The continental free trade area

a GTAP assessment

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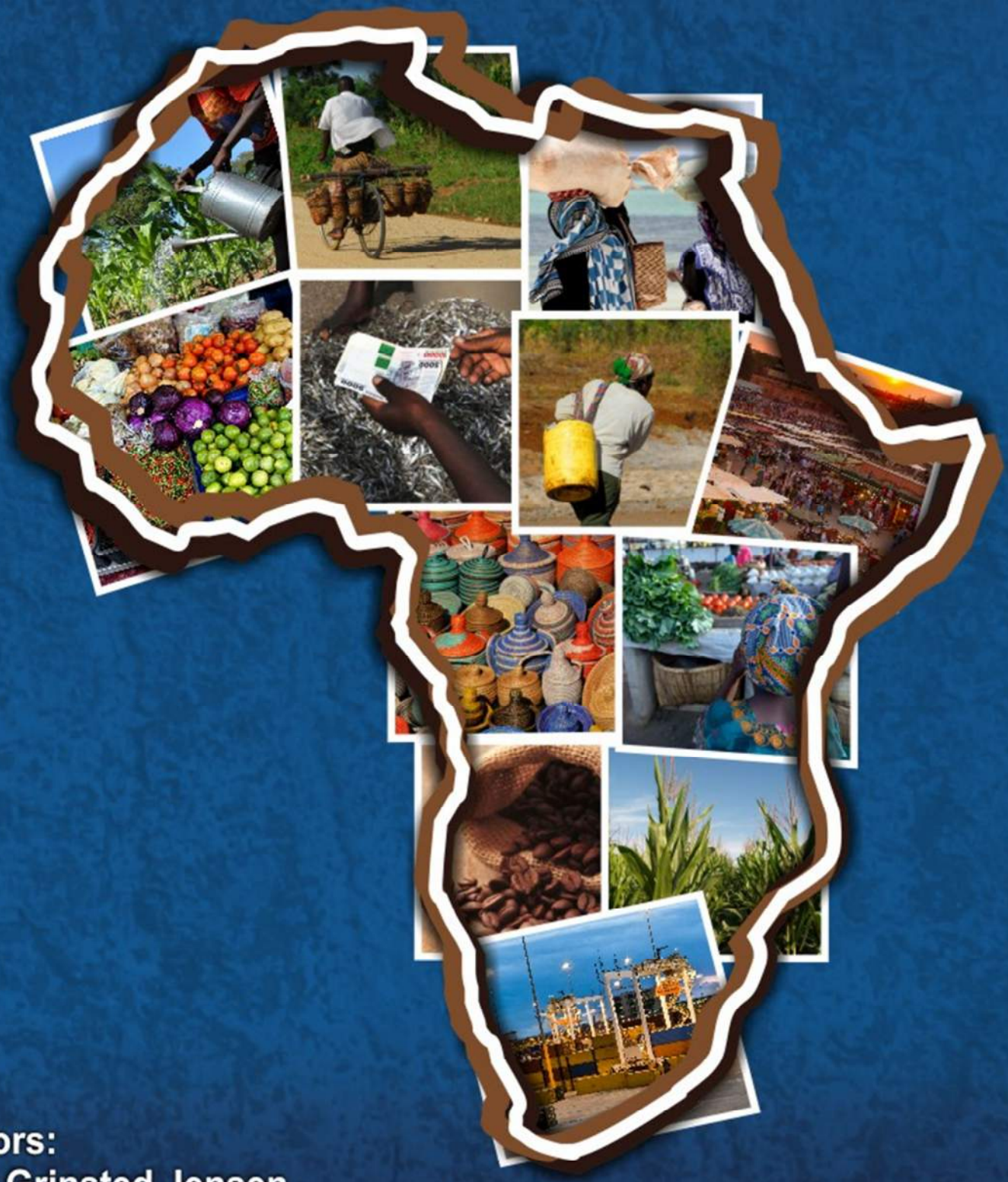

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Chapter 1

African integration[1]

There is considerable interest in the concept of African integration, with the starting point of a continent-wide Free Trade Area (FTA). Recent tralac work (Sandrey et al., 2011; Jensen et al., 2012) has concentrated upon the Tripartite Free Trade Area (TFTA) that to date has examined tariff reductions and a 2% tariff reduction to simulate non-tariff barriers (NTBs). This current research will now take our earlier TFTA analysis further and examine different aspects of an Africa-wide trade integration that extends our NTB analysis significantly. In undertaking this analysis we use the Global Trade Analysis Project (GTAP) model with the Version 9.2 pre-release database, with a trade base year of 2011. Earlier tralac research used Version 8 of the GTAP database with a trade base year of 2007.

Jensen et al. (2012) found that both the full TFTA and the Southern African Development Community (SADC) FTA as the first step along the road to full regional integration are beneficial for South Africa. The intermediate steps of the East African Community (EAC) and the Common Market for Eastern and Southern Africa (COMESA) FTAs are not, but they are almost certainly necessary; however, they are probably not sufficient to ensure a TFTA. Results for the rest of the Southern African Customs Union (SACU) (Lesotho, Namibia and Swaziland) are impressive, while Botswana actually loses. Most other tripartite partners gain, although the aggregation of Angola and the Democratic Republic of Congo (DRC) loses heavily and all countries outside of the agreement lose.

Intra-African trade

One factor that will influence any simulation result is the initial levels of intra-African trade, while another is the initial barriers to this trade. We start by looking at intra-African trade and in subsequent chapters we will look at barriers to this trade such as non-tariff barriers (NTBs) or non-tariff measures (NTMs). This intra-African trade is low, and the data in Table 1 shows just how low by firstly presenting the total values and then the percentage shares of African imports and exports. Row 3 of the table shows the data for the total intra-African trade for 2012 and 2013, and subsequent rows show the data for the top 10 HS 2 product chapters. For 2013, Africa exported $78,475 million to Africa and this represented some 13.3% of African imports and a slightly larger 13.5% of total African exports. By HS chapter, mineral fuels ($18.6 billion) was the largest product by value, and this value represented 19.7% of African fuel imports but only 5.4% of its exports. Chapter 89 (ships and related products) is somewhat misleading. The reason is that although the data suggests that this is a major trade line with significant value, closer examination of the data seems to indicate that much of it is merely the re-exports (rather than new products) of oil-related equipment (rigs, etc.) that is transferred between Angola and neighbouring countries. Note also the discrepancies in the data for HS 71 (precious stones and metals) as the data does not reconcile: tralac research indicates that this is largely a nondisclosure of African trade to the global reporting agencies such as the International Trade Centre (ITC). Vehicles are an interesting entry, with only 8.5% of African

[1] This publication was prepared by Ron Sandrey, tralac Associate and Extra-Ordinary Professor in the Department of Agricultural Economics, University of Stellenbosch, and Hans Grinsted Jensen, Researcher Ph.D. in the Institute of Food and Resource Economics, University of Copenhagen.

imports being from Africa but a significantly higher 36.5% of the exports being destined for Africa. This sector includes vehicle parts, trucks and vans, etc. and is therefore much more than just standard passenger motor cars.

Table 1: Details of intra-African trade, $ (millions) and % shares of imports and exports

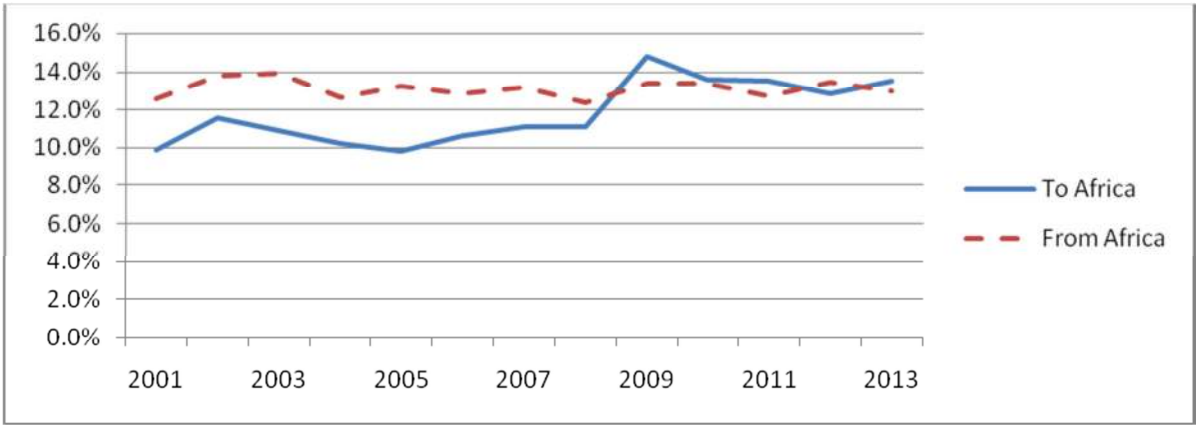
		Africa to Africa $ (millions)		% Africa imports		% Africa exports	
Code	Product	2012	2013	2012	2013	2012	2013
	All products	83,993	78,475	14.7%	13.3%	12.9%	13.5%
27	Mineral fuels	25,820	18,566	26.9%	19.7%	6.6%	5.4%
89	Ships, etc.	4,930	6,319	29.8%	34.1%	73.1%	80.0%
84	Machinery	3,888	4,472	6.0%	6.5%	43.5%	48.0%
87	Vehicles	2,905	4,157	5.6%	8.5%	29.6%	36.5%
71	Precious stone/metal	9,335	3,705	227%	61.7%	20.1%	11.4%
85	Electrical	2,033	2,550	5.0%	5.8%	19.3%	22.1%
72	Iron/steel	1,990	2,102	10.5%	11.0%	22.4%	24.3%
39	Plastics	1,887	1,996	10.5%	10.1%	49.7%	49.4%
73	Articles iron/steel	1,637	1,924	10.2%	11.4%	62.0%	68.5%
24	Tobacco	1,727	1,713	66.4%	66.5%	54.7%	57.1%

Source: ITC

Note that we suspect the exports of HS 89 (ships, etc,) to be biased by what are probably re-exports of oil rigs and related equipment between the Angola-DRC aggregation and immediate neighbouring countries.

Graph 1 shows the changes in intra-African trade over the period from 2001 to 2013. A feature is that there was little overall change in the imports (from Africa), while exports to Africa increased to a new level in 2009 before slowly declining somewhat.

Graph 1: Percentage shares of intra-African trade, 2001 to 2013



Source: ITC

The salient point is that intra-African trade is relatively low, and the question that we are asking in this report is how much further integration and improvements in non-tariff barriers and infrastructure may impact upon both trade and economic welfare.

Destinations and sources of intra-African trade

Table 2 shows the destinations for intra-African exports from 2009 to 2013 inclusive, with the data expressed in dollars (millions) and then in percentage shares of these exports/imports. Note the influence of South Africa – firstly as a major destination itself and then the placing on the table for the next six destinations. Five of these are virtually contiguous with South Africa and suggest that South Africa is likely to be the source of a large percentage of these imports.

Table 2: Destinations of intra-African exports

Importers	2009	2010	2011	2012	2013
Africa $ (millions)	54,316	64,667	73,508	78,138	76,934
South Africa	8.7%	9.7%	10.4%	12.4%	15.9%
Zambia	4.2%	5.2%	5.9%	6.5%	7.9%
Botswana	6.8%	6.6%	6.8%	7.2%	7.2%
Namibia	8.2%	7.0%	7.0%	6.9%	6.7%
Zimbabwe	4.9%	5.4%	7.8%	5.2%	5.8%
Congo	3.3%	2.8%	6.3%	5.0%	5.6%
Mozambique	2.7%	2.2%	3.2%	2.7%	4.6%
Angola	4.5%	3.6%	4.2%	3.0%	3.3%
Morocco	3.1%	3.2%	3.2%	2.9%	3.1%
Libya	1.7%	1.7%	1.9%	3.0%	3.0%
DRC	2.8%	3.7%	3.4%	3.0%	2.9%
Algeria	2.5%	2.0%	2.3%	2.5%	2.7%
Subtotal	53.5%	53.3%	62.4%	60.3%	68.9%

Source: ITC

The hypothesis that South Africa is likely to be the source of a significant percentage of intra-African trade is confirmed in Table 3. The table shows that some 34.9% of this trade originated in South Africa during 2013. Also note that the 2013 figure shows a large difference from the earlier data. We suggest that this is likely due to a more comprehensive reporting from South Africa in that intra-SACU trade is fully included. Nigeria, Egypt and Algeria fill the next three places and, in total, the data shown accounts for 78.2% of the total intra-African exports in 2013.

Table 3: Sources of intra-African exports

Exporters	2009	2010	2011	2012	2013
Africa $ (millions)	54,324	65,529	82,128	83,993	78,475
South Africa	19.4%	18.8%	18.0%	19.1%	34.9%
Nigeria	15.7%	16.0%	15.9%	16.9%	6.1%
Egypt	6.1%	6.2%	5.2%	5.4%	5.6%
Algeria	2.6%	2.8%	2.9%	3.5%	4.4%
Namibia	5.6%	3.8%	3.0%	2.6%	4.4%
Zambia	2.0%	2.2%	2.7%	3.3%	4.2%
Angola	4.3%	4.5%	3.2%	5.8%	4.2%
Zimbabwe	2.8%	3.2%	3.3%	3.7%	4.0%
Kenya	3.9%	3.6%	3.4%	2.6%	2.8%
Tunisia	3.5%	2.9%	2.5%	2.4%	2.6%
Morocco	1.9%	1.9%	1.7%	2.4%	2.5%
Congo	2.9%	2.3%	3.0%	1.7%	2.4%
Subtotal	70.6%	68.3%	65.0%	69.4%	78.2%

Source: ITC

The overall conclusion from this analysis is that 1) intra-African trade is low and not really changing; 2) a large percentage of this trade is concentrated in mineral fuels and a rather suspect category of ships and related vessels; 3) South Africa is the main destination for this trade; and 4) similarly, South Africa is even more dominant as the main source of the trade. This paper will not go into the regional economic communities (RECs) in Africa. Note that intra-SACU trade may account for a significant percentage of this trade and that SADC exports into South Africa are largely duty- and quota-free.

Research on African integration

An excellent background information source on intra-African trade is given in the African Union Commission and Economic Commission for Africa (2012) paper. A particularly telling point the paper makes is that 'intra-African trade owes its current modesty to a lack of diversification and competitiveness', and this statement is backed up by a cataloguing of the raft of barriers such as infrastructural problems in the widest sense. Equally cutting is the final paragraph (paragraph 98) that states in its entirety: 'If there is one single conclusion or recommendation to this end, it would be to emphasise that it is time to move from rhetoric to reality'. Moreover, these statements are backed by some very solid analysis that shows, *inter alia*, shares of country exports to other African countries – shares that range from 71.7% in Mali to 1.8% in Seychelles – and a table showing aggregate protection levels both imposed by and faced by each individual African country. These protection levels show significant differences, and it is the differences in these two factors of intra-African trade and protection levels that will strongly influence the outcome of computer modelling as this is largely determined by barriers and initial trade levels. The notion that tariff barriers are becoming less important than non-tariff constraints is backed up by Fundira (forthcoming) in his analysis of African tariff barriers.

The most comprehensive analytical paper on African integration in recent times is by Mevel and Karingi (2012). They update and extend the African Union Commission and Economic Commission for Africa (2012) paper on the trade and tariff profile for African traders, both

within Africa (intra-African trade) and externally. We will not duplicate that analysis other than to state that in general Africa imposes relatively high tariffs to the rest of the world but enjoys significant preferential access to global markets. This relatively high tariff generalisation is also applicable to intra-African trade despite there being several regional trading preferential arrangements. And, as we saw above, intra-African trade is low, but note that we are using trade data as contained in the GTAP database for the 2011 year. By using the Version 9.2 database we are able to use this 2011 trade foundation and, in addition, the Version 9 database contains new countries such as Kenya and Botswana that are now modelled in their own right. This, along with differences between the Mirage and GTAP models and a different sector aggregation that places more emphasis on agriculture, will make these results difficult to compare with our GTAP results. Moreover, our analysis does not extend to a common external tariff for Africa and we probably take NTBs and related barrier reductions further than Mevel and Karingi although we use similar databases for the infrastructural costs of time in transport.

The Mevel and Karingi results suggest that the FTAs would lead to a stimulation of intra-African trade of 35.7%, while the incorporation of a single Africa-wide FTA would lift this to an increase of 52.3% (or $23.6 billion and $34.6 billion respectively). Most of the increase is in manufacturing products ($27.9 billion) with most of the rest in agriculture. Expressed another way, these changes would see intra-African trade rise from 10.2% to 15.5% in 2022 – an impressive increase but still below the targets set by the African policy goals.

Welfare gains from the Continental FTA (Africa-wide), as expressed in real income rather than GTAP equivalent variation (EV) welfare, are somewhat muted overall. While these overall gains are positive, not all African countries unambiguously gain due to tariff revenue losses, term of trade losses and net food balance changes. In particular, real income losses are reported by Mevel and Karingi for the Angola-DRC aggregation, Malawi, Mauritius, Mozambique, Zambia, Zimbabwe, Botswana and Nigeria, with tariff revenue losses being a factor in most of these countries. In addition, real wages in all categories of African workers increase overall but there is no consistency in these results as wages decline in some countries.

Our analysis: the scenarios

Our base simulation is 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 we extend the analysis in subsequent chapters to simulate a reduction in NTMs (or interchangeably NTBs) in the first alternative run and then extending the analysis further by examining the gains to be made by trade facilitation. For the latter two simulations we use the NTB estimates and those generated by the World Bank (Balistreri 2014a and 2104b) and the 'cost of time' estimates generated by Peter Minor (2013). Thus, we have a series of three separate simulations that we shall write up sequentially as separate chapters.

For the base run these chapters are:

- Chapter 2: Africa-wide, all intra-African tariffs going to zero
- Chapter 3: Africa-wide, a 50% reduction in NTMs
- Chapter 4: Africa-wide, tariffs to zero and a 50% reduction in NTMs combined.

In addition, we run a series of simulations for selected African countries rather than a simulation for a comprehensive continent-wide integration. While our base model is for full African integration and the political goals are firmly based upon this objective we are conscious that

there are major differences in African countries with respect to their economic and political regimes. It is well known that there is a problem with overlapping memberships in the region and furthermore we contend that several countries in the tripartite region are patently not ready for further integration. Jensen and Sandrey (2013) attempted to overcome this latter criticism by modelling only 'willing participants' in the integration. They identified the five SACU members (South Africa, Botswana, Lesotho, Namibia and Swaziland) as being in the 'willing participants' group, along with the EAC members (Kenya, Tanzania, Uganda and Rwanda) and, finally, Egypt. Furthermore, our economic realism is enhanced by the latest GTAP country aggregations which now split Namibia off from 'rest of SACU' as a country in its own right, and similarly in east Africa, Kenya and Rwanda now join Tanzania and Uganda as countries in their own right in our model.[2] We use this earlier eastern African aggregation of Kenya, Tanzania, Uganda and Rwanda as well as the additional countries of Malawi and Zambia in east Africa, Nigeria and Ghana in western Africa and Morocco and Tunisia in northern Africa. We believe this juxtaposition of political economy realism and modelling advances adds realism to our results. We do, however, acknowledge the assumption that we treat the EAC grouping as a fully operational FTA in our modelling work, and while that is valid for SACU it is not necessarily the current case for the EAC.

In this context our additional three chapters are:

a) Chapter 5: an integration of the 'willing participants' only, again with comprehensive tariff elimination between these parties
b) Chapter 6: a reduction in NTBs between these 'willing participants' only
c) Chapter 7: the 'willing participants', tariffs to zero and a 50% reduction in NTMs combined.

We will conclude with:

- Chapter 8: an examination of the implication of the results of reducing the costs in transit for African goods
- Chapter 9: summary, key points and policy implications.

The GTAP simulations[3]

The analysis undertaken here is based upon a variant of the GTAP model to simulate the impact of possible multilateral market access reforms resulting from FTAs involving Africa (the one is Africa-wide and the other involves selected economies only). Regional production is generated by a constant return to scale technology in a perfectly competitive environment, and the private demand system is represented by a non-homothetic demand system (Constant Difference Elasticity function).[4] The foreign trade structure is characterised by the Armington assumption implying imperfect substitutability between domestic and foreign goods. The macroeconomic closure is a neoclassical closure where investments are endogenous and adjust to accommodate any changes in savings. This approach is adopted at the global level, and investments are then allocated across regions so that all expected regional rates of return change

[2] We apologise to Burundi as GTAP does not have this country as a separate entity in the model but rather aggregated into a group called 'rest of East Africa'.

[3] See Hertelet al. (2007) for a discussion of the usefulness of the GTAP in modelling FTAs.

[4] Hence, the present analysis abstracts from features such as imperfect competition and increasing returns to scale, which may be important in certain sectors. We are therefore using what can be thought of as a base GTAP structure.

by the same percentage. Although global investments and savings must be equal, this does not apply at the regional level, where the trade balance is endogenously determined as the difference between regional savings and regional investments. This is valid as the regional savings enter the regional utility function. The quantity of endowments (land and natural resources) in each region is fixed exogenously within the model, while the extent to which labour is employed is endogenously determined. The capital closure adopted in the model is based on the theory that changes in investment levels in each country/region become available on-line instantly, updating the capital stocks endogenously in the model simulation.[5] Finally, the numeraire used in the model is a price index of the global primary factor index.

The applied ad valorem equivalent (AVE) tariff data found in the pre-release GTAP Version 9 database originates from the Market Access Maps (MacMap) database and contains bilateral applied tariff rates (both specific and ad valorem) at the 6-digit Harmonised Systems (HS6) level. These are then aggregated to GTAP concordance using trade weights.

Before simulating the trade policy (FTA) scenario, a baseline scenario implementing trade policy commitments was constructed and projected to the year 2025.

The baseline scenario updates the standard database with a projection of the world economy from 2011 to 2025, applying suitable shocks to Gross Domestic Product (GDP), population, labour and capital, as well as incorporating important developments, realised or planned, since 2011. These developments include our interpretation of the final outcomes of the Economic Partnership Agreements (EPAs) between all African countries and the EU that are currently being implemented.

Shocks are applied to GDP, population, labour force and natural resource extraction to project the world's economy to the baseline year of 2025. After updating the GTAP database to the year 2025 the scenarios are implemented using the updated GTAP database as the base for these simulations. More precisely, the first three modelled scenarios assume that:

- all ad valorem tariffs and ad valorem equivalents of specific tariffs between all African countries are abolished
- NTBs based upon estimates barriers obtained from the World Bank are reduced in isolation from tariff reductions
- a combination of tariff elimination and NTB reduction is simulated.

Differences between the baseline and the primary scenario as measured by the gains in 2025 in 2011 real US dollars are therefore the results of implementation of the sequential FTAs.

The GTAP database/model

The standard GTAP model[6] is a comparative static general equilibrium model: while it examines all aspects of an economy it does not specifically incorporate dynamics such as improved

[5] This is the so-called Baldwin closure as documented in Francois et al. (1997).

[6] See Hertel and Tsigas (1997) for an explanation of the structure of the GTAP model, Hertel et al. (2007) for a discussion of its usefulness in policy making, and Valenzuela et al. (2008) for its sensitivity to modelling assumptions.

technology and economies of scale over time. The economic agents (consumers, producers and government) are modelled according to neoclassical economic assumptions, with both producers and consumers maximising profits and welfare respectively: markets are perfectly competitive and all regions and activities are linked. Results are measured as a change in welfare arising from the reallocation of resources and the resulting change in allocative efficiency; as terms of trade effects; as capital accumulation; and as changes in employment. This change in welfare is based upon a representative household, so unless this is modified it is not possible to examine the distributional aspects other than through the skilled/unskilled labour market closures. The standard GTAP model also does not address the time path of benefits and capital flows. These changes are important as they allow consumers to borrow, which in turn allows consumption patterns to vary over time. The database is the pre-release Version 9.2GTAP database (Badri et al., 2012) with the base year 2011.[7] The main labour market closure of the model has been changed so that the supply of labour is endogenously determined by the labour supply elasticity.

The GTAP model expresses the welfare implications of a modelled change in a country's policy as the EV in income. This measures the annual change in a country's income (gains or losses) from having implemented, for example, an FTA. The EV in this case is simply defined as the difference between the initial pre-FTA scenario income and the post-FTA scenario income, with all prices set as fixed at pre-FTA levels. If a country's EV in income increases due to a policy change, the country can increase its consumption of goods equal to the increase in income and thereby improve the national welfare in the country. Total welfare gains/losses can be decomposed into contributions from improvements in allocative efficiency, capital accumulation, changes in the employment rate of the labour force, and terms of trade (Huff and Hertel, 2000).

Gains from **allocative efficiency** arise from improved reallocation of resources from less to more productive uses. For instance, when import tariffs are abolished, resources shift from previously protected industries towards sectors where the country has a comparative advantage, producing an increase in real GDP and economic welfare.

Terms of trade effects are the consequence of changing export and import prices facing a country. So, when a country experiences an increase in its export price relative to its import price (e.g. due to improved market access), it may finance a larger quantity of imports with the same quantity of exports, thus expanding the supply of products available to the country's consumers. While allocative efficiency contributes to increases in global welfare, the terms of trade affect the distribution of welfare gains across countries; essentially, one country's terms of trade gain is another country's terms of trade loss. The global total must therefore add up to zero, and if a large proportion of the benefit to a country from an FTA is derived from terms of trade effects, this implies transfers to that country from the rest of the world. Note, however, that in our EV we are including a value for the changes in the price and levels of investments and savings (terms of trade on capital) in our terms of trade (ToT) values. This can be a significant portion of the total ToT values.

Capital accumulation summarises the long-run welfare consequences of changes in the stock of capital due to changes in net investment. A policy shock affects the global supply of savings for

[7] The documentation of the Version 8 database can be found on http://www.gtap.agecon.purdue.edu/databases/v8/v8_doco.asp.

investment as well as the regional distribution of investments. If a trade agreement has a positive effect on income through improvements in efficiency and/or ToT, a part of that extra income will be saved by households, making possible an expansion in the capital stock. At the same time, rising income will increase demand for produced goods, pushing up factor returns and thus attracting more investments. Generally, economies with the highest growth will be prepared to pay the largest rate of return to capital, and will obtain most of the new investments. Therefore long-run welfare gains from capital accumulation tend to reinforce the short-term welfare gains deriving from allocative efficiency and ToT.

The welfare effects of changed **employment** rates are the consequence of changes in the employment of the labour force due to changes in the real wage (see also Liu et al., 1998, for a technical discussion). In a situation where the demand for labour and thereby the real wage increases, the amount of labour employed increases, reducing the relative increase in the real wage, thereby increasing the competitiveness of the country's industries.

The GTAP simulations

The countries and regional aggregations used in the model are shown in Table 4a along with their GTAP codes. We have used most of the available African countries in their own right and used the GTAP aggregations for the remainder. Outside Africa we have used the EU27 (minus the United Kingdom which is represented as GBR in its own right), the United States of America (US), the BRIC countries (Brazil, Russia, India and China) and the rest of the world (RoW).

Table 4a: GTAP country/region used and the associated GTAP codes

zaf	South Africa		moz	Mozambique
bwa	Botswana		zmb	Zambia
nam	Namibia		zwe	Zimbabwe
xsc	Swaziland-Lesotho		gha	Ghana
ken	Kenya		tun	Tunisia
tza	Tanzania		sen	Senegal
uga	Uganda		RAfrica	Rest of Africa
rwa	Rwanda		EU	EU27
egy	Egypt		GBR	United Kingdom
mar	Morocco		usa	US
xec	Rest east Africa		chn	China
nga	Nigeria		ind	India
xac	Angola-DRC		bra	Brazil
eth	Ethiopia		rus	Russia
mdg	Madagascar			
mwi	Malawi		row	Rest of world
mus	Mauritius			

Source: GTAP database

For the GTAP sectors we have aggregated the agricultural sectors into primary agriculture and secondary agriculture along with processed sugar that would normally be in the secondary agriculture as the processed output from cane. We used this approach because an analysis of

the results of the simulations from Sandrey et al. (2011) showed that, for agricultural products, sugar was the only sector that resulted in significant gains to South Africa and in a significant loss for Kenya. Manufacturing has retained its full suite of 16 sectors while natural resources and services are merged into their respective aggregated sectors. The focus of this report is on manufacturing, although only those sectors where there is any meaningful change will be reported on in most cases. These GTAP sectors and their associated codes used in this publication are shown in Table 4b.

Table 4b: GTAP sectors and their associated codes

GTAP Sector	Code
Primary agriculture	PAgr
Secondary agriculture	SAgr
Sugar	
Natural resource	nat
Textiles	tex
Clothing	wap
Leather goods	lea
Lumber	lum
Paper products	ppp
Petroleum, gas	p c
Chemical plastic rubber	crp
Non-metal mineral	nmm
Iron steel	I s
Non ferrous	nfm
Fabricated metal	fmp
Vehicles	mvh
Other Transport	otn
Electrical	ele
Other machinery	ome
Other manufacturing	omf
Services	serv

Source: GTAP model

As always, we apply shocks to GDP, population, labour force, and natural resource extraction to project the world's economy to the baseline year of 2025 – a year in which we assume that an FTA could be fully implemented. The projection of the world economy uses the exogenous assumptions listed in Table 5, and this is important in shaping the baseline scenario. The general sources for the assumptions in Table 5 are provided in a footnote to the table, and these assumptions represent the best estimates of the possible future path of the data. Note in particular from Table 5 the projections for real GDP through to 2025, where the relatively strong growth rates for Africa are a feature. They are consistently higher than the low rates projected for the US and the rest of the world and, in particular, those projected for Europe. Indeed, in some cases they are close to or even above the strong growth projections for India and China.

Also note from Table 5 that the population projections for Africa are consistently higher than for non-African projections, and this has the effect of mitigating GDP per head in the medium-term

future. These GDP projections affect the baseline for our computer simulation results for the FTA, as these FTA results are measured as deviations from the baseline that has been driven in part by these GDP projections.

Table 5: GDP assumptions

GDP: Yearly percentage growth				Projections				Changes %	
	2012	2014	2016	2018	2020	2023	2025	total	yearly
South Africa	2.5	1.4	2.8	2.7	2.7	2.7	2.7	42	2.5
Botswana	4.3	4.4	4.0	4.1	4.0	4.0	3.9	77	4.2
Namibia	5.0	4.3	4.6	4.6	4.6	4.6	4.6	88	4.6
Swazi-Lesotho	1.9	2.1	2.1	1.7	1.8	1.7	1.7	30	1.9
Kenya	4.6	5.3	6.4	6.6	6.6	6.6	6.6	131	6.1
Tanzania	6.9	7.2	7.1	6.9	6.9	6.9	6.9	156	7.0
Uganda	2.8	5.9	6.5	6.9	6.9	6.9	6.9	137	6.4
Rwanda	8.8	6.0	7.5	7.5	7.5	7.5	7.5	165	7.2
Egypt	2.2	2.2	3.8	4.0	4.0	4.0	4.0	63	3.6
Morocco	2.7	3.5	5.0	5.4	5.4	5.4	5.4	95	4.9
Rest of east Africa	-1.9	3.1	4.5	5.2	5.2	5.2	5.2	78	4.2
Nigeria	4.3	7.0	7.2	6.9	6.9	6.9	6.9	146	6.7
Angola-Congo	5.5	4.8	6.5	6.7	6.5	6.4	6.4	135	6.3
Ethiopia	8.8	8.2	8.5	8.0	7.9	7.8	7.8	199	8.1
Madagascar	2.5	3.0	4.5	4.5	4.5	4.5	4.5	75	4.1
Malawi	1.9	5.7	5.5	5.0	5.1	5.1	5.1	98	5.0
Mauritius	7.0	6.8	6.7	5.7	8.5	8.6	8.8	192	8.0
Mozambique	7.2	8.3	8.2	8.0	7.8	7.8	7.8	187	7.8
Zambia	6.8	6.5	7.7	6.5	6.7	6.6	6.6	149	6.7
Zimbabwe	10.6	3.1	3.9	4.4	4.4	4.4	4.4	86	4.5
Ghana	8.8	4.5	7.2	5.8	5.1	4.7	4.5	108	5.4
Tunisia	3.7	2.8	4.5	4.5	4.5	4.5	4.5	76	4.1
Senegal	3.4	4.5	5.1	5.1	5.2	5.2	5.2	94	4.8
Rest of Africa	2.2	2.7	2.9	2.5	2.6	2.6	2.6	43	2.6
Total Africa	3.2	3.6	4.6	4.6	4.6	4.7	4.8	82	4.4
EU27	-0.4	1.0	1.8	1.8	1.8	1.8	1.8	22	1.4
UK	0.3	3.2	2.4	2.4	2.4	2.4	2.4	37	2.3
US	2.3	2.2	3.0	2.7	2.7	2.7	2.7	44	2.7
China	7.7	7.4	6.8	6.4	6.5	6.4	6.4	150	6.8
India	4.7	5.6	6.5	6.7	6.7	6.7	6.7	136	6.3
Brazil	1.0	0.3	2.2	2.9	2.9	2.9	2.9	39	2.4
Russia	3.4	0.2	1.5	2.0	1.9	2.0	2.0	27	1.7
Rest of world	5.5	4.3	5.0	5.1	4.9	4.7	4.6	95	4.9
Total world	3.3	3.3	4.0	4.0	4.0	4.0	4.0	69	3.8

Sources: International Monetary Fund; World Economic Outlook Database (October 2014); BASELINE database MaGE model data and projections 1980-2050; Fouré (2012); own assumptions

The GTAP model then determines changes in output through both an expansionary and a substitution effect in each country/region of the model. The expansionary effect represents the effects of growth in domestic and foreign demand shaped by income and population growth and the assumed income elasticities. The substitution effect reflects the changes in competitiveness in each country/region shaped by changes in relative total factor productivity, cost of production, and any policy changes. The GTAP model uses this set of macroeconomic projections to generate the 'best estimate' of global production and trade data for 2025. The relative growth rates of each country/region for GDP, population, labour, capital and total factor

productivity play an important role in determining the relative growth in output of the commodities when projecting the world economy from 2011 to 2025. We can now take the resulting data set from this baseline simulation as the new base for our FTA scenario. A simulation scenario measures the difference between our baseline model's output in 2025 in the absence of, for example, the FTA, against the likely output if an FTA were concluded. The model results shown in this chapter therefore present the isolated effect of a possible FTA or another simulated scenario in the year 2025.

Table 6: Baseline 2011 to 2025: yearly percentage change

Yearly % growth 2011-2027	GDP	Pop	Labour Force	Unskilled labour	Skilled labour	Natural resource	Capital	Total Factor Productivity
South Africa	2.51	0.45	0.87	0.77	2.00	0.96	2.93	0.15
Botswana	4.18	0.84	1.18	1.07	3.37	0.96	4.65	0.45
Namibia	4.60	1.11	0.00	-0.04	0.32	0.96	5.42	0.73
Swaziland & Lesotho	1.90	0.98	1.54	1.44	5.12	0.96	1.74	-0.18
Kenya	6.15	2.53	2.87	2.73	6.05	0.96	6.94	0.53
Tanzania	6.95	3.10	3.20	3.19	5.52	0.96	8.26	0.92
Uganda	6.37	3.02	3.59	3.53	5.07	0.96	7.23	0.61
Rwanda	7.22	2.65	2.84	2.75	6.75	0.96	9.50	1.24
Egypt	3.57	1.45	2.16	1.45	5.78	0.96	3.18	0.09
Morocco	4.91	0.86	1.34	0.80	4.72	0.96	5.27	0.55
Rest of east Africa	4.22	2.14	2.60	2.47	6.44	0.96	4.03	0.12
Nigeria	6.65	2.51	2.67	2.58	5.10	0.96	7.54	1.83
Angola & Congo	6.31	2.51	3.33	3.24	5.96	0.96	6.62	0.75
Ethiopia	8.14	1.88	2.72	2.63	5.42	0.96	9.40	1.57
Madagascar	4.07	2.76	3.27	3.18	5.83	0.96	3.34	0.36
Malawi	4.99	3.29	3.33	3.32	5.52	0.96	5.12	0.46
Mauritius	7.95	0.40	0.24	0.21	1.24	0.96	10.26	1.48
Mozambique	7.82	2.20	2.78	2.73	8.13	0.96	9.21	0.88
Zambia	6.74	3.21	3.21	3.18	5.18	0.96	7.17	0.66
Zimbabwe	4.52	0.77	1.42	1.38	2.63	0.96	5.61	0.53
Ghana	5.36	2.10	2.57	2.57	2.75	0.96	6.92	0.83
Tunisia	4.10	0.85	0.89	0.39	4.04	0.96	4.42	0.44
Senegal	4.84	2.46	3.04	2.93	5.48	0.96	5.04	0.27
Rest of Africa	2.58	2.26	2.56	2.41	5.13	0.96	2.24	-0.04
Total Africa	4.37	-	-	-	-	-	-	-
EU27	1.44	0.11	-0.46	-1.10	1.63	0.96	1.74	0.19
UK	2.30	0.57	0.33	-1.23	3.30	0.96	2.60	0.18
US	2.66	0.79	0.49	-0.33	1.15	0.96	3.87	0.59
China	6.75	0.25	0.08	-0.20	2.94	0.96	7.80	0.98
India	6.32	1.16	1.75	1.51	4.78	0.96	7.39	0.85
Brazil	2.41	0.68	0.90	0.54	4.20	0.96	2.39	0.01
Russia	1.75	-0.19	-0.73	-1.25	-0.35	0.96	2.36	0.34
Rest of world	4.89	0.98	1.20	0.83	2.88	0.96	5.62	0.60
Total world	3.84	-	-	-	-	-	-	-

Source: International Monetary Fund; World Economic Outlook Database (October 2014); own assumptions.

Note: Capital and TFP are endogenously determined by the GTAP model and Version 9 database given the exogenous GDP, population, unskilled, skilled labour and natural resource projections

After updating the GTAP database to the year 2025 the Africa FTA is implemented using the updated GTAP database as the base for this simulation. This enables the gains achieved by implementing the FTA to be put into perspective. Differences between the baseline and the primary scenario as measured by the changes in **2025 as expressed in 2011 real US dollars** are therefore the results of implementation of the African FTA.

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Annex Table 1: GTAP macroeconomic assumptions made (full data)

GDP: Yearly percentage growth							Projection								Changes %	
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	total	yearly
South Africa	2.5	1.9	1.4	2.3	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	42	2.5
Botswana	4.3	5.9	4.4	4.2	4.0	4.1	4.1	3.8	4.0	4.0	3.9	4.0	3.9	3.9	77	4.2
Namibia	5.0	4.3	4.3	4.5	4.6	4.7	4.6	4.7	4.6	4.6	4.6	4.6	4.6	4.6	88	4.6
Swaziland & Lesotho	1.9	2.8	2.1	2.0	2.1	1.8	1.7	1.7	1.8	1.7	1.7	1.7	1.7	1.7	30	1.9
Kenya	4.6	4.6	5.3	6.2	6.4	6.5	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	131	6.1
Tanzania	6.9	7.0	7.2	7.0	7.1	7.0	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	156	7.0
Uganda	2.8	5.8	5.9	6.3	6.5	6.7	6.9	7.0	6.9	6.9	6.9	6.9	6.9	6.9	137	6.4
Rwanda	8.8	4.7	6.0	6.7	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	165	7.2
Egypt	2.2	2.1	2.2	3.5	3.8	3.9	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	63	3.6
Morocco	2.7	4.4	3.5	4.7	5.0	5.3	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	95	4.9
Rest of eastern Africa	-1.9	3.3	3.1	3.7	4.5	5.0	5.2	5.3	5.2	5.2	5.2	5.2	5.2	5.2	78	4.2
Nigeria	4.3	5.4	7.0	7.3	7.2	7.1	6.9	6.8	6.9	6.9	6.9	6.9	6.9	6.9	146	6.7
Angola & Congo	5.5	7.1	4.8	6.4	6.5	6.7	6.7	6.1	6.5	6.4	6.3	6.4	6.4	6.4	135	6.3
Ethiopia	8.8	9.7	8.2	8.5	8.5	8.0	8.0	7.5	7.9	7.8	7.7	7.8	7.8	7.8	199	8.1
Madagascar	2.5	2.4	3.0	4.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	75	4.1
Malawi	1.9	5.2	5.7	6.0	5.5	5.2	5.0	5.0	5.1	5.0	5.1	5.1	5.1	5.1	98	5.0
Mauritius	7.0	6.7	6.8	6.8	6.7	8.9	5.7	10.7	8.5	8.3	9.2	8.6	8.7	8.8	192	8.0
Mozambique	7.2	7.1	8.3	8.2	8.2	7.9	8.0	7.7	7.8	7.8	7.8	7.8	7.8	7.8	187	7.8
Zambia	6.8	6.7	6.5	7.2	7.7	7.0	6.5	6.5	6.7	6.6	6.6	6.6	6.6	6.6	149	6.7
Zimbabwe	10.6	3.3	3.1	3.2	3.9	4.3	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	86	4.5
Ghana	8.8	7.1	4.5	4.7	7.2	6.3	5.8	3.1	5.1	4.6	4.3	4.7	4.5	4.5	108	5.4
Tunisia	3.7	2.3	2.8	3.7	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	76	4.1
Senegal	3.4	3.5	4.5	4.6	5.1	5.1	5.1	5.3	5.2	5.2	5.2	5.2	5.2	5.2	94	4.8
Rest of Africa	2.2	2.3	2.7	2.9	2.9	2.7	2.5	2.5	2.6	2.5	2.5	2.6	2.6	2.6	43	2.6
Total Africa	3.2	3.6	3.6	4.3	4.6	4.6	4.6	4.5	4.6	4.6	4.7	4.7	4.7	4.8	82	4.4
EU27	-0.4	-0.1	1.0	1.5	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	22	1.4
United Kingdom	0.3	1.7	3.2	2.7	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	37	2.3
US	2.3	2.2	2.2	3.1	3.0	3.0	2.7	2.6	2.7	2.7	2.7	2.7	2.7	2.7	44	2.7
China	7.7	7.7	7.4	7.1	6.8	6.6	6.4	6.3	6.5	6.4	6.4	6.4	6.4	6.4	150	6.8
India	4.7	5.0	5.6	6.4	6.5	6.6	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	136	6.3
Brazil	1.0	2.5	0.3	1.4	2.2	2.7	2.9	3.1	2.9	3.0	3.0	2.9	2.9	2.9	39	2.4
Russia	3.4	1.3	0.2	0.5	1.5	1.8	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	27	1.7
Rest of world	5.5	4.9	4.3	4.7	5.0	5.0	5.1	5.2	4.9	4.9	4.8	4.7	4.7	4.6	95	4.9
Total world	3.3	3.3	3.3	3.8	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	69	3.8

Source: IMF and others; own assumption

Annex Table 2: Baseline 2011 to 2025: yearly percentage change (full data)

Yearly % growth 2011-2027	GDP	Population	Labour force	Unskilled labour	Skilled labour	Natural resources	Capital	Total Factor Productivity
South Africa	2.51	0.45	0.87	0.77	2.00	0.96	2.93	0.15
Botswana	4.18	0.84	1.18	1.07	3.37	0.96	4.65	0.45
Namibia	4.60	1.11	0.00	-0.04	0.32	0.96	5.42	0.73
Swaziland & Lesotho	1.90	0.98	1.54	1.44	5.12	0.96	1.74	-0.18
Kenya	6.15	2.53	2.87	2.73	6.05	0.96	6.94	0.53
Tanzania	6.95	3.10	3.20	3.19	5.52	0.96	8.26	0.92
Uganda	6.37	3.02	3.59	3.53	5.07	0.96	7.23	0.61
Rwanda	7.22	2.65	2.84	2.75	6.75	0.96	9.50	1.24
Egypt	3.57	1.45	2.16	1.45	5.78	0.96	3.18	0.09
Morocco	4.91	0.86	1.34	0.80	4.72	0.96	5.27	0.55
Rest of eastern Africa	4.22	2.14	2.60	2.47	6.44	0.96	4.03	0.12
Nigeria	6.65	2.51	2.67	2.58	5.10	0.96	7.54	1.83
Angola & Congo	6.31	2.51	3.33	3.24	5.96	0.96	6.62	0.75
Ethiopia	8.14	1.88	2.72	2.63	5.42	0.96	9.40	1.57
Madagascar	4.07	2.76	3.27	3.18	5.83	0.96	3.34	0.36
Malawi	4.99	3.29	3.33	3.32	5.52	0.96	5.12	0.46
Mauritius	7.95	0.40	0.24	0.21	1.24	0.96	10.26	1.48
Mozambique	7.82	2.20	2.78	2.73	8.13	0.96	9.21	0.88
Zambia	6.74	3.21	3.21	3.18	5.18	0.96	7.17	0.66
Zimbabwe	4.52	0.77	1.42	1.38	2.63	0.96	5.61	0.53
Ghana	5.36	2.10	2.57	2.57	2.75	0.96	6.92	0.83
Tunisia	4.10	0.85	0.89	0.39	4.04	0.96	4.42	0.44
Senegal	4.84	2.46	3.04	2.93	5.48	0.96	5.04	0.27
Rest of Africa	2.58	2.26	2.56	2.41	5.13	0.96	2.24	-0.04
Total Africa	4.37	-	-	-	-	-	-	-
EU27	1.44	0.11	-0.46	-1.10	1.63	0.96	1.74	0.19
United Kingdom	2.30	0.57	0.33	-1.23	3.30	0.96	2.60	0.18
US	2.66	0.79	0.49	-0.33	1.15	0.96	3.87	0.59
China	6.75	0.25	0.08	-0.20	2.94	0.96	7.80	0.98
India	6.32	1.16	1.75	1.51	4.78	0.96	7.39	0.85
Brazil	2.41	0.68	0.90	0.54	4.20	0.96	2.39	0.01
Russia	1.75	-0.19	-0.73	-1.25	-0.35	0.96	2.36	0.34
Rest of world	4.89	0.98	1.20	0.83	2.88	0.96	5.62	0.60
Total world	3.84	-	-	-	-	-	-	-

Sources for BASELINE database: Fouré et al. (2012); own assumptions

Note: Capital and TFP are endogenously determined by the GTAP model and Version 9 database given the exogenous GDP, population, unskilled and skilled labour, and natural resource projections

Chapter 2

The Africa-wide results: hundred percent tariff reduction

Summary and key points

In this chapter we introduce our base scenario simulation whereby we reduce all tariff between all African countries to zero. We show the total gains and then the four components: allocative efficiency, labour, capital, and terms of trade (ToT).

For South Africa, these gains are some $5.74 billion in real terms, and this outcome dominates the results. Kenya is another big gainer ($1,289million), while Uganda gains $683 million. Tanzania's gains are more modest, while the Rwandan gain of $301 million is beneficial. A feature is the very large loss of $1,486 million to Zimbabwe, while in the Angola-Democratic Republic of Congo (DRC) aggregation earlier Global Trade Analysis Project (GTAP) losses are turned into gains of $1,168 million. Zambia gains by a significant $454 million, the gains to Malawi, Mauritius and Mozambique are modest, and those to Madagascar minuscule. Ethiopia reports gains of one-quarter of a billion dollars, while Egypt's and Morocco's gains of $518million and $572million each are very similar. Nigeria gains over two billion dollars, while Ghana and Senegal also report large gains of around one billion dollars each; the 'rest of Africa'[1] shows gains of two billion dollars. Overall, the African Free Trade Agreement (FTA) is globally welfare-enhancing by $7.3 billion. This is an impressive result.

The cells in a bilateral matrix show where each country is making gains or losses. This highlights that many countries gain from their own liberalisation as greater efficiencies flow through their economies. These countries include Kenya (which reforms and compacts its own inefficient sugar sector) and Nigeria, for example, while Zimbabwe loses heavily from its own liberalisation. South Africa is a major gainer in secondary agriculture, as are Namibia, Morocco and Senegal. The rest of Africa gains in both primary and secondary agriculture.

Of interest are the combined textile, clothing and footwear (TCF) sectors; this is because many African countries benefit through improved access into continent-wide markets as tariffs go to zero in the TCF sectors. There are, however, some major losers, including non-African exporters of textiles and leather. However, other global apparel producers actually gain even though they face trade diversion. Virtually all countries and regions gain from duty-free access for vehicles and their parts across Africa, with, as expected, South Africa as the largest African gainer.

Except for Zambia's small decline of less than one percent in both exports and imports and Zimbabwe's decline in imports, both exports and imports increase across the continent for

[1] The 'rest of Africa' includes Benin, Burkina Faso, Cameroon, Ivory Coast, Guinea, Togo and the rest of north, central and west Africa.

all parties. Some of these changes are very large (Rwanda), while others are much smaller (Egypt).

The demand for both skilled and unskilled labour in most of the countries shows increases, with South Africa and Senegal displaying the most significant increases (more than 0.57%).

Tariff revenue for the Southern African Customs Union (SACU) actually increases while at the other extreme tariff revenues into Zimbabwe decline by over one billion dollars. Several other countries have tariff revenue losses of nearly half a billion dollars or even more, but for several larger countries (Egypt, Morocco, Tunisia and Senegal) tariff losses are not an issue.

There are three aspects of the simulation that we examine. The main one is **Zimbabwe** where a major loss is forecast. Tariffs against all African imports decline to zero, reduce Zimbabwe's tariff revenues by over one billion dollars, and set a mechanism in place that results in a welfare loss of $1,471 million. Unfortunately, Zimbabwe has limited abilities to take the opportunities for extra exports in compensation, but the real issue is in the capital market as capital leaves. The **Angola-DRC** aggregation has changed from a small loss in the Tripartite FTA (TFTA) to a significant gain of $1,168 million as the aggregation is becoming more integrated into Africa. The welfare increases are driven by improved access to Africa, and although the aggregation is a major resource exporter there have been increases in the exports of some manufacturing products. There are, however, some possible questions about the trade data. It is very unusual for a country like Russia, which is excluded from an FTA, to make the reported gains from that FTA: we find that Russia is gaining in terms of trade, in the energy sectors in particular. This gain attracts some additional capital and marginally increases employment; this is enough to more than compensate for the usual trade displacement in other exporting sectors.

Introduction and the welfare gains

In this chapter we introduce our base scenario simulation whereby we reduce all tariff between all African countries to zero. Table 1 shows the changes in welfare from the FTAs assuming the scenario of a 100% reduction in merchandise tariffs; the data is expressed in US dollars (millions) as one-off increases in annual welfare at the assessed end point of 2025. This data is presented for all the countries/regions used in the model, and shows, firstly, the total gains and then the four components (allocative efficiency, labour, capital and ToT) discussed in Chapter 1.

For South Africa, these gains are some $5.74 billion in real terms, and, as is usually the case, this outcome completely dominates the results for both Africa and the total world-wide gain of $7.3 billion. These gains for South Africa derive from increased investment which expands the capital stock ($2,261million), allocative efficiency gains of $1,449million as resources are better employed in the economy, gains from increased labour employment ($904million), and ToT improvement ($1,127million) resulting from a favourable change in relative prices between South African exports and imports.

Within SACU, both Botswana and Namibia gain (by $68 and $463 million respectively), while the Swaziland-Lesotho aggregation gains by some $100 million (with the gains spread across most of the factors). Kenya is another big gainer ($1,289million), while Uganda shows a surprisingly large gain of $683 million. Gains for Tanzania are more modest compared with those for Uganda, while the Rwandan gain of $301 million is impressive.

Looking at other countries in east Africa the main feature is the very large loss of $1,486 million to Zimbabwe, a loss that we will examine in more detail later. In contrast to earlier GTAP analysis the Angola-DRC aggregation gains by $1,168 million. We will also examine this swing from a loss to an impressive gain. Zambia gains by a significant $454 million, while the gains to Malawi, Mauritius and Mozambique are modest. Madagascar reports a minuscule loss that means virtually no change. Ethiopia, straddling north and east Africa, reports solid gains of one-quarter of a billion dollars.

Egypt's and Morocco's gains of $518million and $572million respectively are very similar, while their fellow north African country of Tunisia gains by a smaller $357million. Nigeria is a big gainer of over two billion dollars, while Ghana and Senegal also report large gains of just under and just over one billion dollars each. Finally, in Africa, the 'rest of Africa'[2] shows gains of two billion dollars split between the members. Those outside Africa, as is usually the case, lose as their trade is reduced in favour of intra-African trade. The EU (and the UK), China, India, and the 'rest of the world' are big losers overall but perhaps not in the context of the size of their economies. The US is a relatively modest loser, although its initial presence in Africa has not been as visible as that of the Europeans. Surprisingly, Russia gains by over half a billion dollars, and we discuss this result below. Overall, the African FTA is globally welfare-enhancing by $7.3 billion – an impressive result.

[2] The 'rest of Africa' includes Benin, Burkina Faso, Cameroon, Ivory Coast, Guinea, Togo and the rest of north, central and west Africa.

Table 1: Complete intra-African tariff elimination, welfare gains at 2025, $(millions)

Country	Total	Efficiency	Labour	Capital	ToT
South Africa	5,742	1,449	904	2,261	1,127
Botswana	68	11	20	44	-7
Namibia	463	23	50	286	104
Swazi-Lesotho	100	17	18	50	16
Kenya	1,289	264	84	959	-18
Tanzania	377	204	26	132	15
Uganda	683	147	40	403	93
Rwanda	301	78	15	133	75
Egypt	518	100	37	257	124
Morocco	572	105	56	195	216
Rest of east Africa	15	68	-19	6	-40
Nigeria	2,031	506	445	933	148
Angola-DRC	1,168	323	40	815	-9
Ethiopia	255	79	20	180	-24
Madagascar	-1	1	0	-1	-2
Malawi	41	20	2	26	-8
Mauritius	76	12	4	40	20
Mozambique	14	7	6	36	-35
Zambia	454	123	65	129	137
Zimbabwe	-1,486	-203	-49	-480	-755
Ghana	813	264	47	257	245
Tunisia	357	99	25	146	87
Senegal	1,211	332	47	618	213
Rest of Africa	2,012	1,249	142	779	-159
EU	-2,386	-720	-121	-830	-715
UK	-364	-136	-25	-93	-111
US	-726	-149	-145	-206	-226
China	-2,351	-310	-138	-1,233	-670
India	-1,539	-336	-28	-723	-452
Brazil	-188	-58	-30	-98	-3
Russia	553	111	6	167	269
Rest of world	-2,771	-943	-241	-1,876	289
Total world	7,299	2,738	1,304	3,311	-54

Source: GTAP

The unilateral and bilateral gains and losses

In Table 2 we highlight from where the main bilateral gains derive from for the major African countries as measured by the welfare gains in Table 1. The data is shown in a matrix of the full range of countries in the rows but only selected countries in the columns. The cells are to be read as follows: in the column headed South Africa (zaf) there is a small loss from unilateral liberalisation ($-74 million), but that is much more than compensated for by large gains from reforms in Kenya (ken) of $732 million, Angola and the DRC aggregation (xac) of $572 million and Zimbabwe (zwe) of $1,027 million. Kenya is interesting in that it

makes large gains ($480 million) from its own liberalisation, while Ghana ($743million) and the rest of Africa ($756million) gain from liberalisation in Nigeria. Similarly, Nigeria makes large gains from access into Ghana. Further down the table Zimbabwe loses heavily ($1,472million) from its own liberalisation, and its problem is that it has no compensatory gains coming from trade access into any other country. This is likely to be because (a) most of its exports are already duty-free to South Africa and (b) because it has little productive capacity to take advantage of better access into other countries where there were previously tariff barriers. Other interesting cells include the gains to Uganda from access into rest of Africa ($558million from a total of $683million) and, similarly, Senegal's gains are concentrated in the rest of Africa ($1,066million from a total of $1,211million). Also, countries such as Egypt and to a lesser extent Morocco (mar) 'spread their wings' and trade much more actively to countries right across Africa. Finally, note that (a) the rows will not add up as the minor countries have been omitted, and (b) that 'outside' refers to those countries/regions outside Africa. This latter column shows the impacts that liberalisation in each African country has upon the 'outside' world via direct trade and production changes, second and subsequent effects and the effects on capital as the corollary of an increase in African capital flows that must be balanced by both marginally reduced capital stocks 'outside' the FTA.

Table 2: Contribution to welfare by country, $(millions)

Code	zaf	nam	ken	uga	egy	mar	nga	xac	zmb	zwe	gha	sen	Rafrica	Outside
zaf	-74	-1	63	13	133	35	16	0	1	-1	3	4	10	-421
bwa	-1	0	2	0	1	0	4	0	0	0	0	0	0	-9
nam	-1	1	1	0	2	0	1	1	1	0	0	0	1	-5
xsc	-2	0	1	0	3	1	1	0	0	0	0	0	4	-13
ken	732	-1	480	-2	-65	5	23	1	-2	-7	0	-1	32	-517
tza	466	1	-91	-9	91	3	7	26	8	-5	1	0	4	-504
uga	150	0	-55	107	-10	3	7	1	-2	-1	1	0	14	-42
rwa	25	0	-10	-8	-1	0	-1	0	-2	0	0	0	19	-9
egy	51	0	0	0	21	0	19	4	-1	0	2	0	43	-107
mar	17	0	3	0	6	-22	40	18	0	0	8	1	35	-37
xec	225	92	9	11	12	4	183	3	-1	5	2	1	20	-257
nga	372	10	33	2	114	42	19	162	-1	-2	743	32	756	-2,740
xac	572	275	4	1	19	54	83	217	-3	15	5	19	257	-1,350
eth	35	0	110	3	67	-1	0	0	-1	0	0	4	0	-522
mdg	4	0	0	0	0	4	0	0	0	0	0	0	0	-11
mwi	164	1	-31	0	0	0	5	1	-6	-6	0	0	6	-3
mus	20	0	-1	0	0	0	0	1	0	0	0	0	0	-11
moz	136	-2	22	1	13	0	2	1	1	-5	0	0	2	-194
zmb	37	1	-2	0	-1	0	6	0	9	-2	1	0	14	-30
zwe	1,027	10	-30	-1	2	3	50	24	-20	-1472	3	1	45	4,479
gha	252	1	29	3	76	33	438	42	-2	-2	-146	60	412	-690
tun	15	0	9	3	-1	0	16	6	0	0	4	0	37	-71
sen	35	1	1	0	22	51	26	2	0	0	8	24	53	-239
Rafrica	1,485	75	741	558	15	358	1,086	659	473	-3	181	1,066	248	-6,470
Total	5,742	463	1,289	683	518	572	2,031	1,168	453	-1486	813	1,211	2,012	-9,773

Source: GTAP output

The GTAP sectors

Table 3 shows the matrix of GTAP sectors in the rows and contributions that changes in each of these sectors make in the cells for the major African countries. The 'outside' losses are indicated in the right-hand column.

South Africa does particularly well from agricultural reforms across the continent, especially from secondary agriculture. Sugar has been listed as a separate sector in this analysis to re-examine the outcomes from earlier tralac research that shows that South Africa is also doing very well in this sector – especially with better access into Kenya and, to a lesser degree, Uganda. The Swaziland-Lesotho aggregation is not shown. While we would expect them to do well in increased sugar exports this is not the case: this is so because South Africa dominates. Note that Kenya and, to a lesser extent, Uganda also makes significant gains in the sugar sector: the reason is that both reduce their sugar production significantly as shown in Table 5.This enables them to transfer resources out of a sector which has been heavily protected but is technically inefficient. Here is a classic example of how regional integration can benefit a country through efficiency gains, as the overall welfare results for these two countries clearly show that reforming the sugar sector is beneficial to them. Other major gainers in secondary agriculture are Namibia, Morocco and Senegal, while the rest of Africa gains in both primary and secondary agriculture. Note in particular that secondary agriculture in Zimbabwe takes a large hit, and we would hypothesise that imports from South Africa in particular into a heavily protected sector are impacting on Zimbabwe's secondary (but not primary) agriculture.

Before examining the other sectors we would like to note that the contribution from natural resources shows little change. Trade, both exports and imports, in this sector concentrates on coal, oil and gas products, and forestry. In general, tariffs are very low or zero across the continent on imports and hence there are very limited welfare gains from improved access.

We will just comment on two other commodities. One is the combined textile, apparel and footwear sectors (as represented by tex, wap and lea in GTAP) and the other is motor vehicles and their parts (mvh). Both of these are at the heart of African industrialisation. Many African countries benefit through improved access into continent-wide markets as tariffs go to zero in the TCF sectors. These include South Africa and Kenya across the three sectors, Egypt in apparel, Nigeria in leather and the rest of Africa (probably the cotton producers of west Africa) in textiles. There are, however, some major losers, and in particular Zimbabwe loses across all sectors and the rest of Africa in leather. For 'outside', it is interesting that while textiles and leather (footwear) producers lose significantly the 'outside' apparel producers actually gain even though they face trade diversion.

All countries and regions shown, including 'outside' (but again with the exception of Zimbabwe) gain from duty-free access for vehicles and their parts across Africa. As expected, South Africa as the major producer is the largest African gainer, while many gain from presumably better access for both vehicles and parts. Again, Zimbabwe's vehicle sector suffers a massive loss.

Table 3: Contribution to welfare by commodity, $(millions)

	zaf	nam	ken	uga	egy	mar	nga	xac	zwe	gha	sen	Rafrica	Outside
PAgri	329	3	44	17	11	12	21	36	9	64	12	353	-797
SAgri	1,032	238	130	51	47	273	59	-52	-474	28	405	229	-1,323
Sugar	591	-2	558	103	-18	-1	11	37	-8	0	10	-10	-866
nat	15	20	5	1	4	4	48	29	12	12	6	33	-210
tex	209	31	94	39	70	17	59	71	-178	67	22	152	-410
wap	42	4	19	-2	123	25	2	23	-146	-15	5	22	132
lea	73	5	140	47	0	-1	494	-12	-58	39	2	-178	-501
lum	95	42	32	43	8	5	25	34	-81	6	21	50	51
ppp	173	1	12	3	32	49	7	21	-55	8	18	3	-192
p_c	244	0	1	1	24	2	30	147	1	13	7	155	-644
crp	631	24	96	35	61	19	340	3	26	209	110	206	-2,018
nmm	95	8	33	103	4	5	52	-2	-12	25	390	164	-1,190
i_s	162	0	31	77	6	0	34	17	13	29	47	108	-535
nfm	60	0	19	0	-2	1	107	5	10	24	14	-6	-261
fmp	441	20	19	24	61	21	67	146	-65	17	11	43	-279
mvh	573	29	11	86	15	9	63	48	-308	6	22	130	403
otn	56	7	4	11	2	1	135	210	-9	2	5	183	-183
ele	125	17	16	12	3	8	154	19	-20	29	5	17	-77
ome	672	12	14	19	63	102	301	387	-73	155	82	332	-649
omf	121	3	12	13	2	21	21	2	-71	96	19	28	-222
Total	5,742	463	1,289	683	518	572	2,031	1,168	-1486	813	1,211	2,012	-9,773

Source: GTAP output

Changes in African trade

Table 4 turns to the expected changes in aggregate trade as measured by the percentage changes in the quantities of both exports and imports and changes to the overall trade balance as measured in dollars (millions). Note that the trade balance in the right-hand column is a macroeconomic closure in the GTAP model. It is heavily influenced by the difference on one side of an equation that measures savings and investment and which has to balance with exports minus imports on the other side of the classic macroeconomic equation. It is therefore not a trade balance as could be expected as it reflects changes in investment (capital) rather than actual changes in trade values.

The terms of trade as shown in Table 1 reflect the changes in the relative prices of exports and imports and their contribution to total welfare changes in each country. The export and import changes shown here in Table 4 are percentage changes to quantities traded and the change in the value of the trade balance.

Except for Zambia's small decline of less than one percent in both exports and imports and Zimbabwe's decline in imports, both exports and imports increase across the continent for all parties. Some of these changes are very large, with Rwanda the best example, while changes in other countries such as Egypt are much smaller. Note, however, that these are percentage changes and there are large differences in the original trade bases.

Table 4: Percentage changes in trade for the partners

	Exports %	Imports %	Balance $m
South Africa	2.7	3.5	-7
Botswana	1.1	1.8	46
Namibia	2.6	5.0	135
Swazi-Lesotho	2.4	3.6	25
Kenya	5.7	4.5	-450
Tanzania	3.7	3.2	-166
Uganda	4.3	6.4	-125
Rwanda	10.1	13.8	-45
Egypt	0.3	0.4	-110
Morocco	0.8	1.1	-216
Rest of east Africa	2.0	1.4	11
Nigeria	1.7	2.0	-28
Angola-DRC	2.1	3.1	-5
Ethiopia	3.6	2.5	-69
Madagascar	0.2	0.2	0
Malawi	4.2	3.5	-8
Mauritius	0.9	0.9	-28
Mozambique	1.0	0.7	-18
Zambia	-0.7	-0.9	209
Zimbabwe	32.7	-2.4	1,036
Ghana	9.1	7.0	-422
Tunisia	1.0	1.2	-38
Senegal	8.2	9.4	-440
Rest of Africa	2.8	2.8	-407
EU	-0.017	-0.031	21
UK	-0.010	-0.024	57
US	-0.007	-0.016	214
China	-0.021	-0.073	155
India	-0.044	-0.123	242
Brazil	-0.022	-0.032	1
Russia	0.000	0.048	67
Rest of world	-0.013	-0.017	366

Source: GTAP output

At the bottom of Table 4 we have included the trade effects on the 'outside' countries and regions. We have shown these changes at three decimal places as they are marginal. Only Indian imports reduce by more than 0.1% as more African trade is diverted to intra-African trade. They are, however, based upon large initial trade flows, so the values shown reflect more importance when this is taken into account. We commented earlier on the Russian reaction to African integration and noted from Table 1 the welfare gains to Russia and the role that better terms of trade were playing in this outcome.

Production outcomes

Changes to **production** in the partner countries are shown in Table 5 (again expressed as changes from the non-FTA base) and, as expected, these changes largely reflect the sector contributions to welfare changes as shown in Table 3. The top two rows show that the demand for both skilled and unskilled labour in most of the countries shown increases. South Africa and Senegal display the most significant increases (more than 0.57%). This will make

a significant change to the unemployment rate in both countries. Again, Zimbabwe loses one percent of its workforce.

In the agricultural commodities, secondary agriculture and sugar are again the standout sectors across the FTA. For secondary agriculture there are some impressive increases in production from South Africa, Kenya, Uganda and Senegal. The declines in Zimbabwe are again highlighted. We have discussed the sugar sector, and the production increases in South Africa, and declines in Kenya and Uganda are large.

Changes to the trade in TCF and vehicles were shown in Table 3 and discussed at that point. The changes in production in Table 5 largely reflect these trade flows but, as reported earlier, these changes may be off small initial bases. As a generalisation, most of the countries shown increase production in most but not all sectors and, interestingly, production in Zimbabwe does not collapse in all sectors. Although we are not modelling changes to service barriers, it should be noted that there are increases for most countries in their service sectors, and these are likely to involve, at least in part, trade-related services such as transport.

Table 5: Increases in factors of production and actual production, %

	zaf	ken	uga	nga	xac	zwe	sen	Rafrica
Unskilled labour	0.57	0.29	0.32	0.15	0.09	-0.93	0.64	0.08
Skilled labour	0.57	0.38	0.35	0.21	0.10	-0.97	0.68	0.07
Capital	1.39	3.79	4.04	0.86	1.04	-9.42	6.42	0.78
Primary agriculture	0.39	0.60	0.31	0.07	-0.15	1.51	-0.04	0.22
Secondary agriculture	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
Natural resource	-0.35	0.31	-0.48	0.01	-0.02	2.54	0.55	0.09
Textiles	3.77	6.54	8.33	2.66	2.28	-20.28	2.81	3.24
Clothing	1.11	2.32	-1.63	0.03	1.60	-23.90	3.44	0.78
Leather goods	1.79	17.37	-3.15	13.60	-3.88	-38.05	-0.31	-10.23
Lumber	3.20	4.37	11.50	0.87	1.32	-10.94	5.63	0.53
Paper products	1.93	1.81	0.94	0.28	1.27	-4.43	2.99	-0.28
Petroleum, gas	4.15	2.98	0.90	0.51	-2.91	3.52	7.20	1.53
Chemical, plastic, rubber	1.58	6.57	3.61	8.76	0.28	26.77	0.97	1.61
Nonmetal mineral	1.82	2.98	12.50	11.70	0.08	-12.46	31.95	-2.64
Iron, steel	0.65	11.39	35.41	7.23	1.31	33.05	9.24	1.35
Nonferrous	-5.96	6.74	-0.46	4.07	1.19	38.42	-9.04	1.30
Fabricated metal	4.99	4.77	10.96	1.98	4.54	-8.11	3.10	-0.38
Vehicles	2.43	2.10	10.89	0.19	1.32	-5.69	23.97	2.34
Transport	0.86	2.84	0.85	1.25	4.22	1.16	0.91	9.44
Electrical	1.08	3.08	6.45	0.56	1.28	6.07	0.84	0.53
Other machinery	0.69	1.91	2.23	0.94	6.22	15.65	22.33	2.24
Other manufacture	0.97	2.98	86.43	1.41	0.11	-17.99	4.85	0.78
Services	1.17	2.45	2.40	0.39	0.77	-5.48	4.85	0.46

Source: GTAP output

Some technical economic results

Table 6 shows some more technical outcomes relating to the simulation. In effect, it shows that the changes are mostly increasing real Gross Domestic Product (GDP). Most ToT improve as relative export prices rise more than import prices, and this mostly increases the returns from factor income such as the standard land, labour and capital. Table 1 shows the contributions to welfare from ToT expressed in dollar values, while Table 6 shows the same changes expressed as a ratio. The very important result of increases in real GDP are shown here, and some of these are large – the EAC countries and Senegal in particular. At the risk of becoming repetitive we point out that Zimbabwe drops 4.55% of its real GDP as the Africa-wide tariff elimination impacts massively on the economy.

The contributions from skilled and unskilled labour are often large, but we emphasise that these changes are not the same as those shown in Table 5 above, which reflect the changes in employment levels. The data shown below is the contribution that changes in the total wage bill makes to total factor income. In this version of the model we use a 'closure' or assumption that the wage bill is split between increased wages for those in work and new employment, with this based upon the unemployment rate in each country. In earlier tralac work we have shown that for South Africa the total welfare benefits are increased significantly if the wage bill is directed into increasing employment rather than into increased wages. This is a powerful policy outcome from GTAP.

Table 6: Changes in ToT, real GDP and total factor income along with contributions to factor income by %

	ToT	Real GDP	Total factor income	Contributions from land	unskilled	skilled	capital	resource
zaf	0.85	1.01	2.19	0.11	0.51	0.65	0.97	-0.05
bwa	0.23	0.36	1.13	0.07	0.40	0.17	0.61	-0.13
nam	2.18	2.11	5.08	0.28	1.32	0.57	2.84	0.07
xsc	0.76	1.30	2.47	0.26	0.59	0.55	1.18	-0.11
ken	-0.03	1.99	2.72	-0.06	0.75	0.43	1.52	0.09
tza	0.15	0.62	0.90	0.03	0.33	0.23	0.30	0.01
uga	1.42	2.15	3.96	0.26	1.11	0.64	2.03	-0.08
rwa	3.01	1.54	8.06	1.70	3.26	1.12	2.27	-0.29
egy	0.11	0.12	0.30	0.00	0.05	0.09	0.15	0.01
mar	0.36	0.26	0.76	0.04	0.25	0.22	0.25	-0.02
xec	-0.08	0.05	-0.14	0.01	-0.07	-0.09	-0.06	0.07
nga	0.11	0.32	0.69	0.10	0.21	0.18	0.18	0.02
xac	-0.05	0.54	0.70	0.00	0.12	0.15	0.43	-0.01
eth	-0.08	0.36	0.44	0.09	0.11	0.03	0.18	0.03
mdg	-0.04	0.00	0.00	-0.01	-0.01	0.00	0.00	0.01
mwi	-0.20	0.52	0.90	0.26	0.21	0.16	0.26	0.03
mus	0.21	0.25	0.57	0.04	0.15	0.09	0.28	0.01
moz	-0.24	0.18	0.28	0.04	0.07	0.04	0.11	0.03
zmb	1.07	0.96	2.76	0.32	0.98	0.68	0.87	-0.09
zwe	-5.97	-4.55	-12.66	0.45	-3.95	-3.11	-6.61	0.55
gha	0.97	0.82	2.27	0.10	0.67	0.92	0.64	-0.06
tun	0.28	0.40	0.81	0.03	0.18	0.20	0.37	0.03
sen	2.15	4.16	7.42	0.46	1.69	0.83	4.11	0.33
Rafrica	-0.07	0.45	0.57	0.09	0.14	0.10	0.15	0.08

Source: GTAP output

Tariff revenues

In our final table (Table 7) we show the changes to tariff revenues by country. Three cells or sets of cells are important. In the second row we see that tariff revenue for SACU actually increases. This is because (a) imports into SACU from the Southern African Development Community (SADC) are already duty-free, (b) trade with other African countries is either limited or duty-free as with oil imports from Angola, and (c) South Africa imports more goods from 'outside' as its economy in particular grows. Next we see that tariff revenues into Zimbabwe decline by over one billion dollars, and this is because Zimbabwe has very high initial tariffs and surcharges against African imports despite being a member of the SADC FTA. Finally, for several other countries there are tariff revenue losses of nearly half a billion dollars or even more. We would, however, also note that for many larger countries (Egypt, Morocco, Tunisia and Senegal) tariff losses are not an issue.

Table 7: Changes to tariff revenues

Country	Change revenue $ (million)
SACU	167
Kenya	-416
Tanzania	-445
Uganda	-85
Rwanda	-3
Egypt	-25
Morocco	-16
Rest of east Africa	-273
Nigeria	-681
Angola-DRC	-602
Ethiopia	-165
Madagascar	-3
Malawi	-101
Mauritius	-6
Mozambique	-88
Zambia	-20
Zimbabwe	-1,123
Ghana	-382
Tunisia	-20
Senegal	-29
Rest of Africa	-2,573

Source: GTAP output

Zimbabwe, Angola and DRC, and Russia

Zimbabwe

In earlier tralac research assessing the welfare gains of the TFTA Jensen and Sandrey (2011) showed that there was a small loss of $10 million to Zimbabwe from their simulation using Version 8 of the GTAP database. This loss was not alone in the region as several of the potential TFTA members similarly registered small losses. The Version 8 database used as its foundation 2007 trade and 2004 tariffs, and the assumption was made that the SADC FTA

was fully operational, meaning that goods from SADC were entering Zimbabwe duty-free. This is patently not the case now.

Data from Version 8 showed that Zimbabwe was importing goods to the value of some $3.4 billion from all sources in 2007, while according to the Version 9 database Zimbabwe was importing some $9.2 billion in 2011with over 50% of these imports from Africa. Therefore between the two GTAP versions Zimbabwe's trade had picked up significantly. However, more importantly, in recent times Zimbabwe has been implementing import tariff surcharges from all sources, including South Africa. Until recently the bilateral South Africa-Zimbabwe trade was the largest bilateral flow in Africa, but this has just been overtaken by the South Africa-Mozambique bilateral. Thus, according to the most recent data Zimbabwe has duty-free access into South Africa but heavy duties/surcharges on South African imports. At the same time, Zimbabwe is becoming less engaged with Africa for exports but remains at about the same level of engagement for imports.

When the tariffs against all African imports (and South African imports in particular) decline to zero this reduces Zimbabwe's tariff revenues by over one billion dollars. This in turn is a factor in setting a mechanism in place that will result in a welfare loss to Zimbabwe of $1,471 million. Unfortunately, Zimbabwe has limited abilities to take the opportunities for extra exports to Africa in compensation; this is due to the fact that exports to the dominant market of SACU were already duty-free. There are only compensatory export-driven gains of $47 million. Examining the GTAP output we see that secondary agricultural imports from South Africa alone increases by some $396 million as the tariff on these imports fall from 28% to zero while, similarly, motor vehicle imports from South Africa increase by $273 million as duties in this sector fall from 32% to zero.

Meanwhile the real action is taking place in the capital market. This is as much a function of the GTAP model as it is of the real world facing Zimbabwe. What normally occurs in an FTA as welfare increases is that more capital is attracted from outside as a booming economy increases returns to capital employed in the economy. This capital flow contributes significantly to the welfare gains for all of the African countries except Zimbabwe (as shown in Table 1 of Chapter 2). However, for Zimbabwe, the reverse takes place (declining GDP); capital leaves the country and this contributes around $480million to Zimbabwe's loss of $1.48 billion. In addition, given the GTAP model structure for the terms of trade data shown earlier as expressed as Equivalent Variation (EV) in Table 1 we find that investment and savings changes contribute some $475 million to the $755 million terms of trade loss for Zimbabwe.

Angola and the DRC (xac)

This aggregation has changed from making a small loss in the Jensen and Sandrey (2011) outcome from the TFTA to a significant gain of $1,168 million in the current Africa-wide simulation. The background to this change is in some ways the opposite of the Zimbabwe scenario, as this aggregation is becoming more integrated into Africa. In the 2007 Version 8 of the GTAP database only 4% of the combined exports were to Africa, but in using Version 9 2011 data this had increased to 11%.Similarly,xacshowed an increase from 5% to 18% in

intra-African imports. Importantly, this GTAP 'country' is in fact an aggregation of two economies: Angola and the DRC. This situation complicates the disentanglement of the GTAP results. Also note from Chapter 1 that xac is one of the African economies with projected growth rates through to 2025 that rival the dynamic Asian growth projections. Indeed, Angola itself has been one of the fastest growing economies in recent years. These growth rates dramatically change the patterns and profiles of emerging economies.

The welfare increase of $1,168 million, one of the highest from Table 1, comprises a contribution of $217 million from the aggregation's own liberalisation and $1,170 of improved access to other African countries/regions, minus a balancing figure of $219 million from intra-African competition. By GTAP country/region these African gains derive mostly from liberalisation in Nigeria, itself (the Angola-DRC aggregation), and the rest of Africa. Conversely, countries that gained from liberalisation in the xac concentrated on South Africa, Namibia, rest of Africa, itself, and Nigeria plus, rather surprisingly, Morocco.

Although the aggregation is a major resource exporter, with few tariffs associated with these exports, there have been increases in the exports of other manufacturing products (ome) to a range of diverse African markets that include Nigeria, the rest of Africa, Ghana, Mozambique and Tanzania that benefit from tariff elimination. Other exports in manufacturing are concentrated in the other transport (otn) sector. Here the GTAP database suggests that this is an internal export –from Angola to the DRC. However, analysis of the ITC database suggests that these exports are from Angola to Congo, not the DRC, but as there are no tariffs involved it becomes a little academic. Similarly, the other GTAP manufacturing export is fabricated metal products (fmp) to itself or between Angola and the DRC.

In summary, despite some possible questions about the trade data it is clear that the aggregation has become more integrated into Africa and consequently there is a much more solid base to use for enhanced gains from African trade liberalisation.

Russia

It is very unusual for a country excluded from an FTA to make the reported gains from that FTA as are shown by Russia. It behoves us to understand why this is happening against the odds. Russia is gaining in ToT, and in the energy sectors in particular. This then attracts some additional capital and marginally increases employment. Overall, this is enough to more than compensate for the usual trade displacement in other exporting sectors. Aggregate exports remain the same (as do imports), and the Russian GDP actually increases by a small 0.013% of GDP at a time when others outside Africa are declining. The positive effects are second and subsequent round impacts, and in Russia's case a key driver is the changes in Zimbabwe and, to a lesser extent, the rest of Africa.

References

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Chapter 3

The Africa-wide results: fifty percent reduction in non-tariff barriers

Summary and key points

Trade liberalisation increasingly focuses on non-tariff barriers (NTBs). In earlier tralac research we modelled the impacts of these NTBs where we simulated changes in NTBs as an across-the-board reduction of two percentage points in the ad valorem (AV) tariff rate. These exercises have shown that reducing NTBs makes a significant contribution to economic welfare. In this chapter we will not change actual tariffs but rather reduce NTBs by 50%. Crucially, we are becoming much more sophisticated by changing our earlier 'blanket' (or common two percentage points) estimate to using the ad valorem equivalents (AVEs) for both agricultural goods and manufacturing goods as provided by the World Bank. This new database provides tariff equivalents for most Global Trade Analysis Project (GTAP) countries, and, importantly, these estimates vary (often widely) by country and between agriculture and manufacturing within a country. The use of this database therefore enables a much more accurate estimate of the costs of these barriers than our earlier two percentage points estimates.

The World Bank has decomposed trade costs into three categories, namely costs that can be lowered by (1) **trade facilitation**, (2) **non-tariff barriers**, and (3) the costs of **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 licences, quotas and bans; price control measures; competition restrictions; and technical barriers to trade (and do not include customs delays). Poor business services relate to improvements in business associated with trade costs. We examine only NTBs here and leave trade facilitation costs to Chapter 8.

The results in the form of welfare gains show that South Africa's gains of $2,690 million are only 47% of the 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 Angola-Democratic Republic of Congo (DRC) aggregation are now very close behind at around $2 billion each. Several countries gained more from NTB reduction than from tariff elimination. Indeed, Zimbabwe turned a major loss from intra-African tariff elimination into a gain with NTB reductions. Overall, our results have significant policy implications by adding further evidence to the belief that NTBs together with trade facilitation are a bigger problem in Africa than are tariffs!

Our findings also emphasise that in many cases the totals representing 'own' gains are often very large. The policy implications are clear here; this is because these 'own' NTB reductions are directly under the control of the home government. Coordinated efforts to reduce NTBs are the best option but a great deal can be gained in those countries with high barriers in unilateral actions. 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. There are several countries where exports are higher with NTB reforms than they were with tariff elimination, and the same applies to imports. As the NTBs focus on the agricultural sectors for most countries, we find that there are often significant gains to agricultural production.

The loss of tariff revenues can be a problem for many countries that rely on these tariffs as a significant portion of their revenues. In this scenario we are not altering any tariff rates, and consequently all major parties except Tanzania actually increase their tariff revenues as their economies gain overall.

Introduction and a new data set

As global tariffs reduce through either unilateral liberalisation or bilateral, regional and multilateral liberalisation, the focus is increasingly on NTBs or their generally interchangeable non-tariff measures (NTMs). Jensen and Sandrey (2013) have modelled the impacts of these NTBs on selected countries only in a Tripartite Free Trade Agreement (TFTA) liberalisation where they simulated changes in NTBs as an across-the-board reduction of two percentage points in the ad valorem tariff rate. For Southern African Customs Union (SACU) countries in that earlier work, the gains from reducing these NTBs were some 15% to 20% of the full liberalisation that included the 2% NTB reductions Much more diverse were the results for the East African Community (EAC) countries: both Kenya and Rwanda effectively show little improvement in welfare but Tanzania shows welfare gains that were 89% off the base level. Egypt was close to the SACU results with an outcome that was 15% off the base. Jensen and Sandrey concluded that a reduction in NTBs among the FTA partners would be important for both South Africa and Tanzania, of modest benefit to Swaziland and Lesotho, Uganda and Egypt within the FTA, and all at the cost of (or 'funded' by, for the want of an analogy) those countries outside Africa.

In this project we used as our base scenario the simulation whereby we reduced all tariff between all African countries to zero. In this current scenario we will not change actual tariffs but rather reduce NTBs by 50%. Here we are becoming much more sophisticated in our NTB estimates by changing our earlier 'blanket' (or common two percentage points) estimate to using the ad valorem equivalents for both agricultural goods and manufacturing goods as provided by Balistreri et al. (2014).[1] This new database provides tariff equivalents for most GTAP countries and, crucially, these estimates vary (often widely) which therefore enables a much more accurate estimate of the costs of these barriers than our earlier two percentage points estimates. These new estimates for countries of interest for this study on agricultural goods range from 0.0% in Rwanda to 42.5% in Kenya, while for manufacturing goods they range from Zambia's 0.0% (and South Africa's 0.3%) to Tanzania's 47.4%. These are significant differences, and the complete range for our GTAP countries is shown in Table 1. Note that estimates for Mozambique, Madagascar, Zimbabwe, Tunisia and the Swaziland-Lesotho aggregation are not provided, and here we have estimated a proxy from the aggregates provided by Balistreri et al. We have also included the Equivalent Variation (EV) welfare gains from reducing these NTBs in the right-hand column for countries in our GTAP

[1] These are World Bank estimates which in turn are based on data from Kee et al. (2009: 172-199). These are based on estimates for 105 countries at the HS 6digit level.

model. This data is directly relevant to the next table (Table 2) where we discuss these EV gains and their linkages back to Table 1. Not all the countries given in Table 1 are represented directly in our GTAP model, so there are some gaps on the right-hand side of the table.

Table 1: Ad valorem equivalents for NTMs by agriculture & manufacturing for countries in the model

Code	Country/Region	Agriculture	Manufacturing	EV $ (millions)
bra	Brazil	20,8%	11,6%	-261
chn	China	6,1%	5,1%	-2,767
civ	Côte d'Ivoire	27,8%	18,8%	
cmr	Cameroon	5,8%	1,1%	
egy	Egypt	29,9%	23,7%	1,422
eth	Ethiopia	0,0%	1,1%	91
gha	Ghana	10,9%	1,1%	485
ind	India	26,2%	4,8%	-1,395
ken	Kenya	14,6%	0,3%	2,117
mar	Morocco	39,3%	3,8%	489
mus	Mauritius	26,6%	3,3%	223
mwi	Malawi	21,5%	1,4%	100
nga	Nigeria	42,5%	22,2%	1,399
rus	Russia	16,9%	9,2%	188
rwa	Rwanda	0,0%	4,8%	66
sen	Senegal	33,9%	33,4%	703
tza	Tanzania	22,2%	47,4%	1,024
uga	Uganda	3,9%	0,0%	471
usa	US	14,8%	3,3%	-1,037
zaf	South Africa	4,8%	0,3%	2,690
zmb	Zambia	5,1%	0,0%	232
xnf	Rest North Africa	36,4%	20,7%	
xwf	Rest West Africa	2,8%	0,4%	
xcf	Central Africa	0,0%	0,1%	
eu	Europe Union	27	2.3	-2,666

Source: Balistreri et al. (2014)

In a later chapter (Chapter 8) we simulate the benefits to Africa from reducing the trade facilitation costs, again using data from Minor (2013) and comparing our results with Balistreri et al. (2014a and 2014b). A question arose in undertaking this work as to whether or not we were in effect double counting here in that the trade facilitation (time costs) we use in the next chapter are a subset of the NTBs. Personal communication with the authors of Balistreri et al. advised that they had decomposed trade costs into three categories, namely costs that can be lowered by (1) **trade facilitation**, (2) **non-tariff barriers**, and (3) the costs of **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 licences, quotas and bans; price control measures; competition restrictions; and

technical barriers to trade and do not include customs delays. Poor business services for trade are also a problem, and improvements in a wide range of business services such as banking, insurance, communication and professional services (including legal, auditing, engineering and computer services) would also lower trade costs.

Balistreri et al. (2014) use a model focusing on Kenya, Tanzania, Uganda and Rwanda to assess the impacts of reducing trade costs in the EAC. They use the three categories of 1) trade facilitation, 2) non-tariff barriers, and 3) costs of doing business as outlined above. Overall, their aggregate results for Kenya, Tanzania, Uganda and Rwanda show that all four countries gain from this integration, with gains ranging from a low of 0.9% of consumption[2] in the case of Tanzania to a high of 1.4% of consumption in the case of Rwanda.

In this chapter we are interested only in the NTB results, and we introduce a discussion on their results for the other costs in the appropriate chapters. Note that Balistreri et al. reduced these barriers by 20% only, whereas we reduce the NTBs within Africa by 50%.

Technical note

In this simulation we are reducing the NTBs by 50%. We are doing this in two separate ways. First, we recalibrate the initial GTAP Version 9 database to represent half of the World Bank's AVE estimates of NTBs as tariff equivalent in the GTAP database base generating tariff revenues. In the NTB scenario we then reduce these NTB tariff by 50%. Secondly, we have chosen to represent the remaining 25%reduction in the AVE of the World Bank's NTB estimate as an increase in efficiency by augmenting technical change in the respective countries.

The EV shown in this chapter (Table 2) represents the combined effects of reducing the AVE NTB tariff calibrated into the database and the efficiency augmenting technical change. The contribution from the efficiency gain is responsible for 48% of the increased EV income in South Africa. That is not shown directly in Table 2 but can be calculated from the output. The direct NBT efficiency gain is only $12 million but this increased efficiency reduces import price which contributes to changes in terms of trade (ToT), consumption patterns, firm production cost and ultimately changes allocative efficiencies and the amount of capital and labour force employed in South Africa. Thereby the direct efficiency gain of $12 million has multiple second-round effects

The results

Assuming the scenario of a 50% reduction in NTBs (with no reductions in applied duties at the border), Table 2 shows the FTAs' changes in welfare. The data is expressed in US dollars (millions) as one-off increases in annual welfare at the assessed end point of 2025. The data on the left-hand side is the output from this simulation in welfare gains/losses. On the right-hand column of Table 2 we show the percentage that the current simulation results of a 50% reduction of NTBs only represent of the full tariff 100% elimination scenario.

[2] Note that this measure of welfare change of consumption is not the same as our measure of EV. The important comparison in the Balistreri research will be the relative contributions of trade facilitation, NTBs and costs of doing business. This work does not examine tariff changes as the EAC is a largely tariff-free union whereas we are benchmarking tariff changes across Africa.

The results in Table 2 need to be read in conjunction with Table 1 (that shows the levels of initial NTBs). For example, South Africa's gains of $2,690 million are only 47% of the full tariff elimination, but if we look at South Africa from Table 1 above we can see that the NTB levels are relatively low and especially so for agriculture. Conversely, the gains for Tanzania of $1,024 are 271% of the initial tariff elimination gains, and if we look at Table 1 above we see that the NTBs for Tanzania are extremely high. Overall, the gains to the world are worth $5,285 million, a figure that comprises 72% of the Africa-wide FTA tariff eliminationresult.

Table 2: GTAP outcome of NTB reductions, welfare expressed as EV $(millions)

	Total	Efficiency	Labour	Capital	ToT	NTB eff.	% base
Total Africa	18,060	3,935	1,468	7,346	2,120	3,190	105.8%
South Africa	2,690	711	425	1,028	514	12	47%
Botswana	12	2	4	6	-3	3	18%
Namibia	188	11	22	118	34	3	41%
Swazi-Lesotho	61	11	11	29	8	2	61%
Kenya	2,117	272	174	1,057	560	54	164%
Tanzania	1,024	137	65	517	-177	483	271%
Uganda	471	100	34	241	92	5	69%
Rwanda	66	17	4	33	5	8	22%
Egypt	1,422	200	95	700	238	188	275%
Morocco	489	59	42	165	137	86	86%
Rest of east Africa	59	-18	2	18	-29	86	397%
Nigeria	1,399	265	110	547	43	434	69%
Angola-DRC	1,917	367	46	1,088	65	352	164%
Ethiopia	91	17	22	20	29	3	36%
Madagascar	22	-10	0	9	-14	37	large
Malawi	100	16	5	13	41	25	246%
Mauritius	223	28	10	120	31	34	295%
Mozambique	44	8	8	12	-2	18	312%
Zambia	232	37	37	61	89	7	51%
Zimbabwe	174	43	-1	38	-154	247	-12%
Ghana	485	136	27	101	189	32	60%
Tunisia	755	157	53	297	160	88	211%
Senegal	703	170	23	372	38	100	58%
Rest of Africa	3,316	1,199	251	758	225	883	165%
EU	-2,667	-755	-119	-1,147	-646	0	112%
UK	-306	-110	-21	-93	-82	0	84%
US	-1,037	-214	-150	-422	-250	0	143%
China	-2,767	-344	-124	-1,590	-708	0	118%
India	-1,395	-315	-25	-684	-372	0	91%
Brazil	-261	-70	-24	-154	-12	0	139%
Russia	188	51	2	-12	146	0	34%
Rest of world	-4,529	-1,108	-262	-2,949	-210	0	163%
Total world	5,285	1,070	744	295	-14	3,190	72%

Source: GTAP output

Gains to South Africa are still the highest in individual country gains, but both Kenya and the Angola-DRC aggregation are now very close behind at around $2 billion each. Countries/unions with a lower percentage of gains from NTB reduction than from tariff elimination are SACU, Uganda, Rwanda, Morocco, Nigeria, Ethiopia, Zambia, Ghana and Senegal. Note that there is a major turnaround for Zimbabwe as it now shows a positive gain from NTB reductions. This is a significant policy result. Again, all of those outside Africa lose except Russia where the earlier gains are mitigated. Interestingly, the losses to the rest of the world are actually higher in most cases than in the African FTA where tariffs were eliminated.

We next turn to Table 3 where the gains by country for the major partners only are shown. There are several striking points shown here. The first is that in many cases the cells on the diagonal representing 'own' gains are often very large. The policy implications are clear, as it is these 'own' NTB reductions that are directly under the control of the home government and these cells do not require any reciprocal cooperation with others. In a country where the main sport is soccer an 'own goal' is a serious mistake, but here an 'own goal' is to be lauded! Examples include Tanzania where some $892 out of a total of $1,024 involve 'own' changes, and Angola and DRC (xac) – albeit an aggregation – where $1,365 are own gains. Conversely, South Africa gains very little from gains inside SACU but major gains elsewhere in countries such as Tanzania that show large NTBs in Table 1. Coordinated efforts to reduce NTBs are the best option but a lot can be gained in those countries with high barriers in unilateral actions. That is an important policy conclusion.

Table 3: Change in welfare due to the FTAs at 2025, expressed in 2007 $(millions)

	zaf	ken	tza	uga	egy	mar	nga	xac	zwe	gha	tun	sen	Rafrica
zaf	19	2	0	0	6	0	2	-2	15	0	0	0	0
bwa	5	0	0	0	0	0	0	0	1	0	0	0	0
nam	10	0	0	0	0	0	0	1	0	0	0	0	0
xsc	4	0	0	0	0	0	0	0	1	0	0	0	0
ken	29	55	10	19	22	1	2	0	2	0	0	0	4
tza	733	1,302	**892**	247	60	4	80	114	0	12	-1	1	-19
uga	1	18	0	5	0	0	0	0	0	0	0	0	0
rwa	2	12	3	14	1	0	0	0	0	0	1	0	1
egy	78	318	20	2	**257**	39	40	3	0	6	60	3	126
mar	3	5	1	1	141	-12	18	8	0	2	77	6	54
xec	30	130	9	53	141	3	11	1	0	0	2	0	6
nga	406	36	7	3	101	45	**693**	216	-2	347	28	29	826
xac	332	2	9	1	15	36	44	**1,365**	4	4	7	12	64
eth	1	2	0	0	1	0	0	0	0	0	2	0	0
mdg	66	10	3	0	8	2	0	0	-1	0	1	1	0
mwi	17	21	3	0	1	0	1	0	2	0	0	0	-1
mus	62	27	0	1	6	3	0	-1	2	0	0	2	2
moz	39	0	1	0	0	0	0	1	4	0	0	0	0
zmb	8	4	0	0	0	0	0	0	2	0	0	0	1
zwe	275	6	0	1	4	0	9	4	143	0	0	0	3
gha	21	3	0	0	5	10	22	3	0	23	1	8	52
tun	1	3	1	2	160	69	4	3	0	1	113	2	117
sen	44	2	10	1	22	64	65	5	0	7	31	210	231
Rafr	501	157	55	121	472	224	407	196	1	82	433	430	1,849
total	2,690	2,117	1,024	471	1,422	489	1,399	1,917	174	485	755	703	3,316

Source: GTAP result

Table 4 introduces the gains to the main partners by GTAP sectors. Again, before examining the Table 4 results it is useful to review Table 1 which shows the NTB level by agriculture

and manufacturing. As discussed earlier, these are aggregations which will hide a great deal of the details at the disaggregated level, but they are a significant move forwards from the earlier values which tralac used. In particular, almost all of the NTBs shown are more significant for agriculture than they are for manufacturing. Only Ethiopia and Rwanda have agricultural NTB values where manufacturing is marginally higher while Tanzania's manufacturing NTBs are significantly higher. Most agricultural contributions are very high, with only Tanzania (as mentioned) having a low value. We will not discuss the individual manufacturing cells in detail, as the NTB levels here are generic to the sector by country but, of course, vary significantly between countries.

Table 4: Contribution to welfare by sector, $ (millions)

	zaf	ken	tza	uga	egy	mar	nga	xac	zwe	gha	tun	sen	Rafrica
PAgri	169	221	27	24	131	18	155	102	101	66	74	49	461
SAgri	412	567	29	38	235	178	141	88	-42	69	271	203	875
sugar	70	44	13	8	46	2	5	11	5	2	8	6	85
	24%	39%	7%	15%	29%	40%	22%	10%	37%	28%	47%	37%	43%
tex	42	157	8	57	67	12	26	9	3	26	16	9	59
wap	12	26	-9	10	17	5	-1	2	-3	0	2	0	1
lea	10	128	-14	57	2	5	62	1	-4	32	4	-5	40
lum	18	25	11	7	12	2	7	15	-8	7	6	3	63
ppp	70	54	54	8	40	26	7	24	-31	2	39	16	23
p_c	133	6	96	1	107	14	29	103	16	4	61	18	215
crp	372	341	129	61	156	60	158	41	86	100	122	104	341
nmm	22	63	9	28	69	3	21	3	6	5	20	94	174
i_s	140	50	66	28	51	25	32	26	18	7	20	33	121
nfm	72	22	99	2	161	22	39	5	18	21	8	24	15
fmp	133	66	29	7	144	15	25	73	-1	10	21	7	52
mvh	214	50	92	23	12	19	56	34	4	2	14	22	90
otn	123	3	24	6	2	0	73	942	-3	2	1	10	89
ele	84	97	21	6	15	4	91	21	-5	10	5	4	15
ome	569	179	338	100	154	76	453	417	18	85	57	103	581
omf	26	19	2	2	2	2	21	2	-4	34	5	3	15
Total	2,690	2,117	1,024	471	1,422	489	1,399	1,917	174	485	755	703	3,316

Source: GTAP output

Changes to the exports and imports are shown in Table 5, with the NTB changes on the left-hand side. For comparative purposes, the changes from tariff elimination are shown on the right-hand side.

The export and import changes shown in Table 5 are changes to quantities traded by value, and they represent changes to both trade prices and quantities. Changes relating to our current scenario of NTB reductions on the left-hand side can be compared with the tariff elimination scenario on the right-hand side. There are several countries (Tanzania, Egypt, Morocco, Madagascar, Mauritius and Tunisia) whose exports are higher with NTB reforms than they are with tariff elimination. Increases in imports are greater for the NTB reductions than the base scenario of tariff elimination for Kenya, Tanzania, Egypt, Madagascar, Mauritius, and Tunisia. Of special interest are both Zambia and Zimbabwe. In the base simulations both of these countries reduced imports and Zambia reduced exports, but here

they both increased their exports and imports to ensure that all African parties improved their trade profiles.

Table 5: Percentage changes in trade for the partner

	NTB reductions		Base tariff to zero	
	Exports %	Imports%	Exports %	Imports%
South Africa	1.3	1.6	2.7	3.5
Botswana	0.3	0.4	1.1	1.8
Namibia	1.2	2.2	2.6	5.0
Swazi-Lesotho	1.6	2.3	2.4	3.6
Kenya	3.9	6.2	5.7	4.5
Tanzania	4.9	4.6	3.7	3.2
Uganda	2.3	3.9	4.3	6.4
Rwanda	2.3	2.4	10.1	13.8
Egypt	1.2	1.3	0.3	0.4
Morocco	1.1	1.1	0.8	1.1
Rest of east Africa	1.1	0.7	2.0	1.4
Nigeria	0.8	0.9	1.7	2.0
Angola-DRC	1.6	2.2	2.1	3.1
Ethiopia	0.5	0.5	3.6	2.5
Madagascar	3.3	2.6	0.2	0.2
Malawi	1.2	2.3	4.2	3.5
Mauritius	2.1	2.1	0.9	0.9
Mozambique	0.4	0.3	1.0	0.7
Zambia	0.2	0.4	-0.7	-0.9
Zimbabwe	7.3	1.4	32.7	-2.4
Ghana	2.5	2.4	9.1	7.0
Tunisia	1.7	2.1	1.0	1.2
Senegal	6.2	5.5	8.2	9.4
Rest of Africa	1.6	1.7	2.8	2.8

Source: GTAP output

Changes to factors of production are shown in Table 6, and here we see some meaningful gains to employment, as shown in the top two rows, and increases in capital in the third row. Again, as expected from the emphasis on NTBs in the agricultural sectors for most countries, we see that there are often very significant gains to agricultural production for many countries. Note that many of these gains derive from unilateral liberalisation that is directly under the control of the home government! Kenya in particular is showing impressive gains in many manufacturing sectors.

Table 6: Increases in factors of production & actual production, %

	zaf	ken	uga	nga	xac	eth	zmb	zwe	sen	Rafrica
Unskilled	0.27	0.64	0.28	0.03	0.10	0.07	0.21	-0.02	0.31	0.14
Skilled	0.27	0.68	0.28	0.07	0.11	0.04	0.20	-0.02	0.34	0.14
capital	0.63	4.18	2.42	0.50	1.39	0.10	0.67	0.75	3.86	0.76
PAgr	0.31	0.25	0.16	-0.03	-0.06	0.09	0.42	0.12	-0.14	0.14
SAgr	1.25	3.29	1.52	-0.22	0.00	0.21	0.51	-5.49	3.84	0.46
sugar	3.37	-3.78	0.33	-0.28	0.94	0.05	6.38	0.83	3.00	0.61
nat	-0.17	0.39	-0.48	0.03	-0.01	0.00	-0.20	0.40	0.28	-0.01
tex	0.47	4.86	14.53	0.62	0.95	-0.70	-0.96	0.74	1.51	0.46
wap	0.20	-0.16	3.40	0.06	0.77	-0.04	0.16	1.77	2.12	0.31
lea	-0.14	5.03	2.03	1.55	-1.23	-0.56	0.46	1.02	-2.68	-0.34
lum	0.36	3.26	3.29	0.33	0.42	-0.03	0.48	-0.45	-4.59	0.73
ppp	0.93	1.47	2.84	-0.37	1.96	-0.19	0.54	-1.30	1.36	-0.10
p_c	2.26	3.39	-0.69	0.23	-0.21	-0.30	0.67	1.47	4.24	1.76
crp	1.02	8.32	4.29	3.41	1.08	0.93	8.97	0.89	1.23	0.79
nmm	0.56	3.06	3.61	1.16	0.58	0.06	4.14	-3.60	8.72	-0.40
i_s	0.88	17.84	11.03	3.81	1.19	-0.24	7.88	3.42	8.01	0.79
nfm	-2.88	-1.08	-0.98	1.77	0.40	-1.11	-1.94	1.58	1.17	-0.10
fmp	1.65	11.73	2.58	1.09	2.24	-0.02	1.28	-2.04	1.80	-0.42
mvh	0.83	26.40	2.74	0.25	0.54	-0.06	2.79	1.76	11.15	0.98
otn	10.63	0.47	-1.26	1.26	5.41	-0.51	-0.61	1.09	1.85	0.92
ele	1.40	5.61	3.83	0.99	1.56	4.80	-2.31	1.39	2.74	-0.14
ome	1.47	16.81	15.25	1.54	5.97	0.59	14.88	-0.38	17.83	5.12
omf	0.30	0.09	9.98	-0.79	0.57	0.18	-1.01	0.38	3.03	0.43
serv	0.54	2.65	1.40	0.28	1.05	0.04	0.33	0.87	3.01	0.56

Source: GTAP output

Contributions to total factor income are shown in Table 7 by country. In the first example, South Africa, there is an increase of 1.02% in the factors that make up production. A minor 0.05%derives from land increases as agricultural prices increase, and another 0.24% and 0.30% show the percentage increases in the contribution from unskilled and skilled labour respectively. The final 0.45%derives from changes to the capital stock, while there is a very minor decrease from resource to the economy. The welfare increases for South Africa represent an increase of 0.48% in real Gross Domestic Product (GDP), a significant contribution. Kenya is an interesting study, as here the real GDP increases by 2.34% and there are meaningful improvements in the labour markets. Zimbabwe in a turnaround from our tariff elimination scenario gains an increase of 1.84% in real GDP.

Table 7: Changes in ToT, real GDP and total factor income along with contributions to factor income by %

	Terms	Real	Total factor	Contributions from				
	Trade	GDP	income	land	unskilled	skilled	capital	resource
zaf	0.39	0.48	1.02	0.05	0.24	0.30	0.45	-0.02
bwa	0.01	0.07	0.23	0.03	0.08	0.03	0.11	-0.02
nam	0.78	0.90	2.10	0.22	0.57	0.24	1.18	-0.10
xsc	0.42	0.80	1.47	0.15	0.35	0.33	0.70	-0.07
ken	2.32	2.34	5.75	0.62	1.70	0.77	2.50	0.15
tza	-0.42	2.09	2.41	0.24	0.82	0.57	0.76	0.02
uga	1.39	1.37	3.27	0.37	0.96	0.52	1.52	-0.09
rwa	0.21	0.41	1.92	0.52	0.76	0.23	0.48	-0.06
egy	0.22	0.37	0.76	0.04	0.14	0.21	0.37	0.00
mar	0.22	0.25	0.55	-0.01	0.18	0.18	0.20	-0.01
xec	-0.08	0.08	0.09	0.05	0.02	0.00	0.00	0.02
nga	0.01	0.23	0.18	-0.01	0.04	0.06	0.06	0.03
xac	0.03	0.84	0.84	0.02	0.14	0.17	0.49	0.01
eth	0.21	0.08	0.40	0.14	0.15	0.01	0.07	0.03
mdg	-0.35	0.22	0.04	-0.02	0.00	0.01	0.01	0.04
mwi	1.21	0.60	2.33	0.93	0.56	0.38	0.51	-0.05
mus	0.24	0.85	1.34	-0.07	0.37	0.25	0.77	0.01
moz	-0.01	0.15	0.28	0.04	0.10	0.05	0.08	0.01
zmb	0.66	0.43	1.77	0.42	0.56	0.37	0.47	-0.05
zwe	-1.28	1.84	-0.34	0.06	-0.12	-0.08	-0.31	0.10
gha	0.75	0.42	1.30	0.10	0.40	0.51	0.33	-0.04
tun	0.51	0.87	1.80	0.27	0.45	0.37	0.73	-0.01
sen	0.47	2.75	3.58	0.16	0.80	0.41	2.06	0.15
Rafrica	0.14	0.62	0.82	0.09	0.24	0.19	0.29	0.01

Source: GTAP output

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Chapter 4

The Africa-wide results of tariff elimination and reductions in non-tariff barriers

Summary and key points

In Chapter 2 we simulated a tariff elimination for all intra-African trade and followed this up in Chapter 3 by reducing all intra-African non-tariff barriers (NTBs) by 50%. In this chapter we combine an elimination of intra-African import tariffs with the 50% NTB reductions in Africa. The tariff elimination gains are largely confined to African participants but the reduction in NTBs will spread the gains to other countries as efficiency is improved. In general, we found that the results from Chapters 2 and 3 are additive in the sense that combining them outside the model gives a similar result to the scenario where we combine tariff elimination and reductions in non-tariff barriers within the model. They may not be an exact match as the results may be path-dependent (that is, the order in which tariff elimination and reduction in NTB stake place may make a difference). Consequently, we spend less time discussing the results but rather concentrate upon presenting them. The reason is that they tend to follow the results from Chapters 2and 3, and the technical discussion on NTBs is contained in Chapter 3.

Again, South Africa dominates the African welfare gains although it is not the largest African economy as measured in the usual Gross Domestic Product (GDP) terms. Nigeria has taken the honour, but South African dominates because it is Africa's leading manufacturing and agricultural products trader – this in contrast to the dominance of Nigerian exports in the lightly protected resource sectors. Many of the combined tariff and NTB reductions result in welfare outcomes that are around double the tariff elimination results (although this is not always the case).

Again, the generalisations can be made that for some countries many of the gains derive from unilateral liberalisation and for others there are other examples where individual country gains are concentrated in one or two specific countries. For example, Kenya's gains are concentrated on Tanzania and the rest of Africa, Ghana's are heavily concentrated on Nigeria, and gains to the rest of Africa are concentrated in Nigeria and the rest of Africa. Conversely, there are bilateral results that show a zero or close to it for the two respective partners. Only for South Africa is there a spread of countries where significant gains are made. Unfortunately, the 'rest of Africa' aggregation hides some potentially important individual country information due to the fact that this aggregation makes big gains.

South Africa does particularly well from agricultural reforms across the continent. It gains especially from secondary agriculture and sugar as it enjoys better access into Kenya and, to a lesser degree, Uganda for this sugar. In turn, both of these countries gain by reducing production in their own heavily protected and inefficient sugar sectors. There are some rather large gains for individual countries in many manufacturing sectors and, especially for Africa's industrial giant, South Africa.

The combined tariff elimination and NTB reductions result in increased exports and imports across the continent for all parties except Zimbabwe when measured against the pure tariff elimination scenario. Some of these changes are very large, with Rwanda the best example. For others (Egypt and Mozambique), the changes are much smaller.

Consequently, the demand for both skilled and unskilled labour in most countries increases, with South Africa, Kenya and Senegal displaying the most significant increases. As a generalisation, most of the countries in the model increase production in most but not all manufacturing sectors. Interestingly, production in Zimbabwe does not collapse in all sectors. For the technical outcomes, the simulations generally result in increasing real GDP everywhere except in Zimbabwe while the terms of trade (ToT) outcomes vary by country. Factor income in the standard land, labour and capital contributions usually increase, and in particular the contributions from labour are encouraging. While there remain some significant tariff revenue losses across Africa (Tanzania, Nigeria, Zimbabwe and the rest of Africa) for many countries, including some larger ones, tariff losses are not an issue.

Introduction

In Chapter 2 we simulated a tariff elimination for all intra-African trade whereby we reduced all tariffs between African countries to zero. We then followed this up by reducing all intra-African NTBs by 50%. In this chapter we combine an elimination of intra-African import tariffs with the 50% NTB reductions in Africa. The tariff elimination gains are largely confined to African participants but the reduction in NTBs will spread the gains to other countries. Efficiency also improves.

We note that results here may not be an exact match to adding gains from the previous two simulations of (a) tariff elimination for all intra-African trade and (b) reducing all intra-African NTBs by 50% as the results here may be path-dependent. However, we would expect this path dependency to be relatively minor.

We will present the results in this chapter and leave the reader to seek the technical details of our analysis and background on the data sources in Chapters 1, 2 and 3. Similarly, our discussions will be somewhat muted as they are otherwise likely to become repetitive.

The results

We will firstly reproduce the technical note from Chapter 3 that outlined how we reduced the NTBs by 50% in two separate ways. First of all we recalibrate the initial GTAP Version 9 database to represent half of the World Bank's ad valorem equivalent (AVE) estimates of NTBs as tariff equivalent in our TAP database base generating tariff revenues. In the NTB scenario we then reduce these NTB tariffs by 50%. Secondly, we have chosen to represent the remaining 25% reduction in the AVE of the World Bank's NTB estimate as an increase in efficiency by augmenting technical change in the respective countries.

The direct Equivalent Variation (EV) results for NTB reductions as shown in both Chapter 3 and this chapter (Table 2) represent the combined effects of reducing the AVE NTB tariff calibrated into the database and the efficiency augmenting technical change. The contribution from the efficiency gain was responsible for 48% of the increased EV income in South Africa in the Chapter 3 results. The direct NBT efficiency gain is only $13 million in Table 2.

However, this increased efficient reduces import price which contributes to changes in ToT, consumption patterns, and firm production cost. It ultimately changes allocative efficiencies and the amount of capital and the size of the labour force employed in South Africa. Thereby the direct efficiency gain of $13 million has multiple second-round effects. In addition, in this chapter we are effectively adding these NTB gains from Chapter 3 to the tariff elimination gains from Chapter 2 although, as noted, they do not exactly equate.

Again, South Africa dominates the African welfare gains. In passing we would note that while South Africa consistently dominates the welfare gains it is not the largest African economy as measured in the usual GDP terms. Nigeria has recently taken that honour following the revaluation of the Nigerian GDP. Note, however, that this re-evaluation has taken place since 2011 and is therefore not fully reflected in the GTAP database. The reason for the South African dominance is instead associated with the dominance of South Africa as Africa's leading manufacturing and agricultural products trader. This is in contrast to the dominance of Nigerian exports in the resource sectors, sectors which are generally lightly protected and therefore have less to gain from reductions in protection.

In Chapter 3 Table 2 we presented and discussed the NTB results in more depth by country, and specifically how there was a wide variation between the gains from tariff elimination and the gains from NTB reductions by country. We will not reproduce that discussion here. Among the major African economies NTB reductions are relatively more important than tariff elimination for Kenya, Tanzania, Egypt, Angola-DRC, Tunisia and the 'rest of Africa'.

In Table 3 we again highlight where the main bilateral gains for the major African countries derive from as measured by the welfare gains in Table 2. The data is shown in a matrix of the full range of countries in the rows but selected countries only in the columns. Some interesting observations can be gleaned from this table, and many have been discussed previously. The first is the generalisation that for some countries many of the gains derive from unilateral liberalisation as shown in the 'own' diagonal cells. This is especially the case for Tanzania, Angola-DRC and Zimbabwe (losses), but not the case for South Africa, Morocco, Nigeria, Zambia (losses), Ghana, or the rest of Africa. The next observation is that there are other examples where individual country gains are concentrated in one specific partner country. For example, Kenya's gains are concentrated on Tanzania and the rest of Africa, Ghana's are heavily concentrated on Nigeria, and gains to the rest of Africa are concentrated on Nigeria and the rest of Africa itself. Conversely, many cells in the table show a zero or close to it, and only for South Africa is there a spread of countries where significant gains are made. Finally, the rest of Africa hides some potentially important individual country information within its aggregation due to the fact that many countries make big gains from this aggregation (and it is equally likely that some of the 'rest of Africa' countries themselves make big gains).

Table 1: Tariff elimination& NTB reduction, welfare gains at 2025, $(millions)

Country	total	efficiency	labour	capital	ToT	NTB efficiency	Base
Total Africa	38,690	8,876	3,898	17,919	4,226	3,770	17,072
South Africa	9,920	2,517	1,549	3,880	1,960	13	5,742
Botswana	87	14	27	55	-12	3	68
Namibia	758	39	82	473	161	3	463
Swazi-Lesotho	190	33	33	93	29	2	100
Kenya	3,451	532	258	2,061	537	63	1,289
Tanzania	1,459	266	103	752	-203	541	377
Uganda	1,222	253	77	684	204	5	683
Rwanda	391	99	20	177	88	8	301
Egypt	2,028	294	140	1,019	380	195	518
Morocco	1,292	192	121	439	448	91	572
Rest of east Africa	68	33	-16	30	-75	96	15
Nigeria	3,453	347	529	1,835	155	587	2,031
Angola-DRC	3,428	667	105	2,231	24	401	1,168
Ethiopia	403	106	52	224	18	3	255
Madagascar	20	-9	0	8	-17	38	-1
Malawi	138	32	8	40	31	28	41
Mauritius	315	41	15	169	56	34	76
Mozambique	56	17	16	45	-40	18	14
Zambia	808	189	119	221	272	7	454
Zimbabwe	-1,405	-211	-52	-430	-983	271	-1,486
Ghana	1,793	513	104	476	660	40	813
Tunisia	1,120	242	79	460	244	95	357
Senegal	2,137	501	79	1,166	267	124	1,211
Rest of Africa	5,558	2,170	451	1,812	21	1,104	2,012
EU	-5,919	-1,721	-277	-2,397	-1,524	0	-2,386
UK	-754	-278	-52	-216	-208	0	-364
US	-2,143	-446	-347	-809	-542	0	-726
China	-6,185	-797	-307	-3,467	-1,614	0	-2,351
India	-3,373	-735	-61	-1,641	-937	0	-1,539
Brazil	-536	-152	-61	-311	-12	0	-188
Russia	793	176	8	142	468	0	553
Rest of world	-9,117	-2,499	-598	-6,046	26	0	-2,771
Total world	11,456	2,423	2,204	3,175	-117	3,770	7,299

Source: GTAP output

Table 2: Contribution to welfare by country, $ (millions)

	zaf	ken	tza	uga	egy	mar	nga	xac	zwe	gha	tun	sen	Rafrica
zaf	-56	64	0	13	142	35	18	-1	13	3	29	4	10
bwa	4	2	0	0	1	0	4	0	1	0	0	0	0
nam	9	1	0	0	2	0	1	2	0	0	0	0	1
xsc	2	1	0	0	3	1	1	0	1	0	0	0	4
ken	797	581	0	13	-58	6	25	-1	-6	0	1	-2	39
tza	1,564	1,018	889	196	189	9	89	166	-3	13	1	2	-4
uga	154	-38	-2	115	-11	3	7	1	-1	1	0	-1	14
rwa	29	1	-1	5	0	0	-2	0	0	0	10	0	20
egy	171	313	29	3	248	39	80	10	-1	9	60	4	200
mar	27	9	1	1	152	-59	65	27	0	15	77	7	105
xec	292	135	10	62	152	8	221	4	5	2	6	2	31
nga	1,052	95	14	8	301	129	245	493	-4	1,560	65	91	2,163
xac	1,082	8	48	2	41	113	149	1,502	26	10	27	36	355
eth	37	108	0	3	70	0	1	0	0	0	196	4	1
mdg	71	10	3	0	8	9	0	0	-1	0	5	0	0
mwi	188	-15	36	0	1	0	6	1	-5	0	1	0	6
mus	86	27	0	1	6	4	0	1	2	0	1	2	2
moz	176	21	0	1	13	0	3	2	-1	0	5	0	2
zmb	46	3	0	0	0	0	5	0	0	1	0	0	16
zwe	1,282	-27	17	0	4	3	60	29	-1,426	3	4	1	50
gha	293	36	3	3	86	47	491	46	-2	-160	11	76	491
tun	28	18	1	6	157	67	32	13	0	8	77	2	177
sen	112	4	18	1	66	165	125	10	-1	20	97	190	333
Rafrica	2,474	1,078	393	789	455	714	1,825	1,123	-2	309	443	1,717	1,544
Total	9,920	3,451	1,459	1,222	2,028	1,292	3,453	3,428	-1,405	1,793	1,120	2,137	5,558

Source: GTAP output

Table 3 shows the matrix of GTAP sectors in the rows and contributions that changes in each of these sectors make in the cells for the major African countries. Again, South Africa does particularly well from agricultural reforms across the continent, and especially from secondary agriculture. A similar outcome is indicated for the rest of Africa. Sugar has been listed as a separate sector in this analysis to re-examine the outcomes from earlier tralac research that shows that South Africa is also doing very well in this sector – especially with better access into Kenya and, to a lesser degree, into Uganda. Again, Kenya and, to a lesser extent, Uganda makes significant gains in the sugar sector as they both reduce their sugar production significantly (as shown in Table 5). Secondary agriculture in Zimbabwe again takes a large hit, and possibly from South Africa in particular because it is exporting into heavily protected secondary (but not primary) agriculture sectors.

We have commented on the manufacturing cells earlier and again highlight some rather large gains for some countries in many sectors. Outside South Africa and the rest of Africa the cell containing the largest number is that reported for other transportation (otn) for Angola-DRC. We have already commented that this seems to be a statistical or at least a definitional error in the reporting of the export or more likely the re-export of oil-drilling equipment such as large rigs from Angola. This may be erroneously reported as DRC and not the (possibly erroneous) report from the International Trade Centre (ITC) which is an export to the Congo and not the DRC.

Table 3: Contribution to welfare by commodity, $(millions)

	zaf	ken	tza	uga	egy	mar	nga	xac	zmb	zwe	gha	tun	sen	Rafr
PAgri	599	259	43	40	143	27	106	131	4	104	184	61	62	897
SAgri	1,796	725	51	106	281	577	18	-62	39	-510	139	305	721	1,105
sugar	687	672	-72	112	13	0	15	61	91	-4	0	6	20	29
nat	16	4	2	1	5	4	49	29	0	12	11	5	5	33
tex	317	254	48	97	153	42	75	113	1	-189	139	108	31	240
wap	77	46	-16	6	160	34	-8	32	0	-150	-16	18	4	17
lea	99	263	2	98	1	3	592	-17	-3	-59	95	10	-9	-157
lum	133	60	29	61	22	10	38	52	1	-91	17	-2	30	119
ppp	268	55	84	10	79	84	6	52	-1	-82	10	85	33	20
p_c	419	7	107	2	130	17	64	256	-1	13	18	61	25	386
crp	1,146	425	291	98	232	86	527	40	89	101	423	173	224	556
nmm	132	95	22	140	77	11	70	-2	25	-7	32	29	513	365
i_s	347	83	83	120	57	24	70	47	11	31	41	20	92	239
nfm	152	46	167	2	153	24	173	12	84	29	70	11	49	6
fmp	699	74	32	36	224	45	97	251	4	-68	40	30	18	86
mvh	906	59	121	123	28	31	123	92	8	-340	9	23	50	252
otn	208	9	26	20	5	3	271	1,311	0	-14	6	2	18	273
ele	264	109	27	20	20	16	291	44	0	-32	56	8	11	30
ome	1,465	178	414	112	242	228	853	983	440	-70	349	144	216	1,024
omf	189	28	-1	17	4	26	23	3	17	-78	168	22	25	40
Total	9,919	3,451	1,459	1,222	2,028	1,292	3,453	3,428	807	-1,405	1,793	1,120	2,137	5,559

Source: GTAP output

Table 4 returns to the expected changes in aggregate trade as measured by the percentage changes in both exports and imports and changes to the overall trade balance as measured in dollars (millions). The comparable data for the base tariff elimination scenario is shown on the right-hand side. Again, the trade balance is a macroeconomic closure in the GTAP model that is heavily influenced by the difference on one side of an equation that measures savings and investment and which has to balance with exports minus imports on the other side of the classic macroeconomic equation. It is therefore not an expected trade balance: it reflects changes in investment (capital) rather than actual changes in trade values. The terms of trade as shown in Table 2 reflect the changes in the relative prices of exports and imports while the export and import changes shown here are the percentage changes in the quantities traded.

Except for Zambia's small decline of less than one percent in both exports and imports and Zimbabwe's small decline in imports, the combined tariff elimination and NTB reductions result in increased exports and imports across the continent for all parties when measured against the pure tariff elimination scenario. Some of these changes are very large, with Rwanda the best example, while others (Egypt and Mozambique) are much smaller.

Table 4: Percentage changes in trade for the partners

	Tariff & NTB reductions			Base tariff only	
	Exports %	Imports %	Balance $ (millions)	Exports %	Imports %
South Africa	4.6	6.0	7	2.7	3.5
Botswana	1.5	2.5	63	1.1	1.8
Namibia	4.5	8.4	222	2.6	5
Swazi-Lesotho	4.6	7.0	47	2.4	3.6
Kenya	9.7	10.9	-1287	5.7	4.5
Tanzania	10.6	9.5	-664	3.7	3.2
Uganda	6.9	11.1	-212	4.3	6.4
Rwanda	13.2	17.5	-55	10.1	13.8
Egypt	1.6	1.8	-410	0.3	0.4
Morocco	2.3	2.7	-488	0.8	1.1
Rest of east Africa	3.5	2.5	4	2	1.4
Nigeria	3.2	3.8	-194	1.7	2
Angola-DRC	4.7	6.6	93	2.1	3.1
Ethiopia	4.4	3.3	-91	3.6	2.5
Madagascar	3.6	2.8	-2	0.2	0.2
Malawi	6.0	6.3	-18	4.2	3.5
Mauritius	3.2	3.2	-115	0.9	0.9
Mozambique	1.5	1.0	-24	1	0.7
Zambia	-0.7	-0.7	415	-0.7	-0.9
Zimbabwe	43.0	-0.6	1117	32.7	-2.4
Ghana	15.4	12.8	-837	9.1	7
Tunisia	3.0	3.6	-118	1	1.2
Senegal	18.6	18.2	-773	8.2	9.4
Rest of Africa	5.4	5.6	-788	2.8	2.8

Source: GTAP output

Changes to **production** in the partner countries are shown in Table 5 (again expressed as changes from the non-FTA base) and, as expected, these changes largely reflect the sector contributions to welfare changes as shown in Table 3. As indicated in the top two rows, the demand for both skilled and unskilled labour in most countries (but not Zimbabwe) increases, with South Africa, Kenya and Senegal displaying the most significant increases. Secondary agriculture and sugar are again the standout sectors across the FTA, with impressive increases in production from South Africa, Kenya, Uganda and Senegal. The usual sugar-sector production increases in South Africa and consequential declines in Kenya and Uganda are highlighted.

Changes to the production in textile, clothing and footwear (TCF) and vehicles are sometimes large, but these changes may be off small initial bases. As a generalisation, most of the countries shown increase production in most but not all sectors and, interestingly, production in Zimbabwe does not collapse in all sectors. Although we are not modelling changes to service barriers, note that there are increases for most countries in the service

sectors. These increases are likely to derive at least in part from trade-related services such as transport.

Table 5: Increases in factors of production & actual production, %

	zaf	ken	uga	nga	xac	zmb	zwe	sen	Rafrica
Unskilled	0.97	0.92	0.63	0.16	0.23	0.66	-0.98	1.04	0.26
Skilled	0.97	1.04	0.66	0.28	0.25	0.64	-1.02	1.11	0.24
capital	2.39	8.17	6.86	1.70	2.84	2.44	-8.43	12.13	1.81
PAgri	0.92	0.85	0.47	0.01	-0.27	-0.36	1.84	-0.17	0.49
SAgri	5.11	6.94	4.77	-0.61	-0.96	3.91	-18.54	12.41	0.93
sugar	31.25	-36.63	-18.77	-0.90	19.07	35.54	7.99	7.61	-1.21
nat	-0.63	0.69	-1.03	0.06	-0.06	-0.66	2.99	1.03	0.09
tex	5.20	11.60	21.32	4.34	4.34	-0.96	-20.50	4.52	4.77
wap	1.61	2.21	0.85	-0.06	2.94	0.88	-23.16	6.36	1.15
lea	1.84	22.04	-3.69	18.00	-6.53	-6.11	-37.77	-5.60	-11.06
lum	4.14	7.64	17.04	1.64	1.86	5.51	-11.42	2.16	1.42
ppp	3.17	2.62	3.14	0.03	3.98	1.52	-5.57	3.92	-0.36
p_c	7.19	6.46	0.06	0.86	-3.38	0.88	5.27	12.98	3.60
crp	2.87	14.65	7.62	14.99	1.41	40.46	33.14	2.69	2.83
nmm	2.64	5.95	16.87	14.24	0.60	25.11	-15.51	43.98	-2.59
i_s	1.71	29.30	52.10	13.24	2.60	45.82	40.35	20.53	2.36
nfm	-10.07	6.50	-1.64	7.78	1.36	-11.45	45.63	-6.73	1.39
fmp	7.94	14.60	15.67	4.32	8.23	9.95	-9.28	4.57	-1.02
mvh	3.71	26.81	15.06	0.64	2.27	-0.62	-4.99	40.35	4.48
otn	12.10	3.58	0.11	3.70	13.88	-4.67	1.98	3.42	11.54
ele	3.30	8.38	11.48	1.74	3.20	-6.91	7.16	5.97	0.33
ome	2.42	16.71	15.38	3.23	15.25	94.20	17.47	49.06	9.67
omf	1.60	2.82	119.64	1.10	0.59	13.22	-18.40	9.11	1.22
serv	2.00	5.20	4.04	0.73	2.12	1.27	-4.66	9.15	1.14

Source: GTAP output

Table 6 shows some more technical outcomes relating to the simulation. In effect, it shows that the changes are for increasing real GDP everywhere (some rather large) except Zimbabwe and ToT outcomes on relative export and import prices varying by country. Factor income in the standard land, labour and capital contributions usually increase, and in particular the contributions from labour are encouraging. The contributions from skilled and unskilled labour are not the same as those shown in Table 5 above which were the changes in employment levels. This data is the contribution that changes in the total wage bill make to total factor income.

Table 6: Changes in ToT, real GDP and total factor income along with contributions to factor income by %

	Terms of trade	Real GDP	Total factor income	Contributions from				
				land	unskilled	skilled	capital	resource
zaf	1.46	1.75	3.80	0.21	0.89	1.12	1.67	-0.09
bwa	0.25	0.48	1.51	0.11	0.53	0.23	0.81	-0.18
nam	3.42	3.50	8.43	0.59	2.21	0.94	4.74	-0.05
xsc	1.42	2.47	4.68	0.48	1.12	1.05	2.24	-0.22
ken	2.22	4.40	8.68	0.59	2.50	1.23	4.12	0.24
tza	-0.39	2.90	3.75	0.27	1.29	0.91	1.24	0.04
uga	3.05	3.69	7.86	0.71	2.25	1.25	3.83	-0.18
rwa	3.51	2.05	10.87	2.45	4.37	1.46	2.96	-0.37
egy	0.34	0.51	1.12	0.04	0.20	0.32	0.56	0.00
mar	0.73	0.61	1.63	0.06	0.55	0.50	0.56	-0.04
xec	-0.17	0.13	-0.01	0.09	-0.05	-0.08	-0.05	0.09
nga	0.06	0.57	0.87	0.06	0.23	0.24	0.27	0.07
xac	-0.06	1.55	1.88	0.02	0.34	0.40	1.14	-0.02
eth	0.22	0.49	1.03	0.26	0.32	0.05	0.31	0.08
mdg	-0.41	0.22	0.06	-0.01	0.00	0.01	0.01	0.05
mwi	0.92	1.12	3.31	1.19	0.78	0.56	0.80	-0.02
mus	0.50	1.15	2.05	-0.02	0.56	0.37	1.12	0.02
moz	-0.26	0.33	0.66	0.13	0.20	0.10	0.19	0.04
zmb	2.09	1.62	5.40	0.91	1.82	1.24	1.59	-0.16
zwe	-7.29	-2.80	-12.96	0.73	-4.15	-3.27	-6.97	0.70
gha	2.52	1.63	5.11	0.33	1.55	2.02	1.37	-0.16
tun	0.77	1.29	2.65	0.28	0.64	0.59	1.13	0.02
sen	2.74	7.79	12.82	0.73	2.87	1.42	7.18	0.62
Rafr	0.05	1.13	1.63	0.24	0.45	0.32	0.51	0.11

Source: GTAP output

Chapter 5

The African 'willing' results: a hundred percent tariff reduction

Summary and key points

In this chapter we simulate a Free Trade Agreement (FTA) between those countries in Africa that we consider 'willing and able' to move forward on full integration. We employ a tariff-only FTA approach between these selected countries. We know that there are solid economic gains to almost all African economies from a comprehensive FTA, but there are also many political-economy type problems relating to full integration. This chapter therefore takes what can be described as the European Union (EU) approach of starting regional integration slowly from a base of those few countries that appear to be ready for comprehensive liberalisation. We assess the five countries in the Southern African Customs Union (SACU), four in the East African Community (EAC), Malawi, Zambia and Egypt in the Tripartite FTA region, Nigeria and Ghana in west Africa and Morocco and Tunisia in north Africa as being our foundation members of what we call 'an FTA of the willing'. This selection represents 64.7% of the African Gross Domestic Product (GDP).

The results are unimpressive. Our simulation of selected countries only is very much a second-best solution. In all African countries we grouped together the gains from countries Africa-wide are more – and often significantly more – than they are for the selected group only. The only bright spot is the now excluded countries which are effectively neutralised to this integration, albeit sometimes with a small loss. Only South Africa has gains above Ghana's $694 million and for some countries such as Botswana, Namibia, Tanzania and especially Zambia the gains from the selected group are to be scorned! This integration has less than 10% of the global gains from an Africa-wide scenario.

A different country aggregation may lead to better overall results, but on our evidence we do not have a strong economic case to make for an FTA integration based upon these selected countries only. That case could only be made as a second-best argument if progress towards full African integration seems to be irretrievably lost.

There are, however, some features which remain the same. South Africa makes large gains from reforms in Kenya and Nigeria, while Kenya makes large gains from its own liberalisation. Ghana gains from liberalisation in Nigeria and, similarly, Nigeria mirrors this by making large gains from access into Ghana. Overall, we find that gains are almost identical between full and partial integration for the main countries on a bilateral basis, but now there are too many missing countries where large bilateral gains were made under Africa-wide integration.

South Africa continues to do particularly well from agricultural reforms and especially in the sugar section. Again, the heavily protected and highly inefficient sugar sector in Kenya is a drag upon its own economy. Our arguments for reform in Kenyan sugar policies are reinforced as Kenya makes significant unilateral gains in the sugar sector as it both reduces sugar production significantly and transfers resources out of a sector which has been heavily

protected but technically inefficient. There are, however, few gains in agriculture outside South Africa or in the sugar sector in Kenya and Uganda. Both Egypt and Nigeria gain in the textile, clothing and footwear (TCF) sectors, while South Africa does well in the manufacturing sectors. Gains in the motor-vehicle sector are muted outside South Africa's gains.

Welfare changes mostly increase when expressed real GDP, with some of these increases around 1% of real GDP. The terms of trade (ToT) vary, with some improving and others declining. All countries except Rwanda attract more capital.

In terms of the tariff revenues collected at the respective borders there is little difference in the lost revenue between an Africa-wide FTA and our 'willing' countries, with the main exception being SACU where revenues increase by $16 million in contrast to the surprisingly large $167 million increase from an Africa-wide integration.

Introduction and background

We used as our base scenario the simulation whereby we reduce all tariff between all African countries to zero, and reported the results of this scenario in Chapter 2. As outlined in our introduction in Chapter 1 we also intend to simulate an FTA between those countries in Africa that we consider 'willing and able' to move forward on full integration. In this chapter we will examine the tariff-only implications of the 'FTA of the willing' scenario.

From a political-economy perspective we must acknowledge that while there were solid economic gains to almost all African economies from a comprehensive FTA there were also many problems relating to full integration. These were mainly from the political-economy perspective and include the problem of some failed or semi-failed states that are patently not candidates for regional integration. This chapter therefore takes what can be described as the EU approach of starting regional integration gradually from a base of those few countries that appear to be ready for comprehensive liberalisation. This EU approach started in 1960 with the original six members and slowly enlarged over the years to the current 27 – and counting. We believe that such an approach has potential for Africa. Consequently, we assess the five countries in SACU, four in the EAC[1], Malawi, Zambia and Egypt in the TFTA region, Nigeria and Ghana in West Africa, and Morocco and Tunisia in North Africa as being our foundation members of what we call 'an FTA of the willing'.

This juxtaposition of political-economy realism and modelling advances adds realism to our results.

The objective of this chapter is therefore to use the Global Trade Analysis Project (GTAP) computer model to assess the economic implications of this approach to regional integration. The scenario is that all intra-'willing' FTA tariffs are eliminated but there is no reduction in either non-tariff barriers (NTBs) or tariffs in African countries other than our 'willing' selection. Table 1 lists these selected countries and shows their respective GDP values as reported by the World Bank. Nigeria has recently supplanted South Africa as Africa's leading

[1] Unfortunately we cannot include Burundi in this grouping as Burundi is aggregated into the rest of east Africa in GTAP.

economic power,[2] with Egypt and Morocco following these two countries. We note in passing that the entire African GDP is just below the GDP of the United Kingdom (UK) but marginally above that of Brazil and Russia, and that our 'willing' countries represent 64.7% of African GDP.

Table 1: The African economies in the 'willing' FTA, GDP values

Economy	$ (billions)	% of Africa
Nigeria	521,803	22.3%
South Africa	350,630	15.0%
Egypt	271,973	11.6%
Morocco	104,374	4.5%
Ghana	47,929	2.1%
Tunisia	47,129	2.0%
Kenya	44,101	1.9%
Tanzania	33,225	1.4%
Zambia	22,384	1.0%
Uganda	21,483	0.9%
Botswana	14,788	0.6%
Namibia	12,580	0.5%
Rwanda	7,452	0.3%
Swaziland	3,791	0.2%
Malawi	3,705	0.2%
Burundi	2,718	0.1%
Lesotho	2,230	0.1%
Willing	1,512,295	64.7%
Africa	2,335,970	Africa % world 3.1%
World	74,909,811	

Source: World Bank

Results

Table 2 shows the changes in welfare from the FTAs assuming the scenario of a 100% reduction in merchandise tariffs, with the data expressed in US dollars (millions) as one-off increases in annual welfare at the assessed end point of 2025. On the right-hand side we show the welfare gains by country from the Chapter 2 scenario of Africa-wide tariff elimination. The first point is very clear. Our scenario of selected countries is very much a second-best solution; the gains to Africa from Africa-wide integration ($20,488 million) are much higher than the gains to our selected countries ($4,705 million). In addition, there are marginal losses to those African countries not included. In all African countries included the gains are more – and often significantly more – than they are for those gains from our selected 'willing' group only. That is except for (a) the minuscule $1 million difference for Malawi and (b) the turnaround from a $1,486 million loss for Zimbabwe with inclusion in Africa-wide countries to a much more modest $34 loss from exclusion in the selected group. Only South Africa has gains above Ghana's $694 million, and for some countries such as

[2] We note that the GTAP Version 9 database uses as its foundation the 2011 values, and the Nigerian GDP has been revised upwards since that date. This will have some follow-on effects on our results.

Botswana, Namibia, Tanzania and especially Zambia the gains from the selected group are to be scorned! While the selected FTA is still globally welfare enhancing, this global outcome is less than 10% of the global gains from an Africa-wide scenario (as shown in – literally and figuratively – the bottom line).

Table 2: 'Willing only' tariff elimination, welfare gains at 2025, $(millions)

Country	total	efficiency	labour	capital	ToT	All Africa
Total Africa	4,705	1,258	555	2,385	508	20,488
South Africa	2,228	531	356	911	430	5,742
Botswana	0	0	1	1	-3	68
Namibia	8	1	1	-3	9	463
Swazi-Lesotho	73	12	12	37	11	100
Kenya	439	147	13	521	-242	4,705
Tanzania	41	55	-3	58	-69	377
Uganda	106	38	1	76	-9	683
Rwanda	14	6	0	6	2	301
Malawi	40	14	2	21	3	41
Zambia	4	-1	2	4	-1	454
Egypt	350	60	25	174	91	518
Morocco	111	24	11	36	40	572
Tunisia	68	21	5	31	11	357
Nigeria	610	151	93	361	5	2,031
Ghana	694	227	40	195	231	813
Not included in the 'willing'						
Rest of east Africa	2	-4	-1	-1	8	15
Angola-DRC	-11	-5	0	-9	3	1,168
Ethiopia	0	1	0	-1	0	255
Madagascar	-6	-1	0	-3	-2	-1
Mauritius	-7	-1	0	-3	-3	76
Mozambique	-15	-1	0	-7	-7	14
Zimbabwe	-34	-12	0	-11	-11	-1,486
Senegal	-3	-1	0	-2	-1	1,211
Rest of Africa	-6	-7	-2	-9	13	2,012
EU	-610	-160	-20	-321	-110	-2,386
UK	-119	-43	-6	-39	-31	-364
US	-336	-67	-36	-156	-78	-726
China	-891	-109	-39	-531	-212	-2,351
India	-557	-118	-10	-279	-150	-1,539
Brazil	-139	-36	-11	-76	-17	-188
Russia	70	18	0	-5	57	553
Rest of world	-1,413	-388	-68	-986	29	-2,771
Total world	710	356	365	-8	-3	7,299

Source: GTAP output

Perhaps a different country aggregation may lead to better overall results. On our evidence, however, we do not have a strong economic case to make for an FTA integration based upon these selected countries only. A case for that could only be made as a second-best argument if progress towards full African integration seems to be irretrievably lost. Further analysis using a wider set of countries and only excluding some patently failed states may well, however, retrieve our policy position of a step-by-step approach based upon the EU history of gradual integration. In particular, note a significant different negotiating process for gradually extending from a base as distinct from a 'big bang' approach. This is because current EU enlargement allows for a series of processes to be enacted for membership over time. It is this negotiating process that may hold appeal.

In Table 3 we highlight where the main bilateral gains derive from for the major African countries as measured by the welfare gains in Table 2. The data is shown in a matrix of the full range of countries in the rows but only selected countries in the columns. Again, the cells are to be read as follows. In the column headed South Africa (zaf) there is a small loss from unilateral liberalisation ($64), but that is much more than compensated for by large gains from reforms in Kenya (ken) of $727 million and Nigeria (nga) of $367 million. Kenya is an interesting case in that it makes large gains ($475million) from its own liberalisation, while Ghana gains ($765million) from liberalisation in Nigeria. Similarly, Nigeria makes large gains from access into Ghana. Referring back to the comparable table in Chapter 2 for Africa-wide liberalisation we find that these gains are almost identical between full and partial integration for the main countries on a bilateral basis – if those countries are in our 'willing' configuration. The difference is that there are now too many missing countries where large bilateral gains were made under Africa-wide integration. For example, previously the gains to Uganda from access into rest of Africa ($558million from a total of $683million) no longer apply, and that decimates the gains to Uganda compared with countries Africa-wide.

Table 3: Contribution to welfare by country, $(millions)

EV $m	zaf	xsc	ken	tza	uga	egy	mar	nga	mwi	gha	tun
zaf	-64	0	64	0	15	132	35	15	2	3	28
bwa	-1	0	2	0	0	0	0	4	0	0	0
nam	-1	0	1	0	0	2	0	1	0	0	0
xsc	-2	1	1	0	0	3	1	1	1	0	0
ken	727	25	475	-9	-2	-64	5	24	-12	0	1
tza	472	24	-88	14	-8	92	3	7	55	1	0
uga	151	6	-51	-2	101	-10	3	7	-2	1	0
rwa	24	0	-5	-3	-5	-1	0	0	0	0	8
mwi	167	0	-31	32	0	0	0	5	-3	0	1
zmb	41	0	-2	0	0	0	0	6	0	1	0
egy	50	0	0	5	0	-1	0	18	0	2	0
nga	367	16	32	3	0	114	42	10	0	765	18
gha	266	0	30	2	1	78	36	457	0	-90	7
mar	15	0	3	0	0	6	-14	40	0	8	2
tun	14	0	9	0	3	-1	0	15	0	4	1
Total	2,228	73	439	41	106	350	111	610	40	694	68

Source: GTAP output

Table 4 moves on to show the matrix of GTAP sectors in the rows and contributions that changes in each of these sectors make in the cells for the major African countries. South Africa again does particularly well from agricultural reforms across the continent, and especially from secondary agriculture. Sugar has been listed as a separate sector in this analysis; this is because the outcomes from earlier tralac research show that South Africa is doing very well in this sector, especially with better access into Kenya and, to a lesser degree, Uganda. A powerful policy statement from our research is that the heavily protected and highly inefficient sugar sector in Kenya is a drag upon the economy. But we fully appreciate the political pressure, if not the economic logic, to maintain that protection. And again, we would expect the Swaziland-Lesotho aggregation (xsc) to do well in increased sugar opportunities, but this is not the case as South Africa dominates their $13 million contribution from sugar. Our arguments for reform in Kenyan sugar policies are reinforced as Kenya makes significant unilateral gains in the sugar sector. But this is because both reduce their sugar production significantly as shown in Table 6. This enables them to transfer resources out of a sector which has been heavily protected but technically inefficient. This is a classic example of how regional integration can benefit a country through efficiency gains: the overall welfare results for Kenya and, to a lesser extent Uganda, clearly show that reforming the sugar sector is beneficial to them.

Perhaps surprisingly, there are few gains in agriculture outside South Africa or the sugar sector in Kenya and Uganda. Note the losses in the sugar sector for Tanzania and Egypt. Both Egypt and Nigeria gain in the TCF, while South Africa does well in the manufacturing sectors. Gains in the motor vehicle (mvh) sector are muted outside South Africa's gains.

Table 4: Contribution to welfare by commodity, $(millions)

	zaf	xsc	ken	tza	uga	egy	mar	nga	mwi	gha	tun
PAgr	132	0	37	19	14	6	2	13	12	63	-1
SAgr	338	7	-93	-2	-4	27	52	5	-1	33	4
sugar	536	13	547	-89	93	-18	-2	8	30	-1	-1
nat	5	0	2	2	0	1	1	13	2	4	0
tex	61	1	1	6	-3	26	3	4	-5	69	10
wap	-15	0	-1	-5	-4	118	17	-6	-2	-3	14
lea	27	0	5	-1	-1	0	-7	167	-2	43	6
lum	29	0	-4	1	-1	6	0	5	-4	6	2
ppp	135	0	-34	19	0	18	18	2	-5	3	2
p_c	27	0	1	11	1	1	1	5	8	4	0
crp	229	48	-16	18	-3	34	7	83	5	166	6
nmm	19	0	-4	2	0	22	0	28	3	2	4
i_s	84	0	1	12	1	9	0	14	-1	10	0
nfm	14	0	1	7	0	2	0	47	0	23	0
fmp	124	0	1	1	-1	50	2	22	-5	8	5
mvh	193	0	1	15	9	7	0	24	0	2	4
otn	14	0	0	1	0	0	0	3	0	0	0
ele	41	0	4	2	3	2	0	74	0	28	1
ome	187	1	-1	22	1	39	1	127	3	137	8
omf	49	1	-8	0	1	1	15	-28	2	95	3
Total	2,228	73	439	41	106	350	111	610	40	694	68

Source: GTAP output

Table 5 turns to the expected changes in aggregate trade as measured by the percentage changes in the quantity of both exports and imports and to the changes to the overall trade balance as measured in dollars (millions). Again, the trade balance is a macroeconomic closure in the GTAP model that is heavily influenced by the difference on one side of an equation that measures savings and investment which has to balance with exports minus imports on the other side of the classic macroeconomic equation. It is therefore not a trade balance as could be expected as it reflects changes in investment (capital) rather than actual changes in trade values. The terms of trade as shown in Table 2 reflect the changes in the relative prices of exports and imports while the export and import changes shown here are a combination of changes to both prices and volumes.

The trade results from the Africa-wide comprehensive FTA are shown on the right-hand side of Table 5 for a comparison. For all partners, except Zambia which has reversed to a small decline (a marginal increase in exports in the 'willing' scenario), these current 'willing only' trade gains are less than they are for the full Africa wide FTA. Some are significantly less (Rwanda) while others show little difference. For imports, the pattern is almost exactly the same, with Zambia reversing a small decline but all others gaining significantly less.

Table 5: Percentage changes in trade for the partners

	Willing only			Africa-wide	
	Exports %	imports %	Balance $ (millions)	Exports %	Imports %
South Africa	1.0	1.3	-20	2.7	3.5
Botswana	0.1	0.1	2	1.1	1.8
Namibia	0.0	0.1	5	2.6	5.0
Swazi-Lesotho	1.7	2.5	18	2.4	3.6
Kenya	4.4	2.1	-117	5.7	4.5
Tanzania	2.8	2.0	-94	3.7	3.2
Uganda	1.6	1.5	-19	4.3	6.4
Rwanda	0.7	0.8	-1	10.1	13.8
Malawi	3.5	3.3	-6	4.2	3.5
Zambia	0.1	0.1	8	-0.7	-0.9
Egypt	0.2	0.3	-76	0.3	0.4
Nigeria	0.7	0.9	-47	1.7	2.0
Ghana	7.1	5.5	-324	9.1	7.0
Morocco	0.2	0.2	-41	0.8	1.1
Tunisia	0.2	0.3	-9	1.0	1.2

Source: GTAP output

Changes to **production** in the partner countries are shown in Table 6 (again expressed as changes from the non-FTA base) and, as expected, these changes largely reflect the sector contributions to welfare changes as shown in Table 4. The top two rows show that the demand for both skilled and unskilled labour in many of the countries increases, although only in the rest of SACU, Swaziland and Lesotho (xsc), and South Africa (0.22%) are these gains meaningful. Secondary agriculture and sugar are again well-performing sectors across the partial FTA. For secondary agriculture there are some solid increases in production from South Africa, Swaziland-Lesotho and Kenya. We have discussed the sugar sector, and the

production increases in South Africa and declines in Kenya and Uganda are large. However, for the first time we are seeing an increase in sugar production of 10% in Swaziland-Lesotho, and the large percentage declines in production in Kenya, Tanzania, Uganda and Egypt in response to SACU competition are highlighted here. There are a few changes in the manufacturing sectors that really stand out, and note that some large percentage changes may be off low initial bases.

Table 6: Increases in factors of production & actual production, %

	zaf	xsc	ken	tza	uga	egy	mar	nga	zmb	tun
Unskilled	0.22	0.48	0.03	-0.02	0.01	0.02	0.01	0.03	0.01	0.02
Skilled	0.22	0.49	0.10	0.00	0.01	0.02	0.01	0.05	0.01	0.02
capital	0.56	1.47	2.06	0.49	0.76	0.15	0.10	0.33	0.05	0.14
PAgr	-0.02	0.50	0.66	0.06	0.57	-0.01	0.00	0.00	0.25	-0.03
SAgr	0.99	2.08	1.91	-0.52	-0.05	0.11	0.37	-0.05	-0.26	0.02
sugar	24.22	9.81	-32.91	-57.29	-28.09	-1.17	0.02	0.10	-1.40	-0.03
nat	-0.14	-0.22	0.11	0.11	0.03	-0.01	-0.03	0.01	0.01	0.00
tex	0.85	-2.77	3.00	3.82	-0.72	0.09	-0.01	-0.13	-0.34	0.50
wap	0.03	-3.91	2.08	-0.14	-1.89	0.41	0.23	-0.14	-0.23	0.37
lea	0.61	-3.20	11.05	-0.01	2.59	-0.06	-0.50	5.10	-1.05	0.13
lum	1.02	-0.19	0.84	-1.08	-0.17	0.16	0.01	-0.03	0.06	0.14
ppp	1.50	0.71	-0.95	-6.32	-2.20	0.54	0.80	0.14	-0.03	0.22
p_c	0.71	1.44	1.49	-0.64	0.94	0.06	0.06	0.17	-1.58	0.13
crp	0.57	17.72	3.93	2.50	1.17	0.25	-0.01	2.07	0.32	0.11
nmm	0.47	1.37	1.27	0.67	0.55	0.17	0.02	7.63	-1.79	1.56
i_s	0.22	-0.07	1.05	1.96	1.34	0.18	-0.18	2.53	0.73	0.02
nfm	-2.47	-0.80	3.78	3.30	1.47	-0.39	-0.24	2.86	0.02	0.06
fmp	1.43	0.43	1.68	-3.36	-0.51	0.50	0.00	0.98	0.86	0.24
mvh	0.79	0.66	0.42	0.11	0.15	0.25	-0.06	0.02	-1.34	0.06
otn	-0.10	-1.52	1.98	1.97	0.90	0.10	-0.13	0.46	0.08	-0.14
ele	0.25	-0.43	3.02	1.50	1.45	0.06	-0.12	-0.55	0.03	-0.10
ome	0.10	-0.49	1.56	1.99	1.77	1.61	-0.19	0.75	0.30	0.05
omf	0.35	-2.03	2.12	1.30	0.21	0.11	0.84	-5.53	2.90	0.80
serv	0.48	0.88	1.40	0.29	0.51	0.07	0.05	0.13	0.02	0.08

Source: GTAP output

Table 7 shows some more technical outcomes relating to the simulation. In effect, it shows that the welfare changes are mostly increasing when expressed in real GDP, with some of these increases around one percent of real GDP. The terms of trade vary, with some improving and others declining and these changes are up to one percent either way (Kenya down and Ghana up). The returns from factor income such as the standard land, labour and capital mostly improve but the contributions from skilled and unskilled labour are seldom large although some useful contributions are made (Ghana, for example). Again we emphasise that these changes are not the same as those shown in Table 6 above, which indicated the changes in employment levels. The data shown below is the contribution that changes in the total wage bill make to total factor income. In this version of the model we use a 'closure' or assumption that the wage bill is split between increased wages for those in work and new employment. This is based upon the unemployment rate in each country. All countries except Rwanda attract more capital.

Table 7: Changes in ToT, real GDP and total factor income along with contributions to factor income by %

	Terms of Trade	Real GDP	Total factor income		Contributions from			
				land	unskilled	skilled	capital	resource
zaf	0.32	0.40	0.86	0.05	0.20	0.25	0.39	-0.02
bwa	-0.03	0.01	0.07	0.01	0.03	0.01	0.04	-0.01
nam	0.12	0.00	0.13	0.01	0.02	0.01	0.02	0.07
xsc	0.55	0.95	1.80	0.23	0.41	0.38	0.87	-0.09
ken	-0.93	1.04	0.45	-0.23	0.07	0.11	0.48	0.02
tza	-0.35	0.20	-0.17	-0.15	-0.06	0.00	0.03	0.01
uga	-0.08	0.42	0.22	0.03	0.03	0.02	0.12	0.01
rwa	0.09	0.08	-0.07	-0.02	-0.03	-0.01	-0.02	0.01
mwi	0.14	0.40	0.99	0.42	0.22	0.13	0.20	0.02
zmb	-0.02	0.02	0.17	0.10	0.04	0.02	0.02	0.01
egy	0.08	0.08	0.20	0.00	0.03	0.06	0.10	0.00
nga	-0.01	0.11	0.15	0.01	0.04	0.04	0.04	0.01
gha	0.93	0.67	1.93	0.11	0.59	0.77	0.52	-0.06
mar	0.07	0.05	0.14	0.01	0.05	0.04	0.05	0.00
tun	0.04	0.08	0.14	0.00	0.03	0.04	0.07	0.00

Source: GTAP output

Tariff revenues

Changes in the tariff revenues collected at the respective borders are shown in Table 8, where a comparison can be made between these 'willing only' revenues and the right-hand side that shows the declines in tariffs from the complete Africa-wide integration. For many of the countries involved there is little difference. The main exception is SACU where revenues increase by $16 million in contrast to the surprisingly large $167 million increase from an Africa-wide integration.

Table 8: Changes to tariff revenues

	Revenue,US$ (millions)	
	Willing only	Africa-wide
SACU	16	167
Kenya	-448	-416
Tanzania	-452	-445
Uganda	-100	-85
Rwanda	-10	-3
Malawi	-96	-101
Zambia	-23	-20
Egypt	-8	-25
Nigeria	-478	-681
Ghana	-205	-382
Morocco	-14	-16
Tunisia	-14	-20

Source: GTAP output

Chapter 6

The African 'willing' countries' results: reduction in non-tariff barriers

Summary and key points

This chapter examines the implications of a reduction in non-tariff barriers (NTBs) for our Free Trade Agreement (FTA) of the 'willing'[1] countries only. While our results confirmed that partial African integration was very much a second-best option, they nonetheless show that even piecemeal reforms across selected countries lead to some meaningful gains for the continent. It is still a second-best situation, however, and, furthermore, it does not make much sense to address NTBs within the context of an FTA made up of countries geographically so diverse. Even in the best of situations an FTA is not the optimal vehicle for NTB reductions, but at least our results underscore the potential benefits that can be captured from a reduction in NTB costs.

Our results show that the 'willing' partners' NTB reductions represent only 35% of the Africa-wide NTB reduction outcome. There is significant variation in this result, however, as Kenya, Tanzania, Malawi and Ghana all report gains that are 80% or more of the Africa-wide level. Since the overall result is still globally welfare-enhancing and there are large gains for some countries, this highlights that there is significant benefit to be had from reducing barriers to trade, albeit not comprehensively across Africa.

Kenya and Tanzania, two of the big gainers, are the most interesting case studies. Most of the Kenyan gains derive from reforms in Tanzania while most of the Tanzanian gains derive from unilateral reforms in Tanzania itself. This result can be traced back to NTBs in Tanzania that are extremely high (22% for agriculture and 47.4% for manufacturing). A natural consequence is therefore that Kenya, a country with a high economic linkage to Tanzania, will gain from reforms there.

South Africa and Kenya do particularly well from reductions in constraints to agricultural trade across the continent, and especially from secondary agriculture. Our tariff elimination results earlier show that there are significant potential gains to both parties from reforms in the sugar trading relationship between an efficient South African sugar sector on the one hand and an inefficient and highly protected Kenyan sugar sector on the other. While there is some evidence that these gains do occur with NTB reductions, they are not nearly as pronounced as when we were dealing with tariffs rather than with the more subtle NTBs.

[1] These are countries in Africa that we considered to be 'willing and able' to move forward towards full integration. We assessed the five countries in the Southern African Customs Union (SACU), four in the East African Community (EAC), Malawi, Zambia and Egypt in the Tripartite FTA region, Nigeria and Ghana in west Africa and Morocco and Tunisia in north Africa as being our foundation members of what we call 'an FTA of the willing'.

For trade, the emphasis is placed on big changes in the trade flows of both Kenya and Tanzania. From our results, these changes are likely to be increases in the bilateral trade flows. These increases have an impact on other Global Trade Analysis Project (GTAP) results. In particular, the outcome is that the demand for both skilled and unskilled labour in Kenya becomes significant. Significant also is the fact that both Kenya and Tanzania have increases in the real Gross Domestic Product (GDP) of around two percentage points. These are significant gains and further highlight how NTBs are dragging particularly these two countries down.

Introduction and background

We used as our base scenario the simulation whereby we reduce all tariff between all African countries to zero, and reported the results of this scenario in Chapter 2. We then moved on to simulate a reduction in NTBs across Africa in Chapter 3 before combining both tariff elimination and NTB reductions across Africa in Chapter 4. As outlined in our introduction to Chapter 1 we also simulate an FTA between those countries in Africa that we consider to be 'willing and able' to move forward towards full integration. This was undertaken in Chapter 5. In this current chapter we will examine the implications of a reduction in NTBs for the 'FTA of the willing'.

In Chapter 5 we outlined the background to our thinking on this potential integration and named the countries that we included. Our simulation results confirmed that partial African integration was very much a second-best option but nonetheless it still offered potential gains to those countries we included in our simulation. In this current chapter we will reproduce the simulation undertaken in Chapter 3 that reduced NTBs across Africa: the difference is that we are only including our 'willing' partners.

At the outset we must stress that, again, we are looking at a second-best situation. This is because many of these NTBs are Africa-wide issues. Furthermore, as mentioned above, it does not make much sense to address NTBs within the context of an FTA made up of countries geographically so diverse. Even in the best of situations an FTA is not the optimal vehicle for NTB reductions. However, having said that we also consider that this chapter will at least underscore the potential benefits that can be gained from a reduction in NTB costs.

All the background discussions and dataset analysis relating to this simulation are given in our main NTB work in Chapter 3. We will not repeat that discussion here but will rather just make reference to it.

Results

Table 1 shows the changes in welfare from the FTAs assuming the scenario of a 50% reduction in NTBs and NTBs only for the selected group of countries chosen for our so-called 'willing' group within Africa. The data relating to our results is expressed in US dollars (millions) as one-off increases in annual welfare at the assessed end point of 2025. The Equivalent Variation (EV) shown in Table 1 represents the combined effects of reducing the ad valorem equivalent (AVE) NTB tariff calibrated into the database and the efficiency augmenting technical change as discussed in Chapter 3.

The direct NBT efficiency gain for South Africa is only $8 million but this increased efficient reduces import price which contributes to changes in terms of trade (ToT), consumption patterns and firm production costs. It ultimately changes allocative efficiencies and the amount of capital and the labour force employed in South Africa. Thereby the direct efficiency gain of $8 million has multiple second-round effects

The data on the left-hand side reflects the output from this simulation in welfare gains/losses. The data in the right-hand columns of Table 1 shows (a) the linkages between initial NTB levels and welfare gains from their reduction under the 'NTB efficiency' and (b) the percentage that our results in Table 1 show, namely how NTB gains to the selected 'willing' countries relate to the Africa-wide NTB reduction welfare outcome from Chapter 3.

The main point is clear. There is a wide variation in the size of the welfare gains between the Africa-wide results and our selected partners. The selected countries represent a second-best solution with overall gains of only 35% of the Africa-wide total. Those African countries which do not belong to the 'willing' selection are effectively neutral in most instances, although there is some trade deflection in cases such as the Angola-DRC aggregation. While there is significant variation in this result for the 'willing' parties (with the Swaziland-Lesotho aggregation, Kenya, Tanzania, Malawi and Ghana all reporting gains of 80% or above those of the Africa-wide level), the overall result is that the selected NTB reduction is still globally welfare-enhancing. More importantly, these gains are large for some countries and this fact highlights that there are significant gains to be had from reducing barriers to trade, albeit not comprehensively, across Africa.

Table 1: 'Willing' countries, NTB reductions, welfare gains at 2025, $(millions)

	total	efficiency	labour	capital	ToT	NTB efficiency	Africa-wide
Total Africa	6,391	1,059	582	2,814	899	1,037	35%
South Africa	1,354	370	220	518	239	8	50%
Botswana	5	1	1	3	-3	3	41%
Namibia	9	0	1	2	3	3	5%
Swazi-Lesotho	52	9	9	25	7	2	85%
Kenya	1,814	235	149	901	481	49	86%
Tanzania	855	80	52	453	-186	456	83%
Uganda	307	72	21	153	55	5	65%
Rwanda	28	6	1	16	-3	7	42%
Egypt	623	49	37	346	57	133	44%
Morocco	142	2	10	48	19	62	29%
Rest of east Africa	-9	4	1	-2	-11	0	-15%
Nigeria	541	110	20	194	-7	224	39%
Angola-DRC	-35	-9	-1	-24	0	0	-2%
Ethiopia	-4	-1	0	-2	-1	0	-5%
Madagascar	-1	0	0	0	0	0	-4%
Malawi	80	11	4	10	32	23	80%
Mauritius	-5	-1	0	-3	-2	0	-2%
Mozambique	-12	-1	0	-6	-5	0	-27%
Zambia	110	7	20	32	45	6	48%
Zimbabwe	-22	-4	0	-7	-10	0	-12%
Ghana	394	113	23	81	164	14	81%
Tunisia	203	25	15	87	33	42	27%
Senegal	-1	0	0	-1	0	0	0%
Rest of Africa	-37	-19	-1	-10	-8	0	-1%
EU	-1,084	-316	-44	-584	-140	0	
UK	-154	-55	-9	-53	-37	0	
US	-577	-127	-72	-290	-88	0	
China	-1,406	-184	-57	-873	-292	0	
India	-668	-170	-12	-339	-147	0	
Brazil	-129	-34	-8	-89	2	0	
Russia	-93	-13	-2	-87	10	0	
Rest of world	-2,774	-615	-126	-1,818	-215	0	
Total world	-494	-455	252	-1,321	-7	1,037	

Source: GTAP output

In Table 2 we highlight where the main bilateral gains for the selected African countries derive from as measured by the welfare gains in Table 1: the matrix contains the full range of countries in the rows but only selected countries in the columns. Kenya and Tanzania are the two most interesting case studies. Their gains are the first and third highest in Table 1. Table 2 highlights that most of the Kenyan gains derive from reforms in Tanzania while most of the Tanzanian gains derive from unilateral reforms in Tanzania itself. Reverting back to Table 1 in Chapter 3 we can see that the NTBs in Tanzania are extremely high (22% for agriculture and 47.4% for manufacturing).The natural consequence is that Kenya, a country with a high economic linkage to Tanzania, will gain from reforms there. Many of the cells contain low totals or even zero, indicating the low levels of intra-African trade linkages between many countries. However, the Nigerian-Ghana relationship shows some interesting outcomes – with Ghana (and Kenya) doing very well due to liberalisation in Nigeria while the converse does not hold. Similarly, the Egypt-Morocco relationship shows some mutual gains.

Table 2: Contribution to welfare by country, $ (millions)

	zaf	xsc	ken	tza	uga	egy	mar	nga	mwi	zmb	gha	tun
zaf	18	0	2	0	0	6	0	2	2	1	0	0
bwa	5	0	0	0	0	0	0	0	0	0	0	0
nam	10	0	0	0	0	0	0	0	0	0	0	0
xsc	4	2	0	0	0	0	0	0	0	0	0	0
ken	29	0	50	10	20	22	1	2	12	1	0	0
tza	760	29	1,337	813	262	62	4	88	21	22	12	-1
uga	1	0	18	0	4	0	0	0	0	0	0	0
rwa	2	0	12	3	15	1	0	0	0	0	0	1
egy	76	0	321	20	2	125	40	38	18	79	6	61
mar	2	0	5	0	1	142	-28	18	0	0	2	79
nga	399	20	35	6	1	98	45	369	0	-1	360	24
mwi	18	0	22	3	0	1	0	1	27	4	0	0
zmb	9	0	5	0	0	0	0	0	1	2	0	0
gha	23	0	3	0	0	5	11	22	0	0	12	1
tun	0	0	2	0	2	161	69	2	0	0	1	38
Total	1,354	52	1,814	855	307	623	142	541	80	110	394	203

Source: GTAP output

Table 3 shows the matrix of GTAP sectors in the rows and contributions that changes in each of these sectors make to the major African countries in the cells. South Africa and Kenya do particularly well from reductions in constraints to agricultural trade across the continent, especially from secondary agriculture. In the earlier analysis, the sugar trading relationship between an efficient South African sugar sector on the one hand and an inefficient and highly protected Kenyan sugar sector on the other shows large gains to both parties; this is because South African exports displaced inefficient production in Kenya. While there is some evidence that this displacement occurs here it is not nearly as pronounced as when we were dealing with tariffs rather than with the more subtle NTBs. Gains in manufacturing are spread across many cells.

Table 3: Contribution to welfare by commodity, $(millions)

	zaf	ken	tza	uga	egy	mar	nga	mwi	zmb	gha	tun
PAgri	49	195	27	18	74	3	71	51	7	53	35
SAgri	160	413	19	10	74	44	50	7	1	50	34
sugar	15	44	12	4	22	1	2	6	0	1	-1
tex	21	146	4	49	34	6	7	0	0	25	10
wap	5	24	-10	10	10	2	-2	0	0	0	0
lea	4	114	-16	46	1	3	5	0	0	34	2
lum	7	21	8	1	6	0	2	1	0	6	1
ppp	44	46	53	5	24	17	0	0	0	1	8
p_c	66	5	96	1	2	2	13	3	0	2	2
crp	211	296	105	41	71	14	50	4	2	78	51
nmm	6	52	-1	3	32	0	4	1	0	1	5
i_s	101	38	62	5	22	4	18	0	1	2	10
nfm	58	17	88	1	116	14	18	-1	91	21	5
fmp	69	59	23	3	40	7	11	0	0	7	6
mvh	104	47	90	9	6	15	33	1	1	1	4
otn	96	2	24	2	0	0	0	0	0	0	0
ele	38	94	20	4	11	0	40	0	0	10	3
ome	285	183	249	94	78	9	205	5	8	71	27
omf	14	17	1	1	0	1	14	0	0	34	1
Total	1,354	1,814	855	307	623	142	541	80	110	394	203

Source: GTAP output

Table 4 turns to the expected changes in aggregate trade as measured by the percentage changes in the quantity of both exports and imports and also to changes to the overall trade balance, as measured in dollars (millions). Again the trade balance is a macroeconomic closure in the GTAP model that is heavily influenced by the difference on one side of an equation that measures savings and investment – an equation which has to balance with exports minus imports on the other side of the classic macroeconomic equation. It is therefore not a trade balance as could be expected; this is because it reflects changes in investment (capital) rather than actual changes in trade values. The ToT as shown in Table 1 reflect the changes in the relative prices of exports and imports while the export and import changes shown here are a combination of changes to both prices and volumes.

Again, the big changes are in the trade flows of both Kenya and Tanzania. Based on the evidence from Table 2 it is likely that these are increases in the bilateral trade flows. It also seems that there may be some spill over effects for both Uganda and Rwanda as well.

Table 4: Percentage changes in trade for the partners

	Exports %	Imports %	Balance $ (millions)
South Africa	0.7	0.8	4
Botswana	0.2	0.3	2
Namibia	0.1	0.2	4
Swazi-Lesotho	1.4	2.0	12
Kenya	3.7	5.5	-684
Tanzania	4.6	4.1	-335
Uganda	1.6	2.5	-45
Rwanda	1.0	0.8	-2
Egypt	0.7	0.7	-120
Morocco	0.6	0.5	-51
Nigeria	0.3	0.3	-14
Malawi	1.1	1.9	-7
Zambia	0.4	0.7	64
Ghana	2.1	2.0	-151
Tunisia	0.7	0.8	-22

Source: GTAP output

Changes to **production** in the partner countries are shown in Table 5and, as expected, these changes largely reflect the sector contributions to welfare changes as shown in Table 3. The top two rows show that the demand for both skilled and unskilled labour in many of the countries is muted, although in Kenya it is more meaningful. In the secondary agriculture and sugar sectors, there are again glimpses of sugar relationship between South Africa and Kenya, but not nearly as pronounced as it is under tariff elimination that lays bare the Kenyan inefficiencies. There are few changes in the manufacturing sectors that really stand out, except perhaps for some changes in the profile of the East African Community (EAC) members.

Table 5: Increases in factors of production & actual production, %

	zaf	ken	tza	uga	rwa	egy	mar	nga	mwi	zmb	gha	tun
Unskilled	0.1	0.6	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Skilled	0.1	0.6	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
capital	0.3	3.6	3.8	1.5	0.5	0.3	0.1	0.2	0.4	0.4	0.6	0.4
PAgr	0.1	0.2	0.0	0.2	0.1	0.0	-0.1	0.0	0.3	0.3	0.0	0.4
SAgr	0.5	2.6	-0.3	0.5	0.2	0.4	0.3	-0.1	-0.7	-0.3	0.3	0.3
sugar	1.1	-3.7	0.8	-3.7	0.2	2.5	0.2	-0.1	4.1	-1.0	3.7	-0.2
nat	-0.1	0.3	0.1	-0.3	-0.1	0.0	0.0	0.0	-0.2	-0.1	-0.3	0.0
tex	0.3	4.8	-5.1	14.1	2.4	0.1	0.2	-0.4	-1.8	-0.5	9.1	-0.5
wap	0.1	0.0	-0.9	3.5	0.0	0.1	0.0	0.0	-1.2	0.1	-0.5	-0.2
lea	-0.1	5.1	-9.4	3.6	-0.8	0.1	-0.1	0.1	-0.9	-0.3	8.6	-0.3
lum	0.1	2.9	-2.5	1.5	1.1	0.4	0.0	0.0	4.3	0.1	1.4	0.2
ppp	0.5	1.2	-3.3	1.5	-1.7	0.8	0.6	-0.2	1.7	0.2	-0.6	0.2
p_c	1.1	2.8	-3.3	-0.5	-0.6	0.1	0.1	0.0	-2.1	0.2	1.0	0.1
crp	0.6	7.4	0.9	3.1	-0.6	0.7	0.1	0.2	-1.9	-0.1	4.8	1.2
nmm	0.2	2.6	0.4	0.9	-1.6	0.3	0.0	0.5	3.3	-0.3	-0.2	0.3
i_s	0.7	14.3	-1.5	1.4	2.0	0.3	0.2	0.2	-1.3	2.8	-0.5	1.3
nfm	-1.5	-1.5	7.6	0.0	0.3	-1.6	0.6	0.8	0.4	0.3	-4.1	-0.1
fmp	0.9	10.7	-13.4	0.9	13.4	0.5	0.3	0.4	0.1	-0.5	-0.4	0.3
mvh	0.4	25.6	-1.7	1.0	0.1	0.5	1.3	-0.1	1.9	1.7	5.5	0.1
otn	10.0	0.4	1.1	-1.5	0.0	0.5	0.0	0.4	-1.5	-0.7	-0.2	-0.3
ele	0.6	5.7	-1.4	3.1	0.2	0.5	0.0	-0.2	-0.5	-1.3	94.9	-0.4
ome	0.8	18.6	-1.3	15.7	4.2	4.2	0.0	1.4	9.0	-0.2	1.5	0.0
omf	0.2	0.2	3.8	2.7	0.2	0.4	0.1	-2.3	0.3	-0.7	59.9	0.3
serv	0.3	2.3	2.1	0.9	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.2

Source: GTAP output

Table 6 shows some more technical outcomes relating to the simulation. In effect, it shows that the welfare changes mostly increase when expressed real GDP with, again, Kenya and Tanzania showing increases in real GDP of around two percentage points. These are significant gains and further highlight how NTBs are dragging these two countries in particular down. Further across the table the same EAC cells stand out for their increases in total factor income, with Kenya as the star. Again, recall that these returns from factor income (such as the standard land, labour and capital) are not the same as those shown in Table 5 above for labour in particular. Table 5 shows the changes in employment levels. The data shown below is the contribution that changes in the total wage bill make to total factor income.

Table 6: Changes in ToT, real GDP and total factor income along with contributions to factor income by %

	Terms of trade	Real GDP	Total factor income	Contributions from land	unskilled	skilled	capital	resource
zaf	0.18	0.24	0.51	0.01	0.12	0.16	0.23	-0.01
bwa	-0.02	0.04	0.06	-0.01	0.03	0.01	0.04	-0.01
nam	0.05	0.03	0.14	0.07	0.03	0.01	0.04	-0.01
xsc	0.36	0.69	1.23	0.12	0.30	0.28	0.59	-0.07
ken	1.99	2.01	4.89	0.53	1.45	0.66	2.12	0.12
tza	-0.55	1.81	1.92	0.15	0.65	0.46	0.63	0.02
uga	0.83	0.91	2.06	0.23	0.61	0.33	0.96	-0.06
rwa	-0.14	0.21	0.68	0.21	0.26	0.07	0.15	-0.02
egy	0.05	0.18	0.32	0.02	0.05	0.08	0.16	0.00
mar	0.03	0.09	0.12	-0.02	0.04	0.05	0.05	0.00
xec	-0.04	0.00	0.01	0.01	0.00	0.00	0.00	0.00
nga	-0.02	0.09	0.03	-0.01	0.00	0.01	0.01	0.01
xac	0.00	-0.02	-0.02	0.00	0.00	-0.01	-0.01	0.00
eth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
mdg	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
mwi	0.95	0.49	1.79	0.74	0.43	0.29	0.38	-0.04
mus	-0.01	-0.02	-0.02	0.00	0.00	0.00	-0.01	0.00
moz	-0.04	-0.02	-0.01	0.00	0.00	0.00	-0.01	0.00
zmb	0.34	0.20	0.91	0.19	0.29	0.20	0.25	-0.02
zwe	-0.09	-0.07	-0.06	0.02	-0.02	-0.02	-0.04	0.00
gha	0.65	0.33	1.10	0.09	0.34	0.43	0.27	-0.04
tun	0.10	0.25	0.51	0.09	0.13	0.10	0.20	0.00
sen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RAfr	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00

Source: GTAP output

Chapter 7

The African 'willing' countries' results: tariff elimination and reduction in non-tariff barriers

Summary and key points

In Chapter 5 we simulated a Free Trade Agreement (FTA) between selected 'willing' African countries[1] only, whereby we eliminated all bilateral tariffs. In Chapter 6 we followed this up by reducing non-tariff barriers (NTBs) between these countries and these countries only by 50%. In this chapter we combine both tariff elimination and NTB reduction between these selected countries.

This is a second-best situation in that (a) the partial African integration of selected countries is an option only if the road to full integration appears to be irretrievably blocked and (b) many of the NTBs are Africa-wide issues. It does not make much sense to address NTBs within the context of an FTA made up of countries geographically so diverse.

The results still point to a welfare gain to Africa but the FTA is **not** globally welfare-enhancing. This confirms that trade diversion and less-than-optimal resource reallocations taking place are globally suboptimal. Five points can be deduced from the results:

- South Africa shows gains in almost all of our selected countries.
- There is a concentration of gains in the Tanzania-Kenya conglomeration's own and bilateral cells.
- Changes to the Ghana-Nigeria trading relationship throw up some large gains.
- Along the Mediterranean coastline the changes result in some interesting unilateral and bilateral gains.
- Some geographically diverse bilateral partners such as Egypt and Nigeria show comfortable bilateral gains.

Again, South Africa does particularly well from agricultural reforms across the continent, and especially from secondary agriculture and the sugar sector (Kenya and Uganda). Apart from this there are agricultural gains to Egypt, Morocco and Ghana but not to others. Several but not all countries gain in the textile, clothing and footwear (TCF) sector, while South Africa, as always, does well in the manufacturing sectors.

All 'willing' partners increase both exports and imports, with some of these changes being significant – up to and even above 10% (Ghana, followed by Tanzania and Kenya). Changes to **production** largely reflect the sector contributions to welfare; and the demand for both skilled and unskilled labour in many of the countries increases although capital shows gains

[1] We assessed the five countries in the Southern African Customs Union (SACU), four in the East African Community (EAC), Malawi, Zambia and Egypt in the Tripartite FTA region, Nigeria and Ghana in west Africa and Morocco and Tunisia in north Africa as being the foundation members of what we call 'an FTA of the willing'.

that are in general much more meaningful. Secondary agriculture and sugar are again well-performing sectors while there are few significant changes in the manufacturing sectors. Welfare changes mostly increase when expressed in real Gross Domestic Product (GDP), with Kenya and Tanzania doing especially well. The terms of trade (ToT) vary, with some improving and others declining, and these changes are up to 1% either way (Ghana's increase of 2.4% is large).

Introduction and background

In Chapter 5 we simulated an FTA between selected 'willing' African countries only. According to this configuration we eliminated all bilateral tariffs. In Chapter 6 we followed this up by reducing NTBs between these countries, and these countries only, by 50%. In this chapter we combine both tariff elimination and NTB reduction between these selected countries. A background as to how we modelled the potential gains from NTB reductions along with our data sources is given in Chapter 3, while the results of the 'willing' simulations to date are given in Chapters 5 and 6 for the tariff elimination and NTB reductions.

The five countries in the Southern African Customs Union (SACU), four in the East African Community(EAC)[2], Malawi, Zambia and Egypt in the Tripartite FTA region, Nigeria and Ghana in west Africa, and Morocco and Tunisia in north Africa are our foundation members of what we call 'an FTA of the willing'. Note that this grouping contains around 65% of total African GDP. The grouping contains Nigeria which has recently supplanted the African manufacturing giant South Africa as Africa's leading economic power,[3] and Egypt, the third most important African country by GDP.

Again we stress that we are looking at a second-best situation in that (a) the partial African integration of selected countries is an option only if the road to full integration appears to be irretrievably blocked and (b) many of the NTBs are Africa-wide issues. It does not make much sense to address NTBs within the context of an FTA made up of countries geographically so diverse. Even under the best of circumstances an FTA is not the optimal vehicle for NTB reductions, but we argue that our results will at least emphasise the potential benefits that can be captured from a reduction in NTB costs. And, again, the background discussions and dataset analysis relating to the NTB part of this simulation were given in Chapter 3 and our tariff elimination scenario for the selected countries was presented in Chapter 5. Also, Chapter 4 reported on the simulation results from combining tariff elimination and an NTB reduction across the whole continent. We will not repeat these discussions here.

Results

Table 1 shows the changes in welfare from the selected groupings' FTA, assuming the scenario of a 100% reduction in merchandise tariffs and a 50% reduction in NTBs. The data is expressed in US dollars (millions) as one-off increases in annual welfare at the assessed end

[2] Unfortunately, we cannot include Burundi in this grouping as Burundi is aggregated into the rest of east Africa in GTAP.

[3] We note that the GTAP version 9 database uses as its foundation the 2011 values, and the Nigerian GDP has been revised upwards since that date. This will have some follow-on effects on our results.

point of 2025. In the right-hand column we are able to isolate the welfare gains (by country) that result from efficiency gains flowing from the one half of NTB reduction that we modelled to represent efficiency gains (the other half was modelled as economic rents and the benefits became merged with the overall tariff elimination results).

Despite our selected countries representing a second-best solution to Africa-wide integration Table 1 still points to a welfare gain to Africa of just over $12 billion. Note, however, that the selected FTA is **not** globally welfare-enhancing; this confirms that the trade diversion and less-than-optimal resource reallocations that take place are globally suboptimal.

By country, South Africa is again the big gainer from this simulation, followed by Kenya, Ghana and Egypt. An indication of the impact that NTBs may have on the combined outcome can be gleaned from Table 1 in Chapter 3 where the NTB barriers that we are using are given. Here the barriers in South Africa are very low, while those in Kenya are very high for agriculture and agriculture only, and those in Tanzania are extremely high for both. Chapter 6 showed that large NTB gains for Kenya and Tanzania were concentrated in their unilateral and bilateral liberalisations, so it is natural that these effects will show up again in the form of significant gains in the combined simulation for these two countries in particular. As expected, all countries outside our selected group lose, albeit sometimes marginally and, in addition, note that a large share of the overall welfare gains results from capital market readjustments (for Kenya in particular).

Perhaps a different country aggregation may lead to better overall results. But even by combining tariff eliminations and NTB reductions we still do not have a strong economic case to make for an FTA integration based upon these selected countries only. Such a case could only be made as a second-best argument if progress towards full African integration seems to be irretrievably lost. However, further analysis using a wider set of countries and only excluding some patently failed states may well retrieve our policy position of a step-by-step approach based upon the EU history of gradual integration. Therefore possible pointers would be to use a significantly different negotiating process than the proposed full integration. An approach of gradually extending from a selected base may be an option should political recalcitrant members block African progress. It is this negotiating process that may hold some appeal. Just perhaps.

Table 1: 'Willing' countries, tariff elimination & NTB reduction, welfare gains at 2025, $ (millions)

	Total	Efficiency	Labour	Capital	ToT	NTB efficiency
Total Africa	12,183	2,175	1,222	5,880	1,686	1,220
South Africa	4,394	1,101	706	1,747	832	9
Botswana	5	2	3	4	-7	3
Namibia	18	1	2	-1	12	3
Swazi-Lesotho	152	26	26	75	23	2
Kenya	2,149	361	152	1,386	192	58
Tanzania	885	28	54	601	-314	515
Uganda	379	100	21	212	41	5
Rwanda	40	11	1	22	-2	7
Malawi	114	21	6	30	32	25
Zambia	121	9	23	36	46	6
Egypt	1,082	114	70	587	174	137
Nigeria	900	-73	25	675	-48	322
Ghana	1,607	475	94	395	625	18
Morocco	289	27	25	98	74	65
Tunisia	278	42	20	126	44	45
Rest east Africa	-7	-1	0	-4	-3	0
Angola-DRC	-54	-16	-2	-39	2	0
Ethiopia	-4	0	0	-3	0	0
Madagascar	-6	-1	0	-3	-2	0
Mauritius	-13	-2	0	-6	-4	0
Mozambique	-30	-1	0	-15	-14	0
Zimbabwe	-64	-19	-1	-20	-24	0
Senegal	-4	-1	0	-2	0	0
Rest of Africa	-46	-28	-3	-21	6	0
EU	-1,973	-553	-70	-1,066	-285	0
UK	-299	-107	-17	-102	-73	0
US	-1,095	-228	-123	-533	-211	0
China	-2,705	-343	-110	-1,655	-598	0
India	-1,447	-334	-26	-735	-352	0
Brazil	-298	-77	-20	-188	-13	0
Russia	-33	5	-2	-110	75	0
Rest of world	-4,965	-1,184	-221	-3,317	-243	0
Total world	-632	-646	634	-1,827	-14	1,220

Source: GTAP output

In Table 2 we highlight from where the main bilateral gains derive for the major African countries as measured by the welfare gains in Table 1. The data is shown in a matrix of the full range of countries in the rows but only selected countries in the columns. Four points should be made. One is that South Africa makes gains in almost all our selected countries (except within SACU, and that includes South Africa's own liberalisation). The second is that there is a concentration of gains in the Tanzania-Kenya configuration's own and bilateral cells except that Tanzanian gains into Kenya are non-existent (this would result from the Table 1 data in Chapter 3 that shows that Kenyan NTBs are concentrated in

agriculture and therefore gains will be in those sectors only). The third is that changes to the Ghana-Nigeria trading relationships throw up some large gains. The fourth shows that changes along the Mediterranean coastline result in some interesting unilateral and bilateral gains. Perhaps a fifth point could be that some geographically diverse bilateral partners such as Egypt and Nigeria show comfortable bilateral gains.

Table 2: Contribution to welfare by country, $(millions)

	zaf	xsc	ken	tza	uga	egy	mar	nga	mwi	zmb	gha	tun
zaf	-48	0	65	-1	15	141	36	18	4	2	3	29
bwa	4	0	2	0	0	0	0	4	0	0	0	0
nam	9	0	1	0	0	2	0	1	0	1	0	0
xsc	3	3	1	0	0	3	1	1	1	0	0	0
ken	792	25	565	0	14	-58	6	26	-4	-2	0	1
tza	1,624	69	1,073	811	221	194	9	99	78	42	14	0
uga	153	6	-34	-2	107	-10	3	7	-2	-2	1	1
rwa	27	0	6	0	10	0	0	0	0	-1	0	10
egy	169	1	324	28	2	108	39	75	17	78	9	60
mar	23	0	9	1	1	153	-55	65	0	0	15	80
nga	1,058	47	92	9	1	303	130	53	0	-3	1,656	56
mwi	193	1	-15	37	0	1	0	6	19	-2	0	1
zmb	50	0	4	0	0	0	0	5	0	10	1	0
gha	314	0	38	2	1	89	51	513	0	-1	-100	8
tun	24	0	17	1	7	158	68	29	1	0	8	30
Total	4,394	152	2,149	885	379	1,082	289	900	114	121	1,607	278

Source: GTAP output

Table 3 shows the matrix of GTAP sectors in the rows and contributions that changes in each of these sectors make in the cells for the major African countries. Again, South Africa does particularly well from agricultural reforms across the continent, and especially from secondary agriculture. Sugar has been listed as a separate sector in this analysis. This is due to the fact that outcomes from earlier tralac research show that South Africa is doing very well in this sector, especially with better access into Kenya and, to a lesser degree, Uganda. A powerful policy statement is that the heavily protected and highly inefficient sugar sector in Kenya is a drag upon the economy. But we fully appreciate the political pressure if not the economic logic to maintain that protection. We would have expected the Swaziland-Lesotho aggregation to do well in increased sugar opportunities but this is not the case as South Africa dominates their $13 million contribution from sugar. Our arguments for reform in Kenyan sugar policies are reinforced as Kenya makes significant unilateral gains in the sugar sector; this is because both reduce their sugar production significantly as shown in Table 5. This enables them to transfer resources out of a sector which has been heavily protected but which is technically inefficient. This is a classic example of how regional integration can benefit a country through efficiency gains, as the overall welfare results for Kenya and, to a lesser extent Uganda, clearly show that reforming the sugar sector is beneficial to them.

Outside South Africa or the sugar sector in Kenya and Uganda, there are agricultural gains to Egypt, Morocco and Ghana but not to others. Several but not all countries gain in TCF, while South Africa, as always, does well in the manufacturing sectors. Gains in the important motor vehicle (mvh) sector are muted outside South Africa.

Table 3: Contribution to welfare by commodity, $ (millions)

	zaf	xsc	ken	tza	uga	egy	mar	nga	mwi	zmb	gha	tun
PAgr	230	3	234	42	32	82	3	36	63	10	172	31
SAgr	663	15	277	8	5	105	131	-49	4	-3	130	39
sugar	555	13	653	-73	96	-10	-1	8	31	-4	-1	-2
nat	5	0	2	2	0	1	1	13	2	0	4	0
tex	131	1	131	7	40	69	9	-13	-5	0	143	20
wap	7	1	19	-25	3	148	20	-16	-2	-1	-3	15
lea	47	0	111	-17	39	1	-6	165	-2	-1	112	8
lum	46	0	13	10	0	13	1	7	-1	0	17	4
ppp	199	0	-6	81	3	45	35	-2	-5	-1	4	10
p_c	104	0	6	106	2	3	2	19	11	2	6	2
crp	525	110	256	114	34	119	22	99	9	4	353	59
nmm	33	0	44	-2	2	65	0	30	4	-1	3	12
i_s	216	1	36	75	6	32	4	32	-1	1	14	10
nfm	82	0	19	102	2	119	15	68	-1	91	70	5
fmp	247	0	46	18	1	117	10	26	-5	0	25	12
mvh	376	1	44	110	18	13	15	53	2	5	4	10
otn	123	0	2	24	2	1	0	0	0	0	1	0
ele	108	1	94	23	7	15	1	117	0	0	56	4
ome	602	5	163	285	86	144	11	357	8	14	330	35
omf	95	1	6	-5	1	2	16	-50	2	6	169	4
Total	4,394	152	2,149	885	379	1,082	289	900	114	121	1,607	278

Source: GTAP output

Table 4 turns to the expected changes in aggregate trade as measured by the percentage changes in the quantity of both exports and imports and changes to the overall trade balance as measured in dollars (millions). Again, the trade balance is a macroeconomic closure in the GTAP model that is heavily influenced by the difference on one side of an equation that measures savings and investment which has to balance with exports minus imports on the other side of the classic macroeconomic equation. It is therefore not a trade balance as could be expected as it reflects changes in investment (capital) rather than actual changes in trade values. The ToT as shown in Table 1 reflect the changes in the relative prices of exports and imports while the export and import changes shown here are a combination of changes to both prices and volumes.

All 'willing' partners increase both exports and imports, with some of these changes being significant– up to and even above 10% (Ghana, followed by Tanzania and Kenya).

Table 4: Percentage changes in trade for the partners

	Exports %	Imports %	Balance $ (millions)
South Africa	2.0	2.6	-15
Botswana	0.2	0.3	6
Namibia	0.1	0.4	10
Swazi-Lesotho	3.7	5.6	37
Kenya	7.9	7.3	-758
Tanzania	9.2	7.6	-528
Uganda	3.1	3.9	-59
Rwanda	1.7	1.6	-3
Egypt	1.0	1.0	-224
Morocco	1.0	0.8	-107
Rest of east Africa	0.0	0.0	3
Nigeria	1.4	1.6	-148
Angola-DRC	-0.1	-0.1	2
Ethiopia	0.0	0.0	1
Madagascar	-0.1	-0.1	0
Malawi	5.1	5.5	-12
Mauritius	-0.1	-0.1	3
Mozambique	-0.2	-0.3	4
Zambia	0.5	0.7	79
Zimbabwe	-0.4	-0.6	16
Ghana	12.8	10.9	-704
Tunisia	1.1	1.1	-33
Senegal	0.0	0.0	1
Rest of Africa	0.0	0.0	16

Source: GTAP output

Changes to **production** in the partner countries are shown in Table 5 (again expressed as changes from the non-FTA base) and, as expected, these changes largely reflect the sector contributions to welfare changes as shown in Table 3. Although the demand for both skilled and unskilled labour in many of the countries increases, capital shows gains that are in general much more meaningful. Secondary agriculture and sugar are again well-performing sectors across the partial FTA, with the sugar-sector production increases in South Africa and declines in Kenya and Uganda again featuring. There are few changes in the manufacturing sectors that really stand out, although the TCF sectors show both gainers and losers that point to some resource reallocations following liberalisation.

Table 5: Increases in factors of production & actual production, %

	zaf	xsc	ken	tza	uga	egy	mar	nga	mwi	zmb	gha	tun
Unskilled	0.4	1.0	0.5	0.2	0.2	0.0	0.0	0.0	0.2	0.1	0.2	0.1
Skilled	0.4	1.0	0.6	0.3	0.2	0.1	0.0	0.0	0.1	0.1	0.3	0.1
capital	1.1	3.0	5.5	5.1	2.1	0.5	0.3	0.6	1.3	0.4	3.0	0.6
Resource	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAgr	0.1	1.0	0.9	0.0	0.8	0.0	-0.1	0.0	0.5	0.6	-0.1	0.4
SAgr	2.0	3.8	4.5	-1.1	0.3	0.5	0.9	-0.3	-1.7	-0.6	0.5	0.4
sugar	26.0	6.4	-36.8	-60.6	-31.8	0.1	0.2	0.2	29.6	-2.6	15.9	-0.3
nat	-0.3	-0.5	0.4	0.3	-0.2	0.0	-0.1	0.0	-0.1	-0.1	-1.1	0.0
tex	2.0	-5.7	7.5	-1.8	11.4	0.2	0.1	-0.9	-4.8	-0.7	54.6	0.0
wap	0.4	-7.5	1.9	-2.5	0.9	0.6	0.2	-0.4	-1.9	-0.2	-2.3	0.2
lea	0.9	-3.5	16.2	-10.2	5.2	0.0	-0.7	6.5	-9.4	-1.4	22.7	-0.2
lum	1.5	0.5	3.3	-5.2	1.1	0.6	0.0	0.0	3.2	0.2	4.1	0.4
ppp	2.3	1.6	-0.6	-11.0	-1.4	1.4	1.5	0.0	-0.1	0.1	-6.0	0.5
p_c	2.1	4.7	4.2	-4.3	0.5	0.2	0.2	0.2	-5.5	-1.4	3.6	0.3
crp	1.4	41.8	11.3	4.0	4.1	1.1	0.0	2.7	0.8	1.2	23.0	1.4
nmm	0.9	2.8	3.8	1.2	1.3	0.6	0.0	9.3	20.5	-1.7	-2.3	2.6
i_s	1.1	-0.1	14.1	0.9	2.6	0.6	-0.1	3.4	-7.9	4.4	-1.8	1.3
nfm	-4.8	-1.6	2.5	13.6	1.6	-2.1	0.2	4.7	0.9	0.1	-15.4	0.0
fmp	3.0	0.9	10.2	-20.3	0.2	1.3	0.3	2.0	-2.1	1.2	-2.3	0.5
mvh	1.5	1.2	24.1	-1.7	1.0	0.8	1.2	-0.1	1.4	0.9	18.9	0.2
otn	10.7	-3.2	2.4	4.5	-0.5	0.7	-0.2	1.4	1.6	-0.6	-10.1	-0.5
ele	1.3	-2.3	8.8	0.2	4.4	0.6	-0.2	-1.5	1.1	-1.4	large	-0.4
ome	1.1	0.0	18.6	1.5	16.2	7.1	-0.3	2.6	12.2	0.7	9.1	0.1
omf	0.7	-3.5	2.3	4.5	2.3	0.6	1.0	-10.4	39.4	6.1	large	1.3
serv	0.9	1.9	3.6	2.7	1.3	0.3	0.1	0.2	0.7	0.2	1.6	0.3

Source: GTAP output

Table 6 shows some more technical outcomes relating to the simulation. In effect, it illustrates that the welfare changes are mostly increasing when expressed in real GDP, with Kenya and Tanzania doing especially well. The ToT for the partner countries vary, with some improving and others declining: these changes are up to 1% either way (with Ghana standing out with an increase of 2.41%). The returns from factor income such as the standard land, labour and capital improve for all the member partners, with some of these increases (Kenya and Ghana) being noteworthy. Similarly, there are some worthwhile contributions from skilled and unskilled labour (Kenya and Ghana). Again, we emphasise that these changes are not the same as those shown in Table 5 above which are the changes in employment levels. All partner countries attract more capital, although the contribution to some is minimal (Nigeria, Botswana and Namibia, for example).

Table 6: Changes in ToT, real GDP and total factor income along with contributions to factor income by %

	Terms of trade	Real GDP	Total factor income	Contributions from land	unskilled	skilled	capital	resource
zaf	0.63	0.78	1.69	0.08	0.40	0.51	0.75	-0.04
bwa	-0.07	0.05	0.15	0.00	0.06	0.03	0.09	-0.02
nam	0.18	0.03	0.30	0.09	0.06	0.02	0.07	0.06
xsc	1.12	1.98	3.71	0.40	0.88	0.82	1.79	-0.19
ken	0.86	2.96	5.03	0.28	1.42	0.73	2.47	0.14
tza	-1.11	2.12	1.89	-0.05	0.63	0.51	0.75	0.04
uga	0.68	1.22	2.10	0.26	0.58	0.31	0.98	-0.04
rwa	-0.06	0.28	0.53	0.17	0.20	0.05	0.11	0.00
egy	0.16	0.28	0.58	0.01	0.10	0.16	0.30	0.00
mar	0.12	0.15	0.32	-0.01	0.11	0.11	0.12	-0.01
xec	-0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
nga	-0.09	0.17	0.07	-0.03	-0.01	0.03	0.04	0.04
xac	0.00	-0.03	-0.01	0.01	0.00	-0.01	-0.02	0.01
eth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
mdg	-0.06	-0.02	-0.08	-0.02	-0.03	-0.01	-0.02	0.01
mwi	0.99	0.85	2.70	1.14	0.62	0.40	0.55	-0.01
mus	-0.04	-0.04	-0.05	0.00	-0.01	-0.01	-0.03	0.00
moz	-0.11	-0.06	-0.02	0.00	0.00	0.00	-0.02	0.00
zmb	0.34	0.23	1.16	0.32	0.35	0.23	0.28	-0.02
zwe	-0.24	-0.24	-0.21	0.04	-0.07	-0.06	-0.12	0.01
gha	2.41	1.41	4.59	0.33	1.41	1.81	1.20	-0.16
tun	0.14	0.34	0.69	0.08	0.17	0.14	0.29	0.00
sen	0.00	-0.02	0.00	0.00	0.00	0.00	-0.01	0.00
Rafr	0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.01

Source: GTAP output

Chapter 8

Reduction in the time costs of transit

Summary and key points

In this chapter we examine trade facilitation by addressing the trade facilitation or infrastructural costs as outlined earlier. Overall trade costs were divided into the three categories of (1) **trade facilitation**; (2) **non-tariff barriers (NTBs)**; and (3) the costs of **business services**. Trade facilitation addresses costs such as delays at border crossings, roadblocks for trucks, and the necessity to pay bribes. In Chapter 3 we kept tariffs as they were but instead reduced NTBs by 50%. We emphasise that this chapter examines a distinctly different set of trade barriers. The gains from each may well be additive.

African countries are well aware of these problems. Trade facilitation was the main outcome from the 2013 Bali World Trade Organisation (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) developed a database of per day ad valorem costs to use in the Global Trade Analysis Project (GTAP), with these estimates providing ad valorem equivalents of the per day costs along with the number of days involved. In implementing the GTAP model we use the Singapore international best-practice benchmark of four days for imports and assess a reduction of 20% in the days over and above this benchmark for **imports** only: this is to avoid possible double counting.

The data reinforces that transit delays and subsequent costs are largely an African issue. In taking a calculation of a 20% reduction in these costs we believe that our approach is conservative. There is still plenty of 'slack' in the African system, although there are countries in Africa that are very close to international benchmarks, thus proving that Africa has the potential to improve.

The welfare gains to Africa are substantial. 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 the very large gains to Nigeria and the rest of Africa aggregation. In direct contrast to our tariff elimination scenarios there are gains to many of the large economies outside Africa: this is the result of their export prices rising in response to more efficient transit times in Africa.

The striking feature taken from the results is that almost all of the gains to each country overwhelmingly accrue to that same country. This may in part be a function of the way in which we have modelled our reductions; this is because we only addressed changes in import times in transit 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.

Introduction

We used as our base scenario the simulation whereby we reduced all tariff between all African countries to zero. In Chapter 3 we kept tariffs as they were but instead reduced NTBs by 50%. In this chapter we extend our analysis to examine the issue of trade facilitation. Specifically, we address in isolation trade facilitation or infrastructural costs as outlined in Chapter 3. There we reported that Balistreri et al. (2014) advised that they decomposed trade costs into three categories: costs that can be lowered by (1) **trade facilitation**; (2) **non-tariff barriers**; and (3) the costs of **business services**. Trade facilitation addresses costs such as delays at border crossings, roadblocks for trucks, and the necessity to pay bribes. It is this aspect of trade costs that we are concentrating on in this chapter. The reference point for our data is Minor (2013), who in turn draws from Hummels and Schaur (2013) for his data.

African countries are well aware of the problems,[1] and indeed South Africa's Adan Mohamed[2] recently stated: 'Inefficiency in most African seaports is to blame for the lacklustre economic performance of such countries'. He cited capacity constraints, undeveloped skills and security concerns as some of the impediments to development. Mohamed added that interagency collaboration at national levels as well as enhanced cross-border and subregional cooperation could lead to sustainable development and competitiveness. 'The cost of doing business in Africa is directly determined by the state of infrastructure. Transport-system interconnectivity on the continent is still poor and this cannot improve unless governments integrate it in their investment plans,' he added.

Trade facilitation has been on the WTO agenda since 2004. The main outcome from the 2013 Bali WTO Ministerial Conference was an agreement for trade facilitation measures to streamline customs procedures and to minimise delays at borders. Objectives included creating more transparency in import and exports transit traffic (Shayanowako, 2014). The Organisation for Economic and Cooperation Development (OECD)[3] assesses the potential benefits of this package. This is done with the 'limited' implementation scenario that assumes that countries that are already implementing best practices will continue doing so, but that others will not (where implementation is discretionary and showing significant potential benefits). This package is, however, not without controversy: the African countries argue that this package lacks balance and is tilted heavily in favour of an agreement forced on the poor nations by the industrialised countries. Many developing countries, including the African countries, see the package as aimed at opening their markets to goods through enhanced merchandise access. They believe that, conversely, there is little to gain for developing-country exports to the developed world whose infrastructure is generally excellent. African countries have recently adopted it 'provisionally' – a move that has disconcerted the developed countries.

Politics aside, there is no question that African countries have a problem with infrastructural delays and associated costs. Minor (2013), on whose research this chapter is based,

[1] See United Nations Economic Commission for Africa (2013).

[2] Industrialisation and Enterprise Development Cabinet Secretary, 18 Nov 2014.

[3] See website: http://www.oecd.org/trade/tradedev/OECD_TAD_WTO_trade_facilitation_agreement_potential_impact_trade_costs_february_2014.pdf.

emphasises that although constraints such as tariffs, subsidies and quotas limit access, they are no longer assumed to be the most significant impediment to international goods trade. Rather, regulations and procedures such as customs administration, inspections, trade financing, security issues and infrastructure (including ports and roads that cause delays in shipping) are now greater trade barriers to goods trade. Many of these outcomes directly depend upon on 'good governance' (or the lack thereof) in areas such as the efficiency and transparency of processes, contract enforcement and administration. This reinforces the fact that the system can contain hidden costs that may be direct and/or indirect. Direct costs include bribes and unofficial fees, while indirect costs include time delays and uncertainties in delivery resulting from poor administration and infrastructure.

Tafirenyika (2014) sums up this problem by stating that 'among Africa's policy wonks[4], underperforming trade across the continent is a favoured subject. To unravel the puzzle, they reel off facts and figures at conferences and workshops, pinpoint trade hurdles to overcome and point to the vast opportunities that lie ahead if only African countries could integrate their economies. It's an interesting debate but with little to show for it until now. The problem is partly the mismatch between the high political ambitions African leaders hold and the harsh economic realities they face'.

Mwanza (2014) seems more hopeful when he writes about the launching of the Global Infrastructure Initiative by the World Bank and about the agreement between the US and India to resolve the standoff on the WTO Trade Facilitation Agreement. The Global Infrastructure Initiative seeks to unlock additional infrastructure financing for developing countries. Activities include the creation of a knowledge-sharing network on infrastructure projects and building the capacity of officials to improve institutional arrangements. This presents an important opportunity for African countries: for many of these projects it is important to 'meet at the border' to ensure effective development of projects on a regional basis. The Global Infrastructure Initiative's primary focus will be on investment in hard infrastructure, while soft infrastructure such as simplification and harmonisation of customs and border procedures is primarily the focus of the WTO Trade Facilitation Agreement.

The data

Minor (2013) provides a database of per day ad valorem costs to use in GTAP. These estimates are provided in ad valorem equivalents of the per day costs along with the number of days involved. These days include the number of days required for documentation handling, inland transport, customs clearance and technical control, and port and terminal handling. The days include both exports and imports. Obviously, trade costs cannot decline to zero, and in implementing the GTAP model we use the Singapore international best-practice benchmark of four days for imports.

A snapshot of the days estimated by Minor (2013) that we use is shown in Table 1 for **imports** by country/region. This data, along with the time costs per day by commodity and country/region that we add later is the driving mechanism here. We use an estimate of 20% reduction in time over and above our benchmark of four days for imports; this is because costs cannot go below our global best-practice benchmark (Singapore). Thus, for example, South Africa has a total of 18 days, of which four involve customs and related processes, 11

[4] Slang term for policy analysts.

involve the terminal, and three involve inland transportation. Botswana has another eight days, with seven of these inland and one extra for customs. Further down the list there is great variation. Nigeria, for example, needs 12 days in customs, while the landlocked countries of Malawi, Zambia and Zimbabwe need 13 or 14 days in customs. Conversely, there are some bright spots, with Mauritius, Egypt and Morocco close to international best practice. The column headed 20% indicates how much improvement in transit times we are making for imports into each African country, while the right-hand side shows there is still room for improvement! Note how consistently close to best practice many, but not all, of the non-African entries in the lower part of the table are. This reinforces that transit delays and subsequent costs are largely an African issue.

Table 1: Time in transit data in import days

	Customs	Terminal	Inland	Total	Extra	20%	New
South Africa	4	11	3	18	14	2.8	15.2
Botswana	5	11	10	26	22	4.4	21.6
Namibia	4	3	3	10	6	1.2	8.8
Swazi-Lesotho	4	11	5	19	15	3.0	16.0
Kenya	3	6	4	13	9	1.8	11.2
Tanzania	5	10	1	16	12	2.4	13.6
Uganda	7	6	8	21	17	3.4	17.6
Rwanda	4	10	8	22	18	3.6	18.4
Egypt	1	2	2	5	1	0.2	4.8
Morocco	2	2	2	6	2	0.4	5.6
Rest of east Africa	9	7	4	20	16	3.2	16.8
Nigeria	12	5	3	20	16	3.2	16.8
Angola-DRC	8	10	3	20	16	3.2	16.8
Ethiopia	5	3	7	15	11	2.2	12.8
Madagascar	3	2	2	7	3	0.6	6.4
Malawi	3	9	14	26	22	4.4	21.6
Mauritius	2	2	1	5	1	0.2	4.8
Mozambique	3	5	2	10	6	1.2	8.8
Zambia	6	11	13	30	26	5.2	24.8
Zimbabwe	6	11	14	31	27	5.4	25.6
Ghana	5	4	3	12	8	1.6	10.4
Tunisia	3	3	2	8	4	0.8	7.2
Senegal	3	3	2	8	4	0.8	7.2
Rest of Africa	7	6	4	17	13	2.6	14.4
EU	1	2	2	5			
UK	1	2	2	5			
US	1	1	1	3			
China	4	3	2	9			
India	4	5	3	12			
Brazil	4	3	2	9			
Russia	4	2	5	11			
Rest of world	2	2	2	7			

Source: Balistreri et al. (2014a: 90-92)

In our analysis we use only the data for **imports** into African countries. The reason for this is that there may be a danger of double-counting gains by using both days in transit to import and days in transit to export. We consider it best practice to examine the gains from infrastructural improvements to imports. In addition, there is the question as to which country the gains accrue to: we consider that using imports is the best method of ensuring that they accrue to those countries making the changes. Although we are only adjusting handling and transit times in Africa for imports, there will still be some gains to countries outside Africa. This is because their costs of exporting are effectively lowered. In contrast to a tariff reduction scenario whereby those outside the FTA almost invariably lose[5] we would anticipate that there will be gains to all, albeit with those gains outside Africa being modest.

We acknowledge that what we are using may be a lower-bound estimate and that we are only looking at part of the equation. However, we consider that our approach is consistent with economic theory that generally argues for gains of liberalisation accruing to the liberalising country. Technically, we are modelling these gains 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. In addition, the second-round effects of changes in terms of trade (ToT), allocative efficiency and change in capital and employment will be shown.

Examining the work of Minor (2013) we find that the time allocated to trade costs reflects the willingness of the importer to pay for a product delivered earlier. In a personal communication with Minor he reaffirmed that in his experience with GTAP most of the welfare changes showed up on the importing side in any case. The GTAP model that we are running has perfect competition, and perhaps a more advanced model incorporating heterogeneity or monopolistic competition would enable a more elegant distribution of the gains to be split between exporters and importers. Meanwhile, we will use imports only, confident that we have avoided double counting by not introducing time in transit for exports into our simulation and that most of the benefits flow to importers in 'the real world' as we have modelled it.

Balistreri et al. (2014a) discuss how the data was derived. It starts from a comprehensive data base from Hummels and Schaur's (2013) estimation of the ad valorem cost of one day saved in transit for over 600 HS4 products. There is significant variation in these costs from zero for products (such as crude oil and coal) to much higher values in perishable commodities (such as fruit and vegetables). The HS products are then aggregated into the GTAP sectors by country, with statistical adjustments made for missing variables. Minor then combines this data with the World Bank's *Doing Business* data set for 2012 showing the numbers of days to import and maps this data to the GTAP sectors by country.

The result of these calculations generates a tariff equivalent of import barriers to trade. Thus, even though the time in transit is the same for each importer the ad valorem equivalents by GTAP sector are not; this is so because the ad valorem cost of one day differs by commodity. At one extreme one would perhaps find iron ore or coal (where costs of a delay are usually insignificant) while at the other extreme one would perhaps find fresh fruit and vegetables or manufacturing (such as parts for vehicles) that operate on just-in-time assembly processes.

[5] But not Russia in our FTA simulation.

Given this degree of sophistication in the data set and our relatively conservative estimates of a 20% reduction in transit times over and above international best practices for imports only, we consider that our output values should be realistic.

The results

Table 2 shows the changes in welfare from the FTAs assuming the scenario of 20% reductions in transit times. The data is expressed in US dollars (millions) as one-off increases in annual welfare at the assessed end point of 2025. This data is presented for all the countries/regions used in the model. What is shown is firstly the total gains and secondly the four components (allocative efficiency, labour, capital and ToT) discussed in Chapter 1. We have also included in Table 2 the column headed 20% (from Table 1 above) that indicates how much improvement in transit times we are making for imports into each African country to put the relative size of the time in transit reductions in perspective. The right-hand side of Table 1 shows there is still room for improvement in many countries!

Overall gains to Africa are valued at some $30.5 billion, a substantial figure. For South Africa, these gains 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 world-wide gain of $31,231 billion. These gains for South Africa derive from increased investment which expands the capital stock ($4,193million), allocative efficiency gains of $1,546million (as resources are better employed in the economy), gains from increased labour employment ($433million), but a terms of trade loss of $-533million resulting from an unfavourable change in relative prices between South African exports and imports. Following close behind South Africa are the very large gains to Nigeria of $5,112 million and the rest of Africa aggregation ($6,330million). All African countries gain, and only Brazil, Russia and the rest of the world outside Africa lose. It is important that here Zimbabwe gains almost one billion dollars from a reduction in transit times, and we would point out that much, but not all, of these transit costs are under Zimbabwe's own control.

Also note that in direct contrast to our tariff elimination scenarios there are gains to many of the large economies outside Africa. These gains are concentrated in ToT as their export prices rise in response to more efficient transit times in Africa. This shows that our generalisation below – that the African gains were almost all in the diagonal cells – is not strictly the case. Exporters do gain. On the right-hand side we have isolated the direct gains from import efficiency, and it can be seen that these are substantial.

We have included the 20% reduction in days from Table 1 to allow an insight into the transit-efficient economies as represented by the low (that is under 1.0 days) values and, conversely, the high values indicate that there is still plenty of 'slack' in the system to be closer to the benchmarked four-day level. Those countries with low welfare gains as reported in column 3 are generally associated with efficient transit times; this is indicated by column 2 that shows how close they are to international benchmarks. These economies are those of Egypt, Morocco, Madagascar, Mauritius, Tunisia and Senegal. Conversely, those economies with values of 4.0 or more have very costly transit times, as fully outlined in Table 1. This is true in particular of the landlocked countries (Botswana, Malawi, Zambia and Zimbabwe) that rely upon others for part of their transit delays. Overall, the message here is that even with a 20% reduction the gains are larger than tariff elimination, and in many instances the remaining days shown in Table 1 are still 80% over and above international best practice.

This indicates that there are still significant gains 'left on the table' in the sense that there are more significant potential gains in many instances.

Table 2: Welfare gains from reduction in transit time, $(millions)

	20%	Total	Efficiency	Labour	Capital	ToT	Import efficiency
Total Africa		30,507	4,678	1,206	10,494	-1,346	15,475
South Africa	2.8	8,519	1,546	433	4,193	-533	2,880
Botswana	4.4	376	29	13	172	29	134
Namibia	1.2	173	9	7	102	8	47
Swazi-Lesotho	3.0	64	6	2	26	0	30
Kenya	1.8	1,122	106	57	501	23	435
Tanzania	2.4	880	171	36	228	-41	487
Uganda	3.4	553	61	14	295	-16	200
Rwanda	3.6	141	22	1	49	-6	74
Egypt	0.2	81	16	8	28	30	0
Morocco	0.4	25	2	2	7	15	0
Rest of east Africa	3.2	785	54	-10	143	-132	731
Nigeria	3.2	5,112	473	293	1,179	-155	3,321
Angola-DRC	3.2	2,331	251	-3	802	119	1,161
Ethiopia	2.2	620	105	39	230	-58	304
Madagascar	0.6	38	4	1	10	-2	26
Malawi	4.4	213	19	5	52	10	127
Mauritius	0.2	59	7	2	30	1	19
Mozambique	1.2	371	34	32	169	-14	150
Zambia	5.2	848	29	81	291	-102	549
Zimbabwe	5.4	921	163	12	375	-128	499
Ghana	1.6	634	86	11	158	-39	417
Tunisia	0.8	49	12	4	16	17	0
Senegal	0.8	261	55	6	129	-15	85
Rest of Africa	2.6	6,330	1,418	160	1,309	-356	3,799
EU		655	2	-5	47	611	0
UK		197	29	1	61	106	0
US		116	-59	-59	-57	290	0
China		506	-21	6	68	452	0
India		607	43	6	314	243	0
Brazil		-4	-10	-1	-23	29	0
Russia		-571	-123	-11	-222	-215	0
Rest of world		-780	-152	-48	-407	-174	0
Total world		31,231	4,388	1,096	10,276	-3	15,475

Source: GTAP output

The unilateral and bilateral gains and losses

In Table 3 we highlight the sources of the main bilateral gains for the major African countries as measured by the welfare gains in Table 2. The data is shown in a matrix of the full range of countries in the rows but only selected countries in the columns. The striking feature is that almost all of the gains are in the diagonal cells whereby the gains to each country overwhelmingly accrue to that same country. For example, South Africa's total gains are $8,519million, with $8,444 million from its own internal reforms. Similar gains accrue to Nigeria, one of the many countries or aggregations that have internal cell gains actually larger than the total gains. Indeed, apart from some small gains or losses for South Africa in other countries there are effectively only the diagonal cells in Table 3 and many zeros or near zeros!

This may in part be a function of the way in which we have modelled our reductions, as we only addressed changes in import times in transit whereby the benefits accrue to the importer. Had we introduced reductions in export times there would have been a wider distribution of the gains and an increased value of these gains, but we are not certain that an element of double-counting could be introduced. Also, altering our model closures and internal equations would redistribute the gains differently. 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 (a benchmark that several African countries are close to) we are leaving plenty of room for improvement in most African countries. And the gains in welfare to exporters outside Africa show that the benefits, although concentrated on the liberalisers, are global in nature.

The implications for landlocked countries are harder to interpret from our results. Clearly, a country such Malawi or Zambia can do little about the terminal times,[6] but they will have much more control over inland times even if they are reliant upon a partner on the other side of the border. Applied common sense would suggest that in an information age based upon electronic technology, time wasting at the border can be minimised with mutual cooperation.

[6] Note, however, that there are low terminal times for Uganda and especially for Ethiopia, both of which are landlocked. It is therefore not entirely in the neighbours' hands.

Table 3: Contribution to welfare by country, $ (millions)

	zaf	ken	tza	uga	xec	nga	xac	eth	zmb	zwe	gha	RAfrica
zaf	8,444	13	-2	4	-5	-56	-14	-4	14	54	-3	-17
bwa	3	0	0	0	0	-2	-1	0	1	-1	0	-1
nam	5	0	0	0	0	0	3	0	1	0	0	1
xsc	6	0	1	0	0	1	0	0	0	0	0	0
ken	-7	1,018	9	6	-2	-11	-5	0	1	1	0	-3
tza	-11	18	882	1	-1	-8	-4	-1	1	0	-1	-4
uga	1	29	2	539	-1	-1	0	0	0	0	0	10
rwa	0	7	2	7	0	-2	0	0	0	0	0	2
egy	0	0	0	0	0	0	0	0	0	0	0	0
mar	0	0	0	0	0	0	0	0	0	0	0	0
xec	-5	6	-1	5	812	-1	-1	6	-1	0	-1	-2
nga	-18	6	-3	1	-2	5,234	-12	-2	-2	1	7	8
xac	7	2	2	0	-1	-11	2,391	-1	-1	0	1	-17
eth	-7	3	-2	0	-10	-3	-1	624	-1	0	-1	-1
mdg	0	0	0	0	0	0	0	0	0	0	0	0
mwi	4	3	-2	0	0	-1	-1	0	1	-1	0	-1
mus	1	0	0	0	0	0	0	0	0	0	0	0
moz	19	0	2	0	0	-2	1	0	0	2	0	-1
zmb	33	14	-7	0	-2	-12	-5	-2	832	2	-2	-16
zwe	60	-2	0	-1	-1	-5	-4	0	2	864	-1	-7
gha	-5	1	-1	0	-1	1	-2	0	0	0	626	8
tun	0	0	0	0	0	0	0	0	0	0	0	0
sen	-2	0	0	0	0	-2	-1	0	0	0	0	8
Rafr	-8	4	-1	-8	-1	-6	-14	-1	2	1	9	6,364
Total	8,519	1,122	880	554	786	5,112	2,331	620	849	921	634	6,330

Source: GTAP output

The GTAP sectors

Table 4 shows the now familiar matrix of GTAP sectors in the rows and contributions that changes in each of these sectors make in the cells for the major African countries. In contrast to our results to date, agriculture does not feature heavily in the results. We have not examined the GTAP structure and the data to assess why this is the case. Indeed, in Table 4 we deleted sugar as all the entries were zero, suggesting that time delays are not crucial in this sector. In Table 4 were also shown the global welfare gains by GTAP sector in the second column and next to this the African gain in column 3. The overall totals on the bottom row with both global and African gains are similar but there are some differences of up to one billion dollars among the GTAP sectors.

We can say little about the cells other than there is a strong concentration of gains in the manufacturing sectors, for the industrial giant (South Africa in particular with Nigeria not too far behind). The vehicle sector (mvh) is a good example.

Table 4: Contribution to welfare by commodity, $ (millions)

	World	Africa	zaf	ken	tza	xec	nga	xac	eth	zmb	zwe	Rafrica
PAgr	741	1,120	95	45	10	67	296	135	22	9	77	252
SAgr	2,732	2,052	79	22	64	116	683	258	4	15	59	560
nat	1,071	874	194	17	4	13	62	-1	146	291	34	30
tex	582	506	95	24	30	32	111	-5	20	7	-2	150
wap	234	94	55	2	2	16	-2	-1	0	1	3	4
lea	132	61	18	3	4	6	11	4	0	0	3	0
lum	172	108	33	4	5	8	8	18	1	6	0	14
ppp	674	442	112	31	28	1	74	27	11	10	-12	70
p_c	2,900	3,916	630	287	164	43	670	463	250	14	117	679
crp	3,248	3,335	880	154	166	86	680	33	27	144	210	626
nmm	860	763	108	7	17	10	151	85	3	17	24	237
i_s	1,571	2,078	210	122	50	147	359	264	31	38	40	609
nfm	1,109	1,218	819	21	13	14	221	21	-2	9	27	13
fmp	1,017	896	171	40	26	31	156	80	1	33	13	253
mvh	5,068	5,013	2,249	132	109	108	713	182	54	91	228	742
otn	2,177	2,107	220	84	38	11	53	380	6	4	-2	1,213
ele	1,328	1,113	793	17	16	-2	65	19	1	18	-1	53
ome	5,290	4,602	1,751	107	122	80	747	362	44	137	104	766
omf	327	212	8	3	16	0	57	7	0	4	0	59
Total	31,232	30,508	8,519	1,122	880	785	5,112	2,331	620	848	921	6,330

Source: GTAP output

Changes in African trade

Table 5 turns to the expected changes in aggregate trade as measured by the percentage changes in quantity of both exports and imports and changes to the overall trade balance as measured in dollars (millions). Again, the trade balance is a macroeconomic closure in the GTAP model heavily influenced by the difference on one side of an equation that measures savings and investment which has to balance with exports minus imports on the other side of the classic macroeconomic equation. The ToT as shown in Table 2 reflect the changes in the relative prices of exports and imports and their contribution to total welfare changes in each country. The export and import changes shown here in Table 4 are changes to quantities traded expressed in values, and they represent changes to both trade prices and quantities.

We have also shown the changes in exports and imports from our base scenario in Chapter 2 of tariff elimination across intra-African trade on the right-hand side of the table. While the welfare gains from Chapter 2 are usually lower than the welfare gains in this transit-time scenario the increases in exports and imports shown on the right-hand side are higher and, in most cases, significantly higher than our trans-time scenario on the left-hand side. Our gains in this scenario are directed more into improving the efficiency of the economies rather than direct trade-related gains. Recall that we are addressing the cost of delays on the import side only in Africa.

Table 5: Percentage changes in trade for the partners

	NTB reductions			Base tariff to zero	
	Exports%	Imports%	Balance$ (millions)	Exports%	Imports%
South Africa	2.7	2.4	-243	2.7	3.5
Botswana	0.8	0.2	54	1.1	1.8
Namibia	1.2	1.4	21	2.6	5.0
Swazi-Lesotho	1.1	1.0	4	2.4	3.6
Kenya	-0.1	1.0	-252	5.7	4.5
Tanzania	0.5	0.9	-103	3.7	3.2
Uganda	0.9	1.3	-43	4.3	6.4
Rwanda	1.9	1.5	0	10.1	13.8
Egypt	0.0	0.1	-12	0.3	0.4
Morocco	0.0	0.0	-3	0.8	1.1
Rest of east Africa	2.0	1.2	11	2.0	1.4
Nigeria	1.3	1.0	222	1.7	2.0
Angola-DRC	0.8	0.9	56	2.1	3.1
Ethiopia	1.9	1.2	-27	3.6	2.5
Madagascar	0.5	0.4	0	0.2	0.2
Malawi	-0.3	0.4	-12	4.2	3.5
Mauritius	0.3	0.3	-13	0.9	0.9
Mozambique	1.1	1.2	-48	1.0	0.7
Zambia	2.4	2.1	181	-0.7	-0.9
Zimbabwe	0.9	3.5	-277	32.7	-2.4
Ghana	0.2	0.5	-104	9.1	7.0
Tunisia	0.1	0.1	-3	1.0	1.2
Senegal	0.9	1.0	-59	8.2	9.4
Rest of Africa	1.0	0.7	184	2.8	2.8
EU	-0.005	0.004	79		
UK	0.008	0.021	0		
US	-0.002	0.007	149		
China	0.011	0.021	177		
India	0.001	0.035	-4		
Brazil	0.010	0.013	15		
Russia	-0.002	-0.049	-38		
Rest of world	0.001	-0.003	89		

Source: GTAP output.

Note that as the changes in trade to non-African partners are minimal we have not reported them.

The changes to factors of production are shown in Table 6. As is generally the case there are improvements in the contribution of labour to production in every case, and some of these improvements are substantial (Zimbabwe, for example). In contrast to many of the other scenarios there is little movement in the agricultural sectors as much of the activity can be seen in manufacturing where gains are offset by losses in what seems to be random patterns.

Table 6: Increases in factors of production & actual production, %

	zaf	ken	tza	uga	xec	nga	xac	eth	zmb	zwe	gha	Rafrica
Unskilled	0.26	0.21	0.14	0.12	-0.02	0.11	-0.01	0.12	0.43	0.21	0.03	0.09
Skilled	0.28	0.22	0.16	0.13	-0.02	0.13	0.00	0.08	0.46	0.24	0.03	0.09
Capital	2.59	1.98	1.93	2.96	0.81	1.09	1.02	1.12	3.20	7.50	1.20	1.31
PAgr	0.37	0.21	0.10	0.15	0.05	0.05	0.03	0.21	-0.03	0.11	0.05	0.07
SAgr	0.81	1.15	-0.55	0.76	-0.66	-1.41	-0.48	0.15	0.92	0.34	-0.64	-0.26
sugar	1.32	-0.12	0.33	-1.88	0.69	-1.18	1.35	0.51	0.43	2.29	2.41	1.15
nat	0.07	0.30	0.01	-0.06	0.08	0.09	0.10	0.02	-0.50	0.27	-0.05	0.17
tex	-0.18	-0.14	-4.18	-0.88	-1.68	-4.46	0.88	-3.30	-2.20	1.37	-2.79	-1.37
wap	0.55	1.36	-0.81	0.00	-1.54	-0.17	0.87	1.14	1.98	2.86	-0.32	0.27
lea	0.56	0.88	-1.03	4.08	0.60	0.71	0.27	0.23	1.43	0.52	-1.30	0.61
lum	0.67	1.14	0.01	1.99	-0.59	0.45	1.16	0.36	0.86	2.99	0.47	1.13
ppp	0.41	-1.78	-0.92	-0.86	-0.87	-3.18	-1.09	-2.45	-0.22	0.34	-2.93	-1.43
p_c	-0.38	-1.79	-5.32	-5.25	-1.11	-3.15	-4.05	-4.03	0.63	-2.84	-2.04	-0.94
crp	-0.47	-0.91	0.16	-0.62	-2.54	-1.56	-1.09	-1.09	-12.32	-2.40	-1.22	-0.58
nmm	-0.15	-0.47	-0.67	0.60	-0.70	-3.61	-2.27	0.37	-2.98	-4.68	-1.46	-2.32
i_s	0.24	0.90	-2.46	-0.76	1.75	-4.12	-2.98	-3.15	-5.55	4.76	-3.00	-3.04
nfm	5.63	3.71	1.55	3.72	5.94	9.30	2.20	3.08	3.37	0.03	0.50	2.75
fmp	0.27	2.34	-5.16	0.82	-1.83	3.46	-2.61	-0.02	-9.87	-1.96	-1.64	-0.91
mvh	0.62	1.43	-3.06	-1.61	-1.12	-3.82	-2.24	-2.43	-12.79	-3.25	2.76	-3.09
otn	-0.04	0.30	-1.13	-3.97	-0.96	1.13	-0.21	-0.27	-6.60	1.21	4.15	-2.07
ele	-1.55	0.31	-0.31	1.81	-0.48	1.64	0.21	-0.76	-10.17	1.12	8.31	-0.71
ome	0.33	1.76	0.21	3.98	-0.66	0.64	-0.02	-0.36	-8.45	-2.67	0.62	-0.81
omf	1.40	-0.73	-0.31	9.54	0.02	-4.23	-0.45	0.75	-4.51	1.23	2.94	-0.87
serv	1.51	1.64	1.27	2.18	0.62	0.95	0.85	0.91	1.73	5.27	0.70	1.04

Source: GTAP output

Some technical economic results are shown in Table 7. Increases in real Gross Domestic Product (GDP) are significant, with several countries showing an increase of around 2% and Zimbabwe showing an impressive 6.12% increase. Most ToT decline as relative import prices rise more than export prices, although this is a feature of the model in that we only simulate increases in import efficiency which will reflect back onto their prices as domestic demand increases. Table 2 shows the contributions to welfare from ToT expressed in dollar values, while Table 7 shows the same changes expressed as a ratio. Returns from factor income such as the standard land, labour and capital increase are indicated in almost all cases. Some solid increases in the returns to labour are a very pleasing outcome for Africa and a further demonstration as to how trade impediments are impacting adversely on Africa's economy. The contributions from skilled and unskilled labour are often large, but we emphasise that these changes are not the same as those shown in Table 6 above which shows the changes in employment levels. The data shown in Table 7 is the contribution that changes in the total wage bill make to total factor income. In this version of the model we use a 'closure' or assumption that the wage bill is split between increased wages for those in work and new employment – with this based upon the unemployment rate in each country.

Table 7: Changes in ToT, real GDP and total factor income along with contributions to factor income by %

	Terms of trade	Real GDP	Total factor income	Contributions from land	unskilled	skilled	capital	resource
zaf	-0.38	1.99	1.39	0.04	0.23	0.31	0.78	0.02
bwa	-0.07	1.65	1.03	0.02	0.22	0.14	0.49	0.16
nam	0.02	0.95	0.77	0.04	0.18	0.08	0.44	0.03
xsc	-0.24	0.96	0.35	0.06	0.07	0.06	0.10	0.06
ken	0.21	1.62	1.95	0.31	0.55	0.25	0.77	0.08
tza	0.03	1.52	1.31	0.21	0.45	0.31	0.34	0.00
uga	-0.05	2.03	1.54	0.16	0.39	0.23	0.75	0.01
rwa	-0.19	0.97	0.74	0.26	0.27	0.06	0.13	0.01
egy	0.03	0.02	0.05	0.01	0.01	0.01	0.02	-0.01
mar	0.02	0.01	0.03	0.01	0.01	0.01	0.01	0.00
xec	-0.35	0.82	0.00	0.01	-0.05	-0.03	-0.01	0.08
nga	-0.23	0.88	0.39	0.06	0.15	0.11	0.02	0.06
xac	-0.11	0.99	0.10	0.00	-0.01	-0.01	0.00	0.12
eth	-0.23	0.83	0.71	0.28	0.26	0.02	0.16	0.00
mdg	-0.05	0.24	0.17	0.03	0.06	0.03	0.04	0.00
mwi	0.33	2.08	1.88	0.33	0.43	0.46	0.60	0.04
mus	0.04	0.25	0.24	0.01	0.06	0.04	0.13	0.00
moz	-0.03	1.32	1.30	0.20	0.37	0.22	0.50	0.01
zmb	-0.16	2.82	3.25	0.16	1.19	0.87	1.18	-0.15
zwe	0.20	6.12	4.48	0.40	1.08	0.93	1.95	0.12
gha	0.07	0.94	0.61	0.07	0.19	0.19	0.17	0.00
tun	0.05	0.05	0.12	0.03	0.03	0.02	0.04	-0.01
sen	-0.07	1.12	1.00	0.06	0.21	0.11	0.56	0.07
Rafr	-0.16	1.33	0.58	0.04	0.15	0.13	0.14	0.13
EU	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GBR	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00
usa	0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
chn	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ind	0.03	0.01	0.03	0.01	0.00	0.00	0.01	0.00
bra	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
rus	-0.05	-0.02	-0.04	0.00	-0.01	-0.01	-0.02	-0.01
row	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	-0.01

Source: GTAP output

Changes to tariff revenues increase or stay the same. Recall that we are not changing the tariff rates in this scenario but rather removing some of the impediments to imports which will naturally lead to increases in tariff revenues for most countries.

Table 8: Changes to tariff revenues

	revenue US$ (millions)
SACU	205
Kenya	42
Tanzania	18
Uganda	7
Rwanda	2
Egypt	4
Morocco	1
Rest of east Africa	34
Nigeria	132
Angola-DRC	39
Ethiopia	22
Madagascar	1
Malawi	4
Mauritius	0
Mozambique	5
Zambia	0
Zimbabwe	62
Ghana	18
Tunisia	5
Senegal	8
Rest of Africa	114

Source: GTAP output

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Chapter 9

Summary

Summary and policy implications

The *Trade Law Centre for Southern Africa (tralac)* has recently capitalised upon the pre-release Version 9.2 of the Global Trade Analysis Project (GTAP) database and the recent excellent data sets from the World Bank and other publishing quality data on trade barriers across the African continent. It undertook a series of simulations examining regional integration and intra-African trade barrier reductions. The results for tariff elimination on intra-African trade are promising. But the real news is in confirming that these barriers are not as significant as the various trade-related barriers except for tariffs.

Especially impressive results were forecast by simulating a modest 20% reduction in the costs associated with the particular African problem of transit time delays at customs, terminals and internal land transportation. These gains are significantly above both just intra- African tariff elimination and what may be thought of as the more traditional non-tariff barriers that we modelled individually and separately. Although we have not modelled a combined approach which incorporates all three components of tariff elimination, non-tariff barrier reductions and time-in-transit cost reductions, the final combined outcome from all three are likely to be cumulative and generate very large gains to Africa. The overall results from especially time-in-transit costs support the current emphasis on projects such as the World Trade Organisation (WTO) infrastructural supports to Africa.

In addition, the World Bank and others have produced a dataset of constraints in trade-related services for Africa and others that we are examining, adding these simulations to our portfolio. Again, the results here are likely to be significant and additive to reductions in the other three constraints (tariff barriers, more traditional non-tariff barriers, and time in transit costs).

Our simulations for a Free Trade Agreement (FTA) with a selected group of African countries show that this is very much a second-best option, and the inclusion of most of the significant economies in Africa generates the best results. Only in the event of a failure to achieve integration across the continent with all or most African countries should partial integration be pursued.

The policy implications from our research 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. However, against this background the concept of 'governance' must be emphasised, as must the crucial importance of a rules-based structure. In addition, provided African countries are willing to play their part, global funds seem to be available for these reforms.

The research

At tralac for several years now we have been undertaking analyses using the GTAP computer model on South Africa's 'way ahead' on trade policy options, and in recent times this analysis has focused on the Tripartite FTA (TFTA), with both tariff reduction/elimination scenarios and non-tariff barrier (NTB) reductions. For the NTB reductions we have opted to use a blanket (usually 2%) reduction in the tariff equivalent to assess the not inconsiderable costs to African economies of these trade barriers.

In this research we have extended our GTAP analysis to focus on the benefits of continental integration. In particular, we believe that we have taken two very large steps forward in our analysis. The first is the use of the pre-release Version 9.2 GTAP database which is based on actual 2011 trade data. The second step forward is more significant, and we and the research community owe a large vote of thanks to the World Bank and others for the release of detailed and comprehensive datasets for trade-related barriers, by country, that have been dovetailed to match the GTAP model sectors.

Our base simulation is 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 we extend the analysis in subsequent chapters to simulating a reduction in non-tariff measures (NTMs or, interchangeably, NTBs) in the first alternative run and then extending analysis further by examining the gains to be made by trade facilitation along with integration into an FTA of selected African economies only. The chapters are:

- Chapter 1: The model and background
- Chapter 2: Africa-wide, all intra-African tariffs going to zero
- Chapter 3: Africa-wide, a 50% reduction in NTMs
- Chapter 4: Africa-wide, tariffs to zero and a 50% reduction in NTMs combined
- Chapter 5: An integration of the selected 'willing' countries only, again with comprehensive tariff elimination between these parties
- Chapter 6: A reduction in NTBs between these 'willing' countries only
- Chapter 7: The 'willing' participants, tariffs to zero and a 50% reduction in NTMs combined
- Chapter 8: An examination of the implication of the results of reducing the costs in transit for African goods by 20% above the benchmark of international best practice.

For the 'willing' countries we identified the five Southern African Customs Union (SACU) members (South Africa, Botswana, Lesotho, Namibia and Swaziland), East African Community (EAC) members (Kenya, Tanzania, Uganda and Rwanda), Nigeria and Ghana in western Africa, and Egypt, Morocco and Tunisia in northern Africa. We believe this juxtaposition of political-economy realism and modelling advances adds realism to our results. Our analysis for the simulations starts from an examination of intra-African trade, and this confirms the commonly held view that this trade is low.

We used as our base scenario the simulation whereby we reduce all tariff between all African countries to zero (Chapter 2), and later in Chapter 5 we simulate tariff elimination of tariff barriers between the selected countries only. This is standard GTAP research. It is in the other scenarios that we are grateful to the World Bank and others by allowing much more sophistication in our NTB estimates by changing our earlier 'blanket' or common two percentage points estimate to using the ad valorem equivalents for both agricultural goods and

manufacturing goods as provided by Balistreri et al. (2014a and 2014b).[1] This new database provides tariff equivalents for most GTAP countries. Crucially, these estimates vary (often widely) which therefore enables a much more accurate estimate of the costs of these barriers than our earlier two percentage points estimates. The range in these new estimates for countries of interest for agricultural goods varies from 0.0% in Rwanda to 42.5% in Kenya, while for manufacturing goods it varies from Zambia's 0.0% (and South Africa's 0.3%) to Tanzania's 47.4%. These are significant differences, and in the few instances where these values are not individually shown we have estimated a proxy from the aggregates provided by Balistreri et al. (2014a and 2014b).

These authors stated that they decomposed trade costs into three categories: costs that can be lowered by (1) **trade facilitation**; (2) **non-tariff barriers**; and (3) 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 licences, quotas and bans; price control measures; competition restrictions; and technical barriers to trade (customs delays not included). Poor business services for trade are also a problem and improvements in a wide range of business services such as banking, insurance, communication and professional services (such as legal, auditing, engineering and computer services) would also lower trade costs. An examination of reductions for this final set of costs is likely to be on the tralac research agenda.

Technically, we are reducing the NTBs by 50%, and this is done in two separate ways. Firstly, we recalibrate the initial GTAP Version 9 database to represent half of the World Bank's ad valorem equivalent (AVE) estimates of NTB as tariff equivalent in the database-generating tariff revenues and then reducing these NTB tariffs by 50%. Secondly, we represent the remaining 25% reduction in the AVE of the World Bank's NTB estimate as an increase in efficiency by augmenting technical change in the respective countries. Our welfare results (Equivalent Variation) therefore represent the combined effects of reducing the AVE NTB tariff calibrated into the database and the efficiency augmenting technical change.

For our 'time in transit' analysis we use only the data for imports into African countries to avoid any possible danger of double-counting gains if we were to use both days in transit to import and days in transit to export. Also, in using imports only we consider that this is the best method of ensuring that they accrue to those making the changes. Although we are only adjusting handling and transit times for imports in Africa, there will still be some gains to countries outside Africa in that their costs of exporting are effectively lowered (although they will not obtain all the gains from this adjustment). In contrast to a tariff reduction scenario whereby those outside the FTA almost invariably lose[2] we would anticipate that there will be gains to all, albeit with those gains outside Africa being modest. We acknowledge that what we are using may be a lower-bound estimate, but we consider that our approach is consistent with economic theory that generally argues for gains of liberalisation accruing to the liberalising country. Technically, we are modelling these gains 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.

[1] These are World Bank estimates which are in turn based upon data from Kee et al. (2009: 119, 172-199). These are based on estimates for 105 countries at the HS 6-digit level

[2] But not Russia in our FTA simulation.

Minor (2013) states that the time allotted to trade costs reflects the willingness of the importer to pay for a product delivered earlier. This is 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 HS4 products. There is significant variation in these costs by HS products, 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* data set for 2012 showing the number of days to import. He subsequently 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 presenting a summary of the results we will only use five of our seven simulations. These are as shown in Table 1 representing Chapter 2, the baseline of tariff elimination across Africa for intra-African trade; Chapter 3 for a 50% reduction in NTBs only across Africa; Chapter 4 combining Chapters 2 and 3 for tariff elimination and NTB reduction across Africa; Chapter 5 representing a selection only of African countries with tariff elimination; and Chapter 8 representing a 20% reduction in the time of transit for goods over and above a four-day Singaporean benchmark.

Note that we will not discuss Chapters 6 and 7 representing NTB reductions in the selected countries and a combined tariff elimination and NTB reduction in these same selected countries. We are not comfortable with a scenario that reduces NTBs in a selected group of countries only as, in general, NTBs cannot be reduced on a bilateral basis. Barriers or suspected barriers such as sanitary and phytosanitary (SPS) measures for agricultural protection, for example, cannot be simply based upon FTA partners. Perhaps an FTA may provide enhanced avenues for bilaterally addressing barriers but they offer little more than this. This is especially the case where our selected African countries are widely dispersed across the continent and are seldom contiguous.

We would also add that we have not simulated a scenario whereby we add tariff elimination, NTB reductions **and** reductions in transit costs. These are likely to be additive, as is the case with NTBs and tariff reductions, and therefore would produce very large gains for Africa. Our preferred approach is one of conservatism and we emphasise the NTBs and cost of the delays in transit only. We also emphasise that considerable research has gone into the estimation of the NTB estimates of the advalorem equivalents and the GTAP sector costs associated with transit times. However, this research is very much pioneering work and therefore needs to be treated as such. In addition, we are conscious that in using the pre-release Version 9.2 of the GTAP database there may well be some gremlins that need to be exposed.[3]

We would also add that there is a third set of trade barriers identified by the World Bank and its associates, namely that of business service barriers. We have not yet simulated an improvement in these barriers for Africa but intend to do so in the foreseeable future. We expect these results to be significant and essentially additive to tariff reductions, NTB reductions and reductions in transit times. This would present dramatically large gains to

[3] This pre-release version is provisionally only available to GTAP Board members for one year.

reinforce just how much Africa loses by being behind the world's best practices in too many aspects of trade in both goods and services. Importantly, many of the solutions to these problems are in African hands.

The results

This summary table allows for a comprehensive review of our results, and we will use this table as the basis for our discussion. It shows the final economic gains from the simulations expressed in terms of EV welfare at 2025 as measured by the amount over and above the 'business as usual' situation. Our discussions are presented below for each specific chapter.

In general we can see from Table 1 that the gains from complete African integration in the form of tariff elimination only (Chapter 2) are substantial and spread across all African countries except Zimbabwe. A very similar pattern applies to the Africa-wide reduction in NTB costs as modelled in Chapter 3, with the important difference that Zimbabwe now reports modest gains. Those countries outside Africa lose as they are displaced through increased intra-African trade. Combining Chapters 2 and 3 into Chapter 4 where we simulate tariff elimination and NTB reductions produces a result whereby the welfare gains are roughly additive for most African countries to produce a substantial outcome for Africa.

Chapter 5, an integration for selected African countries only, is very much a second-best option and only to be seriously considered in the event of political deadlock on a wider integration.

The exciting outcome is from examining the benefits to Africa of reducing the notorious costs of transit delays that beset much of the continent (but not much of the rest of the world). We use these estimates from the World Bank and others to simulate these delays and their associated costs to Africa.[4] This is not the first African analysis using this data. Mevel and Karingi (2012) show that, although an Africa-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.[5] Meeting that objective needs actions on trade barriers such as the length of customs procedures and port handling – the very measures we are discussing here with the summary results under the heading 'Chapter 8' as shown in Table 1. Even using a conservative 20% reduction in these costs over and above an international benchmark the welfare gains are substantial: about double those from tariff elimination and about 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 as but probably more important than actual tariff barriers.

[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; Mevel and Karingi (2012) use this data in their MIRAGE model.

[5] This research is discussed in more detail in Chapter 1.

Table 1: Simulation results, welfare as EV in $ (millions) at 2025

	Ch. 2	Ch. 3	Ch. 4	Ch. 5	Ch. 8
Total Africa	17,072	18,060	38,690	4,705	30,507
South Africa	5,742	2,690	9,920	2,228	8,519
Botswana	68	12	87	0	376
Namibia	463	188	758	8	173
Swazi-Lesotho	100	61	190	73	64
Kenya	1,289	2,117	3,451	439	1,122
Tanzania	377	1,024	1,459	41	880
Uganda	683	471	1,222	106	553
Rwanda	301	66	391	14	141
Egypt	518	1,422	2,028	350	81
Morocco	572	489	1,292	111	25
Rest of east Africa	15	59	68	2	785
Nigeria	2,031	1,399	3,453	610	5,112
Angola-DRC	1,168	1,917	3,428	-11	2,331
Ethiopia	255	91	403	0	620
Madagascar	-1	22	20	-6	38
Malawi	41	100	138	40	213
Mauritius	76	223	315	-7	59
Mozambique	14	44	56	-15	371
Zambia	454	232	808	4	848
Zimbabwe	-1,486	174	-1,405	-34	921
Ghana	813	485	1,793	694	634
Tunisia	357	755	1,120	68	49
Senegal	1,211	703	2,137	-3	261
Rest of Africa	2,012	3,316	5,558	-6	6,330
EU	-2,386	-2,667	-5,919	-610	655
UK	-364	-306	-754	-119	197
US	-726	-1,037	-2,143	-336	116
China	-2,351	-2,767	-6,185	-891	506
India	-1,539	-1,395	-3,373	-557	607
Brazil	-188	-261	-536	-139	-4
Russia	553	188	793	70	-571
Rest of world	-2,771	-4,529	-9,117	-1,413	-780
Total world	7,299	5,285	11,456	710	31,231

Source: GTAP output from tralac analysis

It is likely that were we to combine tariff elimination, NTB reductions and transit time reductions into one simulation run the gains would be roughly additive. We are reluctant to undertake this simulation or the companion simulation on trade costs associated with some service barriers until we have researched the details more thoroughly. Indeed, it is also likely that the costs relating to business service constraints may be additive to the combined tariff elimination, NTB reductions and transit time reduction simulations.

Chapter 2: Intra-African tariff elimination

This is our base of complete tariff elimination of all intra-African trade: where all intra-African tariffs are eliminated. It is generally, but not always, welfare-enhancing for African countries as shown in the second column. South Africa, as is usually the case, is the biggest gainer with an increase in welfare of $5.7 billion at 2025. Others to gain over a billion dollars each are Kenya, Nigeria, the Angola-Democratic Republic of Congo (DRC) aggregation, Senegal and the residual 'rest of Africa'[6] aggregation.

The cells in a bilateral matrix of other GTAP outputs show where each country is making gains or losses. This highlights that many countries gain from their own liberalisation as greater efficiencies flow through their economies. These countries include Kenya (which reforms and compacts its own inefficient sugar sector) and Nigeria, for example, 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. Of interest are the combined textile, clothing and footwear sectors (TCF), as many African countries benefit through improved access into continent-wide markets as tariffs reach zero in the TCF sectors. There are, however, some major losers, including non-African exporters of textiles and leather. However, other global apparel producers actually gain even though they face trade diversion. Virtually all countries and regions gain from duty-free access for vehicles and their parts across Africa, with, as expected, South Africa as the largest African gainer.

Except for Zambia's small decline of less than 1% in both exports and imports and Zimbabwe's decline in imports, both exports and imports increase across the continent for all parties. Some of these changes are very large (Rwanda), while others (Egypt) are much smaller. The demand for both skilled and unskilled labour in most of the countries shown increases, with South Africa and Senegal displaying the most significant increases (more than 0.57%).

Tariff revenue for SACU actually increases while, at the other extreme, tariff revenues into Zimbabwe decline by over one billion dollars. Several other countries have tariff revenue losses of nearly half a billion dollars or even more. For some larger countries (Egypt, Morocco, Tunisia and Senegal) tariff losses are not an issue.

Notable, however, from our results is the case of **Zimbabwe** where there is a welfare loss from African integration of around $1.5 billion at 2025, based upon the current trade performance and profile. Tariffs against all African imports decline to zero, reduce Zimbabwe's tariff revenues by over one billion dollars, and set a mechanism in place that results in a welfare loss of $1,471 million. Unfortunately, Zimbabwe has limited abilities to take the opportunities for extra exports in compensation, but the real issue concerns the capital market as capital leaves the country.

The **Angola-DRC** aggregation has changed from a small loss in the tralac TFTA analysis to a significant gain of $1,168 million here as the two-country aggregation is becoming more

[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.

integrated into Africa. The welfare increases are driven by improved access to Africa, and although the aggregation is a major resource exporter there have been increases in the exports of some manufacturing products. There are, however, some possible questions about the trade data. It is very unusual for a country like Russia which is excluded from an FTA to make the reported gains from that FTA. But we find that Russia is gaining in terms of trade (ToT, in the energy sectors in particular. This gain attracts some additional capital and marginally increases employment; this is enough to more than compensate for the usual trade displacement in other exporting sectors.

Chapter 3: NTB reductions across Africa

Trade liberalisation is increasingly focusing on NTBs. To date, tralac has simulated changes in NTBs as an across-the-board reduction of two percentage points in the ad valorem tariff rate, but we will now reduce the World Bank estimates of NTBs as researched by country and GTAP commodity by 50%. These estimates vary (often widely) by country and often between agriculture and manufacturing within a country; this enables a much more accurate estimate of the costs of these barriers than our earlier two percentage points estimates. As outlined earlier, the World Bank decomposed trade costs into the three categories (1) **trade facilitation**; (2) **non-tariff barriers**; and (3) the **costs of barriers on services trade**. We only examine NTBs here.

The results in the form of welfare gains show that South Africa's gains of $2,690 million are only 47% of the 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 Angola-DRC aggregation are now very close behind at around $2 billion each. Several countries gain more from NTB reduction than from tariff elimination and indeed Zimbabwe turned a major loss from intra-African tariff elimination into a gain with NTB reductions. Overall, our results have significant policy implications by adding further evidence to the theory that NTBs are a bigger problem in Africa than tariffs!

Digging deeper, our findings also emphasise that in many cases the sums representing 'own' gains are often very large. Here the policy implications are again clear; this is because these 'own' NTB reductions are directly under the control of the home government. Coordinated efforts to reduce NTBs are the best option but much can be gained in those countries with high barriers in unilateral actions. By GTAP sector, 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 for manufacturing. As the emphasis on NTBs is on the agricultural sectors for most countries we find that there are often very significant gains to agricultural production.

Chapter 4: Combining tariff elimination and NTB reductions across Africa

There is an interesting outcome from Chapter 4: when we add the combined individual country welfare gains from Chapters 2 and 3 we find that in most cases they are close to the aggregate total for the country outcome in Chapter 4. The range is from where South Africa is 110% of the combined Chapters 2 and 3 outcome at one extreme while Ghana's 72% is the other low extreme. Conversely, when we compare the outcomes in Chapter 2 and 3 separately

we find a wide variation in their relative ratios in individual countries. There therefore seems to be some internal compensatory mechanism in operation here as in general the overall results are somewhat cumulative as indicated by the narrow range when comparing our results from Chapter 4 with the combined results from Chapters 2 and 3.

Again, South Africa dominates the African welfare gains. Again the generalisation can be made that for some countries many of the gains derive from unilateral liberalisation while for others there are further examples where individual country gains are concentrated in one or two specific countries. Conversely, there are many cells containing a zero or close to it – meaning limited bilateral linkages. Only for South Africa is there a spread of countries where significant gains are made. Unfortunately, the 'rest of Africa' aggregation hides some potentially important individual country information as this is the aggregation which makes big gains.

South Africa does particularly well from agricultural reforms across the continent, and especially from secondary agriculture and sugar: this is so because it enjoys better access into Kenya and, to a lesser degree, Uganda for sugar. Both Kenya and Uganda in turn gain by reducing production in their own heavily protected and inefficient sugar sectors. There are some rather large gains for individual countries in many manufacturing sectors, especially for Africa's industrial giant, South Africa.

The combined tariff elimination and NTB reductions result in increased exports and imports across the continent for all parties (except Zimbabwe) when measured against the pure tariff elimination scenario. Some of these changes are very large, with Rwanda the best example, while for others (Egypt and Mozambique) the changes are much smaller.

Consequently, the demand for both skilled and unskilled labour in most countries increases, with South Africa, Kenya and Senegal displaying the most significant increases. Production increases in most but not all manufacturing sectors by country. The technical outcomes show an increasing real Gross Domestic Product (GDP) everywhere (except in Zimbabwe) while the ToT outcomes vary by country. Factor income in the standard land, labour and capital contributions usually increases and, in particular, the contributions from labour are encouraging.

Chapter 5: Tariff elimination for selected countries only

In this chapter we simulate an FTA of tariff elimination between those countries in Africa that we consider to be 'willing and able' to move forward towards full integration. We know that there are solid economic gains to almost all African economies from a comprehensive FTA, but there are also many political-economy type problems relating to full integration. We therefore take what can be described as the 'European Union (EU) approach' of starting regional integration slowly from a base of those few countries that appear to be ready for comprehensive liberalisation and gradually expanding over time. We assess the five countries in SACU, four in the EAC, Malawi, Zambia and Egypt in the TFTA region, Nigeria and Ghana in west Africa, and Morocco and Tunisia in north Africa; this selection represents 64.7% of African GDP.

The results show that integration between our selected countries only is very much a second-best solution. In all African countries within our selection the gains from the Africa-wide

countries are more (and often significantly more) than they are for the selected group only. The only bright spot is that those excluded are effectively neutralised rather than penalised for being outside this partial African integration. Indeed, in the case of Zimbabwe, they are *rewarded* by being 'outside'! For the countries in the selection only South Africa has gains above Ghana's $694 million, and for countries such as Botswana, Namibia, Tanzania and especially Zambia the gains from membership of the selected group are minimal at best. This partial integration derives less than 10% of the global gains from an Africa-wide scenario.

A different country aggregation may lead to better overall results, but on our evidence we do not have a strong economic case to make for an FTA integration based upon these selected countries only. That case could only be made as a second-best argument if progress towards full African integration seems to be irretrievably lost.

There are, however, some features which remain the same as in the Africa-wide FTA simulation. South Africa makes large gains from reforms in Kenya and Nigeria, while Kenya makes large gains from its own liberalisation. Ghana gains from liberalisation in Nigeria and, similarly, Nigeria mirrors this by making large gains from access into Ghana. Overall, we find that gains are almost identical between full and partial integration for the main countries on a bilateral basis, but in this scenario there are too many missing countries where large bilateral gains were made under an Africa-wide integration.

South Africa continues to do particularly well from agricultural reforms and especially in its exports of sugar to Kenya and Uganda. Again, the heavily protected and highly inefficient sugar sector in Kenya is a drag upon its own economy. Our arguments for reform in Kenyan sugar policies are reinforced as Kenya makes significant unilateral gains in the sugar sector. This is because it both reduces sugar production significantly and transfers resources out of a sector which has been heavily protected but is technically inefficient. There are, however, few gains in agriculture outside South Africa or the sugar sector in Kenya and Uganda. Both Egypt and Nigeria gain in the TCF sectors, while South Africa does well in the manufacturing sectors. Gains in the motor vehicle sector are muted outside South Africa's gains.

Welfare changes for the participants are mostly increasing when expressed real GDP terms, with some of these increases around 1% of real GDP. The ToT vary, with some improving and others declining. All countries except Rwanda attract more capital.

In terms of the tariff revenues collected at the respective borders there is little difference in the lost revenue between an Africa-wide FTA and the 'willing' countries. The main exception is SACU where revenues increase by $16 million in contrast to the surprisingly large $167 million increase from an Africa-wide integration.

Chapter 8: A reduction in the time costs of transit

In this chapter we examine trade facilitation by addressing the trade facilitation or infrastructural costs as outlined earlier where overall trade costs were divided into the three categories of (1) **trade facilitation**; (2) **non-tariff barriers**; and (3) 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. In Chapter 3 we kept tariffs as they

were but reduced NTBs by 50%. We emphasise that this current chapter examines a distinctly different set of trade barriers. The gains from each may well be additive.

African countries are well aware of these problems, and trade facilitation was the main outcome from the 2013 Bali WTO Ministerial Conference. The agreement was to streamline customs procedures and minimise delays at borders – with Africa expected to be the main beneficiary. World Bank researchers and others have combined to produce a database of per day ad valorem costs to use in the GTAP, with these estimates provided in ad valorem equivalents of the per day costs along with the number of days involved. In implementing the GTAP model we use the Singapore international best-practice benchmark of four days for imports. We assess a reduction of 20% in the days over and above this benchmark for **imports** only to avoid possible double counting.

The data reinforces that transit delays and subsequent costs are largely an African issue, and in taking a calculation of a 20% reduction in these costs we believe that our approach is conservative. There is still plenty of 'slack' in the African system, although there are countries in Africa that are very close to international benchmarks, thus proving that Africa has the potential to improve.

The welfare gains to Africa are substantial. 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 the very large gains to Nigeria and the rest of Africa aggregation. In direct contrast to our tariff elimination scenarios, there are gains to many of the large economies outside Africa as their export prices rise in response to more efficient transit times in Africa.

The striking feature from the results is that almost all of the gains to each country overwhelmingly accrue to that same country. This may in part be a feature of the way in which we have modelled our reductions: we only addressed changes in *import* times in transit 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.

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