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Welfare effects of the African Continental Free Trade Area: A simulation analysis

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Abstract

The African Continental Free Trade Area (AfCFTA) has the potential to boost economic development and welfare. Just how this can manifest remains an empirical question. For example, will the AfCFTA impact negatively on tariffs and related existing trade revenues? What is the impact of the AfCFTA on GDP, welfare, efficiency, household consumption, investment and the associated spillovers? This paper provides answers to these questions to guide policy in crafting a continental trade agreement that would be both beneficial to all parties and long lasting. Using a Computable General Equilibrium (CGE) model, the results show continent-wide economic positive effects which consist of a welfare gain of US$ 17.95 billion, 3.15% growth in GDP, and 1.94% increase in household per capita. We show that allocative efficiency, technological change, investment and savings effects all drive welfare gains. However, technological change is the largest driver of welfare gains. The distributional consequences across countries are, however, not shared evenly: for example whereas a substantial number of countries gain in terms of welfare, growth and household income, others suffer losses in all three indicators. Thus a policy design that caters for losses, account for an orderly adjustment and cushion technological development for net losers could be welfare enhancing.

KEYWORDS:
Colonialism; Boundary; Inter-state; Sovereignty; Demarcation.

1 | INTRODUCTION

Continent-wide trade integration has been a strategic objective of the African Union for the past five decades. This has become more important in recent times due to substancial recalibrations in the global economy and the potential viability of regional integration as a panacea to times the problems of the small economic size of many African countries. The past decades, however, depict the exact opposite with the African continent experiencing a proliferation of sub-regional organisations. This includes the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of Central African States (ECCAS), the Economic Community of West African States (ECOWAS), and the Southern African Development Community (SADC). As global markets continue to integrate with many countries abandoning inward-looking trade policies, these developments raise concerns over the potential costs of the fragmented markets on the continent's trading system. Apart from the continent's paltry contribution to world trade (pegged at 3%), intra-Africa trade is also grotesquely low at 15% and compares unfavourably to Europe (68%), developing Asia (51%), North America (33%) and Latin America (20%) (see UNCTADstat database,

http://unctadstat.unctad.org/). Undoubtedly, there is a massive opportunity for increased cross-border trade in Africa that must be exploited as part of the strategic objective of the continent.

Cognisant of the importance of intra-regional trade, the 18th Ordinary Session of the Assembly of Heads of State and Governments of the African Union, in January 2012, endorsed the framework for the establishment of the African Continental Free Trade Area (AfCFTA) and the action plan for Boosting Intra-Africa Trade (BIAT). These agreements offer a comprehensive framework to create viable pathways to deliver prosperity to all of Africa. To the extent that the AfCFTA will comprise fifty-five African countries with a total population in excess of 1.2 billion and a combined GDP of around $3.5 trillion (nominal: 2017), the benefits are expected to be substantial (Alhorr et al., 2008). Nonetheless, the realisation of any or all the expected benefits of the AfCFTA and the broader BIAT action plan is not automatic as significant challenges may arise in the implementation stage. For instance, the possible tariff elimination that comes with such an agreement could have adverse impact on fiscal revenues of member countries (Paunovic, 2004). Further, the pursuit of a continental free trade agreement by countries with natural resource endowments, as is the case for many of the African countries, raises questions on its political viability.

A number of studies have assessed the economic impact of the AfCFTA. A recent study by Saygili, Peters and Knebel (2018) net gains elating to AfCFTA although these are not evenly distributed. Other studies concentrate on regional groups or single country effects. For instance, Minor and Mureverwi (2013) determine the impact of a number of proposed trade agreements in Africa e.g. SADC, the TFTA on Mozambique's and household income gains to the poorest agricultural households. Hallaert (2007) finds negligible impact of a SADC FTA on Madagascar's real GDP. Mashayekhi et al. (2012) estimate that further regional integration within SADC will result in a welfare and employment gains. Two studies on the Tripartite Free Trade Area (TFTA), Willenbockel (2013) and Mold and Mukwaya (2016), show significant welfare benefits to respective sub regions. A missing part of these studies is the decomposition of macroeconomic and welfare impact of FTAs or intra-regional tariff reduction policies. It is fair to argue that failure to correctly identify and understand such drivers could limit any effort to sustain gains in welfare and or adequately deal with mitigation policies for net losers.

This paper, therefore, empirically examines the potential welfare and macroeconomic benefits of AfCFTA resulting with an emphasis on decomposing the welfare changes to ascertain the drivers of welfare changes for Africa. While this is an important consideration in any analysis of the AfCFTA, we are not blinded to the fact that invariably African governments may be apprehensive about the impact of tariff removal for a variety of reasons. First import tariffs constitute an important source of revenue. Although income from taxes on imports has reduced as a share of gross domestic product, it remains an important source of revenue. For instance a third of non-resource revenue in Africa was collected at border points in 2015 (see IMF, 2018). Secondly, governments' could be concerned with potential alterations in output in their domestic sectors given that trade shocks can reshuffle market shares to more productive firms in partner countries (Melitz, 2003; Melitz and Ottaviano, 2008; and Pavcnik 2002 for a theoretical and empirical discussion on this). In addition, a significant feature of the political economy exerting influences on the support and opposition to the tariff removal would be its effects on employment and households (Brenton et al., 2011). Thus, an empirical evaluation of the potential adjustment impact of tariff removal in the African free trade area is essential as it holds the key to unlocking both the design of the intra-Africa trade strategies as well as the implementation of the policies that can alleviate any impact of adjustment.

The next section briefly reviews various forms of barriers to trade that may impact adversely on the free movement of goods and services, in particular, the impact of tariff elimination and the potential implications for the AfCFTA. The review also highlights the difficulties that free trade areas face in dealing with Non-Tariff barriers and suggests ways of dealing with them. Section two empirically examines the impact of tariff elimination on continental trade. Using a Computable Generalised Equilibrium (CGE) model, the study provides several policy scenarios for consideration. In section three, detailed discussion of each of the policy scenarios is considered and the attendant impact of the experiments on various economic outcomes. Section four concludes and offers suggestions for the design of optimal trade policy.

1.1 | Elimination of tariffs

The AfCFTA covers a wide scope, including trade in goods and services, and lays the groundwork for the establishment of a Continental Customs Union. Various legal arrangements formulated to boost intra-African trade are covered under the different protocols of the agreement. In this paper, we focus on the impact of elimination of import tariffs and non-tariffs on trade on the continent.

Import tariffs are an important and sensitive trade policy instrument. Most countries on the continent derive a significant proportion of their fiscal revenue from trade tariffs and use them as an industry protection tool (see e.g., IMF 2018). Tariffs

are considered the visible barriers to trade in goods, hence, their elimination constitute a critical aspect of most free trade agreements, including the AfCFTA. Schedules on tariff concessions are necessary to provide security and predictability of market access for goods, assuming member states would not be able to freely increase them after negotiations. To avoid arbitrary increases, member states must legally agree to bind their tariffs at specific levels and to record such tariff bindings in their schedules of concessions. Given the importance and sensitivity of tariffs, the negotiations on concessions would require careful considerations, particularly concerning the approach to tariff liberalisation, and sensitive products and exclusions lists.

In June 2017, the AU Ministers of Trade adopted modalities for Trade in Goods (tariff negotiations) and trade in services, which are the basis for the negotiations. The modalities for tariff negotiations include a level of ambition of 90% tariff liberalisation -the goal is for 90% of tariff lines to have a zero duty within 5 years (or 10 years for Least Developed Countries [LDCs]). Parties are required to develop schedules of tariff concessions in accordance with approved modalities of tariff liberalisation. The modalities are such that existing Regional Economic Communities (RECs) trade regimes will continue and new tariff liberalisation under the AfCFTA will only take place among those member states who were not party to an FTA. For example, there is no existing preferential trade arrangements between SACU and ECOWAS member states, so tariff concessions need to be determined.[1] Bilateral negotiations on specific commitments for tariff concessions are ongoing; some are nearing conclusions, while others are still in progress, and overall progress is yet to be finalised.[2]

Sensitive products are usually subjected to narrow tariff concessions, extended phase down periods, or even exclusion from liberalisation. Contained in the modalities are provisions for member-states to negotiate on sensitive products, on a request and offer basis. The goal is to reduce tariffs to zero within a 10-year period for non-LDCs and 13-year period for LDCs. The composition of sensitive products and their tariff reduction schedule may vary in each bilateral relationship. In addition, the modalities provide for an exclusion list - a list of products for which tariff reductions are not to be proposed - and this is to be negotiated on a request and offer basis. Importantly, the exclusion list is subject to an 'anti-concentration' clause, which is to prevent members from including entire sectors in their exclusion list.

The AfCFTA defines Non-Tariff Barriers (NTBs) as barriers that impede trade through mechanisms other than the imposition of tariffs (AU, 2018 p.3). In fact, NTBs form part of the popular obstacles to intra-African trade. NTBs are typically less transparent than tariffs and come in forms such as administrative procedures, complex rules of origin documentation, sanitary and phytosanitary measures (SPS), and technical barriers to trade (TBTs). These barriers greatly impede intra-African trade. For instance, it is estimated that the tariff equivalent of NTBs is 40 percent on average (Carrere and De Melo, 2009a, b). Hence, the importance of addressing such barriers cannot be overemphasized and the AfCFTA has taken the right step by including a NTB mechanism.

Although the full details of the NTB clauses are still under negotiation, nevertheless, it is important to discuss some of the challenges that the RECs face in the effort to address NTBs under their Free Trade Areas, given that these RECs form the building blocks for the formation of the AfCFTA. Some of the key challenges identified include overlapping membership in RECs, which leads to regulatory uncertainty; opaque and hidden regulations; slow or lack of implementation of existing REC commitments; cumbersome customs procedures, lack of trust in the issues related to the quality of imported goods, which manifest in the form of more stringent SPS measures.[3]

Obviously, the AfCFTA must find ways of overcoming these challenges to ensure maximum benefit. A possible way is to harmonise and coordinate trade rules and requirements across all the member countries in the region. This could reduce the regulatory uncertainties often associated with overlapping membership. It is also important to adopt the best practices from the RECs and expand them across the continent. The Tripartite NTB offers very good lessons in this regard, where a web-based monitoring mechanism has been introduced to resolve various NTB complaints among trading partners.[4]

2 | SIMULATING THE IMPACT OF AFCFTA

To ascertain the impact of the AfCFTA on trade flows and performance on Africa, we employ a Computable General Equilibrium (CGE) analysis. CGE simulation models, a standard tool in empirical analysis, combine general equilibrium structures with economic data. These models are widely used to analyse aggregate welfare and distributional impacts of policies. A CGE

[1] https://www.tralac.org/documents/resources/faqs/2019-african-continental-free-trade-area-faqs-june-2018-1/file.html
[2] Member-state/customs territory to member-state/customs territory
[3] https://www.tralac.org/discussions/article/12866-the-african-continental-free-trade-area-afcfta-and-non-tariff-barriers-ntbs.html
[4] https://www.tralac.org/news/article/12170-bringing-the-cfta-about-key-factors-for-success.html

analysis has the advantage of tracking the medium to long-term adjustment of firms, households, governments and production and consumption patterns to policy changes. The method, therefore, aptly depicts the impact of a policy or shift in prices. A few studies have documented some potential gains from the AfCFTA using similar analysis. For instance, Saygili et al. (2017) show potential welfare increase by US$16 billion and an average GDP growth of 0.97% from the AfCFTA. However, they also note that there are distributional losses that needs to be addressed. Similar analysis by Vanzetti et al. (2017) also reveal welfare gains of between US$3 billion, for full tariff elimination, to US$21 billion, for full tariff elimination with the elimination of non-tariff measures.

GTAP CGE Model is used for the simulation analysis. It is a well-known model for multiregional, multisector and indeed a global general equilibrium model, which incorporates all economic factors.[5] The GTAP CGE is a comparative static model that allows us to gauge the different possible states of a set of economies and particularly useful in ascertaining the future effect of policy changes. The model contains standard behavioural equations, which describe the behaviour of economic agents, as well as identity equations. Intersectoral linkages and relationships are captured via input-output tables, whilst linkages between countries are captured via bilateral trade flows. Bilateral trade flows are based on the Armington assumption where products are differentiated by country of source. The analysis in this paper uses GTAP database version 9, which contains 140 regions, 57 sectors and 8 factors. The 140 regions were aggregated to 32 regions (including 22 African countries and two regional aggregates of other African countries) and the 57 sectors are aggregated into 22 sectors as shown in Table 1 and 2. Figure 1 shows the share of non-resources customs revenues in Africa in 2015. To keep the analysis tractable, we have organised the impact according to various policy scenarios.

TABLE 1 Country and sector aggregation

Countries/Regions Aggregates (32)	Sectors (22)
Egypt	Grains and Crops
Morocco	Livestock and Meat Products
Tunisia	Forestry and fisheries
Benin	Mining and Extraction
Burkina Faso	Beverages and tobacco products
Cameroon	Dairy products
Cote d'Ivoire	Vegetable oils and fats
Ghana	Other food and sugar
Guinea	Textiles and Clothing
Nigeria	Wood and paper products
Senegal	Motor vehicles and parts
Togo	Leather and Light Manufacturing
Ethiopia	Petroleum, coal products
Kenya	Chemical, rubber, plastic prods
Madagascar	Mineral products nec
Malawi	Metals
Mauritius	Electronics and other manufacturing
Mozambique	Utilities and Construction
Rwanda	Communication
Tanzania	Transport
Uganda	Financial and insurance services
Zambia	Other Services
Zimbabwe	
Botswana	
Namibia	
South Africa	
Rest of World	
Rest of South African Customs	
Rest of Africa	
East and South Asia	
North America	
European Union 28	

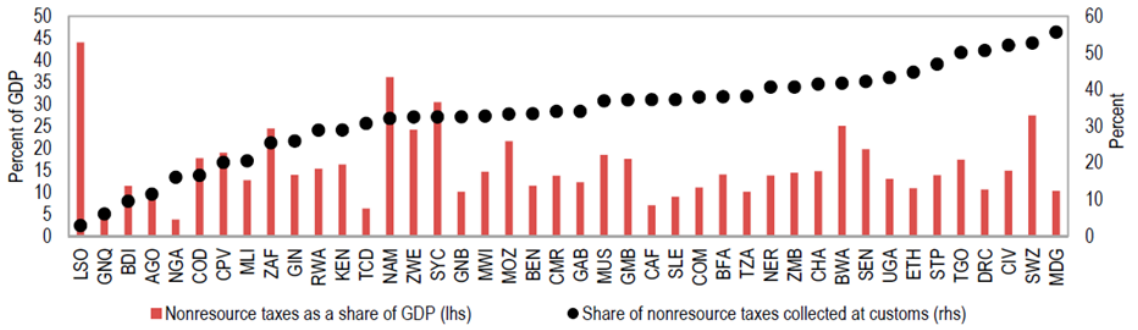
Source: GTAP Aggregation by Authors

[5] https://www.tralac.org/news/article/12170-bringing-the-cfta-about-key-factors-for-success.html

TABLE 2 Aggregation of Commodities

Model Sectors	Acronym	GTAP Sectors
Grains and Crops	GrainsCrops	Paddy rice; Wheat; Cereal grains nec; Vegetables, fruit, nuts; Oil seeds; Sugar cane, sugar beet; Plant-based fibers; Crops nec; Processed rice.
Livestock and Meat Products	MeatLstk	Cattle,sheep,goats,horses; Animal products nec; Raw milk; Wool, silk-worm cocoons; Meat: cattle, sheep,goats,horse; Meat products nec
Forestry and fisheries	fish_forestr	Forestry; Fishing
Mining and Extraction	Extraction	Coal; Oil; Gas; Minerals nec
Beverages and tobacco products	b_t	Beverages and tobacco products
Dairy products	mil	Dairy products
Vegetable oils and fats	vol	Vegetable oils and fats
Other food and sugar	procfood_o	Sugar; Food products nec;
Textiles and Clothing	TextWapp	Textiles and Wearing apparel
Wood and paper products	lumpp	Wood products; Paper products, publishing
Motor vehicles and parts	vehicles_eq	Motor vehicles and parts; Transport equipment nec;
Leather and Light Manuf	Leath_oMnfc	Leather products Manufactures nec
Petroleum, coal products	p_c	Petroleum, coal products;
Chemical,rubber,plastic prods	crp	Chemical,rubber,plastic prods
Mineral products nec	nmm	Mineral products nec;
Metals	metals	Ferrous metals; Metals nec; Metal products
Electronics and other manuf	electronic_o	Electronic equipment; Machinery and equipment nec.
Utilities and Construction	Util_Cons	Electricity; Gas manufacture, distribution; Water; Construction.
Communication	cmn	Communication.
Transport	Transpor	Trade; Transport nec; Sea transport; Air transport;
Financial and insurance service	fin_ins	Financial services nec; Insurance;
Other Services	OthServices	Business services nec; Recreation and other services; PubAdmin/Defence/Health/Educat; Dwellings.

FIGURE 1 Sub-Saharan Africa - Share of Nonresource Revenue Collected at Customs, 2015



Source: World Economic and Financial Surveys, IMF (2018)

2.0.1 | Policy scenarios

The AfCFTA aims at removal of tariffs and barriers to increase intra-African trade and deepen African integration. It also emphasizes the consequential improvement in technology and productivity spill-overs within African countries from trade creation. The AfCFTA ultimately aims to positively impact the economic performance of African countries in ways that enhance welfare benefits. Four sets of experiments (termed Policy Scenarios) are conducted in this paper:

i Policy Scenario 1 is the fundamental AfCFTA policy and involves the elimination of tariffs on all trade amongst African countries.

ii Policy Scenario 2 entails the removal of tariffs on only agricultural products. The idea behind scenario 2 is to gauge the sensitivity of agriculture in African trade. The issue of sensitivity is germane in trade but to incorporate specific sensitive sectors also requires reliable information on the list of sensitive sectors per country. Only a handful of AfCFTA countries have supplied their list of sensitive sectors. Although some studies (Vanzetti et al., 2017) have used this in analysing the impact of the AfCFTA, modelling with such limited information creates an unfair disadvantage to the larger group of countries who have not provided information on the list of sensitive sectors. Further, the use of agriculture to gauge for sensitivity is premised on the fact that trade in agricultural goods are sensitive for all African countries.

iii Policy Scenario 3 involves elimination of tariffs on all trade plus additional reduction in Non-Tariff Barriers (NTBs).

iv Policy Scenario 4 is a variant of 3 where a smaller level of NTBs reduction is applied. Table 2 below presents the structure of the experiment and simulations under the GTAP model framework.

TABLE 3 Experiments and policy scenarios

Policy Scenario	Description	Variable shock GTAP Model
1	Eliminate tariffs on all trade	$\triangle tms = -100\%(T, CfTA, CfTA)$
2	Eliminate tariffs on all agricultural trade	$\triangle tms = -100\%(Ag, CfTA, CfTA)$
3	Eliminate tariffs on all trade plus reduction in NTBs	$\triangle tms = -100\%(T, CfTA, CfTA)$ $\triangle ams = 10\%(T, CfTA, CfTA)$
4	Eliminate tariffs on all trade plus smaller reduction in NTBs	$\triangle tms = -100\%(T, CfTA, CfTA)$ $\triangle ams = 5\%(T, CfTA, CfTA)$

Non-Tariff Barriers are defined by UNCTAD (2015) as *policy measures, other than ordinary customs tariffs, that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both* and include among others standards, custom procedures, technical barriers, licenses, prohibitions, distribution restrictions, procurement restrictions, competition measures, and rules of origin. They can, and often present significant barriers to trade. To account for the removal of NTBs in CGE modelling an identification of NTBs per sectors per country and application of suitable tariff reductions was done. Two other approaches are the iceberg effect and willingness to pay methods (popularized by Hummels et al., 2007; Hummels and Schaur, 2013; Walmsley and Minor, 2016).[6]

This analysis uses the iceberg cost approach. The iceberg cost reduction reflects the idea that there is a cost (fraction of transported good) associated with transporting goods which can be (similar to melting of an iceberg) reduced to enhance trade. It is also referred to as the famous sand in the wheels problems in trade. The sand in the wheels are the various NTBs that delay, and in some cases, stall movement of trade. The idea of iceberg costs is common in African countries and resonates well with barriers to trade across African borders. Since the pioneering work of Hertel et al. (2001) who applied the iceberg cost approach in CGE modelling in assessing the impact of customs delays in trade between Japan and Singapore, there has been a host of studies which utilized the technique (for instance Fox et al., 2003; Fugazza and Maur, 2008). The removal of the cost entails a positive technological shock to augment the free flow of trade and in particular lower the cost of imports. This has further advantages of inducing import benefits for firms, households, investments and government and also generates productivity benefits for domestic production and exports. In GTAP notation the iceberg cost is applied via the technological preference AMS parameter in the Armington (1969) import equation:

$$MV_{i,j}^{F} = \frac{P_{i,j}^{F}}{AMS_{i,j}^{F}} \cdot M_{i,j}^{F} \cdot AMS_{i,j}^{F} \tag{1}$$

where $MV_{i,j}^{F}$ is the value of foreign good i from country j, $P_{i,j}^{F}$ is the price of the foreign good i from country j, $M_{i,j}^{F}$ is the quantity of imports from country j (same as exports of j) and $AMS_{i,j}^{F}$ is the Armington augmenting iceberg cost on imports of country j. Following Hertel et al. (2001) the iceberg cost when reduced (positive shock to AMS) has two contrasting effects within the Armington structure: it first reduces the prices for the importer and causes a substitution of demand for the imported good, and subsequently increase its quantity demand, and, second, it reduces the amount that needs to be imported to satisfy a given level of demand. Although these effects work in the opposite direction, the first effect entails higher price elasticity effects

[6] Elaborated by Samuelson (1954)

and often dominates the second. The computed quantity which the importer observes changes in direct proportion to the size of the NTB and helps maintain the initial accounting balance. The four policy scenarios reported in Table 3 are applied for the simulation exercise using the GTAP Model under standard GTAP closure (Hertel et al., 2007).

3 | INCOME GROWTH AND POVERTY REDUCTION

3.1 | Continent-wide macroeconomic impact

Results based on the Computable General Equilibrium (CGE) analysis are presented in this section. Table 4 presents a summary of the economic impact under various scenarios of the AfCFTA for African countries.

TABLE 4 CaMacroeconomic and welfare impact-regional levelption

	Welfare (US$ Millions)	GDP (%)	Household Utility (%)	Volume of exports (%)	Volume of imports (%)	Terms of trade (%)
Policy Scenario 1	3589.06	0.65	0.41	2.94	3.13	0.39
Policy Scenario 2	751.29	0.12	0.16	0.79	0.86	0.14
Policy Scenario 3	17956.90	3.15	1.94	5.23	6.59	1.35
Policy Scenario 4	10445.70	1.90	1.20	3.79	4.90	0.89

Source: GTAP Model and author estimates

Under Policy Scenario 1 (complete tariff reduction on all trade), total welfare gains amount to US$3.59 billion, GDP and per capita household utility increases by 0.65% and 0.41% respectively. With respect to trade, the volume of exports grows by 2.94%, imports increase by 3.13% and the terms of trade improve by 0.39%. The welfare gains, GDP and per capita utility growth as well as export and import volume growth and terms of trade growth under Policy Scenario 2 (complete removal of tariffs on all agricultural trade) are lower. This is an indication of the sensitivity of agricultural goods in African trade.

The economic gains under Policy Scenario 3 (complete tariff removal on all trade and a reduction in the iceberg cost (NTBs) based on a 10% positive improvement shock) result in a welfare gain of US$17.95 billion, 3.15% growth in GDP, 1.94% increase in household per capita utility, export and import volume growth of 5.25% and 6.59% respectively. This is coupled with higher terms of trade improvement (1.35%). The increased gains can be attributed largely to the technological effect of reducing the iceberg cost. The economic gains under Policy Scenario 4 (complete tariff removal on all trade and a reduction in the iceberg cost (NTBs) based on a 5% positive improvement shock) reflect similar trends as that of scenario 3 trend but gains are of lower magnitude of impact. The reduction in the iceberg cost (the removal of the sand in the wheels) results in technological and productivity benefits accruing to imports of firms, households, investments and governments. Under the iceberg cost reduction, domestic exports also benefit from these productivity gains via changes in the export price.

3.2 | Continent-wide welfare impact

A further decomposition of the welfare effect in Table 5 shows the technological gains from the iceberg cost reduction (US$8.64 billion and just over US$4 billion for Policy Scenarios 3 and 4 respectively). These contribute immensely to the higher welfare gains in these scenarios indicating the overall higher contribution of a reduction in NTBs (iceberg cost) to the general tariff reduction under the AfCFTA.

TABLE 5 CaMacroeconomic and welfare impact-regional levelption

	Allocative efficiency effect	Technological change	Terms of trade	Investment & savings effect	Total welfare
Policy Scenario 1	1697.176	0	1907.632	-15.485	3589.064
Policy Scenario 2	344.364	0	405.784	1.895	751.288
Policy Scenario 3	2953.44	8643.9	5900.36	459.4	17956.9
Policy Scenario 4	2338.139	4045.5	3843.346	216.895	10445.7

Source: GTAP Model and author estimates

As a result of lower iceberg tariffs, allocative efficiency improves and also leads to trade creation thereby improving the terms of trade effect. The technical efficiency gains from the iceberg effect also improves capital resulting in a rise in investment and savings effect. This transmission effect further confirms the productivity benefits which accrue to firms, households, investments and governments as a result of reducing these iceberg tariffs. Notice also that the welfare effect under Scenario 1 is adversely affected by a negative capital account situation (negative investment and savings effect) which could be explained by the already adverse investment-savings position of most African countries. It is evident that Policy Scenario 3 is the most beneficial form of AfCFTA implementation for Africa. The general economic benefits of the AfCFTA are more pronounced under this scenario than in other scenarios. It also shows that significant NTBs and technological/productive inefficiencies exist in African trade which need to be reduced to spur trade creation and economic benefits.

3.3 | GDP and household utility impact across countries

The distribution of GDP and per capita household utility effects are shown in Table 6. Nine countries (Burkina Faso, Cameroon, Guinea, Nigeria, Ethiopia, Mozambique, Tanzania, and Zimbabwe) and the aggregated countries for the rest of Africa experience negative GDP growth under Policy Scenario 1.

TABLE 6 Distribution of GDP and per capita household utility across countries

	Policy Scenario 1		Policy Scenario 2		Policy Scenario 3		Policy Scenario 4	
	GDP (%)	Household Utility (%)	GDP (%)	Household Utility (%)	GDP (%)	Household Utility (%)	GDP (%)	Household Utility (%)
Egypt	0.25	0.07	0.06	0.01	1.77	0.53	0.95	0.28
Morocco	0.89	0.4	0.22	0.1	2.23	1.21	1.51	0.77
Tunisia	0.53	0.25	0.03	0.02	2.63	1.38	1.5	0.78
Benin	3.19	1.8	3.03	2.37	-7.08	-5.43	0.18	-0.26
Burkina Faso	-0.13	0.15	0.19	0.04	1.14	1.64	0.47	0.87
Cameroon	-0.05	0.07	0.05	0.06	1.41	1.01	0.63	0.51
Cote d' Ivoire	2.41	1.03	1.15	0.46	5.62	2.83	3.96	1.9
Ghana	1.69	0.87	0.23	0.13	4.09	2.45	2.81	1.6
Guinea	-1.95	-0.55	-0.76	-0.16	-0.44	1.48	-1.26	0.41
Nigeria	-0.03	0.01	-0.1	-0.01	0.32	0.2	0.14	0.09
Senegal	4.51	1.9	1.51	0.68	9.48	4.38	6.91	3.11
Togo	5.8	4.45	0.34	0.49	14.41	11.05	9.98	7.7
Ethiopia	-0.47	-0.07	-0.07	0	1.66	0.88	0.51	0.38
Kenya	0.01	0.14	-0.72	-0.14	5.31	2.59	2.49	1.3
Madagascar	0.03	0	-0.03	0	1.01	0.5	0.47	0.23
Malawi	0.41	0.27	1.28	0.52	7.12	4.18	3.63	2.2
Mauritius	0.28	0.12	0.17	0.08	2.22	1.42	1.17	0.72
Mozambique	-0.02	-0.08	0.09	0.02	3.3	2.66	1.58	1.25
Rwanda	3.51	0.59	0.93	0.17	6.56	1.91	4.93	1.23
Tanzania	-0.39	0.44	-0.88	0.15	1.79	2.19	0.63	1.26
Uganda	1.62	0.55	0.31	0.23	5.57	2.1	3.49	1.3
Zambia	2.64	0.95	0.42	0.1	10.16	4.72	6.3	2.8
Zimbabwe	-13.56	-3.88	-5.65	-1.28	-8.19	1.45	-11.02	-1.27
Botswana	0.63	0.06	0.03	0	1.38	0.75	0.98	0.39
Namibia	2.41	0.61	0.93	0.24	5.82	2.29	4.03	1.4
South Africa	1.44	0.46	0.27	0.07	3.74	1.33	2.52	0.87
Rest of SACU	2.6	0.95	0.34	0.06	4.57	2.13	3.54	1.52
Rest of Africa	-0.17	0.02	-0.12	0	0.52	0.62	0.15	0.29
Average Africa	0.65	0.41	0.12	0.16	3.15	1.94	1.9	1.2
Rest of the World	-0.01	0	0	0	-0.16	-0.03	-0.03	0

Per capita household utility also reduces for four of these countries; Guinea, Ethiopia, Mozambique and Zimbabwe under this scenario. Togo experiences the largest GDP growth and per capita household growth of 5.8% and 4.45% respectively and Zimbabwe has the worst GDP growth impact of -13.5% and 5.65% reduction in per capita household utility. The GDP and per capita household utility growth impact under Policy Scenario 2 follows a similar pattern but worsens in terms of magnitude. Similar to the countries with GDP losses in Scenario 1, eight countries (with the exception of Mozambique and the addition of

Kenya) and the aggregated countries for the rest of Africa experience GDP losses. Again, four countries (Guinea, Zimbabwe, Nigeria and Kenya) suffer per capita household utility losses. Under scenario 3, where GDP and per capita household growth impacts are higher, the number of countries with GDP losses falls to three (Benin, Guinea and Zimbabwe) and only one country (Benin) suffers per capita household utility losses. Togo again benefits most in terms of the largest GDP and per capita household utility growth of 14.4% and 11.05% respectively. The trend of impact under Scenario 4 is similar to that of Scenario 3 except that the magnitude of the impact is lower across countries. However, Guinea and Zimbabwe suffer GDP growth losses while Benin and Zimbabwe suffer per capita household utility losses.

3.4 | Welfare impact across countries

Table 7 presents simulation results for the total welfare impact for African countries under the four scenarios. Policy Scenario 1 results in welfare gains for most African countries except four (Guinea, Ethiopia, Mozambique and Zimbabwe). Under Policy Scenario 2, a larger number of countries, Guinea, Nigeria, Ethiopia, Kenya, Madagascar, Zimbabwe, Botswana plus the aggregated countries for the rest of Africa experience welfare losses-with Zimbabwe experiencing the worst welfare loss of (US$127 million). The gain in welfare is largest under Policy Scenario 3 for most countries. The top five welfare gainers under this scenario are South Africa (over US$4 billion), Egypt (US$1.15 billion), Morocco (US$1.02 billion), Ghana (US$878 million) and Kenya (US$811 million). Benin is the only country that experiences a welfare loss of US$350 million under this scenario. The trend and patterns in welfare impact under Policy Scenario 4 are quite similar to that of Policy Scenario 3 except for the reduced effect on the magnitude of gains and loss and an additional country—Zimbabwe—also experiences a welfare loss.

TABLE 7 Distribution of welfare impact across countries

	Policy Scenario 1	Policy Scenario 2	Policy Scenario 3	Policy Scenario 4
Egypt	146	31.5	1151	612
Morocco	339	86.8	1026	657
Tunisia	99.8	8.29	543	307
Benin	117	154	**-350**	-10.4
Burkina Faso	13.8	4.04	154	82
Cameroon	15.7	14.9	233	118
Cote d' Ivoire	232	103	638	428
Ghana	310	47.7	878	574
Guinea	**-24.8**	**-7.38**	67.9	18.7
Nigeria	20.6	**-28.7**	788	380
Senegal	249	88.4	573	406
Togo	148	16.3	368	256
Ethiopia	**-21.9**	**-0.801**	252	108
Kenya	44.9	**-43.2**	811	408
Madagascar	0.104	**-0.42**	43	19.8
Malawi	13.7	26.5	213	112
Mauritius	11.8	7.82	140	71.4
Mozambique	**-9.45**	2.63	312	146
Rwanda	35.7	10.2	116	74.2
Tanzania	94.8	33	472	273
Uganda	79.6	33.2	304	188
Zambia	161	17.3	798	474
Zimbabwe	**-384**	**-127**	145	-126
Botswana	7.61	**-0.071**	104	53.3
Namibia	65.8	26.1	249	152
South Africa	1673	249	4815	3141
Rest of SACU	58.6	3.79	130	92.7
Rest of Africa	91.7	-5.61	2983	1430
Total Africa	3589.06	751.29	17956.90	10445.70
Rest of the World	443	**-56.1**	-18.7	205

Source: GTAP Model and author estimates

TABLE 8 Decomposition of welfare effect under Policy Scenario 3

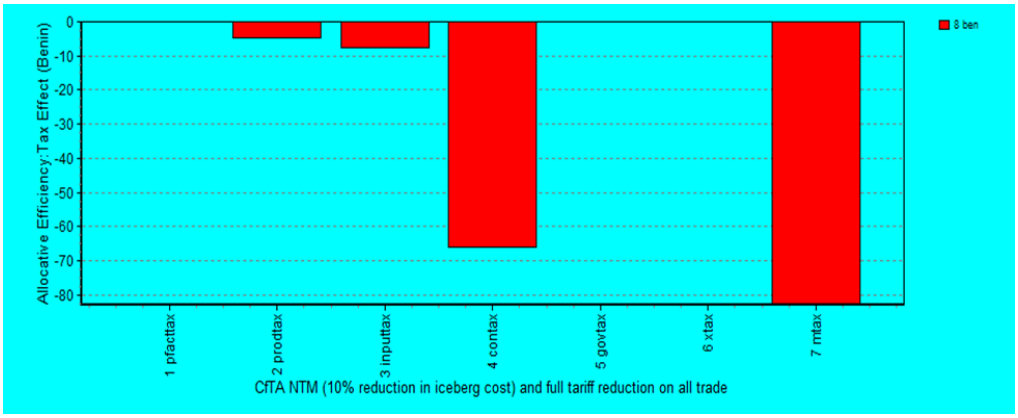
	Allocative efficiency effect	Technological change	Terms of trade	Investment and savings effect	Total welfare welfare
Egypt	86	232	571	262	1151
Morocco	50.7	305	512	159	1026
Tunisia	53.8	136	324	28.6	543
Benin	-162	60.4	-54	-194	-350
Burkina Faso	24.9	103	7.44	18.5	154
Cameroon	110	138	-12	-2.78	233
Cote d' Ivoire	160	212	311	-44.5	638
Ghana	209	283	266	120	878
Guinea	26.3	68.3	-11.8	-14.9	67.9
Nigeria	-81.9	500	366	4.1	788
Senegal	91.6	145	211	125	573
Togo	171	44.5	108	44.8	368
Ethiopia	67.8	113	59.2	11.2	252
Kenya	120	250	233	209	811
Madagascar	-6.6	41.5	6.72	1.36	43
Malawi	11.2	140	55.8	6.29	213
Mauritius	10.5	66.7	55.2	7.33	140
Mozambique	-49.6	273	93	-5.07	312
Rwanda	22.4	63.3	24.6	5.37	116
Tanzania	185	230	63.7	-6.9	472
Uganda	55.4	139	96.9	13.3	304
Zambia	24.2	547	361	-134	798
Zimbabwe	219	499	-259	-315	145
Botswana	-6.16	101	21.7	-12.9	104
Namibia	17.5	108	165	-41	249
South Africa	1353	1180	2138	144	4815
Rest of SACU	39.4	39.2	70.9	-19.6	130
Rest of Africa	151	2626	116	90.2	2983
Rest of the World	219	0	-361	123	-18.7

Source: GTAP Model and author estimates

A decomposition of the welfare effects in Scenario 3 helps to ascertain the drivers of welfare, particularly for Benin. From Table 8, Benin suffers the heaviest allocative efficiency loss of US$162 million. This loss coupled with losses in the terms of trade and further heavy losses in investment and savings are the major contributors to the welfare losses in Benin.

A further decomposition of the allocative efficiency contributors shows that the allocative inefficiencies appear to be mainly from the heavy losses in import tax and consumption (final goods) tax as shown in Figure 2. Benin, unlike most of the other African countries is either unable to take advantage of the reduction in iceberg tariffs or is heavily reliant on NTBs.

FIGURE 2 Decomposition of allocative efficiency effect (Benin)



Source: GTAP Model estimates

TABLE 9 Losses per scenario

Losses				
	Policy 1	Policy 2	Policy 3	Policy 4
Welfare	4	7	1	2
GDP	9	8	3	2
Household Utility	4	4	1	2
Total	17	19	5	6

Table 9 summarizes the number of losses in welfare GDP and household utility and shows clearly that Scenario 3 is the best scenario with minimal losses (5), whilst Scenario 2 is the worst with the highest losses (19). This reaffirms the observation that with an already adverse capital account situation, high sensitivity of agricultural goods in African trade and iceberg costs in trade, the best form the AfCFTA would take is to couple tariff reduction with significant removal of iceberg costs and enhancement of technological and productive spillovers.

4 | CONCLUSION

The potential economic benefits of free trade agreements are clear and supported by economic theory; specialisation among member countries in goods for which they have a comparative advantage would improve efficiency in the use of productive resources at the country level. The current international discourse on trade are, however, somewhat dominated by fears of trade wars between Europe and the United States. The African continent, however, the AfCFTA presents a unique opportunity to boost intra-Africa trade. The agreement offers a comprehensive framework to undertake a strategy of developmental regionalism and encompasses, among others, the removal of barriers on imports such as tariffs and quotas.

In this paper, we simulate the effect of the removal of import tariff and non-tariffs on intra-Africa trade using the GTAP CGE model. Our analysis indicate that the structuring of the AfCFTA need not solely focus on 100% tariff reduction in all goods but focus should equally be given to NTBs, which have the potential of constraining welfare gains and efficiency of intra-African trade. Estimations indicate that proper structuring of the AfCFTA could potentially remove trade inefficiencies and lead to an estimated long-term gain amounting to US$17.96 billion in welfare, 3% annual GDP growth and 1.94% per capita household annual gains. The gains are driven largely by technological improvements, which improve capital availability, and lead to higher saving and investment levels, consequently resulting in productivity benefits to firms, households, and governments.

Further analysis, however, indicates that gains are not evenly distributed. Some countries suffer losses in welfare, GDP and household utility. Some sectors also suffer a reduction in export volumes. This calls for the design of strategies to cater for losses and support an orderly adjustment in some countries. In addition technological adjustments to potential losing countries can help these countries to mitigate the welfare loses. Overall, this suggests the need to pay serious attention to the sequencing and selective application of NTB removals especially with regards to potential net losers. Ultimately there is need to pay attention to public regional infrastructure that enhances technical capabilities of countries. This is one of the ways to increase the pace towards structural transformation of African economies to enhance higher welfare and economic gains.

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