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Quantifying Tariff Revenue Losses from the African Continental Free Trade Area

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Abstract

This paper presents estimates of customs revenue losses for 45 African countries associated with the phase-down of tariffs under the African Continental Free Trade Area (AfCFTA). Unlike previous studies, the trade and revenue estimates are based on the Provisional Schedules of Tariff Concessions offered by each African state or regional economic community (REC) and therefore map closely with the expected tariff reductions from the AfCFTA. The results show that the removal of tariff barriers under the AfCFTA will be effective in raising and diversifying intra-Africa imports. The customs revenue losses after the phase-down of tariffs are likely to be minor, making up less than 0.2 percent of total government revenue for most African countries. Moreover, many African countries have insulated themselves from tariff revenue losses by excluding revenue-sensitive products from the agreement (Schedule C) and by back-loading tariff reductions on revenue-sensitive products (Schedule B). Not all countries are affected equally. The Congo, D.R., Cameroon, Republic of Congo and Zimbabwe are found to be vulnerable to large decreases in the dollar value of customs revenue and declines in the share of customs revenue in total government revenue. While absolutely revenue losses are low for smaller countries, including Malawi, Liberia, Central African Republic and Sierra Leone, these decreases, nevertheless, constitute high shares of total government revenue. Overall, the results indicate that for most African countries, revenue losses should not be a major obstacle towards the commencement of trade under the AfCFTA. These findings also serve as an important input into the design of the proposed AfCFTA Adjustment Fund, which is intended to support those countries that are most vulnerable to revenue shocks.

Keywords: African Continental Free Trade Area, customs revenue, tariffs

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1. Introduction

The African Continental Free Trade Area (AfCFTA) entered into force in May 2019 and trading under the agreement commenced on 1 January 2021. The objectives of the agreement are, amongst others, to boost exports by removing obstacles to intra-regional trade and ultimately create a single continental market for goods, services, people and investment. In doing so, the Agreement seeks to bring together all 55 member States of the African Union in a market of more than 1.3 billion people with a combined gross domestic product (GDP) of more than US$3.4 trillion.[1] In terms of the number of participating countries, the AfCFTA will be the world's largest free trade area since the formation of the World Trade Organization. Estimates of the potential impact on African economies are large. The World Bank (2020: IX), for example, estimates that by 2035, the AfCFTA would raise intra-Africa trade by more than 81 percent, real incomes by 7 percent, or nearly US$450 billion, and contribute to lifting an additional 30 million people from extreme poverty and 68 million people from moderate poverty.

However, as with all trade agreements, the gains across and within African countries will not be equally distributed. In the short-term, it is possible that some countries may experience short-term losses. Specifically, as tariffs are removed on intra-regional trade, some countries are likely to experience reductions in customs duties; and for many countries in Africa, trade taxes still contribute significantly to overall government revenue. Significant losses in customs duties in revenue vulnerable countries have the potential to undermine, or even reverse, their phase-down of tariffs in accordance with the agreement.

This study presents estimates of potential revenue losses for African countries associated with the implementation of import tariff reductions under the AfCFTA. Estimates of the revenue implications of the AfCFTA vary widely across studies and across countries. Previous studies by the United Nations Economic Commission for Africa (UNECA) indicate that the short-term customs revenue losses could amount to between 3 and 5% of GDP for some countries (UNECA, 2020; 2021) However, available estimates of revenue losses from the AfCFTA are largely based on modelling work that was completed prior to the finalisation of the Schedule of Tariff Concessions offered by each African state or regional economic community (REC).

The specific offer in the Schedule of Tariff Concessions has a critical bearing on the extent to which customs revenues will be reduced under the AfCFTA. By excluding product items that contribute high shares of customs revenue, African countries may insulate themselves from tariff losses, albeit at the cost of increased intra-Africa trade. States can also delay the revenue implications by allocating products to their sensitive or excluded lists. The level and evolution of revenue reductions will therefore differ across Member States according to the Schedule of Tariff Concessions offered.

This paper contributes to the available research in several ways. It is the first study to estimate the potential revenue implications of the AfCFTA based on the actual Provisional Schedule of Tariff Concessions (PSTCs) submitted by African States or regional groupings to the AfCFTA

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[1] www.au-afcfta.org.

Secretariat as of March 2023. This includes the RECs of Central African Economic and Monetary Community (CEMAC), Economic Community of West African States (ECOWAS), Southern African Customs Union (SACU), and the Member State submissions of Algeria, Angola, D.R. Congo, Egypt, Madagascar, Malawi, Mauritius, Morocco, Sao Tomé & Príncipe, Seychelles, Tunisia, Zambia and Zimbabwe. The schedules used in this study cover 46 African States, but revenue loss estimates are provided for 45 countries, as no trade data were available for South Sudan.

The paper uses a consistent partial equilibrium model, namely the SMART model, to calculate the revenue implications of tariff reductions under the AfCFTA for all 45 countries. This enables a comparative analysis of the revenue effects across a much wider range of African countries than has been the case in the available literature. Further, the study tests the sensitivity of the customs revenue outcomes to the granting of duty rebates that are widespread across African countries, and incomplete preference utilisation rates that arise from challenges in complying with rules of origin requirements.

The focus of this paper is on the the government revenue effects from reductions in import tariffs on goods and does not consider the long-term boost to intra-Africa trade and customs revenue that will be associated with the implementation of the remaining Annexes of the AfCFTA Protocol on Trade in Goods that cover customs co-operation, trade facilitation, nontariff barriers, technical, sanitary and phytosanitary measures, and transit arrangements. The implementation of these Annexes is estimated to result in even larger impacts on intra-Africa trade and industrial development than the import tariff reductions alone (World Bank, 2020).

The results of the analysis confirm that the AfCFTA can contribute to a significant increase in intra-regional trade. Specifically, the trade analysis shows that high tariffs constrain trade amongst those countries that currently import a relatively low share of goods from elsewhere in Africa. The low volume of trade across many of these products is explained by relatively high import tariffs. The removal of tariff barriers under the AfCFTA will thus be effective in raising and diversifying intra-Africa imports.

The overall revenue losses are likely to be modest. Annual tariff losses for most African States after completing the phase-down in tariffs under the AfCFTA are predicted to be less than 1 percent of total government revenue. Further, if reasonable preference utilisation rates are considered (because not all trade will meet the AfCFTA rules of origin requirements), and exemptions from duties accounted for, then the cross-country average annual revenue loss as a share of total government revenue falls to below 0.2 percent.

Nevertheless, countries differ considerably in their vulnerability to revenue losses, as measured by the loss in customs revenue as a share of total government revenue. Some countries, such as Congo, D.R., Cameroon, Republic of Congo and Zimbabwe, are found to be vulnerable to both large decreases in the dollar value of customs revenue, as well as declines in the share of customs revenue in total government revenue. Other, smaller countries, including Malawi, Liberia, Central African Republic and Sierra Leone, do not experience large decreases in the dollar value of customs revenue, but the losses they experience constitute high shares of total government revenue.

By using the actual Provisional Schedule of Tariff Concessions (PSTCs) offered by Member States, this study provides more precise estimates of revenue losses for a wider range of countries than what has been possible in prior research. The results are also of policy relevance. For countries exposed to large customs revenue losses, alternative mechanisms of revenue accumulation need to be considered, which may include higher indirect taxes and income taxes. A clearer understanding of the potential customs revenue losses, particularly for vulnerable countries, can also inform the feasibility and design of an African-wide compensation mechanism under the proposed AfCFTA Adjustment Fund.

2. Background literature review of revenue implications of the AfCFTA

While much research has been conducted on the revenue implications of the AfCFTA, the estimates of customs revenue losses vary widely across studies and across countries. Figure 1 presents the mean, the maximum and the minimum estimates of the annual customs revenue changes (in percent) for 47 African states drawn from the available literature. For most of the countries, the mean predicted percentage change in customs revenue is very low. For example, 28 of the 47 countries presented, are predicted to experience revenue losses of 5 percent or lower per year following the liberalisation of tariffs under the AfCFTA. However, the estimates range from zero percent (Egypt) to -32 percent (Zimbabwe). The estimates also differ markedly across studies for individual countries. Take for example Malawi, where estimates of customs revenue losses range from just over zero percent to 60 percent.

Figure 1: Existing research estimates of the percentage change in annual tariff revenue from AfCFTA
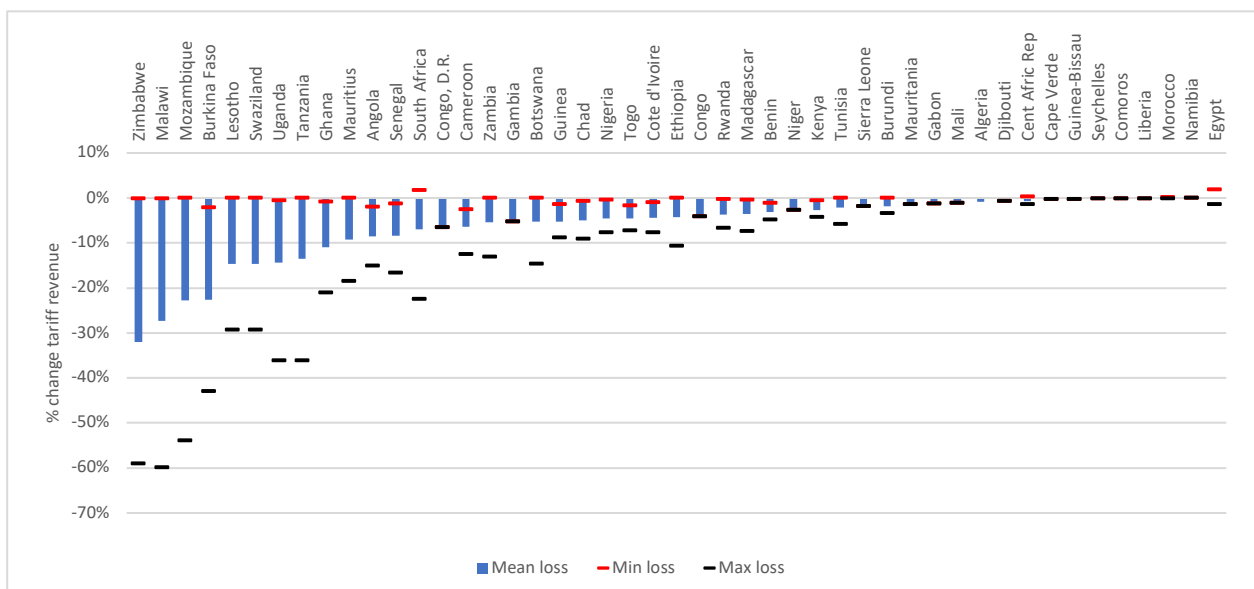
Sources: The sample covers tariff revenue loss estimates obtained from the available empirical literature. The estimates are obtained from UNECA (2020, 2021), UNCTAD (2017), Mevel & Karingi (2012), Jensen & Sandrey (2015), Ekobena, Coulibaly, Keita & Pedro (2021), Knebel, Peters & Saygili (2019), Pasara & Diko (2020), Shinyekwa, Bulime & Nattabi (2020), World Bank (2020), Mureverwi (2016), Bayale, Ibrahim & Atta-Mensah (2020), Chukwu, Omejem Ofoezie, Ugwu & Jideofor (2022), and Mulugeta (2020). Maximum and minimum revenue loss estimates are presented as there are multiple different estimates from the empirical literature for some of the countries. These values reflect the percentage annual loss in customs revenue following implementation of the AfCFTA.

There are several reasons why the estimated revenue implications of the AfCFTA vary so widely. Studies differ in terms of the empirical method utilized. These methods include computable general equilibrium (CGE) analysis (World Bank, 2020; Abrego et al., 2019; Saygili et al., 2019; Chauvin et al., 2016; and Mevel and Karingi, 2012) and partial equilibrium modelling using the SMART and the Tariff Reform Impact Simulation Tool (TRIST) models (World Bank, 2020; UNCTAD, 2021; Ekobena et al., 2021; Shinyekwa et al., 2020, amongst others). Whereas CGE models capture some of the economy-wide effects while holding macroeconomic balances intact, but at the cost of product and country-level disaggregation; partial equilibrium models provide estimates of revenue changes at the detailed product level (usually HS 6-digit level), but don't capture spillover effects and are sensitive to the choice of elasticities (as are CGE models).

Studies also differ signifcantly in terms of liberalisation scenarios. Many studies assume full liberalisation (UNCTAD 2017; Mevel & Karingi 2012; Jensen & Sandrey 2015; Ekobena et al., 2021; Knebel et al., 2019; Pasara & Diko, 2020; Bayale et al., 2020; amongst others), which can exaggerate the revenue effects, as countries are expected exclude sensitive products (category C). Other studies model partial reductions that follow (Lunenborg & Roberts, 2021) or mimic (Coulibaly et al., 2021; World Bank, 2020; Knebel et al., 2019) the AfCFTA offers. These studies are few, given the lack of availability of the Schedules of Tariff Concessions.

The choice of tariff protection measure also affects revenue and trade estimates. Most studies model tariff reductions using the applied statutory rates. This may exaggerate revenue losses as: (i) they over-estimate preference utilisation, and (ii) they don't account for exemptions, duty rebates etc. granted under the national schemes that are widespread in Africa (World Bank, 2020). Other studies use collection rates (see World Bank, 2020) based on actual tariffs applied on imports, but this requires detailed transaction-level import data. The TRIST models developed by Brenton et al. (2011), for example, are designed specifically around using trade transaction data. Studies also differ in whether they adjust for VAT, excises, withholding taxes, and other border revenues associated with changes in trade flows.

Finally, revenue estimates are influenced by the base year of the tariff and trade data used in the models. Several studies are based on relatively old data (e.g., 2007 in Jensen & Sandrey (2015) and Mureverwi (2016)), but this can exaggerate revenue losses as many African states have subsequently reduced tariffs on imports from African partners as they implement regional trade agreements. In terms of data, most partial equilibrium estimates use tariff and trade data downloaded from TRAINS, and are therefore based on more recent data. However, this data also suffers from limitations - for many countries, only gross import data are provided. This can exaggerate tariff revenue changes, particularly for transit countries (e.g. trade through the EAC to the Democratic Republic of Congo). Unfortunately, net imports are not easily obtained for African countries. These factors and others (e.g. differences in depth of integration, short vs. long-run estimates) make comparisons of customs revenue changes from the AfCFTA across studies tenuous.

This study makes several contributions to the literature. Most importantly, the revenue estimates are based on the actual tariff offers by each Member State. The study covers a much wider range of African countries (45) than other similar studies. Further, a consistent partial

equilibrium model, namely the SMART model, is applied allowing for a comparative analysis of the effects across Member States. The study also controls for incomplete preference utilisation rates that arise from several factors including challenges in meeting rules of origin requirements and difficulties in complying with administrative requirements.

3. Empirical method

Partial equilibrium model – the SMART model

To calculate the customs revenue implications of the AfCFTA, the study applies a highly-disaggregated product-level partial equilibrium trade model, following the World Bank/UNCTAD designed SMART model approach that has been widely used to study the potential effects of free trade agreements (Laird and Yeats, 1986; Jammes and Olarreaga, 2005; WTO/UNCTAD, 2012). [2] The SMART model simulates import changes in response to preferential tariff reductions from the perspective of the importer, including the net effects on trade and revenue from both trade creation and trade diversion.

One of the key advantages of the SMART model is that it can be applied to highly disaggregated product-level data. However, the model is 'partial' and therefore does not account for potentially important second round interactions between markets and intersectoral linkages arising from changes in tariffs. The SMART model is also static and does not capture dynamic effects, such as improved productivity, access to a wider range of intermediate inputs, and reductions in costs from economies of scale that can drive long-term gains from trade agreements. The simulated changes in trade from tariff reductions are also based entirely on existing trade flows (intensive margin adjustment). Trade in new products and origins (extensive margin adjustment) in response to lower tariffs is not accounted for. Consequently, the model will potentially under-estimate the long-run benefits associated with the AfCFTA. The results of the partial equilibrium simulation, therefore, can best be seen as short or medium-term outcomes of the AfCFTA.

Finally, the model results are sensitive to the choice of model parameters, including elasticities of export supply, import demand and substitution. We follow previous studies and assume that African countries are price-takers in the international market. For import demand elasticities, we draw on the widely used SMART model elasticities available online from the World Integrated Trade Solution (WITS). Given large outlier values (in some cases elasticities over 100) we restrict the range of elasticities to lie between the 5th and 95th percentile estimates for the sample of African countries. The mean import demand elasticity varies across countries from 1.41 for Ghana to 1.99 for Eritrea, with an average of 1.64 across all countries. The import elasticities also vary considerably across products within each country.

The size of the import demand elasticities have no impact on the customs revenue collected from the new trade partner when tariffs are reduced to zero, with the loss in customs revenue based entirely on prior dutiable import flows. The new imports from trade creation are duty free. In contrast, the higher the elasticity of substitution, the greater the trade diversion, and the higher the loss in customs revenue from dutiable sources. In the base estimates, the elasticity

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[2] We programme the SMART model into STATA using the functional relationships from Jammes and Olarreaga (2005).

of substitution is assumed to be 1.5, as has been followed in most of the empirical literature (McIntyre, 2005; Khorana, 2009; Inama, 2014).

Data

The partial equilibrium model used for this study is based on trade and tariff data from 45 African countries for 2019 or the closest year possible. Table 1 presents the list of countries and the years for which tariff and trade data are used. While data for 2020 and later are available for some countries, imports in these years were severely distorted by the COVID pandemic and are thus not a reflection of 'normal' trade flows. The Provisional Schedules of Tariff Concessions (PSTC) submitted by countries/regional groupings are also based on 2019 tariff and trade data.

Table 1: Statutory tariff year and trade year

Reporter Name	Tariff year	Trade year	Reporter Name	Tariff year	Trade year
Algeria	2019	2017	Liberia*	2019	2017
Angola	2019	2019	Madagascar	2019	2019
Benin*	2019	2019	Malawi*	2019	2019
Botswana*	2019	2019	Mali*	2019	2019
Burkina Faso*	2019	2019	Mauritania*	2019	2019
Burundi*	2019	2019	Mauritius	2019	2019
Cameroon	2019	2019	Morocco*	2019	2019
Cabo Verde*	2021	2019	Namibia*	2019	2019
Central African Republic	2019	2019	Niger*	2019	2019
Chad	2019	2019	Nigeria*	2020	2019
Congo, Dem. Rep.	2019	2019	Rwanda*	2019	2019
Congo, Rep.	2019	2019	São Tomé, Príncipe	2019	2019
Cote d'Ivoire*	2019	2019	Senegal*	2019	2019
Egypt, Arab Rep.	2019	2019	Seychelles	2019	2019
Equatorial Guinea	2019	2019	Sierra Leone*	2020	2019
Eswatini*	2019	2019	South Africa*	2019	2019
Gabon	2019	2019	Tanzania*	2019	2019
Gambia*	2018	2018	Togo*	2019	2019
Ghana*	2019	2019	Tunisia	2019	2019
Guinea*	2019	2019	Uganda*	2019	2019
Guinea-Bissau*	2019	2019	Zambia*	2020	2019
Kenya*	2019	2019	Zimbabwe	2019	2019
Lesotho*	2019	2017			

Source: TRAINS, BACI, TradeMap and UNComtrade. The * denotes countries for which only Schedule A products have been classified.

These PSTCs specify the the tariff phase-down period for products classified as non-sensitive (Schedule A), sensitive (Schedule B) and excluded (Schedule C). Schedule A products are required to cover 90 percent of tariff product lines that are to be fully liberalized over 5 years for Non-Least Developed Countries, 10 years for Least Developed Countries (LDCs) and 15 years for a group of six Member States (Ethiopia, Madagascar, Malawi, Sudan, Zambia and Zimbabwe) that negotiated a special allowance for a longer phase-down period. Schedule B products cover 7 percent of tariff lines to be liberalised over 10 years for Non-LDCs and 13 years for LDCs. Finally, in Schedule C, up to 3 percent of tariff lines can be excluded from liberalization, subject to the value of imports of these goods not exceeding 10 percent of total intra-Africa imports by the Member State or REC

The model is specified at the 6-digit level of the Harmonized system (Revision 2017 or nearest earliest revision possible). The data are sourced from UNComtrade, BACI (Gaulier and Zignago, 2010), Trade Map and the UNCTAD Trade Analysis Information System (TRAINS) database. The raw tariff schedules obtained from TRAINS include data on statutory applied tariffs, including for preferential trade partners. Ad valorem equivalent estimates of specific and mixed tariffs are calculated and used where possible. Several data checks are undertaken. The tariff data are checked for consistency against the Provisional Schedule of Tariff Concessions. The tariff rates of large revenue generating products are also verified. In some of these cases where tariffs vary within these major product lines (e.g. imports of HS 271019 Petroleum oils for EAC countries), tariff line level import data are used to calculate the import weighted average tariff at the 6-digit level, to better reflect actual tariff levels applied.

The use of 6-digit tariff data required the mapping of PSTC schedules (A, B & C) defined at the 8- to 10-digit level to the more aggregated 6-digit level HS classification. The main challenge in doing so, is that in several instances, the 6-digit subheading includes 8-digit subheadings that straddle the PSTC Schedule A, B and C categorisations. In these cases, the 6-digit subheadings are allocated to the Schedule A, B or C category in accordance with whichever category accounts for the highest value of intra-Africa imports by the country within the 6-digit subheading.[3] In the case of CEMAC and ECOWAS, the allocation is based on the regional-level import values, i.e. the allocation of products to Schedules A, B & C are consistent for all countries within the regional grouping.

Only the Central African Economic and Monetary Community (CEMAC) and 7 individual African States (Algeria, Angola, Egypt, Madagascar, Sao Tomé & Príncipe, Tunisia, and Zimbabwe) have categorised tariff lines in their PSTC submissions according to Schedules A, B and C. The remaining countries have only classified Schedule A products. To broaden the pool, we follow the World Bank (2020) and construct a hypothetical Schedule C category for these countries that includes their top tariff revenue generating imported products (at HS6-digit level) from Africa, subject to the constraints that: the share of African import value covered is no more than 10%, and the share of total product lines is no more than 3%.[4] This process may lead to an under-estimate of the full revenue effects of the AfCFTA for these countries, as some of these hypothetical Schedule C products may be classified as Schedule B products in the final tariff schedule offer.

An extensive cleaning and verification process was applied to the data with details provided in the data appendix (see Online data appendix). One consideration is that most countries employ the *general recording system* that includes re-exported goods when compiling import statistics. This inflates dutiable import values, leading to over-estimates of initial revenue collected (Yeats, 2012), and exaggerated losses in customs revenue following trade liberalisation. This is particularly problematic for the measurement of dutiable imports in countries along major transit routes. To help alleviate this problem, we adjust imports of transit and destination

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[3] Where no import data are available at the tariff-line level, the schedule that covers the most tariff lines is used.
[4] Estimates for ECOWAS and EAC are based on intra-Africa imports for the aggregated region. The revenue shares covered by the Schedule C tariff lines ranged from 13% for Mauritania to 44% for the EAC. In all countries, the number of tariff lines is less than or equal to 3% of all tariff lines.

countries using re-export data where available. Countries most affected are those importing from South Africa, Rwanda, Tanzania and Seychelles.

A second consideration is that in addition to customs duties, trade tax revenues include revenue from withholding taxes (e.g., EAC), document charges, Community Integration Levies (e.g. ECOWAS, COMESA, CEMAC), surtaxes (Zambia, Zimbabwe on certain products), etc. These can constitute a considerable share of overall revenues from imports.[5] Total revenue from imports is also influenced by other indirect taxes including VAT and excise duties. These additional taxes can both amplify and diminish revenues lost through lower tariff rates on preferential partners.[6] For example, rising imports from preferential partners following the implementation of a free trade agreement can boost VAT and excise revenues from these partners, thus offsetting some of the losses in customs duties. Given the enormous challenges in obtaining consistent measures of these rates that vary by country and by product within countries, our study only focuses on the direct revenue effects associated with changes in tariff rates.

A third consideration is the use of statutory applied tariff rates, because of the frequent exemptions on import duties provided in several African countries. Governments, international agencies, embassies and NGOs often do not pay duties on products imported for official purposes (Brenton et al., 2011). Rebates of customs duties are also granted on goods imported for use in the production of targeted industries (e.g. Southern African Customs Union Tariff Schedule 3; and the Duty Remission Scheme (DRS) in the EAC (Rauschendorfer and Twum, 2021)), and in the production of exported goods.[7] The actual duties collected (collection rate), may therefore deviate substantially from what is predicted by the statutory tariff rate, leading to exaggerated estimates of losses in customs revenue and gains in trade from trade agreements when using the latter tariff measure (Brenton et al., 2011; de Melo and Regalo, 2014). For example, the World Bank (2020) finds that the collection rate averages 64 percent of the statutory rate for a sample of 13 African countries, with a range of 33 percent (São Tomé and Príncipe) to 100 percent (Chad). An alternative approach is to use import transaction data at the importer-level that includes information on actual duties paid. This is the approach followed in the application of the TRIST model for several African countries by Hamilton (2009), de Melo and Regalo (2014), Twum (2019) and others. However, import transaction level data are not available for all African countries. Our approach is therefore to test the sensitivity of revenue loss estimates using statutory tariff rates, to different levels of revenue collection efficiency.

A fourth consideration is that the availability of competitive alternatives (duty rebates, drawbacks, etc.) combined with difficulties in complying with the administrative requirements for certificates of origin and direct shipment; and ancillary requirements such as third-country invoicing, back-to-back certificates, accounting segregation, etc. means that not all imports

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[5] For example, additional levies, livestock trust fund and document charges account for 31% of reported customs revenue by Seychelles in 2019 (http://www.finance.gov.sc/uploads/national_budget/BUDGET_AMENDMENT_2020_PART_2.pdf).

[6] For example, VAT is applied to the tariff inclusive price of imported goods. Lower customs duties on AfCFTA partner imports thus reduce revenue collected per unit of good imported. The diversion of imports from dutiable sources towards AfCFTA members further diminishes VAT revenue collected. However, rising imports through trade creation boosts VAT revenue from new partners, thus offsetting the losses. The net impact on VAT is shown to be positive in several cases (e.g., Uganda).

[7] Our estimates take into account the EAC member-specific deviations from the common external tariff through the *Stay of Applications* mechanism (Rauschendorfer and Twum, 2021).

from preferential trade partners enter the home country under the preferential tariff rate. (UNCTAD, 2022). According to UNCTAD (2022), the average utilization rate by COMESA country exporters to advanced economies under the GSP/ AGOA and EPA trade agreements is 77 percent, and is lower at 60.8 percent for exports to other African preference partners.[8] With incomplete preference utilisation the effective reduction in tariffs under the AfCFTA will be less severe, resulting in lower revenue loss estimates following its implementation. We therefore test the sensitivity of our revenue estimates, by applying the UNCTAD (2022) average preference utilisation rates for COMESA to all African countries.

Finally, estimates of the trade impact do not consider improvements in customs procedures following implementation of the trade facilitation agreement (Annex 4 of the AfCFTA Protocol on Trade in Goods), the elimination of nontariff barriers (Annex 5), and the removal of restrictive and unnecessary technical barriers (Annex 6) and sanitary and phytosanitary measures (Annex 6). Available empirical literature (African Development Bank, 2019; World Bank, 2020) shows that increases in trade from the lowering of trade costs associated with these initiatives is expected to be substantially larger than the increase from the lowering of import tariffs.[9] Overall, the results of the model simulations need to be interpreted in the context of these limitations.

4. Background trade and tariff analysis

Prior to presenting the partial equilibrium model revenue estimates, this section presents some of the model data as background to the analysis. The potential revenue impact of tariff reductions under the AfCFTA on government revenues depends jointly on (i) the importance of customs revenue in total government revenue, (ii) the level of trade with other African countries, (iii) the level of tariffs imposed on these imports, and (iv) the specific tariff concessions granted as per the Schedule of Tariff Concessions. This section looks at each of these channels in more detail.

Tariffs comprise only one source of revenue for governments, but their importance varies across countries. Figure 2 presents the share of customs and other import duties as a share of government revenue for 47 African countries for which data are available. The customs and other duties are obtained from the World Development Indicators, IMF Government Finance Statistics (GFS) and official sources. They include customs duties, as well as other taxes on imports, such as withholding taxes, excise duties on imports in the case of SACU countries, and other duties on imports.

On average, customs and other import duties make up 10 percent of total government revenue for African countries, but for some countries, these shares rise to over 20 percent (e.g. Liberia, Eswatini, Somalia, São Tomé and Príncipe, Namibia, Benin, Botswana). For other countries,

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[8] Inama (2014) finds that preference utilization rates for Burundi, Ethiopia, Madagascar, Mauritius, Malawi, Rwanda and Sudan, range from 21.7% in Sudan to 80.6% in Burundi, with an average of 39.7%. The utilization rates also vary widely across products: 1% for cotton products (HS chapter 52), 16.6% for steel products (HS 73), and 80% or above for coffee & tea (HS 09) and salt (HS 25).
[9] The model also does not account for unrecorded trade or informal cross border trade that can distort measures of imports. Golub (2012), for example, cites evidence of very large-scale smuggling of heavily protected goods, such as used cars, cloth and rice into Nigeria via Benin and Togo, where customs duties are lower. While these goods are declared for domestic consumption, with payment of tariffs in Benin and Togo, they are overwhelmingly intended for Nigeria.

the shares fall to 3 percent or lower (South Africa, Morocco, Egypt, Congo, Rep., Angola, Mauritius, Equatorial Guinea).

Figure 2: Importance of customs duties: Customs and other import duties as a share of government revenue
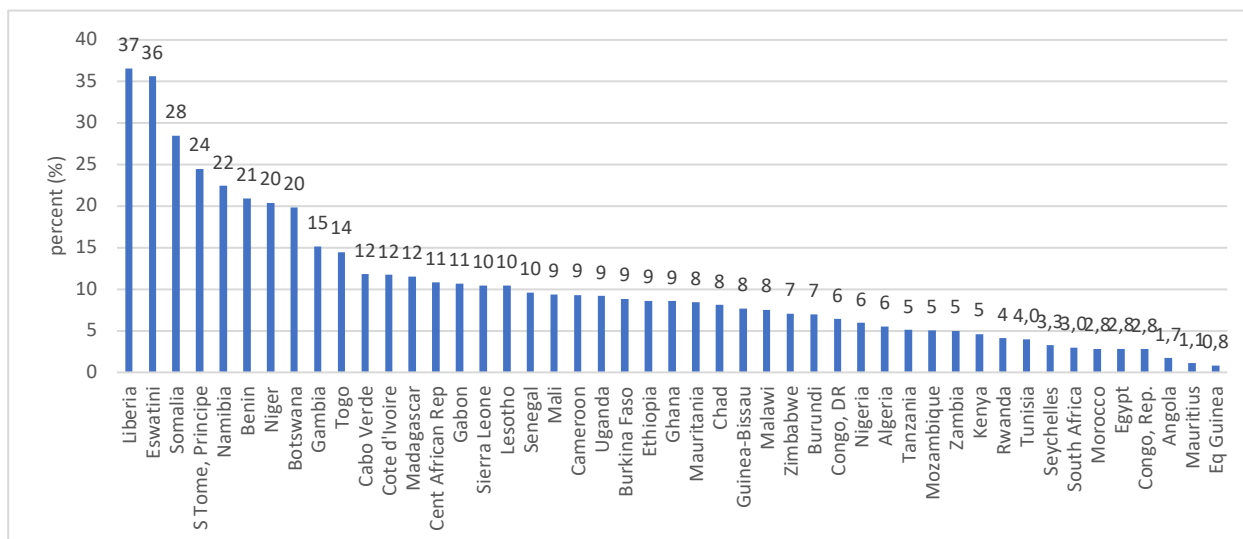
Source: World Development Indicator database, IMF Government Finance Statistics (GFS) and official sources. Most observations are for 2018/2019 with exception of Algeria (2011), Benin (2013) and Burkina Faso (2013). Government revenue includes grants. The values for Botswana, Lesotho, Eswatini, Namibia and South Africa include excise duties on imports, which account for just over 50% of the total SACU customs revenue pool.

While customs revenue as a share of total government revenue is one indicator of revenue vulnerability, the exposure of governments to a loss of customs revenue from the AfCFTA also depends crucially on the importance of African partners as a source of customs revenue. This in turn depends on the value of imports from Africa, plus the tariffs imposed on these imports. To analyse this further, Figure 3 shows the import weighted average tariff on imports from Africa against the share of Africa in total imports for 52 African countries. Somalia and South Sudan are excluded from the trade and tariff analysis as the required data are not available for these countries. For the whole continent, the weighted average tariff on intra-Africa imports is about 4.4% (median is 2.6%).

For most African countries exposure to revenue losses from the AfCFTA appear to be low, while the potential gains to trade are high. Several countries impose average tariffs on African imports that are more than double the continental average (Liberia, São Tomé and Príncipe, Comoros, Gabon, Equatorial Guinea). Reductions in tariffs on African partners under the AfCFTA, therefore have the potential to substantially boost intra-Africa imports by these countries. However, the exposure to aggregate revenue losses for these countries is limited as the share of Africa in total imports for these countries is low (4 to 12 percent).

Other countries, such as Eswatini, Botswana, Lesotho, Namibia and Zimbabwe have already made significant progress in terms of trade integration with Africa with import shares from Africa exceeding 60 percent. However, the potential revenue losses for these countries are also low as the average tariffs imposed on African imports by these countries are below average and, in many instances, close to zero. In a few cases, such as the Democratic Republic of

Congo, São Tomé and Príncipe, Republic of Congo, Zimbabwe and Comoros, we find a combination of above-average shares of imports sourced from Africa and above-average tariff rates on these imports.[10]

Figure 3: Share of imports and import weighted average tariff imposed on imports from Africa, 2019
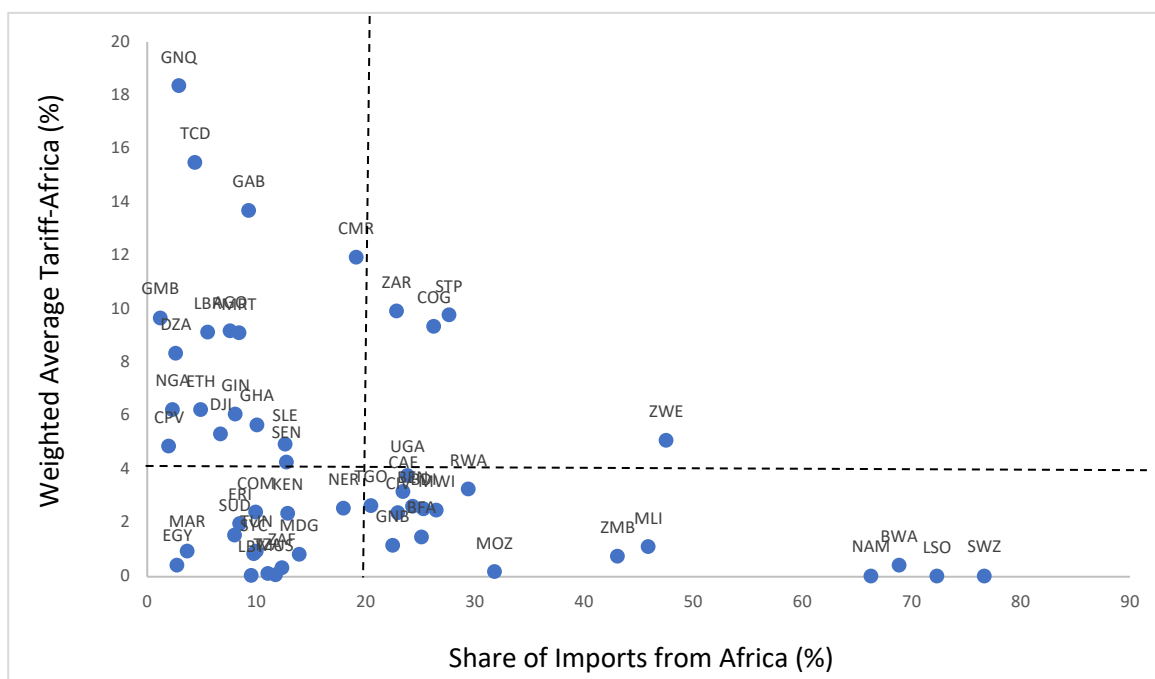
Source: Own calculations using import data from UNComtrade and BACI and tariff data from TRAINS. The data in most cases applies to 2019. See Table 1 for trade and tariff years.

Additional analysis of trade flows reveals a high geographic and product concentration of imports from Africa. The average share of imports from Africa in 2019 accounted for by each country's top 3 African partners is around 78 percent, with extremely high shares (99 percent) for some (e.g. Lesotho, Liberia, and Gambia). Even the least concentrated countries source more than 50 percent of their African imports from their top 3 African partners. African countries imports from Africa are also concentrated in few products – more so than imports from the rest of the world. For the average African country, the top 5 imported products (HS 6-digit level) from Africa in 2019 accounted for 43 percent of its total import value from Africa. The product concentration of imports from the rest of the world is lower, with the top 5 imports contributing 27 percent on average for each African country. The implication is that the trade and revenue implications of the AfCFTA for each country may be strongly influenced by few products and a small number of their African trading partners.

The final consideration in calculating the potential impact of the AfCFTA on government revenue, is the Schedule of Tariff Commitments offered by each African country. Each AfCFTA member may insulate themselves from tariff losses by excluding up to 3 percent of

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[10] The Democratic Republic of Congo (DRC or ZAR) reported import data from UNComtrade and TRAINS is found to be highly unreliable with large differences between imports declared by the country and exports declared by the partner country. The data presented here is based on CEPII BACI mirror import data, adjusted for re-exports from Rwanda and Zambia. The share intra-Africa trade may nevertheless still be inflated by re-exports from other African countries.

products from the free trade agreement (Schedule C products) or delaying the implementation of tariff reductions for up to 7 percent of products (Schedule B). By excluding product items that contribute high shares of customs revenue, African countries may insulate themselves from tariff losses, albeit at the cost of increased intra-Africa trade.

Analysis of the data shows that states have categorised a relatively high share of imports from Africa under Schedules B and C. This can be seen in Figure 4 that breaks down imports from Africa for each country into the shares accounted for by each schedule category. Although Schedule A accounts for 90 percent of tariff lines in the PSTC submissions, these lines account for a lower 66-67 percent share of merchandise imports from Africa, on average.[11] The share of imports from Africa covered by Schedule A varies considerably across countries, making up 90 percent or more in Cote d'Ivoire, Seychelles and Zambia, and below 50 percent in the Central African Republic, Guinea-Bissau, Equatorial Guinea, Niger, Rwanda, Sierra Leone and the Democratic Republic of Congo.

Figure 4: Composition of total imports from Africa by PSTC submissions, country shares (%)
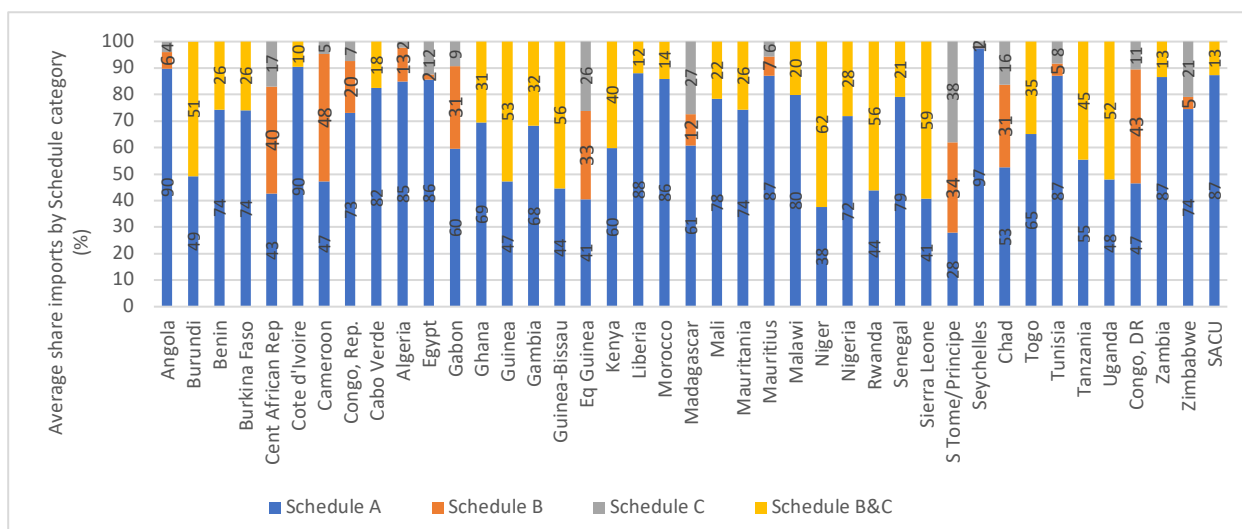
Source: Own calculations using the model data. Products classified as HS999999 are excluded, as are products where either the MFN or preferential tariff are missing. Imports of HS7108 Gold (including Gold Plated with Platinum), Unwrought or in Semi-manufactured Forms, or in Powder Form are also excluded.

African imports facing relatively high levels of protection are also more likely to be classified as excluded under Schedule C or classified as a sensitive product under Schedule B. Figure 5 presents the average import weighted average tariff on imports from Africa. African countries apply an average tariff of 3 percent to 5 percent on Schedule A products, compared to 13 percent to 14 percent on Schedule B and C products for those countries that have submitted all schedules (group 1). For the other countries (group 2), the average import weighted average on combined Schedule B & C products is 6 percent, which is double the tariff on Schedule A

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[11] Note that the 8 to 10-digit tariff lines in the PSTC submissions have been aggregated to the HS6-digit level. The import share structure presented in this report may therefore differ slightly from share structures based on import data at the most disaggregated tariff line level. Further, the share structure in Figure 4 is based on total imports from Africa, including intra-REC imports. Intra-REC trade is excluded when considering the 10 percent import share restriction for Schedule C products. For some countries the share of imports categorized under Schedule C exceeds the maximum 10 percent. In addition to the prior point, this arises because the 10 percent cap for the RECS is determined by the aggregate import value for the regional group, not the individual country.

products. With the exception of Benin, Central African Republic, Morocco and Sierra Leone, the average tariff on combined Schedule B and C products exceeds the average tariff on Schedule A products in all countries.

Figure 5: Mean import weighted average tariff on imports from Africa by country grouping (%)
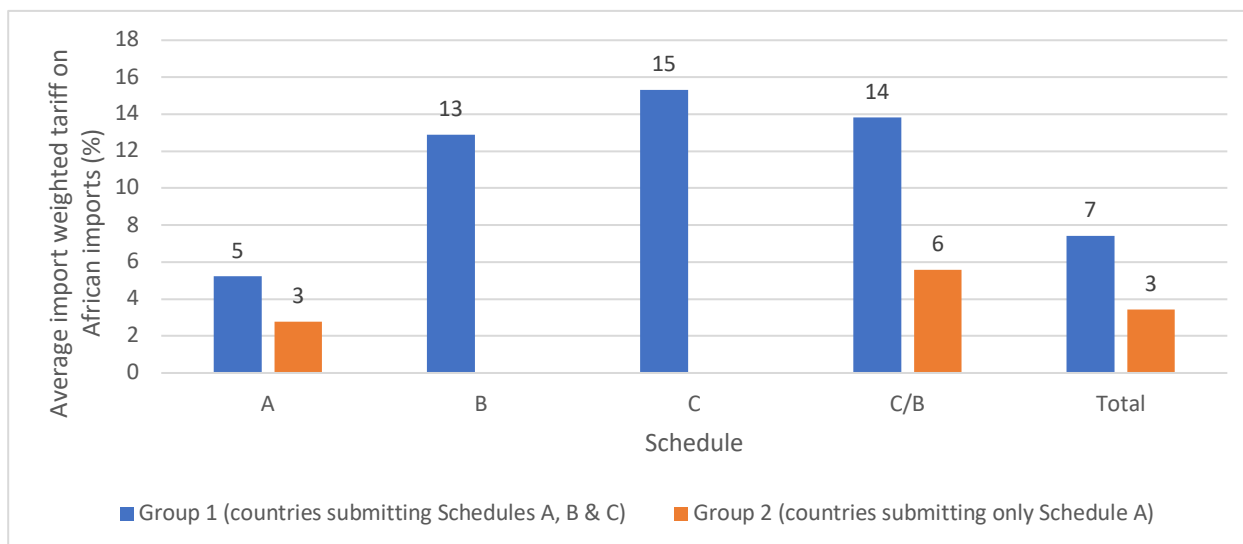
Source: Own calculations using the model data. Bilateral imports from African States are used as weights for each country. SACU is treated as a single observation in the data analysis. Group 1 countries cover CEMAC (6 countries), Angola, Algeria, Egypt, Madagascar, Mauritius, São Tomé & Príncipe, Seychelles, Tunisia, DRC and Zimbabwe that have categorised tariff lines according to Schedule B and C. The remaining countries (covered by EAC, ECOWAS, Morocco, Malawi, SACU and Zambia) have only declared Schedule A products and are defined as group 2.

An implication of these findings is that with their PSTC submissions, African countries have, on average, insulated themselves from customs revenue losses by retaining protection and/or delaying liberalisation on high tariff revenue items. Looking across countries, products under Schedule A account for less than half (47 percent) of total tariff revenue earned from imports from Africa. This revenue share is far lower than the share of tariff lines (90 percent) and the share of import value (67 percent). This approach to the selection of Schedule C products will diminish tariff revenue losses arising from the AfCFTA, but will also have the effect of reducing growth in intra-Africa trade.

5. Model of revenue estimates

This section presents the modelling estimates of changes in tariff revenue arising from tariff reductions under the AfCFTA. The analysis extends previous revenue estimates by incorporating the Provisional Schedule of Tariff Concessions offered by member states. The section first presents a brief overview of the impact of these concessions on import values. This is followed by a presentation of estimates of the revenue implications thereof.

Trade effects

To study the impact on import volumes Figure 6 presents the percentage change in imports from Africa and the world after implementation of AfCFTA tariff reductions. The liberalisation

scenario assumes the complete phase-out of Schedule A and B tariffs on imports from African partners. As explained earlier, hypothetical Schedule B and C product lines are constructed for those countries that only submitted Schedule A product lists. These countries are denoted by an * in the figure. The estimates also assume full utilization of tariff preferences and no tariff exemptions or rebates granted.

Several observations can be derived from the figure. The AfCFTA is effective in boosting intra-Africa imports, but the impact varies widely across countries. The largest percentage increase in imports from Africa is for the Congo, D.R. with a 25 percent increase, with Angola, Cameroon, Chad, Equatorial Guinea and Mauritania following with increases of 20 percent or more. These large increases, at least in the case of Angola and the Congo, D.R., arise in part because these countries, while members of COMESA and/or SADC, have not reduced tariffs as part of the free trade areas of these communities. Most countries experience very low percentage increases in imports from Africa. For half of the countries (22 out of 41), the increase in African imports is lower than 5 percent.

Figure 6: Impact of tariff reductions under the AfCFTA on imports from Africa and the world (%)
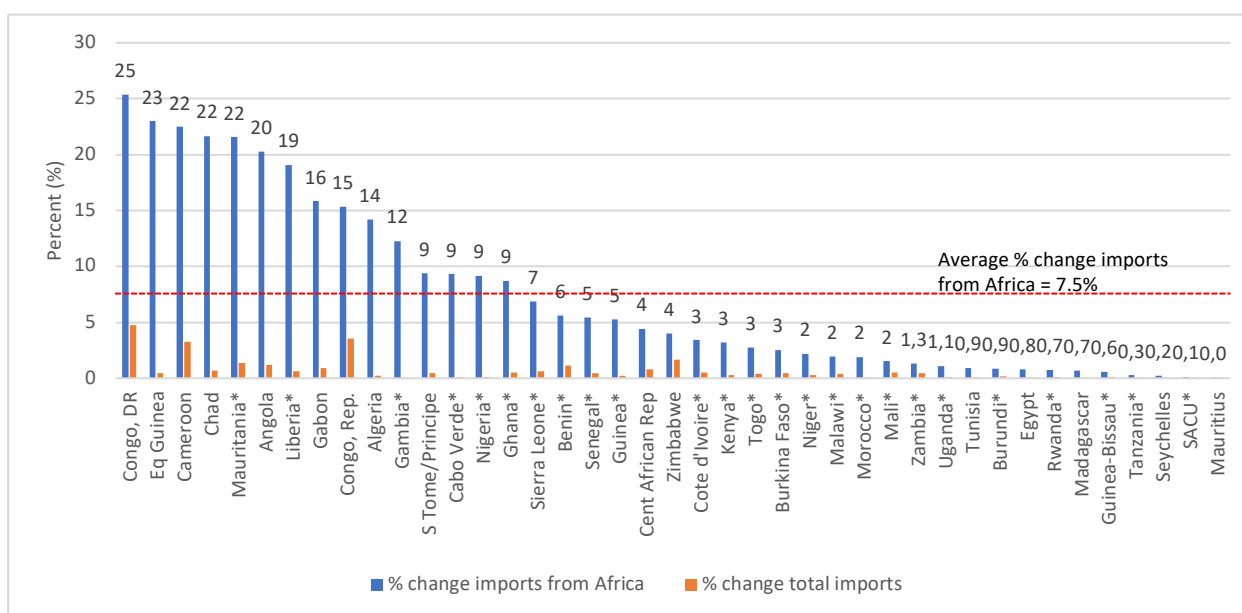
Source: Model estimates. Countries denoted by a * have only provided Schedule A tariffs. Schedule C tariff lines for each of these countries are assumed to include their top tariff revenue generating products imported from Africa, up to a maximum 10% share of African imports and maximum 3 percent share of tariff lines (at 6-digit level). The PSTC submissions of Angola, Malawi, Morocco, Sao Tomé & Príncipe, Zimbabwe and SACU members are still under verification. Estimates assume full tariff utilization and an elasticity of substitution of 1.5. Intra-SACU imports are included in the values for SACU. These values reflect the annual change in imports after complete phase-down of tariff reductions under the AfCFTA.

For some, there is close to no impact – e.g. Mauritius, that has very low MFN tariffs, and already imports duty-free from SADC (mainly SACU) and COMESA. Other countries that experience 1 percent or lower increases in African imports include Tunisia, Burundi, Egypt, Guinea-Bissau, Madagascar, Seychelles, Tanzania and Zambia. A combination of low initial imports from Africa and/or low tariffs on existing imports explain these low percentage increases. The percentage impact on total import volumes is substantially lower than the

percentage increase in African imports, given the relatively low initial share of Africa in total imports for most countries. Nevertheless, increases in total imports in excess of 4 percent are experienced in the Congo, D.R. and the Republic of Congo.

The exclusion of Schedule C products from the AfCFTA reduces the potential positive impact of the AfCFTA on intra-Africa trade. Full liberalisation raises the cross-country average percentage increase in imports from Africa from 7.5 percent to 11 percent (see Table A2 in the Appendix). For some countries, like São Tomé & Príncipe, Equatorial Guinea and Uganda, full liberalisation doubles the increase in imports from Africa. Schedule C in these countries comprises of products with high initial levels of imports from Africa, together with relatively high levels of tariff protection.

Also shown in Table A2 in the Appendix, is that a relatively high share of the increase in imports from Africa can be attributed to trade diversion. Trade diversion, on average, accounts for 32 percent of the total increase in imports from African partners. The trade diversion share is particularly high (above 45 percent) for Algeria, The Gambia, Mauritius, Morocco, Madagascar and SACU. High levels of trade diversion will amplify tariff revenue losses as imports shift from dutiable towards non-dutiable sources.

Much of the increase in imports from Africa will occur after year 5 as tariff reductions on Schedule B products are implemented. This is particularly so for those countries experiencing large percentage increases in African imports. For example, Schedule B tariff reductions account for over 50% of the total annual impact on African imports for the Congo, D.R., Equatorial Guinea, Cameroon, Republic of Congo and Chad after completion of the tariff phase-down period. The implication is that although the AfCFTA will expose these countries to tariff losses associated with rising imports from Africa, the effect will be delayed and spread out over many years.

Tariff revenue effects

Estimates of tariff losses under a full liberalisation scenario are shown in bar column (1) of Figure 7. The elimination of all tariffs on African imports is simulated to reduce tariff revenue by US$ 32 million per year on average across the sample of 45 countries. This is lower than the US$ 43 million calculated by other studies, including UNECA (2021) for the same sample of countries. In bar column (2), tariffs are only removed on those products included in Schedules A and B. The average reduction in tariff revenues falls to US$ 24 million. Estimates that do not account for the actual tariff offer, therefore, greatly exaggerate the future revenue losses from the AfCFTA.

Bar columns (3) and (4) test the sensitivity of the results to different average preference utilisation rates (PUR). In bar column (3), an upper bound preference utilization rate of 77 percent is assumed. This is based on estimates of the North-South preferential agreements by UNCTAD (2022). The average annual loss per member State falls to US$ 17 million. In bar column (4), a lower average preference utilization rate (60.8 percent) estimated for COMESA members by UNCTAD (2022) is used. The average tariff revenue loss falls to US$ 12 million.

The efficiency of revenue collection also influences the revenue loss estimates. Estimates in column (5), are based on an assumed collection efficiency rate (CER) of 64 percent and a

preferency utilisation rate of 100 percent. The collection efficiency rate is based on estimates for 13 African countries obtained from the World Bank (2020) study. The average tariff revenue loss in this simulation is US$ 15 million. If both collection efficiency rates (64 percent) and the preference utilisation rates (PUR=60.8 percent) are accounted for, then the simulated revenue loss falls to US$ 8 million per country per year on average (column 6). In summary, revenue estimates that assume full liberalisation, complete preference utilisation and no duty exemptions are likely to over-estimate revenue losses from the AfCFTA.

Figure 7: Comparison of estimates of average annual tariff revenue per country after completion of AfCFTA tariff phase-down (US$ million)
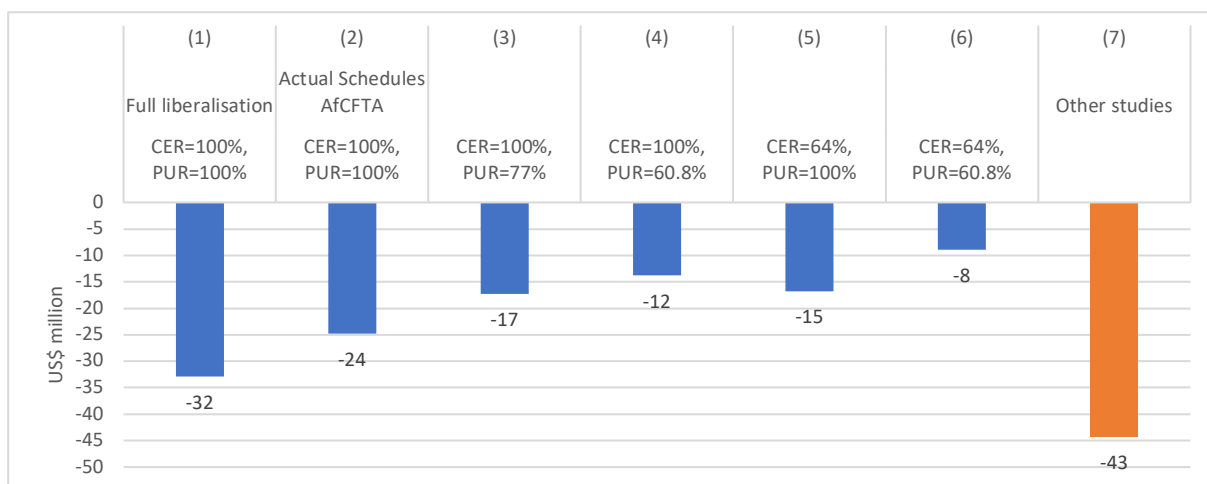
Notes: All simulations assume an elasticity of substitution of 1.5. Results in bar columns (2) to (5) are based on removal of tariffs covered in Schedule A and B of the PSTCs. Collection efficiency rates (CER) are 100 percent, with exception of bar column (5). Preference utilization rates (PUR) are 100 percent, unless specified. The collection efficiency rate of 64 percent is based on the average collected to statutory rate ratio for 13 African countries obtained from the World Bank (2020: 129). The results for other studies are largely based on UNECA (2021). The values in columns (2) to (6) reflect the average annual losses in tariff revenue per country after completion of the AfCFTA tariff phase-down period.

The average values in Figure 7 hide substantial variation in revenue losses across countries. To analyse this further, Table 2 presents estimates of tariff revenue losses for each country from the AfCFTA. Under the different assumptions regarding preference utilisation and collection efficiency. Column (1) assumes liberalisation of all tariffs while column (2) only applies the Schedule A and B tariff reductions offered in the PSTCs. Both revenue estimates assume full preference utilisation and collection efficiency. In all countries, estimated annual tariff revenue losses are substantially lower when considering the PSTC submission offers than under the full liberalisation scenario. Revenue losses, for example, more than halve for Uganda, Niger, Madagascar, Burundi, Gambia, Guinea-Bissau, Seychelles, São Tomé/Príncipe, Mauritius and the SACU members. The revenue change from excluding Schedule C products is smaller for Cameroon, Algeria and Tanzania.

Overall, tariff revenue losses from the AfCFTA (column 2 of Table 2) are greatest for Congo, D.R., Cameroon and Algeria, where tariff revenues fall by over US$ 100 million per year. In contrast, the island states of Seychelles, Mauritius, São Tomé/Príncipe, Cabo Verde experience declines in tariff revenue of less than US$ 1 million per year. Similarly, Lesotho, Gambia and Guinea-Bissau experience tariff revenue reductions of less than US$ 1 million.

Reducing preference utilisation rates to values that approximate what occurs within existing African trade agreements, namely 60.8 percent (column 3), reduces the combined annual revenue loss estimates in column (2) by close to a half (i.e. from US$ 1.1 billion to US$ 0.56 billion). There are some minor changes in the rankings, with Cameroon now experiencing the greatest loss in revenue per year (US$ 74 million), followed by Congo, D.R. (US$ 69.6 million). Finally, extending column (3) results to account for customs duty exemptions and rebates (assuming a collection efficiency rate of 64 percent) in column (4) further reduces the combined annual revenue loss estimate to US$ 0.36 billion, which is a third of that in column (2). The rank order in terms of greatest revenue losses across countries is unaffected.

Table 2: Sensitivity of annual tariff revenue loss estimates from the AfCFTA to preference utilisation and collection efficiency rates in US$ millions

	(1) Full liberalisation	(2) Liberalisation according to PSTC offer	(3)	(4)
	100% preference utilisation & 100% collection efficiency	100% preference utilisation & 100% collection efficiency	60.8% preference utilisation & 100% collection efficiency	60.8% preference utilisation & 64% collection efficiency
Congo, DR	-167.4	-146.6	-77.2	-47.42
Cameroon	-150.9	-139.6	-74.0	-48.35
Algeria	-118.5	-110.9	-56.4	-35.89
Angola	-108.7	-94.9	-31.4	-23.52
Zimbabwe	-120.3	-68.6	-32.2	-21.85
Nigeria*	-75.4	-54.6	-30.0	-19.08
Ghana*	-65.9	-53.8	-29.8	-18.84
Congo, Rep.	-57.4	-50.9	-25.5	-17.20
Cote d'Ivoire*	-62.8	-50.7	-28.4	-18.02
Kenya*	-55.6	-37.5	-19.8	-12.52
Senegal*	-48.4	-33.9	-18.9	-11.96
Gabon	-32.1	-25.7	-13.9	-8.91
Mauritania*	-30.0	-23.7	-12.2	-7.89
Zambia*	-23.6	-23.5	-12.7	-8.33
Mali*	-27.6	-18.8	-10.0	-6.45
Benin*	-19.9	-16.7	-8.6	-5.71
Morocco*	-18.4	-16.1	-9.4	-6.05
Tunisia	-24.2	-15.2	-7.5	-4.88
Guinea*	-24.1	-13.3	-7.4	-4.56
Malawi*	-18.1	-12.2	-6.7	-4.31
Burkina Faso*	-17.1	-11.8	-6.0	-3.90
Egypt	-10.8	-9.4	-4.8	-3.11
Uganda*	-20.4	-8.5	-4.6	-2.64
South Africa*	-24.7	-7.3	-4.0	-2.58
Togo*	-10.4	-6.8	-3.8	-2.42
Chad	-7.0	-5.9	-3.1	-2.05
Sierra Leone*	-7.6	-5.8	-3.2	-2.07
Niger*	-13.7	-5.6	-3.0	-1.89
Liberia*	-6.5	-5.4	-3.0	-1.91
Cent African Rep	-4.6	-3.6	-1.7	-1.16
Eq Guinea	-5.3	-3.2	-1.6	-1.04
Rwanda*	-6.4	-3.1	-1.6	-0.98
Namibia*	-10.1	-3.0	-1.6	-1.05
Botswana*	-9.8	-2.9	-1.6	-1.02
Madagascar	-4.3	-2.0	-1.1	-0.70
Eswatini*	-5.3	-1.6	-0.9	-0.55
Tanzania*	-1.3	-1.3	-0.7	-0.43
Burundi*	-5.7	-1.2	-0.6	-0.41

	(1)	(2)	(3)	(4)
Cabo Verde*	-0.9	-0.8	-0.4	-0.27
Lesotho*	-2.6	-0.8	-0.4	-0.28
Gambia*	-0.8	-0.6	-0.3	-0.20
Guinea-Bissau*	-0.9	-0.4	-0.2	-0.14
São Tomé/Príncipe	-0.8	-0.3	-0.2	-0.12
Seychelles	-1.4	-0.1	-0.1	-0.05
Mauritius	-0.5	0.0	0.0	0.00
TOTAL	**-1428.4**	**-1098.5**	**-560.6**	**-362.7**

Notes: All simulations assume an elasticity of substitution of 1.5. The change in revenue for SACU as a group and individually are presented. The revenue estimates for Botswana, Eswatini, Lesotho, Namibia and South Africa are derived from the change in total SACU customs revenue according to the revenue sharing formula. All data excludes HS 490700 (bank notes), HS 7108.12 (Metals; gold, non-monetary, unwrought (but not powder)), HT 7108.13 (Gold, Nonmonetary, Semimanufactured Forms Others (other Than Powder)) and products classified as HS 9999.99. Countries denoted by a * have only provided Schedule A tariffs, while PSTC submissions of Angola, Malawi, Morocco, Sao Tomé & Príncipe, Zimbabwe and SACU members are still under verification (see earlier tables for further details). These values reflect the average annual loss in tariff revenue per country after completion of the AfCFTA tariff phase-down.

These estimated revenue losses are not immediate. Tariff reductions are phased in over 10 to 13 years with longer periods for Least Developed Countries (LDCs) (13 years) compared to Non-Least Developed Countries (10 years). Tariffs on sensitive products (Schedule B) can also be retained for 5 years, with liberalisation starting in year 6. There are exceptions – the phase-down period in the Malawian PSTC, for example, is 15 years. In most cases, countries offer a linear reduction in tariffs over each of the phase-down periods, and delay the phase-down of Schedule B tariffs until year 6. In contrast, Seychelles offers a reduction in Schedule B tariffs to 10 percent from year 1 to year 5, and then phases these tariffs out over year 6 (7.5 percent), year 7 (5 percent) and year 8 (0 percent). Egypt's offer also phases down Schedule B tariffs from year 1, but in a linear way.

The contribution of Schedule A and B to total revenue losses varies considerably by country, but for most countries Schedule B accounts for a disproportionate (relative to tariff lines) share of the overall revenue loss. Figure 8 plots the share composition of the total revenue loss according to Schedule A and B. For most countries, tariff reductions under Schedule A contribute the bulk of the decline in tariff revenue. A major exception is Mauritius given that almost all Schedule A tariffs are already zero. Three of the 5 countries experiencing the largest reductions in tariff revenues (Congo, D.R., Cameroon and Zimbabwe) are also exceptions, with tariff reductions under Schedule B accounting for between 54 percent to 62 percent of total revenue losses. Other countries where the contribution of Schedule B to total revenue loss equals or exceeds 50 percent include Gabon, Tunisia, Uganda, Chad, Equatorial Guinea and Guinea-Bissau. In almost all countries, the contribution of Schedule B products towards total revenue losses exceeds their contribution to total trade.

Figure 8: Contribution to total revenue losses by Schedule (% share)
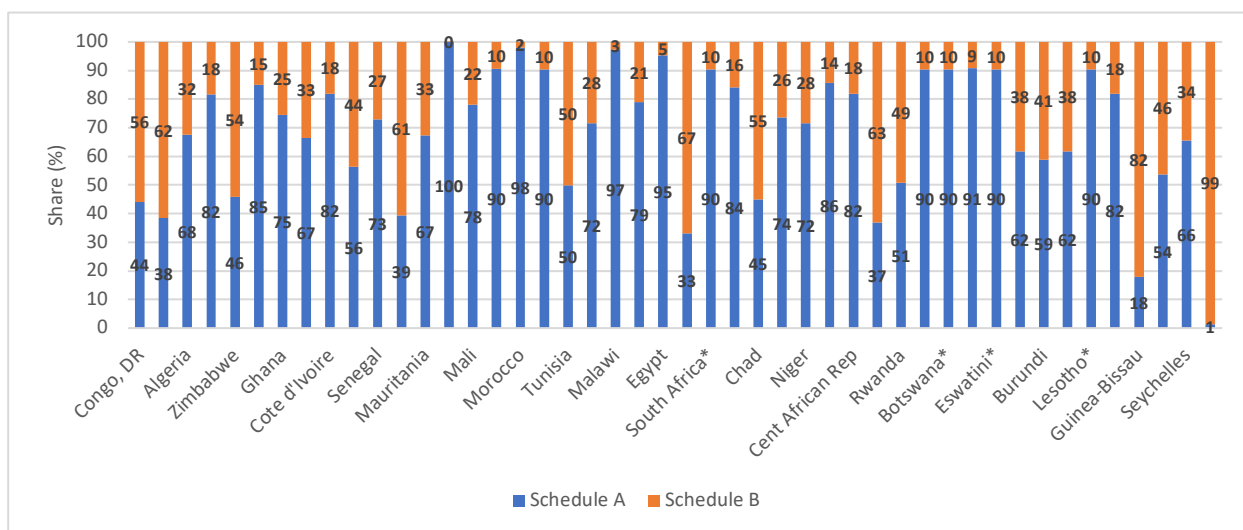
Note: The simulations assume an elasticity of substitution of 1.5, fully efficient collection rates and removal of tariffs covered in Schedule A and B. The shares are unaffected by preference utilisation rates. The change in revenue for SACU as a group and individually are presented. Countries denoted by a * have only provided Schedule A tariffs, while PSTC submissions of Angola, Malawi, Morocco, Sao Tomé & Príncipe, Zimbabwe and SACU members are still under verification (see earlier tables for further details). Countries are ordered by greatest loss in revenue as measured in US$. These values reflect the outcome after the phase-down of tariffs under the AfCFTA has been completed.

African countries have back-loaded tariff reductions under the AfCFTA, with low reductions in customs duties projected until the 6th year of implementation. Figure 9 presents the combined annual loss in tariff revenue and its change for the 45 African countries over the tariff phase-down period.

Figure 9: Total combined loss in tariff revenue for 45 member States under the AfCFTA by year of implementation (US$ million)
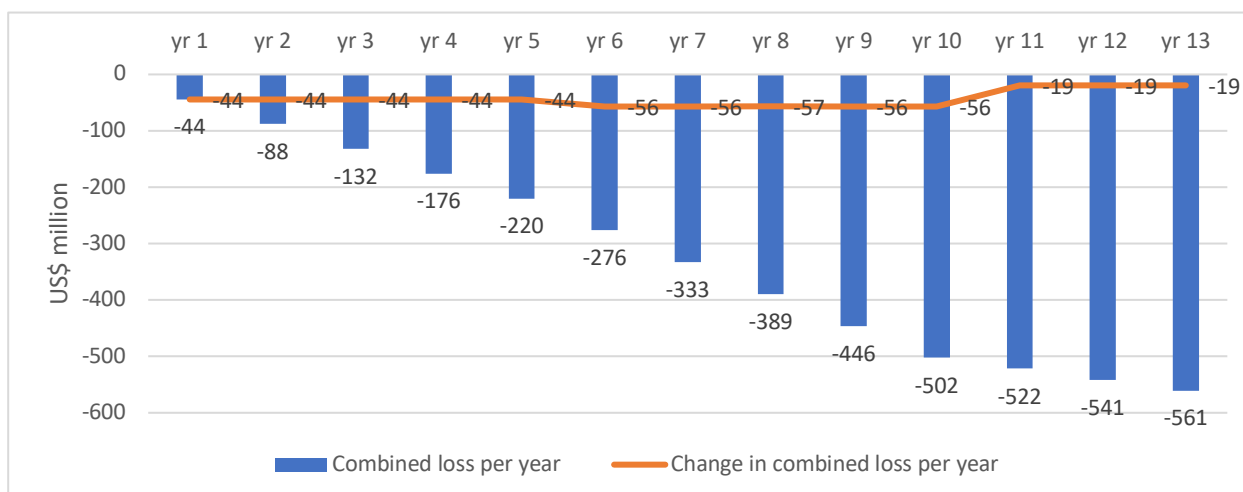
Notes: The sample includes all 45 African countries in the model. The simulations assume an elasticity of substitution of 1.5, a 60.8 percent utilization of tariff preferences, no exemptions or rebates on customs duties and removal of tariffs according to the phase-downs in the PSTCs. The phase-down of the hypothetical Schedule B products for those countries that only submitted a list of Schedule A products is assumed to occur between year 6 and year 13. Although Malawi offered a 15 year phase down of Schedule A tariffs, in the figure, it is assumed that the Malawi phase down for Schedule A is 10 years, Schedule B tariffs phased down from year 6 to year 13 year.

These estimates are based on a preference utilisation rate of 60.8 percent, and no exemptions/rebates and tariff reductions in accordance with the Provisional Schedule of Tariff Concessions. The combined fall in tariff revenue is gradual, starting at US$ 44 million in year 1 and reaching US$ 220 million in year 5. Combined annual tariff revenue losses then accelerate up to year 10 as Schedule B tariffs are reduced. From year 10, the increase in combined revenue losses diminish as the tariff phase-down under Schedule A is completed for all countries. From year 13, the annual losses in tariff revenue for the 45 African States is calculated to be US$ 0.56 billion per year. Over the 13-year phase-down period, the cumulative loss in tariff revenue for these States is US$ 4.2 billion.

The US dollar value of revenue losses is an imperfect measure of revenue vulnerability as it is strongly influenced by the economic size of the country. An alternative indicator of revenue vulnerability is to benchmark tariff declines against initial tariff revenue, total government revenue and/or GDP. These values are presented for individual countries in Table 3. Note that the values in the table assume the complete phase-down of tariffs, 60.8 percent preference utilisation and 100 percent collection efficiency.

The estimated tariff revenue losses account for low shares of initial tariff revenue and a very low share of total government revenue and GDP for most countries. On average, the loss in tariff revenue per year after implementation of the AfCFTA is equivalent to 2.1 percent of initial tariff revenue, 0.2 percent of total government revenue, and less than 0.05 percent of GDP. However, not all countries are affected equally. As shown in Table 3 the annual loss in revenue for the Congo, D.R is equivalent to 11.9 percent of initial tariff revenue, 1.4 percent of government revenue and 0.15 percent of GDP. Tariff losses are also relatively large for Cameroon, Congo, Rep., Mauritania and Central African Republic when measured in terms of total government revenue and GDP. On the other extreme are Tanzania, Egypt, Mauritius and SACU where revenue losses make up very low shares of total government revenue and GDP.

To help gauge the relative tariff revenue vulnerability across countries, Table 3 also presents the average rank of the three vulnerability indicators. The table is sorted from the most vulnerable country, which is ranked as 1 (Cameroon), to the least vulnerable (Mauritius). Also provided are the World Bank income classification status (for 2021) and indebtedness status (for 2005). Four of the top 10 most vulnerable countries to tariff revenue loss are also low income and severely indebted (Congo, D.R., Rep. of Congo, Malawi and Liberia).

Table 3: Annual tariff revenue losses following AfCFTA tariff liberalisation as share initial tariff revenue, total government revenue and GDP

	Tariff revenue losses as share:					
	Initial revenue (%)	Total government revenue (%)	GDP (%)	Average rank	Income classification	Indebtedness status (2005)
Cameroon	-17.88	-1.03	-0.19	1	LM	MIN
Congo, DR	-11.87	-1.37	-0.15	2	L	SIN
Congo, Rep.	-16.54	-0.44	-0.20	3	LM	SIN
Zimbabwe	-14.60	-0.53	-0.09	4	LM	SIN
Mauritania*	-6.91	-0.63	-0.15	5	LM	MIN
Gabon	-7.25	-0.30	-0.08	6	UM	SIN
Benin*	-5.58	-0.53	-0.07	6	LM	MIN
Malawi*	-7.02	-0.43	-0.06	6	L	SIN
Liberia*	-3.62	-0.69	-0.09	6	L	SIN
Cent African Rep	-5.83	-0.41	-0.08	10	L	SIN
Senegal*	-4.57	-0.31	-0.08	11	LM	LIN
Sierra Leone*	-3.89	-0.41	-0.08	11	L	SIN
Cote d'Ivoire*	-6.08	-0.36	-0.05	13	LM	SIN
Mali*	-4.99	-0.31	-0.06	14	L	LIN
Zambia*	-5.18	-0.23	-0.05	15	L	SIN
Angola	-12.72	-0.12	-0.05	16	LM	SIN
Ghana*	-5.08	-0.25	-0.04	17	LM	LIN
Togo*	-3.52	-0.27	-0.05	18	L	SIN
Guinea*	-2.56		-0.06	19	L	SIN
S Tomé/Príncipe	-3.29	-0.19	-0.05	20	LM	SIN
Chad	-4.23	-0.19	-0.03	21	L	SIN
Burkina Faso*	-3.58	-0.16	-0.04	22	L	MIN
Algeria	-2.21	-0.10	-0.03	23	LM	LIN
Niger*	-2.00	-0.16	-0.02	24	L	MIN
Kenya*	-2.52	-0.09	-0.02	25	LM	MIN
Burundi*	-1.35	-0.09	-0.02	26	L	SIN
Cabo Verde*	-0.89	-0.07	-0.02	27	LM	MIN
Nigeria*	-1.11	-0.17	-0.01	28	LM	MIN
Gambia*	-0.50	-0.10	-0.02	29	L	SIN
Guinea-Bissau*	-1.06	-0.09	-0.02	29	L	SIN
Uganda*	-1.75	-0.08	-0.01	31	L	MIN
Rwanda*	-1.28	-0.05	-0.02	32	L	SIN
Tunisia	-0.81	-0.07	-0.02	33	LM	MIN
Eq Guinea	-1.91	-0.05	-0.01	33	UM	MIN
Eswatini*	-0.33	-0.07	-0.02	35	LM	LIN
Lesotho*	-0.33	-0.03	-0.02	36	LM	LIN
Madagascar	-0.69	-0.05	-0.01	37	L	MIN
Namibia*	-0.33	-0.03	-0.01	38	UM	NIN
Morocco*	-0.56	-0.03	-0.01	39	LM	LIN
Botswana*	-0.33	-0.02	-0.01	40	UM	LIN
Seychelles	-0.52	-0.01	0.00	41	H	SIN
Tanzania*	-0.21	-0.01	0.00	43	LM	LIN
Egypt	-0.13	0.00	0.00	44	LM	LIN
South Africa*	-0.33	0.00	0.00	45	UM	LIN
Mauritius	-0.02	0.00	0.00	46	UM	MIN

Note: The simulations assume an elasticity of substitution of 1.5, 60.8 percent utilization of tariff preferences, no duty rebates or exemptions and removal of tariffs covered in Schedule A and B of the PSTCs. Government revenue and GDP data are obtained from WDI, IMF and official government sources. SACU is included as a group, and with member States separated. The average rank is the rank of the average rank of each indicator. Indicators of income status (for 2021) and indebtedness status (for 2005) are obtained from the World Bank. The legends are as follows for income status: Low income (L), Lower middle income (LM), Upper middle income (UM) and High income (H). For indebtedness, the legends are as follows: Severely indebted (SIN), Moderately indebted (MIN), Less indebted (LIN), Not classified by indebtedness (NIN). Countries denoted by a * have only provided Schedule A tariffs, while PSTC submissions of Angola, Malawi, Morocco, Sao Tomé & Príncipe, Zimbabwe and SACU members are still under verification (see earlier tables for further details).

6. Conclusion

This paper presents estimates of the revenue losses associated with the implementation of tariff reductions under the AfCFTA. The paper extends prior estimates of the trade and revenue implications of the AfCTA in several ways. The revenue estimates are based on actual tariff offers by African countries and therefore map most closely with the expected tariff reductions from the AfCFTA. The estimates are based on data for 2019 that is both recent and is the base year for the tariff phase down offers. A consistent partial equilibrium model, namely the SMART model, is applied to all countries, enabling a comparative analysis of the revenue effects across a much wider range of African countries. Finally, the study controls for incomplete preference utilisation rates that arise from challenges in complying with rules of origin requirements and differing collection efficiency rates. The study therefore considers the possible implication of rules of origin requirements and other administrative factors on trade flows and tariff revenues.

Several conclusions follow from the estimates. The AfCFTA is expected to contribute to a significant increase in intra-regional trade. Specifically, high tariffs constrain trade in countries where Africa comprises a low share of total imports. While the value of intra-Africa trade is highly concentrated in a few products, tariff barriers constrain diversification into new products. [12] The removal of tariff barriers under the AfCFTA will thus be effective in raising and diversifying intra-Africa imports.

The analysis also shows that the customs revenue implications of the lower tariffs are likely to be minor. Overall tariff losses per year for most countries are predicted to be less than 1 percent of total government revenue. Further, if realistic preference utilisation rates are considered, and exemptions from duties accounted for, then the cross-country average revenue loss as a share of total government revenue falls further to below 0.2 percent. Moreover, African countries have, on average, insulated themselves from tariff revenue losses by excluding revenue-sensitive products from the agreement (Schedule C) and by back-loading tariff reductions on revenue-sensitive products (Schedule B).

However, not all countries are affected equally. Tariff revenue losses following AfCFTA tariff liberalisation are greatest for Congo, D.R., Cameroon and Algeria, where annual tariff revenues are estimated to fall by over US$ 50 million. Countries also differ in their vulnerability to revenue losses, as measured by the loss in revenue as a share of total government revenue. Countries such as Congo, D.R., Cameroon, Republic of Congo and Zimbabwe are found to be vulnerable to both large decreases in the dollar value of customs revenue, as well as declines in the share of customs revenue in total government revenue. Other, smaller countries, including Malawi, Liberia, Central African Republic and Sierra Leone, do not experience large decreases in the dollar value of customs revenue, but the losses they experience constitute high shares of total government revenue.

Finally, it is important to note that the AfCFTA is considering an Adjustment Fund to ease the adjustment of Member States to tariff reductions and potential revenue losses, and to build

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[12] Regressions of African import values (in logs) on tariff rates with fixed effects for reporter, partner and product, reveal that a one percentage point increase in the tariff rate reduces imports of that product by 1.8 percent.

supply capacity within countries in order to increase and diversify intra-regional trade. The revenue estimates in this study should serve to inform the required size and possible distribution criteria for a short-term revenue compensation mechanism. In the longer-term, the tax earned on rising levels of trade should offset some or all of the predicted revenue losses, though countries may still need to find alternative sources of government revenue. This may include higher indirect and income taxes or improvements in the administration and collection of these taxes. The gradual phase-down of tariffs under the AfCFTA, supported by the proposed Adjustment Fund, should provide governments with the time and resources needed to reform their tax policies and broaden their revenue base.

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Appendix A: Additional tables

Table A1: Mean import demand elasticity and elasticity of substitution

	Import demand elasticities	Elasticity of substitution		Import demand elasticities	Elasticity of substitution
Angola	1.84	1.5	Mali	1.6	1.5
Burundi	1.55	1.5	Mauritania	1.86	1.5
Benin	1.54	1.5	Mauritius	1.42	1.5
Burkina Faso	1.48	1.5	Malawi	1.52	1.5
Botswana	1.45	1.5	Namibia	1.52	1.5
Central African Rep	1.6	1.5	Niger	1.61	1.5
Cote d'Ivoire	1.56	1.5	Nigeria	1.8	1.5
Cameroon	1.68	1.5	Rwanda	1.63	1.5
Congo, Rep.	1.7	1.5	Senegal	1.48	1.5
Cabo Verde	1.71	1.5	Sierra Leone	1.75	1.5
Algeria	1.75	1.5	São Tomé/Príncipe	1.6	1.5
Egypt	1.91	1.5	Eswatini	1.5	1.5
Gabon	1.53	1.5	Seychelles	1.61	1.5
Ghana	1.41	1.5	Chad	1.67	1.5
Guinea	1.5	1.5	Togo	1.48	1.5
Gambia, The	1.53	1.5	Tunisia	1.46	1.5
Guinea-Bissau	1.8	1.5	Tanzania	1.5	1.5
Eq Guinea	1.77	1.5	Uganda	1.58	1.5
Kenya	1.6	1.5	South Africa	1.84	1.5
Liberia	1.62	1.5	Congo, D.R.	1.84	1.5
Lesotho	1.73	1.5	Zambia	1.48	1.5
Morocco	1.61	1.5	Zimbabwe	1.53	1.5
Madagascar	1.56	1.5			

Notes: Import elasticities at the 6-digit level of the Harmonized System are based on those used in the World Bank SMART model, as obtained from the World Integrated Trade Systems online data platform. The import elasticities are bound between the 5th and 95th percentile estimates for the sample of African countries. Import demand elasticities were not available for all countries at the HS 6-digit level. Missing elasticities were first replaced by the country-specific 4-digit Heading average, then 2-digit Chapter average within which the product fell. If these were also missing for the country, the average across all African countries was used. The mean value presented in this table is calculated using product lines with import flows.

Table A2: Impact of AfCFTA on imports by country.

	Change total imports from Africa (%)					Share trade diversion (%)	Change total imports from Africa (%)
	Schedule A	Schedule B	Total (A+B)	Trade creation	Trade diversion		Full liberalisation
Congo, DR	7.3	18.1	25.4	20.7	4.6	18.3	29.0
Eq Guinea	9.7	13.3	23.0	16.5	6.5	28.1	65.7
Cameroon	5.7	16.8	22.5	16.7	5.8	25.9	26.2
Chad	10.0	11.7	21.7	15.9	5.8	26.8	27.9
Mauritania*	15.1	6.5	21.6	16.1	5.4	25.2	37.3
Angola	15.8	4.4	20.3	15.8	4.5	22.3	23.5
Liberia*	17.5	1.6	19.1	11.6	7.5	39.2	21.8
Gabon	7.3	8.5	15.8	10.0	5.9	37.1	20.5
Congo, Rep.	7.4	8.0	15.4	13.5	1.9	12.3	18.8
Algeria	9.5	4.7	14.2	7.5	6.7	47.4	15.2
Gambia*	10.7	1.5	12.3	6.0	6.3	51.1	15.2
S Tome/Principe	4.8	4.6	9.4	6.2	3.1	33.6	29.8
Cabo Verde*	7.1	2.2	9.3	5.2	4.1	43.8	10.4
Nigeria*	8.0	1.1	9.2	5.4	3.8	41.1	12.6
Ghana*	7.0	1.8	8.7	5.1	3.6	41.7	10.7
Sierra Leone*	5.2	1.7	6.8	4.8	2.1	30.5	10.3
Benin*	5.4	0.2	5.6	4.7	0.9	16.8	6.3
Senegal*	4.3	1.1	5.4	3.4	2.1	37.8	7.2
Guinea*	4.3	1.0	5.3	3.1	2.2	41.7	10.3
Cent African Rep	3.1	1.3	4.4	3.5	0.9	21.3	5.2
Zimbabwe	2.1	1.9	4.0	3.5	0.5	11.3	6.8
Cote d'Ivoire*	2.9	0.5	3.4	2.1	1.3	37.4	5.1
Kenya*	2.0	1.2	3.2	2.1	1.1	33.2	4.3
Togo*	2.5	0.2	2.7	2.0	0.7	24.7	4.0
Burkina Faso*	2.3	0.2	2.5	1.9	0.6	25.4	3.2
Niger*	1.9	0.3	2.2	1.6	0.6	27.1	3.9
Malawi*	2.0	0.0	2.0	1.5	0.5	24.1	3.2
Morocco*	1.9	0.0	1.9	1.0	0.9	45.6	2.1
Mali*	1.2	0.3	1.5	1.1	0.4	27.0	2.6
Zambia*	1.3	0.0	1.3	1.1	0.2	17.7	1.3
Uganda*	0.6	0.5	1.1	0.7	0.4	36.3	2.9
Tunisia	0.4	0.5	0.9	0.6	0.3	32.6	1.6
Burundi*	0.5	0.4	0.9	0.6	0.3	30.5	2.2
Egypt	0.7	0.1	0.8	0.5	0.3	39.4	0.9
Rwanda*	0.4	0.3	0.7	0.5	0.2	33.3	1.4
Madagascar	0.6	0.1	0.7	0.4	0.3	47.0	1.5
Guinea-Bissau*	0.2	0.4	0.6	0.5	0.1	21.7	2.1
Tanzania*	0.2	0.1	0.3	0.2	0.1	32.1	0.3
Seychelles	0.1	0.1	0.2	0.2	0.1	25.1	1.2
SACU*	0.1	0.0	0.1	0.1	0.1	47.4	0.3
Mauritius	0.0	0.0	0.0	0.0	0.0	60.7	0.1

Source: Model estimates. See earlier tables for notes to the table.

Online data appendix

Trade and tariff data

The partial equilibrium model used for this study is based on trade and tariff data from 45 African countries for 2019 or the closest year possible. Table A presents the list of countries and the years for which tariff and trade data are used. The data are sourced from UNcomtrade, BACI (Gaulier and Zignago, 2010), Trade Map and the UNCTAD Trade Analysis Information System (TRAINS) database. The raw tariff schedules obtained from TRAINS include data on the statutory applied tariffs, including for preferential trade partners. Ad valorem equivalent estimates of specific and mixed tariffs are calculated and used where possible.

Table A: Statutory tariff year and trade year

Reporter Name	Tariff year	Trade year	Reporter Name	Tariff year	Trade year
Algeria	2019	2017	Liberia*	2019	2017
Angola	2019	2019	Madagascar	2019	2019
Benin*	2019	2019	Malawi*	2019	2019
Botswana*	2019	2019	Mali*	2019	2019
Burkina Faso*	2019	2019	Mauritania*	2019	2019
Burundi*	2019	2019	Mauritius	2019	2019
Cameroon	2019	2019	Morocco*	2019	2019
Cabo Verde*	2021	2019	Namibia*	2019	2019
Central African Republic	2019	2019	Niger*	2019	2019
Chad	2019	2019	Nigeria*	2020	2019
Congo, Dem. Rep.	2019	2019	Rwanda*	2019	2019
Congo, Rep.	2019	2019	São Tomé, Príncipe	2019	2019
Cote d'Ivoire*	2019	2019	Senegal*	2019	2019
Egypt, Arab Rep.	2019	2019	Seychelles	2019	2019
Equatorial Guinea	2019	2019	Sierra Leone*	2020	2019
Eswatini*	2019	2019	South Africa*	2019	2019
Gabon	2019	2019	Tanzania*	2019	2019
Gambia*	2018	2018	Togo*	2019	2019
Ghana*	2019	2019	Tunisia	2019	2019
Guinea*	2019	2019	Uganda*	2019	2019
Guinea-Bissau*	2019	2019	Zambia*	2020	2019
Kenya*	2019	2019	Zimbabwe	2019	2019
Lesotho*	2019	2017			

Source: TRAINS, BACI, TradeMap and UNComtrade. The * denotes countries for which only Schedule A products have been classified.

Several adjustments are made to the data. Most countries employ the *general recording system* to compile import statistics. The import values in the general system include merchandise imports for direct immediate consumption and goods that enter industrial and commercial free zones, premises for inward processing and bonded customs warehouses (Valdivia-Velarde & Razin, 2014). Import duties are not paid on these goods unless they are redirected towards the domestic market. General imports therefore may include goods re-exported to neighbouring countries. [13] This is particularly problematic for the measurement of dutiable imports in

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[13] According to the United Nations International Merchandise Trade Statistics: Concepts and Definitions (IMTS) re-exports are defined as foreign goods in the same state as previously imported (IMF, 2004). Activities in the intermediate country may include sorting, (re)packaging, storage and transport, and trade-mediation services (Lankhuizen and Thissen, 2019). The goods may be exported from the free circulation area, premises for inward processing or industrial free zones, from customs warehouses or commercial free zones. Formally,

countries along major transit routes. For the destination country, the imports may be declared as originating in the bordering country, while for the transit country the re-exports are included in their gross import statistics. The problem is particularly pronounced for trade in processed fuel products.[14] Trade between Rwanda and the Democratic Republic of Congo (DRC) illustrates some of the challenges in measuring imports. For example, of the US$ 372.8 million of gross exports reported by Rwanda to the Democratic Republic of Congo in 2019, US$ 310.7 million (83.3%) were re-exports. The total value of re-exports by Rwanda in 2019 (US$ 351.3 million) are equivalent 11% of the DRC's gross import value. For petroleum oils (HS 271019), the largest import item, re-exports make up 22.4% of the import value, and 93% of the gross export value.

Several adjustments to the import data were made. One concern is that country reported imports from South Africa may be exaggerated given its role as a gateway for goods into the interior. Consequently, African country reported imports from South Africa were replaced with South African reported exports to each country. Where data allowed, the contribution of re-exports to total exports was analysed. In the case of Rwanda, Tanzania and Seychelles, re-exports constituted a high share of total exports. We therefore excluded re-exports from gross imports for these countries. Recent country reported data at the disaggregated level were not available for Guinea-Bissau, Equatorial Guinea, Nigeria, Sierra Leone, and Chad. For these countries mirror import data, based on country reported export data obtained from BACI, are used in the analysis. Countries such as Malawi (9% total imports) and Congo, D.R. (20% total imports) record very high import values for HS 490700 (*Unused postage, stamp-impressed paper, check forms, bank notes, stock, share or bond certificates*). These appear to be related to the transport of bank notes and are therefore all estimates exclude this product. This exclusion has no impact on revenue estimates as the source of imports are from outside of Africa. Countries such as Uganda and Rwanda record high values of gold imports that are subsequently re-exported. Consequently, HS 7108.12 (*Metals; gold, non-monetary, unwrought*) and HT 7108.13 (*Gold, nonmonetary, semi-manufactured forms others*) are excluded from the trade and revenue estimates for all countries. Finally, all unspecified products classified as HS 9999.99 are excluded.

A three-stage processes was followed to validate the model and data used:

1. Comparison of model import data with official data
2. Comparison of model predicted initial customs revenue against government reported customs revenue
3. Comparison of model predictions of full AfCFTA liberalisation against other studies.

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re-exports involve a change of ownership while goods-in-transit do not. However, identification and meaningful measurement of re-exports remains problematic (IMF, 2004).

[14] The import data from UNComtrade is valued inclusive of cost, insurance and freight (cif). This can induce further upward bias in the implied dutiable value of imports for countries, such as South Africa, that apply tariffs to the free-on-board value of imports (Yeats, 2012).

Table B: Comparison of model import values in US$ millions against official and other sources

Country		Import value (US$ mill)		Share official (%)	Trade and tariff data source
		Official	Model		
Angola	AGO	14127	13776	98	UNComtrade, raw TRAINS
Burundi	BDI	887	858	97	UNComtrade, TradeMap, raw TRAINS
Benin	BEN	3932	2925	74	UNComtrade, raw TRAINS
Burkina Faso	BFA	4284	4232	99	UNComtrade, raw TRAINS
Central African Republic	CAF	603	567	94	UNComtrade, raw TRAINS, CEMAC
Cote d'Ivoire	CIV	10483	10465	100	UNComtrade, raw TRAINS
Cameroon	CMR	6264	6006	96	UNComtrade, raw TRAINS
Congo, Rep.	COG	2242	2235	100	UNComtrade, raw TRAINS
Cabo Verde	CPV	796	790	99	UNComtrade, raw TRAINS
Algeria	DZA	41934	44147	105	TRAINS
Egypt, Arab Rep.	EGY	70919	75010	106	UNComtrade, raw TRAINS
Gabon	GAB	2538	2258	89	BACI, raw TRAINS, CEMAC
Ghana	GHA	13411	10397	78	UNComtrade, raw TRAINS
Guinea	GIN	3470	4311	124	BACI, raw TRAINS
Gambia, The	GMB	621	620	100	TRAINS
Guinea-Bissau	GNB	335	317	95	BACI, raw TRAINS
Equatorial Guinea	GNQ	2098	931	44	BACI, raw TRAINS
Kenya	KEN	17655	16895	96	UNComtrade, raw TRAINS
Liberia	LBR	1033	1157	112	BACI, TradeMap, raw TRAINS
Morocco	MAR	50734	50773	100	UNComtrade, raw TRAINS
Madagascar	MDG	3942	3516	89	UNComtrade, raw TRAINS
Mali	MLI	5134	4998	97	UNComtrade, raw TRAINS
Mauritania	MRT	3520	3507	100	UNComtrade, raw TRAINS
Mauritius	MUS	5596	5522	99	UNComtrade, raw TRAINS
Malawi	MWI	2941	2584	88	UNComtrade, raw TRAINS
Niger	NER	2326	2765	119	UNComtrade, raw TRAINS
Nigeria	NGA	55257	47061	85	BACI, raw TRAINS
Rwanda	RWA	2659	2588	97	UNComtrade, TradeMap, raw TRAINS
Senegal	SEN	8144	8088	99	UNComtrade, raw TRAINS
Sierra Leone	SLE	1502	1136	76	BACI, raw TRAINS
São Tomé and Príncipe	STP	148	108	73	UNComtrade, raw TRAINS
Seychelles	SYC	1167	1177	101	UNComtrade, raw TRAINS
Chad	TCD	1847	953	52	BACI, raw TRAINS, CEMAC
Togo	TGO	2091	1795	86	UNComtrade, raw TRAINS
Tunisia	TUN	21564	21487	100	UNComtrade, raw TRAINS
Tanzania	TZA	9452	8833	93	UNComtrade, raw TRAINS
Uganda	UGA	7696	6181	80	UNComtrade, raw TRAINS
Congo, D.R.	ZAR	8825	6890	78	Uncomtrade, raw TRAINS
Zambia	ZMB	7180	6801	95	UNComtrade, raw TRAINS
Zimbabwe	ZWE	4817	4642	96	UNComtrade, raw TRAINS
SACU		105960	96232	91	UNComtrade, raw TRAINS

Source: Own calculations using TRAINS, UNComtrade, BACI and TradeMap. All data excludes HS 490700 (bank notes) and Gold HS 7108.12 Metals; gold, non-monetary, unwrought (but not powder) and HT 7108.13 - Gold, Nonmonetary, Semimanufactured Forms Others (other Than Powder). Official data are sourced from World Development Indicator database.

The first step involved checking the consistency between the aggregate values of import data in the model with official statistics, as provided in the World Bank World Development Indicator (WDI) database. Table B presents a comparison of the model import values against official and other publicly available sources. The average ratio of model import data to official

import data is 93% for the sample of 45 African countries covered by the Provisional Schedule of Tariff Concessions submitted to the AfCFTA Secretariat. Exceptions include Equatorial Guinea (44%) and Chad (52%), where mirror import data for 2019 obtained from BACI was used as recent country reported data from UNComtrade are not available. However, the import data used in the model for these countries, corresponds very closely (90% share) with import data reported by the IMF Direction of Trade Statistics (DOTS). We are therefore confident that the import data used in the model closely approximates values provided from official sources and international databases.

The second validation check entails a comparison of model tariff revenue predictions against publicly available sources of customs revenue such as the WDI, IMF Government Finance Statistics (GFS), and official government websites. Model estimates of tariff revenue are obtained by multiplying bilateral import values with the applied tariff rates. The estimates thus assume full preference utilisation and no exemptions or rebates on customs duties. Table C presents a comparison of the model estimates against publicly available measures of "*customs and other import duties*". An important limitation of this comparison is that the customs and other import duties obtained from publicly available sources include revenues from other taxes on imports (e.g. withholding taxes, integration levies, …) in addition to tariff revenue. Where large deviations were evident, both the tariff and import data in the model was re-assessed, focusing particularly on tariff line items accounting for large shares of predicted tariff revenue.

On average, model predicted revenues exceed official customs and other import duties by a multiple of 1.5, although this varies across countries. Estimates for Equatorial Guinea are 6.3 times higher and Nigeria 4.6 times higher, while estimates for São Tomé and Príncipe are half official values. As discussed above, several sources may account for these discrepancies, namely: (i) use of gross import data, (ii) rebates and exemptions, and (iii) duties other than import tariffs on imports. Unfortunately, without import transaction data at the tariff level, it is not possible to identify the sources of the revenue discrepancies. This constraint is not unique to this study – equivalent challenges are faced by all partial equilibrium and general equilibrium studies that are not based on import transaction data. The simulated revenue effects of the AfCFTA are therefore best interpreted as upper bound estimates assuming no rebates or exemptions.

The third validation check compares model estimates of the AfCFTA with those from other studies. Figure A presents a bar chart comparing the model estimated revenue effects of full liberalisation of all products (Schedule A, B and C) under AfCFTA with the estimates of UNECA (2021). Both studies apply the partial equilibrium SMART model. The revenue implications will be exaggerated for each country given that Schedule C products have not been excluded from the liberalisation scenario. The simulations also assume full preference utilisation rates and no duty exemptions or rebates.

Table C: Comparison of model import tariff revenues in US$ millions against official and other sources

		Model estimates	Official	Ratio of model to official
Angola	AGO	746	464	1.6
Burundi	BDI	75	50	1.5
Benin	BEN	277	341	0.8
Burkina Faso	BFA	285	326	0.9
Central African Republic	CAF	53	45	1.2
Cote d'Ivoire	CIV	811	923	0.9
Cameroon	CMR	778	665	1.2
Congo, Rep.	COG	301	161	1.9
Cabo Verde	CPV	92	74	1.2
Algeria	DZA	4389	3062	1.4
Egypt, Arab Rep.	EGY	5517	2725	2.0
Gabon	GAB	352	487	0.7
Ghana	GHA	1036	1037	1.0
Guinea	GIN	507		
Gambia, The	GMB	112	47	2.4
Guinea-Bissau	GNB	35	20	1.8
Equatorial Guinea	GNQ	166	26	6.3
Kenya	KEN	1319	1056	1.2
Liberia	LBR	150	159	0.9
Morocco	MAR	1457	1016	1.4
Madagascar	MDG	221	246	0.9
Mali	MLI	290	299	1.0
Mauritania	MRT	342	163	2.1
Mauritius	MUS	51	39	1.3
Malawi	MWI	152	118	1.3
Niger	NER	255	380	0.7
Nigeria	NGA	4887	1061	4.6
Rwanda	RWA	193	124	1.5
Senegal	SEN	724	588	1.2
Sierra Leone	SLE	144	82	1.8
São Tomé and Príncipe	STP	10	24	0.4
Seychelles	SYC	17	22	0.8
Chad	TCD	140	137	1.0
Togo	TGO	181	201	0.9
Tunisia	TUN	1093	438	2.5
Tanzania	TZA	561	498	1.1
Uganda	UGA	421	504	0.8
Congo, DR.	ZAR	660	362	1.8
Zambia	ZMB	321	275	1.2
Zimbabwe	ZWE	393	433	0.9
SACU		3676	3821	1.0
Average				**1.5**

Source: Customs and other import duties are obtained from WDI, IMF Government Finance Statistics (GFS), and official government websites (mainly Ministry of Finance online publications). Official values for Seychelles exclude revenues from levies, document charges and livestock trust fees. Values for Mauritania are based on 2007 share of customs revenue to GDP applied to 2019 GDP values. Official data for Niger based on 2007 IMF Government Finance Statistics for 2007, with values for 2019 imputed using 2019 GDP. Southern African Customs Union (SACU) customs revenue is obtained from South African Revenue Services Tas Statistics 2020, and excludes ad valorem and specific excise duties.

The impact on customs revenue varies considerably across countries, but there is a high correlation between the model estimates and those of UNECA (2021) with correlation coefficients between 0.92 and 0.94. the highest revenue declines occurring in Democratic Republic of Congo (DRC) and Cameroon, and the lowest revenue in Mauritius. There are some differences in results. In general, the SMART model predicts lower revenue losses than UNECA (2021) for the top 7 revenue loss countries (average of 30 percent lower). The losses in revenue also fall considerably (on average by 30 percent across countries) once preference utilisation rates are accounted for. In some cases, UNECA (2021) predicts substantially higher losses than the model used in this study. For example, the model in this study predicts losses of US$ 24 million for Zambia compared to US$ 72.3 million by UNECA (2021). [15] Nevertheless, the overall finding is that the relative rankings of tariff loss estimates are similar across studies, with slightly lower estimates obtained from the model used in this study.

Figure A: Estimated impact of full AfCFTA liberalisation on customs revenue, US$ million
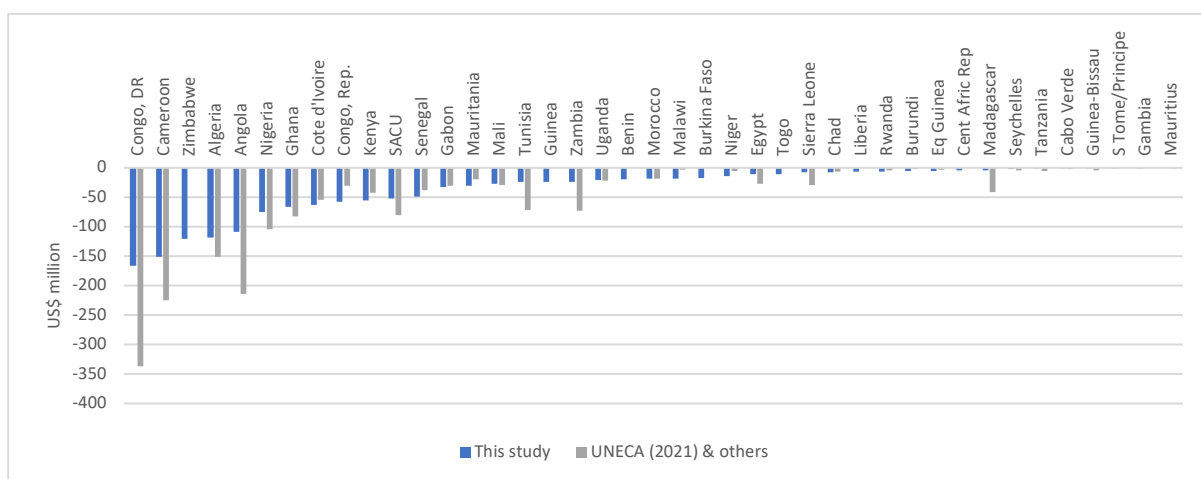
Source: SMART model simulations, and UNECA (2021), with exception of World Bank (2020) for Malawi, Mureverwi (2016) for Malawi and Shinyekwa at al. (2020) for Rwanda. The SACU customs revenue pool is allocated to member states according to their share intra-SACU trade. The aggregate revenue effect for SACU is dominated by South Africa that accounts for the bulk of total imports and customs revenue. Customs revenue also accounts for a very high share of revenue for Botswana, Lesotho, Eswatini and Namibia. The simulated reduction in government revenue of full liberalization using the revenue sharing formula is -0.19% for Botswana, -0.30% for Lesotho, -0.21% for Namibia, -0.43% for Eswatini and -0.02% for South Africa.

The validation exercise reveals several instances where revenue predictions differ widely from existing studies and from official sources. These discrepancies arise from a combination of factors including: (i) use of gross import data, (ii) rebates and exemptions, and (iii) inclusion of duties other than import tariffs in reported customs revenue. Ideally, import transaction data at the tariff level is required to identify the sources of the revenue discrepancies. Additional estimates using import transaction data at the tariff level for each country would therefore provide additional insights into the revenue implications of AfCFTA.

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[15] This estimate by UNECA (2021) is very high compared to other studies that range between US$ 20 million (Jensen and Sandrey, 2015) and US$ 22 million by Mureverwi (2016).

Provisional Schedule of Tariff Concessions (PSTC)

The AfCFTA Secretariat has provided Provisional Schedule of Tariff Concessions (PSTC) submitted by 17 countries/Regional Economic Communities (REC). Of these, 12 submissions have been technically verified (see notes to Table E), while 5 submissions are still to be verified. These schedules cover 45 African countries.[16]

Table D: Amendments to the PSTC schedules

Country	Explanation
Angola	Of the 5605 tariff lines in PSTC, 445 lines have base rates higher tariffs and 34 lower tariffs than the raw tariffs obtained from TRAINS. The TRAINS data are used in the analysis.
Malawi	The PSTC does not perfectly match the 2019 or 2021 raw TRAINS data, nor the officially published 2019 or 2022 Tariff handbook (https://www.mra.mw/assets/upload/downloads/MALAWI_CUSTOMS_AND_EXCISE_TA RIFF(HS_2017_Version)_2019-2020_updated2.pdf) The PSTC contains 7402 lines all categorised as A, whereas TRAINS has 7181(2019)-7188 (2021). Of these 6597 are matched across databases. The PSTC offer contains some tariff line items that are not in the 2019 or 2021 TRAINS, nor in the published 2019 or 2022 Tariff handbook, e.g. HS 0306.21 – 0306.29. The PSTC also contains several more aggregated line items than TRAINS or published tariff book (e.g. 0101.30.00 in PSTC compared to 0101.30.10 and 0101.30.90 in the official tariff handbook. The PSTC base rate differed in some cases, e.g. 27109100 base rate in PSTC is 7.5, whereas is 10 in tariff handbook. Finally, the allocations to Schedule A in the PSTC sometimes do not correspond to the AfCFTA tariffs provided in the published tariff book (e.g. 3922.90.90 and 3922.90.10 the handbook tariff equals 30 in 2019 and 2022, but the concession offer = 25. Further, the handbook indicates no concession to AfCFTA, whereas the PSTC classifies these products as Category A). The model draws on the TRAINS data.
São Tomé and Príncipe	The São Tomé and Príncipe required extensive cleaning. The alignment between tariff rates and the disaggregated HS codes was incorrect in many cases. Many HS codes contained spaces, and/or were incomplete (e.g. missing final digits). Further, the PSTC tariff rates do not always match perfectly with the 2019 tariff rates from TRAINS. In several instances, the PSTC tariff far exceeds what is provided for 2019 by TRAINS (e.g. subdivisions of HS2710 in TRAINS give tariff rates of 5% compared to 40 to 327% in the PSTC. See also HS 2208 where tariff equals 75% in the PSTC vs. 20% in TRAINS. The following process for cleaning was adopted: (i) Stacked the schedules from different sheets, (ii) checked for cases where tariffs were misaligned (e.g. associated with blank HS code, or 4-digit code), (iii) checked for missing tariffs at HS 6-digit level. (iv) Checked for duplicates. (v) filled in missing PSTC tariffs with data from TRAINS. The model estimates are based on the raw TRAINS data.
EAC	The EAC offer covers Republics of Burundi, Kenya, Rwanda, South Sudan, Uganda, and the United Republic of Tanzania. The one issue is that each EAC country has their own exceptions (stays of application) from the EAC Common External Tariff. In the model, we used the 6-digit applied tariff provided by TRAINS that includes country-specific stays of application.
Zimbabwe	The PSTC contains several specific tariff rates. In the model, ad valorem equivalents are constructed using unit values for 2019 calculated at the 4-digit level. The PSTC corresponds well with the raw TRAINS. Where discrepancies are found, the PSTC rate is used.
Seychelles	Several cases of duplicate HS codes found in the PSTC. In most cases, PSTC tariff was same. An exception is HS 2101.20.00 that is classified as both Schedule A (tariff = 0%) and B (tariff = 25%). This was allocated to Schedule B on basis of raw TRAINS data. The tariff book contains mixed tariffs. For the analysis of the PSTC, the ad valorem component of the mixed tariff is used (e.g. 15% of the tariff 15% + SCR 5/kg). For the model, ad valorem equivalents are calculated using 4-digit level import unit values.
Morocco	Only provided Schedule A tariffs. To update for analysis of PSTC, we included other tariff lines as obtained from the 2019 tariffs from TRAINS.

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[16] 46 if including South Sudan in the EAC PSTC submission. South Sudan is not covered in the trade and tariff analysis as no trade data are available.

These submissions were re-assessed and combined into a single database. Where inconsistencies were identified, the PSTC data were compared against the relevant country's raw tariff schedules for 2019 or 2021 obtained from the UNCTAD Trade Analysis Information System (TRAINS) database.[17] In some instances, the submissions required extensive cleaning (e.g. São Tomé and Príncipe) to resolve duplication of tariff lines, missing tariffs, and incomplete submissions (e.g. tariff lines are only provided for Schedule A by Morocco and Malawi). The base tariff in the PSTC also exceeded the MFN tariffs in published tariff books for some products in Angola and São Tomé and Príncipe. These country submissions, however, are still to be verified by the AfCFTA. Almost all countries/REC classify goods at the 8- to 10-digit level of the Harmonized System (HS) (Revision 2017). However, the tariff lines are not comparable across countries beyond the 6-digit level of the HS, as each country has introduced national distinctions beyond the 6-digit level. A comparison with raw tariff schedules obtained from TRAINS also reveals several instances where the PSTC tariff classification differs from that of the TRAINS database. Finally, in the case of the EAC submission, the applied statutory Most Favoured Nation tariff differs from the EAC Common External Tariff given country-specific Stays of Applications provided for under the agreement. Further details are provided in Table D.

Table E provides a breakdown of the number of tariff lines for each PSTC according to Schedule A, B or C. For some countries (Morocco, ECOWAS, EAC), only Schedule A is provided. According to the data, for most countries, Schedule A covers the required 90 percent of tariff lines, or more. Exceptions are São Tomé and Príncipe, but this may reflect inaccuracies in the data provided. Schedule A only covers 88 percent of tariff lines for Morocco, but this could also reflect the use of the 2019 tariffs obtained from TRAINS to fill in missing tariff lines in the PSTC submission. Finally, in the Malawi and Morocco submissions, only products classified as Schedule A products have been provided.

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[17] https://databank.worldbank.org/source/unctad-%5E-trade-analysis-information-system-(trains) .

Table E: AfCFTA offer by Schedule A, B or C

	Number tariff lines					Share			
	A	B	C	B&C	Total lines	A	B	C	B&C
Algeria*	14,817	1,144	435		16,396	90%	7%	3%	
Angola	5,023	395	187		5,605	90%	7%	3%	
CEMAC*	5,253	408	175		5,836	90%	7%	3%	
Congo, DR*	5,644	437	188		6,269	90%	7%	3%	
EAC*	5,125			557	5,682	90%			10%
ECOWAS*	5,516			613	6,129	90%			10%
Egypt*	5,245	407	175		5,827	90%	7%	3%	
Madagascar*	6,111	444	175		6,730	91%	7%	3%	
Malawi	7,402				7,402	100%			
Mauritius*	5,822	399	192		6,413	91%	6%	3%	
Morocco	16,132			2,141	18,273	88%			12%
São Tomé and Príncipe	4,082	739	417		5,238	78%	14%	8%	
SACU*	7,111			790	7,901	90%			10%
Seychelles*	5,623	70	153		5,846	96%	1%	3%	
Tunisia*	10,506	817	349		11,672	90%	7%	3%	
Zambia*	5,874			650	6,524	90%			10%
Zimbabwe	5,758	440	181		6,379	90%	7%	3%	

Source: Own calculations based on Provisional Schedule of Tariff Concessions provided by AfCFTA Secretariat. Notes: * Denotes a technically verified PSTC. Only tariff lines covering Schedule A offer were provided for Morocco. Additional tariff lines were obtained using the 2019 tariff schedule obtained from TRAINS. The data for São Tomé and Príncipe required extensive cleaning. The HS codes in the PSTC do not match perfectly to the 2019 tariffs obtained from TRAINS. In several instances, the PSTC tariff far exceeds what is provided for 2019 by TRAINS (e.g. subdivisions of HS2710 in TRAINS give tariff rates of 5% compared to 40 to 327% in the PSTC).

Table F enables an assessment of the overall distribution of ad valorem tariffs across the tariff schedule offers. 90 percent of all tariff lines are classified as in category A (bottom row, part a). However, we do not find equivalent proportionate distributions within each tariff band. Within low tariff bands, 98 percent to 100 percent of all tariff lines are allocated to Schedule A. The share declines as we move to higher tariff bands. Within the 20 percent to 50 percent band only 79 percent of tariffs line are allocated to Schedule A. The share allocated to Schedule C ranges from at least 4 percent to 9 percent. A very high share of tariff lines above 50 percent are allocated to category C, although these lines only make up 1 percent of all tariff lines. Overall, the preliminary overview of the data indicates that products with relatively high tariffs are more likely to be excluded from the agreement.

Table F: Distribution of ad valorem tariffs across the tariff offer schedules

	A	B	C	C/B	Row total	Share all lines
Tariff band						
0%	99%	1%	0%	0%	100%	21%
0 < t < =5%	98%	2%	1%	0%	100%	22%
5 < t <= 10%	93%	4%	2%	1%	100%	16%
10 < t <= 20%	87%	6%	2%	4%	100%	17%
20 < t < =50%	79%	9%	4%	9%	100%	24%
50 % < t	18%	19%	27%	36%	100%	1%
Total	90%	4%	2%	3%	100%	100%

Source: Own calculations based on Provisional Schedule of Tariff Concessions provided by AfCFTA Secretariat. Notes: Covers all countries in sample. The tariff includes the advalorem component of mixed tariffs (e.g. the 15% of a mixed tariff 15%+100c/kg).

Figure B analyses the distribution of tariff lines across categories for each schedule individually. The tariff structures visually vary across all AfCFTA partners combined. The most common tariff category is category 5 (20 percent < t < =50 percent which makes up 24 percent of the total), followed by category 2 (0 < t < =5 percent which makes up 22 percent of the total). Tariff category 6 (50 percent <= t) is the least common as it only makes up approximately 1 percent of the total. Within these categories, offer schedule A dominates (excluding category 6 where offer schedules are most often B or C). In other words, the highest tariff category coincides with more restrictive offer schedules.

Figure B: Tariff category distribution by offer schedule (as a percentage of total)
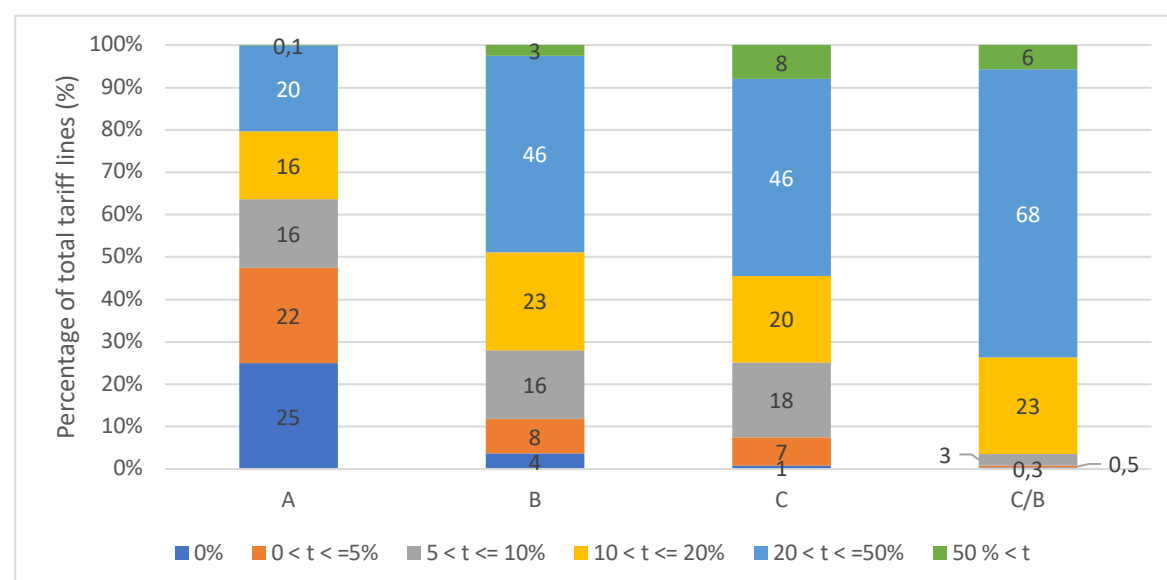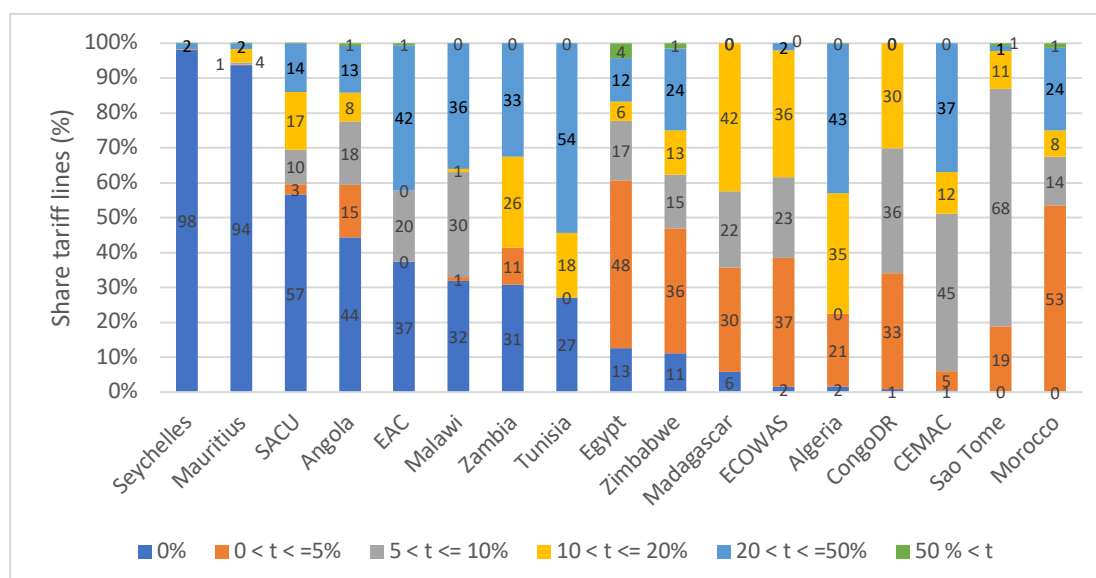

Source: Own calculations based on Provisional Schedule of Tariff Concessions provided by AfCFTA Secretariat. Notes: Covers all countries in sample. The tariff includes the ad valorem component of mixed tariffs, but excludes specific duties.

Figure C illustrates the way in which partner countries/regions differ in the distribution of their tariff lines. Seychelles, Mauritius, SACU and Angola all have the largest proportion of their

tariff lines in the zero tariff category. In particular, both Seychelles and Mauritius have both placed over 90 percent of their tariff lines in the zero tariff category. On the other hand, 9 countries place the largest proportion of their tariff lines in the $0 < t < =20$ percent tariff categories, and only 4 countries (EAC, Zambia, Tunisia and Morocco) place the largest proportion of their tariff lines in the $20 < t < =50$ percent tariff category. Looking at all the countries, 8 have tariff lines that fall in the 50 percent $< t$ tariff category. These structural differences mean that the AfCFTA will have varying effects on the different countries.

Figure C: Distribution of tariff lines by partner country/region

Source: Own calculations based on Provisional Schedule of Tariff Concessions provided by AfCFTA Secretariat. The tariff includes the ad valorem component of mixed tariffs, but excludes specific duties.

Several countries also use mixed/specific tariffs (Egypt, SACU, Seychelles, Madagascar, Zimbabwe). These only account for 1 percent of all tariff lines within the sample. Table G illustrates that non-advalorem tariffs are more likely to be categorised in Schedule B & C compared to the ad valorem rates.

Table G: Distribution of non-advalorem tariffs by tariff offer schedules

| Schedule | Number of tariff lines | | | Share | | |
	advalorem tariffs	Mixed/ specific tariffs	Total	advalorem tariffs	Mixed/ specific tariffs	Total
A	120,620	424	121,044	91%	42%	90%
B	5,386	314	5,700	4%	31%	4%
C	2,480	147	2,627	2%	15%	2%
C/B	4,630	121	4,751	3%	12%	4%
Total	133,116	1006	134,122	100%	100%	100%
Share total lines				99%	1%	100%

Source: Own calculations based on Provisional Schedule of Tariff Concessions provided by AfCFTA Secretariat.