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The Impact of the African Continental Free Trade Agreement

A Continentwide Macroeconomic Assessment and Distributional Analysis in Nigeria and Rwanda

Fousseini Traoré, Pierre Mamboundou, Insa Diop, and Abdourahmane Sy

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EXECUTIVE SUMMARY

Africa remains the least open continent in the world, with high trade restrictions for both intra- and extra-African partners. These restrictions include both tariff and nontariff measures, as well as high transportation costs due to poor infrastructure. However, previous studies have highlighted the crucial role of intra-regional trade in boosting national economies, promoting development, and enhancing food security by increasing the availability of food and stabilizing domestic markets. In particular, informal cross-border trade, which is pervasive in Africa, contributes to food security, although further research is needed on its magnitude.

This research aims to enhance the understanding of current and future trends in Africa's food systems, focusing on continental) trade and its impact on national economies and markets. Its objective is to assess the impact of the African Continental Free Trade Agreement (AfCFTA), the most ambitious regional trade agreement in Africa, on national economies and markets. The study uses state-of-the-art tools, includes informal cross-border trade of agricultural products, and considers realistic scenarios of trade liberalization.

The study finds that the AfCFTA's impact will be positive, although limited. Because most African countries are already trading under preferential regimes within regional economic communities (RECs), AfCFTA primarily affects trade flows outside of these communities. We observe traditional trade diversion effects from partners outside of Africa (up to −1.68 percent) and trade creation within the continent (up to 18.48 percent). Like the agreement's macroeconomic impacts on gross domestic product growth and trade, its effects on poverty are also limited, with more positive effects in Rwanda than in Nigeria, the two countries analyzed in the microsimulation. A gender bias is present in the results: Female-headed households benefit less from the agreement than male-headed households. Given the continent's high transportation costs, significant gains can occur by reducing transport margins in addition to implementing the AfCFTA. In that case, the positive results are amplified, while the negative effects are dampened.

Because AfCFTA implementation is still in early stages, more information is needed to fine-tune the results. First, it is important to examine the assumptions behind the selection of sensitive and excluded products. In the absence of official lists, which are not available for most countries, the final lists may differ from the selection made in this report, although the method we use has proven to be effective for past agreements. In addition, rules of origin and other nontariff measures will play a significant role in the future of the agreement, affecting the results and likely changing the distribution of gains and losses.

RESUME

L'Afrique reste le continent le moins ouvert au monde. Les restrictions commerciales demeurent élevées pour les partenaires intra-régionaux et extra-régionaux. Ces restrictions concernent à la fois les mesures tarifaires et non tarifaires, ainsi que les coûts de transport élevés dus à la faible qualité des infrastructures. Pourtant, des études antérieures ont souligné le rôle crucial du commerce intra-régional dans la stimulation des économies nationales, la promotion du développement et le renforcement de la sécurité alimentaire (augmentation de la disponibilité alimentaire et stabilisation des marchés domestiques). En particulier, le commerce transfrontalier informel, omniprésent en Afrique, contribue à la sécurité alimentaire, même si des recherches plus approfondies sont nécessaires quant à sa contribution exacte.

Ce rapport de recherche contribue à accroître les connaissances sur les tendances actuelles et futures des systèmes alimentaires africains en mettant l'accent sur le commerce régional (continental) et son impact sur les économies et les marchés nationaux. Son objectif est d'évaluer l'impact de l'Accord de libre-échange continental africain (ZLECAf), l'accord commercial régional le plus ambitieux d'Afrique, sur les économies et les marchés nationaux. Il est basé sur des outils de pointe, inclut le commerce transfrontalier informel de produits agricoles et utilise des scénarios réalistes de libéralisation des échanges.

L'étude révèle que l'impact de la ZLECAf sera positif bien que limité. Comme la plupart des pays africains commercent déjà sous des régimes préférentiels au sein des communautés économiques régionales (CER), seuls les flux commerciaux hors CER sont significativement affectés. Nous observons les effets traditionnels de détournement de commerce en provenance de partenaires extérieurs à l'Afrique (jusqu'à -1,68 percent) et de création de commerce au sein du continent (jusqu'à 18,48 percent). Tout comme les impacts macroéconomiques (sur la croissance du PIB et sur le commerce), les effets de l'accord sur la pauvreté sont également limités, avec des effets plus positifs observés au Rwanda qu'au Nigeria, les deux pays analysés dans les travaux de microsimulation. Un biais de genre est présent dans les résultats : les ménages dirigés par des femmes bénéficient moins de l'accord que ceux dirigés par des hommes. Compte tenu du niveau élevé des coûts de transport sur le continent, des gains significatifs peuvent être obtenus si les marges de transport sont réduites en plus de la mise en œuvre de la ZLECAf. Dans ce cas, les résultats positifs (négatifs) mentionnés ci-dessus sont amplifiés (amortis).

Étant donné que la mise en œuvre de la ZLECAf en est encore à ses débuts, davantage d'informations sont nécessaires pour affiner les résultats. Cela concerne d'abord les hypothèses de sélection des produits sensibles et exclus. En l'absence de listes officielles (non disponibles) pour la plupart des pays, les listes finales peuvent différer de la sélection effectuée dans ce rapport, même si la méthode utilisée s'est avérée efficace pour les accords passés. Deuxièmement, les règles d'origine et autres mesures non tarifaires joueront un rôle important dans l'avenir de l'accord et affecteront les résultats, modifiant probablement la répartition des gains et des pertes.

1. INTRODUCTION

In an extraordinary summit held in Kigali, Rwanda, in March 2018, the African Union heads of state and government from 44 countries signed the framework agreement forming a new African Continental Free Trade Area (AfCFTA) (Union 2020). In line with the Abuja Treaty, whose ultimate goal is a continental customs union and a single currency, the AfCFTA—one of the flagship projects of the African Union's Agenda 2063—is an ambitious agreement that aims to create one of the largest free trade areas in the world: a single continental market for goods and services, with the free movement of businesspersons and investments. Its intent is to expand intra-African trade across the Africa's regional economic communities (RECs) and the continent in general; enhance competitiveness and support economic transformation; promote industrial development; and harmonize trade liberalization processes to foster employment, promote diversification, and boost African economies. When fully operational, the AfCFTA will encompass more than 1.2 billion people and represent $2.5 trillion in gross domestic product (GDP) (Union 2020). In this context, trade agreements can be drivers of economic progress for the economies that adopt them.

Our study, therefore, aims to investigate how regional trade agreements impact national economies—both at the market level and among economic agents—to identify opportunities and gaps. Specifically, we examine the impacts of AfCFTA implementation on national market systems, food security, and poverty in selected countries, focusing on smallholder farmers. The AfCFTA is particularly important because Africa remains the least open continent in terms of overall import duties. On average, tariffs on agricultural goods reach 20 percent, while tariffs on nonagricultural goods average 8 percent (Bouët, Laborde, and Cosnard 2017). These tariffs are 6 percentage points higher than the global average for agricultural products and 2 percentage points lower for nonfood products (Debar and Tapsoba 2019). This gap reflects efforts to limit competition from low-cost imports originating from economies with high agricultural productivity that benefit from subsidies granted to the agriculture sector (Debar and Tapsoba 2019).

African countries also continue to impose high duties on trade with one another. Overall intracontinental import tariffs on both agricultural and nonagricultural goods average 9 percent, the highest intracontinental trade tariff in the world (Bouët, Laborde, and Cosnard 2017). This situation leads to African countries' low participation in global value chains and prevents the emergence of regional and continental value chains, which could reduce product prices. As a result, there is a significant dependence on imports. Liberalizing intra-African trade provides many opportunities, as previous studies have shown that expanding regional trade would increase the domestic supply of agricultural and food products. Through this channel, regional trade would help stabilize agricultural and food markets by reducing price volatility and ensuring product availability (Badiane, Makombe, and Bahiigwa 2014). In addition, recent global

crises (the COVID-19 pandemic, the Russia–Ukraine war) highlight Africa's dependence on the rest of the world, underscoring the importance of greater integration as a risk-coping strategy (Laborde et al. 2023). Greater continental integration would diversify trading partners, reducing dependence and exposure to extra-continental shocks.

While AfCFTA aims to liberalize trade, recent analyses show that its effects will be modest unless countries and regions adopt trade facilitation measures, such as improving telecommunication and transportation infrastructure (World Bank 2020). Indeed, these trade facilitation costs are among the highest on the continent and must be reduced to boost the AfCFTA's impact.

Taking into account these initial results from the literature, our study adopts realistic scenarios, including informal cross-border trade, to analyze the potential benefits of reducing transportation costs on the agreement's impact. To this end, the study uses a multicountry, multisector computable general equilibrium (CGE) model with a microsimulation module. The advantage of this methodology is that it considers not only the interdependence of sectors, economic agents, and different economies but also the effects of real income. Moreover, because the AfCFTA reform will be implemented gradually, we adopt a dynamic version of the CGE model, MIRAGRODEP (Laborde, Robichaud, and Tokgoz 2013). This model has an important feature: the "consistent aggregator approach" for import tariffs (Laborde, Martin and van der Mensbrugghe, 2016), which enables us to capture the heterogeneity and variance of tariffs at a detailed level.

Our report contributes to the knowledge on current and future trends in Africa food systems by focusing on regional (continental) trade and its impact on national economies and markets. It concludes that, because most African countries are already trading under preferential regimes within RECs, the AfCFTA will primarily affect trade flows between these RECs. In addition, existing trade diversion effects could yield negative outcomes for some countries. These results are consistent with previous findings from comparable studies (Bouët et al. 2022).[1] The agreement's impacts on poverty and food security are also limited, with more effects in Rwanda than in Nigeria, the two countries analyzed in the microsimulation. Smallholders experienced a slight reduction in poverty, with Rwanda's situation improving slightly more than Nigeria's. Finally, results demonstrate that significant gains can occur if transport margins are reduced to boost the agreement's effects.

The report is organized as follows. Section 2 presents the current state of the AfCFTA. Section 3 describes the structure of intra-African trade, while Section 4 presents the modeling approach. Section 5 presents the selected scenarios, Section 6 discusses the results, and Section 7 concludes the paper.

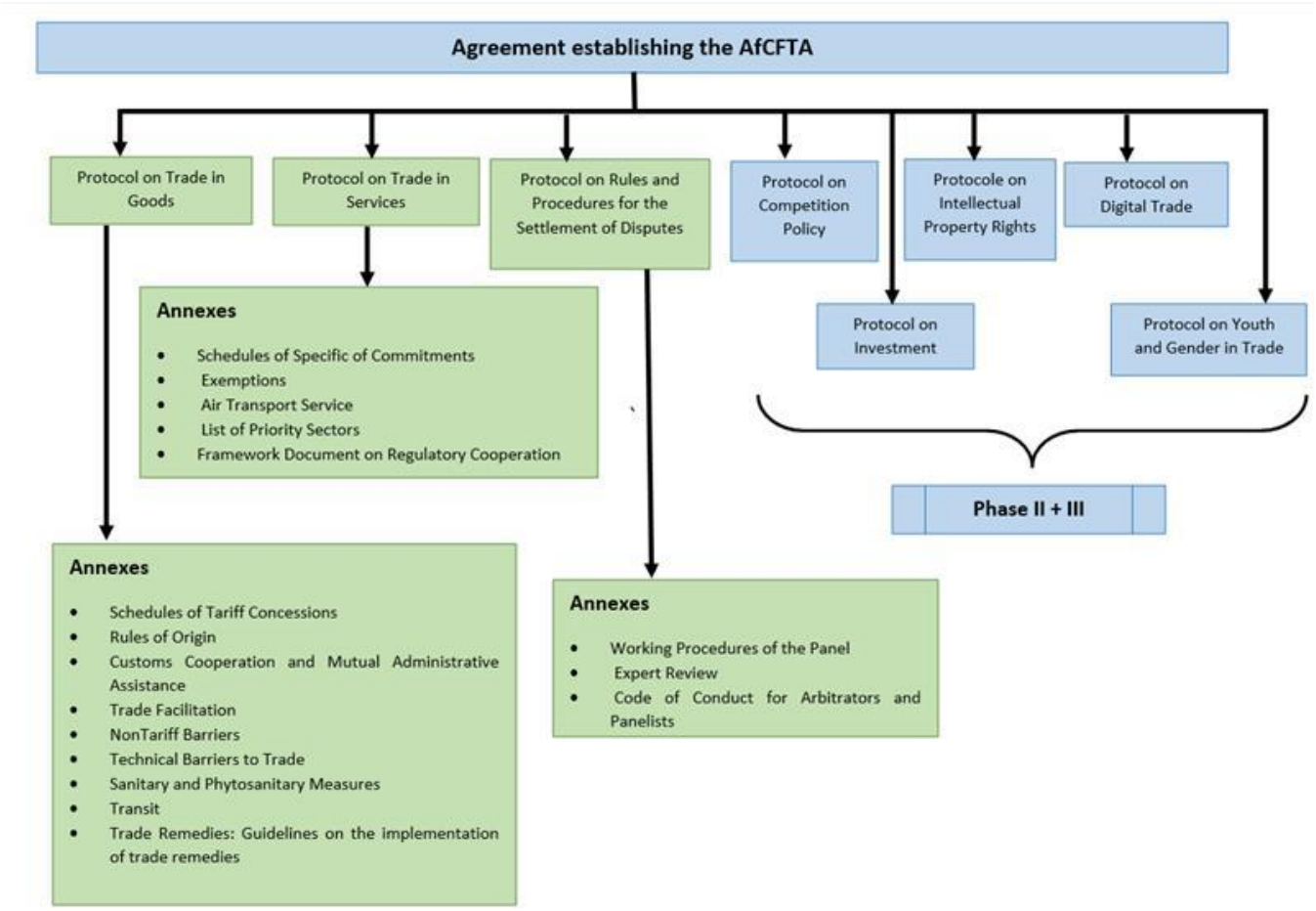
[1] Comparing our results with previous studies requires some caution. It is important to consider the scenarios (full or partial liberalization), the time horizon of the models, the disaggregation level, the way tariffs are aggregated, and so on. See Bouët et al. (2022) and Table 1 in Appendix E for a full picture.

2. THE AFCFTA: WHERE DOES IT STAND?

The AfCFTA is an evolving process, characterized by the adoption of several protocols (Figure 1). It covers several topics beyond traditional trade agreements and is now structured in two phases, following the merger of the last two phases. Phase I negotiations cover trade in goods, trade in services, and the procedures for dispute settlement. To this end, the AfCFTA Council of Ministers of May 31, 2023, adopted the technically verified tariff offers of the Southern African Customs Union (SACU) and Morocco. With this adoption, there are now 42 provisional lists of adopted tariff concessions (Provisional Schedule of Tariff Concessions) of the 47 offers submitted. These adopted tariff offers include four customs unions: the East African Community (EAC), the Economic Community of West African States (ECOWAS), SACU, and the Economic and Monetary Community of Central Africa (CEMAC). The adoption of these tariff lines is an opportunity for small and medium enterprises (SMEs) and farmers because it expands market opportunities for the latter through increased preferential trade.

Despite delays caused by the COVID-19 pandemic, Phase II has also made progress. Digital trade negotiations and the protocols on the place of women and youth in trade are complete and await adoption by the specialized entities. Others, such as the protocol on investments, intellectual property rights, and competition policies, were adopted in 2023, although they have not yet been ratified.

Figure 1 Architecture of the AfCFTA



Source: TRALAC (2025).

The agreement entered into force on May 30, 2019, after 54 countries[2] had signed and 28 had deposited their ratification instruments with the chair of the African Union Commission.[3] Soon thereafter, on July 7, 2019, the agreement's operational phase was launched at the 12th Extraordinary Session of the Assembly of the African Union in Niamey, Niger, with five initiatives and operational instruments: (1) the product-specific rules of origin covering 90 percent of tariff lines; (2) the online negotiating forum; (3) the monitoring and elimination of nontariff barriers; (4) a digital payments and settlements system, and (5) the African Union Trade Observatory. Ghana hosted the Secretariat in charge of the implementation and officially handed it over in August 2020. Although in March 2020 the Secretary-General was sworn in, the Secretariat is not fully operational and is still recruiting staff. Furthermore, outstanding budgetary issues still need to be resolved. As of December 2020, only the beta version of the Trade Observatory, intended to

[2] With the signature of Nigeria and Benin at the 12th Extraordinary Summit of Heads of State and Government of the African Union in Niamey on July 7–8, 2019, Eritrea is the only country yet to sign the agreement.

[3] The agreement was set to enter into force 30 days after the 22nd country had deposited its ratification instrument on April 29, 2019.

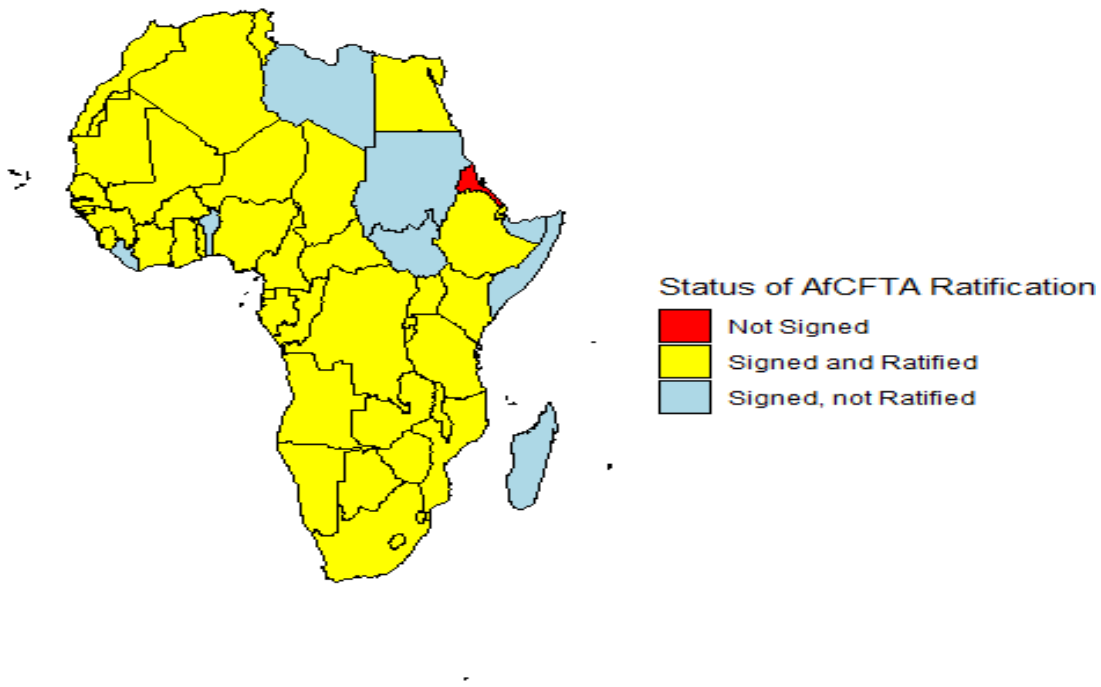
be the main repository of African trade data, had been released, with technical support from the International Trade Center and funding from the European Union.

As of March 2024, 47 countries representing more than 94 percent of Africa's GDP, 88 percent of its population, and 94 percent of its total trade had ratified the agreement and submitted their tariff offers (Figure 2). In the initial plan, trade under the AfCFTA should have begun on July 1, 2020. However, this start date was postponed because of the COVID-19 pandemic. Eventually, during the Thirteenth Extraordinary Session (a special meeting on the AfCFTA) in Johannesburg on December 5, 2020, the African Union decided to start trading under the AfCFTA on January 1, 2021, based on the approved schedules of tariff concessions, with agreed-upon rules of origin and customs documentation. However, the operational stage faced a delay and was postponed again, and negotiations on rules of origin are still ongoing. Because of the various delays, since October 2022, only a pilot initiative involving eight countries[4] that met the minimum requirements started trading under the AfCFTA. The initiative's second phase has attracted the interest of 39 states across Africa's five regions and islands.

Table 1 shows the liberalization schedule, which categorizes countries into two groups: least developed countries (LDCs) and non-LDCs. Non-LDCs have five years to liberalize 90 percent of their tariff lines and 10 years to liberalize sensitive products, which constitute 7 percent of tariff lines. Each country may exclude up to 3 percent of its tariff lines if these exclusions do not exceed 10 percent of the intra-African import value (double qualification). LDCs could implement the tariff dismantling over a longer period: 10 years for the first phase (90 percent of tariff lines) and 13 years for sensitive products. Notably, during the negotiations, a group of six countries (the so-called G6), consisting of five LDCs—Ethiopia, Madagascar, Malawi, Sudan, and Zambia—and Zimbabwe, initially requested differential treatment, mainly a 15-year phase-down period for the first phase, due to their specific development challenges. However, these countries withdrew their reservations in 2020 and joined the rest of the parties in implementing the tariff liberalization process.

[4] Cameroon, Egypt, Ghana, Kenya, Mauritius, Rwanda, Tanzania, and Tunisia.

Figure 2 Status of AfCFTA ratification



Source: TRALAC (2025).

Table 1 Liberalization schedule

Scenario	LDCs	Non-LDCs
Full liberalization	90 percent of tariff lines: 10-year phase-down	90 percent of tariff lines: 5-year phase-down
Sensitive products	7 percent of tariff lines: 13-year phase-down	7 percent of tariff lines: 10-year phase-down
Excluded products	3 percent of tariff lines	3 percent of tariff lines

Source: UNCTAD 2019
Note: LDCs = least-developed countries.

3. THE STRUCTURE OF INTRA-AFRICAN TRADE: AN OVERVIEW

Tariffs

Tables 2 and 3 present the average tariffs applied and faced by the main RECs in Africa for all products and for agricultural products, respectively. Overall, African countries tax agricultural products more than nonagricultural products. Another important feature is that intra-African tariffs applied between some

RECs are higher than those applied to the rest of the world. This situation is due to the preferential trade agreements that some REC member countries have with the rest of the world, such as economic partnership agreements between ECOWAS and CEMAC countries and European countries, or the African Growth and Opportunity Act between the United States and SADC, ECOWAS, and the Common Market for Eastern and Southern Africa (COMESA) countries. In addition, there are overlaps between some RECs, due to countries' membership in several RECs as well as the preferential agreements between these RECs. An example of total intra-African trade integration is that of ECOWAS, where a total elimination of tariffs between member countries leads to free movement of goods. Conversely, within ECCAS, treaties on the free movement goods and preferential agreements between member countries are weak, constraining intra-REC trade.[5]

Notably, African countries apply higher import duties than export tariffs. This discrepancy arises from the nonreciprocal preferences granted to them by the rest of the world. For instance, most African countries benefit from the European Union's Everything But Arms agreement with LDCs, the African Growth Opportunity Act agreement granted by the United States, and various preferential regimes resulting from the Generalized System of Preferences trade program. On the other hand, many African countries export large quantities of products such as oil, gas, and minerals, which, because they are inputs, are only slightly taxed by importing countries.

Table 2 Average tariffs applied by RECs on all product imports, 2019

REC	COMESA	ECCAS	ECOWAS	SADC	AMU	ROW
COMESA	0.04	0.18	0.12	0.03	0.09	0.06
ECCAS	0.11	0.18	0.12	0.06	0.11	0.06
ECOWAS	0.14	0.18	0.00	0.09	0.11	0.06
SADC	0.06	0.18	0.12	0.01	0.11	0.06
AMU	0.09	0.18	0.12	0.08	0.05	0.07
ROW	0.14	0.18	0.12	0.09	0.09	0.06

Source: Authors' calculation using the MAcMap-HS6 2019.
Note: Exporters are in rows, and importers are in columns. AMU = Arab Maghreb Union; COMESA = Common Market for Eastern and Southern Africa; ECCAS = Economic Community of Central African States; ECOWAS = Economic Community of West African States; REC = regional economic community; ROW = rest of the world; SADC = Southern African Development Community.

[5] There is some degree of overlap between the RECs considered here (e.g., between SADC and COMESA), which explains the lower tariffs.

Table 3 Average tariffs applied by RECs on agricultural product imports, 2019

Exporter REC	COMESA	ECCAS	ECOWAS	SADC	AMU	ROW
COMESA	0.06	0.23	0.17	0.06	0.16	0.12
ECCAS	0.19	0.23	0.17	0.11	0.19	0.12
ECOWAS	0.24	0.23	0.00	0.15	0.19	0.12
SADC	0.09	0.23	0.17	0.02	0.19	0.12
AMU	0.14	0.23	0.17	0.13	0.08	0.14
ROW	0.23	0.23	0.17	0.15	0.17	0.13

Source: Authors' calculations using the MAcMap-HS6 2019.
Note: Exporters are in rows, and importers are in columns. AMU = Arab Maghreb Union; COMESA = Common Market for Eastern and Southern Africa; ECCAS = Economic Community of Central African States; ECOWAS = Economic Community of West African States; REC = regional economic community; ROW = rest of the world; SADC = Southern African Development Community.

Trade flows

The evolution of intra-African trade from 2012 to 2022 shows three different trends (Figure 3). Total intra-African trade declined continuously between 2012 and 2016, stagnated until 2020, and rose sharply thereafter, peaking at US$100 billion at the end of the period, similar to the level at the beginning. Intra-African trade in agricultural products stagnated sharply over the same period. Thus, between 2015 and 2022, trade in agricultural products increased by only 20 percent, far from the growth required to achieve the Malabo Declaration's target of tripling intra-African agricultural trade by 2025.

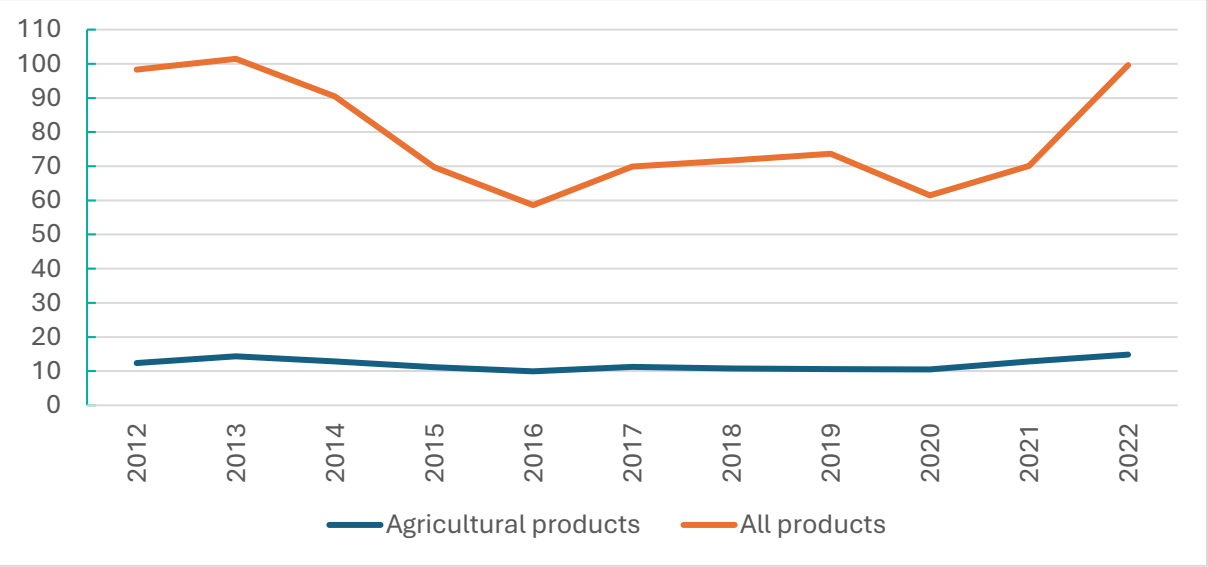
Figure 4 shows the intra-African trade shares of five RECs in Africa out of their total trade and agricultural products. The intra-regional trade shares range from 7 percent in the Arab Maghreb Union (AMU) to 21 percent in the SADC. Therefore, apart from SADC, intra-African trade represents a relatively small share of Africa's total trade. Africa as a whole conducts almost 14 percent of its total trade with regional partners. Except for ECOWAS, the share of intra-African trade is higher for agricultural products than for nonagricultural products. As for total products, SADC is the most integrated region, with almost 40 percent of its agricultural trade occurring in the continent, while AMU accounts for only 8 percent. The average share for the continent is 18 percent. The intra-African trade shares are clearly low, especially when compared to intra-regional trade shares in other regions in the world. For instance, the share of intra-European Union trade is about 70 percent, and the share of intra-Asian trade is 60 percent (Bouët, Cosnard, and Laborde 2017). However, caution is needed when making such comparisons, as official trade statistics do not capture informal cross border trade, and a procyclical bias exists in the measurement of intra-regional trade shades.

First, regarding the absolute levels, informal cross-border trade is pervasive in Africa, especially in agricultural products, and is rarely included in official statistics. Although the magnitude of informal cross-

border trade in Africa is unknown, several studies suggest it is significant. A literature review of observational studies on informal cross-border trade across several African regions by Bouët, Cissé, and Traoré (2020) indicates that informal trade may account for 10 to 60 percent of total trade flows, depending on the region. In addition, a study by the United Nations Economic Commission for Africa (UNECA) (Gaarder, Luke, and Sommer 2021) shows that informal trade represents between 7 and 16 percent of intra-African trade and between 30 and 72 percent of trade between neighboring countries. Another key finding of these studies is that informal trade is more prevalent for agricultural trade compared to the other sectors. Therefore, official figures underestimate intra-African agricultural trade.

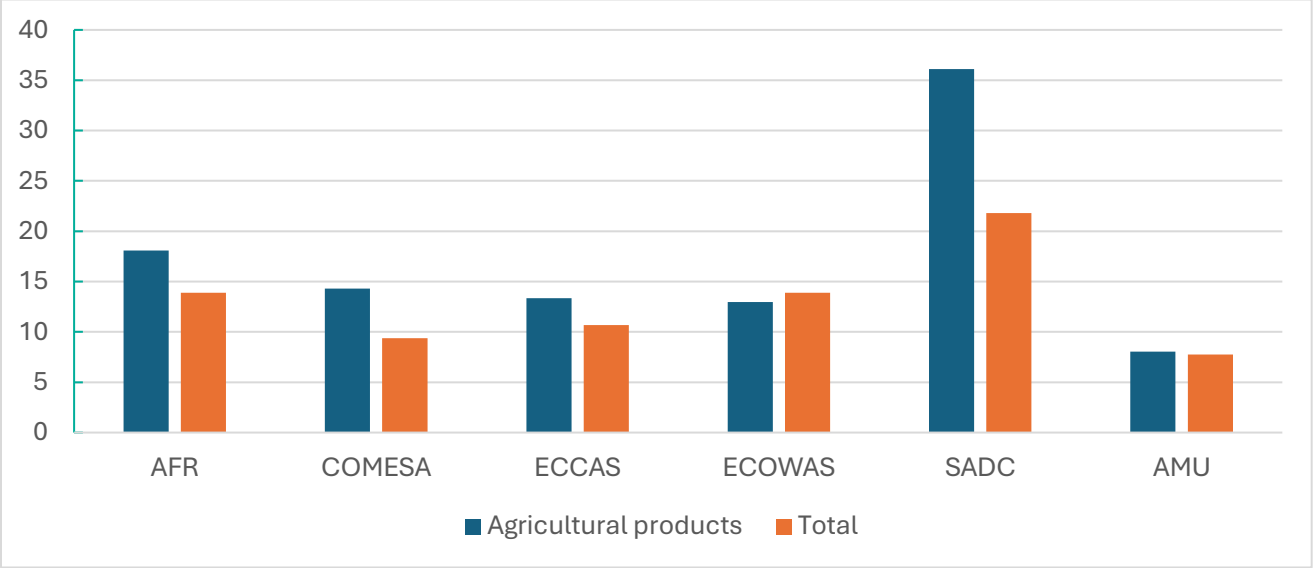
Second, the share of intra-regional trade is subject to biases that make inter-regional comparisons irrelevant, including a procyclical bias. Higher intra-regional trade shares do not necessarily mean greater regional integration; instead, they might indicate a loss of competitiveness in external markets (Walkenhorst 2013) or more dynamic activity within the region than outside it. In addition, the indicator is sensitive to the number and size of countries when comparing different RECs (Anderson and Norheim 1993; Frankel 1997; Lapadre and Luchetti 2009). Indeed, greater integration may occur in a REC with many small countries compared to a REC with the same GDP size but with fewer countries. Therefore, the share of intraregional trade in total trade is better suited for monitoring a single REC over time, instead of comparing different RECs. For the latter, refined indicators such as the regional trade introversion index are more suitable (Lapadre and Luchetti 2009).

Figure 3 Evolution of intra-African exports (US$ billions), 2012–2022



Source: Authors' calculations using the Africa Agriculture Trade Monitor database.

Figure 4 Intra-African trade shares (2012–2022 average in %)



Source: Authors' calculations using the Africa Agriculture Trade Monitor database.
Note: AFR = Africa; AMU = Arab Maghreb Union; COMESA = Common Market for Eastern and Southern Africa; ECCAS = Economic Community of Central African States; ECOWAS = Economic Community of West African States; SADC = Southern African Development Community.

4. MODELING APPROACH

As mentioned in the introduction, our study is based on MIRAGRODEP, a CGE model derived from Modelling International Relations Under Applied General Equilibrium (MIRAGE). MIRAGE was initially developed at the Centre for Prospective Studies and International Information (CEPII) as a recursive, multiregion, multisector model designed to analyze trade policy. It presents a detailed and consistent representation of economic and trade relations with the rest of the world, capturing international economic linkages through the international trade of goods.We us a dynamic version of the model by solving it sequentially and moving the equilibrium from one year to the next. In this study, we assume perfect competition in all sectors, which enables us to have detailed geographic and sector decomposition.

On the supply side, the production function of each sector is a Leontief function of value added and intermediate inputs. A production unit requires x percent of an aggregate of production factors comprising labor (both unskilled and skilled), capital, and land and natural resources and (1 − x) percent of intermediate inputs. The intermediate inputs function is a constant elasticity of substitution (CES) function of all goods. Value added is a CES function incorporating unskilled labor, land, natural resources, and a composite factor combining skilled labor and capital. This overlap makes it possible to introduce less substitutability between capital and qualified labor than between these two factors and others, such as unskilled labor.

Regarding the evolution of production factors, only natural resources have a fixed supply over time. The supply of capital available for production varies from year to year, adjusting endogenously based on

fluctuations in prices and demand. Total investment in the economy is determined by the macroeconomic balance, which is based on private and public savings, investment, and the current account. Investment in each sector depends on the sector's return to capital, the price of capital goods, and the stock of capital. Labor supply growth rates are set exogenously, following the evolution of the labor force. The supply of land is endogenous and varies according to the real return to land.

Skilled labor is the only factor that is perfectly mobile across sectors. Installed capital and natural resources are sector-specific. New capital is allocated between sectors, according to an investment function. Unskilled labor is imperfectly mobile between the agriculture and nonagriculture sectors, following a constant elasticity of transformation function. Land is also imperfectly mobile between agriculture subsectors. Capital in each region, regardless of its origin (domestic or foreign), is assumed to be obtained by assembling intermediate inputs in a specific combination. The capital good is the same regardless of the sector.

Demand for final consumption purposes is modeled in each region through a representative agent whose propensity to save is constant. The returns to production factors constitute the income of this representative agent and enable the agent to finance final consumption. The agent's preferences are represented by a linear expenditure system–constant elasticity of substitution (LES-CES) function, implying that final consumption has a nonunitary income elasticity. The sectoral subutility function used in MIRAGRODEP is a nesting of four CES-Armington functions that define the origin of goods. The Armington hypothesis (Armington 1969) enables the capture of product differentiation, assuming differentiation of goods by country of origin. It is a robust way of representing bilateral and cross-sector trade flows. This study uses Armington elasticities from the Global Trade Analysis Project (GTAP) database.

In MIRAGRODEP, the government is explicitly modeled as different from private agents. Government income consists of taxes collected on production, production factors, exports, imports, consumption, and household income. The government maximizes a Cobb–Douglas utility function: Government spending on each commodity is a fixed share, in value, of total public spending on goods and services. Government purchases are subject to taxes.

Main closure rules

The model includes three important assumptions: the private account closure, the external account closure, and the government account closure.

The private account closure assumption concerns the savings–investment closure: A model is either neoclassical, in which savings determine investment, or Keynesian, with investment determining savings. MIRAGRODEP is neoclassical: The marginal propensity to save is constant, such that variations in income lead to variations in savings, which in turn affect investment.

The external account closure pertains to the assumption about the current account, which includes exports and imports of goods and services, as well as public and private transfers from or to the rest of the world. The current account balance could be affected by a trade agreement or policy reforms that alter border tariffs and, consequently, imports and exports. One option assumes that the current account balance varies, while the real exchange rate is unaffected by the reform. A second option assumes that the real exchange rate adjusts to maintain a constant current account balance. This adjustment could occur through changes in the nominal exchange rate (e.g., devaluation or depreciation) or through evolutions of domestic prices across regions (i.e., competitive disinflation).

The first option—keeping the real exchange rate fixed while allowing the current account surplus or deficit to adjust—has two main disadvantages. First, if a reform modifies a country's current account balance, including the trade balance, the adjustments in the upper part of the balance of payments must be offset by changes in the capital and financial account balance. However, because MIRAGRODEP does not model financial markets,[6] it lacks an explicit representation of how capital flows would be reallocated globally following the agreement, how the sovereign risk levels of the countries might change, or how the propensity of investors to allocate resources to these countries would evolve.

Second, assuming that a current account balance can vary without constraints means there is no limitation in the increase in imports; a country's consumption and welfare are "subsidized" by transfers from the rest of the world. Therefore, a welfare analysis will be biased because increasing the external debt has no negative consequences on welfare, whereas the additional imported consumption increases welfare.

The second option—which assumes an exogenous current account surplus or deficit—requires adjustments in the real exchange rate to maintain a stable current account balance (expressed as a percentage of global GDP). In a nutshell, if a reform primarily increases imports, such as when tariff reductions are greater for imports than for exports, the real exchange rate depreciates. This depreciation enhances the country's competitiveness, ensuring that the rise in imports is offset by a corresponding rise in export value over the long term. Conversely, when a reform primarily increases exports, the real exchange rate appreciates, reducing the country's competitiveness. The key advantage of this assumption is that it enables a welfare analysis that accurately reflects how the reform affects a country's real economic conditions. It also aligns with the long-term assumptions of CGE analysis. Therefore, this study uses the second option: a flexible real exchange rate and a fixed current account balance.

The government or public account closure assumption addresses the effects on the public account balance when a reform alters tax revenues. There are several options for this assumption.

[6] Other multicounty CGEs face the same problem.

One option is to maintain the same level of public spending when tax revenues, such as those from import taxes, decrease. Given that other tax rates and public expenditures are constant, this results in a higher public deficit due to increased public sector borrowing. Because the current account balance is stable, external savings cannot finance this growing public deficit. Consequently, the private sector must finance the public sector. Since domestic private savings are also assumed to remain stable—meaning no change in people's propensity to save—less funding is available for private investment, which leads to less economic activity in the future. This is the "crowding-out" effect of raising the public deficit.

Another option is to assume that the public deficit or surplus remains constant. In this scenario, when one source of revenue for the public agent is reduced, there are two possibilities: (1) Increase another tax to compensate for lost public revenues on import tariffs, or (2) reduce public spending to maintain a constant government account balance. The latter, reducing public spending on healthcare or education services, can lead to a decline in private agents' welfare.

In this study, we assume a variation of these options, in which each government maintains a constant public balance as a share of GDP and, after a shock or reform that reduces custom duties rates, establishes a consumption tax. With this assumption, the crowding-out effect on private investment is limited. We also conduct a sensitivity analysis using an income tax.

Tariff aggregation

The model adopts a specific and original procedure for aggregating tariffs. We apply the optimal aggregator method developed by Laborde, Martin, and van der Mensbrugghe (2016), designed for CGE models. This method is based on the availability of detailed information on trade and tariffs and accounts for the need for different aggregators for expenditures on imported goods and tariff revenues (for a detailed explanation, see Laborde, Martin, and van der Mensbrugghe [2016]). To the best of our knowledge, this approach is the only one that fully captures in a CGE the effects of trade agreements on both the average tariff level and intrasectoral heterogeneity.

Macro data

The social accounting matrix (SAM) and MIRAGRODEP trade data are based on the GTAP database (Aguiar et al. 2019, . The GTAP database is a fully documented global resource that contains complete bilateral trade information, transport, and protection data for 140 countries or regions and 65 commodities and SAMs for 33 African countries or regions. The 26 individual countries represent more than 74 percent of the continent's GDP, 72 percent of its exports, and 77 percent of its imports. The macroeconomic forecasts are based on the International Monetary Fund's (IMF's) World Economic Outlook projections

(IMF, 2022). Finally, the (trade) protection data comes from the Market Access Maps (MAcMAP) database (CEPII, 2019), with additional sources, other than the International Trade Centre, used for export taxes.

As highlighted in previous studies (see the section on the structure of intra-African trade), informal cross-border trade, particularly for agricultural products, is widespread in Africa. Therefore, this study draws on databases built by the Permanent Interstate Committee for Drought Control in the Sahel (CILSS) in West Africa and the Family Early Warning Systems Network (FEWSNET) in East Africa. Although these databases are not exhaustive in terms of product or geographic coverage, they significantly improve upon official data (see the section on the structure of intra-African trade). Consequently, our analysis uses the maximum values reported in both official data and CILSS or FEWSNET data.

Microsimulation approach

One main limitation of the CGE model is the evaluation of distributional effects of an economic policy. To overcome this limitation, we built a microsimulation module and coupled it to the CGE model. This microsimulation model, based on the micro-accounting philosophy, follows a top-down approach, focusing on agricultural households in general and smallholders in particular. Because these smallholders are often excluded from value chains, they have limited market opportunities, which reduces their income and increases their economic and food vulnerability. Therefore, it is important to examine this group to assess the extent to which this agreement could change their situation.

In terms of specificity, this approach does not account for explicit changes in household behavior. It is based on the standard envelope theorem (Chen and Ravallion 2004; Tiberti et al. 2017), which states that changes in household well-being result from variations in consumption and household income.

We calculate the change in household consumption by adding the net consumption of each product consumed in the reference year (i.e., the year in which the household survey used in the analysis was conducted) and multiplying it by the relative variation in consumer prices. Likewise, we obtain income variations by multiplying the value of different income types by the relative variation in their prices, which are the wage rate and returns to capital. We use the difference between income and consumption to compute a net position and determine the household's position in relation to poverty. Households with a net position above the poverty line are considered nonpoor, while those with a position below the poverty line are considered poor, as shown:

$$\Delta y_{it} = \sum_{j} \left[p^{s}_{ijt} q^{s}_{ijt} \frac{dp^{s}_{ijt}}{p^{s}_{ijt}} - p^{d}_{ijt} q^{d}_{ijt} \frac{dp^{d}_{ijt}}{p^{d}_{ijt}} \right] + \sum_{k} w_{kt} F_{ikt} \frac{dw_{kt}}{w_{kt}} + \Delta R_{it}$$

$$y_i^t = y_i^0 + \Delta y_{it}$$

where Δy_{it} and y_i^t are the change in equivalent welfare and the equivalent welfare after simulation t for household i, respectively. Welfare is often measured as consumption by adult equivalent or per capita at the household level in developing countries. p_{ijt}^s and q_{ijt}^s are the supply price and supply quantity of good j for household i at period *t*, respectively. p_{ijt}^d and q_{ijt}^d are the demand price and the quantity demanded of good j for household i at the period t, respectively. w_{kt} is the return to factor F_{ikt} (labor, capital, or land) used in activity k by household i at period t. The term $p_{ijt}^s q_{ijt}^s \frac{dp_{ijt}^s}{p_{ijt}^s} - p_{ijt}^d q_{ijt}^d \frac{dp_{ijt}^d}{p_{ijt}^d}$, referred to as net revenue, captures the welfare impact of an equiproportionate increase in the price of good j. In household surveys, the value of sales is most often observed ($p_{ijt}^s q_{ijt}^s$), followed by consumption value ($p_{ijt}^d q_{ijt}^d$) and factor income (wL_{it}). ΔR_i is the change in transfers. Households for which $p_{ijt}^s q_{ijt}^s > p_{ijt}^d q_{ijt}^d$ are considered net sellers. Otherwise, they are net buyers.

To compute the impact of simulated policies on poverty, we compare the net situation of households in the reference year with their situation after obtaining the CGE simulated results. In practical terms, we retrieve the variations in consumer prices of all products consumed by households for each simulation in the CGE model. We then multiply these variations by the initial consumption value to obtain the new consumption levels. Likewise, on the income side, we multiply the variations in wage rates for each type of work by the initial remuneration value of the corresponding work; the changes in the return on capital by the value of this capital; and the variations in the return on land by the initial value of the land asset. Once we obtain these new values, we determine the new net positions and compute the Foster-Greer-Thorbecke (1984) indices to determine the poverty incidence (P0) and poverty depth (P1):

$$\boldsymbol{P_\alpha^t(z) = \frac{1}{N}\sum_{h=1}^{N} w_i S_i \left|\frac{Z - g(y_i^t, S_i)}{Z}\right|^\alpha I_{g(y_i^t, S_i)<Z}}$$

where $g(y_i^t, S_i)$: welfare by adult equivalent or per capita at period t, w_i : weight of household i, S_i : adult equivalent household size of i, and Z_t : poverty line.

Finally, by comparing the values of these indices from the reference period with those obtained after the simulations, we can determine the impact of the simulated policies on poverty.

Micro data

This microsimulation uses data from the General Household Survey, Panel 2018–2019, Wave 4 (GHS) in Nigeria and from the Integrated Household Living Conditions Survey, 2016–2017, Wave 5 (EICV5) in

Rwanda. We chose these surveys because they provide recent, comprehensive coverage of agricultural and household expenditures.

For Nigeria, our analysis uses the GHS, a long-term panel survey of 4,976 households—32 percent in rural areas and 68 percent in urban areas. This panel data approach enabled us to collect household-level information, such as household characteristics, welfare, and agricultural activity, at different time points. We found that 70 percent of households engage in agricultural activity. Among these households, 70 percent—nearly 3,500 households—engage in agricultural activity, and within this subsample, 84 percent are smallholders who cultivate areas of 2 hectares or less. Men head 80 percent of these smallholder households and mainly cultivate maize, sorghum, and yams.[7]

For Rwanda, we use the EICV5 for the microsimulation. The fifth in a series that began in 2000–2001 and is now conducted every three years, the survey collects data on a wide range of economic, socio-demographic, welfare, and agricultural activity variables. It includes 14,580 households, with 18 percent in urban areas and 83 percent in rural areas. Among these households, 85 percent engage in agriculture, and 98 percent are smallholders. Men head 74 percent of these households and mainly cultivate beans, sweet potatoes, and green vegetables.

5. SCENARIOS

Tariff liberalization

In designing the scenarios, our objective is to reflect on the AfCFTA negotiation outcomes as accurately as possible. However, many uncertainties remain (see the previous sections), particularly regarding sensitive and excluded products. According to the AfCFTA e-Tariff Book online (e-tariff portal),[8] 30 state parties (including three RECs) have submitted and verified their tariff concession schedules (Table 4). The three RECs are ECOWAS plus Mauritania, EAC, and CEMAC, while the individual countries are Algeria, Egypt, Tunisia, the Democratic Republic of the Congo (DRC), Zambia, Mauritius, Seychelles, and Madagascar. However, only Algeria, the six CEMAC countries, Egypt, Madagascar, DRC, Seychelles, and Tunisia have submitted a full schedule outlining the three product categories under the agreement: A (nonsensitive), B (sensitive), and C (products excluded from tariff liberalization). Because an official list (offer) for all the member states is unavailable, we must rely on assumptions. While many assumptions are possible—such as tariff revenues and food security—we base our selection of sensitive and excluded products on a political economy model. Specifically, we use a reduced-form model, in which each government seeks to maximize its economy's welfare while considering the interests of the most

[7] Note that this survey results from a partnership among the national statistics office, the Bill and Melinda Gates Foundation, and the World Bank.

[8] **etariff.au-afcfta.org**

influential lobbies. This approach ensures that the selection of sensitive and excluded products minimizes aggregate welfare loss.

Table 4 Submitted and verified tariff concessions

Country/REC	Three categories defined?
Algeria	Yes
CEMAC	Yes
EAC	No
ECOWAS + Mauritania	No
Egypt	Yes
Madagascar	Yes
Mauritius	No
Democratic Republic of the Congo	Yes
Seychelles	No
Tunisia	Yes
Zambia	No

Source: African Continental Free Trade Area Secretariat.
Note: CEMAC = Economic and Monetary Community of Central Africa; EAC = East African Community; ECOWAS = Economic Community of West African States; REC = regional economic community.

Selection of sensitive and excluded products

The AfCFTA allows countries to exclude up to 3 percent of their tariff lines from the liberalization agreement, provided that this 3 percent does not represent more than 10 percent of a country's trade. To simulate the trade agreements studied, we must identify the list of sensitive products at the highest level of disaggregation of the Harmonized System (HS6). In addition, each country may select a list of sensitive products (up to 7 percent of tariff lines) to liberalize at a later stage.[9] However, because no official list of sensitive and excluded products is publicly available for each African country, a selection criterion must be adopted. This criterion could be based on government-collected tariff revenues, an indicator linked to the country's industrialization level, or the country's food security. In each case, the underlying hypothesis is that countries will want to protect and/or exclude products and sectors that play an important role in stabilizing public finances, as well as in supporting economic and social development.

This study follows an approach in the political economy of protectionism used by Jean, Laborde, and Martin (2010), based on a model by Grossman and Helpman (1994). We chose this approach because

[9] The timing depends on whether or not the country under consideration is an LDC.

it offers both a strong theoretical background and practical applicability. In this framework, the government aims to maximize national welfare while considering its own interests, particularly the political contributions it can obtain through its policy choices. Protecting a sector favors that sector's producers and increases the remuneration of production factors that are used intensively or are specific to that sector. Beneficiaries can therefore "remunerate" policymakers with political contributions. At the same time, this protection raises the price of goods produced in the sector, which can harm the interests of downstream sectors and consumers.

In this political economy approach to protectionism, the policymaker's objective function integrates lobby contributions, consumer protection costs, producer benefits, and public revenue impacts. Ultimately, the selection of sensitive products aims to minimize the political economy welfare loss. This method aligns with the tariff revenue loss criterion but goes beyond it by considering the square of the tariff cut rather than its simple level. By doing so, it places more weight on the tariff cut than on the value of initial trade flow (imports) value itself.

In adopting this approach, our first two scenarios feature full liberalization without any item exclusion clauses. The first scenario, AFCFTF, assesses the agreement's potential, while the second and more realistic scenario, AFCFTA, reflects the negotiated agreement, in which policymakers select sensitive and excluded products according to the political economy criterion.

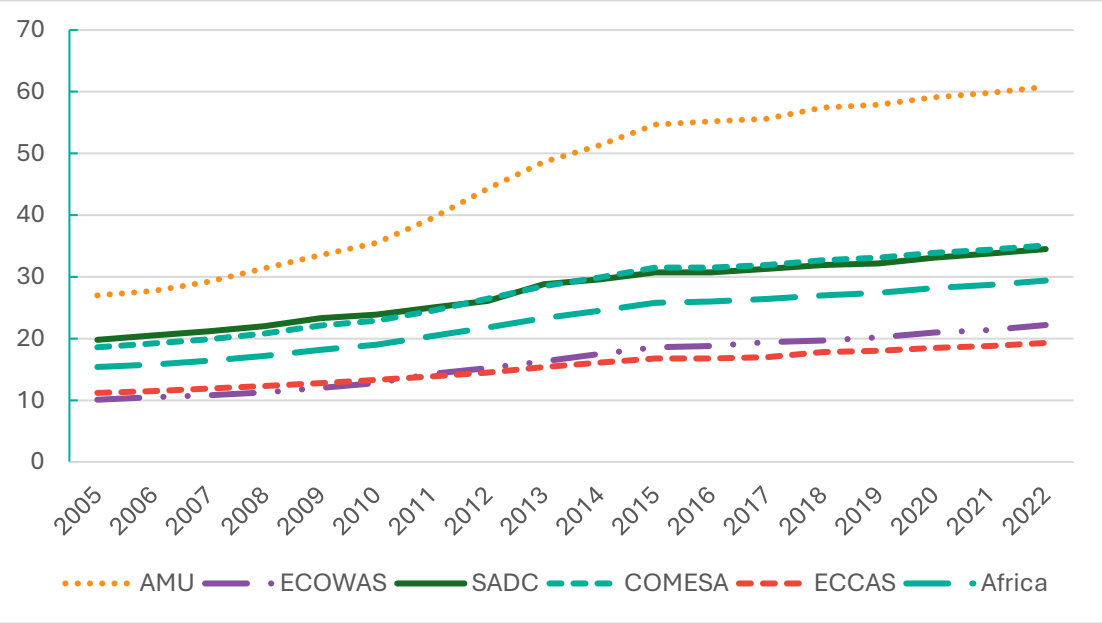
Transportation costs reduction

Beyond explicit tariff barriers such as customs duties and other taxes, the predominance of costs such as those linked to transportation restrict the development of regional and continental trade in Africa (Kayizzi-Mugerwa et al. 2014; Limao and Venables 2001; United Nations 2021). Indeed, the quality of transportation, trade, and communication infrastructure is fundamental to countries' participation in international trade (Bouët, Mishra, and Roy 2008; Bougheas, Demetriades, and Morgenroth 1999; Francois and Manchin 2013; Tandrayen-Ragoobur, Ongono, and Gong 2022). Well-developed infrastructure improves economic actors' productivity and facilitates the smooth movement of both people and goods. As a result, infrastructure quality affects transportation costs, which, when high, create trade barriers whose negative effects on trade dynamics are more significant than import customs duties or other trade restrictions.

In the African context, Gwilliam et al. (2008) and Kayizzi-Mugerwa et al. (2014) emphasize that obsolete transportation and communication infrastructure weakens the productivity of firms and increases production and transportation costs, ultimately driving up sales prices. In fact, unit transportation costs, evaluated in US dollars per ton-kilometer, are 40 to 100 percent higher in Africa than in other regions because many of the continent's countries are landlocked. The African Development Bank's Africa Infrastructure

Development Index (AIDI)—which includes transportation, electricity, information and communication technology, water, and sanitation infrastructure—provides a comprehensive assessment of the evolution of the continent's infrastructure quality.[10]

Figure 5 Average value of AIDI index across RECs, 2005–2022



Source: Authors' calculation from AfDB (2022).
Note: AIDI = Africa Infrastructure Development Index; AMU = Arab Maghreb Union; ECCAS = Economic Community of Central African States; ECOWAS = Economic Community of West African States; COMESA = Common Market for Eastern and Southern Africa; RECs = regional economic communities; SADC = Southern African Development Community.

As Figure 5 shows, the value of the composite infrastructure index increased across all RECs from 2005 to 2022, indicating an overall improvement in infrastructure quality. Among the RECs, AMU had the most advanced infrastructure quality, with its index value almost twice that of the continental average throughout the period. SADC and COMESA also maintained infrastructure quality above the continental level. Although infrastructure in the other two RCAs improved notably over the period, its quality remained lower than the continental average. In addition, infrastructure quality in ECOWAS, which had the lowest index level in 2006, improved enough to surpass ECCAS from 2010 to 2022.

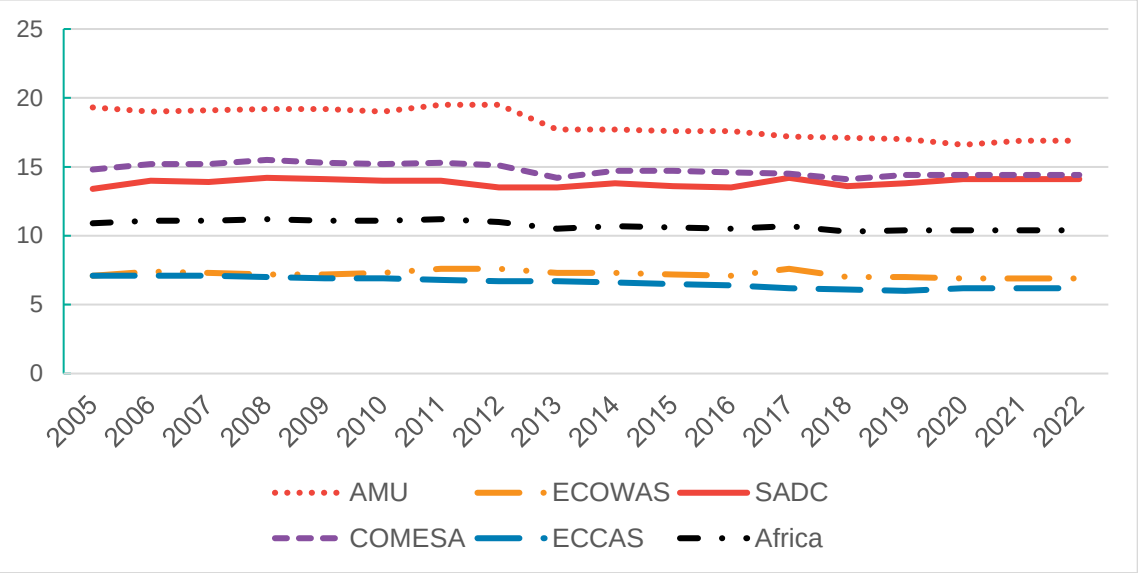
A closer look at the transport infrastructure dimension of the index (Figure 6)[11] shows a different picture. Although AMU remained the REC with the highest transport infrastructure quality, this quality declined over the period. COMESA, which follows AMU in the ranking, exhibits stagnation, and SADC shows an upward trend. ECOWAS and ECCAS remained the two RECs for which the quality of transport infrastructure was below the continental average, with a deterioration over the period, especially in ECCAS. This

[10] The index is a weighted average of the indicators of each component, normalized to take values between 0 and 100.

[11] The transport component of the index is a composite of two subindexes: the total paved roads (km per 10,000 inhabitants) and the total road network (per square km of exploitable land area).

low infrastructure quality in ECCAS, with its limited transport networks and difficulty in offering competitive prices, is one of the factors that explains the region's low level of intra-regional trade.

Figure 6 Average value of AIDI's transport index across RECs, 2005–2022



Source: Authors' calculation from AfDB (2022) datasets.
Note: AIDI = Africa Infrastructure Development Index; AMU = Arab Maghreb Union; Economic Community of Central African States; ECOWAS = Economic Community of West African States; COMESA = Common Market for Eastern and Southern Africa; RECs = regional economic communities; SADC = Southern African Development Community.

Given the index level for the entire continent, the low infrastructure quality remains a challenge because it leads to high transport costs. A 10 percent reduction in transport costs would increase trade by 25 percent (Limao and Venables 2001), and a one-day reduction in domestic travel time would lead to a 7 percent increase in exports (Freund and Rocha 2010). This issue is critical because a lack of quality infrastructure excludes Africa from manufacturing value chains, limiting economic diversification (Storeygard 2016).

In the third scenario (AFCFTATF), we perform a simulation that reduces intra-African transport margins by 25 percent and margins with extra-regional partners by 20 percent. This is modeled through a reduction in transport margins, reflecting an improvement in infrastructure that leads to an increase in transport supply. The reduction in transport margins is reflected in the final price paid by the consumer (lower prices), which should boost demand for goods and services. These figures are reasonable given the huge investment needed to build infrastructure in Africa and can be subject to a sensitivity analysis. In addition, many other factors, such as the highly regulated sector in some countries, limit cost reductions (UNECA 2014). This scenario enables us to assess whether improving infrastructure can boost the AfCFTA and even create more trade, compared to reducing tariffs. The infrastructure investment cost is not considered or quantified in this scenario; the focus is on the benefits. This approach is equivalent to assuming that the investment is undertaken before the simulation.

6. RESULTS

This section presents the results of the three scenarios selected for the study. We first discuss the variation of protection levels, followed by an overview of the macroeconomic impact, a more detailed discussion of the impact of the different scenarios on trade and customs duties, and finally, the impact on activity by sector and factor markets. All the results pertain to 2035, the year when the agreement is assumed to be fully implemented. We compute all the variations from a baseline that assumes no agreement and use macroeconomic, population, and labor force projections from official national and international sources, such as IMF World Economic Outlook projections and United Nations population projections.

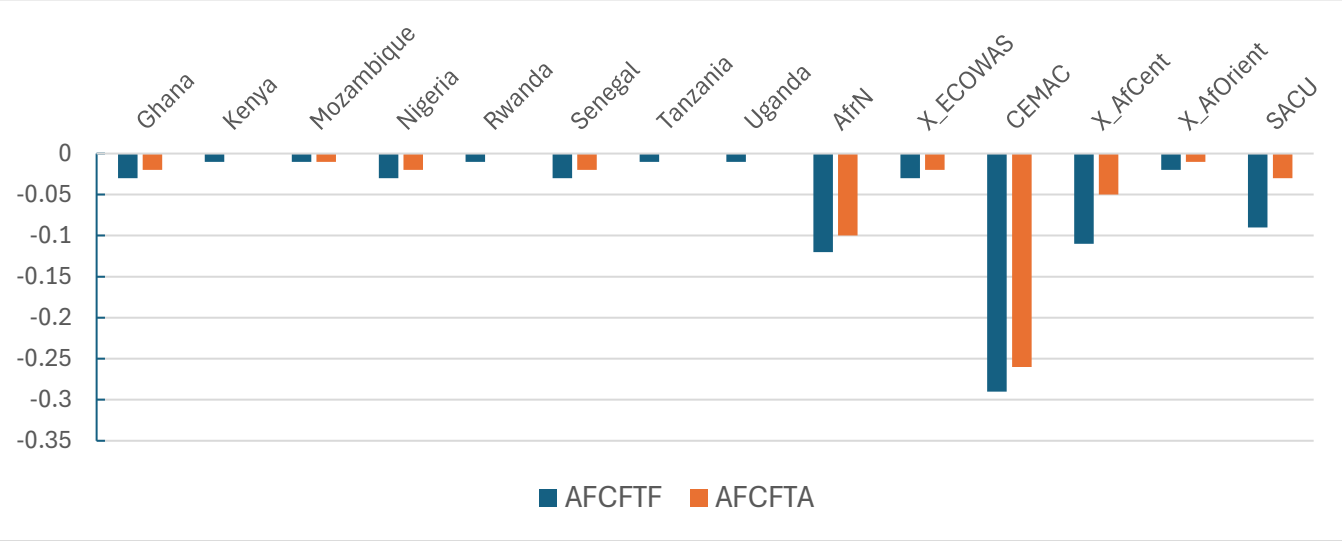
Impact on protection levels

Figure 7 shows the (weighted) average protection that each country or region applies to its imports, while Figure 8 presents the average protection faced by exports. These are averages across all products and all partners worldwide. The results highlight that both scenarios, - either full liberalization (AFCFTF) or partial liberalization (AFCFTA) -have a very limited impact on both the average protection applied to imports and that faced by exports. For all the countries and regions as well as for the two dimensions, the changes are less than 1 percentage point. Regarding imports, the highest impact is in the CEMAC region, where the agreement, if fully implemented (without any exclusion clause), will reduce the average tariff by 0.29 percentage points. The next highest impact is in Ethiopia, at 0.25 percentage points. The addition of the exclusion clause does not significantly alter the results, as the excluded products cannot constitute more than 10 percent of trade flows. With this exclusion clause, the average tariff in CEMAC is reduced by 0.26 percentage points. For other countries and regions, the reduction is less than 0.10 percentage points, except for North Africa and the rest of Central Africa in the AFCFTF scenario.

Regarding exports, tariff reductions are generally lower than import duty reductions. CEMAC and the rest of Central Africa have the highest reductions, similar to those for imports. However, the impact is higher for exports in the rest of Central Africa. Overall, the agreement results in limited changes to average protection levels, as African countries conduct most of their trade with non-African countries. Therefore, the agreement's impact on the different economies will be limited.

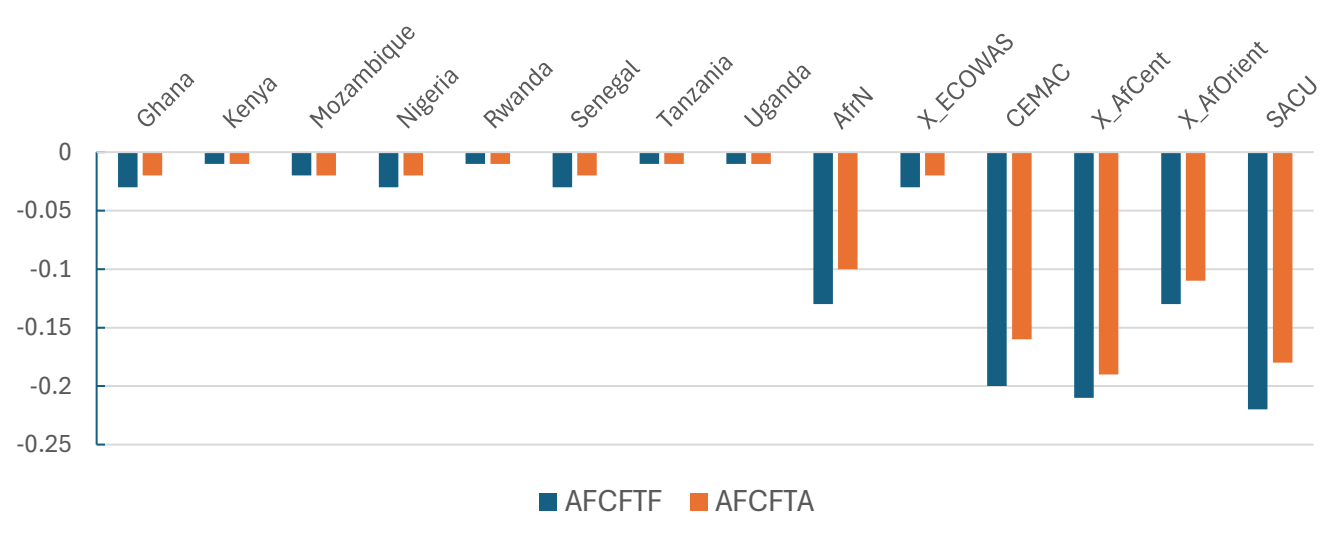
Although overall tariffs do not change significantly, the decrease in intra-African tariffs is not marginal. Indeed, the reduction in intra-African protection is significant, with regions like CEMAC experiencing more than a 10 percent reduction. In most cases, the reduction in intra-African tariffs is more than 10 times the variation in the average tariff. Therefore, one can expect limited changes in total trade flows but significant ones in regional (intra-African) trade. Another feature is the difference between agricultural and nonagricultural products. As Figure 10 shows, the reduction in average tariffs is much higher for agricultural products.

Figure 7 Changes in average import tariffs in percentage points, 2035 (from the baseline)



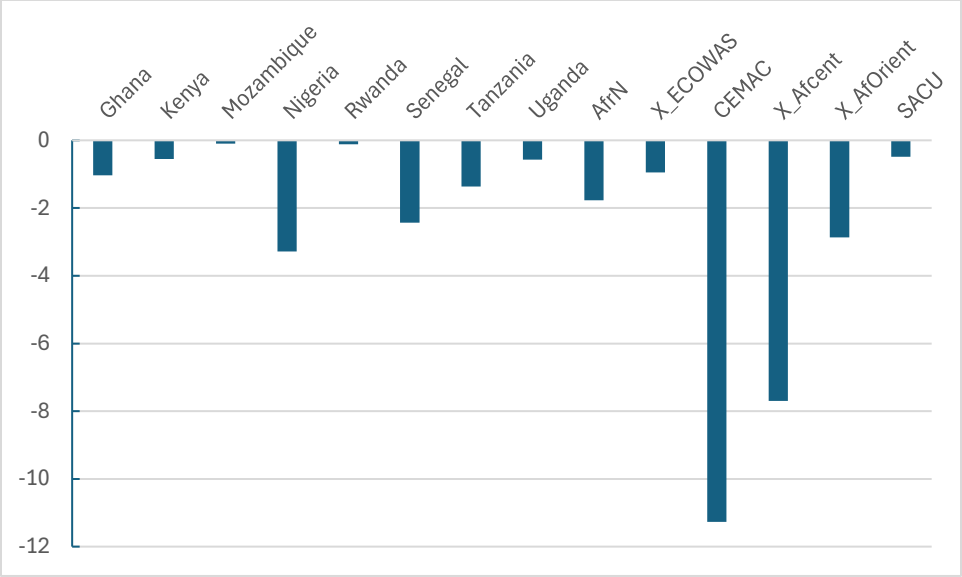
Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Figure 8 Changes in average export tariffs in percentage points, 2035 (from the baseline)



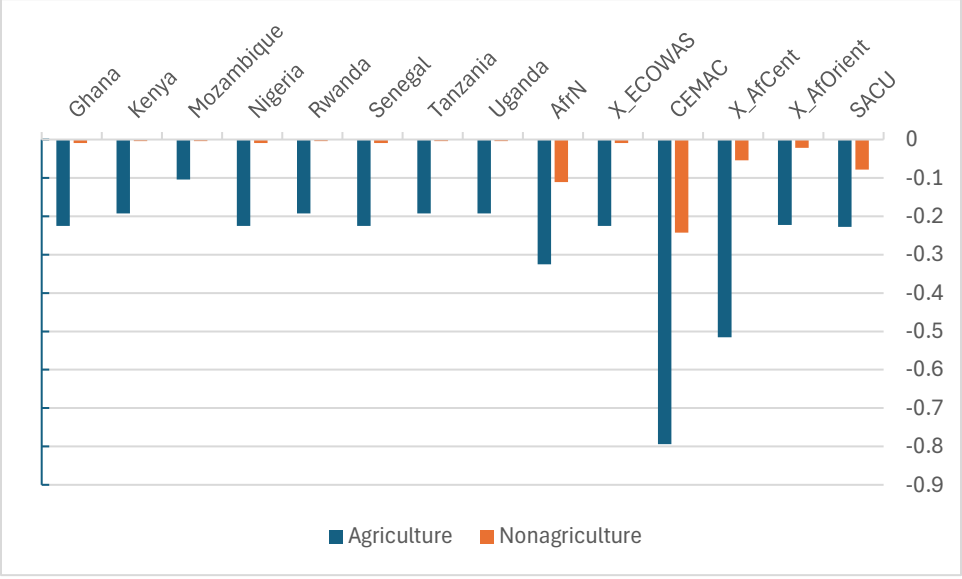
Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Figure 9 Changes in average intra-African import tariffs in percentage points, 2035 (AFCFTA scenario from the baseline)



Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Figure 10 Changes in average intra-African import tariffs in percentage points by product group, 2035 (AFCFTA scenario from the baseline)



Source: Authors' computation based on MIRAGRODEP.

Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Macroeconomic results

Table 5 shows the rates of change in real GDP, while Table 6 presents the impact on welfare (equivalent variation) in 2035 following the agreement's full implementation, compared to the baseline (the economy's evolution without the agreement). While the model includes all countries and regions worldwide, we focus on African regions,[12] as these are the main geographical entities where the agreement has a significant effect. Overall, the agreement has very limited effects, which we expected given the limited changes in the protection levels identified in the previous subsection. However, while aggregate effects are limited, country-level impacts could be significant, with some heterogeneity. In the full liberalization scenario (AFCFTF), the highest, though still limited, positive impacts on GDP are in North Africa (0.05 percent) and SACU (0.06 percent). In the AFCFTA scenario, the impact is positive but limited.

Regarding welfare, measured as the equivalent variation of income, results in CEMAC are negative in the first two scenarios. However, when considering the exclusion clause scenario (AFCFTA), welfare losses decrease, mainly because of the clause's restrictions, which protect certain sectors from liberalization and therefore help them preserve their local market shares. In the trade facilitation scenario throughtransport margin reduction (AFCFTATF), the impact is higher across all countries or regions compared to the other scenarios.

CEMAC experiences negative growth and welfare effects, results that are not completely surprising. Since Viner's (1950) seminal work, it has been well-known that a preferential trade agreement leads to both trade creation (increased trade flows between member countries) and trade diversion (trade shifting from member to nonmember countries). Trade creation results from reduced trade barriers among member countries, which benefits members within the agreement. Trade diversion occurs because disadvantaged foreign producers face a relative increase in trade barriers. As a result, they are replaced by less-efficient producers from member countries. So, trade diversion negatively affects a country, which may experience losses under a trade agreement if it must endure significant trade diversion.

Even within Africa, some countries may lose their preferential access to certain markets. For example, an African REC country's preferential position may erode as African countries outside the REC gain better access under the AfCFTA. With the agreement, African countries outside of CEMAC gain better access to the latter. Given that before the agreement, most of these countries' imports came from outside the continent (particularly for CEMAC, at 95 percent) and tariff dispersion was minimal, a significant reduction in intra-African tariffs leads to substantially reduced imports from the rest of the world, which are replaced by African imports. This shift results in a deterioration of the trade terms. Indeed, a 0.14 percent deterioration in trade terms occurs for CEMAC.

[12] Appendix A provides the geographical aggregation used in the model, based on the Global Trade Analysis Project database.

Table 5 Impact on real GDP, 2035 (% change from the baseline)

Country/Region	AFCFTF	AFCFTA	AFCFTATF
Ghana	0.02	0.01	0.04
Kenya	0.01	0.00	0.20
Mozambique	0.01	0.01	0.54
Nigeria	0.00	0.00	0.06
Rwanda	0.01	0.01	0.10
Senegal	0.01	0.00	0.53
Tanzania	0.00	0.00	0.15
Uganda	0.01	0.01	0.14
AfrN	0.05	0.04	0.25
X_ECOWAS	0.03	0.01	0.25
CEMAC	−0.02	0.02	0.24
X_AfCent	0.03	0.01	0.17
X_AfOrient	0.01	0.01	0.11
SACU	0.06	0.04	0.27

Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Table 6 Impact on welfare, 2035 (% change from the baseline)

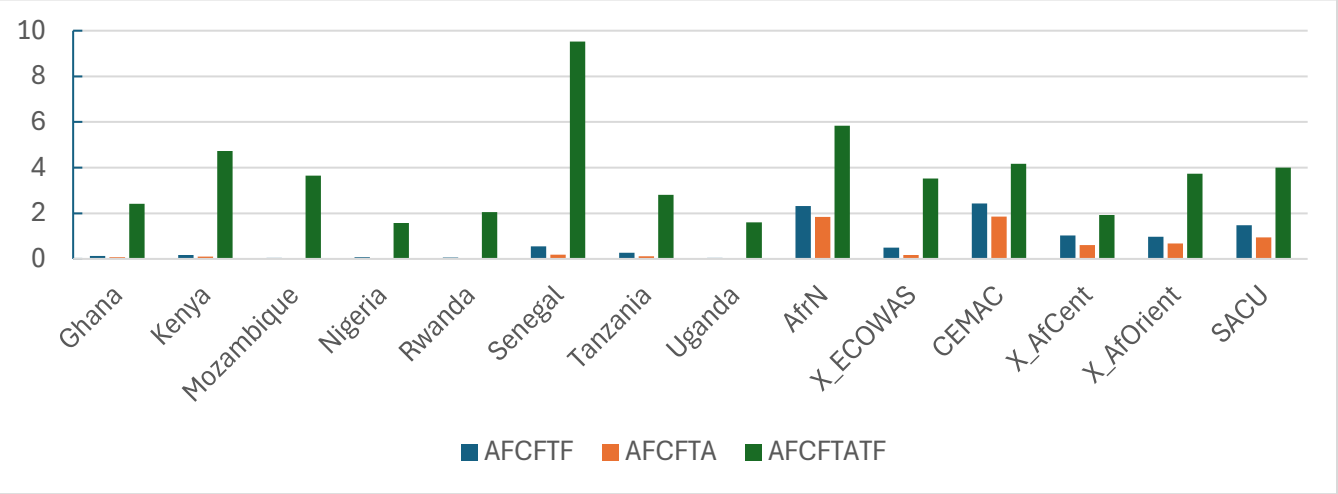
Country/Region	AFCFTF	AFCFTA	AFCFTATF
Ghana	0.02	0.02	0.26
Kenya	0.00	0.00	0.54
Mozambique	0.00	0.00	1.46
Nigeria	0.01	0.00	0.18
Rwanda	0.01	0.01	0.27
Senegal	0.01	0.00	1.34
Tanzania	0.02	0.00	0.35
Uganda	0.01	0.01	0.37
AfrN	0.16	0.13	0.74
X_ECOWAS	0.07	0.02	0.84
CEMAC	−0.11	−0.05	0.45
X_AfCent	0.06	0.00	0.45
X_AfOrient	0.03	0.03	0.36
SACU	0.20	0.13	0.79

Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Impact on trade flows

Figure 11 shows the agreement's impacts on trade flows, indicating positive effects on exports for all African countries and regions. In the full liberalization scenario (AFCFTF), CEMAC has the highest export increase (+2.43 percent). When applying the exclusion clause (AFCFTA), the same trend prevails. The impacts are limited for Tanzania, Ghana, Kenya, Mozambique, Nigeria, Rwanda, Senegal, and Uganda. These results align with the changes in export protection levels, with high reductions for CEMAC and low reductions for Tanzania, Ghana, Kenya, Mozambique, Nigeria, Rwanda, Senegal, and Uganda. Furthermore, exports increase more significantly for the countries or regions in the transport margin reduction scenario (AFCFTAFT) than in the other scenarios.

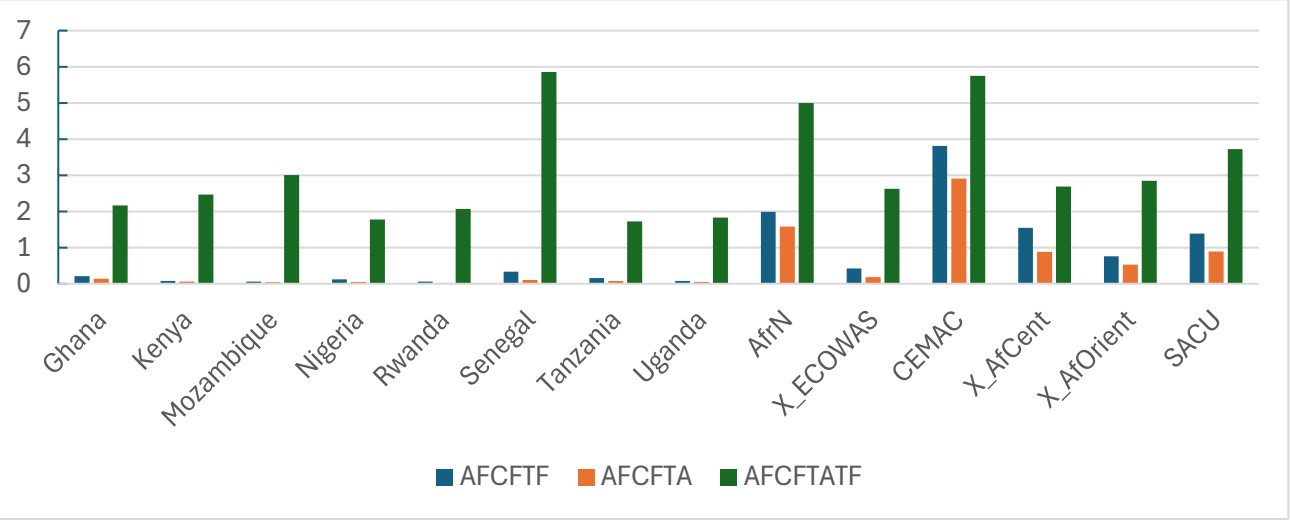
Figure 11 Variation in total exports, 2035 (% change from the baseline)



Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Figure 12 presents the results for imports, showing the highest impacts in CEMAC (+3.81 percent), North Africa (+1.58 percent), and the rest of Central Africa (+1.55 percent) in the full liberalization scenario (AFCFTF). As they do for exports, trade facilitation measures in the transport sector boost imports significantly. The import changes align globally with variations in average tariffs applied to imports. In addition, GDP (income) changes also affect import levels.

Figure 12 Variation in total imports, 2035 (% change from the baseline)



Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; Alacant = rest of Central Africa; Afferent = rest of Oriental Africa.

As previously mentioned, both trade diversions and trade creations occur under the AfCFTA: Africa's imports from the rest of the world decrease, while imports from the continent increase. Table 7 shows the changes in imports from Africa's main trading partners. Intra-African trade increases by 16 percent in the full liberalization scenario (AFCFTF) and by 12 percent in the exclusion clause scenario (AFCFTA).

Table 7 Changes in total African imports, compared to main trading partners, 2035 (% change from the baseline)

Country/Region	AFCFTF	AFCFTA	AFCFTATF
United States	−1.13	−0.87	0.72
China	−1.68	−1.29	2.34
European Union	−0.54	−0.40	2.15
Africa	16.23	11.87	18.48

Source: Authors' computation based on MIRAGRODEP.

Impact on customs revenue

Table 8 shows the impact of different scenarios on customs revenue. In general, the impacts are negative, with the highest figures in CEMAC (−23 percent) and the rest of Central Africa (−20 percent) in the full liberalization scenario (AFCFTF). In the exclusion clause scenario (AFCFTA), CEMAC, Senegal, and the rest of Central Africa have the highest losses. There also are some positive, although limited, increases in Rwanda and SACU. However, the effects of a trade liberalization scenario on customs revenue are ambiguous. For instance, an agreement can increase GDP and, therefore, total imports not only from Africa but also from the rest of the world, and these imports are subject to constant taxation. In addition, there may be complementarities between imports from different sources.

Table 8 Variation in customs revenue, 2035 (% change from the baseline)

Country/REC	AFCFTF	AFCFTA	AFCFTATF
Ghana	−6.81	−5.05	−0.95
Kenya	−8.12	−3.57	0.18
Mozambique	−2.25	−0.75	17.92
Nigeria	−4.36	−2.77	1.29
Rwanda	−3.98	1.3	1.88
Senegal	−10.85	−7.42	−0.99
Tanzania	−8.99	−4.03	−0.91
Uganda	−3.99	−0.45	−0.11
AfrN	−1.29	−0.82	3.16
X_ECOWAS	−10.21	−8.69	−6.72
CEMAC	−22.97	−17.37	−13.76
X_AfCent	−19.77	−8.67	−5.73
X_AfOrient	−2.35	−0.77	2.74
SACU	−0.98	0.56	4.52

Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; REC = regional economic community; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

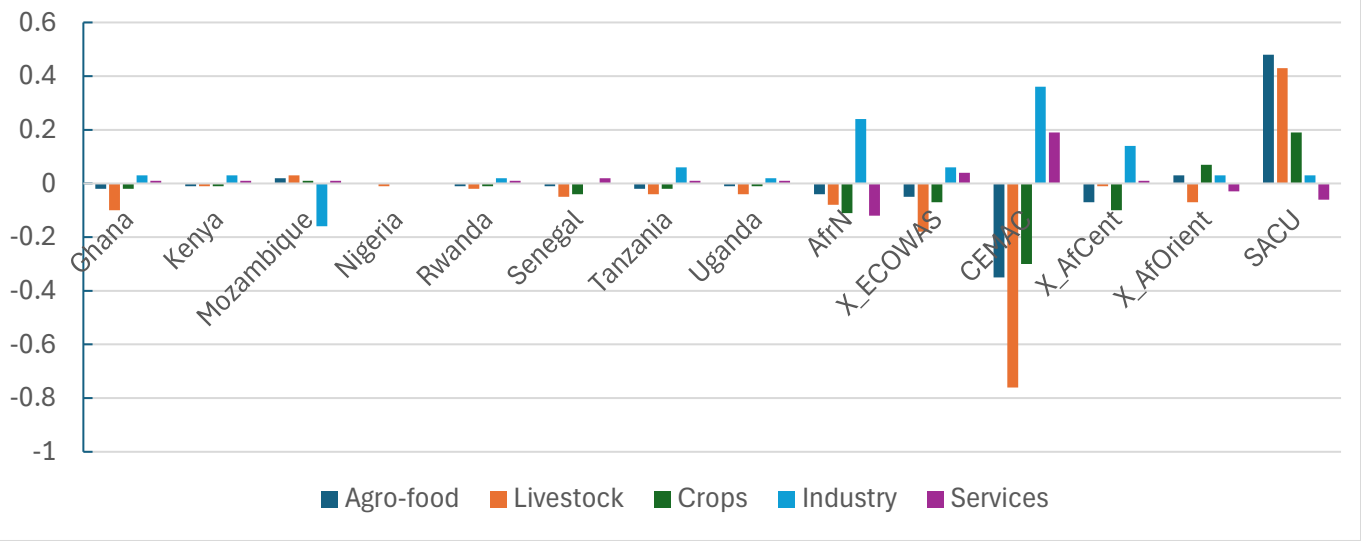
Impact on sectoral economic activities

To assess the impact of the agreement on economic activity, we focus on the value added by major sectors (Tables 1 and 2 in Appendix C). In most countries or regions, the impacts are heterogenous, depending first on the initial level of protections faced by and applied to specific sectors. This determines whether a sector expands or contracts (first-order effects) and leads to general equilibrium effects. In general, the impact on services is negative for certain countries or regions. One reason is that the initial impact on exports tends to be greater than the increase in imports, leading to an improved trade balance for goods, an appreciation of the real exchange rate, and ultimately, a deterioration of the sold and a decline in service sector output.

Impact on labor markets

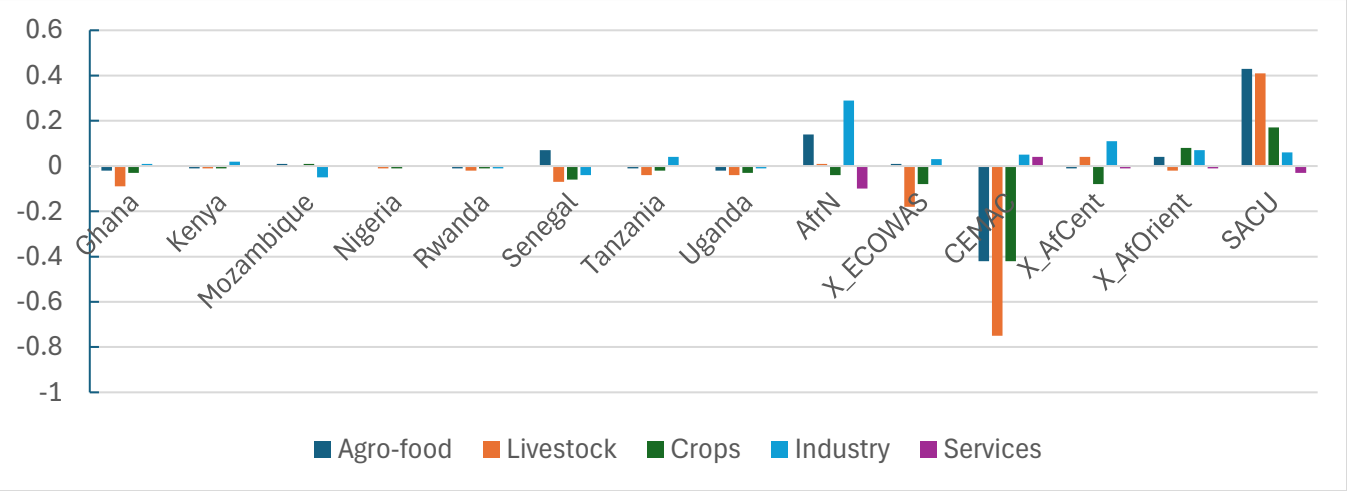
Tables 1 and 2 in Appendix D show the agreement's impact on labor demand. The MIRAGRODEP model assumes full employment, meaning that all labor market adjustments occur through wage variations. However, labor reallocation still occurs across different economic sectors (Figures 13 and 14). The labor demand impacts depend on the initial structure of the production tree and the size of the shock (from both imports and exports) to each sector. Overall, the reallocation effects are limited and align with the evolution observed in our analysis of economic activity.

Figure 13 Unskilled labor demand in volume, 2035



Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

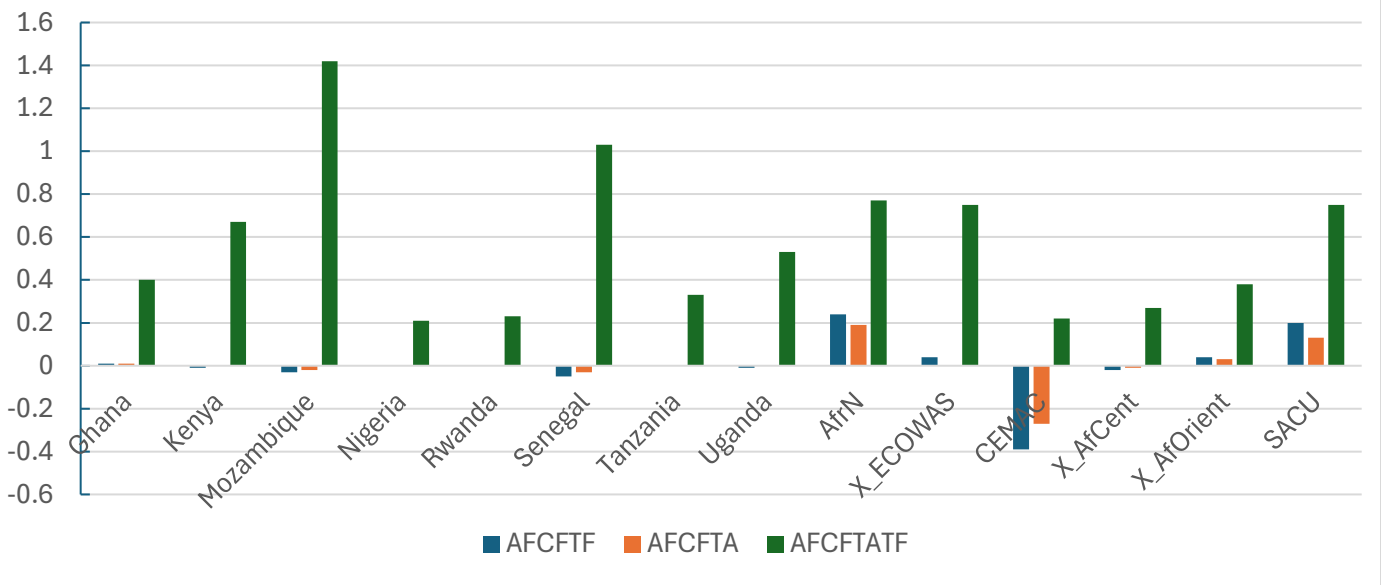
Figure 14 Skilled labor demand in volume, 2035



Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

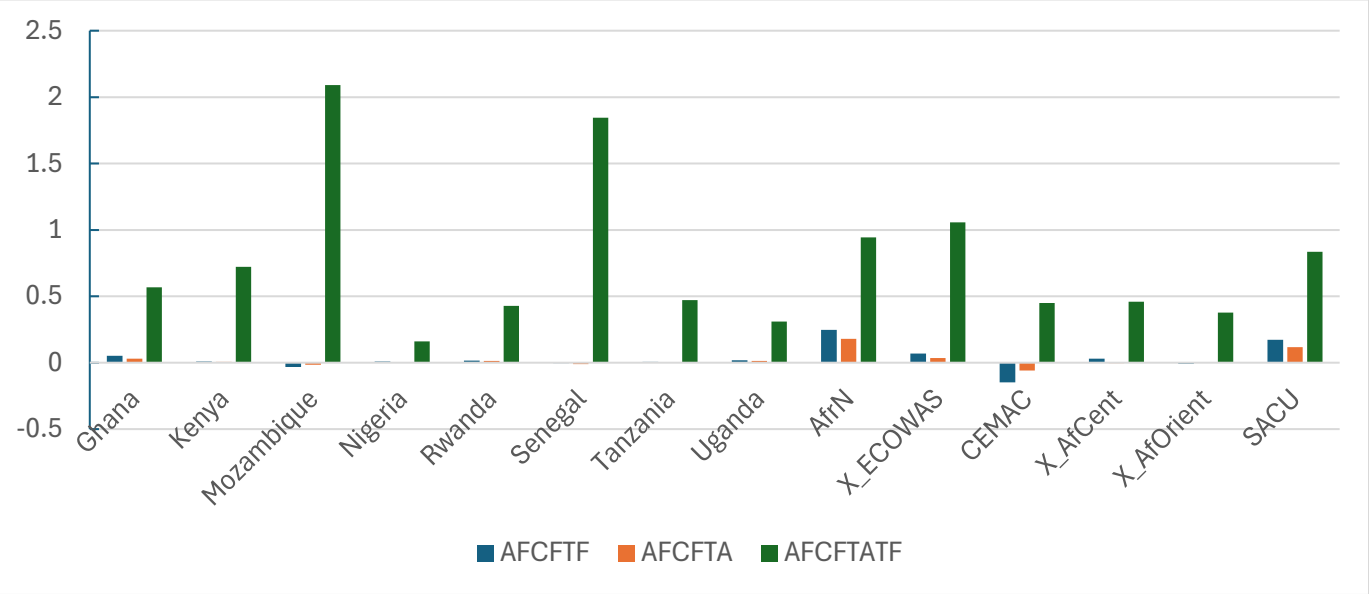
The AfCFTA generally has positive impacts on wages for both labor categories (Figures 15 and 16), except in Senegal and CEMAC. These negative effects generally reflect either the agreement's overall negative macroeconomic effect (as seen in Senegal) or a decline in labor demand in the agricultural and services sectors, which is not fully offset by the positive effects in industry. The difference in evolution between unskilled and skilled wage rates is country-specific and depends on the size of the shocks, the affected sectors, their factor intensity, and labor mobility. For instance, when sectoral factor intensity is the same, unskilled labor is more adversely affected by negative shocks than skilled labor, as unskilled labor is only imperfectly mobile in the model. Overall, the wage impacts are modest—below 1 percent—except in the transport margin reduction scenario (AFCFTAFT).

Figure 15 Impact on unskilled real wages, 2035 (% change from the baseline)



Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Figure 16 Impact on skilled real wages, 2035 (% change from the baseline)

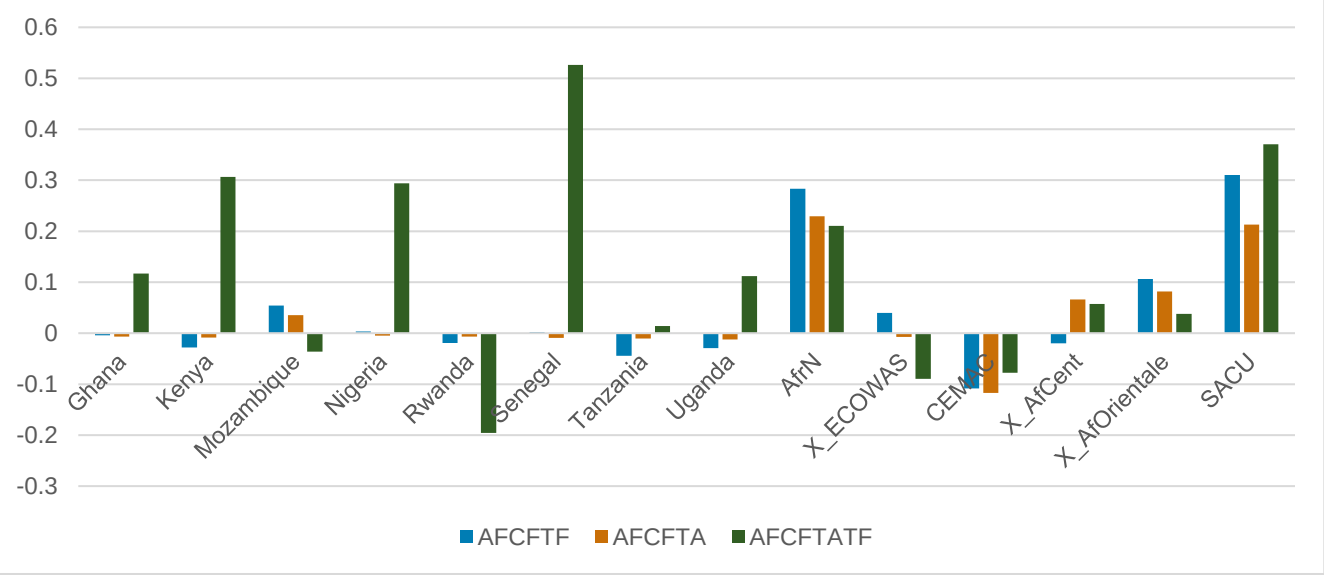


Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

Impact on food prices and consumption

Price variations are mixed, as they are driven by the relative magnitude of shocks on both supply and demand. Considering the model's closure, we observe different trends across countries and economic communities.

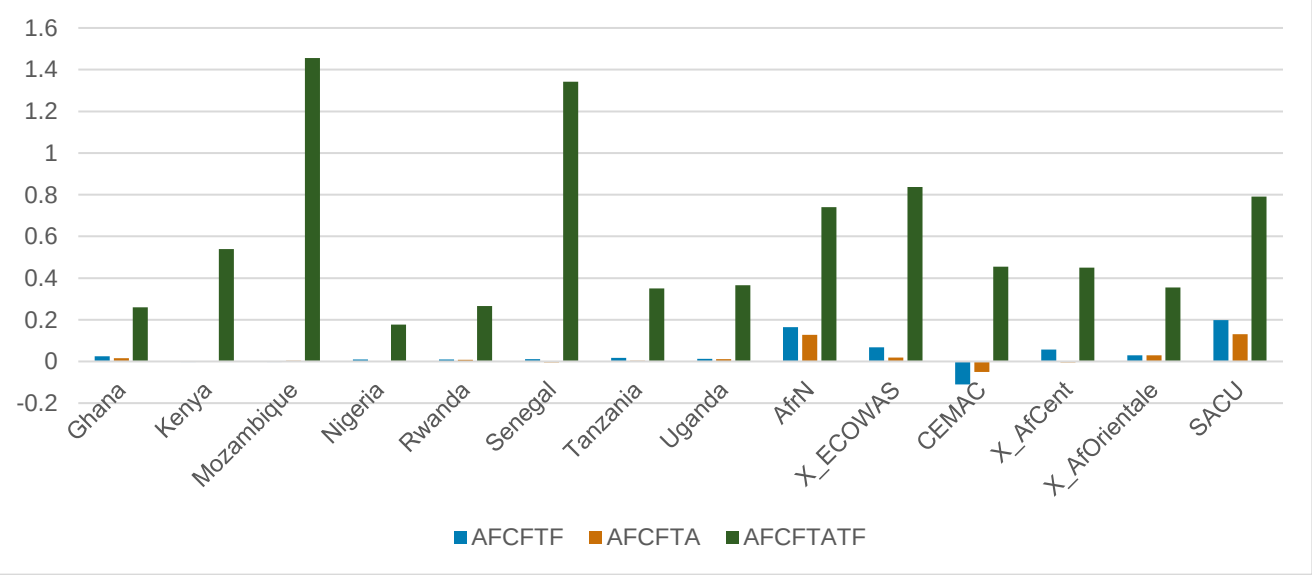
Figure 17 Changes in the consumer price index (% change from the baseline)



Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

The full liberalization scenario (AFCFTF) and sensitive products scenario (AFCFTA) primarily lead to a decline in the consumer price index (CPI). This is the case in Kenya, Rwanda, Tanzania, Uganda, and in CEMAC, where these policies have favored a greater increase in supply compared to demand of goods (Figure 17). The largest CPI drop occurs in CEMAC. The trade facilitation measures scenario (AFCFTATF) contributes to a CPI decline in Mozambique, Rwanda, the rest of ECOWAS, and CEMAC. Apart from these cases, consumer prices increase in some areas and in some of the selected scenarios. This trend occurs because demand for goods rises faster than that of supply, with the model's closure an additional influence. In the model, the current account balance is fixed, and because the initial shock to exports is greater than that to imports, the real exchange rate tends to appreciate. This requires an increase in domestic prices. Variations in income and food prices directly affect household consumption levels, which generally increase (Figure 18). These changes in consumption influence the evolution of poverty in each country. The next section analyzes this evolution in Nigeria and Rwanda.

Figure 18 Changes in household consumption (% change from the baseline)



Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa.

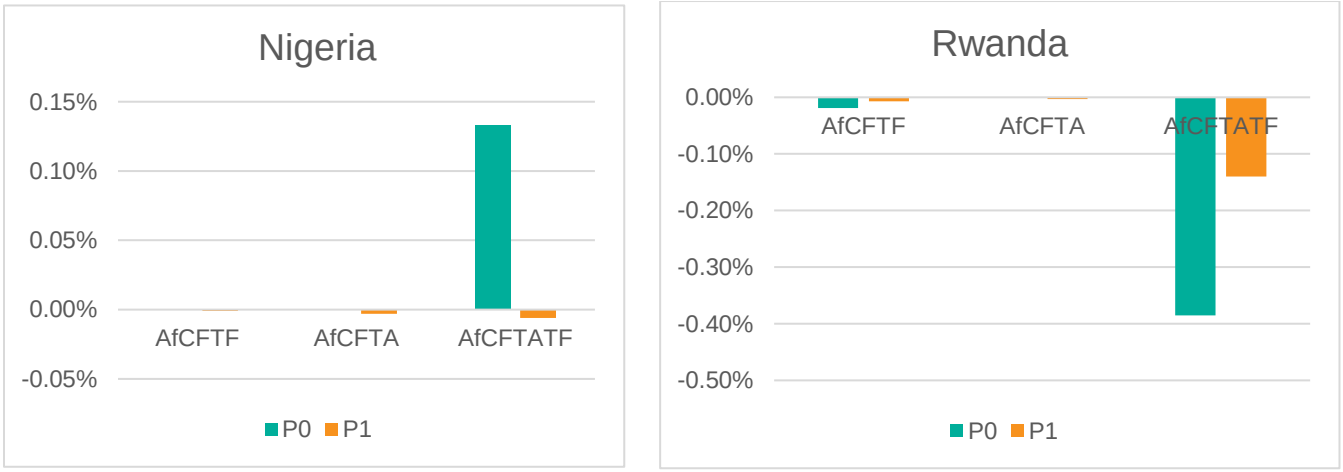
7. MICROSIMULATION RESULTS

As noted in the methodological (modeling) section, the microsimulation analysis focuses on Nigeria and Rwanda. These two countries follow different poverty trend trajectories. Figure 19 shows that Nigeria's poverty head count increases slightly in the AFCFTATF scenario, while Rwanda's is projected to decrease in the AFCFTF and AFCFTATF scenarios. In the remaining scenarios, there is no impact on

poverty head count in the two countries. The poverty gap decreases in Nigeria in the trade facilitation measures scenario (AFCFTATF) and in Rwanda in both the AFCFTF and AFCFTATF scenarios.

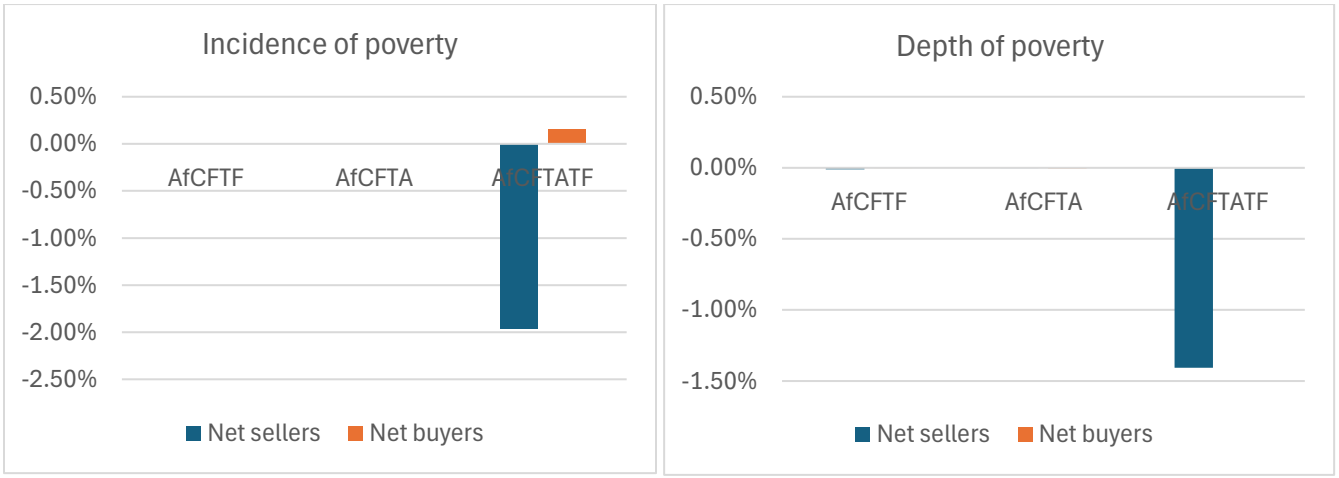
A careful analysis of poverty trends in Nigeria based on household status yields a richer landscape. Whether household poverty changes, and to what extent, depends on whether households are net sellers or buyers. For net sellers, poverty either remains unchanged or decreases, while for net buyers, it increases slightly in the AFCFTATF scenario.

Figure 19 Changes in poverty head count in Nigeria and Rwanda (in percentage points)



Source: Authors' computation from the microsimulation model.

Figure 10 Changes in poverty head count in Nigeria, net sellers vs. net buyers (in percentage points)

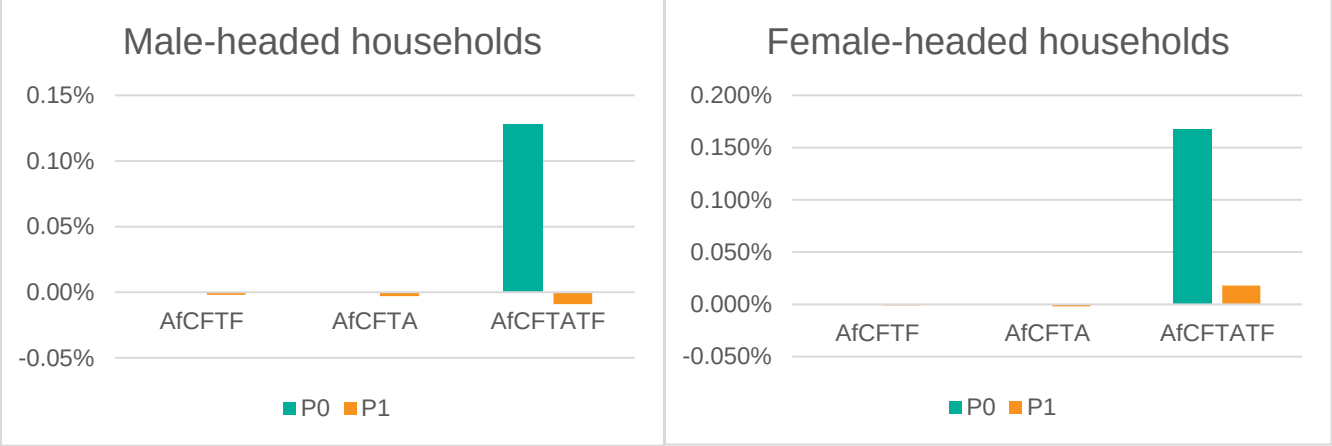


Source: Authors' computation from the microsimulation model.

An analysis of the evolution of poverty by sex of the household head shows that in Nigeria, male-headed households experience a relatively greater drop, or a smaller increase, in poverty compared to female-headed households (Figure 21). In Rwanda, the results are mixed: While poverty head count decreases

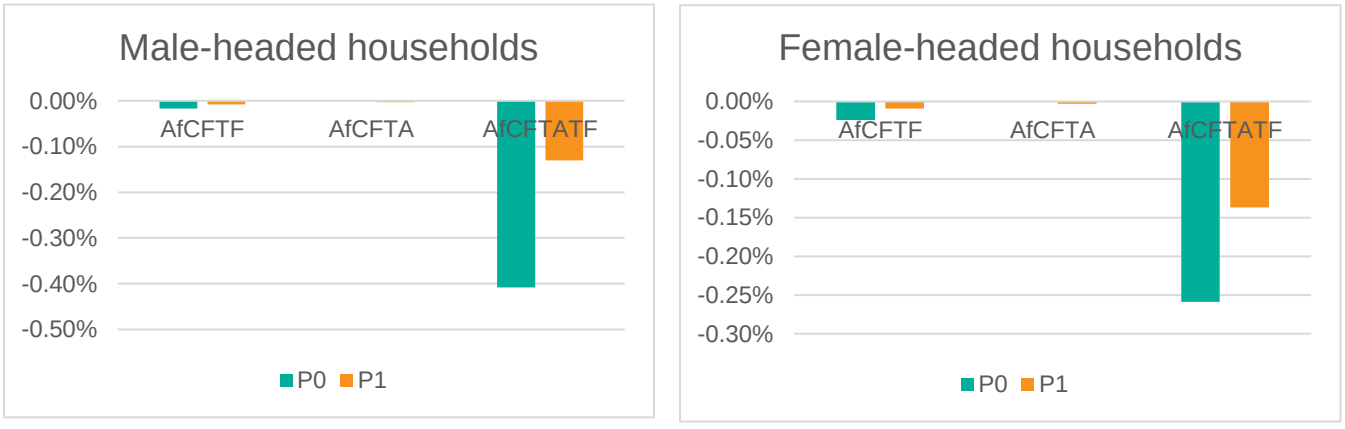
more for men, the depth of poverty decreases more for women (Figure 22). This trend occurs because the sectors that benefit most from the reform, primarily the industrial sector and agricultural production of certain items, have a higher representation of men in the workforce. As a result, it mainly captures the positive impacts of rising wages and income from capital. Finally, the reform's impact on agricultural activity in Rwanda leads to a greater reduction in poverty in rural areas. In Nigeria, on the other hand, the opposite trend occurs, with rural poverty increasing.

Figure 11 Changes in poverty in Nigeria by sex of household head (in percentage points)



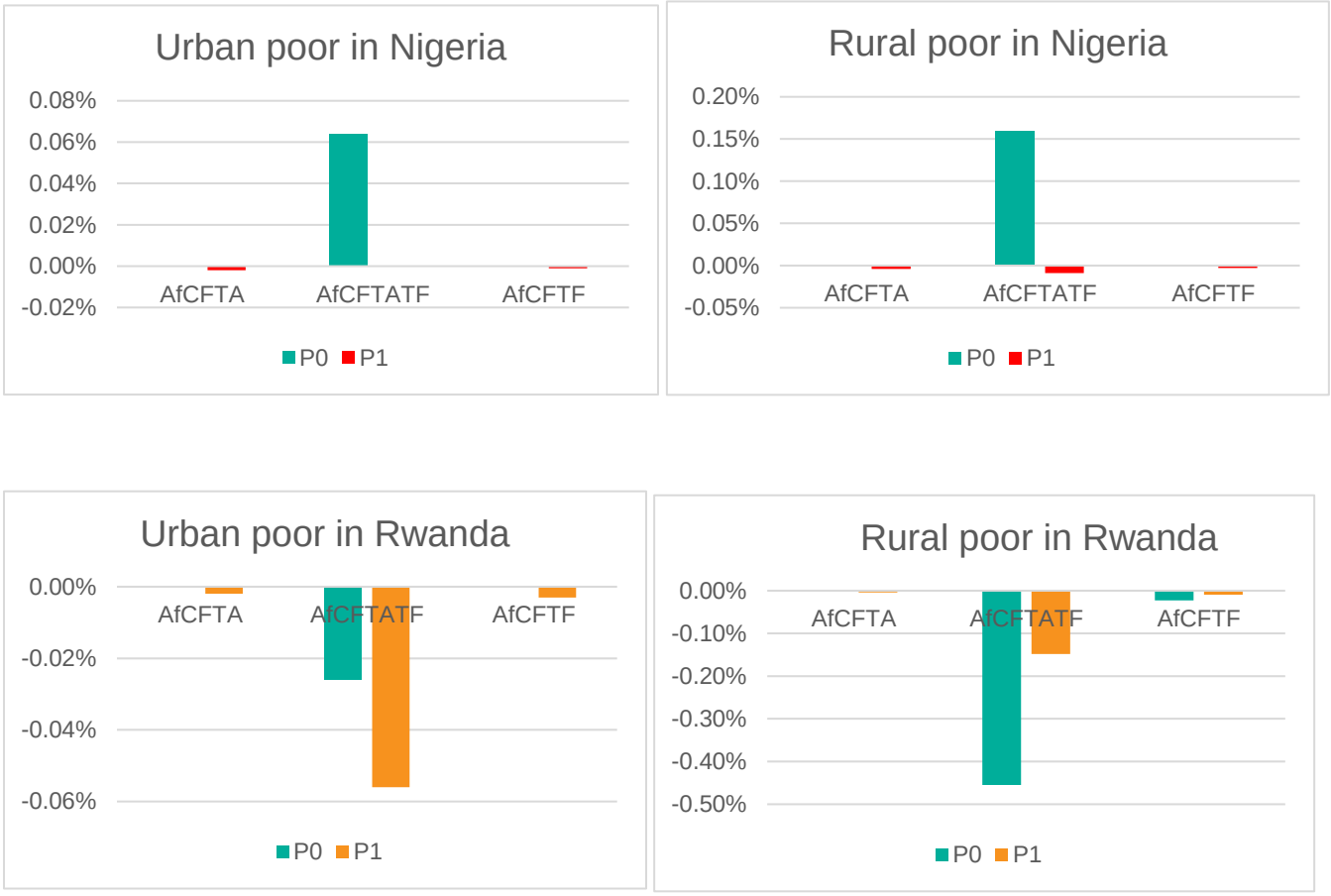
Source: Authors' computation from the microsimulation model.

Figure 12 Changes in poverty in Rwanda by sex of household head (in percentage points)



Source: Authors' computation.

Figure 13 Changes in poverty in Nigeria and Rwanda by rural or urban areas (in percentage points)

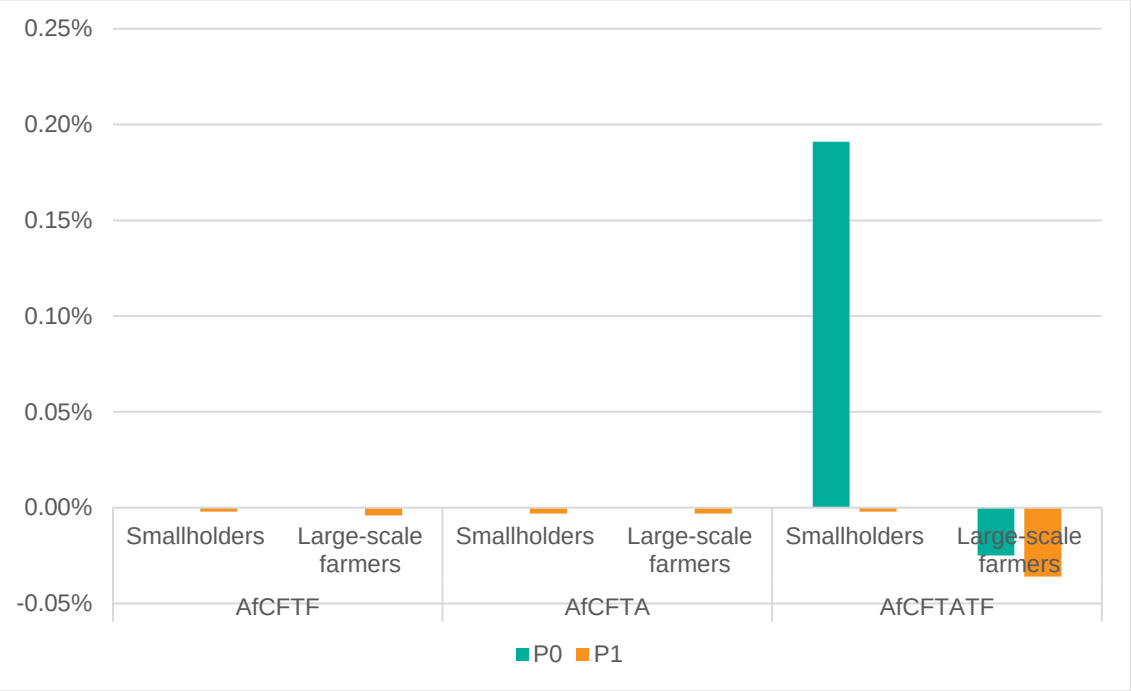


Source: Authors' computation from the microsimulation model.

Beyond analyzing poverty across all households, focusing on households engaged in agricultural activity—particularly smallholders or large-scale farmers—provides insight into how the AfCFTA affects this segment of the population.

Figure 24 shows that in Nigeria, the full liberalization scenario (AFCFTF) and the liberalization with sensitive products scenario (AFCFTA) have very weak effects on poverty variation. In both cases, only the depth of poverty tends to decline, indicating that while these households remain below the poverty line, their income improves. The trade facilitation scenario leads to an increase in poverty among smallholders but a decrease among non-smallholders. This result thus demonstrates that improved infrastructure benefits those who have medium and large farms with less-rudimentary production tools and more diversified crops.

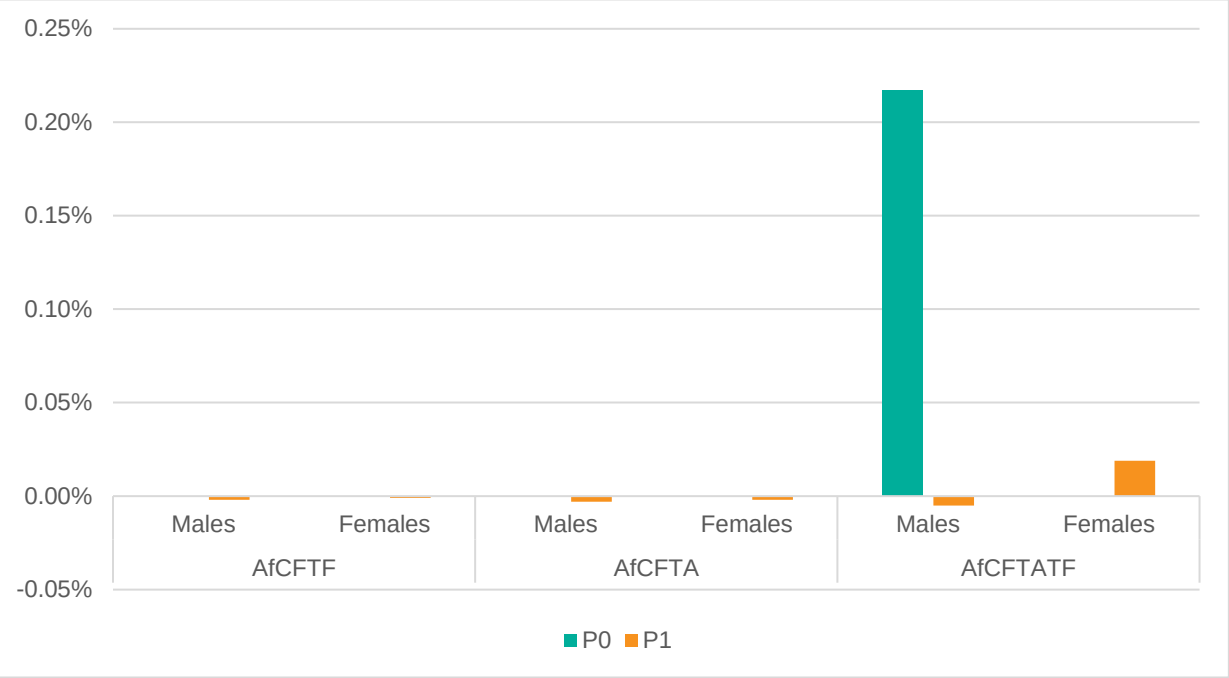
Figure 14 Changes in poverty for smallholders vs. large-scale farmers in Nigeria



Source: Authors' computation from the microsimulation model.

The poverty decomposition within smallholder households, based on the sex of household head, shows that trade facilitation measures benefit women the most (Figure 25). Specifically, poverty decreases more among women than men, primarily because women take the lead in selling agricultural products. When women are household heads, they benefit directly from this activity, thereby avoiding a potential inequitable redistribution of resources and enabling them to further improve their well-being.

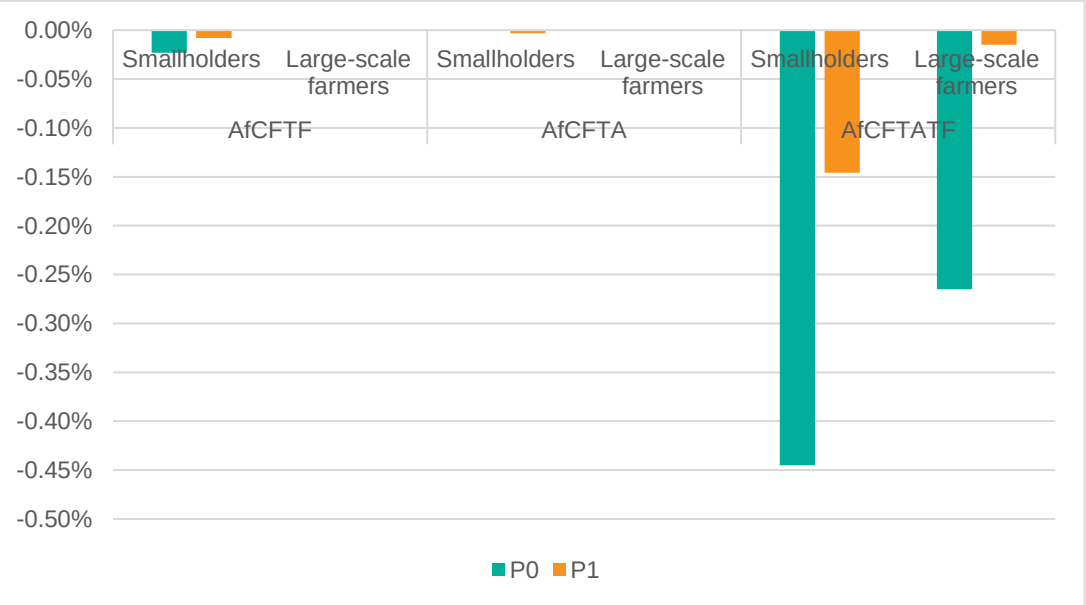
Figure 15 Changes in poverty for smallholders in Nigeria by sex of household head



Source: Authors' computation from the microsimulation model.

Figure 26 shows that in Rwanda, only the full liberalization scenario and the combination of sensitive products and trade facilitation measures scenarios reduce poverty.

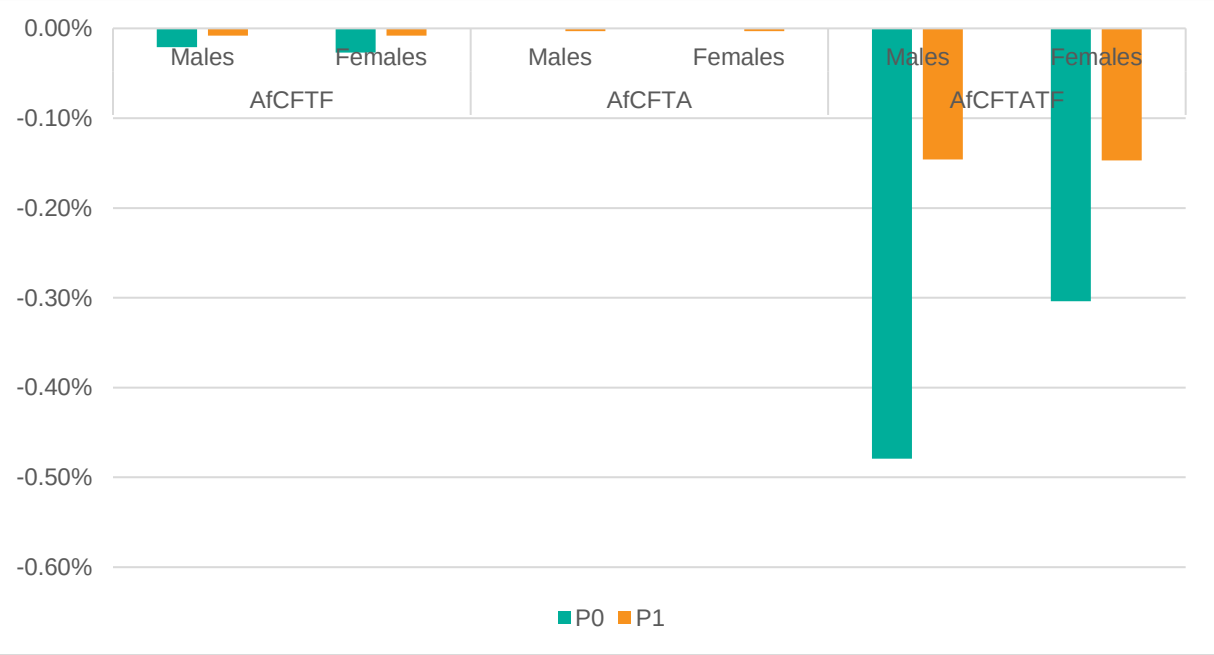
Figure 16 Changes in poverty for smallholders vs. large-scale farmers in Rwanda



Source: Authors' computation from the microsimulation model.

In the AFCFTF scenario, poverty decreases only among non-smallholder households. In contrast, the AFCFTATF scenario reduces poverty in both types of households, with smallholders seeing a greater benefit. These results demonstrate the importance of trade facilitation measures in ensuring that the agreement has a positive impact on the most vulnerable households. Furthermore, the breakdown of impacts on smallholders by the sex of the household head reveals a more significant drop in poverty for male-headed households (Figure 27).

Figure 17 Changes in poverty for smallholders in Rwanda by sex of household head



Source: Authors' computation from the microsimulation model.

8. CONCLUSION

The AfCFTA aims to create the largest free trade area in the world. This report assesses the agreement's impact on African economies, revealing a positive but limited impact on growth and welfare. As most African countries already trade under preferential regimes within a REC, the agreement primarily affects intra-African trade, mainly inter-REC trade flows. In the most realistic scenario, intra-African trade increases by almost 12 percent. Without an exclusion clause, intra-African trade increases by 16.23 percent. In terms of sectoral outcomes, the industrial sector benefits the most from the agreement. In the realistic scenario, if transport margins decrease by 25 percent due to an accompanying measure, the 12 percent increase in intra-African trade could rise to 18 percent. However, the agreement's impact on poverty reduction is limited, particularly in Nigeria. While more positive results are expected in Rwanda,

they would largely occur in the reduction in transportation costs scenario. In addition, a gender bias is present: Female-headed households benefit less from the agreement than male-headed households.

It is important to note that the simulated scenarios focus only on tariffs. Nontariff measures are also important, even with serious data limitations and limited cost estimations.

The results of the report rely on several key assumptions. One important assumption concerns the selection of sensitive and excluded products. Because official lists are not available for most countries, we used a political economy model to select sensitive and excluded products. The final lists may differ from our selection, potentially changing the results. In addition, the scenarios do not include reductions in other nontariff measures, which are also important in Africa.

Finally, a key feature of trade in Africa is informal cross-border trade, which is widespread. As a result, the baseline values are likely underestimated, despite our inclusion of CILSS and FEWSNET data for West and East Africa, respectively. However, as the time of writing, no consolidated database of informal trade existed at the continental level. AfCTFA implementation may shift informal trade to formal channels by reducing formal trade costs. Bensassi, Jarreau, and Mitaritonna (2018) suggest that high tariff levels are a significant driver of informal trade. Therefore, as Costinot and Rodríguez-Clare (2014) explain, the benefits of reducing trade costs depend on changes in the share of national expenditure on local products and the elasticity of trade with respect to trading costs. As a result, if intra-African trade exceeds initial expectations (because informal cross-border trade was not fully considered), greater gains on average will likely occur as the share of domestic spending on local products automatically decreases.

APPENDIX A: GEOGRAPHICAL AND SECTORAL AGGREGATION OF THE MODEL

Appendix A presents the aggregation method used for the results shown in the tables and figures.

Appendix A, Table 1 Geographical aggregation

Region	Countries
MERCOSUR	Argentina, Brazil, Paraguay, Uruguay
European Union	Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom, Bulgaria, Croatia, Romania
AfrN	Morocco, Egypt, Tunisia, Algeria, Libya, Western Sahara
X_ECOWAS	Benin, Burkina Faso, Cote d'Ivoire, Guinea, Togo, Cape Verde, Gambia, Guinea-Bissau, Liberia, Mauritania, Niger, Saint Helena, Sierra Leone
CEMAC	Cameroon, Central Africa, Chad, Congo, Equatorial Guinea, Gabon, Sao Tome and Principe
RAfCent	Angola, Democratic Republic of the Congo
RAfOrientale	Ethiopia, Madagascar, Malawi, Mauritius, Burundi, Comoros, Djibouti, Eritrea, Mayotte, Seychelles, Somalia, Sudan, Zambia, Zimbabwe
SACU	Botswana, South Africa, Namibia, Eswatini, Lesotho

Source: Global Trade Analysis Project database.
Note: Some regional economic communities (RECs) have more entities than the official RECs because of the structure of the GTAP database; therefore, they represent an extended version in general. AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; MERCOSUR = Mercado Común del Sur (Southern Common Market); RAfCent =Rest of Central Africa ; RAfOrientale = Rest of East Africa; SACU = Southern African Customs Union; X_ECOWAS = rest of Economic Community of West African States.

Appendix A, Table 2 Sectoral aggregation

n	GTAP sectors
Rice	Paddy rice, processed rice
Wheat	Wheat
Cereals	Cereal grains nec
FruitsLeg	Vegetables, fruits, nuts
Oleagineux	Oilseed
Aut_cultures	Sugarcane, sugar beet, plant-based fibers, crops nec, sugar, forestry
Betail	Cattle, sheep, goat, horses, animal products nec, wool, silkworms cocoon
X_Dairy	Raw milk, dairy products
Fishing	Fishing
Energy	Coal, oil, gas, minerals nec, petroleum, coal products, mineral products nec
Meat	Cattle, sheep, goats, horse, meat products nec
X_Agro	Vegetable oils and fats, food products nec
Beverages_Tob	Beverages, tobacco products
Industry	Textiles; apparel; leather, wood, chemical, rubber, plastic, metal, and basic pharmaceutical products; ferrous metals; metals nec; motor vehicles and parts; transport equipment nec; computer, electronic, and optical products; machinery and equipment nec; manufactures nec; electrical equipment
Utilities	Electricity, gas manufacture, distribution, water
Other_serv	Business services nec, communications
Construction	Construction
X_Real_estate	Real estate activities, dwellings
Trade	Trade
Finance	Financial services, insurance
X_Transport	Sea and air transport, transport nec, warehousing and support activities
X_Recreat_serv	Recreation and other services, accommodation, food and service activities
Public_serv	Public administration and defense, education, human health and social work activities

Note: GTAP = Global Trade Analysis Project; nec =not elsewhere classified.

Appendix A, Table 3 List of countries

Category	List of countries
LDCs	Angola, Burkina Faso, Burindi, Benin, Central African Republic, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Gambia, Guinea, Guinea-Bisau, Lesotho, Liberia, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, Sud Sudan, Togo, Uganda, Tanzania
G6 countries	Ethiopia, Madagascar, Malawi, Sudan, Zambia, Zimbabwe

Note: LDCs = least-developed countries; G6 = Group of Six.

APPENDIX B: DETAILED TRADE RESULTS

Appendix B, Table 1 Impact on export flows, 2035 (% change from the baseline)

Country/ Region	AFCFTF					AFCFTA					AFCFTATF				
	US	China	EU	World	Africa	US	China	EU	World	Africa	US	China	EU	World	Africa
Ethiopia	7.75	7.8	8	8.98	26.36	5.77	5.8	5.99	6.68	18.45	9.6	11.63	12.12	11.98	25.38
Ghana	0	−.03	0.01	0.13	1.18	0.12	0.07	0.07	0.08	0.16	2.78	2.89	1.96	2.42	9.95
Kenya	0.22	0.18	0.17	0.17	0.16	0.06	0.04	0.04	0.1	0.24	1.36	1.24	4.24	4.73	9.31
Mozambique	−0.38	−0.23	−0.42	0.05	0.79	−0.3	−0.19	−0.32	0.03	0.6	0.17	5.46	4.09	3.65	2.57
Nigeria	−0.31	−0.14	−0.14	0.08	3.29	0.05	-0.02	0.09	0.03	−0.32	1.4	7.64	1.17	1.57	−1.27
Rwanda	0.18	0.1	0.17	0.06	−0.54	0.06	0.03	0.07	0.01	−0.23	2.32	1.48	2.33	2.05	−1.41
Senegal	−0.06	0.03	0.07	0.55	1.36	0.11	0.1	0.13	0.18	0.29	−2.84	−1.45	−0.37	9.52	20.4
Tanzania	0.08	0.19	0.11	0.27	1.15	0	0.02	0.02	0.12	0.66	0.78	5.04	0.84	2.81	7.81
Uganda	0.16	0.11	0.11	0.04	−0.23	0.07	0.03	0.04	0.03	−0.06	−0.21	0.29	0.84	1.6	3.92
AfrN	−1.91	−1.72	−1.86	2.32	50.87	−1.59	−1.4	−1.55	1.84	41.26	1.02	−0.13	1.77	5.83	52.21
X_ECOWAS	−0.78	−0.39	−0.36	0.49	4	0.27	0.07	0.11	0.17	0.37	5.77	5.33	3.3	3.52	6.18
CEMAC	1.68	1.03	2.04	2.43	15.9	1.13	0.66	1.59	1.86	13.66	3.15	3.55	3.69	4.17	14.28
X_AfCent	−0.08	−0.14	−0.03	1.03	18.51	−0.1	−0.11	−0.09	0.6	11.31	1.14	1.18	0.94	1.93	12.22
X_AfOrient	−0.74	−1.06	−0.72	0.97	20.26	−0.63	−1.07	−0.63	0.67	16.56	0.29	1.81	1.29	3.73	26.23
SACU	−2.58	−2.85	−2.49	1.48	14.58	−1.92	−2.09	−1.75	0.95	10.05	−0.13	−1.24	−0.07	4	14.6

Source: Authors' computation based on MIRAGRODEP.
Note: Exporters are in rows, and importers are in columns. AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; EU = European Union; SACU = Southern African Customs Union; US = United States; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa; X_ECOWAS: rest of Economic Community of West African States.

Appendix B, Table 2 Impact on import flows, 2035 (% change from the baseline)

	AFCFTF														
	Ethiopia	**Ghana**	**Kenya**	**Mozam-bique**	**Nigeria**	**Rwanda**	**Sene-gal**	**Tanza-nia**	**Uganda**	**AfrN**	**X_ECOWAS**	**CEMAC**	**X_AfCent**	**X_AfOrient**	**SACU**
United States	−13.53	−0.6	−0.22	0.19	−0.03	−0.09	−0.14	−0.27	−0.1	0.67	−0.08	-5.07	−0.89	0.19	1.01
China	−14.8	−0.18	−0.12	0.57	−0.03	−0.1	−0.08	−0.1	−0.12	1.04	0.04	−11.44	−2.59	0.09	0.98
European Union	−12.48	−0.69	−0.37	0.23	−0.09	−0.29	−0.45	−0.46	−0.36	0.87	−0.23	−8.55	−1.6	0.09	0.95
World	−0.25	0.21	0.08	0.06	0.11	0.07	0.31	0.16	0.07	1.99	0.42	3.68	1.49	0.75	1.4
Africa	281.28	4.92	2.73	−1.11	5.14	0.79	3.22	3.99	1.02	21.45	2.18	76	32.03	3.34	2.87
								AFCFTA							
United States	−10.4	−0.65	−0.09	0.19	−0.07	0	−0.27	−0.12	-0.05	0.56	−0.39	−4.07	−0.46	0.3	0.9
China	−11.23	−0.22	−0.04	0.54	−0.06	0	−0.18	−0.07	−0.08	0.76	−0.21	−9.78	−1.7	0.38	0.96
European Union	−9.55	−0.73	−0.14	0.2	−0.14	−0.18	−0.48	−0.19	−0.28	0.68	−0.44	−6.9	−0.78	0.24	0.9
World	−0.19	0.14	0.06	0.04	0.04	0.02	0.1	0.08	0.05	1.58	0.17	2.73	0.85	0.52	0.9
Africa	216.69	4.57	1.09	−1.18	4.13	0.15	2.28	1.91	0.55	17.1	1.87	59.98	18.38	1.13	0.83

Source: Authors' computation based on MIRAGRODEP.
Note: Exporters are in rows, and importers are in columns. AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa; X_ECOWAS: rest of Economic Community of West African States.

Appendix B, Table 3 Impact on import flows, 2035 (% change from the baseline)

	AFCFTATF														
	Ethiopia	**Ghana**	**Kenya**	**Mozam-bique**	**Nigeria**	**Rwanda**	**Sene-gal**	**Tanza-nia**	**Uganda**	**AfrN**	**X_ECOWAS**	**CEMAC**	**X_AfCent**	**X_AfOri-ent**	**SACU**
United States	−12.36	−1.79	1.77	0.76	0.91	−1.28	4.9	0.84	−0.11	4.55	−1.67	−3.19	−0.17	0.98	3.5
China	−9.8	4.12	3.5	8.73	3.73	0.7	7.08	2.92	1.03	5.43	1.37	−5.65	1.88	4.34	5.22
European Union	−10.17	−0.1	1.7	3.22	1	−1.41	5.48	0.45	0.11	4.26	0.74	−4.03	0.4	1.18	3.61
World	0.89	2.91	3.25	3.64	2.24	2.62	6.67	2.41	2.42	5.57	3.33	6.06	3	3.54	4.27
Africa	227.59	10.81	7.88	2.55	8.32	11.42	10.65	6.45	13.92	24.36	10.78	67.96	25.96	6.16	4.47

Source: Authors' computation based on MIRAGRODEP.

Note: Exporters are in rows, and importers are in columns. AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa; X_ECOWAS: rest of Economic Community of West African States.

APPENDIX C: DETAILED IMPACTS ON ECONOMIC ACTIVITY

Appendix C, Table 1 Impact on value added, 2035 (% change from the baseline)

Country/Region	AFCFTF					AFCFTA				
	Agrofood	Livestock	Crops	Industry	Services	Agrofood	Livestock	Crops	Industry	Services
Ethiopia	−0.4	−0.59	−0.32	−0.37	−0.43	−0.26	−0.42	−0.21	−0.21	−0.23
Ghana	−0.02	−0.12	−0.03	0.02	0.04	−0.01	−0.09	−0.02	0.03	0.03
Kenya	−0.02	−0.03	−0.02	0.05	0.02	−0.01	−0.01	−0.01	0.03	0.01
Mozambique	0.01	0.03	0	−0.08	0.03	0	0.02	0	−0.05	0.02
Nigeria	−0.01	−0.02	−0.01	0.02	0	0	−0.01	0	0	0
Rwanda	−0.01	−0.03	−0.01	0.01	0.02	0	−0.01	0	0	0.01
Senegal	−0.01	−0.07	−0.22	−0.06	0.02	0.01	−0.08	−0.07	−0.02	0
Tanzania	−0.04	−0.15	−0.08	0.12	0	−0.01	−0.04	−0.02	0.05	0
Uganda	−0.03	−0.12	−0.03	0.02	0.02	−0.01	−0.04	−0.02	0	0.02
AfrN	0.1	−0.04	−0.04	0.18	−0.03	0.12	0.03	0	0.14	−0.03
X_ECOWAS	0.04	−0.23	−0.06	0.05	0.02	−0.04	−0.19	−0.07	0.04	0.03
CEMAC	−0.69	−1.36	−0.65	0.4	−0.03	−0.48	−0.96	−0.45	0.34	0.01
X_AfCent	−0.24	−0.83	−0.43	0.19	0.02	−0.06	−0.01	−0.09	0.04	0.01
X_AfOrient	0.09	−0.06	0.17	0.04	−0.03	0.03	−0.05	0.08	0.08	−0.02
SACU	1.08	0.49	1.18	0.12	−0.01	0.49	0.43	0.25	0.12	−0.01

Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa; X_ECOWAS: rest of Economic Community of West African States.

Appendix C, Table 2 Impact on value added, 2035 (% change from the baseline)

Country/Region	AFCFTATF				
	Agrofood	Livestock	Crops	Industry	Services
Ethiopia	−0.06	−0.5	0.03	−0.46	−0.1
Ghana	0.15	−0.52	0.14	−0.61	0.14
Kenya	0.44	0.2	0.78	−0.17	0.07
Mozambique	0.77	−0.34	0.74	0.66	0.57
Nigeria	0.16	0.05	0.18	0	−0.01
Rwanda	0.02	−0.32	0.03	−0.16	0.21
Senegal	−0.37	−1.11	−0.37	1.04	0.88
Tanzania	0.17	−0.31	0.22	0.01	0.17
Uganda	0.59	1.13	0.45	−0.6	0.1
AfrN	0.08	−0.8	0.15	0.57	0.2
X_ECOWAS	0.15	−0.43	0.04	0.37	0.34
CEMAC	0.01	−1.25	0.2	0.68	0.14
X_AfCent	−0.07	−0.09	−0.21	0.52	0.11
X_AfOrient	0.52	0.74	0.55	−0.21	0.12
SACU	1.78	0.97	2.76	0.54	0.17

Source: Authors' computation based on MIRAGRODEP.
Note: AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa; X_ECOWAS: rest of Economic Community of West African States.

APPENDIX D: IMPACT ON LABOR DEMAND

Appendix D, Table 1 Impact on unskilled labor demand, 2035 (% change from the baseline)

	AFCFTF														
	Ethiopia	**Ghana**	**Kenya**	**Mozambique**	**Nigeria**	**Rwanda**	**Sene-gal**	**Tanza-nia**	**Uganda**	**AfrN**	**X_ECOWAS**	**CEMAC**	**X_AfCent**	**X_Af Ori-ent**	**SACU**
Agrofood	−0.02	−0.03	−0.02	0.03	0	−0.01	−0.04	−0.04	−0.02	−0.1	0.01	−0.48	−0.29	0.09	1.01
Livestock	−0.17	−0.12	−0.04	0.05	−0.01	−0.04	0.01	−0.15	−0.11	−0.17	−0.21	−1.06	−0.76	−0.09	0.44
Crops	0.09	−0.03	−0.02	0.02	0	−0.01	−0.16	−0.06	−0.02	−0.19	−0.06	−0.41	−0.36	0.16	1.32
Industry	0.04	0.02	0.06	−0.23	−0.01	0.02	0.04	0.15	0.05	0.34	0.03	0.55	0.47	−0.02	−0.03
Services	0.03	0.02	0.02	0.01	0.01	0.01	0.06	0.02	0.02	−0.13	−0.02	0.26	0.08	−0.04	−0.1
	AFCFTATF														
Agrofood	0.02	0.16	0.23	0.21	0.09	−0.06	−0.65	0	0.24	−0.32	−0.1	−0.18	−0.15	0.44	1.54
Livestock	−0.32	−0.5	−0.2	−0.88	−0.02	−0.42	−1.26	−0.49	0.93	−1.37	−0.57	−1.28	−0.11	0.7	0.7
Crops	0.14	0.19	0.43	0.16	0.1	−0.04	−0.5	0.1	0.12	−0.19	−0.16	−0.02	−0.23	0.41	2.79
Industry	−0.27	−0.62	−0.71	−0.25	−1.18	−0.07	1.28	−0.16	−0.97	0.52	0.18	0.25	0.23	−0.55	0.04
Services	0.03	0	−0.21	−0.08	−0.09	0.09	0.74	0.02	−0.25	−0.11	0.07	0.09	0.05	−0.04	−0.17

Source: Authors' computation based on MIRAGRODEP.

Note: Exporters are in rows, and importers are in columns. AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa; X_ECOWAS: rest of Economic Community of West African States.

Appendix D, Table 2 Impact on skilled labor demand, 2035 (% change from the baseline)

	AFCFTF														
	Ethiopia	**Ghana**	**Kenya**	**Mozambique**	**Nigeria**	**Rwanda**	**Sene-gal**	**Tanza-nia**	**Uganda**	**AfrN**	**X_ECOWAS**	**CEMAC**	**X_AfCent**	**X_AfOri-ent**	**SACU**
Agrofood	−0.15	−0.03	−0.03	0.02	0	−0.02	0.1	−0.02	−0.04	0.1	0.18	−0.6	−0.08	0.09	0.87
Livestock	−0.24	−0.12	−0.05	0.02	−0.02	−0.05	−0.08	−0.14	−0.12	−0.08	−0.21	−1.08	−0.68	−0.02	0.47
Crops	−0.04	−0.04	−0.03	0.01	−0.01	−0.02	−0.21	−0.06	−0.05	-0.1	−0.07	−0.61	−0.34	0.16	1.1
Industry	−0.12	−0.01	0.04	−0.08	−0.02	−0.02	−0.06	0.09	0	0.41	−0.02	0.13	0.3	0.05	0.04
Services	0.01	0	0	0	0	0	0	0	0	−0.13	−0.01	0.05	−0.03	−0.01	−0.05
	AFCFTATF														
Agrofood	−0.13	−0.05	0.31	0.39	0.14	−0.1	−0.76	−0.01	0.57	−0.07	0.22	−0.25	0	0.36	1.26
Livestock	−0.45	−0.66	0.08	−0.55	0.02	−0.41	−1.59	−0.48	1.12	−0.53	−0.59	−1.08	−0.09	0.52	0.69
Crops	−0.06	−0.05	0.6	0.2	0.2	−0.1	−0.9	0.1	0.44	−0.04	−0.06	−0.1	−0.21	0.38	2.48
Industry	−0.49	−0.6	−0.46	0.15	−0.79	−0.37	1.21	−0.1	−0.54	0.57	0.15	0.04	0.08	−0.24	0.12
Services	0.01	0.03	−0.03	−0.04	0	0.02	0	0	−0.03	−0.16	−0.02	0.02	−0.01	0	−0.08

Source: Authors' computation based on MIRAGRODEP.
Note: Exporters are in rows, and importers are in columns. AfrN = North Africa; CEMAC = Economic and Monetary Community of Central Africa; SACU = Southern African Customs Union; X_AfCent = rest of Central Africa; X_AfOrient = rest of Oriental Africa; X_ECOWAS: rest of Economic Community of West African States.

Appendix E, Table 1 Summary of previous studies

Model	World Bank (2020)	UNECA-CEPII (2021)	JRC (Simola et al., 2021)	IFPRI (2025)[13]
	ENVISAGE	MIRAGE	MAGNET	MIRAGRODEP
Geographic and sector disaggregation	34 countries/regions and 28 sectors	29 countries/regions and 30 sectors	36 countries/regions and 40 sectors	21 countries/regions and 20 sectors
Tariff aggregator	Trade weighted	Reference groups' trade weights	Trade weighted	Consistent aggregator
Criteria for selection of excluded products	Minimize tariff revenue losses	Political economy approach + promotion of industrializa-tion + green industrialization	Minimize tariff revenue losses	Political economy
Scenario	Tariffs + NTMs + services + TFA	Tariffs + NTMs + services	Tariffs + NTMs + services	Tariffs + TFA
Impact on intra-African trade	+81%	+33.8%	+22%	+18.48%

Source: Authors and Bouët, Laborde Debucquet, and Traoré (2022).
Note: JRC = Joint Research Centre; NTMs = nontariff measures; TFA = trade facilitation agreement. UNECA-CEPII = United Nations Economic Commission for Africa—Centre for Prospective Studies and International Information.

[13] This study

ABOUT THE AUTHORS

Fousseini Traore is a senior research fellow in the Markets, Trade, and Institutions (MTI) Unit of the International Food Policy Research Institute (IFPRI).

Pierre Mamboundou is an associate research fellow in IFPRI's MTI unit.

Insa Diop is a research analyst in IFPRI's MTI unit.

Abdourahmane Sy is a research analyst in IFPRI's MTI unit.

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1201 Eye Street, NW, Washington, DC 20005 USA | T. +1-202-862-5600 | F. +1-202-862-5606 | Email: ifpri@cgiar.org | www.ifpri.org | www.ifpri.info