

The Economy-wide Effects of the African Continental Free Trade Area (AfCFTA): Evidence from Ethiopia

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Abstract

Economic integration, which has been an important feature in the international economy, is an integral part of the economic policy issue of global, continental, and regional economies. However, empirical evidence on the potential economy-wide effects of economic integration in Ethiopia is inconclusive and hence unable to provide policy guidance. The main aim of this study is to identify aspects of the sectoral, trade, revenue, and welfare effects of the African Continental Free Trade Area (AfCFTA) on Ethiopia's economy. This study employed a recursive dynamic computable general equilibrium (CGE) model based on the 2015/16 social accounting matrix (SAM) dataset. The result shows that AfCFTA is likely to improve sectoral productivity, trade flows, and welfare. However, government revenue has decreased due to tariff reductions. Given that revenue from foreign trade is the main source of government income, four interventions could cushion the adverse effects of AfCFTA on government revenue. First, there is a need to broaden the tax base through identifying new taxes. Second, improve the efficiency of tax administration and collection through automation. Third, expand the scope of the tax net through the formalization of the informal sector by addressing the challenges of licensing, registration, and tax payment. Finally, it is necessary to retain tariff lines for strategic commodities over a short-to-medium term.

Keywords: Economic integration, Economy-wide, Welfare, Trade, Sectoral, Revenue, AfCFTA, and Ethiopia

Introduction

Economic integration enables the region's larger economies to enhance their economic welfare and facilitates and encourages economic expansion by eliminating various trade barriers (Castro et al., 2004; Snorrason, 2012). However, economic integration in Africa remains weak due to the absence of a basic state element of sovereignty (Shaw, 2009). The study by Zepeda, et al., (2011)

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reflects those countries in Africa face the challenges of accepting the conditionality of international regulatory reforms, and economic integration is considered to support inclusive growth in the African continent by sustaining human capital development. More open economies tend to grow faster than closed ones (Edwards, 1993) and the former enjoys welfare improvements (Hamdi and Hakimi, 2021).

However, economic integration in Africa remains weak due to undiversified economic structure and other barriers such as low per capita densities of road and rail infrastructure, absence of policy coherence, overlapping membership, lack of government commitment, and weak private sector involvement are the main challenges in Africa's economic integration (Gada and Haile, 2002). In addition, a weak business environment is the main challenge in Africa which restricts the participation of the private sector and stifles competition and productivity (Beyene, 2014; Ariovich, 1979). As the African geopolitical structure is mainly dominated by the Western colonial hegemony, which resulted in small and disintegrated domestic markets, the trade diversion effect dominates the economic welfare loss (Baldwin and Seghezza, 1998; Claassen et al., 2016).

Despite many challenges, African governments considered continental economic integration as a policy measure to advance and support the continent's socioeconomic transformation. Therefore, the African Union (AU) member countries signed the AfCFTA agreement on March 21, 2018. Ethiopia is one of the signatory countries. According to ECA (2018), the AfCFTA likely improve intra-African trade by 52.3% by 2022 by reducing import tariffs by 90%. Moreover, AfCFTA is seen as an instrument to unify Africa's political and cooperative work on the international level (Gérout et al. 2019). The expected gain from such economic integration is mainly dependent on consistent and sustainable efforts by the member countries and the potential to implement regulatory agreements. For Ethiopia, the justification for joining the AfCFTA is to improve intra-African trade through the movement of resources, attract foreign investments, and share common benefits.

Despite the perceived benefits of AfCFTA, there are also potential costs of joining AfCFTA. The benefits and costs of AfCFTA as well as disaggregated sectoral and welfare effects require a deeper assessment to provide empirical evidence for policy guidance. Moreover, this study examined whether Ethiopia is justifiable on account of joining the AfCFTA by quantifying its economy-wide

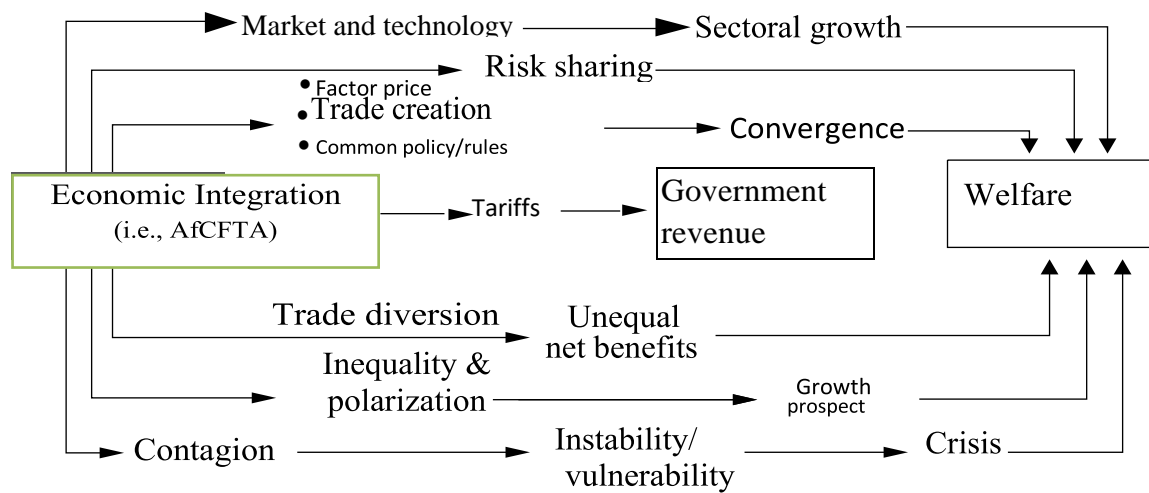
effects. This research contributes to the literature in a variety of ways. There is a paucity of empirical evidence on the potential economy-wide effects of AfCFTA on Ethiopia. Previous studies focused on qualitative and partial equilibrium and static general equilibrium assessment which do not provide adequate evidence on the economy-wide benefits and cost of AfCFTA in the short and long-run. Therefore, this study aims to examine the potential economy-wide effects of AfCFTA implementation on the Ethiopian economy using a recursive dynamic computable general equilibrium framework. The study quantifies the potential welfare, trade, revenue, and sectoral implications of AfCFTA on the Ethiopian economy.

Conceptual Framework

Economic integration is an agreement between different countries to establish or form free trade areas to remove trade barriers (Venables, 2000). Furthermore, trade diversion, which is a risk inherent in the economic integration discourse, can be prevented even if the low-cost manufacturer is not a member of the union. In a low common external tariff, non-member countries may still offer a selling price below that of member countries and this creates a production effect leading to more efficient use of economic resources (Hodgson et al, 2003).

Economic integration, may either have trade creation or diversion effects, which have a positive or negative economy-wide impact (Viner, 1950). It's one instrument that countries use to achieve their trade creation and welfare improvement as it broadens and links markets to regions, (Balassa and Stoutjesdijk, 1975). Trade diversion, on the other hand, happens when trade from a non-member country is redirected to a member country due to preferential treatment of the member's goods, although the non-member country's producers are more efficient and can offer more competitive prices with non-discriminatory tariffs (Viner 1950; Balassa 1963).

Figure 1: Provides the conceptual framework linking welfare, trade, revenue, and economic integration.



Source: Krauss and Johnson (2017)

Data and Method of Research

Data

This study uses various data sources including trade data from the Ministry of Revenues dataset of the 2015/16 import and export account, the National Bank of Ethiopia (NBE) dataset of 2015/16 for factor payments, and other data and incorporated them into the 2015/16 Ethiopia’s social accounting matrices (SAM). The 2015/16 SAM is a multi-sectoral Social Accounting Matrix (SAM) of Ethiopia which has been prepared by the Ethiopian Development Research Institute (EDRI) (now Ethiopian Policy Studies Institute). Note that the trade data was further disaggregated to capture Ethiopia’s trade with African countries and the rest of the world. There are two rest of the world accounts: the rest of Africa, and the rest of the non-Africa world. Thus, disaggregating the trade records (both import and export) with Ethiopia’s trade with Africa and the non-Africa world is one feature of this study.

Elasticities: In this study, elasticity significantly affects Ethiopia’s intra-Africa trade. As a result, elasticity data were obtained from previous studies, such as GTAP.

Tariff data: Tariffs are taxes levied on goods and services imported from other countries. In this study, a tariff is a policy variable, and the scenario is based on the tariff reduction policy

implementation in the AfCFTA implementation. Tariff data were also collected from the Ministry of Revenues.

Other data sources have also been used, including the World Bank (World Development Indicators), World Trade Organization, International Monetary Fund (IMF), International Trade Center (ITC), and World Integrated Trade Solutions (WITS).

Model Design and Calibration

A variety of studies have been conducted to assess the likely impact of AfCFTA on member countries and beyond. Given the multisectoral effects of AfCFTA implementation, an economy-wide framework is required to better assess the policy impact and to help understand the consequences of AfCFTA. This study adopts a recursive dynamic Computable General Equilibrium (CGE) model approach to examine the potential economy-wide effects of the African continental free trade area on the Ethiopian economy. The dynamic CGE model helps quantify both the short- and long-run effects of AfCFTA implementation. The simulation is also supported by a descriptive analysis of socioeconomic variables.

Model Specification

There are various policy measures in those designs in an economy, and the implementation of such policy has an economy-wide effect. Some policies change very slowly over time, and they also use simple analysis methods such as average calculation, ratios, charts, tables, and simple graphs. In this model, the rational economic actors' preferences were characterized by the constant elasticity of substitution (CES) function. Thus, the CGE model employed in this paper is specified by including the most important economic agents and accounts.

Demand Side of the Economy

Households

Households receive a reward of rent, wages, and interest, which is paid out by producers and consumed from the goods market; they are manufactured by businesses and provide happiness to households. Each sub-composite good is a domestic and imported product (see Hertel and Winters, 2005). The utility function is

$$U_{hh} = \sum_i (a_{i,hh} C_{i,hh}^{phh} + B_{hh} L_{hh}^{1-phh})^{\frac{1}{phh}} \dots\dots\dots (1)$$

Where, U_{hh} refers to the household's utility function, $C_{i,hh}$ refers consumption of the household's commodity i , L_{hh} is leisure time of households, $\alpha_{i,hh}$ and $\beta_{i,hh}$ refers to household income share spent on consumption of good i and share spent on leisure, respectively; and ρ is the elasticity parameter; elasticity of substitution between consumption and leisure given by $\rho_{hh} = \frac{1}{1-\rho_h}$

The term "disposable income" refers to a household's income after tax deductions, as determined by:

$$Y_d = \sum_j \sum_i r_j (1 - t_{j,i}) \theta_{j,i} K_j + (1 - t_l) \omega L + TR \dots \dots \dots (2)$$

From equation (2), disposable income is represented by Y_d , the share of assets j in sector i explained by $\theta_{j,i}$, K_j is household capital endowment type j , the capital j rental rate is r_j , the labor endowment is L , the wage rate is w , the capital j tax rate in sector i is $t_{j,i}$, the labor income tax is t_l , and the transfer income is TR . In the other way, disposable income is:

$$P(1 + t_v)C + \omega(1 - t_l)L = Y_d \dots \dots \dots (3)$$

where C refers to the commodity, P is the price, and t_v is the consumption tax, which includes all taxes and subsidies.

By maximizing Equation (1) about Equations (2) and (3), we obtain the demand function for consumption and leisure.

Consumption of goods is given by:

$$C = \left(\frac{\alpha Y_d}{(P(1 + t_v))^{1-\alpha} (\alpha(P(1 + t_v))^{1-\alpha} + \beta(\omega(1 - t_l))^{1-\alpha})} \right) \dots \dots \dots (4)$$

The consumption of leisure is given by:

$$L = \left(\frac{\beta Y_d}{(\omega(1 - t_l))^{1-\alpha} (\alpha(P(1 + t_v))^{1-\alpha} + \beta(\omega(1 - t_l))^{1-\alpha})} \right) \dots \dots \dots (5)$$

L_s refers to Labor supply, which is the difference between the endowment of labor and demand for leisure L by households. Mathematically,

$$L_s = \bar{L} - L \dots \dots \dots (6)$$

When the total supply of labor meets the total demand for employment, the labor market reaches equilibrium. The final consumption function is given by:

$$C = \varphi \left(\left(\sum_i \left(\delta_i^c C C_i^{\frac{\sigma-1}{\sigma}} \right) \right) \right)^{\frac{\sigma-1}{\sigma}} \dots \dots \dots (7)$$

where CC_i refers to the consumption of the i th good (it includes both domestic and imported), φ stands for constant elasticity of substitution (CES), and the consumption share given by δ_i^c . The value of such consumption mathematically is

$$P.C = \sum_i P_i.CC_i \dots\dots\dots (8) \text{ For } i = 1,2,3 \dots \dots N$$

Supply Side of the Economy

The CGE model considers production by a set of products (goods) to produce inputs that are needed. In the production sector, rational representative economic agents exercised their motives of profit maximization. We refer to the prices and factors of production as market signals for their decision on the level and amount of production. They purchase input from households and semi-finished goods from other firms and produce final products that are available in the market for sale. As a result, the supply side of the economy may be expressed mathematically as:

$$GVA_i = \Omega_i\{(1 - \delta_i)(K_i)^{\gamma_i} + \delta_i((L_i)^{\gamma_i})\}^{\frac{1}{\gamma_i}} \dots\dots\dots (9)$$

where GVA_i is gross value added, Ω_i is a changing parameter, K_i and L_i are capital and labor used in sector i , δ_i is the CES of labor, and γ_i is the CES in both factors. The sector Y_i total output includes value-added, GVA_i , and other inputs (i.e., mainly intermediate) Bhattarai (2008).

$$PY_iY_i = PV_i.VA_i + \sum_j PA_i.(1 + t_{i,j}^d)DI_{i,j} + \sum_j PM_i.(1 + t_{i,j}^m)MI_{i,j} \dots\dots (10)$$

The demand for domestic and imported intermediate inputs is expressed in the preceding equation (i.e., equation 10) $DI_{i,j}$, and $MI_{i,j}$, respectively; PV_i is the price for value-added goods, and taxes on intermediate goods (domestic and imported) are explained by $t_{i,j}^d$ and $t_{i,j}^m$. Then, the profit function is given by:

$$\pi_i = PY_iY_i - \omega L_i - \sum_{i,j} r_j K_{i,j} - \sum_j PM_i.(1 + t_{i,j}^m)MI_{i,j} - \sum_j PA_i.(1 + t_{i,j}^d)DI_{i,j} \dots (11)$$

In equation (11), π_i is profit from sector i ; all other coefficients are explained above. When components are in equilibrium, their marginal products match their prices.

Trade and Aggregate Supply

The CGE model considered the trade among different countries, in which there are own sets of consumers, producers, and governments. As a result, imports and exports must be considered. Foreign and local products are not ideal equivalents, according to the CGE model; therefore, goods in international trade are heterogeneous of the product’s country of origin (the Armington assumption) Armington (1969). Mathematically, it is given by

$$A_i = \Phi \left((1 - \delta_i^m) D_i^{\frac{\delta_m - 1}{\delta_m}} + \delta_i^m M_i^{\frac{\delta_m - 1}{\delta_m}} \right)^{\frac{\delta_m}{\delta_m - 1}} \dots\dots\dots (12)$$

From equation (12), A_i is the CES domestic supplies D_i and import supplies M_i , the supply elasticity of substitution is given by δ_i^m , and Φ is the shift parameter for aggregate supply. To recapitulate, the equilibrium of the products market is provided by:

$$A_i = CC_i + G_i + I_i \dots\dots\dots (13)$$

G_i and I_i represent government consumption and investment, respectively, as shown in equation (13). We explained the value form as follows:

$$PA_i A_i = PD_i D_i + PM_i M_i \dots\dots\dots (14)$$

In equation (14), D_i is domestic supplies and M_i is import supplies; these supplies are labeled PD_i and PM_i , respectively, in terms of price.

Public Sector

Governments provide public goods, and social insurance, and transfer income to households by collecting taxes and tariffs, disbursing subsidies, and purchasing goods and services. Hence, the government is a governing institution that seeks to achieve the welfare of the nation or people and uses policy instruments to manage exogenous shocks or any new policy issues such as continental integration agreements that lead to adjustments to the rest of the economy. The public sector is explained by:

$$G + TR = \sum_j \sum_i t_{j,i}^k r_j K_{j,i} + \sum_i t_i^{vc} P_i CC_i + \sum_i t_i^{vg} P_i G_i + \sum_i t_i^{vk} P_i I_i + \sum_i t_l \omega LS + \sum_i t_i^m M_i + \sum_j \sum_i PA_j t_{i,j}^m M_{j,i} + \sum_j \sum_i PA_j t_{i,j}^d D_{j,i} \dots\dots\dots (15)$$

In equation (15), government expenditure is explained by G , and $t_{j,i}^k$ is the tax rate on capital income from asset j used in sector i . ad valorem tax rate on final consumption is represented by t_l^{vc} , where t_l^{vg} is the indirect tax rate on government consumption, t_i^{vk} is the rate of tax on investment, and t_i^m is the tariff (tax on imports). The following formula is used to determine the monetary worth of government consumption:

$$G = \sum_i PA_i GD_i + \sum_i PA_i GM_i \dots\dots\dots (16)$$

where government consumption of domestic and imported goods is denoted by GD_i and GM_i , respectively.

Markets and the Relative Prices

Consumers have preferred a utility-maximizing basket of products given their budget or incomes, whereas producers have a decision on production levels and amounts that maximize their profits. With a CGE simulation, the policymaker tries to rank a policy option in consumer welfare.

$$Y_i = \theta \left(\left((1 - \delta_i^e) D_i^{\frac{\delta_y - 1}{\delta_y}} + \delta_i^e E_i^{\frac{\delta_y - 1}{\delta_y}} \right)^{\frac{\delta_y}{\delta_y - 1}} \right) \dots \dots \dots (17)$$

In equation (17), E_i stands for exports, D_i is domestic supplies, the elasticity of substitution given by δ_i ; and δ_i^e and θ stands for a share of exports and production shift parameters, respectively. The total worth of a country's gross domestic product (GDP), which includes both domestic and foreign sales.

$$PY_i Y_i = PD_i Y_i + PE_i E_i \dots \dots \dots (18)$$

The export earnings equal the cost of imported goods in equilibrium.

$$\sum_i PE_i E_i = \sum_i PM_i M_i \dots \dots \dots (19)$$

where PE_i and PM_i represent the world prices of exported and imported commodities, respectively.

Equilibrium Conditions

For a competitive market equilibrium to exist, two conditions must be satisfied: (i) equilibrium in both factor and product markets (or demand equals supply); (ii) The budget constraints of economic agents such as households, producers, and government are satisfied.

Model Closures and Savings and Investment

The investment demand I function is given as:

$$I = \sum_i PA_i ID_i + \sum_i PA_i IM_i \dots \dots \dots (20)$$

where ID_i and IM_i refer to domestic and imported investment demand for items i , respectively.

The capital market is regarded as closed when the savings-investment identity closes the model. This suggests that the distribution of assets or resources across sectors equals domestic asset endowments, as described by: $\bar{K}_j = \sum_i K_{i,j} \dots \dots \dots (21)$

\bar{K}_j is the endowment of the j th asset, and $K_{i,j}$ is the allocation asset in sector i in equation (21).

The redistribution will continue until all industries have the same capital rental rate. For the

Ethiopian economy, where capital mobility is reliant on local and international rates of return, the premise of a closed capital market is unrealistic. It is discussed in further detail by:

$$\bar{K}_j + FK_j = \sum_i K_{i,j} \dots \dots \dots (22)$$

The net inflow or outflow of asset type j (i.e., FK_j) is determined using equation (22). It primarily focused on the gap between the rental rate in Ethiopia and the rest of the world.

$$r_j^{et} \geq r_j^\omega \implies FK_j \geq 0; \quad r_j^{et} \leq r_j^\omega \implies FK_j \leq 0 \dots \dots \dots (23)$$

Model Equilibrium Condition and Closures

The market clearing or equilibrium condition for the product market is discussed in further detail:

$$Y_i = F_i^d + \sum_{j=1}^N \alpha_{i,j}^d Y_j \dots \dots \dots (24)$$

The disaggregation of final demand in the economy, which is composed of consumption by household, investment, and government expenditure) then, symbolically; $F_i^d = C_i^d + I_i^d + G_i^d + E_i^d$ and $\sum_{j=1}^N \alpha_{i,j}^d Y_j$ refers to aggregate demand for intermediate goods, and $\alpha_{i,j}^d$ is sector i input for sector j production.

Evaluation of Welfare Change

According to Martin (1997), many indicators of welfare have been applied in the context of the CGE simulation of economic integration. The most popular measure of well-being is equivalent variation, which is one of numerous indicators. It is a monetary measure of well-being that may be used to examine interpersonal welfare comparisons in a model. It serves as a point of comparison for various policy initiatives.

The global or continental welfare impact of trade liberalization may then be examined by adding various metrics of comparable variation. The values of equivalent variation and compensatory variation between benchmark and counterfactual situations can be determined as follows; according to Shoven and Whalley (1992), they are expressed mathematically as follows.

$$EV^{hh} = \left(\frac{U_{new}^{hh} - U_{old}^{hh}}{U_{old}^{hh}} \right) I_{new}^{hh} \quad \text{or} \quad CV^{hh} = \left(\frac{U_{old}^{hh} - U_{new}^{hh}}{U_{new}^{hh}} \right) I_{old}^{hh} \dots \dots \dots (25)$$

The levels of equivalent variation (EV) and compensating variation are affected by substitution elasticity in production and consumption (CV). It is mandatory to examine the degree of responsiveness of the equivalent variation (EV) to the gross domestic product (GDP) ratios for the resilience of the policy reform analysis to a collection of relevant substitution elasticities (Bhattarai and Whalley 1998).

Implementation

The recursive dynamic model is implemented using the general algebraic modeling system (GAMS), which is a mathematical programming system of general equilibrium (MPSGE) analysis. It was developed (or advanced) by Rutherford (1995) and Rutherford (1999). The software used a social accounting matrix as an input for the calibration and simulation of policy scenarios. The CGE requires market clearing, normal (or zero profit), and income and expenditure balance.

Scenarios Design

Baseline scenario:

Setting a baseline or reference is required to evaluate policy outcomes. In this case, the business-as-usual scenario serves as a base run scenario for comparison with the policy implementation (free trade agreement) scenario.

AfCFTA Scenario:

Under AfCFTA, trade among member countries aims to remove quantitative trade barriers through tariff cuts (reduction). Tariffs will be reduced by 90% for nonstrategic commodities. If countries follow this, then it is useful to know the economy-wide implications of such tariff reduction, including on the welfare of member countries.

Result and Discussion

Ethiopia's Macroeconomic Performance

Ethiopia's economy showed a remarkable average GDP growth rate of 8.45% for the past eight years (see Table 1). However, the economy is characterized by a low level of domestic savings, which is insufficient to finance investment (on average, for the last eight years, the saving-investment gap is approximately 15% of GDP), a huge level of trade deficit (for the past eight years, on average, 16.5% of GDP), high inflation (based on the NBE data, in 2020/21, the general inflation rate is 20.2), and a high budget deficit (-2.8% of GDP) (see table 1). These problems necessitate that the country depends on domestic borrowing, external debt, and assistance from developed countries and donor organizations.

The current government of Ethiopia introduced a new economic reform, the "Homegrown Economic Reform", in 2019, which aims to address the macroeconomic, sectoral, and structural challenges, including privatizing state-owned businesses. It promised to be financed mainly by

development partners, with an estimated \$10 billion, which is 3 times the current export value of Ethiopia and committed to contributing through technical assistance (Geda, 2019). Despite this reform, the COVID-19 pandemic and war in the northern part of Ethiopia worsened the economy. Hence, it aggravates the macroeconomic imbalances with the severe economic crisis, resulting in current socioeconomic problems and high inflation.

Ethiopia's GDP grew by 6.4% in the fiscal year 2021/22, with the COVID-19 pandemic affecting the country primarily in the fourth quarter. Crop production increased, while service and manufacturing growth slowed to single digits, and foreign demand is still depressed as a result of COVID-19; it is beginning to improve. Merchandise exports excluding gold fell by 4.1% year over year from July to December 2020, while most goods (excluding clothes) showed signs of improvement in the second quarter of the fiscal year. Merchandise exports increased by 21%, including gold. Services exports (including air travel) decreased by 9.2%. Moreover, remittances also decreased by 10% in fiscal year 2019/20. During the first half of fiscal year 2020/21, it recovered by 19.1%, and the net foreign direct investment decreased by 1.7% during the same period. Even though healthcare spending climbed dramatically in reaction to the pandemic, total spending decreased in fiscal year 2019/20. As demand has weakened, revenue collection has declined, owing primarily to a drop in indirect tax collections (see Table 1).

Table 1:**Overview of Ethiopia's Macroeconomic Performance**

Macro Indicator	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Real GDP (% Growth)	10.3	10.4	8.0	10.1	7.7	9.0	6.1	6.3
Consumer prices (% growth)	8.1	7.7	9.7	7.4	14.6	12.6	19.9	20.2
End of period Exchange rate Br/\$	19.5771	20.5659	23.8004	23.1018	27.2621	28.9109	34.9822	43.691
Gross Domestic Saving (% GDP)	17.57748	20.53588	19.74178	22.39868	22.36006	24.08531	22.12464	20.91319
Gross Domestic Investment (% of GDP)	34.08112	37.99373	40.67127	37.34877	38.44399	34.72882	35.26398	30.75215
Saving-Investment Gap (% of GDP)	-16.5036	-17.4578	-20.9295	-14.9501	-16.0839	-10.6435	-13.1393	-9.83896
Fiscal balance (% of GDP)	-2.6	-2.5	-1.87	-3.3	-3.0	-2.5	-2.5	-2.8
External debt stock (% of GNI)	26.47007	30.55355	31.78029	31.59332	32.19526	33.18835	29.76692	28.36146
Current account balance (% of GDP)	-6.36627	-10.3782	-11.7149	-10.6404	-7.2503	-5.47209	-5.23928	-2.52571
Exports of goods and services (% growth)	4.2132	20.18496	21.85153	0.047979	-7.46851	2.204038	18.4639	15.60305
Imports of goods and services (% growth)	0.275165	2.821866	-11.2187	-8.14108	7.665659	11.77793	17.70413	-0.51705
External balance on goods and services (% of GDP)	-16.5036	-17.4578	-20.9295	-19.2749	-15.8449	-14.454	-12.9353	-9.83896

Source: NBE, MoPD, and WDI

In sum, recently, Ethiopia has been challenged by a huge macroeconomic imbalance; among those, there is a large gap between imports and exports, which results in a trade deficit (see Table 1). This trade deficit is due to exporting primarily (or unprocessed) agricultural products and importing finished (or processed) capital goods. Thus, Ethiopia's participation in the African continental free trade area likely has its implications (or effects) on trade and the overall economy.

Ethiopia's Economic Structure by Major Sectors

Table 2 presents the disaggregated level of economic growth measured through major economic activities, and those economic sectors' contributions to Ethiopia's GDP growth are vital. In 2020/21, agriculture, hunting, and forestry grew by 5.6%, which is greater than the 4.3% growth recorded in 2019/20. Moreover, in the same fiscal year, mining and quarrying grew by 115.4%, and other major economic sectors showed improved performance in 2020/21. The Education sector in 2016/17 and mining and quarrying in the fiscal years from 2015/16 to 2018/19 showed negative growth.

Table 2: GDP growth (by Major economic activities)

Economic Activities	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Agriculture, Hunting, and Forestry	2.3	6.7	3.5	3.8	4.3	5.6
Crop	3.4	8.2	4.7	3.0	4.7	5.7
Animal Farming and Hunting	-1.5	4.2	0.6	6.0	3.3	5.8
Forestry	2.2	3.6	3.3	3.8	3.9	3.9
Fishing	0.1	0.5	11.3	2.3	2.8	1.7
Mining and Quarrying	-3.3	-29.8	-20.8	-21.9	91.4	115.4
Manufacturing	18.4	24.7	6.8	7.7	7.5	5.1
Large and Medium Scale Manufacturing	22.9	19.2	8.4	10.0	9.8	6.2
Small Scale and Cottage Industries	2.5	36.9	3.7	3.0	2.6	2.5
Electricity and Water	15.0	12.4	9.6	4.0	7.2	8.9
Construction	25.0	20.7	15.7	15.0	9.9	6.6
Whole Sale and Retail Trade	8.2	6.5	11.4	11.7	6.4	6.3
Hotels and Restaurants	15.6	0.1	6.1	9.0	2.2	2.6
Transport and Communications	13.7	15.1	6.4	21.0	1.1	7.0
Financial Intermediation	9.6	18.3	10.7	13.6	10.2	9.0
Real Estate, Renting, and Business Activities	3.7	4.4	6.2	7.5	9.5	8.9
Public Administration and Defense	7.4	13.2	8.9	9.0	2.3	4.9
Education	8.8	-3.2	3.6	3.5	1.8	2.0
Health and Social Work	10.8	7.0	8.3	14.3	12.9	13.4
Other Community, Social & Personal Services	3.0	4.5	5.1	6.3	2.5	2.0
Private Households with Employed Persons	4.3	3.5	3.9	2.5	2.3	2.2
GDP Growth	8.0	10.2	7.7	9.0	6.1	6.3

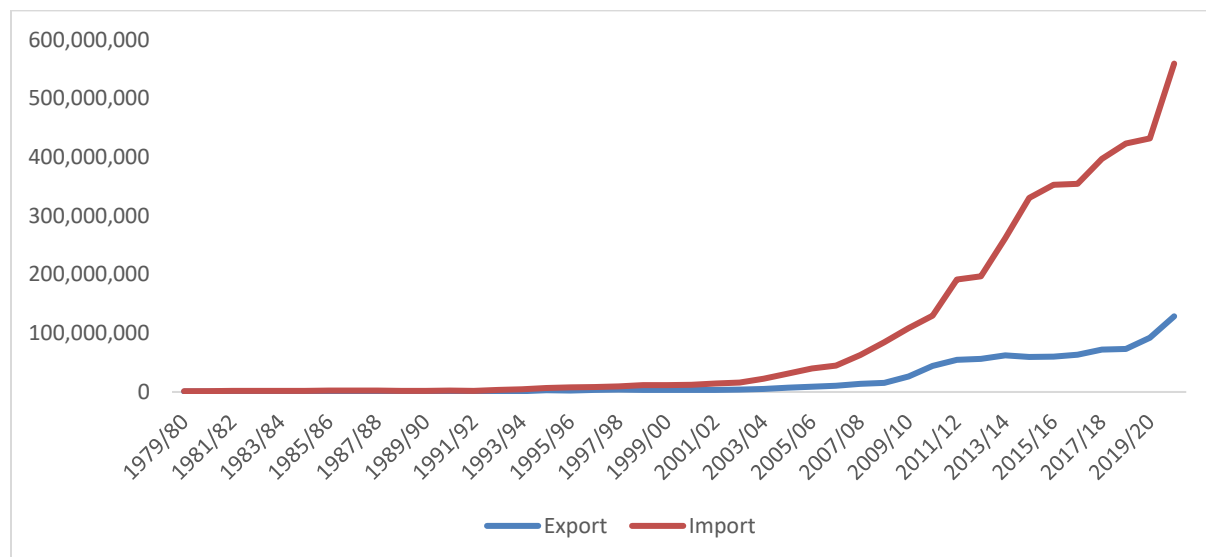
Source: Ministry of Planning and Development

Ethiopia's Trade Statistics: Trade Flows and Implications

Figure 2 presents trends in exports and imports and the resulting trade deficit. Both exports and imports have increased over time, with the latter growing at a higher rate compared with the former. Exports and imports stagnated from 1979/80 to 1990/91 due to restrictive trade policy. But both exports and imports increased between 1991/92 to 2003/04. In particular, there was a rapid increase in both the export and import capacity of Ethiopia after 2003/04, with a rapid expansion of imports which resulted in a widening of trade deficit.

Figure 2:

Import and Export Gap, 1979/80-2020/21 (US\$)

**Source:** Own computation data from NBE

Ethiopia's Intra-African Trade

Based on the World Trade Integrated solutions database, Ethiopia's trade-weighted most-favorable-nation tariffs on African imports ranged from zero percent for Botswana to 33.8% for Cape Verde in 2018. Ethiopia offers special tariffs to COMESA member countries. Ethiopia, on the other hand, has yet to join the COMESA Free Trade Area, although reiterating its pledge to do so in November 2020 (Naumann, 2021).

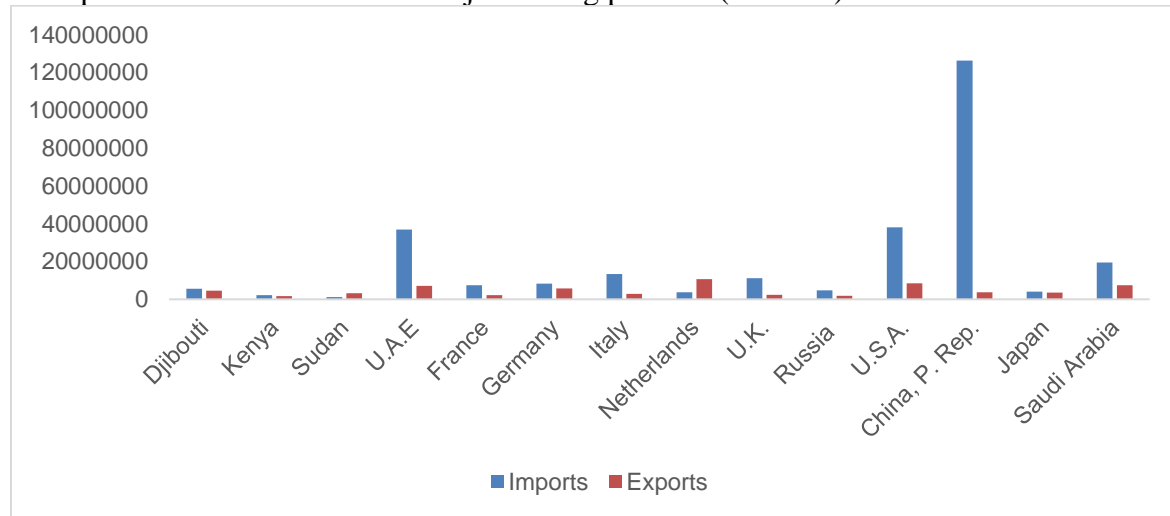
As part of the AfCFTA implementation, tariffs will be gradually removed (or fully liberalized). A 90% of tariff lines will be liberalized (to zero) over ten years for least developed nations (LDCs) and five years for non-LDCs (AfCFTA Secretariat, 2021). Sensitive products must account for no more than 7% of total tariff lines, while the exclusion list must account for no more than 3% of total tariff lines, with a 10% intra-Africa import value limit (Naumann, 2021).

Figure (3) provides a list of Ethiopia's top trading partners in 2020/21, which include three African countries (Djibouti, Kenya, and Sudan), accounting for a weak share of Ethiopia's total trade that year. The intraregional trade agreements, of which Ethiopia is currently a member, are a significant element of the three continental partners. However, except for trade with Sudan, the country

experiences a trade imbalance, i.e., the country is a net importer. Overall, Ethiopia's trade performance with the rest of the world is a negative balance, especially trade with China, the USA, the U.A.E, and Saudi Arabia shows a huge deficit. Generally, Ethiopia's intra-Africa trade balance is negative (trade deficit).

Figure 3:

Ethiopia's trade balance with its major trading partners (2020/21)



Source: Based on NBE data

Ethiopia's 2019/20 intra-African trade accounted for 10% of total trade, as Ethiopia had a goods trade surplus with African countries in 2015/16 and 2016/17, while in recent years, the net import of goods from African countries has become high, which results in a trade deficit (Table 3). In the last five fiscal years, 80% of Ethiopia's exports to the continent went to Somalia, Djibouti, and Sudan, while 80% of Ethiopia's imports from Africa were sourced from Kenya, Morocco, Egypt, and South Africa. Moreover, Ethiopia's trade with African countries shows a negative trade balance. In particular, trade with Kenya, Egypt, Morocco, Rwanda, Tunisia, and South Africa results in a huge trade deficit, while Ethiopia's trade with some African countries, such as Benin, Botswana, Congo, Comoros, Malawi, and Zambia, the results in a positive trade balance or surplus.

Table 3:
Ethiopia's Balance of Trade with Top African Countries Trade Partners, 2019

Countries	Import (US\$ million)	Export (US\$ million)	Trade balance (US\$ million)
Burundi	8.51	0.71	-7.8
Benin	0.25	0.61	0.36
Burkina Faso	42.5	1.56	-40.94
Botswana	0.17	2.82	2.65
Cote d'Ivoire	0.74	41.17	40.43
Republic of the Congo	0.06	0.37	0.31
Comoros	0.01	0.03	0.02
Egypt	2562.16	280.17	-2281.99
Ghana	15.97	18.59	2.62
Kenya	646.82	107.13	-539.69
Morocco	423.85	6.32	-417.53
Madagascar	42.24	0.99	-41.25
Mauritius	0.52	0.19	-0.33
Malawi	1.54	10.12	8.58
Namibia	0.16	0.02	-0.14
Nigeria	0.34	63.71	63.37
Rwanda	102.32	2.17	-100.15
Senegal	16.99	1.06	-15.93
Eswatini	0.01	0.07	0.06
Togo	12.55	0.1	-12.45
Tunisia	337.25	4.34	-332.91
South Africa	708.58	69.42	-639.16
Zambia	0.65	3.48	2.83
Zimbabwe	0.18	0.39	0.21
Total	4924.37	615.54	-4308.83

Source: Based on data from Trade Map of Ethiopia 2019

Ethiopia's major imported products from Africa between 2015/16 and 2019/20 consisted of fertilizers (24.5%), petroleum oil (10.9%), and coal (8.7%). In recent years, imports from African countries have significantly increased in 2019/20 double-digit growth in imports from Morocco and Egypt. Moreover, from 2015 to 2018, Ethiopia's major exports to African countries were composed of coffee (15%), kidney beans (12.5%), broad and horse beans (5.9%), vegetables (7%), and live cattle (4.6%).

Ethiopia's exports to the rest of Africa accounted for 21% of total world exports in fiscal year 2019/20; Ethiopia's major African export destinations include Egypt, Kenya, Nigeria, Ghana, and South Africa. In 2020, those countries' trade with Ethiopia was estimated to be approximately 529 million dollars. Vegetables, manioc roots, tubers, and coffee are the principal export items. On the other hand, Machinery and aircraft (15.9%), petroleum products (12.9%), metal and produced metals (11.2%), electrical materials (7.7%), and road motor vehicles (7.7%) were Ethiopia's primary imported goods in the last five fiscal years (6.7%). China accounted for approximately one-third of Ethiopia's imports during the same period, followed by the United States (7.7%) and the United Arab Emirates (UAE) (3.3%). Ethiopia had the highest trade imbalance with China in FY2020/2021. Ethiopian exports to China totaled \$84 million, compared to \$3.5 billion in purchases from the country, which resulted in a huge trade deficit (see Figure 4). However, Ethiopia's trade with Africa has remained low.

The Potential Benefits of Continental Free Trade Area

One of the key motivations behind the African Continental Free Trade Area (AfCFTA) is to boost intra-African commerce (or trade) and ensure the continent's socioeconomic advantages. It wants to do this by removing tariffs and non-tariff barriers. In a study by UNCTAD, most African countries' GDP will increase in the range of 1–3% as a result of the AfCFTA and its accompanying measures; the AfCFTA is predicted to increase intra-African commerce by 34.6 billion dollars by 2022, according to the findings. This would be a 52.3% increase over the baseline year of 2022 (if no policy change). The surge is projected to affect all key industries and economic sectors.

Table 4:

Ethiopia's Revenue Performance (revenues as % of total revenue and grants)

Fiscal Year	Tax revenue	Direct Taxes	Domestic indirect taxes	Import duties and taxes	Nontax revenue	External Grants
2014/15	77.0	31.0	20.0	26.0	15.0	8.0
2015/16	75.0	30.0	19.0	26.0	13.0	12.0
2016/17	76.0	31.0	20.0	25.0	18.0	6.0
2017/18	82.0	34.0	23.0	24.0	12.0	6.0
2018/19	78.0	34.0	23.0	22.0	12.0	10.0
2019/20	79.0	33.0	20.0	25.0	11.0	10.0
2020/21	81.0	36.0	23.0	22.0	12.0	7.0

Source: Ministry of Finance (MoF)

The estimates, on the other hand, appear to be based on the notion that Africa's economic woes are largely due to foreign factors such as tariff restrictions. In most African countries, such as Ethiopia, tariff revenue from trade (or import duties and taxes) is a significant source of government income. According to the Economic Commission for Africa, foreign trade taxes in Sub-Saharan Africa were the highest among developing areas, accounting for 30.5 percent of total revenue, compared to 22.5 percent in other low-income nations and 18.42 percent in other lower–medium-income countries (ECA, 2004). Thus, a free trade area (FTA) would result in (or likely have) a decrease in trade-tax revenue.

In Ethiopia, customs earnings account for over one-third of Ethiopia's total revenue (see table 4). As previously stated, while international trade taxes have steadily decreased in importance in many wealthy nations, they continue to be a substantial source of government revenue in many developing countries, such as Ethiopia. As a result, Ethiopia has been hesitant to sign trade agreements that may result in a reduction in its tariff earnings. This was apparent in the flimsy attempt made to execute changes under the COMESA Free Trade Area Agreement.

According to UNDP (2012), Ethiopia's Economic Partnership Agreement (EPA) with the European Union (EU) and entering the COMESA Free Trade Area (FTAs) have financial consequences and possible losses from trade tariffs. It also evaluates the country's prospective income compensatory methods, as well as the equitable, social, economic, and political ramifications of these options. The study recommends fiscal adjustments to help fund alternative revenue strategies. According to the report, Ethiopia's entry into the EPA/EU and COMESA free

trade zones will result in an 80% drop in import tariffs. This will result in revenue losses of US \$144.5 million and US \$27.4 million, totaling more than 4% of yearly national income. Finally, the finding suggests that the income loss from import tariffs can be offset by higher exports as a result of improved trade access, as well as possible increases in domestic trade taxes and VAT on imported luxury products. Ethiopia should proceed with the conclusion of the EPA with the European Union and entrance to the COMESA, according to the analysis, because the income loss may be offset.

Ethiopia will suffer a large income loss from other African nations (further reduction in tariffs revenue) who are not members of the EAC and COMESA as a direct result of adopting the AfCFTA's requirements. As a result, Ethiopia's policy of postponing tariff reductions under the AfCFTA obligations is a good one. For starters, it will postpone any potential revenue losses. Second, as previously said, the preferential treatment it wants would allow it to attract export-oriented foreign investors to help it manufacture, add value to, and increase its exports. Jobs may be created as a result of such investment, as well as a larger tax base. However, additional options for paying Ethiopia's trade taxes must be considered for the country's fiscal income levels to be unaffected by its membership in the AfCFTA.

Simulation result and discussion

Macroeconomic analysis

The implementation of the African continental free trade area tariff reduction will almost certainly affect Ethiopia's macroeconomic indicators. Hence, Ethiopia is one of the signatory member states in the AfCFTA agreement.

Table 5:

The effect of AfCFTA implementation on selected macro indicators (% change)

Macro Indicators	ABSORP	PRVCON	FIXINV	GOVCON	EXPORTS	IMPORTS	GDPMP	GDPMP2	GDPFC2
INITIAL	1836645	1099103	588705	148837.2	122366	-426439	1532572	1532572	1409454
BASE	6.9	6.3	8.6	2.6	16.1	7.8	7.9	7.9	8.3
AFTA	6.9	6.3	8.6	2.6	16.1	7.8	7.9	7.9	8.3

Source: Own computation based on CGE simulation result

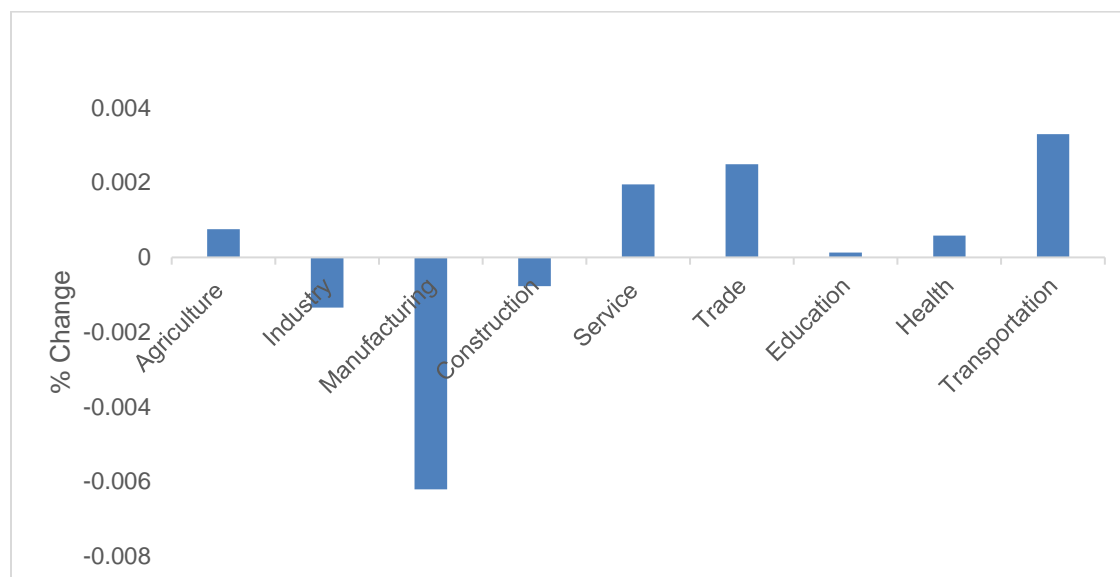
ABSORP is for absorption, PRVCON stands for private consumption, FIXINV stands for fixed investment, GOVCON stands for government consumption, exports, and imports, GDPM2 stands for GDP at market prices, and GDPFC2 stands for GDP at factor cost, as shown in table 5. There is no change in GDP growth in either the BASE line scenario or the AFTA simulation. This might be due to Ethiopia's very small intra-Africa trade share.

Sectoral Effects

The effect of tariff reduction in the AfCFTA policy implementation is used to quantify the sectoral effects. Figure 4 shows the sectoral effect of the AfCFTA implementation in Ethiopia. The simulation outcome reveals that AfCFTA implementation likely has both positive and negative effects on sectoral productivity. Hence, the deviation of the simulation result (i.e., AfCFTA) from the baseline scenario (i.e., BASE) is a positive change in the agriculture, service, trade, education, health, and transportation sectors. While it is also a negative change in the industry, manufacturing, and construction sectors. This is due to Ethiopia's intra-Africa small trade share and the fact that trade is mainly focused on unprocessed primarily agricultural products (or because there is no production support trade). In sum, the AfCFTA implementation (i.e., 90% tariff reduction) in Ethiopia will likely have a strong positive effect on the agriculture, service, trade, education, health, and transportation sectors. While it also negatively affects the industry, manufacturing, and construction sectors.

Figure 4:

The sectoral production effect of AfCFTA: (% deviation from baseline)



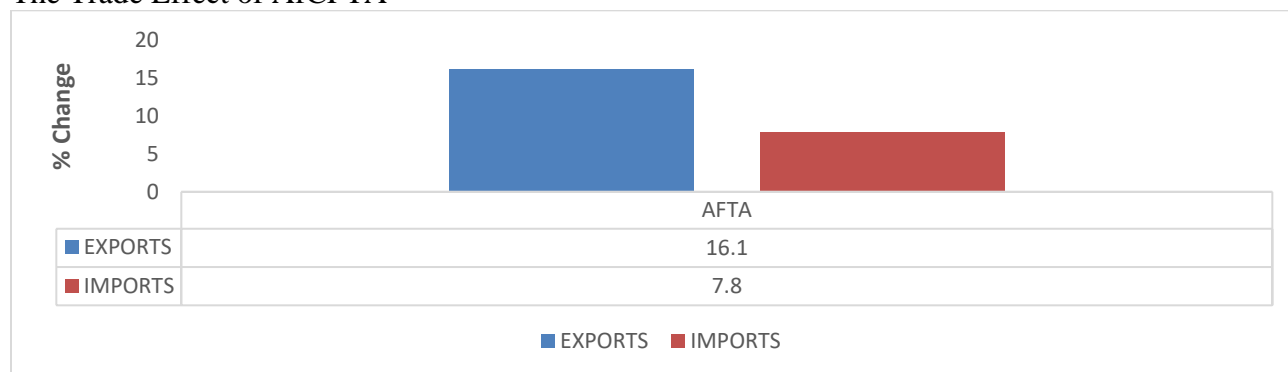
Source: Own computation based on CGE simulation result

Trade Effect

The implementation of the African continental free trade area in Ethiopia likely affects trade (either trade creation or the trade diversion effect). If exports exceed imports, trade creation results, and the reverse is trade diversion. Figure 5 shows that AfCFTA implementation in Ethiopia has a positive (or trade creation) effect. Hence, both exports and imports increased by 16.1% and 7.8%, respectively. Therefore, Ethiopia’s participation in the AfCFTA will likely have a positive trade creation effect.

Figure 5:

The Trade Effect of AfCFTA



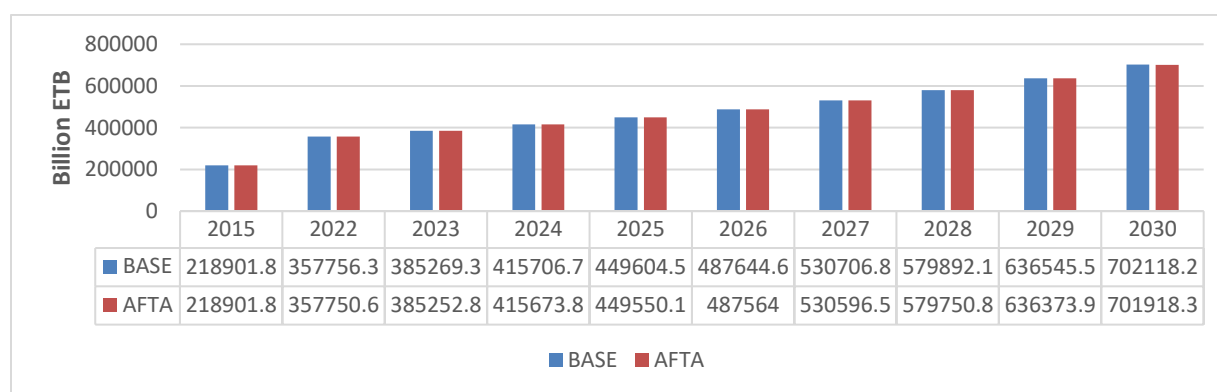
Source: Own computation based on CGE simulation result

Revenue implication (Fiscal Response)

Given that revenue from foreign trade has remained the main source of government income. Therefore, the implementation of the AfCFTA in Ethiopia will likely affect revenue (either gain or loss). Figures 6 and 7 present the revenue implication of the AfCFTA implementation in Ethiopia. Thus, the tariff reduction in the AfCFTA will likely have a revenue loss effect in Ethiopia. Hence, the deviation of AFTA from the BASE scenario is negative. This is due to tariff reduction because tariff duties and taxes on imports are significant sources of Ethiopian government revenue.

Figure 6:

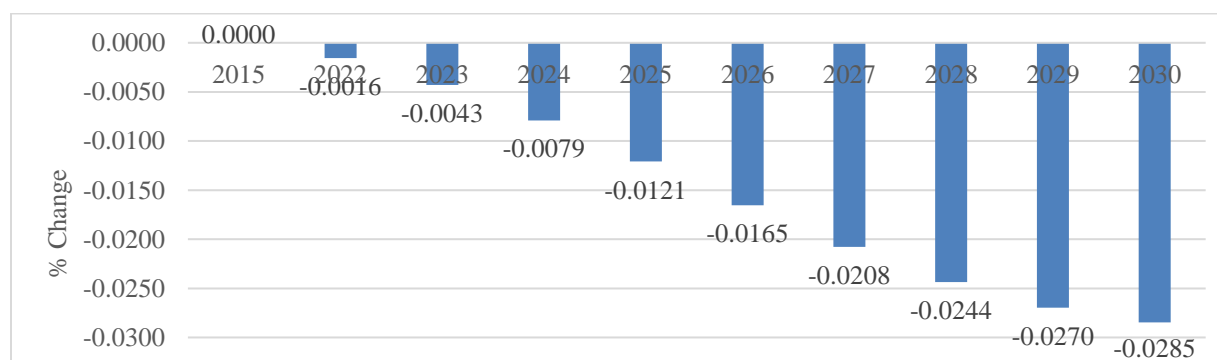
Revenue implication of AfCFTA



Source: Own computation based on CGE simulation result

Figure 7:

Revenue implication of AfCFTA (Deviation from baseline)



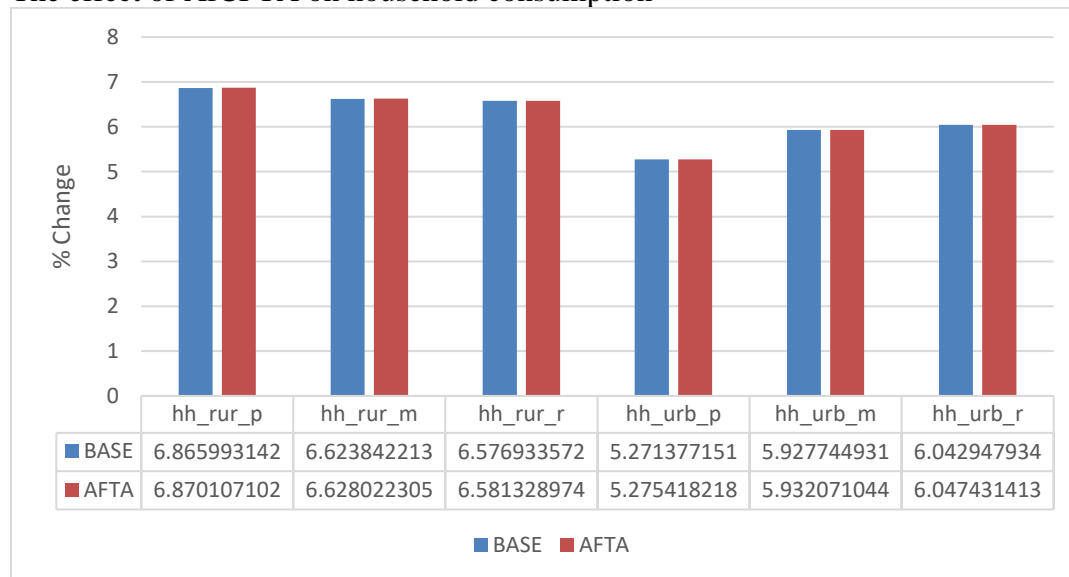
Source: Own computation based on CGE simulation result

Welfare Effect

The AfCFTA implementation will likely have an impact on both microeconomic and macroeconomic indicators, in which welfare is addressed (i.e., the welfare of both consumers and producers). Hence, free trade area agreements have an economy-wide impact in which they affect all economic agents, i.e., households, producers, and the public sector. Therefore, Ethiopia joining the African Continental Free Trade Area (AfCFTA) is a likely effect on the welfare of households and might be welfare improvement or loss. Equivalent variation (EV) is a key instrument for measuring the welfare effect since it quantifies the amount of income that a consumer must spend before a shock to be better off at an equivalent level of utility loss after the shock.

Figure 8:

The effect of AfCFTA on household consumption



Source: Own computation based on CGE simulation result

Notes: hh_rur_p= poor households living in rural areas; hh_rur_m= middle-class households living in rural areas; hh_rur_r= rich households living in rural areas; hh_urb_p= poor households living in urban areas; hh_urb_m= middle-class households living in urban areas; and hh_urb_r= rich households living in urban areas.

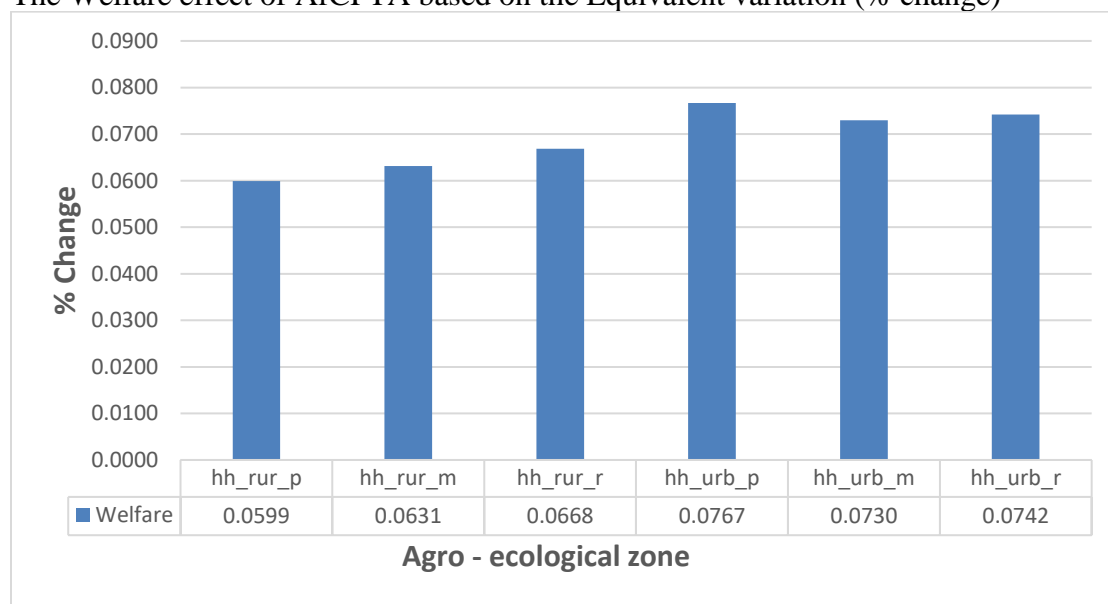
The simulation result in Figure 8 shows that all households are better off as a result of AfCFTA. Hence, with a 90% tariff reduction, both producers and consumers gain a surplus from the rise of imports. The simulation result revealed that all those households are positively affected by the AfCFTA implementation in Ethiopia. Therefore, Ethiopia’s joining the African continental free trade area (or liberalizing trade with the rest of African countries) will likely have a significant

positive effect on all households' welfare. Hence, the Hecksian equivalent variation is positive for all households (i.e., rural poor, rural middle income, rural rich, urban poor, urban middle income, urban rich). However, the welfare gain by urban rich and rural rich households is greater than that of middle-income and poor households, and the welfare gain of middle-income households is also greater than that of poor households [i.e., hh_r (both urban and rural) > hh_m (both urban and rural) > hh_p (both urban and rural)] (see Figure 9).

Overall, both figures 8 and 9 show that the welfare of households improved when the Continental Free Trade Agreement (CFTA) was implemented. Hence, it aims or plans to remove trade barriers through tariff cuts (reduction) by 90%. Thus, the simulation result in Figure 9 revealed that a reduction of tariff by 90% results in a welfare improvement (all households are better off). Therefore, Ethiopia's participation in the African continental free trade area implementation results in welfare improvement (or gain).

Figure 9:

The Welfare effect of AfCFTA based on the Equivalent variation (% change)



Source: Based on CGE simulation result

Conclusion and Implications

Conclusion

Ethiopia's economy is characterized by a very small market share in intra-African trade as well as in global trade, indicating weak economic integration with other African countries. Efforts have been made to improve trade performance through economic integration. However, there has been a great debate on the effect of economic integration on national economic performance, including sectoral effects, trade, revenue, and welfare. There has been limited evidence, especially on dynamic economy-wide effects of economic integration such as the African Continental Free Trade Area (AfCFTA). This study's main objective is to examine the economy-wide effect of economic integration in the African Continental Free Trade Area (AfCFTA) focusing on Ethiopia. Specifically, it assesses the effect of Ethiopia's joining the AfCFTA on sectors, trade, revenue, and welfare using a recursive dynamic computable general equilibrium (CGE) model. Both descriptive and simulation analyses are employed. The main dataset for the CGE model is the 2015/16 SAM for Ethiopia.

Ethiopia's trade statistics show a huge trade deficit, especially in recent years, where the gap between exports and imports has increased significantly. Despite the huge inflow of imports into the country, there is no visible export to the rest of the world; rather, these huge imports from the rest of the world undermine our domestic production or investment and outflow of more foreign currency. Ethiopia's intra-Africa trade flows are also very little or weak compared to Ethiopia's trade with the non-African rest of the world.

The simulation analysis explores the potential welfare, trade, revenue, and sectoral effects of economic integration in the African Continental Free Trade Areas (AfCFTA) evidence from Ethiopia. The sectoral, trade, revenue, and welfare effects of joining the AfCFTA are positive, such that most economic sectors, trade, and welfare are likely improved. However, government revenue is likely to decrease due to tariff reductions. Overall, Ethiopia is likely to benefit from joining the African Continental Free Trade Area (AfCFTA) through improved sectoral productivity, trade flows, and welfare.

Implications

The findings of this study have significant policy implications that suggest the following policies. It is necessary to identify strategic commodities and retain a considerable number of tariff lines for sensitive and excluded commodities to ensure coherence with the import substitution agenda. Provide support to capacitate strategic commodity-producing activities to help them compete in the medium to long run. In addition, there is a need to diversify products and improve their quality through targeted intervention to minimize trade imbalance.

The government of Ethiopia should design or adapt an appropriate economic policy, and conducive economic constitutions must formulate well-detailed development plans, appropriate allocation systems, participatory approaches, and efficient government administration.

There is a need to design a strategy to mitigate revenue loss as a result of AfCFTA implementation. First, there is a need to broaden the tax base through identifying new taxes. Second, improve the efficiency of tax administration and collection through automation. Third, expand the scope of the tax net through the formalization of the informal sector by addressing the challenges of licensing, registration, and tax payment. Finally, it is necessary to retain tariff lines for strategic commodities over a short-to-medium term.

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