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Original
The advent of the AfCFTA: new possibilities and implications for the African land-water-climate-food nexus / Levin-Koopman, Jason; Carrico, Caitlyn; Falsetti, Benedetta. - ELETTRONICO. - (2021). (Intervento presentato al convegno GTAP - 24th Annual Conference on Global Economic Analysis tenutosi a Virtual nel 2021).

Availability:
This version is available at: 11583/2958708 since: 2022-03-17T15:25:39Z

Publisher:
24th Annual Conference on Global Economic Analysis (Virtual Conference)

Published
DOI:

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12 October 2024

The Advent of the AfCFTA: New Possibilities and Implications for the African Land-Water-Climate-Food Nexus

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Introduction

The African Continental Free Trade Area (AfCFTA) was signed in 2018, and came into effect in 2019. Still in an early phase, there is much to expect from the AfCFTA's implementation over the coming decades. While the major expectations for AfCFTA are for increased inter-regional trade and overall levels of economic integration, there will doubtlessly be implications for the Land-Water-Climate-Food nexus in a continent where agriculture is estimated to contribute 15 percent of GDP (Mzali 2019) and employ over 60 percent of the active population (ILO, 2019), continent-wide.

One important effect of the implementation of the AfCFTA will be the reduction of tariff barriers to inter-regional trade which is expected to have an impact on the agricultural and food system. Reduced tariffs will lead to lower food prices which will affect food and nutrition access. At the same time, as the access to regional markets are anticipated to open up, farmers may be drawn to change the crops they grow as well as the intensity of irrigation and fertilizer used or to expand production into land previously unused in agriculture. These changes will have an impact on the land and water systems as well as the greenhouse gas emissions resulting from agricultural activity.

In addition to exploring the changing demands of the agricultural system on the natural environment resulting from the liberalized inter-regional trade from the AfCFTA, we also consider the expected benefits of economic growth as well as the contributions to food and nutrition security. Therefore, progress towards socioeconomic as well as environmental Sustainable Development Goals (SDGs) [4] such as those related to employment as well as land and water use are accounted for alongside consideration of international commitments to reduce greenhouse gas emissions.

Methods

In this study, we employ the MAGNET model (Woltjer and Kuiper, 2014) to examine the possible impacts of the AfCFTA on the land, water, food and climate nexus. MAGNET is a Computable General Equilibrium (CGE) model which is structured in a modular fashion to allow for additional features that can be included to tailor the model to the research question at hand. In this study, we use MAGNET modules which allow for more details in agriculture, food and nutrition, as well as explicit irrigation water resources and a distinction between rainfed and

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irrigated land. Our paper builds on previous work exploring the impacts of trade reform on water resources (Kahsay et al. 2018; Calzadilla et al. 2011; Diao and Roe 2003) and expands the scope to include other elements of the food, land, water and climate nexus.

We run scenarios to assess the trade-induced changes from the AfCFTA to the land, water, food and climate nexus in Africa, with a focus on Burkina Faso. We run an illustrative scenario with full tariff reduction across products assumed implemented between all African regions by 2030. We have 17 total regions in our study (Table 1), capturing the 7 African economic regions, Burkina Faso, and major trading partners.

Table 1. Regional Aggregation

REGION/COUNTRY CODE	***DETAILED DESCRIPTION***
UMA	Arab Maghreb Union
UEMOA	Union Économique et Monétaire Ouest Africaine
ECOWAS	(Rest of) Economic Community of West African States
BFA	Burkina Faso
ECCAS	Economic Community of Central African States
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
SADC	Southern African Development Community
EU27	European Union (27 members)
GBR	United Kingdom
CHE	Switzerland
GCC	Gulf Cooperation Council
IND	India
CHN	China
ASIA	Asia
USA	United States of America
ROW	Rest of World

Preliminary Results

At the macro-economic level, with the implementation of the AfCFTA, GDP is expected to increase across the continent. Naturally this differs by region, dependant on the production, consumption, and trade patterns of each region and how they are altered by the AfCFTA. In particular, there are gains for SADC, EAC, ECOWAS, UEMOA, and UMA. BFA also gains in GDP, following UEMOA and ECOWAS. COMESA and ECCAS however are anticipated in this illustrative example to face GDP expansion.

Overall, the aggregate continent-wide GDP gains are driven by trade gains resulting from the AfCFTA implementation. Further, these trade gains re-orient trade towards within-continent trade, reducing trade with external partners outside of the continent. This re-orientation, however, is not the same across products, and in

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particular there is a distinction between Primary agricultural products and Industry products, as presented in Figures 2 and 3.

Figure 1. Change in GDP by 2030 under AfCFTA, real million USD

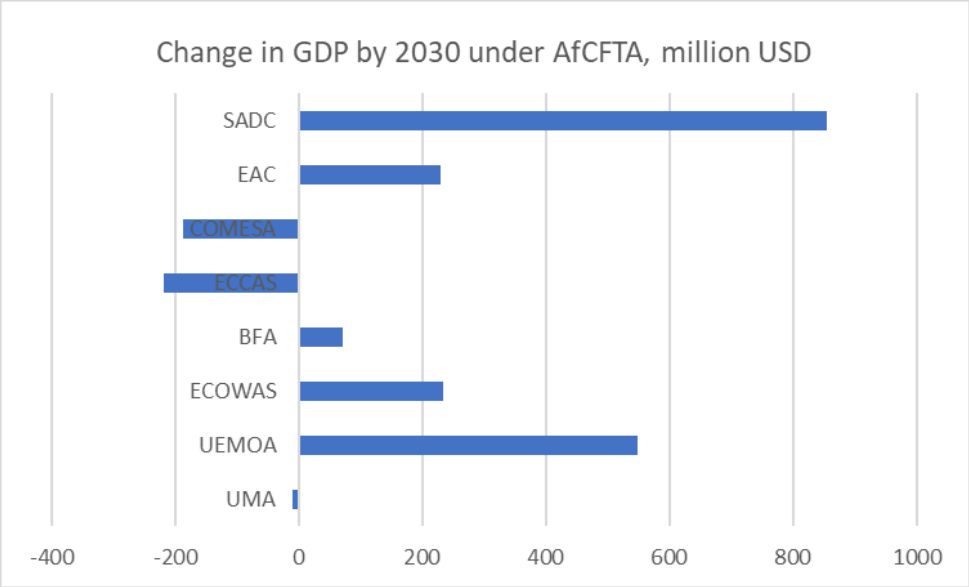
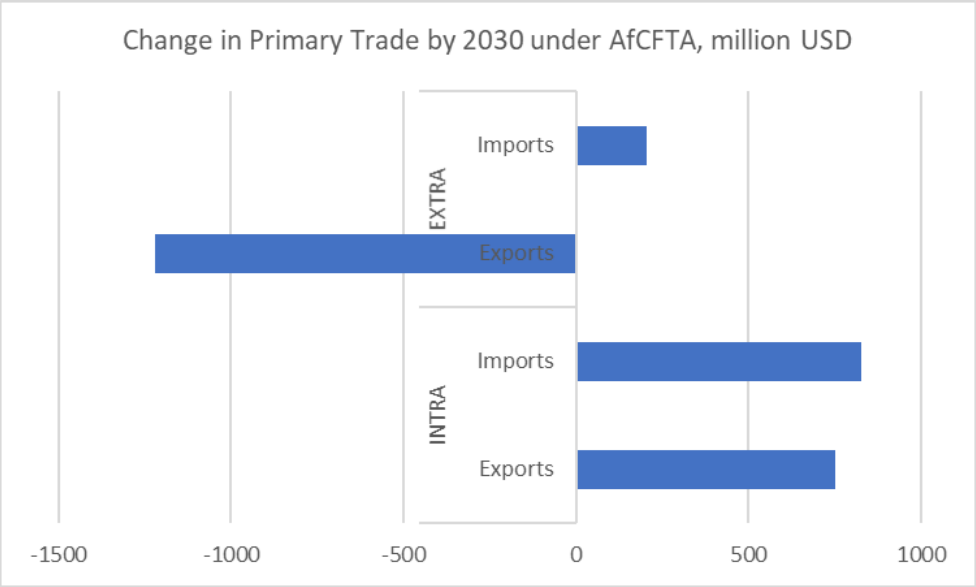


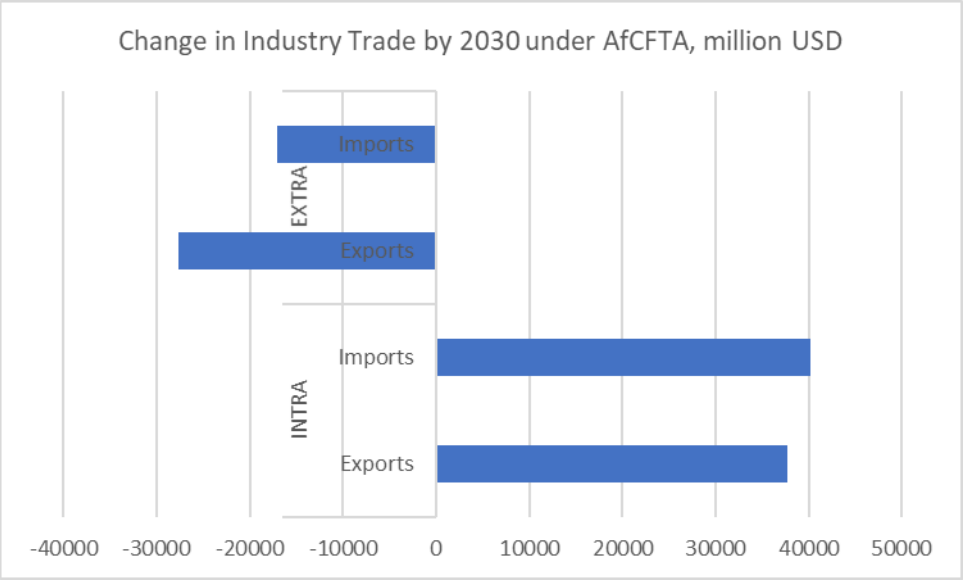
Figure 2 presents aggregate trade-level results for Primary Trade, being crop sectors. Here, we find that intra-continental trade is increasing both in terms imports and exports. However, while extra-continental exports decline, there is an increase in the import of extra-continental primary crops. This has to do with the overall contraction of the agricultural sector across the continent while there is also increasing wealth and thus increasing need and demand for agricultural products.

Figure 2. Change in Primary Trade for the African Continent by 2030 under AfCFTA, real million USD



This increasing wealth comes from the increase in Industry trade and hence the increases in manufacturing production expansion. In Figure 3, we see that intra-continental manufacturing trade increases and extra-continental trade decreases, in terms of both imports and exports. Further, growth in intra-continental trade surpasses extra-continental trade. Overall, comparing with Figure 2, we can also see that the trade in manufacturing is far more important in value than the trade in primary crops.

Figure 3. Change in Industry Trade for the African Continent by 2030 under AfCFTA, real million USD



In Figures 4 and 5 we equally consider the intra- and extra-continental trade for Burkina Faso, differentiated by primary crops trade and manufacturing trade. Figure 4 shows the Primary trade of crops with extra- and intra-continental trading partners. We find that Burkina Faso's trade in crops (imports and exports) with extra-continental trading partners decreases. While Burkina Faso increases its imports of crops from intra-continental trading partners, it decreases its exports of crops to these trading partners.

Figure 4. Change in Primary Trade for Burkina Faso by 2030 under AfCFTA, real million USD

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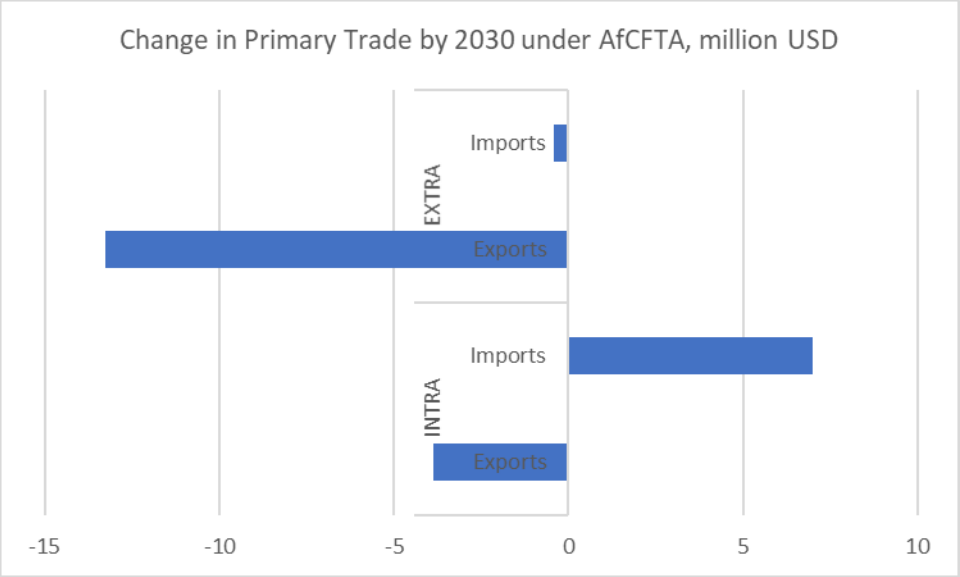

Figure 5 shows Burkina Faso's Industry trade of crops with extra- and intra-continental trading partners. We see that here all extra-continental trade (imports and exports) of manufacturing goods decreases whereas all intra-continental trade increases. This follows the continent-wide trend presented in Figure 3 where increases in intra-continental trade surpass extra-continental trade. Further, comparing with Figure 4, we see that changes in manufacturing trade far outpace changes in agricultural trade.

Figure 5. Change in Industry Trade for Burkina Faso by 2030 under AfCFTA, real million USD

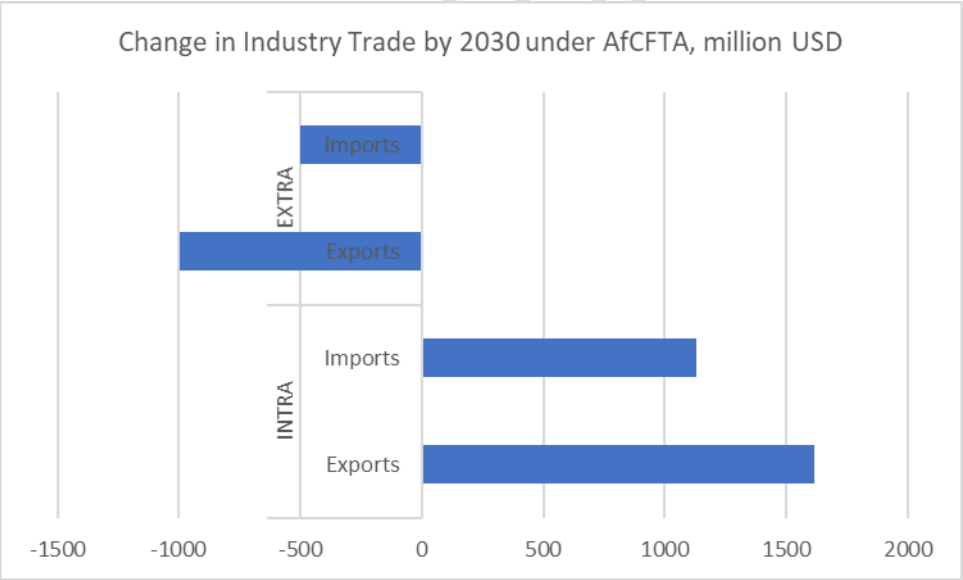

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Table 1. Percent change in Food Security indicators from 2020-2030 for all Africa regions

	Disposable income per capita	Average Food Prices	Share of food expenditure in total disposable income	food consumption per capita
UMA	24.67	-10.04	-14.46	19.25
UEMOA	83.12	-4.35	-24.27	41.00
ECOWAS	36.19	-5.21	-10.33	26.09
BFA	34.89	-3.09	-6.80	31.00
ECCAS	16.80	-6.59	-7.35	15.60
COMESA	39.59	-5.79	-12.60	27.37
EAC	40.26	-6.46	-13.61	28.65
SADC	25.87	-6.22	-17.20	10.62

Table 1 shows that over the coming decade 2020-2030, even without the implementation of the AfCFTA food security is expected to increase for all regions in the African continent. Income per capita increases and average food prices decrease. This results in a wealthier average population which spends a smaller share of income on food despite a significant increase in food consumption.

Table 2. Percent change in Food Security indicators from 2030 baseline without implementation of the AfCFTA and 2030 policy scenario with implementation of the AfCFTA for all Africa regions

	Disposable income per capita	Average Food Prices	Share of food expenditure in total disposable income	food consumption per capita
UMA	0.38	0.27	-0.04	0.05
UEMOA	3.99	1.54	-1.01	1.21
ECOWAS	0.20	0.24	0.05	0.01
BFA	1.42	1.62	0.52	0.42
ECCAS	-0.57	-0.97	-0.17	0.24
COMESA	0.32	0.28	0.02	0.06
EAC	2.07	1.71	-0.02	0.31
SADC	1.58	1.40	-0.07	0.12

Table 2 shows the impact of the AfCFTA on the selected food security indicators across all African regions. Food consumption increases for all regions as a result of the trade policy. Disposable income increases for most regions and average food prices rise as well.

For several regions, despite a significant rise in disposable income per capita increasing food prices results in an increasing share total expenditure spent on food. For Burkina Faso there is approximately 0.5 percent higher share of income spent on food than in the base situation without the implementation of the AfCFTA.

Table 3. Percent change in 2030 between the baseline scenario without implementation of the AfCFTA and the policy scenario with the implementation of the AfCFTA for Consumption, production and trade of agricultural and non-agricultural products in Burkina Faso.

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	Consumption	Exports	Imports	Production volume	Price of production
Primary Agriculture	0.06	-1.98	3.53	-0.09	0.80
Industry and Services	0.56	6	11.11	0.05	0.55

Table 3 suggests that the increase in income shown in table 2 is a result of a higher demand for Industry and services. Exports of these products increase by 6 percent compared with the scenario without the implementation of the AfCFTA. Consumption and imports of both agricultural and non-agricultural products increase and the producer price of these sector outputs increase as well. However both production and exports of primary agricultural products decrease with the implementation of the AfCFTA. This result comes from the increasing demand of the of the Industry and Services sectors for factor of production, this pulls them away from agriculture and increases the cost of production. This is further shown in table 4.

Table 4. Percent change in the demand for non-land factors of production for the agricultural and non-agricultural sectors in Burkina Faso in 2030 between the baseline and AfCFTA policy scenario.

	Unskilled Labour	Skilled Labour	Capital
Primary Agriculture	-0.197	-0.182	-0.125
Industry and Services	0.045	0.003	0.003

Table 4 shows the shift of labour and capital from the primary agricultural sectors to industry and services in Burkina Faso. The pull of these factors into the non-agricultural sectors increases the cost of production for primary agriculture and ultimately decreases production output. Agricultural land prices also decrease slightly as a result in the decrease in production, approximately 0.05 percent compared with the baseline.

Preliminary Conclusions

We observe the stark difference between the effects of the AfCFTA for the agricultural and manufacturing sectors across the continent. While there are a myriad of factors which account for this, we importantly note that additional complementary domestic policies may be key to the success of the AfCFTA from a country level. This is especially pertinent in countries where agriculture is the major employer and manufacturing is highly capital intensive.

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