An integrated framework to analyse the impacts of the African Free Trade Agreement (AfCFTA) – from continent to households analysis

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1. Introduction

The African Continental Free Trade Agreement (AfCFTA), entered into force in 2019, and became operational in January 1st, 2021. The AfCFTA aims to eliminate trade barriers and boost intra-Africa trade, to advance trade in value-added production across all sectors of the continent and to establish regional value chains in Africa, enabling investment and job creation. The AfCFTA is ambitious in its scale, as it is currently the largest FTA in the world, bringing together 54 countries (only Eritrea has not signed the agreement) and a population of 1.3 billion people. The countries vary hugely in their socio-economic and political structures, which adds to the project's complexity. At the same time, the already existing multitude of regional economic communities (RECs) among the AU member states make the analysis of the AfCFTA challenging.

Developing countries still face many food security risks, and Africa's proportion of hungry people, 21%, is the highest in the world and the Covid-19 pandemic has worsened the situation. In 2020, 768 million people were undernourished, and one third of them, 282 million, were Africans. Therefore, enhancing food security in Africa is likely to remain high on the development policy agenda for the coming decades. The agreement could contribute to boost the welfare of African people and to alleviate the food security and poverty issues in various parts of the continent.

This paper presents a framework, which exploit the strength of a global CGE model, an artificial intelligence algorithm, a single-country CGE model, and microsimulation model to provide impacts of ex-ante scenarios at global and continental, country, and household level. Kenya acts as a case study but the framework is currently being extended to additional countries. The AfCFTA includes a complex set of policies, and its analysis requires a comprehensive modelling approach. For this reason, we primarily employ a dynamic global CGE model with a high disaggregation of the African countries and regions represented. The simulations quantify the changes in bilateral trade among African countries and third countries and it assess the key food security variables such as disposable incomes and food consumption and indicate potential risks for individual countries. Given the

structure of the database underlying the global model, the impacts of the agreement cannot be evaluated in detail either for all countries (some of them are not available within the latest GTAP version as individual countries), at sectorial level (the commodity disaggregation is set by the structure of the GTAP database) and at household level (GTAP database includes only one representative household). To overcome these limitations, we develop a linkage between the MAGNET model and a single-country CGE model and microsimulations. These linkages enable the results produced by the global CGE MAGNET model to be used in country-level models to produce a refined analysis, including more detailed sectorial results and impacts on a wider range of agents (e.g., urban and rural households in various regions of the countries, and farmers).

The aim of this paper is to provide an integrated assessment of the economic impacts of the AfCFTA on the agricultural and food sectors across the whole continent as well as at country level, including poverty analysis. Kenya represent the case study to apply the developed framework.

The paper reproduced sections from already published literature (Simola et al. 2022; Simola et al. 2021; Nechifor et al. 2022) providing an integrated approach to allow the modelling of the impacts of the AfCFTA from continental results to single-country detailed results in terms of sector, households and poverty.

The rest of the report is structured as follows: Section 2 reviews the literature on the AfCFTA, with a special focus on computable general equilibrium (CGE) model-based studies. Section 3 presents the models and databases used for this study; Section 4 explains how the different model are linked among each other, while Section 5 introduces the trade scenarios. Section 6 presents the key results of the study. Section 7 concludes.

2. Review of the literature

There is already a significant literature on the economic effects of the AfCFTA. Given the diverse characteristics involved in such continental market integration, these analyses require the use of an economic model capable of representing all sectors in all participating countries. CGE frameworks consider all the interactions among all sectors through domestic, regional, and international linkages. They provide information about trade-offs between various sectors in the event of multiple trade partners. Indeed, they quantify trade-diverting and trade-creating effects because of market opening, driven by comparative advantage and feedback effects (e.g. structural adjustments). They enable a broad view across all those economies that are distinguished separately within the model and quantify which sectors might be affected, in which way and within which schedule.

Several studies using the CGE model analysed the potential effects of deeper trade integration in Africa (see Simola et al. 2021 for an extended review of the literature).

On the other side, country-level analysis of implications stemming from trade liberalization in multi-regional agreements, such as the AfCFTA, is complex as effects are dependent on policy objectives pursued by the other signatory countries. In the case of the AfCFTA, previous regional integration efforts in Africa also need to be incorporated in the baseline. Therefore, past efforts to determine the free trade area impacts on national economies have mostly been multi-regional using global computable general equilibrium (CGE) models many examples analyse the impacts of the AfCFTA at national level, using several methods including single-country CGE model. To account for the indirect effects of liberalization at a country level, single-region CGE modelling has been used in NESG (2019) for Nigeria, however, a major drawback in this analysis is that tariff reductions are done unilaterally, i.e. the effects of the AfCFTA are considered only from the reduction in own tariffs leading to higher imports, but not for the reduction in tariffs by the other trade partners which, in this case, would

increase the demand for Nigeria's exports. The results indicate a substitution of domestically produced goods with their imported variety leading to a loss of domestic output and a net negative effect on GDP and welfare.

3. Methods and data

This section explains the choice of the modelling tools for the analysis of the AfCFTA and provides a brief description of the models. Our analysis is based on CGE modelling. This modelling framework is especially well suited to the analysis as it can incorporate the most significant interactions within a wide array of sectors through domestic, regional, and international linkages. As a result, CGE models can quantify trade-diverting and trade-creating effects of market opening, driven by comparative advantage and feedback effects (e.g. structural adjustments). They enable a broad view across the modelled economies and to quantify the sectorial effects. By contrast, the partial equilibrium models, which concentrate in one sector, include more disaggregated commodities and more detailed production structures. In addition to modelling approaches, empirical analysis (e.g. using gravity equations) can also assess changes in trade flows, typically based on countries' sizes, levels of development and geographic and cultural proximities. This branch of analysis is the foremost tool to assess trade restrictiveness of NTMs. The approaches are interconnected, as the CGE models use estimated NTM rates in calibrating model databases.

3.1 MAGNET

A global recursive dynamic CGE model is well suited for ex-ante analysis of a policy that affects the whole economy and is explicit on its sectoral changes. The model we use is the Modular Applied GeNeral Equilibrium Tool (MAGNET) (Woltjer et al. 2014), based on the Global Trade Analysis Project (GTAP) model (Corong et al. 2017) and databases (Aguiar et al. 2019). The MAGNET model includes a detailed representation of trade flows and agri-food production in African countries. This study uses version 10 of the GTAP database. The database includes 36 regions, of which 29 are African (6 composite regions and 23 individual countries). The database consists of 40 tradable commodities detailed on agri-food industries: 12 commodities in primary food production (agriculture and fisheries) and 9 commodities in processed foods (including animal feed).

The simulations run at five-year time steps over the 2020–2035 period to cover the implementation of the AfCFTA from the launch to the envisioned full implementation. The model baseline builds upon the global Shared Socioeconomic Pathways (SSP) of which we employ SSP2 (Fricko et al. 2017), the middle-of-the-road projection. The policy scenarios consider tariff cuts separately and in combination with NTMs reductions.

A series of exogenous factors drive the baseline economic development: population and GDP growth rates by region, endowment demands by region and endowment category (skilled and unskilled labour, capital, and natural resources), and productivity of land by region and agricultural sector. In MAGNET, population growth is based on the United Nations' population forecasts, and GDP growth is based on the World Bank's projections. Land productivity projections are based on the yield projections of the Integrated Model to Assess the Global Environment (IMAGE) model. They are applied on land according to agricultural sector and they vary by crop and region.

3.2 DEMETRA

The MAGNET model is coupled with the single-country recursive-dynamic open-economy CGE model DEMETRA, a single-country recursive-dynamic open-economy CGE model which comprises many economic sectors and households. The model results therefore allow for an advanced characterisation of impacts at distinct levels: sectoral (output and production costs), household (income and consumer demand), regional (households belonging and migrating between different

regions) and aggregate (GDP, employment, trade). Prominent features of the DEMETRA model comprise:

- An assumption of perfect competition i.e., prices and quantities are not subject to market power on the supply or demand side

- A disaggregation of economic activities into individual processes captured as nested constant elasticity of substitution functions which combine factors of production and intermediate goods

- A separation of marketed and subsistence commodities with a consistent accounting of home production for home consumption allowing for the study of semi-subsistence production and consumption processes

- Trade specified using the Armington assumption whereby the imported and domestic varieties of the same commodity are treated as imperfect substitutes. Export changes are determined through a downward sloping curve considering changes in export prices and exogenous shifts in the export demand.

The model is calibrated using the 2016/2017 Social Accounting Matrix (SAM) for Kenya (Jiménez et al., 2021; Mainar-Causapé et al. 2018). The SAM comprises annual economic transactions structured around 53 sectors (11 of which account for households as home producers), 55 marketed commodities (and 18 home commodities), 22 household groups and 24 labour segments. On the imports side, the changes in import prices obtained from the MAGNET model, together with the NTMs' cost and tariff reductions, are applied as exogenous shocks in DEMETRA. The import price changes from the MAGNET simulations (including thus the direct impacts of tariff and rent generating NTM reductions on import prices but also the induced continental-level price effects of demand-supply interactions) are aggregated to a single "rest of the world" trade partner for Kenya. On the export side, to be able to include this price and quantity interaction in a coherent manner, this study adopts the approach developed in (Horridge and Zhai 2006) whereby an export demand function is introduced in the national model. This demand function is then shifted based on price and quantity information as resulting from the global model simulations.

3.3 Multi-objective evolutionary algorithm (MOEA)

A multi-objective evolutionary algorithm (MOEA) is linked to the single-country recursive-dynamic open-economy CGE model of the Kenyan economy to improve alignment of model responses to trade shocks of the DEMETRA model (single-country) and the MAGNET model (global model using GTAP). The trade shocks are resulting from the establishment African Continental Free Trade Area (AfCFTA) and are applied to the two models for 2021–2035-time horizon. The MAGNET responses of trade (quantities and prices), GDP and other macro-variables are used as target values for the MOEA-based calibration of the DEMETRA model. The MOEA thus aims to minimize the DEMETRA response error across several model responses and considers the possible trade-offs between these errors, which are set as objectives. The MOEA is an artificial intelligence algorithm which minimises the trade-offs between multiple objectives (in this case, the MAGNET/DEMETRA response errors). It uses meta-heuristics and evolutionary principles of mutation and cross-over to iteratively pick values for the so-called "decision variables" (in this case, DEMETRA model parameters such as trade elasticities) and to evaluate their performance against the formulated objectives (see an MOEA application to CGE models in (Basheer et al. 2022)).

3.4 Microsimulations

To quantify the impacts of the AfCFTA on poverty, the results from the Kenya CGE model are passed to a microsimulation model. The model builds on the household expenditure data from the

nationally representative Kenya Integrated Household Budget Survey 2015-2016 (KIHBS) from the Kenya National Bureau of Statistics (KNBS 2018). The dataset comprises data for 748 expenditure items of 21,773 households representing 45.4 million Kenyans of which 64.2%, 7.4%, and 28.4% are living in rural, peri-urban, and urban areas. Poverty is measured using the Foster-Greer-Thorbecke poverty indices (Foster et al., 1984) adopting household expenditure per adult equivalent as the income proxy with equivalent scales taken from the official reports accompanying the KIHBS (KNBS 2018). The poverty headcount index measures the percentage of the population living with an income below the poverty line. The poverty gap index measures the additional income the average poor person would require reaching the poverty line as a percentage of the poverty line, while the poverty severity index is like the gap index but gives a higher weight to incomes further below the poverty line. Households' expenditure items are all valued at market prices, including items own-produced and received as gifts. The survey households are linked to the 22 household groups in the Kenya SAM. Two poverty lines are set such that the official poverty headcounts for 2015/16 of 38.3% and 29.4% for rural and urban households, respectively, as reported in the KNBS (2018) are matched. The agreement reduces the poverty headcount by up to 140 thousand people nationally but can also increase poors' consumer price index, with adverse effects in peri-urban areas.

4. Model integration

4.1 Baseline and the MOEA

4.2 From global to single-country

As a country-level model, DEMETRA model for Kenya cannot explain the AfCFTA trade creation and trade diversion effects occurring on trade links Kenya is not part of. Therefore, these trade impacts are determined by a global multi-regional model and passed on to the national model as exogenous shocks. Nevertheless, linking global with national models poses challenges given by differences in structure and closure rules between the two frameworks. A crucial difference is that in the MAGNET global model trade is specified at a bilateral level with export changes in one region being determined by import decisions by all the other regions. Trade impacts (imports and exports) are therefore explained through price and quantities which are both entirely endogenous. In a national model, lacking the behavioural information of trade partners, export decisions are governed by a Constant Elasticity of Transformation (CET) function which determines an allocation of national production across the domestic and export markets based on relative price differences between the commodity domestic and the world price. In this framework, the modeller makes a choice of considering as exogenous either the price or the quantity variable. Therefore, the linking of a global model to a country-level model in a top-down manner could boil down to including either the price or the quantity information as exogenous while allowing the other one to be computed by the model. On the export side, relying on either the price or the quantity results obtained from the global model may lead to inconsistent results across the two models. In the global model, depending on the cumulative effects of import decisions across regions, an exporting country may face for instance a decrease in export quantities and an increase in world prices. In a national framework, this situation is counterintuitive as the CET specification implies that an increase in world prices leads to an increase in exports and not to a reduction. Therefore, to be able to include this price and quantity interaction in a coherent manner, this study adopts the approach developed in Horridge and Zhai (2006) whereby an export demand function is introduced in the national model. This demand function is then shifted based on price and quantity information as resulting from the global model simulations. The export demand function has a downward slope. By factoring in the export demand elasticity, the export quantities are then responding to changes in export prices. Following

Horridge and Zhai (2006) the elasticity is initialised for each commodity based on the Armington elasticities from the GTAP database. To shift the export demand curve as a result of the AfCFTA, the F locator is then altered exogenously based on quantity and price changes from the global model, in this case, MAGNET.

While on the export demand side, shifts are explained by the MAGNET information, the supply response is given by the country-level model through the export world price response which is endogenous to the DEMETRA model. Therefore, using the multi-market interactions in DEMETRA (across domestic and foreign markets, and across factors of production), the supply curve shifts are explained by the inner structure of the country-level model.

4.3 From single-country to Households

Exploiting the household group detail of the CGE model, the simulated percentage changes from the Kenya CGE model for household groups' consumer prices and expenditure quantities serve to update the expenditures of each survey household. As price changes affect household purchasing power, each survey household's expenditure value is deflated with a household specific CPI which is calculated as a Laspeyres index adopting the 2015/16 survey expenditure quantities as weights. The reference poverty figures are updated from 2015/16 to 2019/20 using the results from the procedure to update the SAM to 2019/20. Household population weights are updated according to the CGE model's household group growth rates which nationally are in line with the SSP2 projections.

5. Trade policy data and scenarios

5.1 Import tariffs

As final tariff liberalisation offers from the AU member states detailing the exact tariff lines and rate cuts were not available at the time of drafting the report, several tariff liberalisation scenarios are constructed for each country separately while respecting regional trade blocs. Specifically, the scenarios are constructed utilising the information on the modalities on liberalisation of trade in goods agreed in the AfCFTA negotiations to date. The scenario construction allocates tariff lines into four lists of products: non-sensitive, non-sensitive G7 (18), sensitive and excluded. The details of the liberalisation commitments for each of the four lists differ by country category – non-LDC, LDC and G7 – and are summarised in Table 3. For the list of excluded products, the AfCFTA adopts a double-qualification approach, limiting the number of tariff lines to 3 % (or 156 lines) of all HS6 tariff lines, as well as limiting the value of intra-AU trade covered by selected lines to 10 %, measured using the average import value over the period 2014–2016 or 2015–2017. The basis for the tariff liberalisation is the MFN rates applied in 2019, the year the AfCFTA came into force (Lunenborg, 2019).

The construction of realistic tariff line scenarios, as they might emerge at the end of the AfCFTA implementation period for all member states after 15 years, involves selecting tariff lines according to the four lists of products considered here, as a hierarchical process with three steps: in step 1, a maximum of 3 % of tariff lines for the list of excluded products are selected; in step 2 – only in the case of G7 countries – a maximum of 5 % of non-sensitive tariffs are selected, with an extended and optionally delayed liberalisation period; and in step 3, a maximum of 7 % of sensitive products are selected, with an extended and optionally delayed liberalisation period. All remaining tariff lines are allocated to the list of non-sensitive products. Two alternative assumptions about rules guiding governments' tariff line selection were considered for constructing scenarios. The first rule is maximisation of tariff revenue retained and the second rule is maximisation of the political economy-based index (19) developed by Jean et al. (2008), which combines preferences for

retaining tariff revenue with preferences to continue the protection of products with high tariff rates. However, as differences in selected tariff lists turned out to be small, the decision was taken to proceed with the tariff revenue maximisation rule only. In addition to the above guiding rule, four options regarding a primary objective for an import liberalisation strategy are considered, which imply complete liberalisation of a defined product group before applying the tariff revenue maximisation approach to the remaining tariff lines. These options are:

(a) no additional strategy (Tarrev),
(b) improving food access by liberalising agri-food products (Agrifood),
(c) promoting industrialisation by liberalising intermediate input products (Interm),
(d) increasing healthy competition by liberalising industries with revealed comparative advantage within the AU (RCA).

5.2 Non-tariff measures

The AfCFTA will harmonise rules and regulations in many areas of merchandise and services trade (SPS standards, TBTs, etc.) and thereby reduce the cost of trading not only for trade within the AU but also for trade outside the AU. In the absence of information on how NTMs will be reduced by the AfCFTA, we assume that the scope of the AfCFTA facilitates a reduction of 50 % in NTMs on merchandise and services trade for all intra-AU states. The AfCFTA is also assumed to reduce the cost of trading with countries outside of the AU as a result of greater standardisation and harmonisation of rules and regulations and a corresponding reduction in costs of compliance with foreign rules and regulations. NTMs for all imports and exports between AU and non-AU countries are assumed to decrease by 25 %. The NTMs are reduced linearly, starting from the year 2020 and completing in 2035.

NTMs on merchandise are distinguished between technical measures (SPS and technical measures) and nontechnical measures (contingent trade measures, quantitative restrictions, price controls, finance measures) (see Kee and Nicita, 2016), and are treated differently in the implementation of the simulation scenarios. All NTMs on services are assumed to be technical measures. To address variation in these types of NTMs and their effects, we assumed that the technical measures are cost generating and represented them as iceberg costs in the model, and that the non-technical measures are rent generating and represented them as ad valorem tariff equivalents. The NTM reductions in the scenarios are distributed accordingly.

6. Results

6.1 Global results[1]

The results, which are consistent with existing literature, show the positive impact of the AfCFTA on African economies and on the continental agri-food sectors. The policy simulations show that the AfCFTA is likely to strengthen the positive economic development of the African continent, while intracontinental trade is likely to undergo a strong positive shift. GDPs are predicted to grow moderately; however, welfare gains are more significant given both a reduction in general prices and an increase in household income.

Tariff revenues are an important part of public finances for African countries; however, despite their importance, they are predicted to decrease on our baseline. The loss of tariff revenues should not be a concern for African governments as the model shows that it should be more than covered by an increase in tax revenues from other sources thanks to the increased economic activity and the net effect on public expenditures. Therefore, this is expected to be positive for most of the regions.

Food security indicators of food availability, on one hand, are predicted to improve as a result of better access to food commodities in all the modelled regions. Food consumption and disposable incomes are also predicted to improve. Food prices, on the other hand, show more varied changes among the regions. The issue of increasing prices could undermine food security for lower-income groups and should be one of the main concerns of governments after the liberalisation period. Indeed, the study has indicated several regions where food prices will increase faster than the wages of the low-income groups.

The reported results show the crucial importance of the NTMs on the final outcomes of the agreement. It is important to emphasise again that 'reduction' in the context of NTMs does not mean a lowering of the NTMs per se (e.g. food standards), but instead it means harmonisation, a reduction in differences in NTMs between countries. Firstly, scenarios including only import tariff reductions show a minimal impact on the continental agri-food sectors, reinforcing the idea that NTMs are increasingly the key factors for a successful free trade agreement. Secondly, the results show a high sensitivity to the extent of the NTM reduction. More specifically, the extent of the reduction in NTMs on goods imported by the AU member states and goods exported outside the AU has substantial influence on the results of crucial food security variables, such as AU imports and production. This is also more relevant for agri-food products, for which NTMs tend to be higher than for other sectors. Increasing harmonisation with partners outside the continent is also predicted to cause an increase in imports and increased competition with domestic production. This result shows that policies accompanying the adoption of the AfCFTA to increase agri-food productivity will be crucial measures to encourage domestic production and intracontinental trade. Estimating intra-Africa NTMs and quantifying the extent of their reduction as a result of the AfCFTA is a challenging task, given the absence of empirical evidence around this issue. In addition, quantifying how much non-members of a trade agreement (third countries) could benefit from NTM harmonisation (reduction), if it decreases the cost associated with export to the newly integrated market, is extremely difficult, and often neglected, but crucial in generating results. Given the large uncertainty around NTMs, the scenarios including NTM reduction should be considered as an optimistic view about the extent to which the AfCFTA will lower NTMs, both intra-African and with respect to third countries. The potentially large trade effect triggered in this scenario represents a best-case scenario for NTM liberalisation, whereas the scenario without NTM reduction could be seen as the worst-case one. These results call for a more detailed analysis of the NTM issue within the AfCFTA and a

[1] This section is taken from (Antii Simola et al. 2021).

quantitative analysis of the relationship between the reduction in NTMs within the continent and the cost associated with importing from and exporting to outside of the AU. Liberalised trade helps countries to exploit their comparative advantages. African countries can move their resources from food production to other activities, and food production might become more regionally concentrated.

Looking at the four liberalisation scenarios considered, the one promoting trade in agri-food products results in the lowest food prices and the largest increases in per capita food consumption, but also results in a slight reduction in the income gains as compared with the other scenarios. When the prices are compared to the development of wages of the low-income groups, we find that the most beneficial outcome is achieved by promoting industrialization as that yields the highest increase in the real wages to food prices ratio, and avoids the worst outcomes in the negatively affected regions. In other words, promoting low food prices doesn't have as positive effects on real incomes as promoting industrialization has. The difference shown in our results is probably a conservative estimate as it does not fully account for the ensuing dynamic effects. From a GDP perspective, the agri-food promotion liberalisation scenario results in the highest GDP gains in EAC, ECOWAS and SADC, whereas a scenario promoting trade in intermediate products lead to better outcomes for COMESA and UMA. ECCAS is predicted to have a slightly greater gain when the liberalisation is coordinated around country-specific products with a revealed comparative advantage.

An interactive data visualisation tool for the results presented in this analysis is available at https://datam.jrc.ec.europa.eu/datam/mashup/AFCFTA/.

6.2 Kenya results[2]

The tariff-only liberalization leads to moderate positive outcomes, encouraging trade in commodities where Kenya already has a comparative advantage (cash crops) with only mild increases in exports of the other commodities. Moreover, there is a decrease in production of food crops which are substituted by their imported variety signalling an increase in import dependency in this area.The tariff and NTMs liberalization induces a more significant reduction in trade costs which stimulates trade activities. Exports of cash crops have a higher expansion rate followed by manufacturing products. At the same time, there is an important increase in imports of manufacturing products and processed food, which determines the output of many domestic activities in this area to reduce about relative to baseline values.

The four liberalization schedules indicate some differences of the AfCFTA impacts. The AGR and RCA schedules enhance trade, notably in the tariff+NTMs liberalization scenario. The INT schedule, although promoting the trade of intermediate goods, does not have the same effect on trade volumes due to trade balance constraints – with Kenya having a comparative advantage in cash crops, lower exports of these commodities imply less foreign currency to import intermediates. The few sectors that have an output advantage in this schedule are construction, mining, and a few service activities.

By 2035, the differences of trade and output across the four liberalization schedules considered in this study are reduced with the addition of the NTMs liberalization. The exception to this is processed food, for which the AGR and RCA schedules determine higher trade volumes. Nevertheless, the transition period remains important as the pace of tariff liberalization for many commodity groups may be faster than that of NTMs liberalization.

[2] This section is taken from (Nechifor et al. 2022)

For the labour market, the re-allocation of employment in both liberalization scenarios follows the sectoral output changes. There is a marked increase in labour demand in the cash crops activities and a reduction in food processing, manufacturing, services, and food crops.

The AfCFTA determines an overall increase in household welfare and food consumption. Nevertheless, some urban households have a small decline in welfare relative to the baseline during the medium term (2021-2030). Rural households have a higher welfare increase overall with no negative impacts during the transition to 2035. The extension of the AfCFTA liberalization into the NTMs increase the average welfare gains but also increases the discrepancies between the household groups represented in this study's model.

Touching household food demand, the market prices of primary agricultural products increase due to higher costs of production given competition over factors of production with cash crops activities. These price changes determine a gradual consumption substitution of food crops, livestock and fish with processed food and meat. The price and substitution effects in household food consumption is even more pronounced with NTMs liberalization whereby better priced processed food commodities (notably milled grains and bakery) outcompete the domestic varieties.

Government revenues are on slight declining trend relative to baseline levels towards 2030 but then start to recover. The REV and AGR schedules introduce a time lag for this decline with revenues being the same as the baseline up to 2025. The NTMs liberalization allows for government revenues to recover more and even to surpass the baseline levels in 2035. Higher trade levels and economic gains determine a net increase in revenues from tariffs and taxation of output and income.

The sales tax changes considered in this study increase to compensate for the negative deviations of government revenue. This fiscal intervention shows little impacts on prices, output, consumption, and trade due to the small increase in the tax rate. Nevertheless, it shows some marginal benefits in alleviating the adverse effects of the AfCFTA during the transition period on some urban household groups.

Further research: The impact of the NTMs liberalization is however uncertain given that the size and nature of the NTMs were not directly observed but deducted from other studies for which data availability was a limitation. Therefore, given that the impact of their liberalization may be higher than that of tariffs, it is recommended that a further assessment is conducted in Kenya for a more thorough qualification of both rent-generating and cost-generating NTMs.

An interactive data visualisation tool for the results presented in this analysis is available at https://datam.jrc.ec.europa.eu/datam/mashup/AFCFTA_KENYA/index.html

6.3 Poverty results

7. Conclusions

The framework is currently under development for additional four countries: Ghana, Tanzania, Nigeria, and Niger.

Additional future research would be necessary to cope with some of the limitations of the current modelling approach. Firstly, once the final AfCFTA tariff access offer is decided, the model should assess with more precision the results of the definitive market access offer instead of relying on hypothetical scenarios.

Future research should benefit from an improved modelling approach in allocating the NTM reductions between import and export costs. Despite all these uncertainties around the analysis of the NTM reduction, the results highlight that there is a potentially large gain for the AU from an ambitious commitment to lower NTMs.

An additional stream of research should focus on the impact of a higher level of integration among African countries, including free mobility of people and/or capital.

Finally, further model enhancements should be developed to include a more refined analysis of social (nutrition, employment, migration) and environmental (emissions, resource use, footprints) indicators affected by the trade agreement and the possible interactions and impacts on food security between Africa integration and climate change issues.

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