AfCFTA: Does it fast-track structural transformation in Senegal?

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Abstract

The AfCFTA has recently entered into force and it appears as a possibility of economic growth and structural transformation for most African countries. Senegal is a country with a great potential for trade, GDP and welfare improvement under this continental agreement according to the recent literature. The aim of this paper is to evaluate the impact of intra-Africa tariff reduction/elimination in the AfCFTA framework for Senegal industrial transformation through trade and labour market impact. Four scenarios of the AfCFTA have been simulated, from full to partial liberalization, with a Senegal multi-sector static CGE model based on the STAGE CGE model. Results suggest some trade diversion effects.Assuming the elimination of Senegal tariffs on all African products, main increase on imports come from sectors such as forestry, tobacco, grain milling, leather and footwear, and food crops. In addition, production increases mainly for manufacturing sectors including manufactured food , chemicals, cash crops , processed tobacco, hotels, fertilizers and machines . In contrast, production decreases for mining products ,glass and pottery , food crops and forestry whose production is substituted by imports. Finally, macroeconomic impacts show that the elimination of trade barriers has the potential to boost trade and transform the production structure of Senegalese economy. However, the choice of sensitive products to be excluded is critical and have several implications.

Keywords: Senegal, AfCFTA, Structural transformation, CGE modelling

1. Introduction

Senegal is among the 54 countries that had signed and the 28 countries that had ratified the agreements on the African Continental Free Trade Agreement (AfCFTA). The AfCFTA is aligned with the African Union Agenda 2063 and the Sustainable Development Goals and aims to establish a single continent-wide market for goods and services, including the free movement of people and capital. In the agreement, member states of the African Union agreed to eliminate at least 90% of tariff barriers on goods imported from other states. Estimates from the Economic Commission for Africa (UNECA) suggest that the AfCFTA has the potential to boost intra-African trade trade by 52.3 per cent by eliminating import duties and reducing non-tariff

barriers (UNECA, 2019). Besides, as part of the implementation of its strategic development plan, Senegal, like other African countries, implemented a plan called Plan Senegal Emergent (PSE) in 2014 to achieve economic emergence by 2035. The main axis of the PSE, which mobilizes 66.3% of Priority Action Plan (PAP) funding, relies on the structural transformation of the economy and growth. The strategic axes pass through the development of infrastructures and services of transport and energy; of agriculture, breeding, fishing and the agro-food industry; and on mining resources and fertilizers.

The process of structural transformation involves reallocating employment from low-productivity sectors, such as agriculture, to high-productivity sectors, such as manufacturing and marketable services. This reallocation increases average labor productivity and therefore average incomes. This is an essential condition for ensuring sustainable growth in order to reduce poverty. International trade plays a key role in this process, as it allows countries to transform their production structures by moving towards more sophisticated products. Several authors have shown the link between trade and the level of industrialization of the economy (Teignier, 2018). Literature on structural transformation has shown export structure to be a good predictor of economic growth and therefore, can help to understand the underlying knowledge or institutional advantages that make a country competitive (Hausmann et al., 2007; Hausmann & Hidalgo, 2011; Hidalgo et al., 2007).

The objective of this study is to quantify the impact of the abolition of imports duties on the transformation of the Senegalese economy by looking at the effects on the various sub-sectors of the economy. The economic transformation is assessed in terms of both international trade composition (intra-African potential trade) and domestic output (macroeconomic aggregates, sectoral production, employment by skills, etc.).

For that purpose, the chosen model is a single country static Computable General Equilibrium (CGE) model. Based on the STAGE model (McDonald, 2009), the treatment of a continental agreement for Senegal requires the distinction of intra-Africa trade from the trade relations with the non-Africa rest of the worlds, thus some improvements and adaptions were implemented in the base model. The Senegal CGE model was calibrated for 2014 based on the Social Accounting Matrix (SAM) of Boulanger et al. (2017) with a sector, factor and agents' disaggregation that allow focusing on socio-economic impacts of the AfCFTA. The calibration data is completed with the BACI database (Gaulier & Zignago, 2010) for Senegal bilateral trade and MAcMap-HS6 (Guimbard et al., 2012) for tariffs between this country and its African and non-African partners.

The remaining paper is organized as follows. Section 2 discusses potential impacts of the AfCFTA in Senegal according to the current literature. Section 3 describes the ex-ante situation for trade and tariffs in Senegal by sector and partners. Section 4 present the CGE model for Senegal, its improvements compared to the base STAGE model, data calibration and aggregation chosen and presents the scenarios to be simulated. Section 5 presents and discusses the AfCFTA socio-economic impacts in Senegal at the different levels of details. Finally, section 6 provides final conclusions of this exercises of simulations, highlights its technical limitations and potential extensions to overcome them.

2. The potential AfCFTA impacts: the state of the art

2.1. Toward the AfCFTA

Regional integration is an essential pillar of the development programs of African countries. The overall development strategy of the African continent is based on regional integration, as

adopted and pursued by the African Union Summit. The basement of boosting African integration are related to the known links between growth and trade in the literature. Increasing regional trade would enrich intra-Africa value chains (e.g., minerals and metals) to then, favour the participation of Africa's products in global value chains. This is an important issue since relative share of manufactured products trade intra-Africa is low compared to worldwide trade in manufactures (Bouët et al., 2020). It is estimated that manufactures exports account for 68% of merchandise exports worldwide while the share is 24% for Senegalese exports (WorldBank). In this sense, regional integration in Africa can help in diversifying economies away from dependence on the export of just a few raw minerals by adding value; in delivering food and energy security; in generating jobs for the increasing number of young people; and in alleviating poverty and delivering shared prosperity in general terms.

The roadmap of African integration started in 1991 when the African heads of state and government signed the Treaty Establishing the African Economic Community (Abuja Treaty). It set out the guiding principles and objectives, as well as the regional framework aimed at strengthening the integration agenda. The integration strategy adopted by the Abuja Treaty is based on the use of Regional Economic Communities (RECs) as "milestones" for the final continental trade block. AU Member States thus have a dual obligation to comply with the provisions of the Abuja Treaty as well as those of the RECs of which they belong. The continental vision is to create an African Economic Community at the end of six successive stages: .

Under this framework and for the 25th Summit of the African Union, the negotiations for the AfCFTA started in June 2015. The first 44 countries signed the agreement in March 2018, which is structured in six protocols covering:

1. Trade in goods,
2. Trade in services,
3. Dispute settlement system (rules and procedures),
4. Investments,
5. Competition provisions, and
6. Intellectual property rights.

Up to date, only the three first protocols have been adopted. Trade in goods is based on the progressive elimination of import duties of and on African members' products, in accordance with their schedules of tariff concessions. In general terms, this tariff eliminations concerns:

- 90% of tariff lines liberalized within 5 years (10 years for Least Developed Countries - LDCs) following the entry into force of the agreement (January 2021);
- 7% of tariff lines designated as "sensitive products" subject to longer phase-out periods of tariff elimination;
- 3% of tariff lines "excluded", for which no tariff concession is offered.

Nevertheless, non-tariff measures that constraint trade in goods should be also considered in this intra-African market access improvement.

For boosting trade in services there are four priority sectors (i.e., tourism,...). Trade in services is complementary to trade in goods. It has been growing fast in the last 10 years and increasing their shares in global value chain (OMC, 2019). Concerning how to improve trade in services there is two possibilities: same as goods or by common disciplines.

2.2. Potential impacts of the AfCFTA

The recent empirical literature has analysed the potential impacts of the AfCFTA for African economies. Since the purpose of this paper is to evaluate this trade agreement in terms of boosting Senegal industrialization through its integration with the rest of Africa, this state of the art will focus particular on the chanel in trade, production, employment and of course on welfare.

In general terms, regional integration helps countries overcoming restrictions that impede free flows of goods, services, capital, people and ideas. The existence of policy barriers limits the possibilities of economic growth and socioeconomic development; thus, regional integration can lead to substantial economic gains. In the context of a free trade agreement, such as the AfCFTA, regional integration allows countries to improve market efficiency and share the cost of public good, they can generate. However, several risks are also known.

Most of papers that particularly address the impact evaluation of the AfCFTA uses Computable General Equilibrium (CGE) models, either static or dynamic. Depetris Chauvin et al. (2017) and Maliszewska & Ruta (2020) use different multi-sector multi-country dynamic CGE models (the former the Mirage-E CGE model and the latter the Envisage CGE model) using the GTAP dataset to evaluate different scenarios of the AfCFTA. As main AfCFTA scenario they reduce/eliminate intra-Africa tariffs in different sectors (some of them with a differentiated treatment due to their sensitivity) but also the add the reduction of some non-tariff measures (NTMs) and the reduction of trade costs as a consequence of the economic integration and infrastructure potential investments. Nevertheless, simulated scenarios in both papers are not identical. While Depetris Chauvin et al. (2017) differentiate tariff elimination scenarios between agricultural and non-agricultural intra-Africa trade, (Maliszewska & Ruta, 2020) follows a tariff cut scheme quite similar to the market access in goods provision in the real agreement. Moreover, the latter identifies sensitive products according to their importante in tariff revenue for each country. Another methodologucal coincidence between these two works is that they couple their CGE models with microsimulations modules in order to capture distributional impacts of the AfCFTA, between and within some of African countries, such as a poverty analysis. Even when magnitudes differ, findings of both papers are in line, particular for Senegal, which would benefit from this agreement (trade and welfare) particularly due to the reduction of non-trade barriers and trade facilitation of this integration. This is due because, Senegal already benefit from low tariffs in the African markets due to current agreements (e.g. the custom union it belongs).

Abrego et al. (2019, 2020), with a static CGE model, find similar conclusions as (Maliszewska & Ruta, 2020) and (Depetris Chauvin et al., 2017), even under different market structure assumptions (perfect competition, monopolistic competition and heterogeneous firms). Gains from eliminating intra-Africa tariffs are positive but small, specially compared to that could provide lower NTMs and lower transactions costs.

(Mevel & Karingi, 2012) in terms of scenarios compare gains from the AfCFTA with an additional African custom unions. Conclusions highlighted by the authors are that there is not additional intra-Africa trade gains from a continental custom union.

Since all these papers analyse the AfCFTA focusing on international aggregates and macroeconomic indicators for each African country, the purpose of this work is to focus on the AfCFTA impact on the Senegal's economy and to evaluate a potential economic transformation, assessed in terms of both domestic output and international export composition. That is why in section 4 we improved a single-country multi-sector CGE model for Senegal to measure:

- the impact on production and the various economic aggregates,
- the impact on trade potential (intra-African trade), and

- the effect on employment for each qualification.

3. Senegal's trade and tariffs concessions under the AfCFTA

3.1. Senegal trade structure

In 2018, according to the Observatory of Economic Complexity (OEC), Senegal exported a total of 3.89B dollars, making it the number 120 exporter in the world and imported 11.1B dollars, making it the number 97 trade destination in the world. Senegal like many African countries has demonstrated a high degree of dependence on a few agricultural or mineral exports. The structure of Senegalese trade shows that the country mostly exports raw materials and imports finished products. In 2019, exports are driven by primary products like animal related products, fruits and vegetables, food, minerals and fuels which account for more than 70% or total exports (Table 9). Intra-African trade is characterized by a greater proportion of manufactured products than African exports to the rest of the world, which are concentrated in low value-added products like animals, vegetables and chemicals. In contrast, imports are higher for manufacturing products like machinery and equipment (16%), fuels especially petroleum product (26%), transportation (9 %) and metals (9 %) (Table 2). According to UN COMTRADE database (Table 9), 43% of Senegal's total exports are sold in the African market. Main exported product in this market are fuels (34%), food products (16 %), fish products (11%), chemicals (10%) and minerals (9%).

Table 1: Senegal exports by sector - total and intra-Africa - 2019

	Export	**Intra-Africa exports**	**Row exports**	**Intra-Africa exports**
	(% of total exports)	**(% of total Intra-Africa Exports)**	**(% of total row exports)**	**(% of total exports)**
Animal	12.07	11.37	12.60	40.56
Vegetable	12.16	3.96	18.36	14.03
Food product	8.75	16.01	3.25	78.84
Minerals	9.36	9.38	9.34	43.16
Fuels	19.91	34.29	9.03	74.17
Chemicals	12.44	9.59	14.59	33.22
Plastic or Rubber	0.93	1.94	0.17	89.40
Hides and skin	0.16	0.02	0.27	6.61
Wood	0.62	1.00	0.33	69.42
Textile and Clothing	1.14	0.75	1.44	28.27
Footwear	1.00	0.73	1.20	31.55
Stone and Glass	15.43	0.14	27.01	0.38
Metal	3.23	6.70	0.60	89.33
Mach and Electricity	1.39	2.37	0.66	73.07
transportation	1.18	1.43	0.99	52.23
Miscellaneous	0.23	0.33	0.15	62.35
Total	**100.00**	**100.00**	**100.00**	**43.07**

Source: own elaboration based on UN COMTRADE database .

Senegal imports from the rest of Africa is quite limited to the 13% of its total imports in 2019 (Table 2). Senegalese imports from Africa are driven by fuels (50%), vegetables (11%), chemicals (7%) and wood (6%). Fuels include mainly crude oil and coal while palm oil is the main component of vegetables. Goods imported with non African partners are mainly fuels (22%), machinery and equipment(17%) and vegetables (12%).

Table 2: Senegal imports by sector - total and intra-Africa - 2019

	Import	**Intra-Africa imports**	**Row imports**	**Intra-Africa imports**
	(% of total imports)	**(% of total Intra-Africa imports)**	**(% of total row imports)**	**(% of total imports)**
Animal	1.90	1.05	2.0	7.10
Vegetable	11.60	11.56	11.6	12.77
Food product	6.45	5.98	6.5	11.88
Minerals	1.19	0.93	1.2	10.06
Fuels	26.01	50.27	22.4	24.76
Chemicals	7.88	7.20	8.0	11.71
Plastic or Rubber	3.50	2.98	3.6	10.91
Hides and skin	0.11	0.03	0.1	3.80
Wood	2.19	6.36	1.6	37.17
Textile and Clothing	2.32	0.75	2.5	4.14
Footwear	0.24	0.04	0.3	2.14
Stone and Glass	0.77	0.24	0.9	3.95
Metal	8.72	3.77	9.5	5.54
Mach and Electricity	15.76	3.78	17.5	3.07
transportation	9.21	3.15	10.1	4.39
Miscellanous	2.15	1.90	2.2	11.33
Total	**100.00**	**100.00**	100	**12.81**

Import duties applied for African countries are generally lower than those applied for the rest of the world for all commodity groups of activity except chemicals where tariff rates are 6 percent lower. Energy products like fuels benefit from the lowest tariff rate of 0.63 percent for African while 2 percent is applied in average with other partners. Agri-food products including livestock products, fishery, cereals, fruits and vegetables, and footwear imported from Africa are the most challenging group with tariffs rates from 8 to 13 percent.

Table 3: Senegal import taxes by sector (%)

Sectors	**Rest of the world**	**Africa**
Animal	18.58	8.20
Vegetable	15.00	8.68
Food product	17.36	11.91
Minerals	6.86	5.19
Fuels	2.07	0.63
Chemicals	5.34	5.70
Plastic or Rubber	8.79	5.62
Hides and skin	12.43	6.62
Wood	7.82	6.31
Textile and Clothing	16.62	5.26
Footwear	17.28	13.30
Stone and Glass	7.26	5.71
Metal	8.97	5.89
Mach and Electricity	7.21	6.33
transportation	6.79	5.13
Miscellaneous	10.69	10.48

Source: own elaboration based on MAcMaps-HS6 database Guimbard et al. (2012)

Senegal's import taxes paid are mainly intended for the rest of the world. Africa only benefits from 3 percent on average (Table 4. Africa's share is relatively larger than average for agricultural and mineral products (9%). African tax revenues from Senegal are driven by primary products like Stone and glass group (17%), vegetable (14%), chemichals (11%) and fuels (10%). In contrast tariff revenue for the rest of the world is more manufacturing oriented with a higher share for machinery and equipement (19 %) and textile and clothing (11 %)

Table 4: Senegal tariff revenue by sector and market of origin

	Rest of the world	**Africa**	
	(% of total tariff revenue RoW)	(% of total tariff revenue Africa)	(% of total tariff revenue)
Animal	2.94	2.87	2.77
Vegetable	9.30	14.26	4.29
Food product	5.68	8.54	4.21
Minerals	1.30	4.15	8.55
Fuels	6.08	10.40	4.76
Chemicals	6.32	10.68	4.71
Plastic or Rubber	4.73	2.88	1.75
Hides and skin	0.67	0.57	2.42
Wood	2.25	3.50	4.34
Textile and Clothing	11.15	3.05	0.79
Footwear	0.74	0.39	1.54
Stone and Glass	10.20	16.73	4.57
Metal	9.15	9.24	2.86
Mach and Electricity	18.83	5.82	0.89
Transportation	6.45	5.18	2.29
Miscellaneous	4.23	1.74	1.18
Total	100.00	100.00	2.84

Source: own elaboration based on UN COMTRADE and MAcMaps-HS6 Guimbard et al. (2012).

4. Modelling issues

The simulation model chosen for the Senegal economy is a single-country multi-sector multi-agent static CGE model based on the STAGE CGE model in its free available version (STAGE 1) (McDonald, 2009). This model is commonly used for representing African economies (Kenya, Ethiopia, Senegal, Mozambique, Botswana, etc.) and provides a basis on which adding bilateral trade behaviours to simulate the AfCFTA.

Main characteristics of the STAGE model are:

- a generalised treatment of trade relationships by incorporating provisions for non-traded exports and imports;
- relaxation of the small country assumption for exported commodities that do not face perfectly elastic demand on the world market;
- multiple product activities (fixed proportions of commodity outputs);
- production technologies specified as nested Constant Elasticity of Substitution (CES);
- household consumption expenditure represented by Stone-Geary utility functions.

  Households are assumed to choose commodities they consume so as to maximise utility where the utility function is Stone-Geary. McDonald (2009) argues that for a developing country a Stone- Geary function may be generally preferable since it allows for subsistence consumption expenditures, which is an arguably realistic assumption when there are substantial numbers of very poor consumers.The households choose their consumption bundles from a set of 'composite' commodities that are aggregates of domestically produced and imported commodities. These 'composite' commodities are formed as Constant Elasticity of Substitution (CES) aggregates that embody the presumption that domestically produced and imported commodities are imperfect substitutes. The optimal ratios of imported and domestic commodities are determined by the relative prices of the imported

and domestic commodities. This is the so-called Armington 'insight' (Armington, 1969), which allows for product differentiation via the assumption of imperfect substitution (see Devarajan et al., 1994). The assumption has the advantage of rendering the model practical by avoiding the extreme specialisation and price fluctuations associated with other trade assumption. In this model the country is assumed to be a price taker for all imported commodities.

Figure 1: Standard Model Stage

	Commodities	**Activities**	**Factors**	**Households**	**Enterprises**	**Government**	**Capital**	**RoW**	**Total**	**Prices**
Commodities	0	Leontief Input-Output Coefficients	0	Utility Functions (CD or Stone-Geary)	Fixed in Real Terms	Fixed in Real Terms and Export Taxes	Fixed Shares of Savings	Commodity Exports	Commodity Demand	Consumer Commodity Price Prices for Exports
Activities	Domestic Production	0	0	0	0	0	0	0	Constant Elasticity of Substitution Production Functions	
Factors	0	Factor Demands (CES)	0	0	0	0	0	Factor Income from RoW	Factor Income	
Households	0	0	Fixed Shares of Factor Income	Fixed shares of income	Fixed Shares of Dividends	Fixed (Real) Transfers	0	Remittances	Household Income	
Enterprises	0	0	Fixed Shares of Factor Income	0	0	Fixed (Real) Transfers	0	Transfers	Enterprise Income	
Government	Tariff Revenue Domestic Product Taxes	Indirect Taxes on Activities	Fixed Shares of Factor Income Direct Taxes on Factor Income	Direct Taxes on Household Income	Fixed Shares of Dividends Direct Taxes on Enterprise Income	0	0	Transfers	Government Income	
Capital	0	0	Depreciation	Household Savings	Enterprise Savings	Government Savings (Residual)	0	Current Account 'Deficit'	Total Savings	
Rest of World	Commodity Imports	0	Fixed Shares of Factor Income	0	0	0	0	0	Total 'Expenditure' Abroad	
Total	Commodity Supply	Activity Input	Factor Expenditure	Household Expenditure	Enterprise Expenditure	Government Expenditure	Total Investment	Total 'Income' from Abroad		
	Producer Commodity Prices Domestic and World Prices for Imports	Value Added Prices								

Trade is modelled using nested CES (imports) and CET (exports) functions with an adaptation to mitigate the impacts of small trade shares.

There also are multiple tax instruments on commodities, activities, factors and institutions, and multiple sources of savings. The model is designed to include many factor and household accounts.

4.1. STAGE CGE model with bilateral trade modelling

In the basic STAGE CGE model trade is modelled using the Armington insight Armington (1969) under the assumption that imperfect substitution between domestically produced and imported goods is represented by a one-level CES function. In addition, exports are assumed to be imperfect substitutes for domestically produced goods and this is represented by a one-level CET function.

Small country assumption can be relaxed with Export Demand functions. This model allows for non-traded and non-produced and non-consumed domestic goods ($ARMALT$ and $CETALT$).

Nevertheless, this basic model does not distinguish between different origin of imports and export markets, which is required for a proper modeling and simulation of the AfCFTA.

For that paper, the trade block has been improved by extending imports and exports trees (Figures 2 and 3).

In figure 2 shows a CES demand function where: QQ is the quantity of a composite commodity, QM is the total quantity of that commodity imported, QM_{afr} is the total quantity of that commodity imported from Africa, QM_{row} is the total quantity of that commodity imported

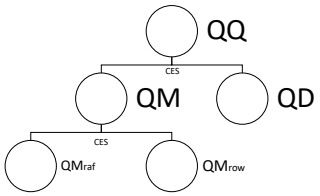

Figure 2: Import demand tree - CES structure

from other regions outside Africa, QD is the quantity of that commodity that is produced and consumed domestically.

A CET supply function is presented in Figure 3, where: QXC is the quantity of a commodity produced domestically, QE is the total quantity of that commodity exported, QE_{afr} is the total quantity of that commodity exported to Africa, QE_{row} is the total quantity of that commodity exported outside Africa, QD is the quantity of that commodity that is consumed domestically.

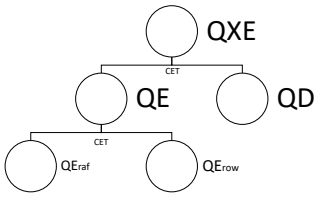

Figure 3: Export supply tree - CET structure

4.2. The SCIndex

A commonly used method of measuring structural change in output (and employment) is the rate or coefficient of (composition) structural change, often referred to as a SCI. The SCI for output may be defined as half the sum of the absolute value of the differences in value-added shares over time. The calculation is given by the formula:

$$SCI = \frac{1}{2} \sum_{i} |x_{i,t} - x_{i,t-1}| \tag{1}$$

where $x_{i,t}$ and $x_{i,t-1}$ represent each industry's share of total value-added at time (t) and (t-1), respectively. The use of absolute values ensures that positive and negative changes in industry shares do not cancel each other out when the values are summed across industries.

The SCI is bounded between zero and 100, with zero representing no structural change while 100 indicates a complete reversal of structure (OECD 1994).

In order to compute this indicator for sectors' production and labours' value-added we will consider the initial situation of 2014 and the results under each AfCFTA scenario.

4.3. Calibration data

Senegal's CGE model requires three main data sources for calibration:

- Social Accounting Matrix (SAM) for Senegal: we have chosen the most recent (2014) and free available SAM Boulanger et al. (2017) ;
- Bilateral trade (imports and exports) between Senegal and its African and non-African partners at a compatible sector level with the SAM: we have used the BACI database Gaulier & Zignago (2010) to reflect trade structure of Senegal in 2014;
- Trade protection in Senegal over imports coming from African and non-African partners in a compatible sector breakdown with the SAM: we have been working with MAcMap-HS6 database Guimbard et al. (2012) for 2013/2017 duties.

The Senegal SAM 2014 from (Boulanger et al., 2017) considers 218 accounts, from which 55 are the economic activities (including 14 household accounts as producers), 66 commodities (including 3 agricultural commodities and 9 accounts of self-consumed products), 3 categories of labours differentiated by qualification (skilled, semi-skilled and unskilled) in 14 Senegalese regions and the rest of the world, 5 capital accounts (agricultural, non-agricultural, non-irrigated land, irrigated land and livestock), 5 taxes and tax accounts (direct, indirect, sales, labour factor and imports), 33 categories of representative households (regionalized),[1] on account for margins, an investment savings account, 4 accounts allocating investments (roads, irrigation, other infrastructure, rest of investments) and 3 accounts for enterprises, government, and the rest of the world (Table 5).

[1]The regions considered are : Dakar, Ziguinchor, Diourbel, Saint-Louis, Tambacounda, Kaolack, Thiès, Louga, Fatick, Kolda, Matam, Kaffrine, Kédougou, Sédhiou. Households from Dakar are splitted by quintile of income and in the rest of regions they differentiate by rural and urban households.

Table 5: Senegal SAM 2014 - Accounts details - Boulanger et al. (2017)

Categories	**Description**
Activities	55 activities including 14 representative household groups producers
Commodities	66 commodities with 57 marketed commodities and 9 self-consumed commodities
Regions	14 regions including Dakar.
Labor	3 labours by qualification (skilled, semi-skilled and unskilled) in 14 Senegalese regions and the rest of the world
Capital and Land	5 capital accounts (agricultural, non-agricultural, non-irrigated land, irrigated land and livestock),
Households	33 categories of representative households (regionalized): 5 quintiles of income in Dakar and 2 (rural and urban) in other regions.
Other institutions	3 accounts for enterprises, government, and the rest of the world.
Investment and savings	An investment savings account, 4 accounts allocating investments (roads, irrigation, other infrastructure, rest of investments)
Taxes	5 tax accounts (direct taxes, indirect taxes, sales taxes, Factor taxes and imports taxes)

In order to calibrate the Senegal CGE model and to properly address the objective of this paper we have chosen a particular aggregation of the original SAM's accounts (Table 6). So, we sill have a SAM of 112 accounts: 44 activities and commodities (one of each represents a good of self-production/consumption by households), 10 production factors (Senegal and rest of the world's labour by 3 skills; 1 land and 3 capital - agricultural, non-agricultural and livestock); 2 representative households in Senegal (rural and urban), 1 household of the rest of the world, enterprises aggregated at national level with one single representative group. Other institutions include the government (with its taxes) and the rest of the world.

Table 6: Senegal SAM Aggregation and CGE model accounts

Activities	Commodities	Factors	Agents	Taxes	Others
Self-cons. HH activity	Self-cons. good HH	High skilled labour SEN	Urban HH SEN	Value added taxes	Inv-Savings
Food crops	Food crops	Medium skilled labour SEN	Rural HH SEN	Import duties	Stock Changes
Cash crops	Cash crops	Unskilled labour SEN	HH ROW	Export taxes	Transport margins
Livestock	Livestock	High skilled labour ROW	Government	Excise duty	Trade margins
Forestry	Forestry	Medium skilled labour ROW	Enterprises	Sales taxes	
Fish	Fish	Unskilled labour ROW	Rest of World	Production taxes	
Mining products	Mining products	Land		Factor taxes	
Meat - Fish processed	Meat - Fish processed	Livestock		Direct income taxes	
Grain milling	Grain milling	Capital agri			
Cereal based food	Cereal based food	Capital non-agri			
Sugar	Sugar				
Other manufactured food	Other manufactured food				
Beverages	Beverages				
Tobacco (processed)	Tobacco (processed)				
Textile & clothing	Textile & clothing				
Leather & footwear	Leather & footwear				
Wood & paper	Wood & paper				
Printing and publishing	Printing and publishing				
Petroleum	Petroleum				
Chemicals	Chemicals				
Fertilizers	Fertilizers				
Rubber	Rubber				
Glass, pottery	Glass, pottery				
Metals	Metals				
Machines	Machines				
Equipment	Equipment				
Transport material	Transport material				
Other manufactures	Other manufactures				
Electricity	Electricity				
Construction	Construction				
Trade	Trade				
Maintenance / Repair	Maintenance / Repair				
Hotels	Hotels				
Transport	Transport				
Communication	Communication				
Finance	Finance				
Real estate	Real estate				
Other business services	Other business services				
Administration	Administration				
Education	Education				
Health	Health				
Other personal services	Other personal services				

Trade (Gaulier & Zignago, 2010) and protection data (Guimbard et al., 2012) have been used to calibrate bilateral trade imports and export functions of the model. Ad-valorem equivalent tariff from Senegal have been aggregated at the sector level (Table 6) and for African and non-African partners using the weight of the reference group from MAcMaps-HS6. Sectoral imports and exports have been splitted between Africa and the rest of the world by applying trade shares calculated on the based of UNCOMTRADE data for each SAM sector.

4.4. AfCFTA experimental scenarios

According to the criteria of the share in the Senegal tariff revenue for Africa imports (Table 3), we classify tariff lines (at HS4 level) a sensitive capping to 10% of tariff lines and the for those lines that compromise 30% of Senegal's tariff revenue. Tariff revenue for each country generated from imports is ranked by descending order to identify the two categories, sensitive and non-sensitive goods.

For ranking the lines from the most sensitive to the least sensitive and ultimately determining the lists of products under each of the two categories for the two scenarios.

Full Trade Liberalisation: elimination of all tariffs on Senegal's imported goods from the rest of Africa.

Partial Trade Liberalisation with 10% of HS lines as sensitive: elimination of all tariffs between Senegal and the rest of Africa except for sensitive products. An alternative to thus scenarios assumes a tariff cut of a 50% for these sensitive products.

Partial Trade Liberalisation with sensitive of 30% of tariff revenue: elimination of all tariffs between Senegal and the rest of Africa except for sensitive products that concentrate 30% of tariff revenue.

It is important to note that all these scenarios assumes a unilateral tariff reduction/elimination for Senegal. These scenarios will be improved in a next version with the complement of the rest of Africa tariff cut to complete the impact of the AfCFTA.

Table 7: African Continental Free Trade Agreement - Senegal's Scenarios of tariff cuts (ratios)

	Senegal's Scenarios in the African Continental Free Trade Agreement			
	Full Liberalisation	Sensitive Products - 10% HS6 lines		Sensitive Products - 30% in tariff revenue
		No tariff change	50% tariff cut	No tariff change
Food crops	-1.00	-0.06	-0.53	-0.42
Livestock	-1.00	-0.56	-0.78	-1.00
Fish	-1.00	-0.27	-0.64	-1.00
Cash crops	-1.00	-0.14	-0.57	-1.00
Forestry	-1.00	-0.02	-0.51	-0.28
Mining products	-1.00	-0.21	-0.61	-1.00
Meat - Fish processed	-1.00	-0.09	-0.55	-1.00
Other manufactured food	-1.00	-0.10	-0.55	-1.00
Grain milling	-1.00	-0.01	-0.51	-1.00
Cereal based food	-1.00	-0.11	-0.55	-1.00
Sugar	-1.00	-0.06	-0.53	-1.00
Beverages	-1.00	-0.02	-0.51	-1.00
Tobacco (processed)	-1.00	-0.48	-0.74	-1.00
Textile & clothing	-1.00	-0.48	-0.74	-1.00
Leather & footwear	-1.00	-0.19	-0.59	-1.00
Wood & paper	-1.00	-0.22	-0.61	-1.00
Printing and publishing	-1.00	-0.01	-0.51	-0.29
Petroleum	-1.00	-0.13	-0.57	-0.70
Chemicals	-1.00	-0.05	-0.52	-1.00
Fertilizers	-1.00	-0.24	-0.62	-1.00
Rubber	-1.00	-0.33	-0.67	-1.00
Glass, pottery	-1.00	-0.25	-0.62	-1.00
Metals	-1.00	-0.54	-0.77	-1.00
Machines	-1.00	-0.37	-0.68	-1.00
Equipment	-1.00	-0.08	-0.54	-0.69
Transport material	-1.00	-0.51	0.00	-1.00
Other manufactures	0.00	0.00	0.00	0.00
Transport	0.00	0.00	0.00	0.00
Communication	0.00	0.00	0.00	0.00
Finance	0.00	0.00	0.00	0.00
Other business services	0.00	0.00	0.00	0.00
Education	0.00	0.00	0.00	0.00
Health	0.00	0.00	0.00	0.00
Other personal services	0.00	0.00	0.00	0.00

5. Socio-economic impact of AfCFTA agreement: the results

When a country reduces or eliminates import tariffs, imports become less expensive than before in the domestic market. Since tariff cuts can differ between products, relative prices change and thus, trade, consumption and production patterns also do.

Next, we analyse the impact of Senegal's unilateral trade liberalisation with its African partners in the AfCFTA framework. Results of the four scenarios described above are presented in a comparative way for trade, consumption - in rural and urban regions-, production and also for macroeconomic indicators as a general performance of each of them.

5.1. Trade impact

Under each of scenarios Senegal's tariff cuts impact directly on import prices for African imported products. Relative import prices between African's and RoW's products also change, in favour to the African's one in the Senegal market. Consequently, we find some trade diversion effects.

Assuming the elimination of Senegal tariffs on all African products, main increase on imports come from sectors such as Forestry, Tobacco, Grain milling, leather and footwear, and Food Crops. Imported products from the rest of world mainly fall for Forestry (-45%), cash crops (-2%) and others (Table 2 - Full Liberalisation).

Nevertheless, when introducing some criteria of product sensitivity and thus, a differentiated tariff reduction for them, the magnitudes of the impact become lower and the pattern of import changes. If the selection of sensitive products is based on the 10% most protected HS6 products, import increase from the rest of Africa is oriented to Forestry and to a lesser extent to Grain and milling, Food Crops, Cash Crops and Chemicals. The impact becomes greater when reducing 50% of tariffs in the 10% of sensitive products (Table 2 - Sensitive Products 10% HS6 liens). In the last scenario where products contributing to 30 percent of revenue are sensitive and not liberalized, Senegalese imports from Africa increase for most of commodities similarly to full liberalization scenario.(Table 2 - Sensitive Products 30% of tariff revenue). With a lesser extent Forestry, Tobacco, Grain milling, leather and footwear, and Food Crops appear as the most benefiting sector.

Table 8: Impact on bilateral Senegal's imports by product (% change compared to the baseline)

	Senegal's Imports - African Continental Free Trade Agreement							
	Full Liberalisation		Sensitive Products - 10% HS6 lines				Sensitive Products - 30% in tariff revenue	
			No tariff change		50% tariff cut		No tariff change	
	Africa	*RoW*	*Africa*	*RoW*	*Africa*	*RoW*	*Africa*	*RoW*
Food crops	38.94	-1.27	2.18	-0.07	18.69	-0.63	28.69	-1.02
Livestock	0.70	0.19	0.29	0.01	0.47	0.07	0.62	0.11
Fish	0.37	0.18	0.03	0.01	0.20	0.09	0.30	0.11
Cash crops	25.81	-1.67	1.40	-0.07	12.68	-0.89	10.29	-0.40
Forestry	30612.02	-45.70	124.38	-1.21	993.27	-6.34	30593.13	-45.73
Minning products	0.48	-0.03	0.03	0.02	0.25	-0.01	0.18	0.04
Meat - Fish processed	7.08	-0.17	1.41	-0.08	4.19	-0.13	6.94	-0.30
Other manufactured food	2.44	-0.61	0.25	-0.07	1.33	-0.35	2.41	-0.64
Grain milling	109.06	-1.48	6.20	-0.09	46.23	-0.68	108.88	-1.57
Cereal based food	27.08	-0.70	2.35	-0.06	13.84	-0.36	27.08	-0.70
Sugar	20.84	-1.05	0.25	-0.01	9.89	-0.52	20.84	-1.05
Beverages	12.38	-0.95	0.64	-0.05	6.30	-0.49	12.39	-0.94
Tobacco (processed)	139.76	-1.82	1.63	-0.08	51.42	-0.81	140.69	-1.44
Textile & clothing	8.61	-0.21	3.99	-0.08	6.34	-0.08	8.55	-0.26
Leather & footwear	68.52	-0.83	26.97	-0.36	45.86	-0.53	68.41	-0.89
Wood & paper	1.21	-0.45	0.24	-0.07	0.76	-0.22	1.18	-0.48
Printing and publishing	9.82	-0.21	2.00	-0.07	5.80	-0.15	9.74	-0.28
Petroleum	0.93	-0.23	0.01	0.00	0.47	-0.11	0.25	-0.09
Chemicals	9.97	-0.55	1.23	-0.07	5.45	-0.33	6.89	-0.37
Fertilizers	0.57	0.57	0.06	0.06	0.27	0.27	0.43	0.43
Rubber	5.29	-0.22	1.23	-0.08	3.22	-0.16	5.24	-0.28
Glass, pottery	39.76	-1.28	11.49	-0.31	24.62	-0.73	39.83	-1.23
Metas	9.17	-0.47	2.16	-0.10	5.59	-0.29	9.19	-0.46
Machines	6.37	0.15	3.21	-0.06	4.75	0.03	6.27	0.05
Equipment	12.03	-0.37	4.25	-0.11	8.06	-0.23	12.04	-0.36
Transport material	22.42	-0.82	1.50	-0.04	11.35	-0.38	14.72	-0.57
Other manufactures	8.00	-0.06	3.85	-0.12	7.91	-0.15	7.89	-0.17
Transport	0.18	0.18	0.02	0.02	0.10	0.10	0.13	0.13
Communication	0.27	0.27	0.03	0.03	0.14	0.14	0.18	0.18
Finance	0.34	0.34	0.03	0.03	0.17	0.17	0.22	0.22
Other business services	0.17	0.17	0.03	0.03	0.11	0.11	0.10	0.10
Education	-0.02	-0.02	-0.01	-0.01	0.00	0.00	-0.04	-0.04
Health	0.14	0.14	0.01	0.01	0.07	0.07	0.09	0.09
Other personal services	0.32	0.32	0.03	0.03	0.17	0.17	0.21	0.21

Impacts on exports potential is presented in Table for the different scenario 9. It shows that with an unilateral liberalization, exports are mainly negative. Import tax shocks have a negative or neutral effect on exports values. In case of full liberalization, only the forestry increased

by more than 3 % percent. Exports for other sectors like fishing, mining, textiles and clothing increase slight or are stable. The scenario (**??**- 30% tariff revenue) implies as well a negative change on exports values. The unilateral trade agreement is beneficial for importing countries mainly.

Table 9: Impact on Senegal's bilateral exports by product (% change compared to the baseline)

Senegal's Exports - African Continental Free Trade Agreement				
	Full Liberalisation	Sensitive Products 10% HS6 lines		Sensitive Products - 30% in tariff revenue
		No tariff change	50% tariff cut	No tariff change
Food crops	-0.30	0.01	-0.15	-0.25
Livestock	-0.21	0.01	-0.11	-0.17
Fish	0.01	0.17	0.02	-0.01
Cash crops	-1.90	-0.04	-0.92	-1.27
Forestry	2.81	0.02	0.28	2.76
Minning products	0.23	0.00	0.27	-0.30
Meat - Fish processed	-0.10	0.22	-0.01	-0.10
Other manufactured food	-3.25	0.04	-1.50	-2.12
Grain milling	-0.52	0.04	-0.26	-0.26
Cereal based food	-0.53	0.07	-0.25	-0.48
Sugar	-0.46	0.03	-0.22	-0.04
Beverages	-0.26	0.11	-0.12	-0.16
Tobacco (processed)	-1.21	-0.01	-0.60	-0.62
Textile & clothing	0.05	-0.15	0.00	0.06
Leather & footwear	0.42	-0.01	0.29	0.37
Wood & paper	-0.52	0.02	0.05	-0.59
Printing and publishing	-0.21	0.02	-0.08	-0.15
Petroleum	-0.03	0.20	-0.02	-0.08
Chemicals	-1.32	0.05	-0.58	-1.19
Fertilizers	-0.44	-0.05	-0.19	-0.33
Rubber	0.26	0.05	0.17	0.19
Glass, pottery	-0.16	0.05	-0.04	-0.28
Metas	-0.59	0.01	-0.26	-0.53
Machines	-0.35	0.00	0.16	-0.56
Equipment	-0.24	0.07	-0.03	-0.23
Transport material	-0.83	0.03	-0.40	-0.69
Other manufactures	-0.19	0.01	-0.09	-0.17
Transport	-0.12	0.02	-0.04	-0.12
Communication	-0.23	0.00	-0.09	-0.20
Finance	0.01	0.00	0.03	-0.04
Other business services	0.08	0.02	0.02	0.05
Education	-0.13	0.01	-0.06	-0.12
Health	-0.19	0.00	-0.03	-0.20
Other personal services	0.00	0.00	0.00	0.00

5.2. Production and Consumption Impacts

Overall, the reduction/suppression of import duties has a direct impact on the level of trade in all sectors of activity with imported goods that are much more competitive. All else being equal, exports are lower or stable for most of activities. The indirect consequence is on production and consumption levels as presented below. Table 10 present changes in production structure of the country and the potential to foster agricultural structural transformation from an economy highly dependant on primary commodities with a low value added. In a full liberalization, production increases mainly for manufacturing sectors including manufactured food (2.71%), Chemicals (1.20%), Cash crops (1.15%), Tobacco (processed) (0.81%) Hotels (0.57%), Fertilizers (0.55%) and Machines (0.48%). In contrast, production decreases for Mining products (-0.22%),Glass, pottery -0.37%), Leather & footwear (-0.37%) , Food crops (-0.83%) and Forestry (-2.74%) whose production is substituted by imports. When excluding sensitive products using 10%tariff lines or 30% tariff revenue, the same sectors appear as the most impacted positively, which shows

the potential of the free trade agreement to impact the production structure of the country.The SCI index will provide more insights on this point.

Table 10: Impact on Senegal's production by product (% change compared to the baseline)

Senegal's production - African Continental Free Trade Agreement				
	Full Liberalisation	Sensitive Products 10% HS6 lines		Sensitive Products - 30% in tariff revenue
		No tariff change	50% tariff cut	No tariff change
Autocons good HH	0.00	0.00	0.00	-0.01
Food crops	-0.83	-0.04	-0.39	-0.67
Cash crops	1.15	0.12	0.54	0.90
Livestock	0.42	0.02	0.19	0.30
Forestry	-2.74	-0.04	-0.23	-2.75
Fish	0.23	0.01	0.09	0.20
Minning products	-0.22	0.02	-0.26	0.28
Meat - Fish processed	0.15	0.00	0.05	0.11
Grain milling	0.08	0.01	0.04	-0.10
Cereal based food	0.13	0.01	0.06	0.11
Sugar	0.13	0.04	0.05	-0.13
Other manufactured food	2.71	0.18	1.25	1.75
Beverages	-0.02	0.01	-0.02	-0.07
Tobacco (processed)	0.81	0.07	0.41	0.41
Textile & clothing	-0.07	-0.02	0.00	-0.10
Leather & footwear	-0.37	-0.15	-0.24	-0.37
Wood & paper	0.19	-0.02	-0.07	0.22
Printing and publishing	0.13	0.00	0.04	0.06
Petroleum	-0.04	0.01	-0.02	0.02
Chemicals	1.20	0.18	0.53	1.09
Fertilizers	0.55	0.06	0.24	0.44
Rubber	0.28	0.02	0.11	0.19
Glass, pottery	-0.37	-0.08	-0.23	-0.31
Metas	0.07	0.03	0.00	0.16
Machines	0.48	0.03	0.20	0.41
Equipment	-0.19	-0.04	-0.11	-0.17
Transport material	0.06	0.00	-0.18	0.24
Other manufactures	0.21	0.00	0.06	0.16
Electricity	0.16	0.01	0.08	0.12
Construction	-0.31	-0.02	-0.13	-0.24
Trade	0.23	0.03	0.11	0.16
Maintenance / Repair	0.24	0.03	0.12	0.18
Hotels	0.57	0.05	0.27	0.46
Transport	0.18	0.03	0.10	0.15
Communication	0.19	0.02	0.09	0.15
Finance	0.28	0.03	0.13	0.21
Real estate	0.22	0.02	0.10	0.17
Other business services	0.06	0.01	0.02	0.06
Adminsitration	-0.07	0.00	-0.03	-0.06
Education	-0.05	0.00	-0.01	-0.04
Health	0.14	0.01	0.06	0.10
Other services	0.23	0.02	0.08	0.21

The impact of the trade liberalization is different among sectors and depends also on zones. The first highlight is household auto consumption decreases in all scenarios for urban and rural areas.This can be explained by the relative competitiveness of imported goods which substitute the domestic supply. The consumption of most of goods increased slightly both in urban and rural areas. Furthermore, the impact on rural household consumption is positive in all scenario with a higher increase in the full liberalization. However, for urban households, when 10% HS6 lines sensitive products experienced a 50% tariff cut, consumption decreases for most of goods including manufacturing products and food and agricultural products.

Table 11: Impact con Senegal's urban and rural consumption patterns (% change compared to the baseline)

	Senegal's Consumption - African Continental Free Trade Agreement							
	Full Liberalisation		Sensitive Products - 10% HS6 lines				Sensitive Products - 30% in tariff revenue	
			No tariff change		50% tariff cut		No tariff change	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Autocons good HH	-0.04	0.00	0.00	0.00	0.00	-0.01	-0.04	0.00
Food crops	0.09	0.12	0.01	0.01	0.00	0.04	0.07	0.10
Livestock	0.04	0.07	0.00	0.01	0.00	0.02	0.03	0.06
Fish	0.03	0.07	0.00	0.01	0.00	0.01	0.02	0.05
Cash crops	0.16	0.19	0.01	0.01	0.01	0.08	0.08	0.11
Forestry	0.23	0.26	0.01	0.01	0.00	0.03	0.22	0.25
Mining products	0.06	0.13	0.01	0.01	-0.01	0.03	0.05	0.11
Meat - Fish processed	0.17	0.23	0.02	0.02	0.00	0.09	0.13	0.18
Other manufactured food	0.17	0.23	0.01	0.02	0.29	0.08	0.14	0.19
Grain milling	0.11	0.17	0.01	0.01	0.00	0.05	0.09	0.14
Cereal based food	0.16	0.22	0.01	0.01	0.00	0.08	0.12	0.18
Sugar	0.12	0.19	0.01	0.01	0.00	0.06	0.10	0.15
Beverages	0.19	0.25	0.02	0.02	0.00	0.09	0.12	0.17
Tobacco (processed)	0.13	0.24	0.02	0.02	0.04	0.07	0.10	0.19
Textile & clothing	0.19	0.30	0.05	0.05	0.00	0.11	0.17	0.26
Leather & footwear	0.18	0.29	0.02	0.02	0.00	0.07	0.16	0.25
Wood & paper	0.15	0.26	0.02	0.02	0.00	0.08	0.12	0.21
Printing and publishing	0.15	0.29	0.01	0.02	0.00	0.08	0.10	0.21
Petroleum	0.28	0.40	0.03	0.04	0.00	0.15	0.20	0.30
Chemicals	0.19	0.32	0.03	0.03	0.03	0.10	0.16	0.26
Fertilizers	0.25	0.38	0.05	0.05	0.00	0.14	0.22	0.32
Rubber	0.22	0.39	0.04	0.04	-0.03	0.12	0.18	0.32
Glass, pottery	0.20	0.39	0.03	0.03	0.00	0.10	0.17	0.32
Metals	0.11	0.23	0.01	0.02	0.00	0.06	0.08	0.18
Machines	0.24	0.45	0.03	0.04	0.00	0.12	0.18	0.36
Equipment	0.37	0.57	0.03	0.04	0.00	0.18	0.29	0.45
Transport material	0.19	0.40	0.02	0.03	0.00	0.10	0.14	0.32
Other manufactures	0.17	0.38	0.02	0.03	0.00	0.08	0.13	0.30
Transport	0.18	0.39	0.02	0.03	0.00	0.09	0.13	0.31
Communication	0.15	0.36	0.01	0.02	0.00	0.06	0.12	0.30
Finance	0.17	0.38	0.02	0.03	0.00	0.08	0.13	0.31
Other business services	0.18	0.39	0.02	0.03	0.00	0.09	0.14	0.31
Education	0.18	0.39	0.02	0.03	0.00	0.09	0.14	0.31
Health	0.19	0.40	0.02	0.03	0.00	0.10	0.14	0.32
Other personal services	0.17	0.38	0.01	0.02	0.00	0.07	0.14	0.31

5.3. Macroeconomic impact

The macroeconomic impact is assessed in this section. Table 12 shows that while household consumption is higher in the full liberalization, government and investment consumption is decreasing more importantly in case of full liberalization.This can be mainly explained by a reduction of government revenue from imports. Besides, domestic final and imports demands and exports supply are increasing in all scenarios as the liberalization process is greater. Finally selecting sensitive products based on tariff revenues provide better results on several macroeconomic variables compared to 10% HS6 lines. The impact on the global economy can be assessed using other welfare measures (equivalent variation for example) in future versions of the report.

Table 12: Macro-economic impact (% change compared to the baseline)

Macroeconomic impact-African Continental Free Trade Agreement					
	Value (millions CFA)	Full Liberalisation	Sensitive Products 10% HS6 lines		Sensitive Products 30% in tariff revenue
			No tariff change	50% tariff cut	No tariff change
Household consumption	588	0.17	0.01	0.08	0.13
Government consumption	131	-0.07	0.00	-0.03	-0.06
Investment consumption	212	-0.31	-0.02	-0.13	-0.24
Domestic final demand	930	0.03	0.00	0.02	0.02
Import demand	379	0.44	0.04	0.17	0.36
Export supply	212	0.69	0.06	0.28	0.56
GDP from Income side	762	-0.09	-0.01	-0.04	-0.07
GDP from Expenditure	764	0.01	0.00	0.01	0.00
Total domestic production	1480	0.15	0.02	0.07	0.11
Total intermediate inputs	819	0.26	0.03	0.13	0.19

6. Concluding remarks

In the framework of the African Continental Free Trade Agreement, members can experience changes in production and consumption structures, by improving value chains integration through trade. The aim of this paper was quantifying the impact of the abolition of Senegal's imports duties on the transformation this economy by looking at the effects on the various subsectors of the economy. The economic transformation is assessed in terms of both international trade composition (intra-African *versus* trade with the rest of the world), domestic output, consumption pattern in rural and urban regions of the country and main macroeconomic indicators.

To address this objective, we have improved bilateral trade block of the single-country static STAGE CGE model (McDonald, 2009), which was calibrated for Senegal in 2014 as base year Boulanger et al. (2017). New block of equations was calibrated using trade and protection data according to BACI database (Gaulier & Zignago, 2010) and MAcMap-HS6 (Guimbard et al., 2012) respectively. Simulated scenarios have considered four options of Senegal tariff cuts *vis-a-vis* its African trade partners: full trade liberalisation in goods and partial trade liberalisation in goods assuming two different criteria of sensitiveness (10% of tariff lines according to protection and products that concentrate 30% of tariff revenue) and lower tariff cuts for them.

Sectoral and macroeconomic results across scenarios show that improving market access in Senegal for African partners based on a sensitivity criteria of tariff revenue losses is close to a full trade liberalisation scenario. Full liberalization has a positive impact on household consumption globally and affects the production structure with a higher impact on manufacturing sector. Other sensitivity criteria limit trade liberalisation and thus, the magnitude of changes in the current production and consumption patterns. At the macroeconomic level, this scenarios' relation remain true by highlighting that trade, consumption and production gains are greater when Senegalese market is full open for an African integration. In addition, the choice of sensitive products is critical and have several implications. Our results suggest that the criteria based on tariff revenue may be closer to the optimum full liberalization scenario.

Nevertheless, these exercises are partial yet since scenarios only considered unilateral tariff cuts from the Senegalese side. The extension of this work is to add the reduction in the average African tariffs over Senegal's exports to the regions in order to have a full effect on Senegal of this continental trade agreement that is just coming into force.

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