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Impact of AfCFTA Implementation on the Moroccan Economy: A CGE modeling assessment

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Summary

The main objective of this research project is to try to make an *ex-ante* assessment of trade liberalization between Morocco and African Countries, within the framework of the AfCFTA, on production and value added by industry and on foreign trade. Therefore, this work addresses the effects of creation and /or diversion of trade with African and non-African partners. It is also a question of analyzing the impact of this agreement on the well-being of households, on the use and remuneration of factors, employment (skilled, medium-skilled, and unskilled labor) and on the variation of relative prices.

At the sectoral level, this research focuses on the industrial sector by trying to know if this agreement will promote the integration of Morocco in GVCs, in this case in the industrial sector and what will be the effects and channels of transmission of this liberalization in this sector.

This issue represents a growing interest for policymakers for at least two reasons. First, the industrial sector in Morocco has become, over the past five years, the leading exporting sector ahead of phosphate products and represents a major stake in terms of industrialization and employment. The second reason relates to the fact that the country's ambition is to integrate further into GVCs and improve its integration rate to reap the benefits of AfCFTA and avoid problems related to rules of origin.

The implementation of this agreement would allow, *a priori*, the Moroccan industry to benefit from the entry of inputs at lower costs from the Africa zone and to gain access to a large market. This intuition is supported by statistical data on intra-African trade which shows an increasingly important dynamic in terms of trade in manufactured goods.

To do this, a national and static CGE Model has been implemented to simulate the impact of the removal of customs duties between African countries and Morocco on its economy. This model is based on the standard PEP1-1 model of Decaluwé et al (2013) and adapted to the Moroccan case with ad hoc modeling of foreign trade inspired by Boûet (2020). The model is calibrated on a SAM of the year 2018 with a disaggregation of the rest of the world account into two regions: Africa and the rest of the world excluding Africa. This research project is also justified by the fact that no study, to our knowledge, has yet been carried out in this direction for the case of Morocco by distinguishing the trade relations between the two regions. Most of the work has focused on evaluating Morocco's association agreement with the EU or using a gravity model (Chater 2004 ; Abdelkhalek, 2006 ; Chater, 2009 ; Raouf et al, 2014, Raouf et al, 2016).

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1. Introduction

1.1 Context

A very abundant literature, theoretical and empirical, deals with the link between trade liberalization and economic growth in developed and developing countries (Michaely, 1977; Frankel and Romer, 1999; Romer 1994, Devarajan er Rodrik 1989; Cox and Harris 1985; Balassa, 1978; Bhagwati, 1978; Krueger, 1978; Krugman 1979; Edwards 1993). This work shows a near-consensus on the positive role that trade liberalization can play in the dynamics of growth and development, through spillover effects, technology transfers, improvement in productivity and the effect of market size (Coe and Helpman, 1995; Aghion and Howitt, 2009). While the positive impact of openness on growth is not to be demonstrated in developed countries, it is open to discussion in the case of developing countries (Raouf et al, 2019). The liberal trade policies applied in the 1980s and 1990s under the auspices of the World Bank and the IMF and known as the "Washington consensus" did not bring all the expected results (Stiglitz 2002, Rodrik 2006, Ben Hamouda and al, 2010). In this context, it is difficult to generalize the causal link between openness and economic growth. Some Asian countries have even seen a boom in rejecting the policies of the Washington consensus.

African economies have not experienced, as a whole, the same trajectories as Asian countries. They applied "structural adjustment programs" (SAPs), but some African countries sank into underdevelopment instead of returning to the path of prosperity. Despite the boom in world trade since the establishment of the GATT, the African continent remains on the fringes of trade globalization with a weight in international merchandise trade of around 2.5% in 2018 (WTO 2019). The same observation is to be deplored at the level of inward FDI, Africa is the last continent in terms of attracting FDI with a share of 4% in 2018, far behind Asia (UNCTAD 2019). Integration in Africa has been based largely on the development of the RECs (Regional Economic Communities), but the dynamics of trade within these groupings mirror trade in the continent (figure 1). It remains very weak and has not helped put the continent on the rails of development.

Figure 1: The share of total intra and extra group exports in 2018
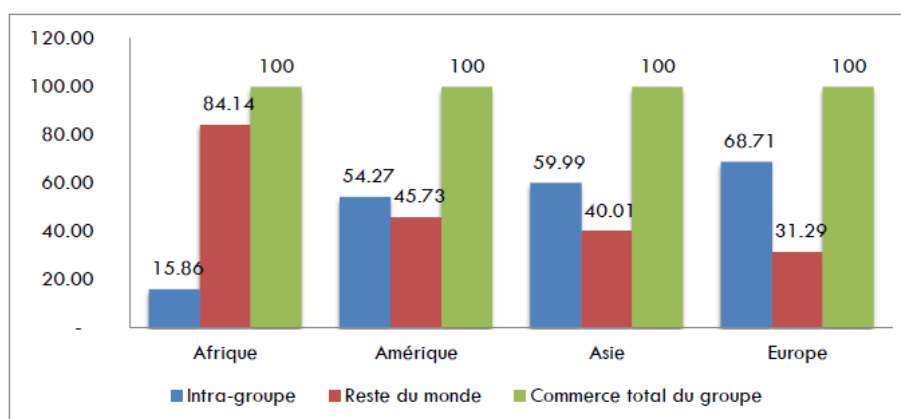
Source : Author, from UNCTADSTAT, UNCTAD

Analysis of statistical data relating to trade policies in Africa (MacMap, TRAINS, WITS, etc.) shows that African countries are more protectionist among themselves than with other partners (figure 2), which could explain, at least in part, the weakness of economic integration at the continental level. In addition, the gravitational foundations, in the sense of geographic theory, either are not met or they have not given effects on trade between African countries. This situation is confirmed by most trade indices. In 2019, the index of global regional integration in Africa posted a very moderate score of around 0.327 out of 1, while that of infrastructure, which is the keystone of successful integration, posted a score of 0.22. and 0.20 for the productive integration index (CUA, ADB, ECA 2020). According to the same source, Morocco achieves a high performance (4th overall) of around 0.434 well behind South Africa with a score of 0.625.

Figure 2 : Average customs duty evolution applied between African partners
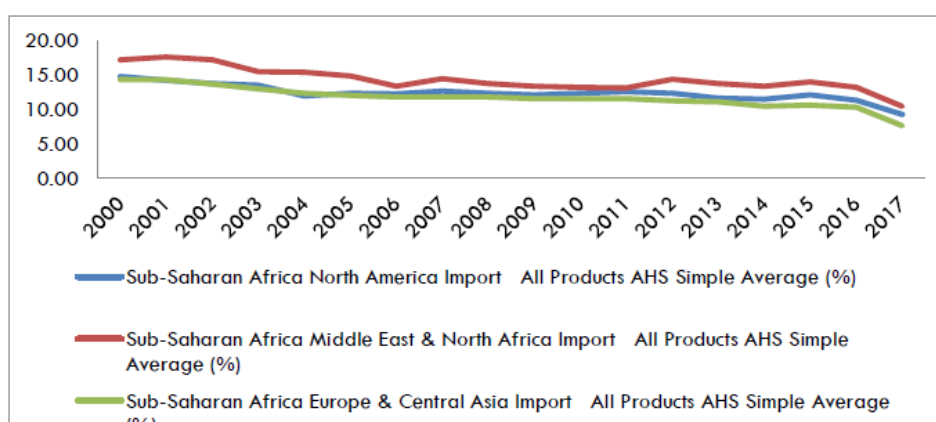
Source : WITS

On March 21, 2018, Africa entered a new stage in its regional integration with the opening for signature of the Agreement establishing the African Continental Free Trade Area[1]. Once in force, this continental agreement will affect more than a billion people and will be, in terms of the number of participating countries, the most important trade treaty to have taken effect since the establishment of the World Trade Organization (WTO)[2]. The Agreement covers not only trade in goods, but also trade in services, investment, competition policy and intellectual property rights. On the other hand, the speed at which ratification has occurred could be interpreted as widespread political buy-in, in part driven by analysis showing that lowering intra-African trade tariffs can produce significant long-term economic gains (ECA, WTO, 2019)[3].

The theoretical argumentation of ECA, AU and ADB (2017) for the establishment of AfCFTA revolves around the following points:

- Immediate gains are expected for producers. Through access to cheap inputs and intermediate products of African origin, a wider variety of inputs and intermediate products, and larger markets for their products. This enables them to produce more efficiently, more competitively and with greater economies of scale.

- Consumers reap immediate gains from access to cheaper products from other African countries and a wider variety of products. Both improve consumer welfare.

- Continental trade integration also helps to eliminate the problems associated with the overlap of multiple trade agreements in Africa.

- AfCFTA can stimulate trade diversion to African countries at the expense of third countries. This can translate into higher relative prices of export products in Africa, encouraging investment, production, and employment in these sectors.

-Trade diversification and the transition to trade in industrialized products would contribute to Africa's long-term growth and development. Promoting such trade can generate industrial diversification in Africa and catalyze structural transformation[4].

Estimates based on multi-region CGEM (ATPC-ECA, 2018) show that thanks to AfCFTA, intra-African trade is expected to increase by 52.3% ($ 34.6 billion) compared to a baseline scenario without AfCFTA. Africa's industrial exports expected to experience the highest gains,

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[1] Look https://au.int/en/treaties/agreement-establishing-african-continental-free-trade-area

[2] United Nations Economic Commission for Africa, World Trade Organization (WTO) (2019). « An Inclusive African Free Trade Area: Aid for Trade and the Empowerment of Women and Youth. », Addis Ababa

[3] Frederick S. Pardee Center for International Futures Josef Korbel School of International Studies - University of Denver, The African Union Development Agency-NEPAD (2019). « Conditions for successful implementation of the African Continental Free Trade Agreement. Work sponsored by the African Union Development Agency »

[4] African Center for Trade Policies - United Nations Economic Commission for Africa (ECA) 2018, « Rationale for the African Continental Free Trade Area. The African Continental Free Trade Area, African Trade Flows and Industrialization ».

growing by 53.3% ($ 27,9 billion)[5]. Estimates predict an increase in real wages for unskilled labor in the agricultural and non-agricultural sectors as well as for skilled labor, with an increase in employment in the non-agricultural sector. To take advantage of AfCFTA's potential for industrialization, the study[6] recommends the establishment of trade facilitation measures.

Based on more ambitious assumptions in terms of reducing tariff and non-tariff barriers, the World Bank (2020) considers that the creation of a large market through the AfCFTA is a major opportunity to help African countries diversify their exports, accelerate their growth and attract FDI. AfCFTA would significantly boost African trade especially in the industrial sector. Total exports would increase by 29% by 2035 compared to the baseline scenario.

Three important messages emerge from this work:

1- The importance of complementary policies that go beyond tariff reductions: Complementary policies are needed to optimize AfCFTA's gains. Such measures include reduction of non-tariff measures and transaction costs, such as those associated with greater regulatory transparency, harmonization of sanitary and phytosanitary regulations, accreditation and mutual recognition procedures regarding technical barriers to trade and improving administrative conditions in customs services. With the inclusion of such measures, all African countries will be able to enjoy greater well-being.

2- The biggest profits from AfCFTA will be seen in the long run. In a progressive manner, the agreement contributes to a change in the economic structure of African sectors to ensure that the industrial and export sectors can be more productive.

3- The recognition that such studies are likely to underestimate the range of benefits derived from AfCFTA, as modeling exercises struggle to capture and quantify all these benefits. They often overlook gains such as those that facilitate trade in food security products, strengthen the stability of fragile countries, improve firms' access to inputs and intermediate goods, reduce the cost of innovation, improve intra-African competition, resolve issues related to overlapping trade agreements as well as membership of several regional economic communities and provide a platform for cooperation and broader dialogue (ATPC/ECA 2018).[7]

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[5] Ibid 4
[6] Ibid 4
[7] Ibid 4

In addition, the AfCFTA will have an impact on pre-existing multilateral free trade zones (FTZs) within the Regional Economic Communities (RECs) and the World Trade Organization (WTO). The existing RECs are not only the economic components of African integration, they are also key partners of the AU in ensuring stability, peace, and security. Therefore, the role of RECs in the successful implementation of AfCFTA is essential.

In addition, the AfCFTA could significantly boost intra-regional trade in Africa, provided that both tariff and non-tariff levers are activated. An overall reduction in tariffs would be needed to achieve significant effects on trade flows in the region. Ultimately, eliminating tariffs on 90% of existing flows - which is AfCFTA's most ambitious goal - would lead to an increase of around 16% in regional trade ($ 16 billion) (IMF, 2019)[8].

It should be noted that the ability of African countries to take advantage of AfCFTA depends more on the structure of their economy. Those that are more diversified and geared towards manufacturing production, existing regional trade poles as well as small economies are already relatively more open to international competition and likely to do better from regional trade integration than the geared economies. on agriculture or natural resources.

1.2 The implications of AFCFTA for the Moroccan economy

Morocco is among the countries that have signed and are in the process of ratifying the AfCFTA agreement. This trade liberalization will open a market of more than a billion potential consumers for Morocco. It will be an opportunity for the country to gain further economies of scale in sectors where it has real comparative advantages and to consolidate its position in GVCs, particularly in the automotive sector. Morocco could benefit considerably from the acceleration of trade in intermediate goods within the continent. The industrial sector would be one of the most profitable sectors. The first estimates of trade facilitation show an increase in sub-regional industrial trade of 70% (ECA 2019). In this context, the study of the impact of AfCFTA on the Moroccan economy and in particular its integration into the GVC or rather RVC [9] today, represents a growing interest for public decision-makers for at least two reasons.

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[8] International Monetary Fund (2019). « Economic and financial studies. Economic outlook. Recovery in a context of great uncertainty ». Washington DC.
[9] Theoretically and after what the health crisis linked to covid-19 revealed and unlike CVMs, regional value chains (CVRs) would be more suited to the short circuit and would make logistics more secure. Africa could become a land of relocation of companies once established in the Asian continent.

The first is that the industrial sector in Morocco, in this case the automobile, has become, over the past five years, the leading exporting sector and that it represents a major stake in terms of industrialization and jobs. The health crisis, covid-19, could also redraw the map of locations and / relocations from which Morocco would be able to benefit thanks its proximity and its relations with Europe. The second reason relates to the fact that the kingdom hopes to improve its rate of integration into the industry to take full advantage of the benefits of AfCFTA and to avoid problems with rules of origin.

In these trade relations with Africa, Morocco is no exception to the rule. Trade with African economies not exceeding 4% of its total trade flows (exchange office 2019). In terms of tariffs and despite progress in signing trade agreements with many African countries, Morocco continues to apply relatively higher rates on its imports from Africa compared to those applied on its imports from its Mediterranean partners (ADB 2017).

Despite a proactive policy for the development of South-South and Afro-African cooperation over the past ten years, Africa's weight in the Moroccan foreign trade remains very low. Europe is still the main trading partner (leading customer and leading supplier) with 70% of trade. Empirical work based on gravity models (Raouf, 2016, ADB 2017) estimate a real untapped potential in terms of trade, economic cooperation, and complementarities to be put in place with African partners.

Over the past fifteen years, the trend has been rather positive. Morocco's trade with Africa increased by 20%, an increase of MAD 14.458 billion. They recorded in value nearly 40.5 billion dirhams in 2018. On the other hand, they are concentrated in the West Africa zone (58%) followed by the East Africa zone (15, 5%) (Office des changes 2019).
As part of the AFCFTA simulations carried out by the ECA (2018) and the World Bank (2020), Morocco is among the countries that would gain the most in terms of exports, particularly in the industrial sector, income and growth..

2- Data and modeling strategy

The methodological approach chosen in this work is based on the construction of a static CGEM adapted to the Moroccan economy. It is an adaptation of the PEP1-1 model (Veronique Robichaud, Andre Lemelin, Helene Maisonnave and Bernard Decaluwe 2013)

calibrated on the Moroccan SAM for the year 2018. To capture the liberalization of trade with the African continent, we have opted for a disaggregation of the ROW account of the PEP1-1 model into two regions: Africa region (AFRICA) and rest of the world region outside Africa (ROWHAF). This is the most suitable modeling to measure the impact of AfCFTA on the Moroccan economy. This disaggregation will allow us to simulate changes in terms of tariffs in the African continent without affecting ROWHAF.

To clearly differentiate the destinations of exports. We have therefore introduced a new branch in the CET (1) function which allocates the output of a branch between local sale and export. We added a disaggregation, using a TEC (2) to allocate exports between the two regions.

On the demand side, we differentiated between the origin of imports by adding a branch in the CES (1) function which allocates absorption between the local product and total imports. This new branch is modeled using a CES (2) function, distinguishing between imports from the AFRICA region and those from the ROWHAF region.

2.1- Data presentation: SAM 2018

The SAM constitutes a coherent framework of data necessary for the development of MEGCs. Its construction took a very special place in this work. The concern to have recent and coherent data with the problematic while keeping a fairly significant disaggregation of branches (20 branches), a breakdown of the labor account into three qualifications and the disaggregation of the ROW account into two regions, required work of rather heavy and very rigorous collection and processing of data from different sources. The objective is to develop a SAM that is consistent with the data of the national economy. The choice of the year 2018 was made with a view to exploiting recent data, in accordance with national accounts standards, on foreign trade. For the rest of the ratios, we kept the same proportions of the SAM for 2015. The table below outlines the stages in the construction of the 2018 SAM and the resources used.

Table1 : Elaboration stages of the SAM-2018

Steps	Information required
1. Construction of the SAM-MOD	• SAM-HCP 2018 • TRE and TCIE (transfers)
2. Adjustment of the SAM-MOD (TRO account cancellation)	• SAM-MOD primary
3. Establishment of characteristics (Structure and dimension) of the SAM-2018	• SAM-MOD adjusted

4. Decomposition: The disaggregated RDM account Work factors (USK, MSK et SK) The tax bill	• Trade data 2018 / SAM-2015 • HCP, employment survey (2015) • TRE-2018 / SAM-2015 désagrégée et OMC (tarifs douaniers)
5. SAM rebalancing and consistency tests	• SAM-2018

1.1 The construction of the SAM-MOD

In national accounts, agents are grouped into institutional sectors (IS): Groupings of institutional units defined as the elementary center of economic decisions. We distinguish 6 institutional sectors:

- Non-financial corporations (SNF)

- Households (MEN), including sole proprietorships (EI)

- Public administrations (APU)

- Financial institutions (SF)

- Non-profit institutions serving households (NPISHs)

- The rest of the world (RDM)

We have dealt with the accounts of the allocation of primary income, the secondary distribution of income and the account of the use of income, in order to explicitly highlight the different receipts and expenditures of economic agents and especially the transfers that have been made between them. . Thus, we have retained four economic agents, namely, households, companies, the government, and the rest of the world.

In addition, the lack of detailed data for certain accounts and the need to have consistent data did not allow us to rank the number of branches present in the SAM-HCP (40 branches of activity and 40 products according to the standard nomenclature). We have aggregated these accounts according to the classification of sectors of the national accounts by keeping 20 sectors.

Table 2 : Sectors used in SAM-MOD

A00: Agriculture, forestry and related services
B05: Fishing, aquaculture
C00: Extraction industry

D01: Food and tobacco industries
D02: Textile and leather industries
D03: Chemical and parachemical industry
D04: Mechanical, metallurgical and electrical industry
D05: Other manufacturing industries, except petroleum refining
D06: Refining of petroleum and other energy products
E00 : Electricity et Water
F45 : Building and public construction
G00 : Commerce
H55 : Hotels et restaurants
I01 : Transports
I02 : Post and telecommunications
J00 : Financial activities and insurance
K00 : Real estate, rental and services rendered to businesses
L75 : Public administration and social security
MNO : Education, health and social action
OP0 : Other non-Financial services

1.2 Cancellation of the TRO account: territorial corrections

The territorial correction represents an item that corrects for direct purchases by non-residents inside Morocco and direct purchases by Moroccans living abroad who do not go through the international trade circuit. The SAM must account for the consumption of Moroccan residents in the territory. However, the accounting data include the consumption of goods and services made by non-residents in Morocco in the household current account and by Moroccan residents outside the territory in the Rest of the World account. Thus, there is a risk of overestimation or underestimation of consumption by Moroccan residents in the territory, which requires a territorial correction.

It is first of all necessary to ensure the total deletion of the TRO account, using a method which relates to the distribution of the territorial correction according to the structure of final consumption (CF) of households, deletion of the row and column territorial correction and rebalancing. of the SAM.

i. The Resource-Employment Table (TRE) specifies this information but in an aggregated way which does not correspond to the SAM format. The territorial correction was therefore disaggregated according to the assumption of a consumption structure identical to that of household consumption on Moroccan territory.

ii. The logic is then to reduce the final consumption given in the household current account from the consumption of non-resident households and to increase it from the consumption

of Moroccan residents abroad because this supposes a higher income than indicated initially. for households.

iii. Consumption by residents of goods and services abroad is assumed to be imported by Morocco, while goods and services consumed by non-residents in Morocco are assumed to be produced locally only.

1.3 Construction of the transfer matrix

The SAM summarizes the formation of income for each economic agent in accordance with the accounting rules reproduced in the accounts of the institutional sectors and the table of integrated economic accounts (TIEA).

The formation of gross disposable income for each agent follows a sequence of accounts articulated between them by the balance which ensures equilibrium. In the matrix, the transactions which account for the formation of income in addition to wages and operating income, are summarized by the transfers which correspond to certain transactions of the allocation of primary income account, the secondary distribution account of the income and income redistribution account in kind.

Taking all these transfers into account serves to release gross disposable income and generate gross savings per agent once final consumption expenditure is deducted.

Adjusting this income available for the capital transfer, knowing that investment expenditures are recorded at the level of uses, makes it possible to identify the financing capacity or need for each institutional agent which corresponds to the balance of the capital account.

The construction of the transfer matrix is essentially based on the following accounts:

- Property income.
- Taxes, Social contributions and benefits, Other current transfers.
- Adjustment for variation of the rights of households on pension funds.

These three accounts must be aggregated (the sum of the three matrices) to obtain the transfers to be introduced in SAM-MOD 2018:

> **Property income + Taxes, social contributions and benefits and other current transfers + Adjustment for changes in the rights of households on pension funds = Matrix of transfers between agents**.

1.4 Disaggregation of the rest of the world account (ROW)

For the purposes of our modeling, we have, on the one hand, broken down the ROW account between AFRICA and ROWHAF (rest of the world excluding Africa). On the other hand, the government revenue account (TM) is broken down into two sub-accounts. The first is the revenue from import duties applied to imports from ROWHAF, called TM_ROW, the second is the revenue from customs duties applied to imports from AFRICA, called TM_AFRICA.

It should be noted that the disaggregation of the ROW account is made on the basis of trade data by continent for the year 2018 and based on the distribution made in the SAM-2015 to show the shares relating to customs duties and transfers between domestic agents and the RDM.

After disaggregating the matrix and entering external data, we were able to rebalance the two ROW sub-accounts of the matrix using the Accumulation / Savings account, since it is assumed to be exogenous in the SAM.

1.5 Disaggregation of the labor factor

Labor income is made up of wage and non-wage labor income. The SAM 2018 counts three categories of work broken down according to the educational level and the diploma held by the individuals of the household. This disaggregation is done by the Mincer equation and which takes into account the correction for selection bias using the Heckman method. This approach made it possible to distribute the wage bill between households according to the type of labor force they have.

Unskilled labor (USK) is offered by people with no diploma. In general, these are workers who are either without schooling or have a Koranic or preschool level, or they have completed the basic cycle but without vocational training.

Medium-skilled work (MSK) includes individuals with a diploma, basic education certificate or secondary education diploma.

Qualified work is offered by graduates (vocational qualification diploma; vocational specialization certificate; higher education diploma, etc.).

The labor factor is used by all branches of economic activity. It should be noted that the disaggregation of this factor according to the three qualifications is made on the basis of the work of Khallef (2015) in the SAM-2015.

1.6 Other Data

Data on customs duties applied on export and import to or from Morocco by the two regions are extracted, by weighting, from the WTO database. These are the weighted averages by branch and by region.

The elasticities (CET and CES) relating to trade, level 1 and 2, are taken from estimates by the Moroccan Ministry of Foreign Trade (2011). In this estimate which disaggregates Moroccan foreign trade between two regions: EU and Non-EU (HUE). We have assumed that the elasticities of the EU, and given that it is Morocco's main partner, are the elasticities of the ROWHAFR region and the HUE elasticities are the elasticities for the AFRICA region.

2.2- The model

Our standard CGEM is based on the "Partnership for Economic Policy" model PEP-1-1, version (2.1). This is a multisectoral static computable general equilibrium model for a national country. It includes three categories of labor and one of capital, as well as several fiscal instruments (Decaluwé et al (2013)). It is mainly based on the following assumptions: in a competitive market the various agents optimize their objective functions under specific constraints. This is because the adjustment takes place at the level of relative prices to achieve equilibrium. These prices are flexible and determined in relation to a cash which is the nominal exchange rate. There is perfect mobility of the labor and capital factor between the various branches of activity. Note that the factors of production are immobile at the international level.

There is a perfect complementarity relation to the "Leontief" (zero elasticity of technical substitution), between on the one hand the intermediate inputs, and on the other hand between the latter and all the factors of production or value. added. While there is an imperfect substitutability between the two factors of production (capital and labor), hence the technology is modeled by a constant elasticity of substitution (CES) function. Thus the final destination of local production is heterogeneous, between the domestic market and the external market, achieved on the basis of relative prices. The maximization of household utility functions is represented by a linear system of expenditure under budget constraint.
We will not present the PEP1-1 model mathematically here (see Decaluwé et al, 2013 for more details. We will be more interested in the innovations integrated in this model which allow us to model the disaggregation of the ROW and the implementation of the shock relative to

AFCFTA The diagram below shows the overall structure of the model and the functional choices.

Figure 3 : Schematic presentation of the model
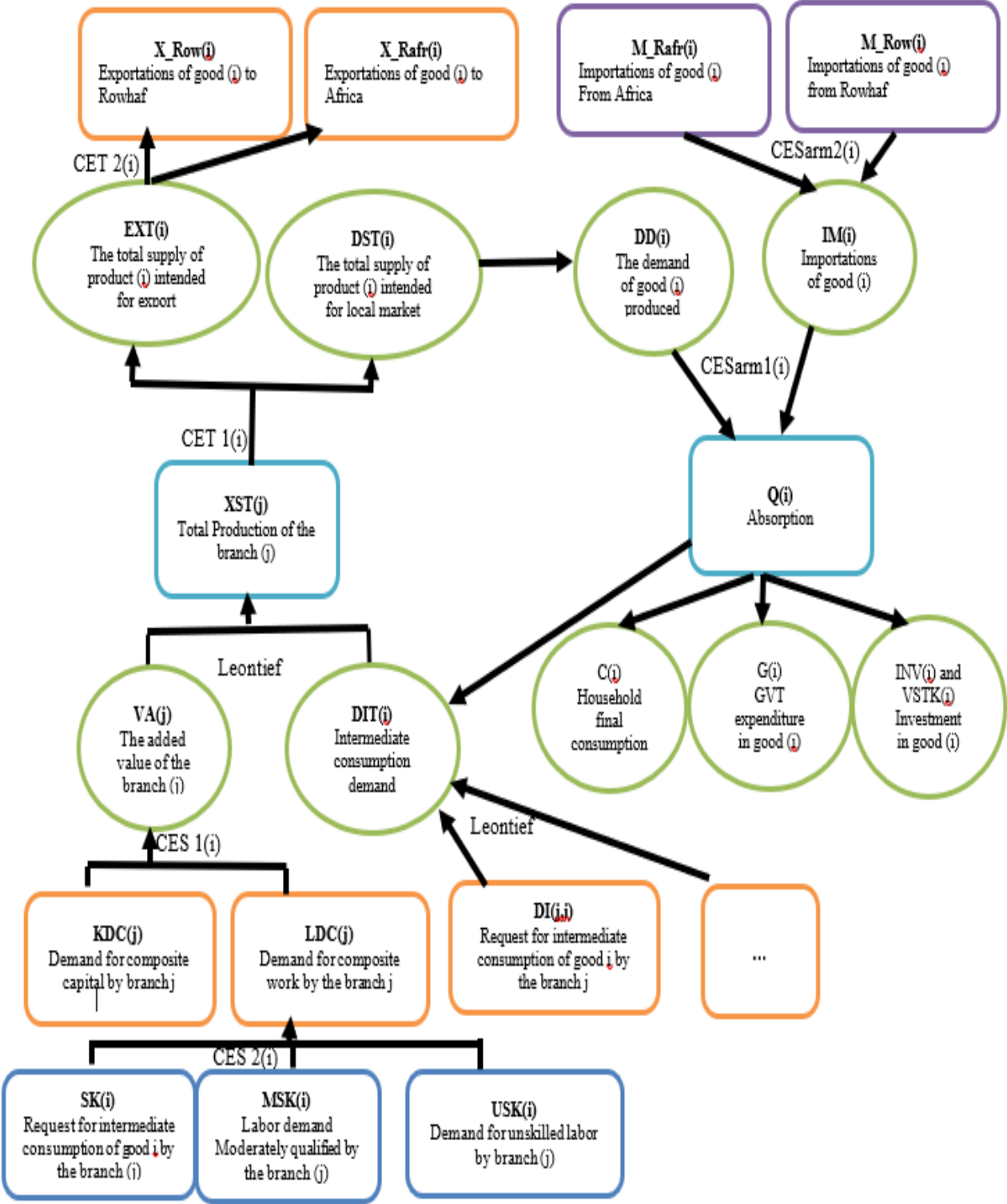
Source: developed by the author

1. Modeling of international trade: exports

The production of the branches of activity is allocated to the domestic market and abroad according to a CET function, considering the demand in each market and the various taxes applied. The maximization of the total income of the producer, thus the production intended for one market is assumed to be different from that intended for the other market, which explains the use of a function with constant elasticity of transformation (CET 1) (equation 44 of PEP1-1).

$$XS_{j,i} = B_{j,i}^X \left[\beta_{j,i}^X EX_{j,i}^{\rho_{j,i}^X} + \left(1 - \beta_{j,i}^X\right) DS_{j,i}^{\rho_{j,i}^X} \right]^{\frac{1}{\rho_{j,i}^X}} \quad (44)$$

With $B_{j,i}^X$: the scale parameter; $\beta_{j,i}^X$: the distributive parameter; $DS_{j,i}$: the domestic supply of the product i by branch j ; $\sigma_{j,i}^X$: the elasticity parameter. $\sigma_{j,i}^X = \frac{1}{1+\rho_{j,i}^X}$.

First-order conditions find external demands by equalizing the ratio of marginal costs to the ratio of prices:

$$EX_{j,i} = \left[\frac{1-\beta_{j,i}^X}{\beta_{j,i}^X} \frac{PE_i}{PL_i} \right]^{\sigma_{j,i}^X} DS_{j,i} \quad (45)$$

this level, we add a variable EXT (i) such that:

$$EXT(i) = \sum EX_{j,i}$$

Then we write EXT (i) based on exports to the rest of Africa (X_RAFR(i)) and exports to the Row outside Africa (X_ROW(i)). The program inspired by Boûet (2020) is therefore written as follows :

$$PE(i).EXT(i) = Px_{Rafr(i)}.X_{Rafr(i)} + Px_{Row(i)}.X_{Row(i)}$$

$$X_{Rafr(i)} = \alpha(i).EXT(i). \left[Px_{Rafr(i)} \middle/ PE(i) \right]^{CET2(i)}$$

$$X_{Row(i)} = \beta(i).EXT(i). \left[Px_{Row(i)} \middle/ PE(i) \right]^{CET2(i)}$$

$$px\_rafr(i) * (1 + te\_rafro(i))$$
$$= PE\_FOB\_rafr(i) - (1 + te\_rafro(i)) * SUM[ij, PC(ij) * tmrg\_X(ij,i)]$$

$$px\_row(i) * (1 + te\_rowo(i))$$
$$= PE\_FOB\_row(i) - (1 + te\_rowo(i)) * SUM[ij, PC(ij) * tmrg\_X(ij,i)]$$

With : $te\_rafro(i)$ et $te\_rowo(i)$ are successively the customs duty rates applied by Morocco on exports to the Africa region and on the region ROWHAF. And where $px\_rafr(i)$ and $px\_row(i)$ are respectively the export prices of the good (i) to the Africa region and to the Rowhaf region.

$$
\begin{aligned}
e * pwx\_rafr(i) &= PE\_FOB\_rafr(i) \\
e * pwx\_row(i) &= PE\_FOB\_row(i)
\end{aligned}
$$

Where : $pwx\_rafr(i)$ and $pwx\_row(i)$ are respectively the world prices of exports in the Africa region and in the ROWHAF region.

Modeling of foreign demand for exports by the two regions as a function of the world price and customs tariffs applied to imports from Morocco:

$$
\begin{aligned}
x\_rafr(i) = {}& fx\_rafr(i) * (pwx\_rafr(i) * (1 + tm\_star\_rafr(i))) * \\
& * (-sigmax\_rafr(i))
\end{aligned}
$$

$$
x\_row(i) = fx\_row(i) * (pwx\_row(i) * (1 + tm\_star\_row(i))) ** (-sigmax\_row(i))
$$

With : $tm\_star\_rafr(i)$ and $tm\_star\_row(i)$ are respectively the rates of customs duties applied by the Africa region and the Rowhaf region on imports from Morocco.

2. Modeling of international trade: imports

The behavior of the buyer is symmetrical to that of the producer, in the sense that it assumes that local products are imperfect substitutes. The products demanded on the market come from the local market and from imported products, the demand function is described by a constant elasticity of substitution (CES) function, function 47 in PEP1-1.

$$
Q_i = B_i^M [\beta_i^M IM_i^{-\rho_i^M} + (1 - \beta_i^M) DD_i^{-\rho_i^M}]^{\frac{-1}{\rho_i^M}} \quad (47)
$$

With B_i^M : Scale parameter; β_i^M : Distributive parameter; IM_i :Product import i ; DD_i : Domestic product demand i ; ρ_j^{XT} : Elasticity parameter;

Just as producers seek to maximize their income, buyers minimize their expenses under the constraint of the CES 1 function (equation 48 in PEP1-1) and is written :

$$
IM_i = \left[\frac{\beta_i^M}{1 - \beta_i^M} \frac{PD_i}{PM_i} \right]^{\sigma_i^M} DD_i \quad (48)
$$

Equation (48) shows that the imported quantity of market products is determined when the TMS between the importation of good i (IM_i) and the demand for domestic good (DD_i) is equal to the ratio of their respective prices PM_i et PD_i.

We use the same modeling strategy adopted on the supply side to model the disaggregation of imports on the demand side. This modeling is inspired by the model developed by Boûet (2020).

$$PM(i).IM(i) = PM_{Rafr(i)}.M_{Rafr(i)} + PM_{Row(i)}.M_{Row(i)}$$

$$M_{Rafr(i)} = \gamma(i).IM(i).\left[\frac{PM(i)}{PM_{Rafr(i)}}\right]^{CES\ arm2(i)}$$

$$M_{Row(i)} = \delta(i).IM(i).\left[\frac{PM(i)}{PM_{Row(i)}}\right]^{CES\ arm2(i)}$$

$$pm\_row(i) = (1 + ttic(i)) * \{(1 + tm\_row(i)) * e * pwm\_row(i) + SUM[ij, PC(ij) * tmrg(ij, i)]\}$$

$$pm\_rafr(i) = (1 + ttic(i)) * \{(1 + tm\_rafr(i)) * e * pwm\_rafr(i) + SUM[ij, PC(ij) * tmrg(ij, i)]\}$$

Of which : $tm\_rafro(i)$ et $tm\_rowo(i)$ are successively the customs duty rates applied by Morocco on imports from the Africa region and the Rowhaf region.

With : $pm\_rafr(i)$ et $pm\_row(i)$ are respectively the price of imports, all taxes included, of goods imported from the Africa region and the Rowhaf region.

And where : $pwm\_rafr(i)$ et $pwm\_row(i)$ are respectively the world import prices in the Africa region and in the ROWHAF region.

Modeling of the foreign supply of imports according to the world price and customs tariffs on exports to Morocco applied by the two regions

$$m\_row(i) = fm\_row(i) * (pwm\_row(i)/(1 + te\_star\_row(i))) * * sigmam\_row(i)$$

$$m\_rafr(i) = fm\_rafr(i) * (pwm\_rafr(i)/(1 + te\_star\_rafr(i))) * * sigmam\_rafr(i)$$

With : $te\_star\_rafr(i)$ et $te\_star\_row(i)$ are respectively the rates of customs duties applied by the Africa region and the Rowhaf region on exports to Morocco.

3   Closures of the model, Numeraire and implementation of the shock

For public closure, we will keep a fixed public expenditure and all tax rates constant. The balance is achieved by adjusting the public deficit. This closure is consistent with the economic reality of Morocco and in particular its public finance. The adjustment is made through the deficit.

For external closure, Morocco has long adopted a fixed exchange rate regime and is recently moving towards controlled flexibility (+/- 2.5%). The current account is structurally in deficit but stable. Therefore, in this version we assume the exchange rate to be constant and the current account to be variable. The adjustment is made through the evolution of the relative prices of imports and exports according to the elasticities.

Numeraire is the consumer price index (Laspeyres).

The simulation, or the shock, of the impact of AFCFTA on the Moroccan economy is implemented by reducing, even in our case, by canceling the import and export tariffs applied by the Africa region on the flows. to and from Morocco and at the same time by canceling the customs tariffs applied by Morocco on import and export flows coming or going to the Africa region.

$$tm\_star\_rafr(i)) = te\_star\_rafr(i) = tm\_rafr(i) = te\_rafro(i) = 0$$

3- Results and interpretations

The cancellation of customs duties, on export and import by Morocco with its African partners and by African countries vis-à-vis Moroccan trade flows, directly impacts the prices of imports and the prices of exports and consequently the volume of trade.

Since trade liberalization under the AFCFTA only concerns African countries, it is the volumes of trade with the Africa region and their prices that are most affected. On the other hand, all branches of activity are not housed in the same boat.

Imports from Africa recorded an increase for all sectors and a decrease in their prices (Table 3).

The most significant variations concerned the agricultural sector (14.15%), the extractive industries sector (15.8%), the textile and leather sector (12.16%) and the mechanical industries sector, metallurgical and electrical. A slight diversion of trade in favor of Africa for the

extractive industry sector is highlighted (C00). These increases can be explained by the fact that Morocco imports crude products, raw materials, minerals, and energy products from Africa which goes into production. This can be seen at the level of total production by branch where, overall, we are witnessing an improvement (Table 5). With a relative decline in their prices, demand is shifting more towards the Africa region.

This increase in imports is accompanied by a significant improvement in exports to Africa to the detriment of the rest of the world outside Africa (Table 4). We are witnessing a real diversion of trade in favor of the Africa region. The most significant increases are found in the agricultural sector (23.84%), fishing (17.65%), food and tobacco industries (12.92%) and real estate and services provided to businesses (12.26%). Improving export price levels to Africa (PX_Rafr(i)) encourage companies to increase their offers.

It should also be noted that the service sectors (J00, I02, K00 and I01) saw their exports increase between 8.9% to 12.3%. These four sectors represent, statistically in terms of exports, the main sectors that have been most oriented towards Africa during the last fifteen years.

Table 3 : Variation of imports by origin and their prices

Branches	VAR in % compared to Baseline					
	M_Rafr(i)	M_row(i)	PM_Rafr(i)	PM_Row(i)	PWM_Rafr(i)	PWM_Row(i)
A00	14,15	1,36	-6,94	0,72	1,75	0,68
B05	2,93	1,45	-0,38	0,82	-1,01	0,72
C00	15,79	-0,02	-6,41	0,05	-6,42	-0,013
D01	5,22	1,23	-5,62	0,65	-2,30	0,61
D02	12,16	0,25	-5,21	0,25	-3,72	0,12
D03	2,30	0,35	-1,29	0,29	-1,32	0,17
D04	11,43	0,73	-7,64	0,46	-8,20	0,36
D05	3,72	0,56	-3,98	0,35	-3,00	0,28
E00	4,02	0,98	-3,16	0,49	1,99	0,49
H55	1,11	1,11	0,55	0,55	0,55	0,55
I01	0,94	0,94	0,34	0,34	0,47	0,47
I02	1,08	1,08	0,54	0,541	0,54	0,54
J00	1,17	1,17	0,58	0,58	0,58	0,58
K00	1,21	1,21	0,60	0,60	0,60	0,60
OP0	1,11	1,11	0,55	0,55	0,55	0,55

Source : Author, based on the shock simulation on GAMS

Table 4 : Variation in exports by destination and their prices

Branches	VAR in % compared to Baseline					
	X_Rafr(i)	X_Row(i)	PWX_Rafr(i)	PWX_Row(i)	PX_Rafr(i)	PX_Row(i)
A00	23,84	-1,27	12,72	0,64	12,72	0,64

B05	17,65	-1,81	16,64	0,92	16,64	0,92
C00	6,372	-0,85	10,35	1,07	10,35	1,07
D01	12,92	0,93	15,26	-1,15	15,26	-1,15
D02	6,62	-0,36	9,95	0,45	9,95	0,45
D03	7,50	-0,08	3,83	0,10	3,83	0,10
D04	4,16	-0,28	5,99	0,36	5,99	0,36
D05	6,12	0,11	6,54	-0,14	6,54	-0,14
E00	-	-0,54	-	0,68	-	0,68
G00	-	-0,66	-	0,83	-	0,83
H55	1,44	-0,73	2,02	0,92	2,02	0,92
I01	8,94	-0,51	5,32	0,64	5,32	0,64
I02	8,88	-0,58	5,43	0,74	5,43	0,74
J00	8,87	-0,59	5,44	0,75	5,44	0,75
K00	12,26	-0,61	7,10	0,77	7,10	0,77
OP0	1,53	-0,60	1,83	0,75	1,83	0,75

Source : Author, based on the shock simulation on GAMS

In terms of the labor market, there is a slight improvement in the demand for skilled labor for most sectors and especially those sectors which have seen their increased exports to Africa (Table 5). There is also a concomitant decline for the other qualifications. This variation can be explained by the relative changes in factor prices where the increase in the price of SK (0.78%) is less than the other factors (1.4% on average) (Table 6).

Table 5 : Production and labor demand by industry

	VAR in% compared to Baseline			
Branches	**USK(i)**	**SK(i)**	**MSK(i)**	**XST(j)**
A00	-0,13	0,38	-0,02	-0,05
B05	-0,76	-0,24	-0,65	-0,70
C00	-1,07	-0,55	-0,96	-1,26
D01	1,05	1,58	1,17	1,01
D02	-0,30	0,22	-0,18	-0,28
D03	0,83	1,36	0,95	0,86
D04	0,01	0,54	0,12	0,004
D05	0,29	0,81	0,40	0,25
E00	0,17	0,70	0,28	0,035
F45	1,06	1,59	1,17	1,10
G00	0,18	0,71	0,29	0,11
H55	-0,14	0,37	-0,03	-0,17
I01	0,11	0,63	0,22	0,06
I02	0,14	0,67	0,25	0,06
J00	0,22	0,75	0,34	0,08
K00	0,40	0,92	0,51	0,18
L75	-1,13	-0,61	-1,02	-0,84

MNO	-0,95	-0,43	-0,83	-0,70
OP0	0,31	0,84	0,43	0,20

Source : Author, based on the shock simulation on GAMS

Table 6 : Wage rate and capital price

	VAR in %
USK	1,44
SK	0,78
MSK	1,30
R	1,37

Final household consumption increased slightly for all sectors except for fishing and aquaculture as its consumer price increased significantly (1.38%) compared to the prices of other goods (Table 7). Aggregate demand (Q(i)) has improved except for education, health, and social work (MNO), public administration and social security (L75). This decline is due to the decline in public demand (CG(i)) which is dependent on tax revenue and in this case in our case the decline in revenue after the cancellation of customs duties under the AfCFTA.

Table 7 : Change in demand components

	VAR in% compared to Baseline						
Branches	**C(i)**	**Q(i)**	**CG(i)**	**CI(j)**	**DD(i)**	**PC(i)**	**PD(i)**
A00	0,10	0,41	-1,02	-0,05	0,09	1,03	1,20
B05	-0,09	0,33	-	-0,70	0,24	1,39	1,43
C00	0,89	0,51	-	-1,27	-1,59	-0,08	0,98
D01	0,51	0,48	-	1,02	0,24	0,71	0,83
D02	0,62	0,10	-	-0,29	-0,51	0,33	0,64
D03	0,64	0,32	-0,30	0,87	-0,02	0,30	0,47
D04	0,56	0,74	-	0,00	0,06	0,42	0,76
D05	0,67	0,47	-	0,26	-0,26	0,25	0,62
E00	0,25	0,12	-	0,04	0,07	0,87	0,90
F45	0,33	1,07	-	1,11	1,07	0,78	0,78
G00	0,12	0,42	-	0,11	0,42	1,09	1,09
H55	0,10	-0,01	-	-0,17	-0,10	1,11	1,16
I01	0,38	0,30	-	0,06	-0,34	0,66	0,99
I02	0,14	0,06	-	0,06	-0,02	1,06	1,10
J00	0,10	0,10	-1,11	0,09	0,07	1,12	1,14
K00	0,12	0,23	-0,91	0,19	0,05	1,10	1,19
L75	0,23	-0,88	-	-0,84	-0,88	0,91	0,91
MNO	0,19	-0,71	-0,97	-0,71	-0,71	0,97	0,97
OP0	0,15	0,13	-	0,20	0,08	1,04	1,07

Source : Author, based on the shock simulation on GAMS

Overall, ceteris paribus, the cancellation of customs duties with African partners and considering the choice of closure in this simulation 1 and the model assumptions, would

improve overall income by 1.2%, final consumption of households of the same order and the income of other agents of more than 1% (Table 8). Real GDP hasn't really changed.

The most important changes are to be observed at the level of foreign trade and at the level of trade relations with Africa. There is also an improvement in production (XST (i)) in industrial sectors, in this case at the level of the food industries sector (D01), the chemical and parachemical industries sector (D03), in the sectors manufacturing industries and mechanical industry (D05 and D04) and in particular in construction and public works (F45).

These results confirm our intuition of the positive impact on high value-added sectors, such as the industrial sector. It should also be noted that the meaning of the results is in line with the results advanced in the work that used multi-region CGEMs (ECA 2018 and the World Bank 2020), but the scale is less important in our simulation. The difference in the amplitude may be partly due to the methodological choice (country model versus multi-country model), but also to the values of the parameters and the nature of the closure, hence the need to provide for other forms of closure, and sensitivity tests on the parameters.

Table 8 : Variation of Aggregates

Aggregates	Var %
GDP at basic price	1,25
Real GDP at basic price	0,002
GDP at market price	1,20
Household final consumption (CTH)	1,13
Inflation (GDP deflator)	1,25
Disposable income	
- Household	1,13
- Firms	1
- GVT	1,03
- ROW	1,18

Source : Author, based on the shock simulation on GAMS

3. Discussions and implications for economic policy

The results presented in this simulation should be taken with caution, as a large part of the adjustments are made based on price. The modeling of foreign supply and demand for Moroccan exports and imports is done according to an isoelastic function according to the world price and customs tariffs (export or import). Therefore, the choice of price elasticity is fundamental. Moreover, foreign demand and supply do not depend only on prices. The determinants of trade are numerous and vary by region. The Africa region represents trade

potential for the Moroccan economy, and indeed for the world, of course, but other obstacles to trade are also important other than prices. Non-tariff barriers, problems linked to the establishment of rules of origin, the fragility and weakness of connectivity in the continent, the lack of infrastructure, the weak complementarity between countries, weak industrialization, the informal sector, illiteracy, corruption, "Path dependence"… are all factors that can make the simulations less consistent with the reality of the economies of the African continent.

That said, Africa is full of potential, natural resources, a young population, and a sizeable market. AfCFTA can play a leading role in boosting intra-African trade and unlock this potential if local actors are able to meet the challenges and initiate structural reforms. An adaptation of institutions in the broad sense to this new era seems to us a sine qua non condition for hoping for a better Africa.

The opportunities that the AfCFTA could present for African countries and in particular for Morocco, can be identified in certain key sectors:

- **Agricultural sectors to be developed at the regional level**

The agribusiness sector is seen as the driving force behind the continent's industrialization process. It employs nearly 70% of the population and contributes to food security.

The potential for co-development in this sector mainly concerns the creation of integrated value chains that can be achieved through investments in countries with high water potential (Equatorial Guinea, Guinea, Cameroon, etc.), particularly in packaging units. small-format sugar like the model developed by COSUMAR (a Moroccan company) in Guinea. Morocco has a developed ag-food industry which can benefit from the agreement (affirmed by the results of the simulation) and participate in the revitalization of the continent's industry. Morocco is the world's leading exporter of phosphates, a product sought in the field of agriculture. Partnerships in this sector can improve productivity in the agricultural sector and consequently its competitiveness.

- Cocoa

Africa dominates the cocoa sector thanks to production from Côte d'Ivoire and Ghana, whose production reached 2.9 million in 2018 (60% of world supply). These countries export almost all production in the form of cocoa beans, generating low added value locally. Potentialities can thus be developed at different stages between the place of production, including the first stages of transformation until industrialization. By relying on the intervention capacities and specializations available to Morocco and these two countries, the scheme of this cooperation can promote the upscaling of this sector in value chains.

- Cashew nut

African countries account for nearly 55% of world cashew production, the rest of the production comes mainly from Asia (45%) and South America (5%). In Africa, this production, carried out mainly by countries in West and East Africa, is not, or little or no, processed locally.

Regional integration of the value chain would consist of processing cashews in local and international markets. Morocco, a cashew nut importing country, could consider both productive and technical cooperation with West African countries through the establishment of research programs to improve added value and ensure better processing. and promotion of the product locally.

- **Textiles: a potential to be exploited**

The textile and clothing sector exhibits a high degree of horizontal integration in the areas of design, retail and branding. The destination towards the countries of sub-Saharan Africa and in particular the ECOWAS zone remains constrained by customs tariffs between 20 and 35% due to the application of the common external tariff (CET) in force since 2016. However, the Morocco and the countries of West Africa, in particular Mali, Benin, Burkina, Côte d'Ivoire and Senegal which record the highest productions on the continent (4.685 million bales (480 lb) in 2017), present complementarities which suggest a potential for cooperation in this sector.

- The automotive industry: expertise to share and complementarities to develop

The automotive sector in Morocco is one of the most integrated in the global value chain in Africa. The installation of internationally renowned automobile manufacturers has enabled Morocco to become the second largest automobile producer in Africa after South Africa.

As the leading African producer of rubber, 60% of the continent's production, and seventh globally (720,000 tons in 2018), Côte d'Ivoire has complementarities that can be exploited jointly with Morocco, particularly in technical assistance and the development of research and production programs in the tire industry.

- **Health and the pharmaceutical industry: facilitating access to medicines**

The pharmaceutical industry represents an area in which Co-development constitutes an opportunity to improve populations' access to drugs and to strengthen the capacities of States in research and the fight against health risks.

As a result, Africa imports about 97% of the drugs consumed by its population, with however disparities:

■ Morocco manages to cover 70% to 80% of its pharmaceutical needs while in Central Africa, 99% of drugs are imported.

■ 38 countries have a pharmaceutical industry, while 8 African countries have no structure in this sector.

However, the development potential in this area is significant. Africa is growing at 10% and is the second fastest growing pharmaceutical industry in the world, after Asia-Pacific.

4. Conclusion

The Abuja Treaty and the AU's 2063 program enshrine regional integration as a fundamental priority for the development of the African continent. The achievement of this objective also requires the signing of the AfCFTA. This continental agreement raises hope for the success of this integration and ultimately a means to eradicate poverty, create jobs and achieve the SDGs promoted by the UN.

The AfCFTA begins with the elimination of tariffs for 90% of the products traded and the rest will be done gradually. In this context, impact studies on trade and on economies in general are very useful in giving an idea of the extent of the changes that such an agreement could bring about at the economic level, and also a means of informing public decision-makers.

The main objective of this study was to assess the impact of a complete cancellation of customs duties between Morocco and its African partners on trade, sector dynamics and on prices in Morocco. The analysis was based on the construction of a static CGEM based on the PEP1-1 model with a disaggregation of the ROW account into two regions: Africa and ROW excluding Africa. The shock was to cancel tariffs on export and import between Morocco and partner countries to simulate the entry into force of the AfCFTA.

The results of this simulation and under the assumption of complete liberalization, first show the appearance of a trade creation / diversion effect. We would see a real diversion of trade in favor of the African region about Moroccan exports. All branches of the study are concerned by significant improvements in exports to the African continent to the detriment of the market outside Africa. The most significant increases would be found in the agricultural sector (23.84%), fishing (17.65%), food and tobacco industries (12.92%) and real estate and services provided to businesses (12.26%). compared to the reference situation of 2018. It should also be

noted that the service sectors (J00, I02, K00 and I01) could see their exports increase between 8.9% to 12.3%.

Imports from Africa recorded an increase in all sectors and a decrease in their prices. The most significant variations concerned the agricultural sector (14.15%), the extractive industries sector (15.8%), the textile and leather sector (12.16%) and the mechanical industries sector, metallurgical and electrical. A slight diversion of trade in favor of Africa for the extractive industry sector is highlighted (C00).

These results are in line with those advanced by studies covering the entire continent using multi-country MEGCs but differ in amplitude. Our results are more significant on trade but less important in terms of GDP and income.

This research work deserves a deepening on the methodological level by incorporating the dynamics to be able to simulate a gradual liberalization and capture the long-term dynamics. This work can also be improved by modeling the labor market to have more consistency with economic reality. Finally, it would be very useful to update the estimates of a certain number of key parameters in the model and to be able to disaggregate the household account.

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