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Mega-deals: What Consequences for sub-Saharan Africa?¹

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Résumé

Les pays d'Afrique sub-saharienne sont complètement exclus des « mega-deals », ces accords de libre-échange actuellement en négociation entre plusieurs grandes économies (Union européenne-États-Unis, Union européenne-Japon, Chine-Japon-Corée du Sud, etc.). Dans la mesure où les exportations d'Afrique sub-saharienne restent très dépendantes de ces grands marchés, la conclusion de ces accords pourrait affecter les économies de la région. À partir d'un modèle d'équilibre général calculable (MEGC) dynamique, nous trouvons que la signature des « mega-deals » aurait un effet négatif sur le bien-être des pays d'Afrique sub-saharienne. Un renforcement de l'intégration régionale, limitée à la seule mise en œuvre de l'accord de libre-échange Tripartite impliquant 26 États africains, pourrait limiter les pertes occasionnées mais non les compenser. Par contre, un accord commercial régional plus ambitieux engageant tous les pays d'Afrique sub-saharienne pourrait neutraliser les effets négatifs des « mega-deals ». Nous montrons également dans cette étude que l'ouverture de l'Afrique sub-saharienne envers l'Asie pourrait constituer une solution au détournement de commerce.

Mots clés: Commerce International, Mégarégionales, Afrique

Classification JEL: F13, F15, O55

Abstract

The sub-Saharan African (SSA) countries are excluded from the mega-deals, free trade agreements (FTA) currently under negotiations between several large economies (European Union – United States, European Union - Japan, China-Japan-South Korea...). As Sub-Saharan African exports remain dependent on these large markets, sub-Saharan African countries could undergo important economic impacts. Using a dynamic Computable General Equilibrium Model (CGEM), we find that mega-deals would have a negative impact on the welfare of SSA countries. Regional integration strengthening limited only to the implementation of a “Tripartite” FTA gathering 26 African countries, might limit these losses but could not overcome them. A continental regional trade agreement (RTA) involving all SSA countries would slightly counterbalance the negative impacts of the mega-deals. We also show that openness of SSA countries towards Asia could be a potential solution to avoid trade diversion.

Keywords: International trade, Mega-deals, Africa

JEL Classification: F13, F15, O55

Non-technical summary

A few large free trade agreements involving some of the largest countries of the world, the so-called “mega-deals”, are currently under discussion. While sub-Saharan African countries are totally excluded from these negotiating agreements, their signature could significantly affect African economies through export diversion effects. As suggested in the literature on international trade (Rosales and Herreros, 2014), the impact of such agreements on sub-Saharan African countries, are likely to increase with their dependency on demand from mega-deals’ countries, existing preferences with participating countries, the substitutability between their exports and products exchanged within involving countries, and the existence of “harmonization spillovers” (see Fontagné et al., 2013).

The main aim of this paper is therefore to evaluate, using a Computable General Equilibrium Model (CGEM), the consequences for SSA countries of mega-deals successful negotiations. While RTAs contain numerous items on which countries negotiate (services, FDI, intellectual property, etc.), we only focus on market access for goods through tariffs and non-tariff measures.

Our results clearly evidence a negative impact of the mega-deals on the welfare of sub-Saharan African countries, despite their sectoral specialization. The magnitude of the impact of each agreement depends on the participation of countries that are preferred destinations for African exports (Europe, China, United States), and also on the erosion of preferences linked to the increased competition of involved developing countries. It is therefore appropriate for SSA countries to follow-up the negotiations and pay attention to decisions about mutual recognition of products or to the rules of origin potentially applied in these agreements. Indeed, unlike negotiations on tariffs, harmonization of non-tariff measures could enable them to benefit from facilities to export to previously less accessible destinations.

To go further in this paper, we also examine the effectiveness of some trade policy options available to SSA countries, especially trade liberalization within Africa, to mitigate the negative effects of mega-deals on their economies. Our results reveal that a limited regional integration process in Africa, involving the establishment of the “Tripartite” RTA between COMESA, SADC and EAC, would tend to limit but not overcome losses due to the mega-deals. However, a more ambitious regional integration process, assuming the implementation of a continental RTA involving all SSA countries, would slightly counterbalance the negative impact of the mega-deals. In this framework also, openness of African countries towards Asia could be an additional promising solution to avoid trade diversion effects.

1. Introduction

In 2013, a new wave of negotiations on free trade agreements involving some of the largest countries of the world, the so-called mega-deals,⁴ has been launched. The European Union (EU) and the United States announced in February 2013 their wish to open shortly discussions about an agreement that would liberalize trade in goods, services and investments (the Transatlantic Trade and Investment Partnership, TTIP). In March of the same year, Japan formalized her participation to a potential agreement in the Pacific area, the Trans-Pacific Partnership (TPP), involving the USA among others.⁵ At the same time, Japan initiated bilateral negotiations with the EU. In addition, the 10 ASEAN countries (Association of South East Asian Nations) and their six FTA partners (Australia, China, India, Japan, Korea and New Zealand) have initiated discussions since the beginning of 2013 for the implementation of the Regional Comprehensive Economic Partnership (RCEP, also known as ASEAN+6), expected to be completed by the end of 2015. Finally, the possibility of a trilateral FTA between China, South Korea and Japan (CJK FTA) was first mentioned in December 2011. Negotiations accelerated in 2013 and a first agreement was completed between China and South Korea in February 2015.

While Sub-Saharan African (SSA)⁶ countries are totally excluded from these negotiations⁷, the region could be significantly affected by the implementation of the mega-deals through export diversion effects. As Rosales and Herrerros (2014) explain, the impact of any agreement on non-participating countries, sub-Saharan African countries in our case, will increase with *i*) their dependency on demand from mega-deals' countries, *ii*) existing preferences with participating countries and *iii*) the substitutability between their exports and products exchanged within involving countries. 70% of Sub-Saharan African exports are destined to the mega-deals' countries and African products still benefit from preferences to enter these markets (the United-States, the European Union, etc.). Moreover, some products exported by African and Asian countries to the EU or the US may be substitutes, suggesting possible important impacts from the achievement of mega-deals on African trade. In addition to diversion effects, Fontagné et al. (2013) mentioned another channel through

⁴ In this paper, we refer to the expression "mega-deals" to designate hereafter the five trade agreements presented in the first paragraph of the introduction: TTIP, TPP, EU-Japan, RECP and CJK FTA.

⁵ The other participants are: Australia, Brunei Darussalam, Canada, Chile, Malaysia, Mexico, New Zealand, Peru, Singapore and Vietnam. The negotiations of the TPP involve 11 countries.

⁶ Following the United-Nations, sub-Saharan Africa refers in this paper to all African countries excluding northern African countries but including Sudan (see <http://unstats.un.org/unsd/methods/m49/m49regin.htm>).

⁷ For example, on the occasion of the last Conference of the African Union Trade ministers, which took place in December 2014 in Ethiopia, African countries have stressed their fear to be more isolated with the implementation of mega-deals.

which third countries may be impacted by the mega-deals: “harmonization spillovers”. As they argued, measures to harmonize Non Tariff Measures (NTM, like standards and norms) between participating countries might facilitate third countries’ access to their markets (through the adoption of a common rule of origin or a common standard, for example). However, this aspect can also be discriminatory as much depends on the details of the agreements (Aichele et al., 2014).⁸

At the same time, the trade integration process in Africa is expanding and strengthening. In 1991, the Abuja Treaty (1991) launched the gradual implementation of a continental free trade area: the African Economic Community (AEC). The AEC’s establishment should pass by six steps and be reached 34 years later. Today, the process is in its third step. This phase involves the implementation of a free trade area and of a custom union in each of the eight Regional Economic Communities (RECs), of which seven are in sub-Saharan Africa, by 2017. By now two of them, the West African Economic and Monetary Union (WAEMU) and the Economic and Monetary Community of Central Africa (EMCCA), are monetary unions. Five RECs are free trade areas: the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the Economic Community of Central African States (ECCAS), the Economic Community of West African States (ECOWAS) and the Southern African Development Community (SADC). In addition, three of them have a custom union (COMESA, EAC and SADC) and ECOWAS adopted a common external tariff in January 2015. EAC has gone further by establishing a common market in 2010. A project of monetary union in EAC is currently under discussion. Moreover, a Tripartite Free Trade Area including countries of COMESA, EAC and SADC (26 countries), is planned to be effective in 2015.

Hence, the aim of this paper is to evaluate, using a Computable General Equilibrium Model (CGEM), the consequences for SSA countries of mega-deals successful negotiations. While RTAs contain numerous items on which countries negotiate (services, FDI, intellectual property, etc.), we only focus on market access for goods through tariffs and non-tariff measures.

Our paper contributes to the empirical literature on mega-deals in three ways. First, to our knowledge, it is the only quantitative assessment of the impact of those large negotiations on SSA countries, explicitly modeled. Second, we use recent and detailed data on tariffs to design our scenarios, taking into account all trade preferences. Finally, we provide some trade policy options for SSA countries, especially trade liberalization within Africa, that could dampen the effects of mega-deals on their economies.

⁸ See also Cadot et al. (2002) on the negative consequences of harmonization of NTMs.

Our results evidence a negative impact of the mega-deals on the welfare of sub-Saharan countries, despite their sectoral specialization. Moreover, they reveal that regional integration (the “Tripartite” RTA) in Africa tends to limit but cannot overcome losses due to the mega-deals. A continental RTA involving all SSA countries will slightly counterbalance the negative impact of the mega-deals. In this framework, openness of African countries towards Asia could be an additional promising solution to avoid trade diversion.

The remainder of the paper is organized as follows. Section 2 reviews the literature examining the impact of RTAs for African countries. Section 3 describes the patterns of African trade and protection. Sections 4 and 5 present respectively our model and the results of our estimates. Finally, we carry out some sensitivity analyses in Section 6 and conclude.

2. Sub-Saharan African countries and trade policies

The integration of sub-Saharan Africa countries in international trade has been widely discussed and documented in the empirical literature. During the 2000s, following the launch of the Doha Round (Doha Development Agenda, DDA), numerous studies have shown the special place of the African continent in international trade.

African countries already have a privileged access⁹ to major developed markets: to the European Union via Everything But Arms (EBA) or the Generalised System of Preferences (GSP) and to the USA via the African Growth and Opportunity Act (AGOA). Consequently, preference erosion (reduction of the preferential margin, following the opening of the EU and the USA vis-à-vis others developing countries such as Asia or South America), resulting from the implementation of successive DDA proposals, would have a negative impact on all SSA countries. Bouët et al. (2004) found for example, that the preference erosion following multilateral trade liberalization in agriculture would be particularly detrimental for African economies. In addition to the loss of market access, two other effects are at stake: strong growth in other developing countries (e.g., China, India, etc.) and weak commitments of African countries into the multilateral framework (eligible to the Special and differentiated treatment, SDT, that allows them to undertake reduced tariff liberalization).

⁹ Applied duties faced by African exporters on those markets are generally lower than MFN (Most Favored Nation) tariffs applied to other partners. Among large countries negotiating mega-deals, India also grants preferences to some African Countries through GSPT. China also gave some preferences to African LDCs in 2010.

Meanwhile, in compliance vis-à-vis the WTO, the Economic Partnership Agreements (EPA), between the E.U. and the ACP¹⁰ countries, designed to replace the Cotonou agreement, have raised other issues for African countries. Indeed, the requirement of reciprocity and the most favored nation (MFN) clause do not authorize the use of unilateral preferences for a specific subset of partner countries, excluding *de facto* other WTO members. Using a partial equilibrium model, Fontagné et al. (2011) found that the implementation of EPAs would negatively affect ACP countries, especially West African countries.

Moreover, numerous studies examined consequences of regional integration in Africa. Findings of the empirical literature (using gravity models or Computable General Equilibrium simulations) do not converge. Yang and Gupta (2005) highlighted the inability of African RTAs to significantly promote intra-African and external trade. As for them, this inefficiency comes from various factors such as the lack of complementarity between countries' endowments, the inadequate infrastructures and the small size of local markets. Carrère (2004) found evidence of differentiated effects of African RTAs on intraregional and extraregional trade over the period 1962-1996. For example, her results showed that the SADC agreement increased intraregional trade by 2.5 times (0.2 for ECOWAS), but reduced extraregional trade by 35 percent.¹¹ Similarly, estimating a gravity model over 1960-2006, Turkson (2012) found that ECOWAs and SADC agreements positively influenced intra-regional trade, more than EU-ACP agreements. According to the results of Elbadawi (1997), the impact of African RTAs on intra-African trade varies over time: over the period 1980-84, RTAs significantly promoted intra-African imports, while this effect became negative during the second half of 1980s (trade diversion effects).

Using the MIRAGE¹² model, Douillet (2011) compared the impact of multilateral vs. regional integration on agriculture in Africa. While global liberalization would increase the concentration of African trade in unprocessed agricultural products, she found that the regional process would both increase the volume of agricultural exports and their value-added. Recently, Mevel et al. (2013) examined the effects of a possible continental free trade area in Africa and focused also on the impacts on the agricultural sector. Their results suggest that such an agreement would benefit Africa: agricultural exports would be stimulated and the share of intra-African trade in total African trade would increase.

¹⁰ ACP is the African, Caribbean and Pacific Group of Countries, created in 1975, which aims at reduce poverty within its members.

¹¹ Yang and Gupta (2005), however, tempered this result. Because intraregional trade represents only a marginal share of SADC's trade, the total effect corresponds to a decline of the SADC's international trade by 7 percent.

¹² See section 4.

Regarding the mega-deals, the literature has been mainly focused on the economic consequences for countries participating in these trade agreements or for the whole world. One example is the study carried out by the CEPR (Centre for Economic Policy Research) in 2013 for the European Commission on the effect of the EU-US TTIP. Using a computable general equilibrium (CGE), they showed that the TTIP implementation will significantly improve the GDP of both EU and the USA, especially when tariff removal is associated with reduction of non-tariff measures. Another study (Fontagné et al., 2013) evaluated the macroeconomic impact of the TTIP. They found that its implementation would promote bilateral trade between the EU and the USA (mainly through the reduction of NTMs) and significantly increase the annual national real income of both areas. Looking at the impact of the TPP and other possible free trade agreements involving ASEAN countries, Petri and Plummer (2012) evidenced significant global gains, especially in the scenario assuming a free trade agreement between the 21 APEC (Asia Pacific Economic Cooperation) countries (annual benefits would reach 1,922 billion of US dollars).

In this literature, Africa is generally either considered as a continent in which the status quo prevails in trade policy, or belongs to a vast “rest of the world”. We identify however very few analyses that focused on the potential consequences of the mega-deals for developing countries, especially for African countries.

For example, aside from measuring the potential gains of tariff removal and NTMs reduction for the US and EU through a CGE model, Francois et al. (2013) examined how the TTIP would impact the rest of the world. Globally, they found evidence of a positive effect of this trade agreement for third countries. GDP of low income economies is expected to increase from 1 billion to 2.4 billion Euros (according to the scenario considered). However, since regions are not disaggregated enough in their model, it is not possible to draw clear conclusions for African countries. Another report written by CARIS and the University of Sussex (2013) examined the possible effects of the US-EU economic integration on trade for 43 Least Income Countries (LICs), including 31 African countries. Using a partial equilibrium approach, the authors examined for each country how their exports to the US and EU would be shaped by the TTIP implementation. Overall, their results indicate that LICs would not be significantly affected by this agreement.¹³ They gave three explanations: i) the high differences in the composition of exports from LICs to TTIP members and those between the US and EU, ii) most products exported by LICs enter the US or the EU market at zero tariff duty, and iii) LICs represent

¹³ They found however that a few LICs would experience a significant decrease of their exports to TTIP parties, as Niger and Ghana (oil) and Malawi (Tobacco).

small market shares in TTIP countries. By using an econometric methodology based on a multi-country, multi-industry Ricardian trade model, Aichele et al. (2014) found that the implementation of the TTIP would not significantly affect the welfare of African countries when only the elimination of tariffs is considered. However, when considering regulatory spillovers effects on third countries, the TTIP implementation is associated with improved well-being of African countries. Felbermayr et al. (2013) reached opposite results. They estimated with a CGE model the impact of trade liberalization resulting from the TTIP on a large panel of countries. Their findings indicate a loss of income per capita following tariff elimination in most developing countries and in all African countries. The largest loss would be supported by Guinea (-7.4%), Côte d'Ivoire (-6.4%) and Namibia (-4.4%). Addressing the same issue with a different empirical approach (econometric estimates of the effect of the TTIP on real GDP), Felbermayr et al. (2014) got similar results.

More recently, Draper and Ismail (2014) and Ramdoo (2014) reviewed the possible implications of the mega-deals for Africa. The formers expected a diminishing influence of SSA countries in world trade and thereby concluded to the necessity to minimize this phenomenon through a closed collaboration with historical partners involved in mega-deals. They also highlighted the importance of promoting a dynamic domestic environment. In her note, Ramdoo stressed the erosion of the margin of preferences SSA countries enjoy on mega-deals markets. She also questioned the consequences of being a rule/standard takers, emphasizing the need for African leaders to anticipate strategic responses and alliances in order to avoid marginalization of the region in the world trade.

As a conclusion, the handful of studies that examined the economic consequences of mega-deals on other countries, especially on African countries, does not converge. Using a detailed geographical aggregation of African countries might limit some bias in the analysis.

3. Descriptive evidence

3.1. Trade evolution and specialization

In 2012, sub-Saharan African exports of goods represented only 2.5% of world exports (BACI).¹⁴ Only 13.6% of SSA exports are intra-regional, which is very low compared to other regions

¹⁴

All trade data cited in this paper come from the BACI database, which harmonizes bilateral trade data at the HS6 level from the COMTRADE database (United Nations), starting from 1989 and ending in 2012 (Gaulier and Zignago, 2010). Regarding intra-trade in SSA countries, an issue can be the potential importance of informal cross-border trade (i.e. trade flows not recorded in national statistics). Several surveys published by USAID (1997), Uganda (UBO, 2008 and 2011) tackle this problem, but, to our knowledge,

(23.4% in South America, 46% in North America, 60% in European Union). In 2012, only four African countries exported a majority of their exports to other African countries: Rwanda (58%), Mali (56%), Zimbabwe (51%) and Togo (51%).

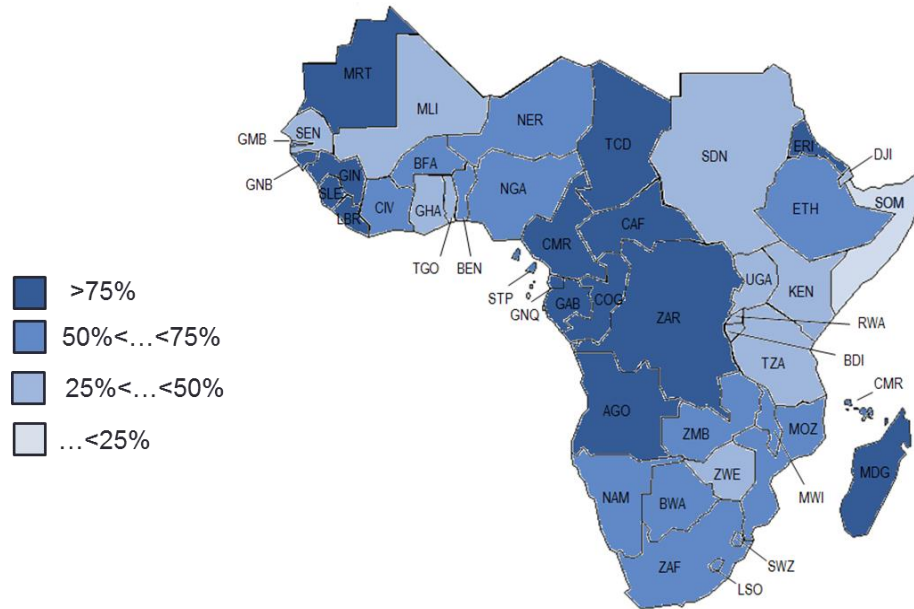
Over the last twenty years, African trade has become more geographically diversified. Emerging countries like China, India and Brazil, are absorbing an increasing share of sub-Saharan African exports (from 7% in 1998 to 24.5% in 2012), at the expense of traditional trade partners as Europe and North America. In 2012, the main African exporters to China were the Democratic Republic of the Congo, the Gambia, Angola, Zambia and Sierra Leone with China representing respectively 72%, 51%, 49%, 47% and 46% of their total exports of goods. Guinea-Bissau was the most reliant on Indian imports (70% of its exports). In all other sub-Saharan African countries, exports to India represent less than 25% of the total. Some African countries however still greatly depend on imports from the European Union (Cape Verde 78%, Seychelles 63%, Mauritius 57%, Sao Tome and Principe 55%, Cameroon 51%, Niger 49%, etc.).

Since emerging markets mainly need raw materials, the geographical diversification of African trade has been accompanied by an increasing specialization in energy. Between 1998 and 2012, exports of energy have increased their share in total SSA countries' exports by 25.5 percentage points (pp): from 22.5% to 48%. Some African countries are very vulnerable because at least 40% of their exports depend on one destination country. In 2012 this was the case of Angola (oil to China, 49%), Chad (oil to the United-States, 72%), Eritrea (gold to Canada, 88%), the Gambia (wood to China, 47%), Guinea-Bissau (cashew nuts to India, 70%), Mali (gold to South Africa, 46%) and Sierra Leone (iron ore to China, 42%).

In 2012, countries that export the most to mega-deals' countries are mainly located in Central Africa (see Figure 1), like Chad (99%), Eritrea (98%), Angola (95%), Equatorial Guinea (93%), Guinea Bissau (93%), Sierra Leone (91%) and Central African Republic (91%). However, products exported are mainly commodities that could not find substitutes in the production of countries taking part of the mega-deals.

there is no comprehensive study on this aspect (both in terms of countries and products). If existing surveys are very useful (see Lesser and. Moisé-Leeman, 2009), they cannot really be integrated in a framework like ours (trade is not the only endogenous variables specified in a CGE model: information on intermediary consumption or factors remuneration would also be required.). Thus, acknowledging the importance of this aspect, we do not treat this "statistical bias" in our analysis. Moreover, trade with other countries (e.g. the mega-deals countries) might be not as "informal" as intra-SSA trade.

Figure 1 - Dependence (% of total exports, 2012) of SSA on imports from countries taking part in the mega-deals



Source: Authors' calculations, BACI

3.2. Border protection

Worldwide, tariff barriers have been significantly reduced since the beginning of the century (from 6.1% in 2001 to 3.9% in 2010¹⁵). However, aggregated protection can hide an important heterogeneity at the regional level. Table 1 presents the bilateral average protection in 2010, by regions.

¹⁵ Own calculation using MAcMap-HS6.

Table 1 - Average applied tariffs in 2010, by region (%)

Exporter -> Importer	Sub-Saharan Africa (SSAs)				MENA	Asia	CIS countries	Europe	North America	South America
	Central Africa	Eastern Africa	SACU	Western Africa						
Central Africa	9.3	15.3	13.6	13.8	13.6	10.9	12.2	10.2	9.4	12
Eastern Africa	8.4	6.1	11.2	12.5	9.8	12.5	11.2	10.3	9.6	15.9
SACU	0.1	1.2	0	0.6	5	7.3	7.7	2.8	5.8	7.9
Western Africa	7.3	12.9	10.2	8.4	8.5	10.6	10.8	9.1	9	11.1
MENA	4.4	6.1	7.5	4.6	2.3	7.6	7.7	7.4	6	9.5
Asia	0.9	7	5.6	2.3	3.2	4.8	5.2	5.3	5.3	7.8
CIS countries	2.2	6.5	7	6.5	6.2	5.7	3.4	5.5	6.8	10.9
Europe	0.1	1.6	1	0.2	0.4	3.2	0.5	0.4	2.8	3.8
North America	0.5	4.4	0.9	0.7	1	3.1	2.7	2.5	0.2	3.7
South America	2.9	5.8	7	4.2	5.2	8.5	6.7	9.2	6.7	4

Source: Authors' calculations, MAcMap-HS6 database.¹⁶

Vis-à-vis non-African partners, SSA countries are not very opened. Indeed, with the exception of SACU countries applying a moderate average tariff¹⁷ (between 2.8% and 7.9%), the three other SSA blocks remain very protectionist, with average duties ranging between 8.5% and almost 16%. In terms of reciprocity, the other major regions apply to SSA countries lower tariffs. Europe and North America have for example implemented a generous preferential market access to African countries (through EBA, GSP or AGOA). This asymmetry, due to unilateral preferences, has generated the need of EPAs negotiations, to be compatible with WTO rules.¹⁸ Besides, Europe and North America apply higher tariffs to other developing countries (Asia, South America) or even to each other (the MFN rule applies between EU and the USA, for example), creating SSA countries' preferential market access highly dependent on the evolution of trade policies in third countries.

In sub-Saharan Africa, the picture is also contrasted. SACU region is also very open: its internal tariffs are zero and those applied to its neighbors are very low (0.1% to 1.2%). This is explained by the FTA concluded with the SADC (2004) and also by the level of development of its members (South Africa), the protection schemes being classically different from least developed countries. In contrast, other SSA regions apply even higher tariffs at the regional level. However, we

¹⁶ Tariffs data come from the MAcMap-HS6 database which provides an equivalent ad valorem of the tariffs at the products level (HS6) applied by around 190 importers to 220 exporters. The 2010 version is an updated version of the 2007 database (Guimbard et al., 2012).

¹⁷ SACU signed a RTA with the EU in 2000 and another with EFTA in 2008.

¹⁸ Following the last ECOWAS Summit in July 2014, sixteen West African countries (the 15 ECOWAS member states and Mauritania) signed the Economic Partnership Agreement (APE) with the European Union. A few days later, on 15th July 2014, five SADC countries (Botswana, Lesotho, Mozambique, Namibia, South Africa and Swaziland) signed the agreement.

can observe progress towards regional integration: each block (East, Central and West) generally applies lower tariffs to its neighbors than to other SSA countries, even if their effective enforcement is subject to caution.¹⁹ Moreover, the still significant protection within African blocks shows that their total implementation is not yet accomplished.

Finally, this table shows a high tariff protection among Asian countries. We can thus expect significant trade diversion effects with the liberalization of trade in Asia.

3.3. Non-Tariff Measures in goods

Non-tariff measures (NTMs) covers areas as different as sanitary and phyto-sanitary standards, technical barriers to trade, administrative constraints, etc. Even if some measures are used solely to protect domestic producers from foreign competitors, revealing thereby a will of protectionism of some lobbies, others allow an improvement in the quality of imported products and better information for consumer (e.g. chemical contain of the products...), implying that their suppression is not necessarily desirable.

In addition to tariffs, recent RTAs include provisions about NTMs. In some cases, mutual recognition of the products applies, especially when many countries are involved in the process (as it was the case in the successive EU enlargements). Regulatory convergence is also a key debate in the TTIP negotiations, for example. Clearly, NTMS are among the most discussed items in the mega-deal negotiations and the expected outcome can dramatically change the future trade possibilities for SSA countries. Indeed, measures included in mega-deals to harmonize technical barriers to trade between participating countries could positively impact non-participating countries. As explained in Fontagné et al. (2013), the resulting greater compatibility between the standards and norms might make it less costly to cope with the requirements to export to the signing parties' markets. This is what they call "harmonization spillovers". In this case, third countries are likely to benefit from a regional trade agreement even though they did not participate. This is why it is relevant to examine in a sensitive analysis the possible impact of a larger cut in NTMs.

On the SSA side, recent African trade agreements and those being negotiated include progressive elimination of a part of NTMs.²⁰ For example, the Draft Tripartite Agreement mentions

¹⁹ The multiplicity of regional trade agreements and the multiple belonging of sub-Saharan African countries to these RTAs have been identified as a major obstacle to the actual implementation of tariffs.

²⁰ See Cadot and Gourdon (2014) for some examples on NTMs used by SSA countries.

the removal of all Non-Tariff Barriers among its main objectives. The technical aspects of these discussions are however not really specific and the outcome is really fuzzy.

The outcome of the negotiations is specific to each NTMs and it remains difficult to assess in ex-ante quantitative analysis. This is why our simple choice is to use a single *ad valorem equivalent* that roughly sums up all the information about NTMs. We thus use data from Kee et al. (2009), who proposed an estimation of *ad valorem* equivalents of NTMs for a panel of 78 countries at the six-digit level of the harmonized nomenclature (HS6). In our simulations, we aggregate those AVE at our level of aggregation, using a trade weighted average. Moreover, to control for the complexity of customs and administrative procedures, we add the AVE of time spent at the border (Minor and Tsigas, 2008). **Erreur ! Source du renvoi introuvable.** sums up the average *ad valorem* equivalent used to model trade restrictions implied by these measures.

Table 2 - Weighted Average AVE of non tariff measures and time of transit through customs

	Applied by sub-Saharan African countries to Mega deal countries' exports	Applied by Mega deal countries to African countries' exports	Applied within Sub-Saharan Africa
All products	40	51	45,5
Primary sector	29	87	37,5
Agricultural products	12	34	27
Animal products	11	23,5	17
Fishing & meat products	12	14,5	24
Food products	40	41,5	35
Primary energy	79	100	80
Secondary sector	41	23	47
Chemistry	47	34,5	60
Clothing	40	34	32,5
Energy+Metals+Minerals	42,5	20	49
Machinery (vehicles+elec+equipment)	43	26,5	43

Source: Kee et al. (2009), Authors' calculation.

Table 2 shows first that, unlike tariffs, the most binding measures in our sample are enforced by developed countries towards imports from sub-Saharan African countries (average *ad valorem equivalent* of 51%), primary imports in particular (87% compared with 23% for industrial exports). Non-tariff protection is especially high towards primary energy (100%), agricultural (34%) and food imports (41.5%) from Africa. Non-tariff barriers applied within sub-Saharan Africa ranked second and are just somewhat weaker (45,5% on average). Contrary to Mega deal imports, the most protected products in Africa are in the industrial sector. As a whole, protection observed within Africa in the

industrial sector is twice as high as protection applied by Mega deal countries on industrial exports from Africa (47% vs. 23%). Non-tariff protection applied by African countries to Mega deal exports is the lower (40%). Here too, the industrial sector is the most protected (41% on average compared with 27% for the primary sector) and primary energy exports face again the highest non-tariff barriers (79%).

4. Model and design of scenarios

We use a global dynamic CGE model, nicknamed Mirage that focuses on trade policy analysis.²¹ In our version, the model assumes perfect competition and mainly relies on nested Constant Elasticity of Substitution (CES) trees both for demand and supply. Our base year for calibration is 2007. Social Accounting Matrixes come from the GTAP database (version 8.1) and tariffs from MAcMap (performed at the HS6 level).

To build our dynamic baseline, we use data of Total Factor Productivity (TFP) and saving rates from EconMap (Fouré et al., 2012) and labor force projections from the International Labour Organization (ILO). Generally, in terms of trade policies, a status quo is assumed in the baseline. As results are expressed in variation between the simulations and the baseline, we incorporate two foreseeable changes in trade policies: we first implement a linear change in tariffs from 2007 to 2010 in order to stick to the most recent evolution of tariff levels. Moreover, the signature of EPAs between the EU and the ACP countries is also integrated in our baseline in a stylized fashion. Full reciprocal dismantlement is assumed between EU and all of its EPA partners (during an 8-year period, starting from 2015), in the wake of recent signing of those agreements between ECOWAS and the EU (July 2014).²²

As in section 3.3, our set of AVEs for NTMs comes from Kee et al. (2009). In Mirage, NTMs are modeled as an iceberg trade cost, meaning that producing a good requires more intermediate

²¹

The model is fully documented in Bchir et al. (2002), Decreux and Valin (2007) and Fontagné et al. (2013). The version used in this paper corresponds to Fouré et al (2013). However, the energy sector, in this paper, is considered as an intermediate consumption and not as a factor in the value added. The Mirage model has been extensively used to assess the impact of trade policies (see Bouët and Laborde, 2010; Gouel et al., 2011) or to examine consequences on environment policies (Laborde and Valin, 2012). The MIRAGE model documentation is available at <http://www.mirage-model.eu>. And a short description is provided in appendix.

²²

The tariff dismantlement will certainly not be as important, like ECOWAS which pledged to eliminate its tariffs on 75% of its imported European products. Moreover, the refusal to sign EPAs by the ACP not yet signatory would result in reinstatement (less favorable) of these countries into the European GSP. In any case, it seems that the EU therefore continues to grant non-reciprocal preferences to those partners.

consumptions and more production factors (labour, land, natural resources and capital). Thus, reduction of such trade cost leads to two positive effects: the exporter becomes more efficient, requires less production factors, while the importer sees a decrease in its import price, synonymous of a positive terms of trade effect, all things being equal.

Our analysis focuses on market access improvements through the reduction of border protection for trade in goods. Each of our scenarios assumes the complete phasing-out of tariff protection, accompanied by an across-the-board 25% cut in the AVE (*ad valorem* equivalent, i.e. a percentage) of non-tariff measures. As negotiations on the services sector are subject to an even greater uncertainty, we consider the status-quo for this sector. Thus, effects at stake in services only result from general equilibrium effects. Foreign investment is also not considered in this study, given the lack of reliable data for African countries, both in terms of volume of FDI and in terms of barriers to foreign investment.

Our central scenario, called “*Mega Deals*”, considers the implementation of five large agreements that are currently negotiated. We suppose the removal of tariffs and reduction in NTMs in the following agreements: EU-Japan, TTIP, TTP, the RECP (ASEAN+6)²³ and the China-Japan-Korea FTA. We simulate mega-deal agreements one by one to disentangle their respective effects on SSA countries.

Then, to examine whether the liberalization of sub-Saharan African trade could amplify or dampen the impact of “*Mega Deals*”, we consider additional cumulative scenarios. The “*Tripartite*” scenario assumes that, in addition, to the “*Mega Deals*” scenario, a Tripartite FTA including countries of COMESA, EAC and SADC, which is planned to be effective in 2015, is established.²⁴ This tripartite scenario is finally extended by a larger African integration process in the scenario called “*SSA*” which adds Western Africa to the tripartite area.²⁵

To seek other outlets, two additional scenarios are performed. Both assume “*Mega Deals*”, “*Tripartite*” and “*SSA*” scenarios implemented. As a complement, the “*Asia*” scenario supposes a free trade zone between SSA countries and Asian countries, whereas “*South America*” considers the same

²³ In that case, liberalisation only involves ASEAN countries and each of their six partners. The latter do not take any commitment between each other.

²⁴ Official documents contain a very ambitious proposal: removing of all tariffs and non tariff measures, among other topics. Thus, our stylized scenario seems to be less ambitious than what it is proposed. See <http://www.tralac.org/resources/by-region/comesa-eac-sadc-tripartite-fta.html>

²⁵ We do not make any assumption on the forthcoming Common External Tariffs (CET). We believe their effects, if the implementation is conformed to WTO (the level of protection must not raised against third countries), are of second order regarding the results we obtain.

ambition between SSA countries and South American countries. These stylized scenarios can be seen as possible directions in terms of trade policies for SSA countries.

Starting from 2015 and ending in 2025, all scenarios assume an 8-year phase-in period and are considered as fully implemented in 2023. Tariff reductions are computed at the HS6 level from 2010 tariff level, using the MAcMap-HS6 2010. Cuts in AVE of NTMs are also linearly implemented during the same period. Given the uncertainty on commitments (both on tariffs that can be replaced by tariff rate quotas and on NTMs), we choose to design stylized scenarios to get effects from large liberalization exercises. Sensitivity analyses will tackle some assumptions made in this section. Table 3 summarizes our set of trade policy scenarios.

Table 3 - Trade policy scenarios

Name	Involved Countries	Sectors	Trade Policy
BASELINE	All countries: changes between 2007 and 2010. EPAs between EU and ACP countries	Agriculture and Industry	EPAs' Bilateral tariffs = 0
Mega Deals	Mega deals (TTIP, TPP, EU-Japan, RCEP, CJK)		
TRIPARTITE	"Mega deals" + COMESA-EAC-SADC	Agriculture and Industry	Bilateral tariffs = 0 ; NTMs = 0.75*NTMs
SSA	"TRIPARTITE" + Rest of SSA		
SSA-ASIA	"SSA" + SSA-ASIA		
SSA-SOUTHAM	"SSA" + SSA-South America		

Source: Authors

To keep the model's size at a computationally reasonable level and given our topic of interest (the SSA countries and the mega-deals), we aggregate the GTAP database into a limited number of countries and sectors.²⁶ We choose to isolate each available SSA country and composite SSA regions (they represent an aggregation of individual countries in GTAP). Thus, we obtain 20 individual SSA countries and 5 composite regions. The rest of the world is split in 15 countries/regions. Our sectoral

²⁶ The full GTAP provides data for 134 countries/regions, disaggregated in 57 sectors.

aggregation exhibits 23 sectors, among which 11 agricultural sectors, 9 industrial sectors, 1 energy sector and 2 service sectors. Details about geographical and sectoral aggregation are provided in Appendixes B and C.

5. Results

This section discusses results of our simulations.²⁷ Among all variables that can be analyzed with CGE models, we choose the ones that may be the most representative given our topic of interest (SSA countries): welfare, tariff revenues and trade. The variations of GDP and terms of trade are presented in Appendix E. We focus on long run effects and provide results as a variation to our baseline, in 2025.

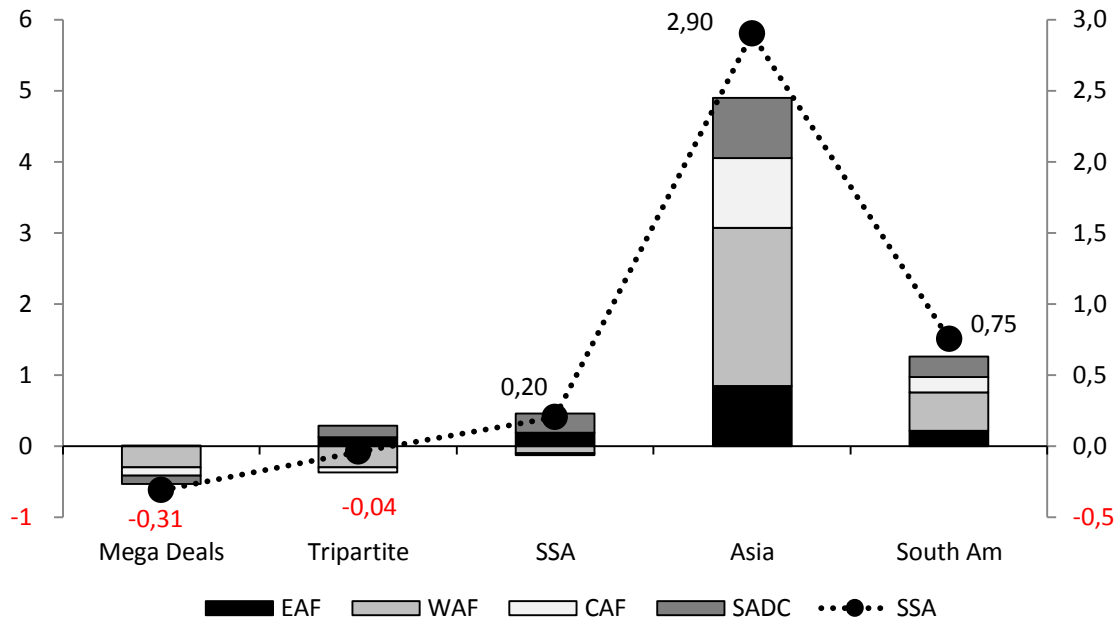
5.1. Welfare analysis

In this sub-section, we present, for each scenario, results on the changes in welfare (which can be seen as a variation of real income). Technically, welfare is calculated as an equivalent variation of the representative agent's revenue, between each simulation and the baseline, at the country level.²⁸ As our geographical classification has many individual countries, detailing all the results could be fastidious. For the sake of clarity, in a first step, we choose to focus on large aggregated SSA regions and the total of SSA countries. In a second step, we detail effects at stake for the six countries that undergo the largest impacts in the mega-deal scenario (both negative and positive). Figure 2 provides variations in billions of USD for each region (bar, left hand side) and variations in percent for all SSA countries (line, right hand side).

²⁷ Results are available upon request.

²⁸ In other words, it measures the increase of the agent's income that would have been necessary, prices remaining unchanged, to obtain the new level of agent's utility. Contrary to the variations of real GDP which measures changes in production, this indicator accounts for effects linked to terms of trade (which can be underestimated by GDP indicator, see Kohli, 2004).

Figure 2 - Welfare variations in 2025



Source: Author's calculations, Mirage Model.

Note: The dash line represents the variation for all SSA countries in each scenario (% , right hand side). The bars give the volume, by SSA regions, in 2007 US dollars (billion, left hand side).

Overall, in our central scenario, SSA countries suffer from a decline of their real income (-0.31%, in 2025, compared to the baseline) due to the mega-deal agreements.²⁹ Negative impact is mainly explained by trade diversion effects: SSA countries' exports to the rest of the world decreased following the erosion of trade preferences on the mega-deals countries' markets, generating a decrease in capital accumulation, accompanied by a deterioration of terms of trade (lower export prices) to deal with this new competition. The latter implies changes in specialization that increase the negative effect, through losses in allocation efficiency.

²⁹

The EPAs with Europe are included in the baseline. However, we also simulated their effect in a specific scenario. Their implementation leads to an overall decrease of welfare of -0.22% compared to the baseline. The large asymmetry of the initial protection between the two blocs (the EU applies very low tariffs to all SSA countries) explains this negative effect. Indeed, following a strong liberalization, exporting countries reduce the prices of their exports to avoid an excessive erosion of their trade balance. Thus, the price of their imports falls (following the abolition of their custom duties). This results in deterioration of their terms of trade. Gains related to the suppression of their tariffs (allocation efficiency gains) do not compensate for losses. Thus, the overall effect for SSA countries is negative. As expected, we also find a strong decrease of their tariff revenues (-32% in average), in line with Fontagné et al. (2009).

Considering the overall decline (-0.31%) associated with the five agreements we consider, the impact can be divided as follows: the TTIP has a very small impact (3% of the total variation), reflecting the low trade diversion and differences in specialization between these two blocks and SSA countries. The integration between China, Japan and South Korea has also a limited impact on SSA (7%). The EU-Japan agreement represents around 11% of this variation. Pacific agreements involving ASEAN countries (or some members at least) have an important impact: the TPP is the most penalizing (45%), followed by the implementation of RECP (-34%), witnessing the ASEAN countries as the major competitors of SSA countries (agriculture, textiles ...).

The additional scenarios with sub-Saharan African integration show two interesting aspects. On the one hand, the incapacity to offset losses due to the mega-deals with only an ambitious tripartite trade integration (-0.04% of welfare). On the other hand, the full integration of SSA countries exhibits positive real income gains (+0.2%), at the expenses of West African countries. The assumption of reducing non-tariff measures in the case of SSA can be seen as an extreme case of trade liberalization. However, it seems important to make that happen: reducing only customs duties does not allow fair competition against products that would meet common standards.

Finally, the opening of trade with Asia ("SSA-ASIA") helps counteracting all the negative effects associated with mega-deals (+2.9%). This liberalization scenario is the most promising for all SSA countries. A trade agreement with Asia, and especially with China, India and ASEAN countries, would benefit SSA countries the most: not only they trade a lot with each other, but trade barriers remain important. The opening with South America ("SSA-SOUTHAM") also provides positive gains for SSA as a whole (+0.75 pp), since exports to a few MERCOSUR countries are significant,³⁰ but remains of second order compared to the scenario "SSA-ASIA".

Aggregate results often hide the heterogeneity at the country level. We now turn to individual variations, focusing on the three highest positive variations and the three largest losses (Table 4).³¹

³⁰ The main destination is Brazil that absorbed 2.4% of SSA exports in 2012 (rank 7th).

³¹ We chose to focus on variation (an alternative could be to look at changes in values) and to limit the interpretation of the results to 6 countries. We believe that the diversity we obtain is meaningful. For convenience, we omit composite regions as their construction is subject to strong assumptions. See <https://www.gtap.agecon.purdue.edu>

Table 4 – Largest welfare variations for individual countries, in 2025

Country	Variation in	
	%	Million of USD
Uganda	-0.88	-21.21
Madagascar	-0.85	-7.92
Nigeria	-0.66	-302.40
Zimbabwe	0.36	2.32
Benin	0.55	8.60
Togo	1.79	13.94

Source: Author's calculations, Mirage Model.

Uganda, Madagascar and Nigeria are the three countries for which the negative impacts of the mega-deals are the largest. The losses of market shares on mega-deals' markets are translated in a decrease of their production. Thus, the decrease in real income³² in Uganda (-0.88%) mainly comes from losses in capital accumulation (-0.85 pp) and losses in land supply (-0.01 pp). Madagascar sees its real income decreases by 0.85%. The country losses in terms of return to capital (-0.12 pp) and to land (-0.2pp), but also undergoes a strong negative effect due to terms of trade (-0.53 pp). The same reasons apply to Nigeria that is negatively impacted by the mega-deals (-0.66%). As the country is large, it represents the largest losses in values (-302 million of 2007 USD).

Positive real income impacts are expected for some SSA countries (see results by country in Appendix E). The three main winners are Togo (+1.79%), Benin (+0.55%) and Zimbabwe (+0.36%). Even if they suffer from a negative impact on terms of trade, Togo and Benin strongly benefit from capital accumulation (+1.69% and +0.87% respectively) as well as allocation efficiency (+0.17% and +0.06% respectively). Zimbabwe is one of the countries that do not suffer from the implementation of mega-deals, as its initial share of intra-SSA and MENA trade is important.

³² The decomposition of the variations of real income is due to allocation efficiency, capital accumulation, land supply, terms of trade, and effects linked to a reduction of trade cost (NTMs). However, the last effect is null: SSA countries do not directly benefit from changes in NTMs in our central scenario.

5.2. Tariff revenues

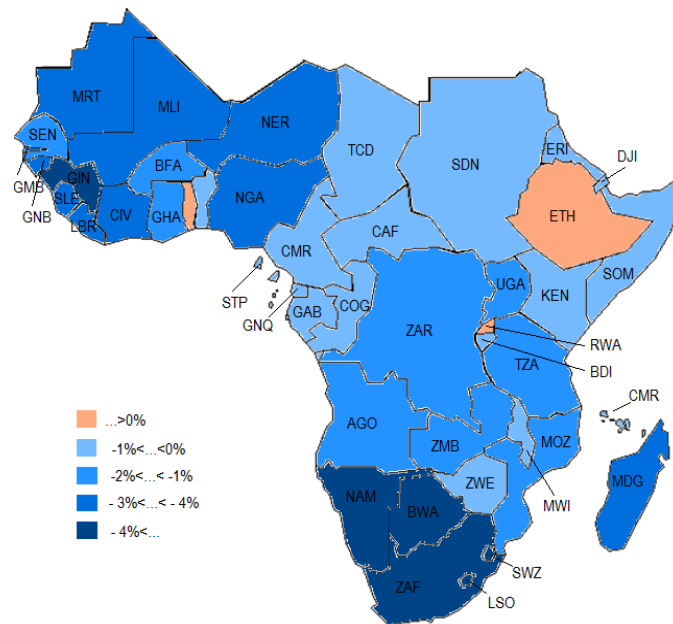
Since tariff revenues are important for SSA economies (see Fontagné et al., 2011), potential losses in our central scenario may be crucial. Indeed, exports from countries belonging to mega-deals might be redirected inside each agreement, to the detriment of SSA countries (trade diversion). This process may be disadvantageous for tariff revenues in Africa.

Our estimates reveal that on average, losses caused by the implementation of mega-deals would be low (-1.30%).³³ African countries facing the biggest losses of tariff revenues would be located in Southern Africa and West Africa (

Figure 3). The most affected countries/regions relatively to the mega-deals' implementation would be Guinea SACU (-4.46%), Guinea (-3.53%), Madagascar (-2.42%), the rest of Western African countries (-2.32%) and Cote d'Ivoire (-2.25%). For these countries, losses of tariff revenues arise mainly from a decrease of imports from ASEAN countries and other developed Asian countries.

Figure 3 - Tariff revenue losses in the “Mega Deals” scenario (%)

³³ African countries already lost a huge share of their tariff revenues in the baseline, through the implementation of the EPAs.



Source: Author's calculations, Mirage Model.

How strongly would greater openness within the African continent exacerbate tariff revenue losses caused by the implementation of the mega-deals?

Regarding the “Tripartite” scenario, as expected, the situation would be significantly worse in terms of tariff revenues for African countries directly involved in the agreement: Zimbabwe (-84 pp compared to the central scenario), Malawi (-72 pp), Zambia (-37 pp), Mozambique (-30 pp), the rest of Africa (-25 pp), Uganda (-20 pp) and to a lesser extent Ethiopia, Kenya, the rest of East Africa, Tanzania and Rwanda (see Appendix E).

Indeed, these countries import a lot from other African countries and would suffer from a significant loss of tariff revenues through the implementation of a continental free trade area. Zambia imports 59.5% from other sub-Saharan African countries, Zimbabwe 54.9%, the Democratic Republic of Congo 44.2%, Malawi 43%, Mozambique 31.9%, Rwanda 31.7% and Uganda 17.8%.

For countries that keep a significant share of their tariff revenues despite the additional implementation of a continental free trade area, mainly West African countries (Benin, Cote d’Ivoire, Senegal, and Togo), the liberalization process with Asia would cancel almost all their remaining tariff revenues.

5.3. Trade

This section explores the trade outcomes generated by our scenarios in SSA.³⁴ Changes reflect the economic adjustments following the further sectoral specialization induced by trade liberalization. Table 5 presents the variations (in billion of USD) of the exports from SSA countries to three aggregated zones: mega-deal countries, the African continent and the rest of world.

Table 5 – Variation of SSA countries’ exports, compared to the reference situation, 2025, billion of USD.

Importer	Sector	Reference	MD	Tripartite	SSA	Asia	South Am
Mega-deals	Primary	36.4	-1.1	-1.4	-2.4	9.4	-1.8
	Energy	352.0	-8.4	-8.6	-9.2	56.7	-78.5
	Secondary	153.2	-8.2	-11.4	-13.7	17.9	-12.8
	Tertiary	69.2	3.6	2.9	1.6	1.4	1.7
SSA	Primary	16.7	0.1	3.0	6.5	5.2	5.9
	Energy	24.4	0.2	0.7	2.6	-2.5	0.6
	Secondary	69.7	-0.5	16.2	33.1	13.7	32.6
	Tertiary	2.6	0.0	-0.0	-0.1	0.1	0.0
ROW	Primary	6.3	0.1	0.1	-0.1	6.9	0.3
	Energy	51.8	5.5	5.4	5.2	24.5	102.7
	Secondary	35.2	0.5	0.1	-0.8	14.0	2.5
	Tertiary	21.0	0.7	0.5	0.1	-0.1	0.1

Source: Authors’ calculations

At the aggregated level, exports from SSA countries would decline by 0.9% (around - 7.5 billion of USD) consecutively to the mega-deals’ enforcement. This result can be explained by the decrease of their exports intended to the mega-deal markets (-2.3%, i.e. - 14.2 billion of USD) and amplified by a shrinking of intra-SSA trade (-0.08%, i.e. -0.1 billion). The report of SSA exports to the remaining destinations (+6%, i.e. 6.8 billion) does not compensate the losses.

³⁴ Variations of global exports in each country, for each scenario, are provided in Appendix 4.

Industrials exports will be the most negatively affected (-3.2%, i.e. 8.2 billions of USD), followed by energy exports (-8.4 billion). Agricultural exports are reduced by 0.9 billion, resulting from an important loss of market shares on mega-deal markets (-1.1 billion). Exports of services benefit from general equilibrium effects: mega-deal countries increase their specialisation in the production of goods. This creates opportunities for outsiders in these sectors.

The picture is slightly more contrasted at the country level. Benin, Ethiopia, Rwanda and Togo see their total exports growing, mainly driven by the services sector. Other SSA countries' exports suffer from the conclusion of large scale trade agreements. In percentages, the biggest loser regarding exports is Guinea (-2.79%). However, in value, SACU sees its exports decreased by 2.57 billion of USD (-1.46%) while Nigeria ranks second with a loss of 2.05 billion of USD and Tanzania follows (-0.31 billion of USD equivalent to negative impact of -1.44%). Regarding SACU, the most affected exports are those to India (-9.5%, i.e. 1 billion), to ASEAN (-8.6%, i.e. 0.5 billion) and to China (-4.8%, i.e. 1 billion), and the most impacted sectors are metal (-1.5 billion of USD), chemistry (-0.7 billion) and equipment (-0.5 billion). These exports, originally destined to the EU, China and the USA, are replaced by those coming from mega-deal insiders (EU to the USA, Asian competition on Chinese market...). As for Nigeria's exports, the most affected destinations are India (-14.1%, -8.1 billion),³⁵ the Mercosur (-7.6%, -1.5 billion) and NAFTA (-0.6%, -0.5 billion). Tanzania experiences a much lower trade deviation. The most affected Tanzanian exports' destinations are ASEAN (0.2 billion, -18.5%), India (0.14 billion, -13.9%) and - China (0.13 billion, -4.9%).

Looking at the "Tripartite" scenario, trade losses on mega-deal markets are completely overcome by the boom of intra-regional trade. We observe a clear redirection of SSA exports to closer destinations, resulting from the removal of high initial protection between SSA countries. Consequently to this new geographical orientation, trade with mega-deal countries shrinks (-4.3 billion compared to our central scenario). SSA trade is also favoured by the deviation effect of such an agreement: both mega-deal countries and the rest of the world lose market shares in SSA countries as they face constant and high barriers to trade. Both agricultural and industrial exports are boosted by the conclusion of a tripartite agreement: exports of manufactured goods increase by 16.7 billion, witnessing the important initial share of this trade between SSA countries. The exporting agricultural sector find new opportunities internally (+ 3 billion, whereas exports in this sector only decline by 1.4 billion on mega-deal markets). At the country level, the negative effect of mega-deals on SSA countries' exports is more than compensated by the tripartite free trade agreement, with most countries

³⁵ Exclusively due to the fall of energy exports (-14.1%) coming from tougher ASEAN competition (RECP)

involved turning into positive variations of exports (Ethiopia, Kenya, Malawi, Mozambique, SACU, Uganda, Zimbabwe, etc.). The unfavourable situation remains almost unchanged for African countries that are excluded.

Expected trade gains are even greater with the realization of a CFTA. Except for some energy exports destined to the rest of the world, the increase of SSA exports is almost exclusively destined to the African continent. The gathering of SSA countries into a single free trade area reveals large export gains in all sectors but the tertiary one (+6.5 billion in agriculture; +33.1 billion in industry). Logically, trade between SSA countries in the latter slightly declines, in regards of the enhanced specialisation of SSA countries in goods. Lastly, industrial exports to the rest of the world decrease by 0.8 billion.

Even if largely stylized, the SSA-Asia scenario reveals some interesting features. The initial dependency of SSA exports to mega-deals countries can be seen here: integrating Asian and SSA markets lead to a formidable increase of exports to Asia, which contains large countries belonging to the mega-deal zone (China, India...), at the expense of the intra-SSA trade. The latter declines by 25.6 billion of USD between the Continental scenario and the Asia one. The decrease is very pronounced in the industrial sector whose variation of exports is halved between the two scenarios.

If SSA countries liberalize their trade with the South American block, intra-regional is as affected (- 3 billion, compared to the Continental scenario) as it is with Asian countries. Exports to the rest of the world increase, mainly due to energy exports from Nigeria. Exports to mega-deals decline, due to the mega-deals deviation effect and to the new export opportunities in South America. The openness of the latter destination remains, however, less profitable than trade integration with Asia (global SSA exports increase by 53.5 billion in South Am scenario whereas it would grow by 147.2 billion in the former scenario).

6. Sensitivity analyses

In this section, we test the robustness of our results to some choices we made in our central scenario ("*Mega deals*"). We only present results about welfare (Figure 4) which remains a synthetic indicator (Appendix F provides results at the SSA country level in SSA).

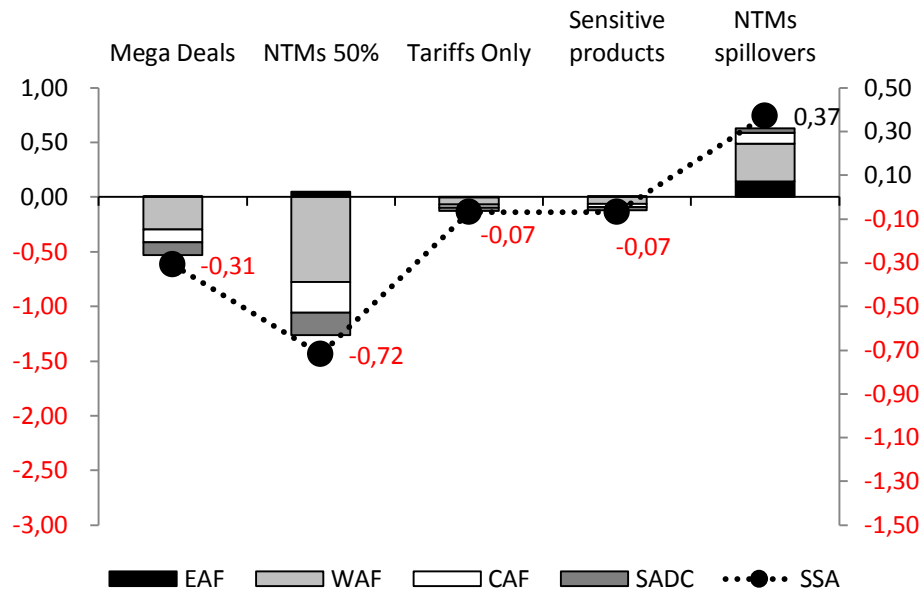
Our sensitivity analyses aim at quantifying the impact of alternative assumptions regarding trade policies implemented in our central scenario. To evaluate the consequences of changes in NTMs, we perform two additional scenarios: scenario 1 ("NTMs 50%") halves NTMs instead of reducing them by 25% and scenario 2 ("Tariffs Only") only suppresses tariff barriers. To disentangle the

potential effects of sensitive products (products that are excluded from the liberalization), scenario 3 (“Sensitive products”) starts from scenario 2 and considers the possibility, for each government, to use flexibilities when concluding a RTA, by excluding a list of products of tariff dismantlement. To define products as sensitive, we use the “90% of liberalized trade”³⁶ criteria as a definition of the “substantially all trade” used by WTO to authorize RTAs between countries. To do so, we used a very simple method: excluding freely traded products, we sort bilateral trade at the HS6 product level by descending order. Then we exclude all HS6 lines from liberalization (their tariffs are kept constant) until the cumulative trade matches 10% of the total trade (consequently trade liberalization is applied on 90% of initial bilateral trade). Scenario 4 “NTMs spillovers” makes a simple assumption of spillovers effects of the creation of large “unified” markets within the mega-deals. Indeed, a greater compatibility regarding standards or norms between countries signing mega-deals may involve a greater facility (less costly) for third countries to export to those markets. Thus, to evaluate the consequences of such externality, we simply assume an ad hoc reduction of 5% of NTMs in countries taking part in the mega-deals vis-à-vis the rest of the world, for all products.³⁷

³⁶ We follow Fontagné et al. (2010) : “The ‘substantially all trade’ quantitative requirement is achieved here, following EU guidelines, considering 90% of bilateral trade in volume or 90% of tariff lines in the harmonized system (HS).”

³⁷ Aichele et al. (2014) clearly underlined that regulatory cooperation in the TTIP can or cannot be extended to third countries. This will depends on the final design of the agreement.

Figure 4 - Welfare variations, in 2025.



Source: Author's calculations, Mirage Model.

Note: The dash line represents the variation for all SSA countries in each scenario (% , Right hand side). The bars give the volume, by SSA regions, in 2007 US dollars (billion, Left hand side).

Sensitivity analyses in trade policies (scenarios 1 to 3) also evidence negative impacts for SSA countries in terms of welfare.³⁸

Real income of SSA countries is likely to decrease a lot more when the removal of NTMs becomes very ambitious (-0.72%, scenario 1). The losses are more than double in this scenario compared to the “Mega Deals” scenario. Given the toughness of the mega-deals’ negotiations (e.g. GMOs, hormones beef in the TTIP, rice or auto parts³⁹ for Japan in the TTP), an ambitious cut in NTMs seems to be out of reach. However, this sensitivity analysis emphasizes the potential negative

³⁸ Given the high specialization of a number of SSA countries in the energy sector, we run a simulation that excludes this sector from the negotiations of the mega-deals i.e. we keep constant tariffs and NTMs in those agreements. The overall impact remains negative (real SSA income decreases by 0.11%), but consequences are more limited. We choose not to present those results in Figure 5.

³⁹ See: <http://insidetrade.com/Inside-US-Trade/Inside-U.S.-Trade-10/03/2014/us-auto-parts-tariff-emerges-as-flashpoint-in-us-japan-tpp-talks/menu-id-710.html>

consequences of a very ambitious integration process between the main destination markets of sub-Saharan African exports. As an example, part of this additional integration in terms of NTMs can be thought as the 100% scanning between the EU and the USA in the TTIP negotiations (see Fontagné et al., 2013).

If the mega-deals only include provisions about tariffs (full removal), the negative impact on SSA countries would be limited (-0.075%, scenario 2). This scenario can be seen as a lower bound of the negative consequences of mega-deals on SSA countries. The rank of losses by large SSA regions is preserved, but the magnitude is weaker. Besides, countries involved in the mega-deals have much less to gain when negotiating only on tariff protection explaining why SSA countries loss less: less competition on the mega-deals' markets is translated into a lower trade diversion and more favorable terms of trade.

When focusing only on tariffs, the inclusion of sensitive products in the mega-deals does not change the overall picture. However, the consequences for the aggregated SSA welfare (that goes down by 0.073%) are slightly more preferable than in the scenario 2 (-0.075%). Thanks to the products excluded from the negotiation, the trade diversion is less important in that case, allowing SSA countries to still benefit from their preferential access on some agricultural products.

Assuming potential spillovers on all products for third parties leads to positive results for SSA countries (+0.37%). By acting directly on production costs, the externality provides an additional effect on the real income of exporting countries. Indeed, if we assume that relaxing this inefficiency is not going to reduce factor use, the released factors will help to produce other goods and services. In a dynamic perspective, this also allows a greater accumulation of capital, so the gain is growing beyond the direct cost constraints that were removed. This is particularly the case for Nigeria (+0.58% of real income). We also perform a scenario in which NTMs against third countries are only cut by 1%: results on real income are still negative (-0.16% for SSA countries). Thus, becoming a standard taker is not necessarily good for SSA countries. As rough as they can be, those results show the necessity, for SSA countries, to follow up those large trade negotiations (for example on the modification of rules of origin).

7. Conclusion

An unprecedented wave of bilateral trade agreements involving major developed countries/areas (called mega-deals), from which sub-Saharan African countries are excluded, is being negotiated. Because large markets of Asia, North America and Europe remain the major destinations of African

exports, this new integration process represents a major challenge for SSA economies. Using a CGEM, our results show that mega-deals, should they be implemented, would impact not only the signatory countries, but the entire world. Moreover, SSA countries would be the first losers.

The impact of each of these agreements depends on the participation of countries that are preferred destinations for African exports (Europe, China, United States), and also on the erosion of preferences linked to the increased competition of involved developing countries (trade diversion, e.g. with the RECP). It is therefore appropriate for SSA countries to follow-up the negotiations and pay attention to decisions about mutual recognition of products or to the rules of origin potentially applied in these agreements. Indeed, unlike negotiations on tariffs, harmonization of non-tariff measures could enable them to benefit from facilities to export to previously less accessible destinations.

Moreover, an ambitious regional integration within SSA countries seems to be the key to counterbalance the negative consequences of mega-deals. This is already underway (African regional blocs, the Tripartite agreement, the Continental Free Trade Area), but it must be necessarily considered in an extended framework to limit trade diversion effects caused by the mega-deals.

Finally, the multilateralism card can also be another option: by relaunching the WTO machine with taking credible commitments, SSA countries could limit their exclusion from the world trade.

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Appendix A - Glossary

ACP	Africa Caribbean and Pacific
AEC	African Economic Community
AGOA	African Growth and Opportunity Act
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of South East Asian Nations
CES	Constant Elasticity of Substitution
CGEM	Computable General Equilibrium Model
DDA	Doha Development Agenda
EAC	East African Community
EBA	Everything But Arms
ECOWAS	Economic Community Of West African States
EFTA	<i>European Free Trade Association</i>
EPA	Economic Partnership Agreements
FTA	Free Trade Agreement
GSP	Generalised System of Preferences
GTAP	GlobalTrade Analysis
ICBT	Informal Cross Border Trade
MD	Mega Deals
MFN	Most Favored Nation
MIRAGE	Modelling International Relationships in Applied General Equilibrium
NTM	Non-Tariff Measures
RCEP	Regional Comprehensive Economic Partnership
REC	Regional Economic Community
RTA	Regional Trade Agreement
SACU	Southern African Custom Union
SADC	Southern African Development Community
SDT	Special and Differentiated Treatment
SSA	Sub-Saharan Africa
TFP	Total Factor Productivity
TTIP	Transatlantic Trade and Investment Partnership
TTP	Trans-Pacific Partnership
WTO	World Trade Organization

Appendix B - Countries /country groups included in the model and regional classification

Geographical aggregation	Code	Countries/country groups included
Asia		
Oceania	Oceania	Australia (AUS), New Zealand (NZL), Rest of Oceania (XOC)
China and Hong-Kong	ChinaHK	China (CHN), Hong-Kong (HKG)
Japan	Japan	Japan (JPN)
Developed Asian countries	Dvypd_Asia	Republic of Korea (KOR), Taiwan (TWN)
Rest of Asian developing countries	RestDvypgA	Mongolia (MNG), Rest of East Asia (XEA), Bangladesh (BGD), Nepal (NPL), Pakistan (PAK), Sri Lanka (LKA), Rest of south Asia (XSA), Rest of North America (XNA), Rest of the world (XTW)
ASEAN	ASEAN	Cambodia (KHM), Indonesia (IDN), Lao People's Democratic Republic (LAO), Malaysia (MYS), Philippines (PHL), Singapore (SGP), Thailand (THA), Viet Nam (VNM), Rest of Southeast Asia (XSE)
India	India	India (IND)
North America		
Nafta	Nafta	Canada (CAN), United-States of America (USA), Mexico (MEX)
South America		
Mercosur	Mercosur	Argentina (ARG), Brazil (BRA), Chile (CHL), Paraguay (PRY), Uruguay (URY)
Latin American countries	LAC	Plurinational Republic of Bolivia (BOL), Colombia (COL), Ecuador (ECU), Peru (PER), Venezuela (VEN), Rest of South America (XSM), Costa Rica (CRI), Guatemala (GTM), Honduras (HND), Nicaragua (NIC), Panama (PAN), El Salvador (SLV), Rest of Central America (XCA), Caribbean (XCB)
Europe		
European Union	EU27	Austria (AUT), Belgium (BEL), Cyprus (CYP), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), Ireland (IRL), Italy (ITA), Latvia (LVA), Lithuania (LTU), Luxemburg (LUX), Malta (MLT), Netherlands (NLD), Poland (POL), Portugal (PRT), Slovakia (SVK), Slovenia (SVN), Spain (ESP), Sweden (SWE), United-Kingdom (GBR)
EFTA	EFTA	Switzerland (CHE), Norway (NOR), Rest of EFTA

(XEF)		
Rus		
Other European countries	OtherEur	Albania (ALB), Belarus (BLR), Croatia (HRV), Russian Federation (RUS), Ukraine (UKR), Rest of Eastern Europe (XEE), Rest of Europe (XER), Kazakhstan (KAZ), Kyrgyz Republic (KGZ), Rest of Soviet Former Union (XSU), Armenia (ARM), Azerbaijan (AZE); Georgia (GEO), Turkey (TUR)
North Africa and Middle East		
Middle East countries	MiddleEast	Bahrain (BHR), Islamic Republic of Iran (IRN), Israel (ISR), Kuwait (KWT), Oman (OMN), Qatar (QAT), Saudi Arabia (SAU), United Arab Emirates (ARE), Rest of Western Asia (XWS)
North African countries	NorthAfr	Egypt (EGY), Morocco (MAR), Tunisia (TUN), Rest of North Africa (XNF)
Africa		
Benin	Benin	Benin (BEN)
Burkina Faso	Burkina	Burkina Faso (BFA)
Cameroon	Cameroon	Cameroon (CMR)
Cote d'Ivoire	CoteIV	Cote d'Ivoire (CIV)
Ghana	Ghana	Ghana (GHA)
Guinea	Guinea	Guinea (GIN)
Nigeria	Nigeria	Nigeria (NGA)
Senegal	Senegal	Senegal (SEN)
Togo	Togo	Togo (TGO)
Rest of Western Africa	Rest_Waf (XWF)	Cape Verde (CPV), the Gambia (GMB), Liberia (LBR), Mali (MLI), Mauritania (MRT), Niger (NER), Guinea Bissau (GNB), Sierra Leone (SLE)
Central Africa	Central_Af (XCF)	Central African Republic (CAF), Gabon (GAB), Sao Tome & Principe (STP), Chad (TCD), Republic of Congo (COG), Equatorial Guinea (GNQ)
Ethiopia	Ethiopia	Ethiopia (ETH)
Kenya	Kenya	Kenya (KEN)
Madagascar	Madagascar	Madagascar (MDG)
Malawi	Malawi	Malawi (MWI)
Mauritius	Mauritius	Mauritius (MUS)
Mozambique	Mozambique	Mozambique (MOZ)
Rwanda	Rwanda	Rwanda (RWA)

United Republic of Tanzania	Tanzania	United Republic of Tanzania (TZA)
Uganda	Uganda	Uganda (UGA)
Zambia	Zambia	Zambia (ZMB)
Zimbabwe	Zimbabwe	Zimbabwe (ZWE)
Rest of Eastern African countries	Rest_Eaf (XEC)	Fm. Sudan (SDN), Eritrea (ERI), Djibouti (DJI), Somalia (SOM), Burundi (BDI), Comoros (COM)
SACU	SACU	Botswana (BWA), Lesotho (LSO), Namibia (NAM), South Africa (ZAF), Swaziland (SWZ)
South Central Africa	Rest_Af (XAC)	Angola (AGO), Democratic Republic of Congo (ZAR)

Appendix C - Sectoral aggregation used in the model

Mirage sector	GTAP Code	GTAP label
Primary		
Cereals	pdrr	Paddy rice
	wht	Wheat
	gro	Cereal grains nec
Vegagr	v f	Vegetables. fruit. nuts
	osd	Oil seeds
Sugarcane	c b	Sugar cane. sugar beet
Fibers	pfb	Plant-based fibers
Cropsnec	ocr	Crops nec
AnimAgr	ctl	Cattle.sheep.goats.horses
	oap	Animal products nec
	rmk	Raw milk
	wol	Wool. silk-worm cocoons
Forestry	frs	Forestry
Fishing	fsh	Fishing
Meat	cmt	Meat: cattle.sheep.goats.horse
Meatprod	omt	Meat products nec
Food	vol	Vegetable oils and fats
	mil	Dairy products
	pcr	Processed rice
	sgrr	Sugar
	ofd	Food products nec
	b t	Beverages and tobacco products
Energy		
PrimEne	coa	Coal
	oil	Oil
	gas	Gas
	elv	Electricity

	gdt	Gas manufacture, distribution
Secondary		
Minerals	omn	Minerals nec
Clothing	tex	Textiles
	wap	Wearing apparel
	lea	Leather products
OthManuf	lum	Wood products
	ppp	Paper products, publishing
	omf	Manufactures nec
SecEner	p_c	Petroleum, coal products
Chemistry	crp	Chemical, rubber, plastic prods
Metals	nmm	Mineral products nec
	i_s	Ferrous metals
	nfm	Metals nec
Vehicles	mvh	Motor vehicles and parts
	otn	Transport equipment nec
Electronic	ele	Electronic equipment
Equipment	ome	Machinery and equipment nec

Mirage sector	GTAP Code	GTAP label
Tertiary		
	wtr	Water
	cns	Construction
	trd	Trade
	cmn	Communication
Services	ofi	Financial services nec
	isr	Insurance
	obs	Business services nec
	ros	Recreation and other services
	osg	PubAdmin/Defence/Health/Educat
	dwe	Dwellings
Transport	otp	Transport nec
	wtp	Sea transport
	atp	Air transport

Appendix D – The Mirage Model

As a complement to the short description given in the main text, the main elements of the MIRAGE model's structure are sketched below. The latest version of the MIRAGE model, used here, is

documented in Fontagné et al. (2013), the original model being fully described in Bhir et al. (2002) and Decreux and Valin (2007).

Supply Side

On the supply side, each sector in MIRAGE is modeled as a representative firm, which combines value-added and intermediate consumption in fixed shares. Value-added is a CES bundle of imperfectly substitutable primary factors (capital, skilled and unskilled labor, land and natural resources). Firms' demand for production factors is organized as a CES aggregation of land, natural resources, unskilled labor, and a bundle of the remaining factors. This bundle is a nested CES aggregate of skilled labor and capital (that are considered as relatively more complementary).

MIRAGE assumes full employment of primary factors, whose growth rates are set exogenously, based on the macro projections on a yearly step, as detailed below. Population, participation in the labor market and human capital evolve in each country (or region of the world economy) according to the demographics embedded in the macro projections. This determines the labor force as well as its skill composition (skilled/unskilled). Skilled and unskilled labor is perfectly mobile across sectors, but immobile between countries. Natural resources are sector specific, while land is mobile between agricultural sectors. Natural resources for the mining sector and land for agricultural sectors are set at their 2007 levels: prices adjust demand to this fixed supply. In the baseline, natural resources for fossil fuel production sectors adjust to match the exogenous price target that is imposed (from the International Energy Agency, 2012) for coal, oil and gas, and according to the energy demand projected by the model. By contrast, in the simulations, changes in demand for fossil energy sources influence their price, while natural resources are fixed at their baseline level.

Installed capital is assumed to be immobile (sector-specific), while investments are allocated across sectors according to their rates of return. The overall stock of capital evolves by combining capital formation and a constant depreciation rate of capital of 6% that is the same as in the long-term growth models. Gross investment is determined by the combination of saving (the saving rate from the growth model, applied to the national income) and the current account. Finally, while total investment is saving-driven, its allocation is determined by the rate of return on investment in the various activities. For simplicity, and because we lack reliable data on foreign direct investment at country of origin, host and sectoral levels, international capital flows only appear through the current account imbalances, and are not explicitly modeled.

Demand Side

On the demand side, a representative consumer from each country/region maximizes instantaneous utility under a budget constraint and saves a part of its income, determined by saving rates projected in our first-step exercise. Expenditure is allocated to commodities and services according to a LES-CES (Linear Expenditure System – Constant Elasticity of Substitution) function. This implies that, above a minimum consumption of goods produced by each sector, consumption choices among goods produced by different sectors are made according to a CES function. This representation of preferences is well suited to our purpose as it is flexible enough to deal with countries at different levels of development.

Within each sector, goods are differentiated by their origin. A nested CES function allows for a particular status for domestic products according to the usual Armington hypothesis (Armington, 1969): consumers' and firms' choices are biased towards domestic production, and therefore domestic and foreign goods are imperfectly substitutable, using a CES specification. We use Armington elasticities provided by the GTAP database (Global Trade Analysis Project) and estimated by Hertel et al. (2007). Total demand is built from final consumption, intermediate consumption and investment in capital goods.

Dynamics

Efficiency in the use of primary factors and intermediate inputs is based on the combination of four mechanisms. First, agricultural productivity is projected separately, as detailed in Fontagné et al. (2013). Second, energy efficiency computed from the aggregate growth models is imposed on MIRAGE. Third, a 2 percentage point growth difference between TFP in manufactures and services is assumed (as in van den Mensbrugghe, 2005). Fourth, given the agricultural productivity and the relation between productivity in manufacturing and services, MIRAGE recovers endogenously country-specific TFP from the exogenous GDP and production factors. Notice that TFP thus recovered from the baseline projections is subsequently set as exogenous in the alternative scenarios. Therefore, GDP becomes endogenous in such scenarios.

Dynamics in MIRAGE is implemented in a sequentially recursive way. That is, the equilibrium can be solved successively for each period, given the exogenous variations of GDP, savings, current accounts, active population and skill level coming from the growth models, as described above. Simulations extend up to 2025. Finally, MIRAGE is calibrated on the GTAP dataset version 8.1, with 2007 as a base year.

Appendix E - Results detailed by country (situation in 2025)⁴⁰

		Mega Deals	Tripartite	SS A	SSA-Asia	SSA- Southam
Benin	GDP (vol.)	1.30	1.30	1.52	5.16	1.63
	Terms of trade	-1.63	-1.63	-0.51	-5.18	-0.67
	Exports (vol)	0.03	0.01	6.63	25.58	7.03
	Tariff revenue	-0.47	-0.49	-8.44	-90.57	-10.35
	Welfare	0.55	0.55	0.86	-0.88	0.74
Burkina Faso	GDP (vol.)	-0.40	-0.40	0.23	-1.31	0.19
	Terms of trade	0.24	-0.25	-0.24	2.24	-0.36
	Exports (vol)	-0.47	-0.48	6.92	4.47	7.15
	Tariff revenue	-1.63	-1.71	-72.87	-82.71	-77.63
	Welfare	-0.30	-0.30	0.10	-0.04	0.05
Cameroon	GDP (vol.)	-0.02	-0.02	0.10	-0.07	0.11
	Terms of trade	0.23	0.22	-0.46	-1.01	-0.51
	Exports (vol)	-0.66	-0.71	7.46	9.37	6.14
	Tariff revenue	-0.13	-0.23	-32.30	-86.96	-35.69
	Welfare	-0.03	-0.04	-0.07	-0.36	-0.10
Central Africa	GDP (vol.)	-0.18	-0.18	0.13	4.65	1.09
	Terms of trade	-0.40	-0.41	0.18	0.43	-0.18
	Exports (vol)	-0.42	0.42	4.50	19.66	7.94
	Tariff revenue	-0.96	-1.02	-60.61	-78.25	-65.07
	Welfare	-0.29	-0.30	0.62	3.71	1.05
Cote d'Ivoire	GDP (vol.)	-0.07	-0.07	0.29	-0.11	0.30
	Terms of trade	-0.62	-0.63	-0.14	0.50	-0.14
	Exports (vol)	-0.82	-0.89	3.84	3.27	2.50
	Tariff revenue	-2.25	-2.36	-13.52	-78.70	-20.00
	Welfare	-0.29	-0.30	0.14	0.14	0.11
Ethiopia	GDP (vol.)	0.34	0.90	0.94	2.10	1.16
	Terms of trade	-0.07	0.85	0.93	9.05	0.87
	Exports (vol)	0.52	4.30	4.51	22.47	5.85
	Tariff revenue	0.71	-15.30	-14.79	-83.43	-17.23
	Welfare	0.31	0.72	0.76	3.67	0.79
Ghana	GDP (vol.)	0.13	0.15	0.52	-0.03	0.69
	Terms of trade	-0.25	-0.19	0.50	0.47	0.17
	Exports (vol)	-0.91	-0.71	3.84	7.36	4.65
	Tariff revenue	-1.43	-1.37	-15.00	-75.95	-27.02
	Welfare	0.14	0.16	0.46	0.48	0.40
Guinea	GDP (vol.)	-0.36	-0.37	0.18	-0.63	0.26

⁴⁰ For each indicator we present the loss in percentage.

	Terms of trade	-0.52	-0.52	-0.61	-0.69	-0.65
	Exports (vol)	-2.79	-2.83	2.53	8.04	3.69
	Tariff revenue	-3.53	-3.62	-26.29	-88.36	-29.37
	Welfare	-0.39	-0.40	-0.18	-0.39	-0.11
		Mega Deals	Tripartite	SSA	SSA+Asia	SSA+Southam
Kenya	GDP (vol.)	0.06	0.26	0.45	-0.02	0.56
	Terms of trade	0.24	-0.13	0.30	2.39	-0.01
	Exports (vol)	-1.00	1.30	3.52	10.46	4.57
	Tariff revenue	-0.33	-13.74	-13.01	-85.33	-17.31
	Welfare	0.23	0.19	0.44	0.99	0.37
Madagascar	GDP (vol.)	-0.14	-0.12	-0.11	1.57	0.17
	Terms of trade	-2.50	-2.47	-2.43	4.62	-2.47
	Exports (vol)	-0.40	0.56	0.74	16.53	2.00
	Tariff revenue	-2.42	-8.28	-8.32	-91.58	-10.68
	Welfare	-0.85	-0.80	-0.77	3.34	-0.62
Malawi	GDP (vol.)	0.00	0.37	0.41	1.73	1.10
	Terms of trade	-0.21	2.22	2.21	10.70	2.30
	Exports (vol)	-0.30	7.13	7.09	11.43	8.88
	Tariff revenue	-0.36	-72.00	-71.63	-93.55	-72.16
	Welfare	0.09	1.51	1.52	6.10	1.88
Mauritius	GDP (vol.)	-0.24	-0.06	0.02	3.16	0.55
	Terms of trade	0.21	0.32	0.35	2.85	0.40
	Exports (vol)	-0.42	0.32	0.58	12.72	1.55
	Tariff revenue	-1.27	-6.41	-6.26	-97.09	-7.43
	Welfare	-0.03	0.18	0.24	3.95	0.55
Mozambique	GDP (vol.)	-0.04	1.24	1.23	1.72	1.44
	Terms of trade	-0.22	1.12	1.10	2.58	1.31
	Exports (vol)	-0.34	3.30	3.21	5.56	3.70
	Tariff revenue	-1.54	-32.10	-31.52	-85.33	-37.43
	Welfare	-0.18	0.94	0.93	1.94	1.13
Nigeria	GDP (vol.)	-0.63	-0.63	-0.53	7.15	3.04
	Terms of trade	-0.73	-0.74	-0.50	2.60	-0.76
	Exports (vol)	-0.87	-0.88	-0.20	17.35	7.18
	Tariff revenue	-2.13	-2.18	-15.64	-68.73	-24.04
	Welfare	-0.66	-0.66	-0.54	3.83	0.86
Rest of Africa	GDP (vol.)	-1.01	-0.97	-0.89	10.77	2.89
	Terms of trade	-0.44	0.02	0.01	1.50	-0.08
	Exports (vol)	-0.71	0.04	0.35	19.10	6.18
	Tariff revenue	-1.90	-27.25	-29.34	-72.32	-48.29
	Welfare	-1.14	-0.62	-0.57	9.00	1.89
Rest of East	GDP (vol.)	0.12	0.68	0.97	2.44	1.23

Africa	Terms of trade	-0.38	-0.67	-0.71	0.71	-0.95
	Exports (vol)	-0.69	4.06	8.11	51.54	11.25
	Tariff revenue	-0.61	-13.89	-12.75	-85.31	-14.81
	Welfare	0.10	0.54	0.68	2.89	0.80
Rest of West Africa	GDP (vol.)	0.34	0.36	0.65	6.21	1.01
	Terms of trade	-1.18	-1.17	-0.78	-0.18	-0.82
	Exports (vol)	-0.97	-0.87	2.94	20.52	4.29
	Tariff revenue	-2.32	-2.27	-19.74	-63.51	-24.07
	Welfare	-0.28	-0.26	0.29	5.51	0.49
		Mega Deals	Tripartite	SSA	SSA+Asia	SSA+Southam
Rwanda	GDP (vol.)	0.09	0.15	0.22	-0.12	0.25
	Terms of trade	-0.03	-0.18	-0.28	0.85	-0.30
	Exports (vol)	0.18	0.47	0.90	2.98	1.09
	Tariff revenue	0.02	-10.40	-13.22	-84.54	-13.95
	Welfare	0.10	0.08	0.08	-0.11	0.08
SACU	GDP (vol.)	-0.16	0.35	0.56	1.47	0.71
	Terms of trade	-0.39	-0.20	-0.02	0.31	-0.18
	Exports (vol)	-1.46	2.23	3.77	17.48	5.32
	Tariff revenue	-4.46	-1.29	0.39	-81.20	-12.22
	Welfare	-0.22	0.22	0.43	1.18	0.43
Senegal	GDP (vol.)	0.32	0.32	2.30	4.43	2.63
	Terms of trade	-0.31	-0.32	1.30	2.09	1.29
	Exports (vol)	-0.56	-0.59	13.54	25.31	15.29
	Tariff revenue	-1.59	-1.64	-2.83	-74.37	-22.20
	Welfare	0.25	0.25	2.20	4.16	2.45
Tanzania	GDP (vol.)	-0.15	0.78	1.04	4.38	1.41
	Terms of trade	-0.69	-0.84	-0.53	4.85	-0.74
	Exports (vol)	-1.44	3.53	4.60	26.07	6.47
	Tariff revenue	-1.43	-12.46	-10.94	-90.00	-16.76
	Welfare	-0.22	0.30	0.58	4.25	0.68
Togo	GDP (vol.)	2.03	2.04	2.38	0.95	2.83
	Terms of trade	-0.14	-0.14	3.30	12.44	3.07
	Exports (vol)	1.35	1.37	16.58	9.71	17.70
	Tariff revenue	0.92	0.92	-0.97	-92.18	-2.76
	Welfare	1.79	1.79	4.86	13.12	4.84
Uganda	GDP (vol.)	-1.20	1.12	2.92	5.05	3.42
	Terms of trade	0.02	0.19	0.14	5.59	0.06
	Exports (vol)	-0.64	7.69	12.46	21.97	13.74
	Tariff revenue	-1.65	-21.79	-17.59	-87.69	-18.98
	Welfare	-0.88	0.28	1.18	4.29	1.45
Zambia	GDP (vol.)	-0.23	0.24	0.96	1.90	1.12

	Terms of trade	-0.50	1.95	2.42	4.57	2.55
	Exports (vol)	-1.36	4.17	7.32	16.69	8.03
	Tariff revenue	-1.76	-38.38	-53.73	-95.51	-54.91
	Welfare	-0.20	0.29	0.58	1.62	0.64
Zimbabwe	GDP (vol.)	0.07	8.01	8.31	13.42	8.46
	Terms of trade	-0.00	-0.90	-0.89	3.99	-0.98
	Exports (vol)	-0.37	18.62	19.40	27.65	19.52
	Tariff revenue	-0.05	-83.74	-83.53	-95.24	-83.86
	Welfare	0.36	3.91	4.05	13.93	4.04
Africa	GDP (vol.)	-0.28	0.04	0.29	4.07	1.65
	Exports (vol)	-0.90	0.91	2.77	18.02	6.51
	Welfare	-0.31	-0.04	0.20	2.90	0.75

Appendix F – Results of sensitivity analysis (welfare variation, %, 2025)

Country / Region	Mega Deals	NTMs 50%	Only Tariffs	Sensitive Products	NTMs Spillover
Benin	0.55	1.57	0.05	0.05	0.71
Burkina	-0.30	-0.73	-0.08	-0.09	-0.52
Cameroon	-0.03	-0.10	0.01	0.01	-0.07
Central Africa	-0.29	-0.69	-0.08	-0.08	0.48
Cote d'Ivoire	-0.29	-0.42	-0.16	-0.15	-0.44
Ethiopia	0.31	0.84	0.08	0.08	0.94
Ghana	0.14	0.48	0.02	0.02	0.13
Guinea	-0.39	-1.12	-0.07	-0.06	-0.88
Kenya	0.23	0.70	0.03	0.03	0.24
Madagascar	-0.85	-0.95	-0.74	-0.52	-0.37
Malawi	0.09	0.13	0.07	0.06	1.08
Mauritius	-0.03	-0.23	0.17	0.16	1.33
Mozambique	-0.18	-0.55	0.04	0.04	0.44
Nigeria	-0.66	-1.80	-0.14	-0.13	0.58
Rest of Eastern Africa	0.10	0.15	0.08	0.08	0.59
Rest of Western Africa	-0.28	-0.24	-0.09	-0.06	0.93
Rwanda	0.10	0.21	0.03	0.03	-0.02
SACU	-0.22	-0.39	-0.05	-0.06	-0.02
Senegal	0.25	0.75	0.07	0.07	1.40
South Central Africa	-1.14	-2.76	-0.34	-0.32	0.87
Tanzania	-0.22	-0.20	-0.13	-0.12	0.57
Togo	1.79	3.28	0.95	0.93	1.89
Uganda	-0.88	-1.98	-0.36	-0.35	-0.13
Zambia	-0.20	-0.37	-0.07	-0.07	0.15
Zimbabwe	0.36	0.91	0.20	0.09	1.73
Total of SSA Countries	-0.31	-0.72	-0.075	-0.073	0.37

Appendix G – Welfare variations, regional level, all scenarios (% , 2025)

Region	Main Scenarios					Sensitivity analysis			
	Mega Deals	Tripartite	SSA	SSA-Asia	SSA-South America	NTMs50	Only Tariffs	Sensitive Products	Spillovers
Asia	1.86	1.86	1.86	1.63	1.84	4.57	0.19	0.18	2.14
CIS Countries	-0.11	-0.11	-0.11	-0.50	-0.10	-0.25	-0.02	-0.02	0.98
Europe	0.30	0.29	0.29	0.15	0.28	0.85	0.00	0.01	0.85
MENA	-0.27	-0.28	-0.28	-0.79	-0.24	-0.99	0.02	0.02	0.49
North America	0.88	0.88	0.88	0.77	0.88	2.26	0.02	0.02	0.99
South America	1.25	1.25	1.25	0.99	1.42	3.67	-0.05	-0.04	1.55
SSA Countries	-0.31	-0.04	0.20	2.90	0.75	-0.72	-0.07	-0.07	0.37
World Welfare	1.10	1.11	1.11	0.98	1.13	2.53	0.23	0.23	1.48

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