Trade policies and agriculture in Sub-Saharan Africa Comparative analysis in a Computable General Equilibrium framework

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Foreword

For the last three years, I have undertaken this research as part of my activities at the Foundation for World Agriculture and Rurality (FARM) who wished to support academic-grounded reflections on trade and agricultural policies in Sub-Saharan Africa (SSA).

As a think-tank promoting sustainable agriculture growth for the economic development of developing countries, FARM supports the production and dissemination of academic research to the extent that it generates debates on topical issues of interest to organization of farmers, public authorities, cooperation agencies and international institutions.

Keeping this aspect in mind explains why this research is grounded in the political debates surrounding the choices of economic policies for agricultural development in SSA. I hope it also makes clearer the underlying reasons behind some of the major choices of the dissertation such as the interest in computable general equilibrium analysis as one of the most used economic tool for ex-ante policy evaluation, the concern on making the assumptions and the results of economic research better understandable to directly support the governments in their own analysis and choices, and the focus on trade policies as a topical issue subject to much debate and divergence among the actors of international development and among academic researchers.

Indeed, while being mindful of the necessity of 'policy coherence for development'[1] and the ownership of the overseas development assistance provided by richer countries and financial assistance programs, it seemed equally as important to me to treat the question of the definition of policies from the point of view of governments of countries from SSA. This concern justifies the comparative approach adopted to look at a wide range of the possible trade policy agreements they are negotiating currently, but it also explains the consideration for the coherence with other development stakes mainly related to agricultural development.

For instance, in a context of stagnant multilateral trade negotiations in the Doha Round and renewed regional policy initiatives in Africa, shedding light on some of the advantages and disadvantages of regional integration for countries in SSA thanks to the same models that were used to analyze the gains and the losses of multilateral integration for those countries

[1] which according to the OECD means "ensuring to the least that a government's development policies toward developing countries are not undermined by other policies of that government, and if feasible that these other policies support development objectives".

seemed appropriate. Further depth to the analysis was brought by looking at the impacts of trade policies on production and trade of value-added agricultural products.

Similarly, considering the ongoing debates on the justification of using aid to finance direct public intervention in agriculture rather than focusing on trade policy instruments, it appeared interesting to apply the same framework that is used to assess the poverty reducing effects of multilateral trade liberalization on poverty within specific countries, to emphasize the difference in the distributional effects on sectoral growth and poverty that trade and agricultural policies can bring to Malawi.

Far from claiming to solve the question of which public policy is the most adequate to answer the challenges of agricultural development for poverty reduction and food security in Sub-Saharan Africa, this dissertation aims at throwing light on the real underlying debates on trade and agricultural policies for SSA, showing how trade policies are under some conditions complementary to domestic development policies, stressing the usefulness and limits of economic modeling, and putting forward some research area that could be explored next.

Finally, the views expressed in this dissertation are my own and do not necessary reflect those of any of the organizations or people cited.

Acknowledgments

The idea of doing a PhD was first suggested to me in 2006 by the wonderful Edgard Pisani who had come to Minneapolis to receive an award from the Institute for Agriculture and Trade Policy (IATP) where I was interning as part of my year abroad at the AgroParisTech. I will keep an unforgettable memory of our walk in the Minnesotan woods where he gave me advices, the main one being not to rush into humanitarian jobs (as I had told him I was tempted to), but rather complete my training in agronomy with other fields such as economics who would surely be of use if I really wanted to work on agricultural policies.

The first person who made this PhD possible is Patrick Messerlin when he accepted me in his Masters in Economics of international relations at Sciences Po. He was well aware that my previous graduate degree meant that I had not been taught to look favorably at trade liberalization. Nevertheless he even encouraged the PhD, accepting to be the supervisor until a specialist of the subject of agricultural trade and African countries would take over. I wish to thank him for his open-mindedness. I am also immensely grateful to Barbara Bender for all the help she provided right until the end…

When Antoine Bouët accepted to supervise the PhD, he made it a personal challenge that I would be convinced of the usefulness of computable general equilibrium (which he succeeded to do, as the general conclusion reveals). I wish to thank him for the very careful reviews of the numerous versions of the different parts of this dissertation he has received in the last three years.

The initiator and main supporter of this PhD is Bernard Bachelier, then director of the Fondation pour l'agriculture et la ruralité dans le monde (FARM). He was the one who suggested the subject of agricultural policies in Africa to me. This PhD would not have been possible if he had not proposed the CIFRE scholarship who enabled me to be a research analyst at the Foundation while working on the PhD, and if the new director Jean-Christophe Debar had not decided that I should continue working on agricultural policies at FARM. I am so grateful to them for having trusted me with this and accepted to support the research, the field trips, the conferences. I also am indebted to Michel Petit for having accepted to take part to the steering committee of the PhD and for having taken the time to advise me wisely.

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So many other people have been inspirational that the risk is high not to mention them all. My years at the AgroParisTech have been defining moments. I wish to thank all the teachers at the Chaire d'Agriculture Comparée and the researchers from the IATP for what they taught me. I feel particularly indebted to Blandine Cheyroux, Sophie Devienne, Laurence Roudart and Sophia Murphy. They probably don't realize how much of the knowledge and the values they transmitted have enlightened my choices in this PhD. I have tried to keep in

mind that farmers have reasons to do what they do, and that if they don't respond to incentives, it's either that they don't have the interest or the means to do so. I hope that even them can find a few interesting things from this research.

Over the last year and a half, as part of my mission at FARM, I have had the pleasure and the privilege to attend the GISA, an inter-ministerial meeting on food security organized by the French Ministries of Agriculture and Foreign Affairs. I am indebted to all the participants as their lively debates have kept me up to date on the international discussions on food security and agricultural policies, taking my mind off of my modeling problems.

I am also sincerely grateful to previous and current colleagues at FARM for having been there in the hardest moments, and reminding me how far from real life constraints to agricultural development in Africa my models are. Many thanks to Solène, Fanny, Eric, Fabrice and Pierre for our endless discussions.

On a more personal note, I wish to tell Laure how grateful I am that she decided to go on with the Masters at Sciences Po and the PhD after that. I don't know if I would have dared doing either of them without you, you have been my greatest inspiration. I am so happy that we will be able to defend a few weeks apart!

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To Antoine, "my" Antoine, I hardly know what to say. You already know that you contributed much more to the realization of this PhD than with the "pdf to excel", excel macros, VBA interface, SQL database, and careful reference reviews (still an impressive list…). Now is my turn to take care of you. TKM !!!

Finally, to all my friends and family, thank you so much for your efforts at trying to understand what it was like and be supportive. You can stop asking me when it will *really* be finished.

Daddy, I'm not a student anymore.

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General introduction

This doctoral research started in late 2008, right when the food prices where spiking on international markets. While food prices dropped sharply in 2009 with the financial crisis, they quickly spiked again by early 2011 and now in 2012 are back to 2008 levels[1]. Faced with the threats of food, economic and financial crises, governments in many poor countries have been urged to act by their constituents[2] and adopt new policies to spur rapid economic development to pull their countries out of food insecurity and poverty.

Since the early 2000, there seemed to have been a growing political recognition from governments[3], and international institutions (World Bank 2008) that agricultural growth might be an efficient way to do so, especially for countries from Sub-Saharan Africa[4] (SSA).

But considering the major ideological debates both on measures to be implemented and on tools which could guide them, the first aim of the dissertation has been to look for academic guidance from both the theoretical or empirical economic literature to help countries set priorities for policy reforms to achieve those goals. Coherently with the objectives of "policy coherence for development", potential policy reforms both from countries in SSA but also countries from the rest of the world were scrutinized based on how instrumental to SSA development strategies they could be. The focus turned to trade policy reform as they were identified in the literature as both promising and very debated.

Acknowledging the fact that the subject is part of controversial fields, this general introduction aims at laying the framework for the research that was undertaken as part of the dissertation. In the two first sections, a historical review of the policies implemented in Sub-Saharan Africa linked in parallel to the history of economic thought enable to explore the debates on the role of agriculture for development and on the use of public intervention and trade policies to promote development strategies. Although being potentially contentious, it

[1] According to both the FAO Food price index, World Bank food price index and the IMF Food Commodity Price Index.

[2] 14 of 53 African countries saw mass disturbances following abrupt spikes in food prices in 2007-2008. Berazneva and Lee (2011) review the underlying causes of the so-called "food riots" by exploring the different socio-economic and political situations and find that the few countries that experienced riots when most of them faced the increase in prices, were the ones with the greater incidence of poverty, larger urban populations, a greater decrease in domestic food production and slightly lower level of political freedoms and foreign aid.

[3] See the African Union Maputo Declaration on Agriculture and Food Security of 2003.

[4] "SSA" refers here to all the countries in the African continent below the Sahara, as opposed to northern Africa. SSA is composed of Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Saint Helena, Sierra Leone, Togo Nigeria, Senegal, Ethiopia, Madagascar, Malawi, Mauritius, Mozambique, Tanzania, Uganda, Zambia, Zimbabwe, Botswana, South Africa, Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, São Tomé and Principe, Angola, Democratic Republic of Congo, Burundi, Comoros, Djibouti, Eritrea, Kenya, Rwanda, Seychelles, Somalia, Sudan, Lesotho, Namibia, Swaziland. Note that Mayotte and the Reunion are not assumed to be part of SSA but are included in some of the database used.

helps justify the focus of the dissertation on the comparative analysis of trade and agricultural policies. The second section of this general introduction explains the choice of the computable general equilibrium methodology and outlines the main questions that were asked in chapter II and III.

1. The general background of the dissertation: why study agriculture for development in Sub-Saharan African countries?

Development strategies are clearly context-specific and, ultimately, have to be endogenously shaped at the individual country level (de Janvry and Sadoulet 2010). Nevertheless, countries in Sub-Saharan Africa are often considered at the regional level, probably because they share common features, and are interdependent in addressing common challenges (Ndulu *et al.* 2007). In particular, Haggblade and Gabre-Madhin (2010) show how agriculture is still a crucial sector at the sub-continental level since it remains the major source of employment accounting for 65 percent of full time employment, 25 to 30 percent of grow domestic product (GDP)[5] and over half of total export earnings. According to their estimates[6], with around 40 percent of Sub-Saharan Africans living under the poverty threshold of US$1 per day and more than 30 percent undernourished, poverty and food security are critical challenges, both intrinsically linked to agriculture since 70 percent of the subcontinent's poors work in agriculture, and agriculture underpinning the livelihoods of even a higher share of the poors in the poorest countries of Burkina Faso, Burundi, Ethiopia, Malawi, Tanzania or Togo.

Prominent economists have underscored how the poor performance of the agricultural sector has been a long-term structural problem in SSA[7], (additionally to the ones previously cited, many others including Adesina 2010) and that for economic development to succeed in Africa in the next 50 years, African agriculture will have to change "beyond recognition" as Collier and Dercon (2008) put it. Beyond those consensual facts, analysis have arisen at two level, first on their determinants, and secondly on their interpretation. Understanding the underlying causes of this poor performance is an important first step before studying some

[5] When weighting by GDP for all countries outside of South Africa (which alone accounts for 40 percent of Sub-Saharan Africa's aggregate GDP), the authors produce an agricultural share of 25 percent, whereas when weighting by population they find an agricultural GDP share of 30 percent.

[6] Since complete data on the sectoral composition of poor households' income do not exist for Sub-Saharan Africa as a whole, they rely on work by Ravallion, Chen, and Sangraula (2007), who project the percentage of poor households residing in rural and urban parts of Sub-Saharan Africa; by Valdés et al. (2009), who provide breakdowns of the sectoral composition of income among poor rural households; and Garret (2004) and others, who provide evidence on the prevalence of urban agriculture among poor African households.

[7] This recognition however does not hamper acknowledging the existence of success stories in SSA agriculture in the same period. Haggblade and Hazell (2010) have collected episodes of successful agricultural growth in Africa and identifies processes, practices, and policies for accelerated growth in the future.

remedies. But the link between agriculture, growth and economic policies is highly controversial. What is the state of the debates in the economic literature?

1.1. Agriculture and economic development in SSA

Development economics have widely explored the fact that Sub-Saharan African economic policies have failed to develop an agricultural sector successful in fighting poverty and hunger in the last 60 years, especially compared to Asian and Latin American countries. According to the African Development Indicators database of the World Bank, average agricultural value added per capita in Sub-Saharan Africa was lower in 2008 than in the early 1970s. Haggblade and Gabre-Madhin (2010) show for instance that SSA remains the only developing region where per capita agricultural production has fallen between 1960 and 2005[8]. They link this trend to the lower aggregate agricultural output growth of 2.4 percent annually in Sub-Saharan Africa compared to 2.8 percent in Latin America and 3.6 percent in developing Asia (FAOSTAT 2008) due to the stagnant agricultural productivity (both in labor and land productivity) and higher population growth rates of 2.6 percent per year, 0.5–0.7 percent greater than in Latin America and developing Asia. As a consequence, SSA claimed in 2005 the highest poverty headcount and undernourished rate of all developing regions, and highest per capita food aid (quadruple that of other developing regions).

1.1.1. *Policies historically adverse to agriculture…*

In terms of the political determinants, political economics have attributed the poor performance of agriculture to two successive trends in the economic policies undertaken by African governments.

The first period begun with the independences of most African countries in the 1960s. A large strand of the literature starting with Lipton (1977) has identified an "urban bias" in the post-independence policies (see literature review in Bezemer and Headey 2008). This bias is traduced by the discriminatory macroeconomic, sectoral and trade policies that increasingly favored urban consumers at the expense of farms households, taxing exportable crops in order to develop industries and setting low prices to crops, principally food crops, in favor of urban consumers, either explicitly or implicitly through exchange rate distortions and marketing boards. This anti-agricultural bias of domestic policies in Africa included anti-market bias that has been measured by the recent research program on agricultural distortions of the World

[8] All data taken from FAOstat in 2008.

Bank confirming earlier analyses of Krueger, Schiff and Valdes (1988). Summarizing the findings of this research on Africa, Anderson and Masters (2009) show that the magnitude of the pro-urban (anti-agricultural) and pro-self-sufficiency (anti-trade) interventions has differed across countries and periods, but that overall Sub-Saharan Africa[9] is where sectoral and macroeconomic policies have been the most detrimental to agricultural, and slowest to reform since then. The region is also specific in that most of the distortions is due to border measures (trade taxes, quantitative trade restrictions and the operations of parastatal trading companies). Their quantitative estimates of distortions show that policies have substantially reduced the earnings of farmers in the 1960s and 1970s, especially for the producers of the main traded agricultural products, which are the traditional exports crops (tobacco, cocoa, coffee, cotton, groundnut, sugar, etc.) but also the commercial food staples (maize, rice, bean, sesame, soybean, poultry). They estimate that the transfer paid by farmers in the 21 focus countries peaked in the late 1970s at over $10 billion a year in constant (2000) U.S. dollars. They also find that Ethiopia, Sudan and Egypt largely subsidized their consumers of food products whereas Nigeria and South Africa rather taxed them.

A second period started from the 1980s with the deregulation policies of the structural adjustment programs of the International Monetary Fund and the World Bank. The bulk of policy reforms were actually implemented in the 1990s in many Sub-Saharan African countries and experienced occasional reversals. These policy reforms are documented as being successful in reducing domestic bias against agriculture in most African countries (Jensen, Robinson and Tarp 2010). Anderson and Masters (2009) find a gradual improvement in the pricing environment for farmers between 1975 and 2004, with the transfers paid by farmers reduced to $6 billion a year over the 2000-2004 period. But there is considerable diversity across Sub-Saharan African countries. According to their data, major reductions in the taxation of farmers were experienced in Ghana, Uganda, Cameroon, Senegal and Madagascar. Some countries even transitioned from taxing their farmers to supporting them as in Mozambique and Kenya. But others rather started taxing them as in Nigeria or increased the level of taxation as in Côte d'Ivoire, Zambia and Zimbabwe. They also show a strong variation across products, which is somewhat similar across Sub-Saharan African countries and to the rest of the world. Taxation was mostly reduced for the commercial food staples,

[9] The 21 case studies in Africa include Egypt, the largest North African economies. In Sub-Saharan Africa, Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Madagascar, Mali, Mozambique, Nigeria, Senegal, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia and Zimbabwe are considered, accounting for about 90 percent of Sub-Saharan Africa's agricultural value added, farm households, total population, and total gross domestic product.

while taxation continued for tropical traditional export crops (coffee, cocoa, cotton and tobacco). Similarly to the rest of the world, but to a much lesser extent, producers of sugar, rice and milk gradually received assistance in some Sub-Saharan African countries.

One of the objectives of the deregulation policies was to allow the emergence of the private sector that had been previously crowded out by the public sector control over main economic activities. One of the still controversial aspects of this period is the finding that in most countries the emerging private sector failed to provide the goods and services necessary for the development of agriculture (USAID 1996) which in some situations worsened the situation of smallholders (Killick 1997, Sahn, Dorosh and Younger 1997, Kherallah *et al.* 2002, Devèze 2008, Nubukpo 2011). But opponents to this view rather attribute those adverse effects to the failure of most African countries to implement the structural adjustment programs by the book (World Bank 1995). Kherallah *et al.* (2002) indeed document that only a few Sub-Saharan African countries (such as Ethiopia, Madagascar, and Tanzania) dramatically transformed their agricultural markets, compared to others that implemented the plans only partially (such as Malawi, Zambia, and Zimbabwe) and that a number of countries continued to control exports through state-owned enterprises (such as West African cotton producers) and implement targeted distribution fertilizer programs or indirect subsidies (as in Ethiopia, Malawi, and Zambia). Another strand of arguments is to blame policies from the rest of the world, in particular of developed countries, which have known an opposite gradual "rural bias", particularly in more well off countries, where supports and import barriers to protect their farmers have been increased over the years (see Anderson 2009 for documenting the trend or Lamy 2012 for an example of political statement on the detrimental effects of such a trend).

Additionally to those trends, over the last 30 years, governments rather accentuated the "urban bias" in their investment and public expenditure policies so farmers and rural areas generally still suffer from under-investment (Headey *et al.* 2009). There were lower relative public investments in agriculture in Africa than in the rest of the developing world, both from the point of view of African government spending and development aid to agriculture. These trends have been precisely documented by Fan *et al.* (2008). They find that from 1980 to 2005 on average African government spent on agriculture around 6 percent of their total national budget as compared to 11 percent for Asia, but the share ranged considerably from country to country, with only a few African countries—Burkina Faso, Ethiopia, Malawi, and Mali—

surpassing the CAADP[10] threshold of 10 percent of budgetary spending on agriculture, and nearly half of them rather reducing their spending on the sector. According to their figures, African agricultural public spending as a percentage of agricultural gross domestic product (GDP) was only half that of Asia in 2005. Fan *et al.* (2008) also find the same decline in spending on infrastructure, which has had a detrimental effect on agricultural development. Anderson and Masters (2009) argue that the remaining taxation to agriculture of $6 billion a year over the 2000-2004 period is larger than both the public investment and foreign aid to the sector in that period in Africa, and that this trend contrasts with both Asia and Latin America where the taxation has been reduced much more.

Fan *et al.* (2008) also document that donor aid to the agricultural sector has declined in terms of both absolute amount and as a share of total aid from 20 percent of total aid in 1980 to 15 percent in 1990 and 4 percent in 2006. Their assumption is that the shift in the focus of aid may have been due to pressure to broaden the aid agenda to include social aspects to the detriment of sectoral approach. OECD data show that although bilateral donors as a group have played a comparatively larger role, the World Bank was the largest donor to African agriculture between 1990 and 2005. The independent assessment of the World Bank assistance to agriculture in Sub-Saharan Africa over the period of 1991–2006 finds that not only did the institution decrease its support to agriculture in the period, it also dispersed its lending support across an array of activities in rural space (including research, extension, marketing reform, drought relief, seed development, and transport) with little recognition of the potential synergy among them and the need for all of these areas to be developed at the same time, or at least in an optimal sequence, to effectively contribute to agricultural development. As a result, agricultural investment projects in Africa performed[11] below that for non-agriculture investments in the region but also below similar investment projects in other regions. Thus the report concludes that the Bank has had limited success in contributing to the development of African agriculture (World Bank 2007).

1.1.2. *… slowly reversing*

However, the beginning of the 2000s have seen a shift in those trends: with the end of the structural adjustment policies, the definition of the Millennium Development Goals and

[10] The "Comprehensive Africa Agriculture Development Programme" (CAADP) is the agricultural programme of the New Partnership for Africa's Development (NEPAD), established by the African Union assembly in 2003, to improve food security, nutrition, and increase incomes in Africa's largely farming based economies. It aims to do this by raising agricultural productivity by at least 6% per year and increasing public investment in agriculture to 10% of national budgets per year. See http://www.nepad-caadp.net.

[11] In terms of percentage of satisfactory outcome ratings as evaluated by the report.

the recognition that a necessary component in meeting them by 2015 in many parts of the world would be a more productive and profitable agricultural sector (World Bank 2000), and the beginning of a new increasing trend in the price of some agricultural commodities, many African governments, supported by international donors, have been redefining interventionist policies for agriculture and investing in this sector (UNECA 2006). In Maputo in 2003 African governments[12] committed to allocating 10 percent of their national budget to agriculture. The donor community has gradually also recognized the need to increase aid in this sector[13]. This shift is linked to the significant changes experienced by African countries that have led to the recognition that agriculture is still central to employment, government revenue and food security, has been accelerated with the 2008 food price spike.

One of the main consensual assessments is that the expectation of a population boom in the sub-continent by 2050 exacerbates the issues of employment and food security. The fact that the population has not been and will probably not be absorbed by the industries and services sectors brings the development of rural activities to the center of the political struggle against unemployment, especially since the rural population is still expected to grow faster than urban population (IFAD 2011). Additionally, from the 1980s, SSA has been increasingly dependent on food imports and thus more sensitive to the conditions of international markets. In a context where world agricultural prices are expected to be significantly higher and more erratic than in the past (OECD and FAO 2011), many countries fear that the rise in the cost of basic foodstuffs, observed since 2008, might continue, and are concerned with the lack of adaptive capacity of part of their population, and thus their vulnerability to shocks on their food security. Finally, agriculture is now at the heart of many other issues, such as energy with the prospects from emerging market for biofuels, climate change which impacts are expected to be exacerbated on rain-fed dependent agricultural regions, or the potential from the contribution of agriculture to the reduction of greenhouse gases emissions.

1.2. What are the theoretical groundings of sectoral policies?

The mainstream research on the sectoral trade-offs for investment and policy planning has been dominated by debates on the role of agriculture for development, questioning whether agriculture, and agricultural employment in particular, had a specific role to play for

12 See the African Union Maputo Declaration on Agriculture and Food Security of 2003.

13 See the G8 l'Aquila Food Security Initiative in 2009 and the G20 "Action plan on food price volatility and agriculture" in 2011.

successful economic growth or not, and thus whether or not the development of the sector should be targeted by specific policies.

1.2.1. *The stylized fact of "structural transformation"*

According to Memedovic and Iapadre (2009), the stylized fact the structural transformation of economies, namely, the observation that economic growth is generally accompanied by changing composition of the productive system in terms of output and employment has been at the heart of the classical literature on economic development since Smith's "Wealth of Nations" (1776) and Ricardo's "Principles of political economy" (1817). Kuznets (1966) and Chenery and Taylor (1968) in their classical works on the evolving structure of economies describe the declining share of agriculture in GDP and employment to the benefit of the manufacturing sector. In light of three centuries of the European experience, Malassis (1997) explain this trend by the combined reduction of the relative importance of food products in the consumer's basket (Engel's law) at the national level, and the diminishing value of agricultural production as other activities grow in the economy, in particular agro-processing. More recently, Timmer and Akkus (2008) through an econometric analysis have confirmed the regularity of this phenomenon in many developed and emerging countries.

It appears in several recent literature reviews (e.g. de Janvry and Sadoulet 2010, Headey, Bezemer and Hazell 2010, Diao, Hazell and Thurlow 2010) confirming earlier analysis of Mounier (1992) that most of the literature interested in this stylized fact has focused on the respective role of agriculture and manufacturing for economic development. Two opposite school of thoughts have stemmed from distinct interpretations of the stylized fact, relying on different assumptions on which of the industrial or the agricultural revolution is driving the other one (Mazoyer and Roudart 2001).

The dominant school of thought for the last 50 years, according to Bezemer and Headey (2008), states that agriculture, a backward, unproductive sector, was a provider of exploitable surplus, particularly of labor, which had to be transferred to the benefit of a modern industrial sector, the engine of growth. This vision is embedded into a wide array of models starting with the dual model of Lewis (1955) in which there is surplus labor operating at zero marginal productivity in agriculture, and Hirschman's model (1958) in which agriculture has weak upstream and downstream linkages with other sectors, and followed by many others such as Kuznets (1966) which added the stylized fact that total factor productivity in agriculture is

much less that of other sectors. The main drawback of those models is that economic growth is automatically created by the transfer of labor and capital from agriculture to non-agriculture. Based on those models, a normative interpretation of the stylized fact of structural transformation has been used to legitimize the industrialization policies unfavorable to agriculture in many developing countries, assuming that less employment in the agricultural sector was necessarily a positive trend. According to Bezemer and Headey (2008) the anti-agricultural policy bias is linked to the more general anti-agricultural bias in development research of the most influent financial institutions, which is traduced for instance by the decrease by half of the publications of the World Bank devoted to agriculture between 1995-2005.

Starting with Johnston and Mellor (1961), an opposite school of thought argues that on the contrary at the early stages of development it is rather agriculture the engine of growth. This view of agriculture's lead role was stimulated in large part by the emerging experience in Asia with the green revolution and was popular until the 70s. Schultz (1964) and Hayami and Ruttan (1985) formalized models where labor intensive traditional agriculture could be transformed rapidly into a modern sector through the adoption of technologies, thereby making a large contribution to overall growth. Several contributions have described in details historical observations where agricultural revolutions preceded industrialization of around fifty years, thereby enabling it, as in the United Kingdom at the beginning of the 18th century, France in the 1820s, Germany in the 1850s, the United States in 1860s and Japan in the 1880s (e.g. Ohkawa and Rosovsky 1964, Bairoch 1973, Johnston and Kilby 1975, Jorgenson 1967, Sauvy 1980 or Adelman 1984). Seminal contributions were made by Kaldor (eg. Kaldor 1975 and 1995) who argued that industrial growth was constrained by the demand growth of the agricultural sector in poor developing countries and hence agriculture revolution (increasing productivity) was necessary for industrial development, not only because it created the extra wage goods for the growing urban population, but also because it created the conditions for autonomous demand of the goods produced by the manufacturing sector. In de Janvry and Sadoulet's view (2010) "*there is something particularly deceptive about the way agriculture fulfills its development functions*" since "*the more successful agriculture is in inducing growth, the more it tends to decline as a share of the economy and of total employment*", which explains the often reversed interpretation of causalities.

Additionally, it should be highlighted that while the authors cited above, following the tradition of the classical economists consider that structural change is a necessary condition

for economic growth, most theories of economic growth that emerged from the 80s have regarded this issue as secondary, rather focusing on the question of capital accumulation and the allocative efficiency of the factors, considering structural change as an automatic result of market development (Rodrik 2007).

In some sense, the 2008 World Development Report (World Bank 2008) has changed that trend by putting the issue of structural change back in the center of the process of successful economic growth and in some sense merged those two schools of thought by positing that the relative role of agriculture depends of the level of development of countries but also on the initial dependence on agriculture. The typology of the 2008 World Development Report distinguishes countries according to the share of agriculture in aggregate growth over the past 15 years, and the current share of total poverty in rural areas. According to the criteria, most Sub-Saharan African countries are "agriculture-based countries" where agriculture is a major source of growth and most of the poor reside in rural areas. But Angola, the Congo and Zimbabwe are "transforming countries" and agriculture is no longer considered a major source of growth, even though poverty remains overwhelmingly rural. Finally South Africa is the only country in SSA to belong to the "urbanized countries" category for which agriculture contributes even less to growth and poverty is mostly urban.

However as pointed out by an increasing number of detractors, despite acknowledging that agriculture productivity can be a strong driver of economic growth, the 2008 World Development Report maintains the strong positive association between measures of structural change (as share of agriculture in employment and GDP) and economic growth, which does not seem to fit with many African cases such as Nigeria which experienced transformation without development (Headey, Bezemer and Hazell 2010). A recent new literature has re-explored the cases of African and Asian countries and looked at how much they diverged with the standard structural transformation story. For instance de Janvry and Sadoulet (2010) have shown that in the last 50 years most Sub-Saharan African have followed a distinct path, characterized by a drastic reduction in the share of labor in agriculture rarely accompanied by growth. According to them, these countries can be considered as having "missed" their structural transformation in that the rural-urban migration that occurred was not pulled by rising incomes in the urban economy, but pushed by lack of income opportunities in agriculture resulting in stagnant rural incomes. A similar conclusion is reached by MacMillan and Rodrik (2011), who recently reinvestigated the issue of structural change, but defining it as a transfer of resources from the low labor productivity to high labor productivity sectors. In

their view, the two sources of economic growth are thus this transfer of resources and the growth in total factor productivity. Comparing the performance of many countries, they find that Africa has still the most to gain from additional structural change since the productivity differences among sectors are the greatest. They also find that the region has experiences in the 1990-2005 period a "perverse" structural change where labor reallocation has rather been towards lower productivity sectors. This result can obviously be linked with on the one hand the stagnating or declining yields in agriculture over the same period and the fact that the workers displaced from agriculture were not successful in finding employment in the more productive manufacturing sector.

On the contrary, MacMillan and Rodrik (2011) find "successful" structural transformation in several Asian countries which increase both total productivity and the allocation of factors to more productive sectors. De Janvry and Sadoulet (2010) find that the economic growth in several Asian countries has coincided with rural industrialization and a rather constant share of workers in agriculture, but with increasing labor productivity thanks to the green revolution (Headey, Bezemer and Hazell 2010).

Those studies thus argue that the paradigm of "structural transformation" is not, as has sometimes been considered, automatically and sufficiently linked to a decline in agricultural employment. Haggblade, Hazell and Reardon (2007) rather turned the focus of the analysis to the relative strength of the demand and employment linkages of productivity growth. They show the strong link between agricultural income growth and rural diversification in the rural non farm economy explaining the pattern of structural change in Asia. They find that growth in the productivity of smallholder producers is considered more labor intensive, which is beneficial from an employment point of view, and that additionally small- to medium-sized farm households (the "smallholder producers") typically have expenditure patterns that are more favorable for promoting growth of the local non-farm economy, including rural towns, since they spend higher shares of income on rural non-traded goods and services, which are generally also more labor intensive (King and Byerlee, 1978). Thus they argue that focusing on the growth in the productivity of smallholder farmers can have both beneficial employment and demand linkages to the rest of the economy. But they also publicize the fact that the strength of those effects is highly context-specific, and thus should be empirically tested.

1.2.2. *Looking for measurement of growth linkages*

The recent development of modeling and econometrics has been a turning point in those debates. It has helped identify and quantify the mechanical effect of agricultural growth - due to the importance of this sector in the economies of most Sub-Saharan Africa – but also its multiplier effect and many analysis have concluded on the larger growth linkages of agricultural growth compared to non agricultural growth in Sub-Saharan Africa, although those growth linkages are much smaller than in Asia (e.g. Delgado *et al.* 1994, Haggblade, Hazell and Reardon 2007, Ligon and Sadoulet 2007, Self and Grabowski 2007, Cervantes-Godoy and Dewbre 2010, and Christiaensen, Demery and Kuhl 2011). In particular, thanks to economy-wide, multimarket (EMM) models for Ethiopia, Ghana,and Rwanda and computable general equilibrium (CGE) models for Kenya, Uganda, and Zambia, Diao, Hazell and Thurlow (2010) compare the effects of agricultural and non agricultural growth and find that the poverty-growth elasticity is larger when growth is driven more by agriculture than non-agricultural sectors consistently with the econometric estimates of Christiaensen, Demery and Kuhl (2011) on a sample of Sub-Saharan African countries. They go further and analyse poverty and aggregate growth effects of staple crops and livestock growth compared to traditional and nontraditional export crops growth. They find in all their case studies that growth in the staple sector has a larger impact on agricultural and economic growth and also leads to stronger pro-poor outcomes because it is a larger broader baser sector.

However, in the context of globalized agricultural markets, the exact quantification of the effects of the inter-sectoral linkages of agricultural growth, especially its pro-poor impacts remains debated, since some researchers doubt the possibility to actually develop what is seen as slow-growth, low return agriculture and rather document that urban-based manufacturing and services as more likely to stimulate broad-based economic growth in some African settings (eg. Ellis 2005, Dercon 2009, Collier 2009).

To add to those debates, a contribution of agriculture that is often forgotten in the discussion on the respective role of agriculture versus manufacture is agriculture's linkages with industry and manufacture, through agro-processing (direct value-addition downstream of farms), direct upstream in the provision of farm inputs, and more generally in improved post-harvest operations, storage, distribution and logistics that are essential elements of agribusiness value chains (Yumkella *et al.* 2011). Wilkinson and Rocha (2009) have estimated empirically that the ratio of GDP generated by agribusiness to that generated by farming increases from 0.57 for a sample of nine "agriculturally-based countries" (all in SSA)

to 1.98 for a set of eleven "transforming countries" (mainly Asian) and to 3.32 for twelve "urbanized countries", a trend that had been identified in Europe by Malassis (1997). They further show that in agriculture-based countries the contribution of agro-processing to total manufacturing is 66 percent, and that productivity levels for food processing are above the manufacturing average. According to Page (2012) this makes food processing an ideal candidate as the key entry sector to push the rest of the manufacturing sector towards higher levels of "*technical capabilities*" and "*value-adding achievements*", as in the framework of Mac Millan and Rodrik (2011).

1.3. Existing typologies on the role of agriculture for development in Sub-Saharan Africa

The diversity of the countries in SSA considering the stakes related to agricultural development are well illustrated in the several tentative typologies that some studies have undertaken, namely the African Economic Research Consortium (AERC) Growth Project typology (Ndulu *et al.* 2008), the World Development Report 2008 typology (World Bank 2008), and the IFPRI typology (Diao *et al.* 2007), which are best summarized by Thorbecke (2009).

The AERC Growth Project (Ndulu *et al.* 2008) is the first major assessment of the post-independence growth performance of the countries of SSA and identifies several political economy drivers of growth in SSA linked to detrimental government behavior whether regulatory (reliance on controls and nationalization), distributive (redistribution between ethno-regional groups including looting), inter-temporal (anticipated redistribution by a power group expecting to lose power and unsustainable spending), or state breakdown (inability to maintain internal security), but also linked to the location (distinguishing low opportunity high transport cost landlocked economies and high opportunity coastal economies), and linked to the endowment (distinguishing resource-rich countries). Even though the AERC Growth Project typology makes a major contribution to a better understanding of the anatomy of the growth process and political economy forces that shaped it, Thorbecke (2009) points out that it relies on an aggregate analysis based on the evolution of GDP per capita assuming that higher growth is not only necessary but sufficient to reduce poverty, and does not look at the inter-sectoral changes in the pattern of growth. It is thus unable to determine whether agriculture has a specific role to play for future growth challenge of those economies and whether the sector requires specific policies.

According to the World Development Report 2008 typology (World Bank 2008) described above, agriculture is the main engine of growth and poverty reduction in the "agriculture-based countries", i.e. most Sub-Saharan African countries. But this typology does not take into account the heterogeneity of conditions within the "agriculture-based" group and does not provide specific policy recommendations on how to spur agricultural growth and whether to focus interventions on specific types of products and farmers. Hence, additional characteristics need to be considered to identify the adequate development strategy for each Sub-Saharan African countries.

Diao *et al.* (2007) go further than those two previous typologies since their aim is to identify distinct patterns of growth and, more specifically, the role of agriculture in reducing poverty. They combine the previous criteria of location, resource endowment, relative importance of agriculture in the economy, stage of development and add a measure of "agricultural potential" based on the classification of the FAO Farming Systems' potentials (based on agro-ecological conditions and population densities) weighted by system's land coverage within each country (Dixon, Gulliver and Gibbon 2001). Focusing on low income countries, they identify four groups of countries. They find that 26 out of the 34 low-income Sub-Saharan African countries have favorable agricultural potential. However, even in countries with favorable conditions, agriculture competes with other sectors for limited resources. Of those countries 10 have rich mineral and oil endowments and thus may have alternative sources of growth and so are separated in the typology. Furthermore, the 10 coastal countries may have advantages in export-oriented agriculture or greater opportunities in nonagricultural sectors. Therefore, coastal and landlocked countries are also separated. For each category countries are selected as case studies, Ghana for the "coastal countries" (with more favorable agricultural potential and without large mineral resources), Ethiopia and Uganda for the "landlocked countries" (with more favorable agricultural potential and without large mineral resources), Zambia for the "mineral-rich countries" and Rwanda for the "countries with less favorable agricultural potential". For each case study they simulate the impact of agricultural and industrial growth and compare their impact on poverty thanks to an economy-wide multimarket or a computable general equilibrium model. They find in the five case studies that for similar GDP aggregate growth poverty is reduced more with agricultural growth than industrial growth, including in the copper dependent Zambia because contrary to agriculture, the copper sector is a capital intensive enclave industry with few backward linkages to rural areas. They also examine how the various agricultural sub-sectors impact

GDP growth and poverty reduction. They find that in all cases the food staple sector has a broader base thus contributes the most to poverty reduction. But the difference is reduced in the case of the coastal country with a strong export sector such as Ghana with cocoa. Hence, the IFPRI typology is an interesting step towards the recognition that agriculture has an important role to play for Sub-Saharan African low income countries, but that country context matters and agriculture's role differs according to the circumstances. Nevertheless, it misses the political context of countries.

Thorbecke (2009) proposes to add two more categories to the IFPRI typology. The "failed states" category includes countries vulnerable to violent internal conflict and societal deterioration based on the "Failed States Index" produced by FOREIGN POLICY. According to Thorbecke, this category is meant as being transitory and once stability and law and order have been restored, countries can be reclassified in other categories. The "South African region" groups the countries belonging to the South African Customs Union (SACU) which are specific since they enjoy relatively higher per capita income and income inequality than the rest of Sub-Saharan African countries and their incomes growth and development depends largely on the performance of the South African economy. The classification of Sub-Saharan African countries in the six categories is shown in Table 1 below.

TABLE 1— CLASSIFICATION OF COUNTRIES IN THORBECKE'S TYPOLOGY

Category	**Country**
Failed States	Chad, Democratic Republic of Congo, Côte d'Ivoire, Central African Republic, Equatorial Guinea, Chad, Somalia, Sudan, Zimbabwe
South African region	Bostwana, Namibia, Lesotho, South Africa, Swaziland
Coastal resource-poor countries with favourable agriculture potential	Benin, Ghana, Kenya, Gambia, Togo, Guinea Bissau, Tanzania, Mozambique, Senegal
Landlocked resource-poor countries with favourable agriculture potential	Burkina Faso, Ethiopia, Malawi, Uganda
Resource-rich countries with favourable agriculture potential	Angola, Cameroon, Nigeria, Sierra Leone, Republic of Congo, Zambia
Countries with less favourable agriculture potential	Comoros, Burundi, Niger, Mali, Rwanda, Madagascar, Mauritania, Gabon, Cape Verde

Source: Author's compilation from Thorbecke (2009)

1.4. Take away recommendations for the dissertation: favor economy-wide approach to sectoral analysis and country level to aggregate level

Despite the appealing arguments in favor of a focus on agriculture and agribusiness layed out in the previous section, the first choice of this research will be to avoid assuming that any development of the agricultural sector would be positive per se for the Sub-Saharan African region as a whole.

The objective will thus be to conduct economy-wide research in order to analyze the evolution of the agricultural sector within the rest of the economy. The agriculture and agro-processing sectors will nevertheless be given specific attention.

Furthermore, the recognition of the diversity of the Sub-Saharan African region which explains that development strategies regarding agriculture should be country-specific justifies the use as much as possible of country-level assessment.

2. The framework: Why compare trade reforms with development policy objectives in Sub-Saharan Africa?

Ideas regarding the linkages between trade, development and the role of government have considerably changed in the last 60 years, influenced by country experiences, changes in development thinking and the evolution of the global context (Winters 2000). Needless to say, throughout the evolution of economic thought, the justification of state intervention and the role of trade and liberalization policies in growth have always been highly controversial subjects.

The strand of the literature interested in the determinants of the policies undertaken in Sub-Saharan Africa since their independence in the 1960s highlights the importance of underlying political economic origins of the policy choices. For instance, Ndulu *et al* (2007), argue that "*global ideas have had a powerful role in shaping the growth environment in African countries. They have influenced the ideological and technical content of chosen development strategies; standards of peer review, peer pressure, and performance assessment; and the levels and character of official development assistance (ODA). The development paradigms have been shaped, in turn, by the dominant ideologies of the time; the evolving frontier of development economics in response to actual experience; and the*

changing attitudes towards the roles of the market, state, private sector, institutions, and political regimes."

Building from Ndulu *et al.* (2007 and 2008), we summarize the main stages of the policies implemented in Sub-Saharan since the 1960s and the underlying characteristics of the principal evolution in development economics. Then we focus on the specific issues regarding trade policies, which are from African countries' perspective, their interest in regional integration, and from the donor's perspective looking at the "policy coherence for development" framework and new agenda for Aid for Trade.

2.1. Historical policies in Sub-Saharan Africa

Following independence in the 1960s, the first generation of African leaders operated under relatively weak institutional and donor conditionality constraints and considered their governments as the principal driving force for industrialization and economic transformation of their countries through central planning. The form in which nationalism of the economy was pursued and the balance between redistribution and growth strategies differed drastically between countries (Ndulu *et al.* 2008). Indeed, according to Stiglitz (1998), at that time economists mostly saw economic development as a matter of increasing the capital stock (either through transfers from abroad or through higher savings rates at home) and improving the allocation of resources. Developing countries were considered to differ from developed countries mainly by the extent of the inefficiencies in resource allocations due to the greater incidence of missing or malfunctioning markets. Despite divergence among economists on the adequate answer to those market failures, the consensus among leaders of third world countries as well as the multilateral and bilateral development agencies was that it was the state's responsibility to intervene (Ndulu *et al.* 2008). Drawing from the Latin American experiences, many countries pursued "inward" import substitution strategies through overvalued exchange rates that were meant to encourage investment, as most capital goods had to be imported, and a variety of trade restrictions including high tariffs to try and spur industrialization and accelerate capital accumulation (Winters 2000).

Over the 1970s, the countries gradually gave way to more "outward orientation" development strategies drawn on the Asian experiences of "export led growth". In a context of generally high prices for the commodities exported and the very low rates (sometimes negative) of the loans including those facilitated by international financial institutions, governments and financers were so focused on the expansion of productive capacity that the

efficiency of resource allocation and the productivity of investments in "mega projects" were not thoroughly considered. Krumm (1985) analyses how over excessive expansionary responses to favorable but temporary terms of trade shifts, inflexible public expenditure programs, investments directed primarily by availability of external financing[14] rather than by economic criteria and delays in macroeconomic adjustment supported by non-concessionary financing led to what is known as the "debt crisis" of Sub-Saharan African countries.

Over the 1980s, the "outward orientation strategy" was even reinforced in hope to earn enough foreign exchange to repay their debt. It was accompanied by significant changes in the leadership of several countries that were accompanied by changes in attitudes towards the old "inward orientation" paradigm (Ndulu *et al.* 2008). From that period onward, most countries experienced chronic balance-of-payments, budget-deficit problems, had difficulties to pay the service of their debt, and thus became dependent on the financial assistance from the World Bank and the International Monetary Fund and Overseas Development Assistance (ODA) donors, who used their increased leverage to start imposing conditionalities in exchange for their financial support.

The failure of most countries to spur growth through the import substitution policies and to deal with the debt crisis had inspired a strong skepticism towards import substitution policies and government interventions in the international institutions and bilateral donors. Several academic researches fueled that view. The theory of second best of Lipsey and Lancaster (1956) stating that government intervention could create more distortions than the initial market distortions they were supposed to solve gained momentum. Building on this and applying it to protectionist tariffs, Johnson (1965) and Bhagwati (1969) developed a general theory of distortions arguing that the best "second best" policy should be specific state intervention targeted directly at the market failure. Furthermore, seminal case studies by Little, Scitovsky, and Scott (1970) on Argentina, Brazil, India, Mexico, Pakistan, the Philippines and Taiwan, and Balassa (1971) on Brazil, Chile, Mexico, Malaysia, Pakistan, the Philippines and Norway, compared trade policies across industries and countries and highlighted the biais against agriculture and exports and higher level of protection of the

[14] From Krumm (1985) we learn that part of the expansion of Sub-Saharan African borrowing was due to the evolution of the international banking system after the 1972-73 oil shock and its key role in "recycling" the huge OPEC surpluses. The Euromarket became an important source of financing for a number of governments which had never borrowed in it before or only small amounts. Financial market credit grew tenfold between 1972 and 1979 at an annualized rate of 40% for Sub-Saharan Africa as a whole and 32% for the oil importers, and came to represent 32% of disbursed public debt, up from 15%. This credit was characterized by floating, rather than fixed rates which boomed in the 80s. Additionally, the majority of export credit were extended through official bilateral agencies or officially guaranteed by export credit agencies from the countries of the Development Assistance Committee which are the largest aid donors, at an annualized rate of about 35% between 1972 and 1979.

manufacture sector of many developing countries. Balassa (1978) used his data to analyze econometrically the link between trade and growth. Krueger and Bhagwati (1978) considered the array of macroeconomic policies (e.g. monetary and fiscal especially exchange rate policies) in Chile, Colombia, Egypt, Ghana, India, Israel, Korea, the Philippines, and Turkey at different periods and concluded that import-substitution policies generally had not produced sustainable increases in long-run growth rates contrary to outward-looking policies. Krueger (1990) further supported the view that government failures were more likely than market failures, based on extensive case studies on rent seeking and difficulties associated with the implementation of "sophisticated" policies in developing countries. According to her research, an effective market mechanism would thereof naturally emerge if the policy induced distortions were eliminated.

As a consequence, the World Bank and the International Monetary Fund started imposing as prerequisite to their loans the implementation of stabilization policies aimed at achieving macro-economic stability in the short term, combined with structural adjustment plans aimed at accelerating growth through supply side responses. The guiding principles of those programs were domestic liberalization, macroeconomic stability, a reduced role of the state and unilateral openness to international trade, best captured in the "Washington Consensus" developed in the World Development Report of 1991 (World Bank 1991).

As these policy reforms were implemented until the late 1990s in African countries, a large literature on their effects emerged. They have been documented as having been quite successful at reducing anti-market bias of previous policies (Anderson and Masters 2009), but as stated before, the actual implementation by the African governments of the policy prescribed and the extent to which the private sector emerged were very unequal between countries and generally disappointing (USAID 1996). Over the years, considering the poor supply response and poor overall economic performance despite the successive structural adjustment plans undertaken in many countries, including in Sub Saharan Africa, economists started debating whether the structural adjustment policies could be effective at delivering growth and poverty reduction. Debates laid on different grounds, but during results from economic research were mixed, the main underlying problem from a research point of view being the lack of data and scarce evaluation of the programs that had been undertaken at that period (Killick 1997). Nevertheless, the recognition that structural and market-oriented reforms tended to be slow in producing positive effects advocated for a balance between market and political institutions (World Bank 1991).

In particular, considering the potential very adverse effects on the poors of some of the policy measures implemented, new social programs were included as the World Bank and the International Monetary Fund started focusing more on poverty in the 1990s (Ndulu *et al.* 2008).

Evaluations undertaken by the World Bank many years later (World Bank 2005) pointed to the lack of ownership of the reforms by the governments of the countries in which they failed, and to the institutional weaknesses which increased the vulnerability of the economies to the exogenous shocks that occurred during that period, which in turn undermined reforms.

2.2. The "mixed approach" to development policy

From the 1990s, policy recommendations stemming from research in economic development has been an apparently consensual "mixed approach" stating that the challenge to policy-makers in developing countries is actually to exploit the complementarities between state and the market (Ndulu *et al.* 2008).

In reality, interpretation of the determinants of the growth of "successful" countries, such as the "Asian Tigers", is still subjected to heated debates, and the questions of which of the markets or government failures are the most pervasive, and on the impacts of trade on growth have stayed at the heart of economics as one the most contentious issues. Indeed, far from pretending extensively reviewing the existing literature on these issues, the following section aims rather at showing how the theoretical and empirical evidence to date leaves ample room for debate.

The existence of many types of distortions in markets which justify strategic targeted intervention of the state are increasingly recognized, but academic debates are still raging whether there are enough arguments for state intervention or whether the extent of government failures should prevent any intervention (Lipsey 2007).

Focusing on trade, it appears similarly that debates on the causality between trade openness and growth, and on the distributive impacts of trade liberalization are far from being settled.

i) Coordination failures and imperfect information

A renewed attention to the theory of second best in response to the general theory of distortions was fuelled by new development in the economic analysis of coordination failures,

imperfect information and institutions, putting an increasing emphasis on the necessity of interventions in production sectors as well as social sectors for optimal outcomes.

On the empirical side, microeconomic empirical analysis on the supply side constraints to agricultural growth such as Binswanger and Deininger (1997) have precisely documented the pervasive market failures causing supply-side constraints in African countries (inadequate transportation, storage and communication infrastructures in the countries, low levels of productivity of the farmers and their little technical or financial capacity to raise it on their own, in a context of low agricultural extension services, inaccessibility of finance, inadequate funding for research) preventing many farmers, and especially poor farmers, from taking advantage of any opportunities that arise (e.g. de Janvry, Fafchamps and Sadoulet 1991). More recently, analysis of the micro-level determinants of developing countries producers' integration in the global agricultural supply chains (Gomez *et al.* 2011) highlight the complex supply side constraints poor farmers are still facing. Many ex-post micro level analysis have been undertaken on the supply response of farmers in developing countries as a consequence of the increased agricultural prices of 2006-2008. For instance Aksoy and Hoekman (2010) present a review of the past literature on supply response and several new case studies which highlight that factors such as credit constraints and possible asymmetries in responses to price, where farmers would expand output with a lag if price increase is sustained enough, but might answer more rapidly to price drops, largely reducing long term investment. Cadot, Dutoit and Olerreaga (2006) look at the entry cost of moving out of subsistence farming into commercial farming in Madagascar and find that the extent of those costs hamper the poorest farmers from switching to commercial agriculture. Porto, Chauvin and Olarreaga (2011) focus on the impacts of market power along the supply chain on farmers in low-income countries. They show that the absence of competition among the providers of key inputs, intermediates or services and storage is apparent in all their case studies and that it is detrimental to farmers, and to the society as a whole, since it results in inefficiencies.

Rodriguez-Clare (2007) and Rodrik (2007) suggest that coordination failures in taking the necessary actions to increase sector-wide productivity may seriously hamper development as they impede the emergence of activities where industry-specific local externalities are important, which are extremely common in agriculture.

Informational barriers to entry and learning spillovers among producers have also been raised as causing externalities linked to trade, or capital markets. Because of information asymmetries, equities markets and credit markets might under fund the optimal investment

because institutions might fail in conveying the necessary information to economic agents. Hence there may be a greater role for governments to create institutions and facilitate coordination (World Bank 1993).

Conversely, the suspicion on targeted policy interventions has been rooted in a general skepticism regarding the capability of governments to deliver appropriate policies. This view has been fuelled over the years in particular by the research of Ann Krueger at the IMF and many collaborators, including Shanta Devarajan at the World Bank. While most economists would agree that some market failures provide a case for temporary intervention, advocates of the predominance of "government failures" would stress that the difficulties with detecting and quantifying the externality, identifying the appropriate intervention and preventing the capture of policies, are sufficient reasons not to intervene. For instance in the case of coordination failures or imperfect information reducing the level of investment made, the best government's intervention could be to ensure that all interrelated investments are made, through pure coordination or through ex-ante subsidy schemes (investment guarantees or implicit bail-outs). But then such measures induce moral hazard and are prone to abuse. Hence for any market failure advocates of "government failures" question the administrative and fiscal feasibility of the policy interventions, their informational requirements, and their political economy consequences.

ii) Debates on trade openness, growth and poverty

Starting from the widely known theory of the comparative advantage of Ricardo (1817), a large strand trade theories support the view that economies that are open to trade perform better. Once again, this section will not attempt to exhaustively review the literature but aims at summarizing the main results framing the current debate.

Theoretically, static gains arise as the misallocation of resources under protection and import substitution is corrected and resources shift to more productive sectors, activities and firms, ideally leading to employment generation, and as the foreign exchange constraints is relaxed. In particular the well-known model of Melitz (2003) shows that lower trade costs can promote the reallocation of resources toward more productive firms. A corollary of the allocation effect is the so-called "scale and variety effects" (Baldwin, 1997) according to which access to larger outside markets enables the country to exploit economies of scale in exporting activities, reducing average costs of production and lowering consumer prices, and under the assumption that firms produce distinct variety of goods, allowing the consumers to

choose from a varied array of goods, increasing their welfare. Increased competition across a wide range of products can also lower consumer prices (Krueger 1978). Empirical estimates of the welfare costs of these static distortions rarely exceed 2 or 3 percentage points of GDP at the world level (Bhagwati 1993).

From Grossman and Helpman (1991), new trade theories have also explored the dynamic gains that can occur thanks to trade liberalization, including efficiency advances as a result of knowledge and technological spillovers from exporting experience and imported inputs and intermediate products (Stone and Sheperd 2011). This knowledge transfer through international trade may increase productivity and, by extension, lead to economic growth and development (Nordås, Miroudot and Kowalski 2006).

The relationship between exports and economic growth has been tested both theoretically and empirically in numerous studies, but although some level of correlation makes consensus, finding the direction of the causality has proven very complex. Theoretically, some authors provide evidence in support of the growth-led-export hypothesis (e.g. Lancaster 1980 or Krugman 1984), while other authors (e. g. Helpman and Krugman 1985) argue that there is a feedback relationship between export growth and economic growth. It is noteworthy that the evidence generated by empirical analysis has not translated into a consensus on either direction of causality. For instance, Giles and Williams (2000a) presented a comprehensive survey of more than 150 empirical papers on the relationship between exports and economic growth distinguishing between cross sections and time series approach. They find that in general cross section analyses find that growth precedes economic growth hence giving a stance to the export-led-growth hypothesis, but that this result is not confirmed by time series studies. The main issue relates to the limitations of the econometric tools (Giles and Williams 2000b), in particular cross-country regressions. Indeed the most famous ones (Dollar 1992 and Sachs and Warner 1995) that showed that economies with open trade regimes experienced higher growth rates than those with closed regimes have been challenged on methodological grounds by Rodriguez and Rodrik (1999), followed by Srinivasan and Bhagwati (2001) who rejects the cross-country regression methodology because of their weak theoretical foundation, and argue that the cross-country they reviewed use poor quality of the data base and inappropriate econometric methodologies. Srinivasan and Bhagwati (2001) argue that the most compelling evidence can come only from careful case studies of policy regimes of individual. Despite the remaining debates on the causality between growth and trade openness, some extreme normative and ideological interpretations

lead to the assessment that trade policies are a sufficient tool for development (Dollar and Kraay 2004).

As most research has move to the firm level, similar debates are now taking place at the firm level, based on the empirical evidence suggesting that exporting firms present higher productivity, including in Africa (Bigsten et al 2004). On the one hand, exporting could contribute to enhanced productivity. On the other hand, the higher productivity of exporters could reflect the self-selection of the more productive firms as exporters.

Another debated question is that of the distributional outcome of trade reforms. One of the most used theorems in international trade is the Stolper-Samuelson theorem, which in its simplest form suggests that the abundant factor should see an increase in its real income when a country opens up to trade. Starting form the idea that the abundant factor in developing countries is unskilled labor, many studies have argued that this framework suggests that the poor (unskilled) in developing countries have the most to gain from trade (e.g. Bhagwati and Srinivasan 2002). But in a recent article, Davis and Mishra (2007) argue that trade theory, and Stolper-Samuelson in particular, are not sufficient to predict the impacts of economic policies in their complexity which are rather a matter of empirical analysis. Comprehensive assessments of the empirical literature that look at the distributive impacts of trade can be found in existing surveys such as Reimer (2002), Berg and Krueger (2003), Bhagwati and Srinivasan (2002), Baldwin (2003), Goldberg and Pavcnik (2004), Winters, McCulloch and McKay (2004), or Porto (2011). Books grouping several simulation exercises have also tried to answer that question such as Hertel and Winters (2006), Hoekman and Olarreaga (2007) or Anderson, Cockburn and Martin (2010). Both surveys and simulations support the view that the distributive impacts of trade policies are far from being negligible, and depend on the specific policies, countries and group of population analysed. From Porto (2011), trade reforms appears to impact domestic prices which then affect households via several channels. Households are at the same time consumers (benefitting from lower prices and hurt by higher prices of consumption goods), producers (benefitting from higher prices, and hurt by lower prices for their outputs) and income earners (benefitting from higher wages and employment level, and increasing capital income). They are also affected by other channels, such as changes in transfers. Hence, it is now consensual that the impact of trade on poverty is ambiguous, depending on the size of the price change, on whether the poor are net producers or net consumers of the goods affected by the trade reform, on the response and nature of the labor markets, and so on.

Growing attention has been attributed to the idea that trade liberalization could be a powerful driver of growth in the long term but that they might be adjustment costs and losers might oppose the change in the short term. Indeed, according to Krueger (1990), one of the reasons to the opposition to trade liberalization is the fact that losers might be more concentrated and thus more easily identifiable, whereas the gains are diffuse and appear merely prospective and theoretical.

In the end, effects of trade liberalization and openness are complex and ambiguous, and in order to make policy recommendations regarding trade reforms, their distributional impacts on different segment og the population should be assessed and need to be tested against broad development objectives of poverty reduction, and food security.

2.3. The role of trade in the ownership and "policy coherence for development"frameworks

Beyond those academic debates, in terms of policy recommendation, it is now consensual that the balance between the market and the state will depend on the country, the capacity of its government, and the institutional development of its markets. What is the role foreseen for trade in the case of Sub-Saharan African countries?

As we have seen in the previous section, trade liberalization policies have always exercised influence on development theory and practice promoted by the international financing institutions (IFI) and donors in Sub-Saharan Africa since the apparent success of "outward growth strategies" of Asian countries in the 1980s. Unilateral trade liberalization has been an integral part of the structural adjustment plans promoted by the IFI in that period and implemented mostly in the 1990s in African countries. Since the end of the structural adjustment programs, the World Bank has continued to promote trade integration into international markets as an engine of growth for Sub-Saharan African countries through the Integrated Framework Diagnostic Trade Integration Studies (DTIS) which are country-case evaluation of the internal and external constraints on integration into the world economy, recommending areas where technical assistance and policy actions are needed.

From the Fourth Ministerial Conference of the World Trade Organization (WTO) in 2001, African countries have been encouraged to take active part into the multilateral trade negotiations. The specific needs of developing countries were supposed to be taken into account in the Doha Development Agenda (DDA) negotiated in the new round known as the "Doha Round". Ensuring that African countries could benefit from the DDA has been a focus

point of the negotiations (Lamy 2011), but determining the conditions under which they would has been an issue subject to heated debates. A new agenda of trade facilitation was even included in the WTO to take into account the specific needs of the poorest countries. It is related to a larger Aid for Trade[15] agenda provided by donors of the official development assistance (ODA) to developing countries.

A sign that trade is more than ever considered a powerful tool for development in African countries by all donors is the increasing trend of Aid for Trade in the ODA. Indeed according to the report on Aid for Trade in Africa prepared by the Economic Commission for Africa (UNECA 2011) the growth rate of Aid for Trade commitments to Africa has grown twice as fast as the growth of the total ODA commitments to the Africa (respectively 21.4 per cent per year and 11.1 per cent per year in real terms between 2006 and 2009) and since 2009 Africa has been the largest recipient of Aid for Trade.

But at the same time increased focus has been placed on the necessity for the government of the developing countries to increase the ownership of their reform agenda (Stiglitz 1998), which might require governments that face administrative and political limitations to focus their policy-making capital at one target at a time, hence to prioritize the reform they want to implement (Haussman, Rodrik and Velasco 2006). Realizing that ownership was critical to the success of the structural adjustment plans, the IMF and the World Bank initiated in 1999 the Poverty Reduction Strategy Papers (PRSP) which are documents that each Least Developed Country had to complete before being able to access their loans. The PRSP are supposed to describe the comprehensive strategy for poverty reduction that the country wants to undertake, so that every ODA partner can refer to the country-based strategy and integrate its action within it.

But the focus on "ownership" in a context of lack of good governance and political will, and limited human and financial capacity has been seen as a potential constraint to the implementation of commitments, and has risked eroding confidence and generating mistrust between donors and recipient countries. At the creation of the African Union in 2001, and the New Partnership for African Development (NEPAD), it has led African countries to take an initiative to improve governance through the African Peer Review Mechanism (APRM)

[15] The 2005 Hong Kong Ministerial Declaration provided the mandate for further developments of the Aid for Trade agenda. According to the UNECA (2011) "*This was recognition that in the long run, important gains in economic growth can be achieved, especially in Africa, through trade liberalization. […] To enable developing countries to reap full benefits from liberalization, public investment in infrastructure and institutions, as well as private and public investment in productive capacity, are necessary co-requirements to liberalization that developing countries alone are unable to deliver. Therefore, the core purpose of Aid for Trade is to help developing countries to (i) increase their trade of goods and services, (ii) integrate into the multilateral trading system, and (iii) benefit from liberalized trade and increased market access.*"

(Ndulu *et al.* 2008). In terms of trade reforms, since the independences in the 1960s, priority has consistently been placed on regional cooperation and integration to unlock the numerous very small, landlocked countries within the African continent and build a united Africa to the fight the impact of colonialism (UNECA 2006). This was reaffirmed at the creation of the African Union in 2001, and commitments to regional trade integration have been renewed at the last African Union Summit in January 2012 named "Boosting Intra African Trade".

Despite the recognition of the need for ownership, political economy analysis have showed that past economic reforms in Africa have been more driven by external political prescriptions of the World Bank than by the domestic political economy influence (Jones, Morrissey and Nelson 2010). According to Ndulu *et al.* (2008), "*the role of aid agencies in transmitting global ideas and standards, particularly through aid conditionality, is likely to be uncommonly strong in Africa, given the significantly higher dependence on ODA within the region than elsewhere in the world*." Until the new actors of the cooperation scene from emerging economies rebalance the state of play (Smith and Zimmermann 2011), it might be assumed that the extent of Sub-Saharan African countries ownership over the policy reform to prioritize will depend on their capacity to understand and influence their donor's positions.

Despite the focus of the IFIs on increasing participation of Sub-Saharan African participation in global trade, one cannot but notice that the interest of most Sub-Saharan African countries into the multilateral trade negotiations has been rather defensive in ensuring that they kept a special and differential treatment allowing them to protect and support their agriculture, backing attacks on developed countries own policies where they felt their export commodities were threatened by developed countries subsidies (cotton exports of the US and sugar exports of the EU), proposing increased market access for LDCs to prevent, or at least mitigate, the negative effects of multilateral tariff reductions on their preferential market access (UNCTAD 2006). Those issues relate to the increased consciousness for the need of "policy coherence for development" led by the recognition that in a globalized world, the impacts of developed countries policies on developing countries are equally as important to consider as developing countries own domestic policies, according to Matthews and Giblin (2006).

Building from their framework, it can be further argued that policy coherence is a specific importance for the agriculture of Sub-Saharan African countries for several reasons. First, the agricultural sector relates to the Millenium Development Goals of eradicating extreme poverty and hunger, for which Sub-Saharan African countries are the worst

performers. Secondly, as presented above the agricultural sector is still a dominant source of income for poors and of foreign exchange for the countries. Third, policies of Organization for Economic Cooperation and Development (OECD) countries affect the trade and development opportunities of Sub-Saharan African countries in several ways including directly through their development cooperation policies, including aid coordination and trade capacity building which condition direct support to agricultural development in SSA, as described above, but also through the domestic agricultural instruments in OECD countries which impact international markets conditions, and their agricultural trade policies regulatory interventions (aiming at ensuring food safety, or environmental protection, for instance but are de facto non tariff barriers to trade).

2.4. Take away recommendations for the dissertation: favor comparative ex-ante approaches to replace trade policies into the "coherence for development" framework

Considering the strength of the academic debates presented above, the dissertation is voluntarily set outside normative considerations on the type of desirable policies and will consider both agricultural policies and trade policies.

From the previous section we conclude that trade reforms that best serve Sub-Saharan Africa's interest could come both from Sub-Saharan African own reforms but also from trade reforms from the rest of the world. Looking at the existing literature, there is no consensus on whether the Sub-Saharan African countries should better focus on regional integration, the multilateral negotiations at the World Trade Organization, or other types of trade negotiations they might be involved in. Neither is there much focus on whether those types of negotiations are complementary. Our assumption is that considering the limited negotiation capacity constraints highlighted by several analysis from the United Nations, and the calls from many countries for capacity building support on issues relating to trade negotiations (e.g. UNCTAD 2006), the multiple trade negotiations might be competitors in terms of "policy-making capital" (Haussman, Rodrik and Velasco 2006).

Tsikata (2001) identify the need to prioritizing commitments as the key challenge for Sub-Saharan African countries: "*In view of the number of commitments and the resource requirements for their implementation, it is important to define a framework for selecting and prioritizing them, taking into account country-specific priorities. Africa should use its limited*

resources and institutional capacity selectively, concentrating on those commitments that can best serve its accelerated and sustainable agricultural development and food security goals."

But from the literature review we find that comparative ex-ante approach on radically different policy reforms from the point of view of the country are rarely if ever done. Hence, there is a need for research to help clarify policy options for Sub-Saharan African countries regarding trade policies.

Our choice is to empirically compare the impacts of different trade orientations according to the issues of interest to Sub-Saharan African countries. These policy analysis will be placed within a coherence framework where they are compared based not only on impacts in terms of Gross Domestic Product growth, but also on whether they promote agricultural growth which has a potential to be sustainable (which we will assess looking at the literature on the prospective evolution of agricultural markets in our first chapter).

Furthermore, development economics emphasize the fact that macroeconomic policies in Africa have been insufficiently linked with micro-level realities (Bhorat, Hanival and Kanbur 2006), while the micro-level policies implemented with no consideration for the macroeconomic context have failed. Hence, trying to bridge the gap between the different levels of policy analysis from the global to the household level should be a key concern.

2.5. What are the stakes of Sub-Saharan Africa in global agricultural markets?

The first step to determine the current trade negotiations of interest to Sub-Saharan African countries is to review them. What is the state of Sub-Saharan African participation in global trade? How dependent are Sub-Saharan African countries to trade? What are the trade negotiating options? What could be the benefits from additional market access?

Chapter I will try to answer those questions and make the main stylized facts on Sub-Saharan African agricultural trade and the debate that sometimes surround them understandable in order to explain the different policy prescriptions emerging from their interpretation and hopefully highlight the key policy implications for Sub-Saharan African countries in their diversity.

3. Outline of methodological motivation and main simulations

There has been a recent recognition that economic theory was not sufficient to predict the impact of economic policies in their complexity (Harrison *et al.* 2010), especially regarding the distributional effects across sectors and households (Winters, McCulloch and McKay 2004). Hence, in order to compare the different trade and agricultural policies identified in chapter I, the main methodological option of the studies undertaken in chapter II and III are to use empirical models for ex-ante simulations of the policy options.

3.1. The rationale for computable general equilibrium modeling

Several methodologies are available for evaluating ex-ante the impacts of different policies. The advantages and drawbacks of spatial and nonspatial partial equilibrium trade analysis, single-country and multicountry general equilibrium models, and gravity models to study trade liberalization have been reviewed by Bouët (2008). Our choice is to use computable general equilibrium (CGE) models, because we want to capture the linkages effects of differential sectoral growth, to be able to see the evolution of the agricultural sector within the rest of the economy, while analyzing Sub-Saharan African countries in the global context. Furthermore, they enable the analysis of the macro and the social impacts of policies, provided necessary data for instance on poverty and food insecurity are included (Sadoulet and de Janvry 1995).

As described by Bouët (2008), the first objective of a general equilibrium model is to analyze how equilibrium is simultaneously determined in every market. A shock on the activity in a sector will have economy-wide effects, and change demand for primary factors and their remuneration. This will therefore modify the cost of production for other sectors and the demand of intermediate goods addressed to other sectors. Further, it will affect the level of net public receipts and/ or expenses if the production or the utilization of some factors is either taxed or subsidized. The variation of remuneration will modify the income level of households, which in turn change their levels of consumption, and so forth. As a result of this full integration of income and interdependence effects, general equilibrium models account for the complete budget closure of a model. If the behavior of n agents is modeled and (n – 1) agents are globally in budget deficit (they consume more than they produce), the closure ensures that the nth agent is in surplus (produces more than it consumes) that this surplus exactly matches the global deficit of the other (n – 1) agents. In order to keep the models

workable, it is necessary to adopt simplifying assumptions about specific elements, such as policy instruments, household or government behavior, and complementarity/substitutability among productive factors. The model is usually first calibrated using the economic data of a social accounting matrix and additional parameters retrieved from external surveys of econometric estimates. The resulting system of numerical equations are usually solved for the equilibrium values of economic variables (Sadoulet and de Janvry 1995).

CGE models are particularly suitable to model developing countries' economies for which time series data are scarce. Furthermore they enable to undertake many counterfactual analysis and results are expressed in terms of variations of macroeconomic variables easily understandable by policy makers (Francois 2000). As a consequence, they have been extensively used to model policy options and their weight on policy decisions has been far from negligible (Derajavan and Robinson 2002). However, their results give rise to intense debate and they are perceived as "black boxes" which results are difficult to understand (Francois 2000, Piermartini and The 2005, Bouët 2008). Discussing the specific limits of CGE modeling is out of the scope of this dissertation, but a discussion of the limitations of each of the CGE modeling exercises in chapter II and III will be undertaken in order to clarify the types of policy prescriptions that can or cannot be derived from their results.

Reviewing the results from the literature on the prospects from international trade liberalization, Bouët (2008) offers four explanations for the divergent results of multicountry general equilibrium models. First, experiments are not the same. Indeed, assessing the impact of trade agreements that are still under negotiations is a difficult task because of insufficient information on the contents of the final agreement. Secondly, data are not the same. There are many potential sources of divergence starting with the social accounting matrix, data on economic policies, and the sectoral and product decomposition. Third, behavioral parameters are not the same because there is a disagreement in the scientific community on the values of these parameters. In particular, trade flows, and thus activity is very sensitive to the choice of the trade elasticity, which measures the degree to which a change in relative prices leads to substitution of imported products for domestic products. Fourth, theoretical assumptions are not the same. Several theoretical assumptions can be implemented in the CGE models. Labor and capital may be sector-specific or they can be reallocated to other sectors. Land supply may be fixed or may be positively related to real remuneration. Competition may be perfect or imperfect. Openness may or may not have a positive effect on factor productivity. Divergence

may also concern functional forms such as utility function, and complementarity versus substitutability of productive factors and intermediate inputs or among intermediate goods.

Those elements explain why simulation results based on different models are difficult to compare (Bouët 2008). They justify our choice of focusing the rest of the dissertation on the use of one model in order to undertake comparative analysis of the different policies. In the dissertation, we will as much as possible rely on the existing negotiated proposal, and make clear the remaining assumption we make, the data and parameters we use and their limitations.

It should be highlighted at that point that because of the methodological choice on CGE models, this dissertation focuses on how the trade policy reforms will affects the demand of Sub-Saharan African products and thus provide different opportunities for growth and economic development. Indeed, most supply side constraints are not well represented in CGE models. Despite some assumptions on imperfect mobility of factors, most CGE models rather assume ("*unrealistically*" according to Dorward *et al.* 2004) that economic agents, including the majority of smallholder farmers, are able to respond to new price incentives by substantially increasing their supply and they do not capture other constraints such as liquidity constraints on purchasing inputs when credit is not available, risk and uncertainty, which induce farmers to keep their scarce land and other resources spread across a "portfolio" of income activities rather than concentrate them in activities that may be more profitable. Additionally because of the lack of data, trade costs and other barriers to trade will not be integrated into our analysis. In this end it justified to consider that those assumptions do not reflect Sub-Saharan African countries reality. Hence our results should be considered as illustrating the potential demand for Sub-Saharan African products that could arise provided all those supply side constraints were relieved.

Nevertheless we are not oblivious of the complexity of the supply-side constraints of Sub-Saharan African countries and particularly of smallholder farmers within those countries. de Janvry, Fafchamps and Sadoulet (1991) show how the fact that smallholder farmers are linked to inadequate transportation, storage and communication infrastructures, have low levels of productivities and little technical or financial capacity to raise it on their own might in reality prevent many of them, and especially poor farmers within them, from taking advantage of any opportunities that arise. The main implication of this consideration for the policy implications that could stem from the results produced by the dissertation, is that

specific accompanying measures are preconditions in order to ensure that countries and households within these countries are able to take advantage of the new market opportunities.

3.2. Global modeling of multilateral and regional trade integration

Chapter II is interested in the consequences of different scenarios of trade integration on Sub-Saharan Africa. What are comparative impacts of multilateral a Doha Development Agenda, a Duty Free Quota Free market access for LDC and regional trade integration within Sub-Saharan Africa in terms of GDP and welfare growth?

These simulations presented in chapter II rely on the model Modeling International Relationships in Applied General Equilibrium (MIRAGE). Beyond a simple comparison of their macroeconomic impacts, the analysis assesses whether each type of trade integration promotes the processing of agricultural production and exports within Sub-Saharan Africa. Would those agreements promote the processing of agricultural products in Sub-Saharan Africa? What would the country-level impacts be?

Given the limitations inherent to multicountry general equilibrium models to assess detailed results at the country level, sectoral level, and households level, it is necessary to move to a single country CGE linked to household data to assess impacts on poverty.

3.3. Poverty reducing effects of agricultural policies and trade policies in Malawi compared

Chapter III is a case study focusing on Malawi, a landlocked resource poor populous country with favorable agricultural potential according to Thorbecke (2009)'s typology. Malawi is highly dependent on one agricultural export, tobacco, and one food crop, maize, and has become an emblematic case of the revival of agriculture, through its inputs subsidy program launched in 2005, the Fertilizer Input Subsidy Program (FISP). Evaluations of that program have highlighted the success in terms of increased production but findings have been more mixed impacts on food security and poverty (Douillet 2011) because of lack of available survey data. The opportunity cost of not having transitioned to a more broad based agricultural policy is often mentioned. To our knowledge none of the existing empirical studies compare the distributional impacts of those agricultural policies with different the trade arrangements Malawi is currently involved in.

What are the impacts in terms of overall growth, sectoral growth and poverty of the current agricultural policy, the future agricultural policy envisioned and the potential trade agreements currently negotiated?

The methodology chosen to answer that question is to transmit the shocks of the global trade reforms modeled with the global CGE MIRAGE from chapter II to the national framework and compare them with the impact of domestic agricultural policies. A new Social Accounting Matrix of Malawi for 2007 (Douillet, Pauw, Thurlow, forthcoming), with more detailed representation of agricultural sectors and households has been developped. The link with the latest available national household survey offers the possibility to analyze impacts of policy in terms of change in poverty.

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Chapter I

Trade policies and agricultural exports of Sub-Saharan African countries: Some stylized facts and perspectives

Abstract

It has long been consensual that limited market demand within poor African countries have hampered economic development of Sub-Saharan Africa and that countries therefore needed to rely on exports markets to spur economic growth. But despite benefitting from preferential agreements, Sub-Saharan African countries have been marginalized from global trade. Indicators of the exports of Sub-Saharan African countries are constructed to reflect their characteristics. Existing trade negotiating options are examined in the current context of agricultural markets. It appears that prospects at the regional level arise as well as at the global level, especially when looking at the opportunities from a policy coherence for development perspective. Regional prospects are even more acute in light of the global economic crisis affecting traditional trade partners.

1. Introduction

In spite of being among the most protected markets, Sub-Saharan African countries benefit from privileged market access to the rest of the world. Nevertheless, their participation in global trade has decreased in the last 50 years, even though they have stayed among the most trade dependent economies in the world.

A large strand of the international trade literature has focused on the prospects from further global trade liberalization and the potential positive or detrimental outcomes on Sub-Saharan African countries of the Doha Development Agenda (DDA) currently negotiated at the World Trade Organization (WTO). Recently, a Duty-Free Quota-Free (DFQF) market access towards LDCs was included in the Doha Round negotiations and is now used as a definitive argument that a successful conclusion of a Doha Round is bound to be highly beneficial for African countries (Lamy 2011).

But, Sub-Saharan African countries also have other trade negotiations on their agenda. For instance, there are involved in the Economic Partnership Agreements (EPA) with the European Union (EU), and some Sub-Saharan African countries that have refused to sign interim agreements which should have been concluded before 2007, have begun to experience an increase in the tariffs they face for their exports to the EU. The renewed political will to integrate at the continental level has led to efforts to rationalize the membership of African countries belonging to several regional economic communities, for instance, successfully leading to the creation of a common market from the previous custom union with a common external tariff (CET) for the EAC in 2010 and to the implementation of the Southern African Development Community (SADC) Free Trade Agreement (FTA) in 2008 (UNECA 2010).

What do the "stylized facts" about Sub-Saharan African agriculture and trade (i.e. simplified presentation of empirical trends) imply in terms of the current trade agenda outlined above? Why have Sub-Saharan African countries lost their share in global markets despite the many non reciprocal preferential schemes already granted? What could be the benefit from additional market access? What is the renewed attention at the regional level worth? What does the stagnation of the EPA negotiations mean?

Diverging "views" or normative interpretation of the stylized facts lead to distinct policy recommendations, many of them revolving about whether global or own trade reform are priorities for SSA. Some of the diverging predictions are also related to the fact that, for the sake of simplicity or because of lack of data, it is often referred at "Sub-Saharan Africa" as if it was a homogenous group, when the region is composed of many different countries of various economic development stage and with potential diverse interest in agricultural trade.

Understanding the main stylized facts on Sub-Saharan African agricultural trade and the debate that sometimes surround them can contribute to explain the different policy prescriptions emerging from their interpretation and hopefully to highlight the key policy implications for Sub-Saharan African countries in their diversity.

The rest of this chapter is organized as follow: Section 2 will sketch the main stylized fact of the participation of Sub-Saharan African countries in international trade with a specific focus on agricultural trade and try to underline the main explanations and debates surrounding them. Section 3 will turn to the regional and preferential trade agreements the region is involved in, once again outlining the main academic debates there are subject to. Section 4 will provide some key statistics and indicators regarding the extent of tariff barriers imposed

by Sub-Saharan countries and faced by their exports and will highlight the debates surrounding the impacts of non tariff barriers and trade costs, especially on value-added exports. Eventually, section 5 presents the perspectives in terms of trade agreements negotiated, evolution of global markets and existing ex ante evaluation on the prospects of Sub-Saharan African countries on those issues, and section 6 concludes.

2. Sub-Saharan Africa in international trade

Sub-Saharan African countries face three challenges in their integration in international markets: their dependence to trade, their marginalization in international trade and the concentration of their exports.

2.1. The challenge of dependence

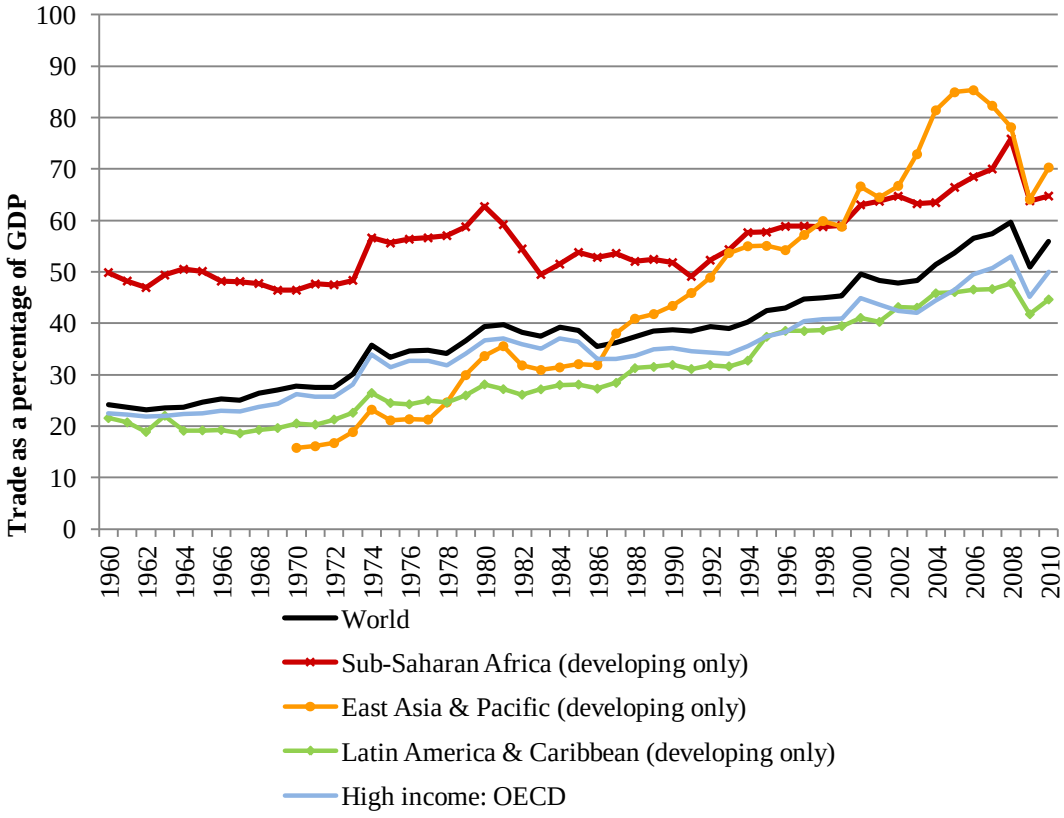
Sub-Saharan African countries are among the most trade dependent economies in the world, in terms of trade as a share of their GDP, of dependence of their government revenue on tax on international trade, but also of dependence upon primary exports.

2.1.1. *Is Sub-Saharan Africa "open" ?*

An indicator often reported in trade statistics is the Trade-to-GDP ratio, or "trade dependence". For a single country, it represents the combined weight of exports and imports as share of the GDP.

This ratio is often called the "trade openness ratio" which may be somewhat misleading. Indeed the value is sometimes used to argue that Sub-Saharan African countries are "open" countries compared to global standard and interpreted as meaning that there is little more they can expect from further integration in world markets, as is argued for instance by Beavogui (2005). However, it is not because this ratio is high for a given country that this country can be considered "open" in the sense the trade barriers it imposes on its imports or the one its exports are facing are low. It is thus not possible to evaluate trade regimes as "open" or "closed" on the basis of this indicator alone. It is rather an index of dependence to trade and sensitivity to trade shocks.

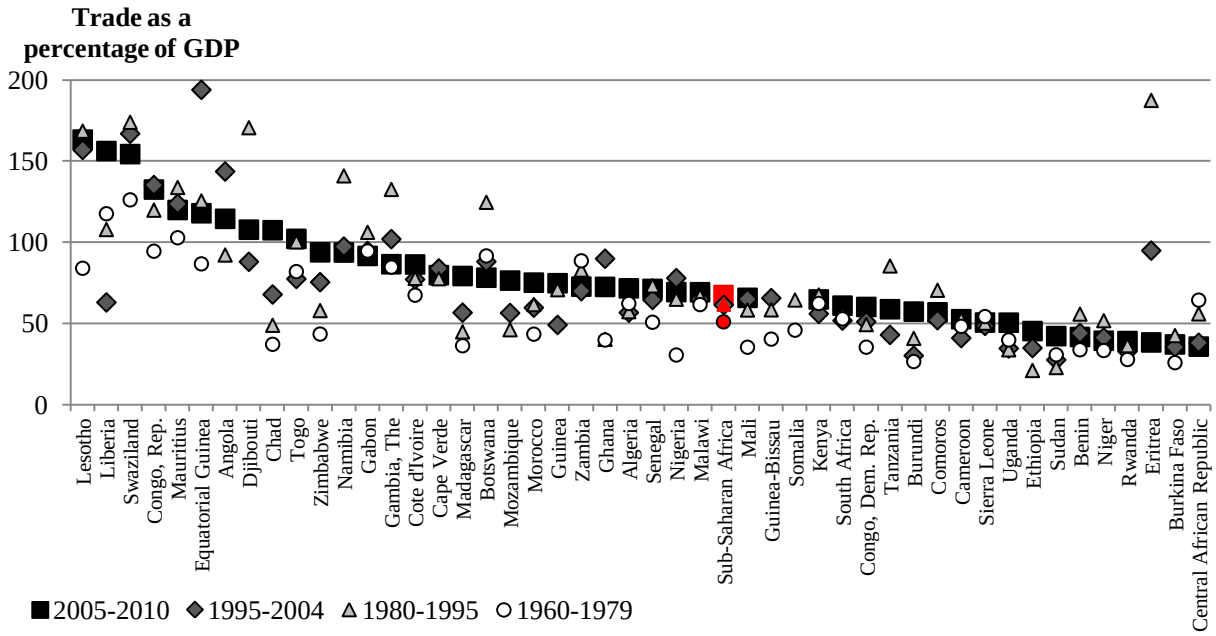
FIGURE I.1 — EVOLUTION TRADE-TO-GDP RATIO, 1960S-2010



Source: Author's calculation from the World development indicator database

Figure I.1 enables comparing the trend of the ratio of total merchandise trade on GDP of Sub-Saharan Africa to other regions of the world since the 1960s. It appears that the region has always had on average a higher dependence to trade than other regions of the world, including other developing regions. This is linked to the historical pattern of export oriented colonial economies that the Sub-Saharan African countries were left with at their independences in the 1960s. The global trend has been a steady growth of the trade to GDP ratio from 22 percent in 1960 to 55 percent in 2010, very similar to the trend of high income countries of the Organization for Economic Cooperation and Development. Comparatively the trade to GDP ratio of Sub-Saharan Africa fluctuated around fifty percent until the late 1980s with a temporary rise between the two oil shocks in the 1970s, until. Since the 1990s with the structural adjustment policies favored liberalization and integration to world trade the ratio for SSA started following world trend. Since the 1990s, the trade to GDP ratio of developing countries from East Asia and the Pacific has reached that of Sub-Saharan African countries and is now higher at around 70 percent.

FIGURE I.2 — TRADE TO GDP RATIO OF SUB-SAHARAN AFRICAN COUNTRIES 1960 TO 2010



Source: Author's calculation from the African development indicator database

As apparent in Figure I.2, countries in SSA are heterogenous and this index ranges between 30 (Central African Republic) and 160 percent (Lesotho). Historical evolution at the country level has been much wider than reflected by the regional average.

The fact that most countries in SSA tend to have a high trade to GDP ratio means that they are relatively more sensitive to changes in the global trade context than the rest of the world. Additionally considering that Sub-Saharan African countries are among the poorest countries of the world, their higher trade to GDP ratio means that they are very dependent on imports for their consumption, and exports as a source of foreign exchange earnings and revenue at the national level, so they are likely to be not only sensitive but also much more vulnerable to trade shocks than other countries in the world.

2.1.2. *Dependence on revenue from tax on international trade*

Additionally, the share of tax on international trade as a share of revenue is particularly high for most Sub-Saharan African countries as compared to the rest of the world, even in other developing countries that have similar trade to GDP ratio such as East Asian developing countries, as apparent in Table I.1.

TABLE I.1 —TAX ON INTERNATIONAL TRADE AS A SHARE OF REVENUE

Country	Taxes on international trade (% of revenue) average 2006-2010
Lesotho	58
Swaziland *	48
Liberia	42
Namibia	41
Cote d'Ivoire	38
Madagascar	30
Cameroon*	29
Ethiopia*	29
Sierra Leone	26
Benin	21
Togo	19
Zimbabwe*	19
Burundi*	18
Ghana	18
Niger	17
Congo, Dem. Rep.	15
Cape Verde	13
Burkina Faso	12
Kenya	10
Uganda	9
Zambia	9
Congo, Rep.*	8
Mali	8
South Africa	4
East Asia & Pacific (developing only)	6
World	5
Latin America & Caribbean (developing only)	5
OECD members	0.3

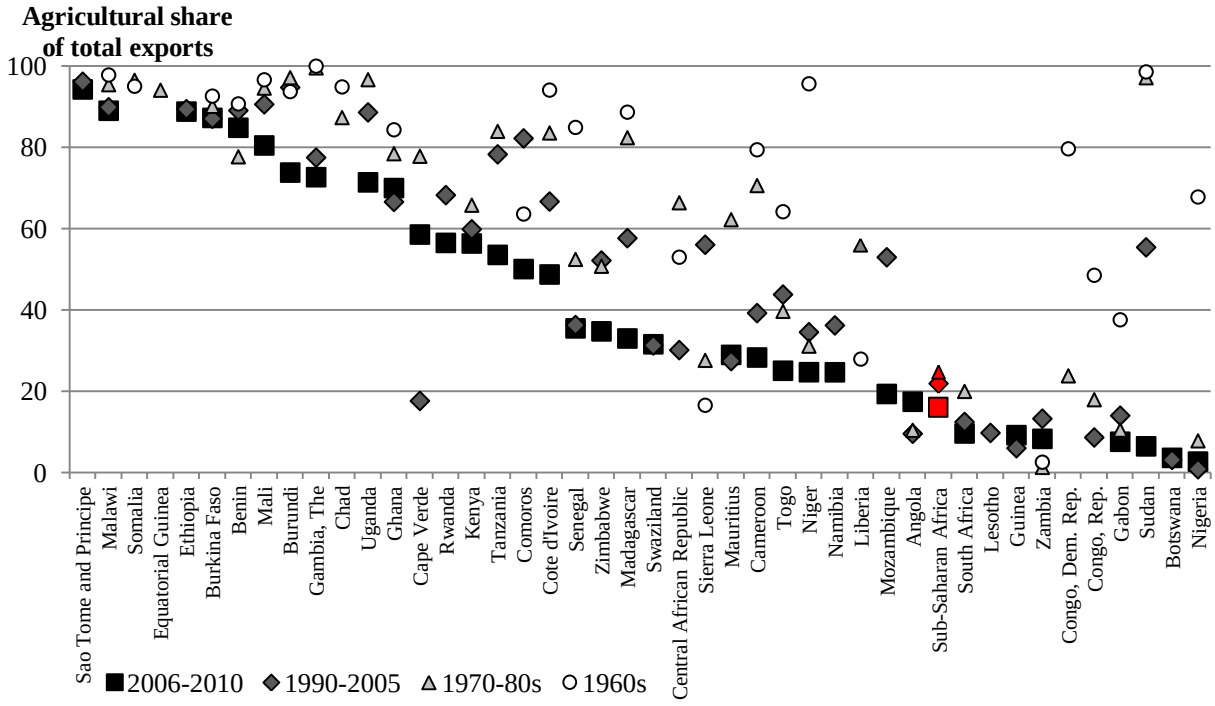
Source: Author's calculation from World Development Indicator
Note: * average value for 1995-2005.

As in most poor countries, governments have difficulties raising taxes, because of administrative constraints and a high level of informal economy, it is difficult for them to replace tariff revenue loss with other taxes (IFC 2009). This can explain that those countries can be reluctant to reduce their import tariffs.

2.1.3. *Dependence on agricultural trade*

As shown in Figure I.3, most countries in Sub-Saharan Africa export a large share of agricultural goods.

FIGURE I.3 — AGRICULTURAL SHARE OF SUB-SAHARAN AFRICAN COUNTRIES TOTAL EXPORTS, 1960S-2010



Source author's calculations from the African development indicator database

Although the regional average is not available for the 1960s, it is apparent that most countries were dependent on agriculture for more than 60 percent of their exports. But this share has tended to decrease with time since the 1960s, as agriculture decreased in the GDP of many countries but also as many of them exploited their natural resources. For instance, in the 1960s 68 percent of Nigeria's exports were agricultural products. But in the 1970s this share dropped to 1 as the country started exporting fuel which now composes 94 percent of its exports. Today most countries, still rely on agriculture for more than 20 percent of their exports and among them many such as Benin, Burkina Faso, Burundi, Ethiopia, Gambia, Ghana, Kenya, Malawi, Mali, Rwanda, Somalia or Uganda still rely on agriculture for more than 50 percent of their exports. Most of them do not have access to large reserve of natural resources.

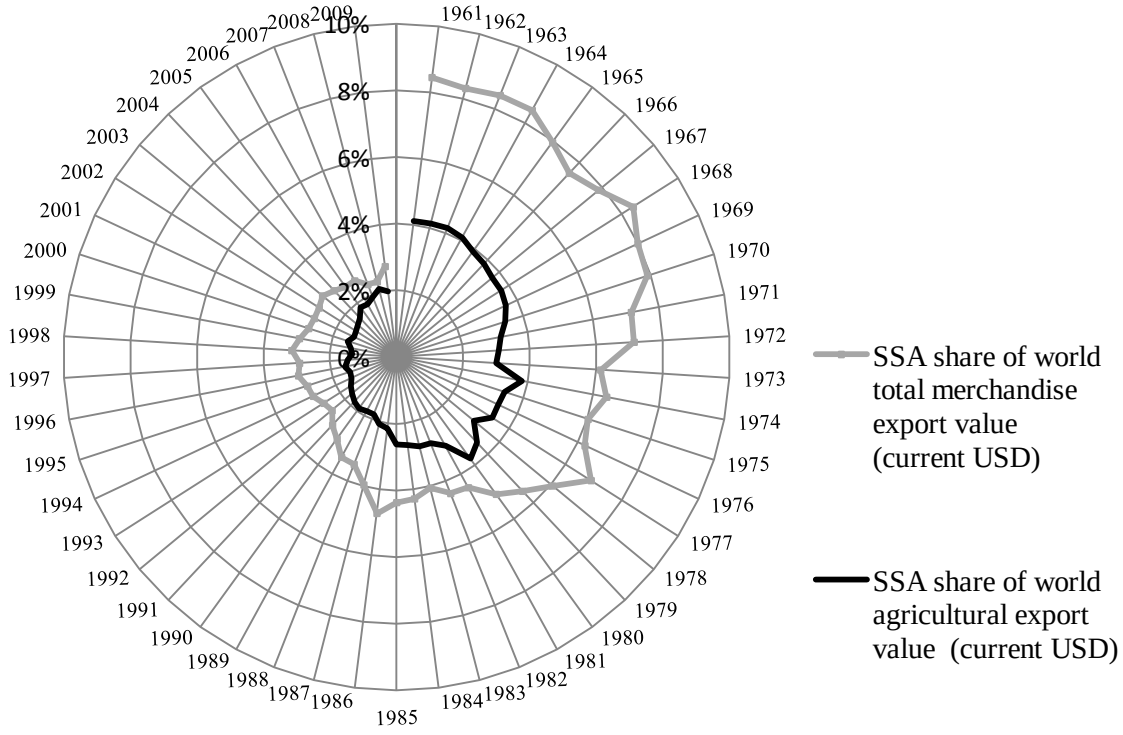
Sub-Saharan African countries tend to be more dependent on agricultural exports than the rest of the world, for which agricultural share of total trade has decreased from 30 percent in 1960s to 10 percent in 2010 according to the World Development Indicator database.

2.2. The challenge of marginalization

African agricultural exports represent less than 3 percent in total merchandise trade in 2009, with this share slowly increasing since 2008, and less than 2 percent share in agricultural trade with a decreasing trend since 2008. Considering the importance in the economies of Sub-Saharan African countries as shown above compared to this small participation in global markets, as Morrissey (2005) puts it "*exports are very important to African countries even if African exports are not very important in the world market*".

Moreover, Sub-Saharan African countries participation in global merchandise and agricultural trade has decreased since 1960s, as shown in Figure I.4.

FIGURE I.4 — SHARE OF SUB-SAHARAN AFRICA IN TOTAL MERCHANDIZE AND AGRICULTURAL TRADE



Source: Author's calculation from FAOstat

A large strand of the literature in international economics has analyzed that trend, and tried to explain it. Several key findings appear from the literature survey:

First, a large strand of the literature associates the poor participation in global trade to the region's poor economic performance and lagging development. Rodrik (1998), through a cross country econometric regression, and Foroutan and Pritchett (1993) through a gravity

equation[17] find that the poor economic growth of SSA explains its poor export performance. Tentative normative interpretation of the stylized fact of low and decreasing participation of SSA in global trade from this strand of the literature is persistent. Subramanian and Tamirisa (2001) expose the terms of the debate. According to them, it is important to know whether SSA is "over" or "under" trading because diverging answers to the question will lead to distinct policy recommendations. For instance Sachs and Warner (1997) by looking at the determinants of the small economic growth of countries in SSA through a cross-country regression conclude that those countries "missed" their globalization because their policies were not open enough. According to the authors, the restrictions have cost Africa about 1.2 percent of growth per year on average. Subramanian and Tamirisa (2001) find that SSA is undertrading and thus particular emphasis should be put on "policy intervention to assist Africa better exploit its trade opportuntites". While recognizing that views differ on the nature of such action, the authors recommend unilateral liberalization by countries in SSA. On the contrary, the propopents of the "view" that SSA has traded "normaly" such as Rodrik (1998) put emphasis on improving the other drivers of economic growth than trade first, in his case mainly institutions. But pushing this debate further, Bouët, Mishra and Roy (2008) show that accounting for transport and communication infrastructure reduce the "undertrading" tendency of Africa in the gravity model framework. In some specifications, they find that the "under-trading" effect vanished altogether suggesting that considering the weak trade infrastructures in Africa, its low participation in global trade is "normal".

Second, another strand of the litterature compare the evolution of Sub-Saharan Africa with that of competitors. Initial shares of Sub-Saharan African countries in global trade were displaced by Latin American and Asian countries because African exporters did not remain competitive even for their traditionnal exports, for which they used to be dominant providers on the global markets in the 1960 years (Ng and Yeats 2002, World Bank 2000). Anti-agricultural and antitrade biases of past global and domestic policies in Africa (Anderson and Masters 2009) have been documented to have had a negative impact on the development of competitive export sectors in SSA but also on agricultural productivity growth. According to the distortion database of the World Bank, even if those distortions were reduced during the Structural Adjustment period, some still remain in many countries of SSA. Many studies assess that productivity growth has not resumed in Africa as much as in the rest of the world

[17] which explain the level of trade bteween two countries based on their respective GDP, their "distance » and a range of other variablesvariables.

(Haggblade and Gabre-Madhin 2010, Haggblade and Hazell, Nouve and Staatz 2003, Block 2010). A large literature in microeconomics focuses on the supply-side constraints which prevent many farmers, especially the poor ones, from taking advantage of market opportunities that arise (see for instance de Janvry, Fafchamps and Sadoulet 1991). These constraints due to low levels of productivities of the farmers and their little technical or financial capacity to raise it on their own, but also to the inadequate transportation, storage and communication infrastructures in the countries. Additionally, compared to similar regions in Brazil and Thailand, it seems that the few agricultural export products for which African countries are competitive are unsustainably exploiting favorable agro-ecological features and cheap labour (Poulton *et al.* 2009).

Third, another strand of the literature focuses on the composition of the exports and the conditions of the global markets. Historical determinants explain the initial structure of external trade of African countries in the 60s which had been mainly determined by the colonial power who needed natural resources such as timber and minerals, and tropical agricultural crops (coffee, cocoa, cotton, etc…; Devèze 2008). It appears that the composition of the exports have not changed drastically changed since then. Morrissey and Mold (2006) look at the volume of exports, considering that previous studies have fixed too much attention to the value of African exports, something which, as primary commodity exporters, is largely beyond their control. Looking at UNCTAD data from 1980-2002, they find that despite a fall in export volumes during the crisis period in the 1980s, the volume of exports have subsequently expanded quite impressively, by around 80% over the period since 1990. But these gains have been largely offset by a significant decline in the terms of trade over around 20 percent over the whole period, leaving the value index of exports only 20% higher, which is significantly less than the expansion in exports value from other parts of the world. These figures hint at the extent to which gains from a supply-side response have been hidden by falling commodity prices and increased size of the global market.

Beyond competitiveness and economic growth it is interesting to look at characteristics of merchandize and agricultural trade of SSA in more details to try to determine what is exactly at stake.

2.3. The challenge of concentration

A stylized fact often heard is that countries in Sub-Saharan Africa are specific at the world level because they present a much higher concentration of their exports (e.g. in the case of LDCs Bouët and Laborde 2011).

Thanks to the trade data of the MAcMap database, an index of product diversification for 2004 is constructed based on Herfindhal equivalent number, which represents the number of markets of identical size that would lead the degree of export concentration exactly equal to the level observed[18]. The index of product diversification of country *r* is NE_r calculated as follow:

$$NE_r = \frac{1}{\sum_i \left(X_{ri} / X_r \right)^2}$$

where

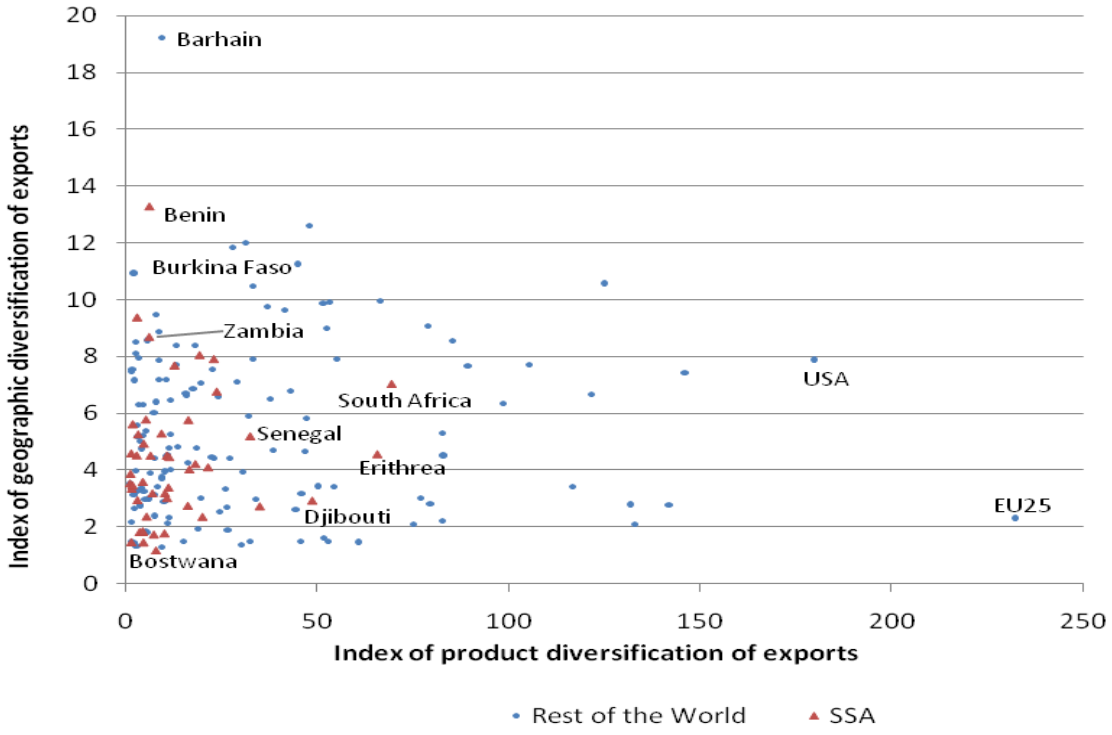
X_{ri} : Exports of product *i* by country *r*.

X_r : Total exports of country *r*.

Similarly, we compute an index of market diversification (replacing products with partners). The interpretation of those indices are straightforward: the higher those indices are, the higher the diversification.

[18] See OECD, 2005, International Indicators of trade and economic linkages.

FIGURE I.5 — PRODUCT AND DESTINATION DIVERSIFICATION INDEX



Source Author's calculation based on MacMAps 2004
Note: Sub-Saharan countries are represented by red triangles.

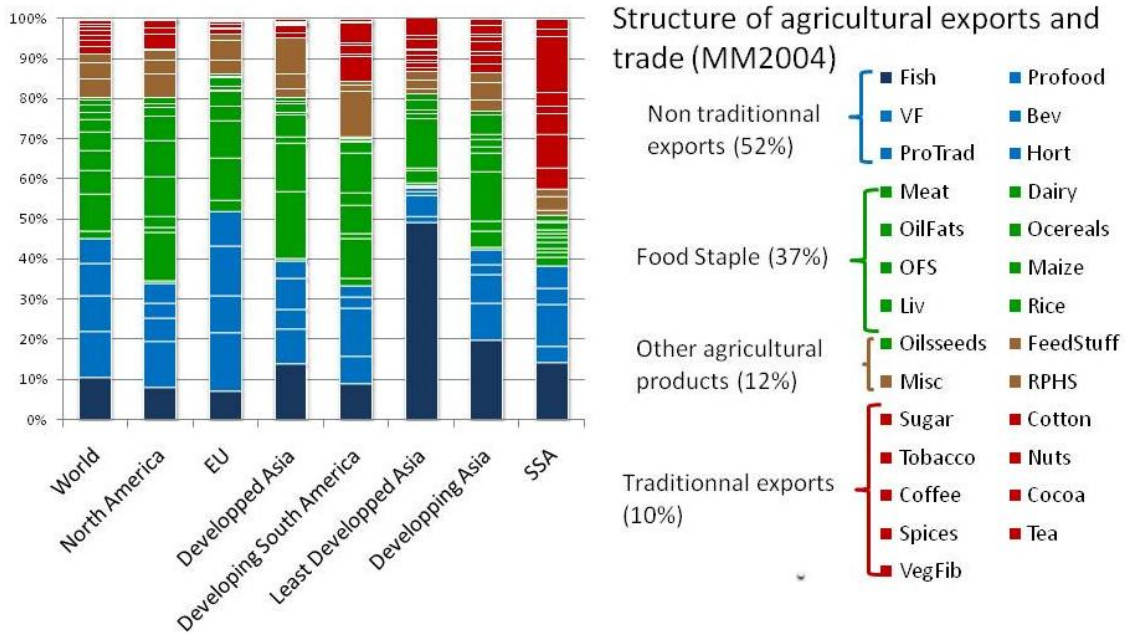
The results of diversification of products and markets are presented in Figure I.5. We can see that compared to the rest of the world, Sub-Saharan African countries (represented with the red triangles) generally have a more concentrated structure of exports, especially in terms of products. There is large variation between countries within SSA, with Benin for instance presenting a very large geographic diversification of export destination when Botswana has among the lowest index both of product diversification and geographic diversification. This poor diversification means that Sub Saharan African countries are very sensitive to external trade shocks.

In terms of destination, the EU and the USA are the main destinations for sub Saharan African exported goods, with respectively 45 percent and 5.20 percent of agricultural exports in 2004 (MAcMap 2004). The structure of exports excluding oil, metals and mineral products from Sub-Saharan Africa to the EU is dominated by agricultural products whereas it is dominated by textile and apparel towards the US. Emerging economies such as India or China only account for 10 percent of total trade and 5 percent of agricultural exports in 2004 but according to COMTRADE time series, the share has been growing over time.

Appendix A illustrates this concentration by giving the first three products in terms of share of total exports for most sub-Saharan countries. It appears that many countries rely heavily on a few specific agricultural products. Furthermore looking at bilateral data at the Harmonized System 6-digit level (which is the most precise international level of the Harmonized system) such as the BACI database developed by the CEPII, enables to identify extreme dependence to some agricultural products by some Sub-Saharan African countries. According to those data, 57 percent of agricultural exports of Burkina Faso is composed of one specific cotton at the HS6 line level, and 40 percent of agricultural exports of Malawi is made of one very specific HS6 type of tobacco. Another feature about the commodities exported from Sub-Saharan Africa, is that many countries have specialized in similar types of products: overall the composition of agricultural exports of most Sub-Saharan African country is dominated by one of the following five commodities: coffee, cocoa, cotton, hides and skins, and horticultural crops. Many studies have underlined the dependence of some African countries on a few commodities. For instance, Porto, Chauvin and Olarreaga (2011) undertake case studies on cocoa, a crucial foreign exchange generator both in Côte d'Ivoire and Ghana, where it raises between 20 and 25 percent of all export revenue, coffee, which exports account for more than 10 percent of the total exports in both Rwanda and Uganda, cotton which accounts for more than one-third of total exports in Benin and Burkina Faso, and tobacco which accounts for more than 70 percent of export earnings in Malawi.

Figure I.6 illustrates that the structure of Sub-Saharan Africa exports is quite distinct from that of other regions of the world and from the average composition of world trade.

FIGURE I.6 — STRUCTURE OF AGRICULTURAL EXPORTS



Notes: VF = Vegetables and Fruits; ProTrad = Processed Traditional Exports; ProFood = Processed food products; Bev = Beverages; Hort = Horticulture; OFS = Other Food Staples; Liv = Livestock; Ocereals = Other Cereals; Misc = Products not elsewhere mentioned; RPHS = Hide and skins; VegFib = Vegetal Fibers.

Source: Author's calculation from MacMaps 2004

Concentration of the trade structure is an issue since it related to slower economic growth especially at lower levels of development (Imbs and Wacziarg 2003). According to a recent study by ITC (2010), to much dependence on a few export products increased the vulnerability to trade shocks and exposes the developing country to income volatility. Hence diversification is seen as a necessary condition for growth as well as developing higher value-added products.

3. The multiplicity of trade agreements

Concerning international trade Sub-Saharan African countries are specific because of the historical large trade preferences they have been granted and the low level of internal trade recorded despite the multiplication of trade agreements in the region.

Advantages and drawbacks of preferential and regional agreements for Sub-Saharan African countries are still debated, but a striking feature is the low overall academic support (in economics) for those forms of trade integration compared to multilateral trade liberalization. Theoretically, the economic impacts of further trade integration at the regional level (preferential or not) are in the same lines of the gains to trade described in the static and

dyna*mic trade literature (allocation effects, scale economies, variety effects, location effects, productivity and growth effects, described for instance by Baldwin and Venables 1995). But in his extensive literature review, Baldwin (2008) shows that the academic thinking on regionalism has been framed by the predictions of Viner (1950) [19] that the effects of regional trade integration are ambiguous, depending on whether the trade created among partner countries is additional or replace trade diverted from the rest of the world. Baldwin adds that an important effect missed by this framework is the impact on third countries, an effects all the more important that the economic literature since the 1990s has focused on whether trade preferences and regional agreements are "stumbling blocks" or "building blocks" (following Bhagwati 1991) toward the global objective of multilateral trade liberalization. For instance, Ozden and Reinhardt (2005) argue those countries that are granted preferences are slower in liberalizing at the multilateral level.

3.1. Regional economic integration

3.1.1. *The multiplication of regional initiatives*

Following the independence in the 1960s, regional cooperation and integration was considered by many African leaders a tool for promoting economic growth and sustainable development. Sub-Saharan Africa being characterized by the high number of very small, landlocked markets which are mostly dependent on their neighboring coastal countries for their trade flows, it could provide a rationale for the proliferation of regional agreements. But the main strategic objective was political, i.e. to fight the impact of colonialism and build a united Africa in a context of complex political issues (UNECA 2006).

The first step towards promoting continental unity was the formation of Organization of African Unity (OAU) in 1963, changed in 2001 in the African Union (AU). It was followed by many initiatives, in the form of multiple blocs at the regional level, but the decisive political commitment to integrate at the continental level was the Abuja Treaty in 1991 which committed the continent to fully integrate in the African Economic Community (AEC) by 2027, with a common currency, full mobility of the factors of production, and free movement of goods and services. The AU oversees the New Partnership for Africa's Development (NEPAD) an anti-poverty blueprint promoting good political and economic practices

[19] Baldwin (2008) highlights the limitations of the Vinerian framework and suggests that the trade creation/diversion terms probably persist in the economic literature because they are powerful tools to "focus policy makers' attention on the ambiguous welfare effects of regional trade arrangements" (Panagaryia 1999).

designed in 2000 at the continental level to nurture further integration and attract aid and investment. NEPAD emphasizes regional and sub-regional approaches while encouraging African countries to pool resources to enhance growth prospects by taking advantages of economies of scale and to build and maintain international competitiveness.

As apparent in Figure I.7, by 2006, instead of the 5 regional economic communities envisioned as an intermediary step towards the AEC (North Africa, West Africa, Central Africa, East Africa, and Southern Africa), there were 14, almost all of them having full economic union as a target. Most had been established as trade blocs with, in some cases, some political and military cooperation, but with according to UNECA (2006) countries seem to have barely analyzed the economic rationale of belonging to a particular group, the main incentives behind the creation of new groups rather being externally motivated by economic and political destabilization periods.

FIGURE I.7 — ASSESSING REGIONAL INTEGRATION IN AFRICA

Source: UNECA, 2006.

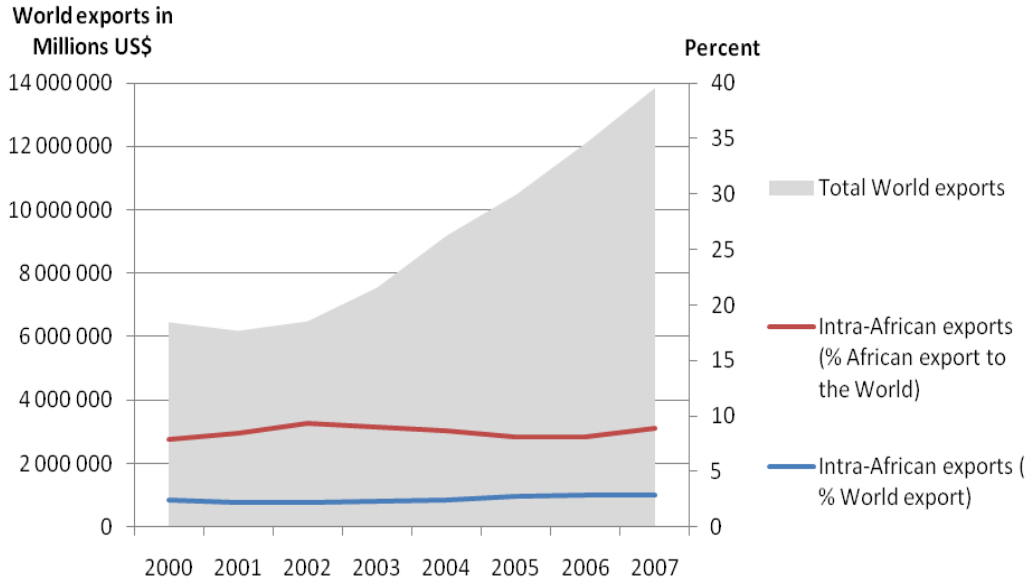
According to Fourth report Assessing Regional Integration in Africa of the UNECA (2010), the African Union (AU) together with member States have decided to put an embargo on the establishment of more RECs in Africa and rather focus on rationalizing the existing eight main RECs which are the AMU (Arab Maghreb Union), CEN-SAD (Community of Sahel-Saharan States), ECOWAS (Economic Community of West African States), ECCAS (Economic Community of Central African States), COMESA (Common Market of Eastern and Southern Africa), EAC (East African Community), IGAD (Inter-Governmental Authority on Development), and SADC (Southern African Development Community).

One of the main issue identified in Second report Assessing Regional Integration in Africa of the UNECA (2006) was the number of overlapping memberships of countries. Indeed 95% belonged to more than one agreement. The overlapping memberships are considered to have serious drawbacks and might have hindered regional integration rather than enhanced it because of the cost of duplicate efforts.

3.1.2. *Low intraregional share according to official statistics*

Additionally, despite the integration efforts aforementioned, intra-regional trade share of African countries is lower than other developing regions: intra-regional trade share represents less than 10 percent on average in 2004-06 of African countries total trade, when it is 20 percent for developing America and 47 percent in Asia according to UNCTAD (2010). According to Figure I.8, recent trends (UNECA 2010) show that intra-African trade has been growing more rapidly than African trade to the rest of the world for the last decade: intra African trade growth has been about 25 percent per year on average between 2000 and 2007, when growth in African exports to the rest of the world was 16 percent for that same period. Part of this trend is attributable to the overall better economic performance of African countries compared to the world in this decade.

FIGURE I.8 — EVOLUTION OF THE SHARE OF INTRA-AFRICAN TRADE



Source: Author's calculation from data from UNECA (2010)

3.1.3. *Historical low academic support in economics to regional integration*

Academic debates on whether African countries should pursue further trade integration have sometimes been based on the theory that integration will be beneficial only to the extent that it is pursued between countries that are "natural trading partners" which is mostly assessed based on indicators of initial trade volumes and transports costs between partners. This theory has been largely spread by Summers (1991) and Krugman (1991), and although it has been criticized by many others including Bhagwati, Lehman and Panagariya (1996), it is still refered to (UNECA 2006). It is based on that conception that critics to regional trade integration in African countries often argue that their production and export structure are often similar and their intra regional trade shares is low (UNECA 2006). But a limit to that analysis has been the fact that informal economy and informal trade undermines our knowledge of the exact extent of potential internal demand and intra-regional trade. Indeed, official statistics on which are based all the analysis do not take into account informal trade, but it is known to be important in Sub-Saharan African countries. For instance, informal cross border trade with Uganda's neighboring countries has been estimated at more than 80 percent of its official exports to those states (Lesser and Moissée-Leeman 2009). According to UNECA (2010), informal trade is the main source of job creation in Africa, providing between 20 per cent and 75 per cent of total employment in most countries. The informal economy might represent up to 40 per cent of the overall economic activity. Keeping in mind the fact that informal trade is

particularly important in bulk agricultural products, analysis based on official statistics not only tend to undermine the importance of the agricultural sector in the economy but also its regional perspectives.

As stated above, since the 1990 years the interest in regional trade integration in the academic economic literature has rather been in a comparative perspective with multilateral integration, and the trend has been to consider that multilateralism is bound to be superior to regionalism based on the view that multilateralism does not entail the risk of trade diversion, and that in any case dynamic gains from trade will be superior if developing countries trade with developed countries. This trend is apparent in the conclusions of Schiff and Winters (2003) summarizing World Bank research on regional integration and development.

Nevertheless, a consensual finding has always been that linking physical infrastructure such as roads and harmonizing quality standards could increase intra-regional trade and trade with the rest of the world, contributing to the growth of African economies.

3.2. The long standing –non reciprocal- preferences for African countries

The trade patterns described above have been shaped by those historical links but also through the preferential market access, provided through tariff advantages and/or tariff rate quotas to which they have been entitled since their independence.

3.2.1. *Historical preferences for African-Caribbean-Pacific countries in the EU market*

Sub-Saharan African countries are specific at the global level because they have benefitted from "*the long standing preferences for African countries*[20] "of the EU and from other specific preferential schemes.

Historically, African countries have had strong trade ties with Europe. The process of cooperation between Europe and its former colonies formally started when the first Yaoundé Agreement was signed in 1963 to foster economic cooperation with French-speaking African countries. With the accession of the United Kingdom into the European Economic Commission (EEC), the agreement was widened to include 46 Africa–Caribbean–Pacific (ACP) countries, and the Lomé Convention replaced the earlier agreement and was extended

[20] Grand-Baie Declaration of June 20th, 2003 by the Ministers of Trade of the Member States of the African Union

in 2000 to the Cotonou Partnership Agreement (CPA) that granted non reciprocal duty free market access to many Sub-Saharan African products. The CPA has been attacked at the World Trade Organization which has compelled the EU to reform it. It is now in the process of being transformed into reciprocal Free Trade Agreements between the EU and ACP main regions within the Economic Partnership Agreements (EPAs) negotiations. But in 2007 the WTO waiver for the Cotonou Agreements ended, without the expected conclusion of the EPA being successfully signed. Initiated as regional negotiations were pursued until 2008 on a bilateral basis between each ACP country and the EU, leading to only some country to sign Interim Economic Partnership Agreements which were supposed to be the first step towards the conclusion of the EPA.

3.2.2. *The multiplication of preferential schemes*

Together with other developing countries, most Sub-Saharan African countries also benefit from the Generalized System of Preferences (GSP)[21] set up in 1968 which is an umbrella that comprises the bulk of preferential schemes granted individually by industrialized nations to developing countries, with corresponding specific schemes for least developed countries. The GSP schemes grant specific reduced tariff modulated according to the degree of sensitivity of the products, excluding a substantial number of agricultural products. The preferential schemes designed for least developed countries that are the most important for Sub-Saharan African least developed countries are the European "Everything But Arms" (EBA) initiative set up in 2001, granting all eligible least developed countries duty-free, quota-free access for all products but arms (implementation for sugar, rice and bananas was delayed until 2009); and the North American "African Growth Opportunity Act" (AGOA) set up in 2000 also granting duty free quota free access to many tariff lines but excluding more "sensitive products", among which most agricultural products.

But there are constraints on participation to these schemes. All the GSP schemes except the EBA are temporary and renewed every few years. Furthermore countries eligibility are unilaterally decided by granting countries and not definitely negotiated, and most of them

[21] In 2009 there were 11 national GSP schemes notified to the UNCTAD secretariat (these GSP schemes are granted by Australia, Belarus, Canada, the European Community, Japan, New Zealand, Norway, the Russian Federation, Switzerland, Turkey and the United States of America).

impose rules of origin (ROOs) which are used to determine whether a good qualifies for preferential treatment when exported from one member state to another.

3.2.3. *Literature review on preferential agreements*

Preferential schemes have benefitted from more support than African regional integration in the economic literature.

Indeed, the fact that these policies are set by foreign, not domestic government, is viewed as an advantage by Collier and Venables (2007) since they are relatively immune from recipient country political economy problems and are fiscally costless to African governments (as long as they do not compete with aid). Additionally, Rodrik (2003) argues that the fact the beneficiary firms are required to face the discipline imposed by international competition can prove an important positive factor, underlying the success of East Asian export oriented strategies, as compared to the failure of past import substitution in Africa. Coherently with the new trade theory, preferential initiatives have the virtue of encouraging production for the export market, which are supposed to be more conducive to learning and spillovers of knowledge, in contrast with the traditional infant industry protection which encouraged protection for the domestic market.

Theoretically, the static benefits of trade preferences come from a transfer of the rent from the granting country (equivalent to the tariff revenue the granting country would gain without the preferential agreement) to the exporters of the recipient countries, and from the supply response mechanism generated by the increased prices which could create increased employment and increased wages. Additionally, it is also hoped that trade preferences can have a dynamic catalytic role on productivity. According to Collier and Venables (2007) nevertheless, trade preferences will only perform this role if imports of complementary inputs is facilitated and in countries with the skills and infrastructure near the threshold of global competitiveness. The success story of preferential policies is the famous Mauritius, the only African country to have decisively penetrated global markets in manufacturing and transformed itself from a poor sugar island to one of Africa's richest economies. According to Subramanian and Roy (2003) economic success is mostly due to manufacturing export-led growth, triggered by duty-free inputs for manufactured exports and the temporary trade preferences in garments through the multi-fibre agreement granted by OECD countries until 2004, which gave a crucial privileged access to OECD markets relative to established Asian producers.

As stated above, since the 90s, a central concern in the international trade literature has been that the future erosion of the preference rent might lead to adjustment costs and justify resistance to further global trade liberalization. In that sense, the existence of preferences has been identified since Krishna (1998) and Freund (2000) as one important stumbling block to multilateral trade liberalization. The fact that compared to Mauritius, it has been rather consensual that Sub-Saharan African countries had been rather unsuccessful in promoting export-led growth, only fuelled the position of the opponents to trade preferences.

But the preferences are found to have had an influence on the trade structure of beneficiaries (Collier and Venables, 2007, Elliott 2010). Evenett (2008) estimates from a comprehensive literature survey that the EU GSP has induced a increase by 30 to 60 percent of exports from beneficiary countries. Considering that effect, another concern is that preferential access to protected markets might "lure" Sub-Saharan Africa to concentrate their efforts in changing their dynamic comparative advantage towards the production of goods for which it does not have a global comparative advantage. According to that narrative, not only, would they suffer from a decline in MFN tariffs and preference margins erosion which would induce significant adjustment costs, but they might be even worse off because of the foregone opportunities to learn-by-doing in areas where they do have a comparative advantage (Ianchovichina, Mattoo and Olarreaga 2001). The fact that most trade preferences granted by the EU and the USA are motivated by political objectives rather than economic ones (explicitly justified on the basis of international solidarity, anti-drug or anti-terror policies, Baldwin 2008, ITC 2010) is a rather strong proponent for the view that they are not designed per se to help country change their structure of production and export in a way that benefit them the most.

But in order to determine what would be the impacts of future trade agreements, preferential or not, on Sub-Saharan African countries, we need to turn to a more precise analysis of the effect of the existing schemes.

4. The state of protection and market access

Two of the most asserted stylized facts related to global tariffs are that agriculture is the most protected sector and Africa the most protective region. But the extent to which Sub-Saharan African countries benefit from preferential access and whether it is beneficial or not to them is much debated. We will look at each of those facts in turn.

4.1. Protectionist agriculture and African region

Looking at the ad valorem tariffs of the Market Access Maps database (MAcMapHS6, Bouët *et al.* 2008) in Table I.2, we find that on average agriculture is the most protected sector worldwide and Sub-Saharan African among the most protective region on imports from other regions. The Sub-Saharan African region is also the most protective on intraregional trade. Hence much still can be done to increase trade integration in the region. Comparatively tariff barriers are already pretty low on average for SSA to other markets.

TABLE I.2 — WORLD WIDE PROTECTION PATTERN

		Exporter				
Importer	Sector	Developped countries	Emerging Economies	Other developing countries	North Africa	Sub-Saharan Africa
Developped countries	Agriculture	0.14	0.17	0.12	0.11	0.10
	Agro-industrial products	0.18	0.17	0.16	0.11	0.14
	Fish	0.04	0.04	0.05	0.04	0.05
	Other	0.03	0.04	0.03	0.03	0.02
Emerging Economies	Agriculture	0.13	0.13	0.11	0.09	0.19
	Agro-industrial products	0.24	0.21	0.25	0.18	0.32
	Fish	0.14	0.11	0.13	0.10	0.20
	Other	0.08	0.11	0.09	0.06	0.07
Other developing countries	Agriculture	0.12	0.20	0.17	0.20	0.15
	Agro-industrial products	0.19	0.32	0.21	0.25	0.22
	Fish	0.22	0.21	0.21	0.14	0.21
	Other	0.07	0.11	0.08	0.07	0.09
North Africa	Agriculture	0.21	0.25	0.26	0.17	0.12
	Agro-industrial products	0.40	0.26	0.37	0.18	0.82
	Fish	0.25	0.26	0.26	0.11	0.25
	Other	0.14	0.18	0.17	0.07	0.16
Sub-Saharan Africa	Agriculture	0.11	0.16	0.13	0.16	0.18
	Agro-industrial products	0.26	0.24	0.23	0.34	0.28
	Fish	0.16	0.11	0.10	0.05	0.15
	Other	0.10	0.16	0.12	0.12	0.14

Source: Author's calculation from MAcMapHs6 2004, reference group weighted aggregators

The ad valorem tariffs form the tables are equivalent measure of tariff duties and tariff rate quotas accounting exhaustively for preferential trade agreements that were calculated for each country at the HS6 level thanks to the MAcMapHS6 database.

4.2. Decomposing the preferential margin of SSA

Since countries in SSA are involved in many preferential agreement, it is expected that they should be advantaged compared to most countries in global trade and that they ought to benefit from a "preferential margin" compared to the tariff barriers that other countries face.

But analysis of the "preferential margin" require substantive amount of data on the level of tariff they should face compared to what they actually face, together with the level of trade actually involved. This includes specifically the Most Favoured Nation (MFN) bound, applied tariffs but also the preferential applied duties, which had not been available until the development by the CEPII and the International Trade Center (ITC) of the MAcMapHS6 database representing the full structure of protection cited above at the HS6 and bilateral level including the preferential tariffs[22].

4.2.1. *A decomposition taking into account the composition of exports*

The "preferential margin" can be defined differently depending on what it is compared to. By comparing the average protection faced by the exports of each country to the world average MFN applied duty, Bouët, Fontagné and Jean (2006) compute what they call an "apparent margin", AM_i defined for a given exporting country *i* as:

$$AM_i = \frac{\sum_r \sum_s \sum_h w_{s,r}^h t_{s,r}^h}{\sum_r \sum_s \sum_h w_{s,r}^h} - \frac{\sum_s \sum_h w_{s,i}^h t_{s,i}^h}{\sum_s \sum_h w_{s,i}^h}$$

where *s* are all the importing countries, *h* the exported products, *r* the exporting countries, $t_{s,r}^h$ the applied ad valorem equivalent duty imposed by country *s* on product *h* exported by country *r*, and $w_{s,r}^h$ is the value of products *h* exported by country *r* to country *s*.

This apparent margin is highly heterogeneous among countries as the result of two different effects: a composition effects and a "true" preferential margin. The composition effect depends on the composition of exports, hence on the specialization of countries and their geographic destination, CE_i for country *i* is defined as:

$$CE_i = \frac{\sum_r \sum_s \sum_h w_{s,r}^h MFNt_s^h}{\sum_r \sum_s \sum_h w_{s,r}^h} - \frac{\sum_s \sum_h w_{s,i}^h MFN_s^h}{\sum_s \sum_h w_{s,i}^h}$$

[22] Rules of origin are not taken into account and thus preferences are supposed to be fully used, even though there is some evidence that developing countries are not able to fully take advantage of those preferences.

where $MFNt_{s,}^{h}$ is the Most Favored Nation duty imposed by country *s* on product *h*. It is the difference between the average MFN duty faced by the world and the average MFN duty faced by country *i*. Since for each importing country *s* MFN duties are by definition the same across exporters *r*, the average MFN duty faced by exporter *i* is a measure of the composition of its exports.

The "true" preference margin captures more precisely the preferential margin the country has managed to negotiate thanks to the trade regimes it has been conceded. It is the difference between the apparent margin and the composition effect and thus the difference between the country's and the world's average preferential margin, defined as the weighted average across products of the difference between the MFN and the applied rate.

TABLE I.3. presents the decomposition of the apparent, composition effect and true margin computed for each Sub-Saharan country in 2004 based on the MAcMapHS6 database following Bouët, Fontagné and Jean (2006). The average MFN applied duty is 4.3 percent at the global level.

TABLE I.3 — COMPOSITION OF PREFERENTIAL MARGIN IN 2004, LIST OF SUB-SAHARAN AFRICAN COUNTRIES ORDERED BY INCREASING PROTECTION FACED

Countries	Applied duty faced on exports	AM	CE	TM
Dem. Rep. of Congo	1,0	3,3	4,6	-1,2
Equatorial Guinea	1,2	3,1	4,6	-1,5
Comoros	1,2	3,1	2,6	0,5
Liberia	1,3	3,0	3,5	-0,5
Lesotho	1,4	2,9	-5,6	8,5
Angola	1,4	2,9	4,4	-1,5
Chad	1,6	2,7	3,8	-1,1
Botswana	1,9	2,4	3,7	-1,2
Gabon	1,9	2,4	3,8	-1,3
Central African Republic	2,0	2,3	3,3	-1,0
Guinea	2,4	1,9	3,1	-1,1
Congo, Republic of the	2,4	1,9	3,0	-1,2
Nigeria	2,6	1,7	3,1	-1,4
Madagascar	2,7	1,6	-3,3	4,9
Sierra Leone	2,8	1,5	1,7	-0,2
Mozambique	3,2	1,1	-1,6	2,7
Sao Tome and Principe	3,7	0,6	0,7	-0,1
Cape Verde	3,9	0,4	-2,0	2,4
Cameroon	4,1	0,2	0,0	0,2
Sudan	4,3	0,0	0,8	-0,7
Mali	4,4	0,0	0,5	-0,6
Niger	4,4	-0,1	0,0	-0,1
Ghana	4,5	-0,2	-0,4	0,2
South Africa	5,0	-0,7	-0,1	-0,6
Zambia	5,5	-1,2	-2,0	0,8
Mauritania	5,5	-1,2	-1,7	0,5
Eritrea	5,8	-1,5	-3,3	1,8
Seychelles	5,8	-1,5	-5,2	3,7
Rwanda	6,5	-2,2	-1,4	-0,8
Cote d'Ivoire	6,5	-2,2	-3,0	0,8
Burundi	6,6	-2,3	-1,7	-0,7
Uganda	7,3	-3,0	-6,1	3,1
Tanzania	7,7	-3,4	-4,8	1,4
Namibia	8,2	-3,9	-4,8	1,0
Ethiopia	9,1	-4,8	-4,6	-0,2
Senegal	9,4	-5,1	-6,0	1,0
Somalia	10,2	-5,9	-9,0	3,2
Gambia, The	10,5	-6,2	-7,8	1,6
Zimbabwe	10,9	-6,5	-10,1	3,5
Djibouti	11,1	-6,8	-9,7	2,9
Guinea-Bissau	11,5	-7,2	-6,4	-0,8
Mauritius	11,5	-7,2	-13,0	5,8
Kenya	12,0	-7,7	-9,3	1,6
Burkina Faso	12,2	-7,9	-8,8	0,9
Togo	14,4	-10,1	-10,2	0,1
Malawi	14,4	-10,1	-23,3	13,2
Benin	14,6	-10,3	-10,5	0,2
Swaziland	22,9	-18,6	-25,5	7,0
HICs	3,9	0,4	0,0	0,4
MICs	5,1	-0,8	0,1	-0,8
Least Developed Countries	4,6	-0,3	-1,5	1,2

Source Author's calculations based on MacMAps hs6v2
Note: AM : Apparent Margin, CE: Composition effect, TM: True margin

TABLE I.3 shows that only 20 out of the 48 countries of Sub-Saharan Africa actually have a positive apparent margin. What is striking is that 30 African countries indeed face highly negative composition effect of their exports, because it is skewed towards protected goods, with 15 of them having a composition effect lower than -5. For some countries exporting highly protected goods such as agricultural goods for which developed countries still have tariff peaks, the negative composition effect can more than compensate a very positive true margin: this is the case for Malawi which relies on tobacco, and sugar for more than 70 percent of its exports revenue, two goods that are highly protected at the global level. On the contrary, natural-resource rich countries exports almost unprotected products and can compensate very low true margins: for instance, by exporting mainly petroleum (90 percent) and diamond (7.5 percent), Angola benefits from a positive composition effect and faces overall a very low protection on its exports. Hence, the situation of sub Saharan countries in terms of preference margin is far from being homogeneous even when they are granted similar preferences, and much caution is needed to interpret average tariff data.

4.2.2. *Taking into account competitors*

Other definition of the "preferential margin" further shed light on some specific features of the preferential agreements. Low *et al.* (2005) suggest that preference margins should be "adjusted" by the countries competing in the same market rather than the average MFN. Indeed, when the granting region extends the preferential access to new trading partners, as has been the case of the EU when it created the GSP schemes and extended preferences to other developing countries than the initial ACP countries, the original preference receiving countries, the ACP, had to compete with new exporters. Hence their "adjusted" preference became less than the apparent margin computed above suggest. By computing those "adjusted" preferential margin, Carrere and De Melo (2010) actually show that margin of least developed countries is about 3 percent in the EU market, and that, in spite of preferences under AGOA, least developed countries are actually discriminated against in the US market.

By combining the two approaches above, it appears that the "true adjusted" margin of Sub-Saharan African LDC is equivalent to the preferential margin of the other LDCs granted EBA in the EU, but it is worth much more than the margin of the developing countries granted GSP. Additionally, the "true adjusted" margin of the Sub-Saharan African non LDCs

countries is much more important than for other non LDC developed countries, even those who are granted the GSP.

This has considerable impacts in the EPA negotiations, since it is linked to the fact that the Cotonou Partnership Agreement offered much better preferences than the GSP schemes do. This explains why the non LDCs in SSA have stronger incentive to accept the Economic Partnership Agreements than the LDC do, since non LDCs would have much more to lose if they were transferred to the GSP scheme.

4.2.3. ***The utilization rates***

Since actually benefiting from the preferential schemes requires complying with several requirements, technical, administrative, or rules of origin, which are costly and complex, the benefit of preferential agreements cannot be considered as automatic, costless nor unconditional (Candau and Jean 2005, DeMaria, Drogue and Matthews 2008). Many studies have tried to look at the extent to which the preferential schemes were used by the exporting countries, but the lack of detailed data and the complexity of their analysis has restricted the actual measure and many debates still remain open. Brenton and Manchin (2003) argue that exporters are systematically under-utilize the GSP EU preferences scheme, but they do not take into account the fact that ACP countries could rather have used the CPA, especially since the rules of origin under CPA were less stringent. Estevadeordal and Suominen (2003) estimate that administrative costs of compliance to benefit from EU preferential arrangements range between 2.0 and 5.7 percent of the value of exports. This is consistent with the findings from Manchin (2006) and the mid-term review of the EU GSP scheme (Gasiorek *et al.* 2010) that preferences margins less than 3 to 5 percent tend to be ignored by exporters, who under these circumstances tend to pay the MFN tariff. In addition, the analysis suggests that given the export structure of the majority of GSP countries, the preference margin under GSP is rather small compared to MFN rates. It explains why they do not find much higher gains when they simulate the full utilization of GSP preferences.

Taking stock of the necessity to simplify and harmonize their rules of origin, most granting countries are discussing it at the Committee on the Rules of Origin of the World Trade Organization, although progress has been slow (De Melo and Cadot 2008).

4.2.4. *Impact on the concentration of exports*

Gasiorek *et al.* (2011) look at the utilization rates of the EU GSP preferences scheme according to the preference margin per product exported and the GDP per capita and level of development (as measured by the UN Human Development Index and Human Poverty Index) of exporters. A striking result is that growth in exports within the preference scheme is largely due to growth in existing export products rather than in new types of exports, hence the EU GSP scheme does not lead to diversification of exports.

According to the ITC (2010) analysis, some selective trade preferences with strong benefits, such as the sugar production that the EU imported from ACP countries at price well above international market prices as development aid can even have created historically a "forced dependency" leading those countries to specialize in the export of those specific commodities.

According to Gasiorek *et al.* (2011) the lack of diversification can also be related to the remaining tariff peaks in semi-processed and/or finished goods which hamper the local value addition of raw products and the existence of numerous 'sensitive products' being excluded from the EU GSP scheme. It is likely that this result can be generalized to all GSP scheme, not only the EU one. Often, many agricultural products are classified as 'highly sensitive' even though they represent the main export products of poor countries, and many Sub-Saharan African countries as we have seen above.

4.3. Tariff escalation on value added and processed agricultural products

The actual extent of market access for value added agricultural products from sub-Saharan countries is a particularly relevant issue. A "stylized fact" of tariffs worldwide is the fact that countries usually maintain higher tariffs on value-added products, compared with tariffs on raw commodities (Bouët and Laborde 2009). Looking at the MacMaps database, we find that at the applied MFN level, there is generally a substantial tariff escalation on transformed products compared to raw products, both in agriculture and other products, but more significant in agriculture. Considering that many sub-Saharan countries are exporters of raw agricultural products, but also in textiles and clothing, tariff escalation in those sectors are of specific concern.

In the agricultural value chain, tariff escalation could enable food processing sectors in many countries to benefit from relatively free access to international sources of inputs while

sheltering domestic processed products from foreign competition. But if importing countries escalate their tariffs, it makes it more difficult for countries producing raw materials to process and manufacture value-added products for export. Indeed, in the "policy coherence for development" debate, which looks at the impacts of policies from developed countries on developing countries, tariff escalation is suspected to some extent to have hampered the export-led industrialization possibilities of developing countries (Matthews 2003) since only a limited part of the value added-actually stays in producing countries. Van Berkum (2009) shows that although the number of commodities attracting escalating tariffs has been declining in the EU, tariff escalation is still prevalent in many commodities in which African countries are speciliazed, particularly cocoa, tomatoes, palm oil, soya, leather and cotton.

The concern is that tariff escalation might lock developing countries in the place of raw commodities exporters (Gasiorek *et al.* 2010). This issue is sufficiently recognized that it was added to the Doha negotiations and specific tariff cuts are negotiated.

Nevertheless, divergent results are found, depending on the tariff considered, the commodities and specific destination markets. For instance, Vlahantoni-Tikof (2005) point out that much of the initial debate on the subject has been created by looking at the MFN applied rates, but that sub-Saharan countries actually are actually not suffering from tariff escalation when exporting to the EU at the applied level when preferential market access are taken into account thanks to the CPA. But tariff escalation is an integral feature of the barriers to other markets.

4.4. Non-Tariff Measures

Many other types of barriers impede trade. Non-Tariff-Measures (NTM) regroup a vast array of heterogeneous regulatory instruments restricting trade with the exception of tariff barriers. The extent to which those barriers actually restrict the access to some markets for Sub-Saharan African export is debated since it is hard to quantitatively estimate their impacts, but it is rather consensual that they can considerably restrict trade for some specific products and destinations (Mold 2005, Gourdon and Cadot 2011).

4.4.1. *Technical Non Tariff Measures*

The two types that are considered by the WTO so far are sanitary and phytosanitary (SPS) and technical barriers to trade (TBTs) measures, often referred as the "technical" NTM,

which are particularly restrictive for agricultural products specifically for value added and processed.

For long, because of the lack of data, most analysis focused on barriers to developed countries markets. Existing studies show for instance, in the case of the beef exports to the EU, the increasing cost of compliance with the EU food-safety and SPS regulations (and decreasing EU beef market price) has had a deterrent effects on Sub-Saharan African exports, and in 2010[23] only Namibia and Botswana were still exporting to the EU despite the preferential access. Based on detailed analysis of EU food import law and its application to livestock products coming from East Africa, Geboye Desta (2010) argues that these otherwise generous preferential schemes have been deprived of any effect by the stringent sanitary and phytosanitary requirements that are beyond the capacity of the many producers in these countries to satisfy. Similar results are found by Disdier, Fontagné and Mimouni (2007). Those NTMs are considered to be more stringent for value added products such as horticulture, fisheries and processed food products.

Another issue is the private sector standards. According to Memedovic and Iapadre (2009), the process of corporate concentration in the commodity sector in a context of vertically coordinated agri-food chains, have led the private standards, although not legally binding, to become de-facto requirements. Consequently it is essential to develop strategies to enable African agro-food enterprises of all sizes, to participate in global value chains (Vorley, Lundy and MacGregor 2009).

The consensus had thus rather been that since these technical barriers were prevalent mostly for exports towards developed countries, they tended to render exports towards other developing countries, especially other Sub-Saharan African ones more interesting (Poulton *et al.* 2009). But new recent data collection undertaken jointly by the World Bank, UNCTAD and the African Development Bank provide new estimates of NTMs including in SSA. Combining these data with price data collected as part of the World Bank's International Comparison project, a new research has estimated the price-raising effect of NTMs on African food staples using econometric methods. Preliminary results presented in Gourdon and Cadot (2011) suggest that the ad valorem equivalents of SPS and TBTs on African cross-border trade in food are actually very high, because of a high number of measures.

[23] http://agritrade.cta.int/en/Commodities/Beef-sector/Executive-brief#1

This result contrasts with the expectations that low-income countries with low monitoring and testing capabilities would be able to handle fewer measures, than high income countries. They suggest however that in SSA SPS measures seem to be designed and implemented in a way that makes them cumbersome and costly due to lack of harmonization, poor design, and haphazard enforcement, raising the price of foodstuffs by 15 to 25 percent. Indeed, looking at the WTO Trade Policy Reviews of several Sub-Saharan African countries reveals that licensing is necessary for most agricultural and livestock products on the ground of human health protection and parasite attacks prevention.

Nevertheless, the extent of those technical barriers varies across food commodities, and the extent to which the regulation is actually applied varies greatly, specifically for live animals and coarse grains whose cross border trade is mostly informal and escapes controls.

4.4.2. *Rules of origin as barriers to value added agricultural exports*

Rules of origin present often one of the most contentious issues of the negotiations of trade agreements, whereas preferential or not, according to Estevadeordal and Suominen (2003) due to "*their lack of transparency, the difficulties of assessing their impact on trade and investment flows, their potential use for protectionist purposes by powerful economic lobbies and the complexity associated with their administration*". Public economics have long considered that rules of origin were captured by powerful lobbies in the processing industries and used as protectionist measures (De Melo and Cadot 2008).

Because the complexity in determining the origin of the product increases with the more processed it is, it can be considered that most rules of origin have a negative impact on the development of the processing industry preventing beneficiary countries from gaining from the export of higher value and processed products (Guerin *et al.* 2011), particularly for processed agricultural products which are subject to seasonal shortage of raw material inputs and need to import from the world market to keep their mills and canneries rolling, but risk being denied export under preferential terms to their partners during that period (UNECA 2010).

Recognizing this issue, a new regulation by the European Commission revising the rules of origin for products imported under GSP was adopted and new simpler rules and procedures came into effect on the 1 January 2011. Those new rules allow LDCs to outsource up to 70 percent of input in their exports and still claim origin. This measure is likely to encourage export diversification and regional integration (Guerin *et al.* 2011*)*.

4.4.3. *Quantitative restrictions*

Gourdon and Cadot (2011) suggest that the use of quantitative restrictions (QRs) have been largely reduced in SSA, at least on the books. This is coherent with their phasing out as part of the implementation of the structural adjustment plans, and their higher regulation within the WTO framework for WTO members (although in line with Article XI of GATT 1994 developing countries are allowed to use them temporary under specific circumstances, for instance in case of specific revenue needs, or to protect an infant industry, ensure food security, protect the environment or for industrial development needs).

Looking at the WTO Trade Policy Reviews of several Sub-Saharan African countries reveals that quantitative restrictions are commonly applied tools to protect domestic agricultural and agroindustrial sectors. For instance, in Namibia imports of white maize, wheat, pearl millet and their milled products are subject to seasonal prohibition (WTO 2009a). In Niger, exports of milled rice, millet, sorghum, maize, cassava flour and cattle feed have been banned periodically in case of serious food crisis, and in Senegal imports of rice, maize, bananas, potatoes, onions, tomatoes for processing, sorghum and millet are seasonally banned (WTO 2009b). Even though most countries have committed to reduce their use and to switch to alternative trade policy instrument, it is stated in the case of Nigeria that the use of quantitative restrictions is still necessary even for SPS or TBT objectives because of the current lack of institutional and technical capacities (WTO 2011).

Gillson (2011) notes numerous instances of temporary bans, especially on exports. In particular, recently many countries have tried to insulate their domestic markets from the volatility on international markets, by putting exports bans in export products when price increased in order to maintain internal prices lower than international prices and imports controls or bans on imported products in countries that were trying to stimulate their local production, especially of staple products, such as Malawi, Tanzania, or Zambia.

4.4.4. *Other trade costs*

Physical and administrative trade costs have been identified as a crucial problem in Sub-Saharan African countries (Platteau 1996). Transport infrastructure, whether by road, sea or air, are of low quality, costly and generally inefficient, significantly increasing trade transaction costs, hampering competitiveness of exports and depressing trade opportunities. According to UNECA (2010), only 30 percent of roads are paved and as a consequence shipping a good from Côte d'Ivoire to Ethiopia is 3.5 more costly than from Japan to Côte

d'Ivoire. Africa's maritime port's productivity is estimated to be only 30 percent of the international norm, which is likely linked to the fact that 7% of the ports (in Egypt and South Africa) handle 50 percent of the trade.

Most of the available data come from World Development Indicators and the Doing Business index of the World Bank. A striking feature of the Doing Business index is that the African region is behind all the other ones for every single criterion taken into account. It is thus the most expensive region to trade with according to Doing Business 2011(World Bank and IFC 2011). For instance, due to the inefficiencies specific to Sub-Saharan Africa, the time of transit, documentation, and ports and customs delays, for a container to reach a ship in the closest port from a factory and be ready to be exported, 116 days were needed from Bangui (Central Africa), 71 days from Ouagadougou (Burkina Faso), and 87 days from N'Djamena (Chad), when only 5 days were required from Copenhaguen (Denmark) and 6 days from Berlin (Germany).

Several research have used those databases to show how much the higher African trade costs are hampering the region's participation in global trade, underlying the positive impacts of their reduction. Bouët, Mishra and Roy (2008) have been able to bring the debate on whether Africa is trading "as much as it should" a step further using both database, showing that Africa's low participation in global trade is "normal" considering the weak trade and communication infrastructures. But despite those database, trade costs are still difficult to take into account in global simulation work due to the lack of bilateral data. Preliminary work by Fontagné and Decreux (2009) find that the high trade costs in Africa would hamper Sub-Saharan African from taking advantage of any trade opportunity they might receive at the multilateral level.

Djankov, Freund and Pham (2010) estimate thanks to a gravity equation that reduction of trade costs could have relatively large effects on exports in Sub-Saharan Africa since reducing export times by 10 days would expand exports by about 10 percent on average. Using the same database and an improved gravity equation, Freund and Rocha (2011) find that the reducing trade costs in Sub-Saharan Africa is particularly beneficial since a one day increase in inland transit time is expected to reduce exports by 7 percent on average, even more negative impacts for time sensitive products such as agricultural ones.

The findings of those researches on non tariff measures imply that their reduction could have significant impacts on the trade volumes, which could be higher than the effects of

additional market access, especially for the Sub-Saharan African countries that already benefit from substantial market access. They results have important policy implications in light of the Aid for Trade policy agenda that has surfaced in official development assistance (ODA) to developing countries and in the Doha Round with the trade facilitation initiatives.

5. Perspectives

We are witnessing profound changes in domestic, regional and international markets. What are the new trade opportunities for Sub-Saharan African countries? What are the prospective impacts of the current trade negotiations? What is the state of research on those perspectives?

The objective of the following section is to look at the potential opportunities for Sub-Saharan African countries focusing on the demand side, which does not mean that we are oblivious of the supply-side constraints that Sub-Saharan African countries will need to overcome in order to take advantage of them.

5.1. How much adjustments are to be expected from the new global agricultural markets?

The predicted higher agricultural prices and increased price volatility on international markets (OECD and FAO 2011) present both opportunities for improved incentives in favor of agricultural production and challenges for the food security of the poors in Sub-Saharan African countries. Rising incomes, faster urbanization, foreign and domestic investment and technological advances are increasing demand for high-value commodities, processed foods and agro-industrial products in domestic, regional and international markets (Yumkella *et al.* 2011) which also present SSA with new agricultural exports opportunities.

5.1.1. *The challenge of higher and more volatile international agricultural prices*

Agricultural commodity prices on international markets have experienced an increasing trend since the early 2000s with a considerable volatility in recent years (OECD and FAO 2011).

According to the analysis of the OECD-FAO (OECD and FAO 2011), there has been important co-movement among primary commodity prices and increased variability since 2006 due to a combination of increasing demand, supply shocks and transmission of price

changes among markets. Indeed the higher cereals and rice prices in mid 2010 due to negative weather-related supply shocks transmitted to the markets of other food commodities such as meat with higher feed costs. Strong price increase in the dairy markets is rather due to a combination of stronger demand, particularly from emerging Asian countries in a context of constrained supply with the reduction of price support in the EU. Sugar prices, which have been found to be highly correlated to energy prices have been highly volatile since the 2006 peak with succession of peaks and downward corrections. The OCED-FAO outlook predicts that agricultural commodity prices in real terms are likely to remain on a higher plateau during the next ten years compared to the previous decade. Taking a closer look at the key forces driving price volatility, the report assumption is that many of the drivers of price volatility (weather, yields, stocks, energy prices) may themselves be more volatile in the future, because of a number of factors, including climate change and the close link between agricultural and oil prices as a result of the growing influence of biofuels production on agricultural markets. Hence both agricultural prices and agricultural price volatility are expected to remain at higher level than in the past.

But the pass-through of international prices to domestic markets has varied greatly across countries and commodities depending on the initial market conditions, the consumption patterns and policy reactions. For instance, Minot (2011) shows that the spike in maize has had comparatively less impact on SSA than for other commodities since imports from international markets accounting for only five percent of consumption for that commodity. The transmission of the 2008 international maize price spike has been even weaker in Eastern and Southern Africa because most of those countries fill their import needs through cross-border trade with regional white maize producers rather than from overseas. On the contrary, transmission of the price spike from international markets has been much higher in large rice importing countries such as Senegal.

According to the Global Monitoring Report 2012 (IMF and World Bank 2012), the Sub-Saharan African region is particularly sensitive to increases in food prices since the region imports about 45 percent of its consumption of rice and 85 percent of its consumption of wheat and many Sub-Saharan African countries have higher shares of food imports in total imports than the rest of the world. Furthermore, Sub-Saharan African households are more vulnerable than other regions of the world to agricultural price spikes since in most countries around 60 percent of the household spending is devoted to food. They are also likely to be less resilient to food price spikes considering that there are already are high levels of

malnutrition specifically among poors resulting in 38 percent of children being stunted. The situation is most perilous in the drought and conflict-stricken countries of the Horn of Africa, and in the Sahel region.

In the short term, according to the Global Monitoring Report 2012 many Sub-Saharan African countries have adopted targeted domestic policies such as quantitative export restriction or export bans, reduction of import tariffs and domestic taxes on food and cash transfers in order to mitigate the economic and social impact of high energy and food prices, which they did not necessarily have the time to rebuilt before the 2011 price spike. Those price spikes episodes have increased their awareness on the usefulness to keep some tariff and consumer tax margins to dampen potential price increase, but also the necessity to find alternative longer term coping mechanisms.

However, on the longer term, higher agricultural prices increase incentive to invest in agriculture. Many countries in SSA have launched new investment programs aiming at increasing agricultural productivity, particularly based on input subsidies specifically targeted at smallholder farmers. According to the Global Monitoring Report 2012 (IMF and World Bank 2012) the increased cereal production has improved the continent's ability to cope with the food price spike of 2011, compared to the experience in 2008. The report recommends that Sub-Saharan African countries should focus on encouraging private investment in agriculture and providing direct support to the agricultural sector in order to further increase agricultural productivity. Since 2007–08 there has been a proliferation of long-term acquisition of farmland in Sub-Saharan African countries by other countries, many of them land and/or water-scarce, seeking to ensure their food supplies. But there are also been a large number of industrial (non food) projects such as for biofuels (FAO, IIED and IFAD 2009). Depending on how they are structured, agricultural investments may inject much-needed investment into agriculture and rural areas, deliver local benefits and include small-scale producers in value chains, but they also carry environmental and social risks that have increasingly raised concerns because they would fall disproportionately on local people. Many publications have indeed looked at the need to integrate smallholder farmers in agricultural markets to fight poverty and food insecurity (e.g. Barrett 2008).

Recommendations from the literature include ensuring that these land deals, and the environment within which they take place, are designed in ways that will reduce the threats and facilitate the opportunities for all parties involved (Hallam 2011). Even though negotiating "*Principles for Responsible Agricultural Investment*" is proving challenging

despite commitments towards an agreement by the FAO, IFAD, UNCTAD and World Bank, the recent successful conclusion of the *"Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the context of National Food Security"* (officially endorsed on 11 May 2012 by the Committee on World Food Security) is a positive first step.

5.1.2. ***Modernization of the global agricultural value chains***

Global markets are changing rapidly. In the current phase of globalization, functional and spatial fragmentation of production and consumption have increased and trade in intermediate goods has grown faster than that in final goods, leading to a higher degree of interdependence among national production systems and higher exposure to external shocks, as shown by the recent global crisis (Sturgeon and Memedovic 2010). Task-based production is seen as an opportunity for countries to develop comparative advantages in particular segments of international value chains and to raise technological sophistication, as was the case of Chinese and Indian exports (Memedovic and Iapadre 2009).

Memedovic and Iapadre (2009) look at the evolution of the productive structure of the world economy in the last decades based on the UNIDO INDSTAT 2 2009 database, and find that the respective shares of agriculture has decreased from 10 per cent in 1970 to 3.6 per cent in 2005, and those of industry 38 to 29 per cent while the services sector was rising. But the trend since 2005 has been different with a slower growth in the value added in the service sector than in agriculture and industry, in part to the increase in the relative prices of agricultural, mineral products and energy. The marginalization in global trade of Sub-Saharan Africa can be explained by the fact that during that period, the African region further deepened its specialization in raw materials' production to the detriment of manufacturing and services, whose combined share of total value added fell from 65 to 53 percent between 1995 and 2008. Building various index to test adequacy with global evolution, they find that African exports structure has become less consistent with the evolution in world demand. But the region has been much more responsive to the positive signals in agriculture since the beginning of the 2000's to which it has answered by increasing agricultural production.

Focusing on agro-industrial products, it appears that 80 percent of the agricultural trade worldwide now undergoes processing in food and beverages (Wilkinson and Rocha 2008). The most striking feature is that while 60 percent of the demand comes from developed countries, growth in consumption is much faster in developing countries (Yumkella *et al.* 2011). This trend towards an increasing demand from processed products is suppose to

continue due to, among others, the growth in population and per capita consumption associated with changing diet, greater variety and improved quality of processed food products, urbanization, which increases the importance of food preservation and convenience, greater internationalization of retail outlets, which influence shifts in consumer behaviour and patterns, and demographic changes involving increasing female participation in labour markets.

Evolution of the Trade Performance Index—a sectoral benchmarking tool of export performance and competitiveness developed by the International Trade Centre (ITC)—for those products in African countries indicates that African countries have not yet managed to adjust the composition of their agro-industrial exports to fit the changing patterns of world demand (Yumkella *et al.* 2011). Indeed, in sharp contrast with the commodity composition of global agro-industrial exports, exports from Africa are still dominated by unprocessed commodities and the recent expansion have been mostly composed of unprocessed agricultural commodities. Memedovic and Iapadre (2009) show that African countries are considered to have the least developed downstream industries directly related to their resource-based products compared to other regions, because they have rarely diversified their industrial structure by exploiting vertical complementarities in value chains.

But according to Yumkella *et al*. (2011) the regional trend is encouraging since over the last two decades the fastest growth in intra-African trade has been achieved for processed commodities destined for final use (19.8 per cent a year), before semi-processed commodities destined for further processing (18.7 per cent a year), horticulture products (15.5 per cent a year) and unprocessed commodities imported for processing (9.7 per cent annually).

5.1.3. ***Prospects from future regional agricultural demand growth***

First, it is important to realize that existing domestic agricultural markets are much larger than what trade figures suggest especially for food crops and livestock products. One of the most cited analysis is that of Diao *et al.* (2003) who show for instance based on FAO and COMTRADE data, that demand for the main cereals in SSA (maize, rice and wheat) has been on average four times larger than imports on the period 1996-2000. With the exception of traditional export crops such as cotton, coffee, cocoa, sugar or tobacco, the main destination of agricultural production is indeed domestic demand. On average only a small share of agricultural production is marketed in Sub-Saharan African countries, the majority of the food staple production is being own-consumed by the producing household. Of the marketed part,

most food crops and livestock products are traded domestically and with neighboring countries, with a large share of informal unreported trade which makes available data uncertain. These shares obviously vary greatly depending on the types of products, and for instance among staple foods, roots crops are usually much less traded than cereals, although they account on average for 20 percent of nutrition requirements.

Secondly, regional demand is mostly met by intra-regional trade and demand growth could be a driving force of overall economic growth. The prospects from increased market food demand to spur growth in Sub-Saharan African countries had already been highlighted by Diao *et al.* (2003) and following work, which showed that on the period 1996 to 2000 the value of regional (intra-African) exports of agricultural products has been more than three times those of exports to non-African markets, and that regional exports, particularly of staples, were likely to become the largest single source of demand growth for African agricultural and food exports over the next 20 years, based on simulations with the partial equilibrium model IMPACT, and a global CGE model. But recently several analysis of the evolution of agricultural demand have put forward that regional demand in SSA might even grow faster than demand from the rest of the world. Indeed, SSA will experience the highest population growth rates of the world (World Bank 2009), and has the potential to become the world's second-fastest growing region after East Asia, according to the Economic Report on Africa 2012 (UNECA and AUC 2012). It is also expected to experience rapid urbanization rates which, together with increasing income level will modify the composition of agro-industrial demand towards more rice, more meat and more processed food products (Yumkella *et al*. 2011).

Third, with the changing international price context, the scope for import substitution, both nationally and regionally has increased (UNECA 2010). Indeed given the geographic proximity of the countries and cultural affinity of the populations, in a context of higher international prices Sub-Saharan African countries themselves could be in a favorable position to take advantage of the increased regional demand (World Bank 2009). There are several positive signs on the regional trend, since not only has regional trade already starting to increase, but also intra-African agro-industrial trade has been less concentrated on specific commodities than trade to the rest of the world and has been faster to adapt its composition to changing demand (Yumkella *et al*. 2011). Nevertheless, there still much to be done since there are many supply side constraints, and the growing demand from the 1980s has been met by a substantial and growing reliance on food imports. Realizing the potential of intra-regional

trade growth might also be constrained by the relatively strong competitive position of actual and potential international suppliers to Africa (UNECA 2010). Analysis of the constraints to supply growth to meet regional demand identify as main limitations the fragmented markets, poor infrastructure and technology dissemination, and rather advocate for the development of regional value chains (UNECA and AUC 2009). By integrating markets of sub-optimal size, sizeable private investments in the different stages of the commodity chain could be encouraged (FAO 2007). Hence the idea has emerged that trade integration is key for the development of several strategic commodities, particularly those identified by the Abuja Food Security Summit of 2006 as being regionally or subregionally strategic. The Summit identified these commodities by their importance to the African food basket, significance to Africa's trade balance measured by contribution to export earnings or import substitution, and by having unexploited production potential in Africa. These commodities included rice, legumes, maize, cotton, palm oil, beef, dairy, poultry and fisheries products at the continental level and cassava, sorghum and millet at sub-regional levels.

5.2. The perspectives from current trade negotiations

Sub-Saharan African countries currently have many trade negotiations on their agenda (UNCTAD 2010), at the regional, bilateral level and multilateral level. We will look at them in turn in order to expose the current state of play, and review the literature estimating the potential prospects from successfully concluding the negotiations.

Following the acknowledgement that non tariff barriers to trade and trade cost were significantly hampering countries from taking advantage of market access opportunities, much is currently being done to reduce them as part of the trade facilitation organized by the World Trade Organization, additional commitments to the ODA for Aid for Trade (mostly oriented to SSA) and additional trade corridors projects with the World Economic Forum (UNECA 2011).

5.2.1. *The prospects from accelerating regional integration*

As we have seen in the previous section, despite the existing regional agreements in place, there is still scope to decrease both tariff and non tariff barriers among Sub-Saharan African countries and take more advantage of the growing intraregional trade potential.

Based on analysis of the past constraints to regional integration (UNECA 2010) it appears that it is foremost the strong political will to effectively do so that has been missing.

But recently, there has been a renewed political interest in accelerating regional integration by all governments in SSA and some development agencies[24]. Even the WTO Director General (Lamy 2012) and Deputy Director (Rugwabiza 2012) are now advocating that greater regional integration is a priority for Africa. The main reason advanced is that considering the uncertainty of the prospects from global economic growth following the economic and financial crisis, comparatively African growth prospects are much more promising and robust (Lamy 2012). Beyond fostering its own development, they express the hope that the region could actually become a growth pole for the rest of the world.

The Economic Report on Africa (UNECA and AUC 2012) exposes how the development of regional commodity (especially agricultural) value chains could help Sub-Saharan African countries exploit economies of scale at all stages of the commodity value chains, increasing vertical coordination (among the different stages of commodity chains) and complementary diversification and specialization (among countries and sub-regional groupings based on their various resource endowments), provided the necessary investment related to infrastructure, technology and institutions are made. National and regional markets are not only seen as potentially profitable outlets, but also as training grounds, in which firms can upgrade their operations to eventually break into international markets for high-value products. Three case studies of regional value chains are provided, on cotton, meat and leather products.

Despite a large literature on regional trade integration in Sub-Saharan Africa, ex-ante quantitative estimates of the expected impacts from implementing the regional agreements currently negotiated are scarce (te Velde 2008). Most ex-ante studies focus on a specific type of measure, usually investment, non tariff measure or trade costs, within one specific regional agreement or at a country or commodity level. This is due to the lack of reliable data to represent Sub-Saharan African economies, on the level of informal, unreported trade but also on the bilateral tariffs and non tariff barriers between Sub-Saharan African countries.

The most cited ex-ante analysis looking at the decrease in trade costs at the Sub-Saharan African level is Diao *et al.* (2003). It shows that efforts to decrease marketing costs by improving the productivity of the transport sector by 30% in South Africa and by 50% in all other African countries could boost Africa's total agricultural exports by 28% and intra-

[24] See the Outcome Statement of the "Joining up Africa: Regional Integration" conference agreed in London, United Kingdom on March 4th 2010 by representatives from the African Development Bank, the World Bank, the European Commission, the WTO and the Department for International Development (DFID). See also the declarations at the 18th African Union Summit on "Boosting Intra-Trade" on 23-30 January 2012 in Addis Ababa, Ethiopia.

regional trade by 22%. But it does not look specifically at the reduction in tariffs linked with regional agreements.

Seck *et al.* (2010) look at the impact of reducing non tariff measures within ECOWAS on agricultural trade with a gravity model. ECOWAS membership is found to have resulted in net trade creation. But no information is given on the relative magnitude of the effects.

Comparing the ex-post impacts of COMESA in SSA, the ASEAN Free Trade Agreement (AFTA) and MERCOSUR in South America on agricultural trade in the different continents with gravity modeling, Korinek and Melatos (2009) find an increase in the bilateral trade of COMESA countries since its implementation in 2000 but also some trade diversion away. In comparison to AFTA and MERCOSUR, trade creation within COMESA is relatively low, probably because of the relatively higher trade costs and lower complementarity of natural endowments and smaller markets in COMESA.

Simulating the potential ex-ante effects of SADC on agricultural trade with a partial equilibrium analysis, Nin-Pratt *et al.* (2008) find a small but positive net trade creation effect and welfare effect in SADC countries. They explain these small impacts with already low level of tariffs on agricultural products between SADC countries and the low level of complementarity in their export structure.

The main results from multicountry studies, whether ex-post regressions or ex-ante simulations is that the distribution of the gains of regional integration among participating countries is unequal. For instance, Venables (2003) finds that under the protection of the East African Community tariff in the 1960-1977 period, Kenya successfully engaged in structural transformation and developed its manufacture but it was at the expense of manufacturing sectors in Tanzania and Uganda.

From this literature review we find that considering the renewed interest in regional integration at the continental level, new ex ante quantifications of the potential impacts from reducing tariff and non tariff barriers are still lacking. Considering their political sensitivity, specific attention should be given to the impacts on tariff revenue loss, the issue of overlapping memberships and the distributional effects at across, countries, sectors, and households.

5.2.2. *Economic Partnership Agreements*

The EPA negotiations with all ACP countries were launched in 2003 at the regional level. The EU signed its first regional EPA with CARIFORUM in October 2008 but regional negotiations with Sub-Saharan African countries were not successful and continued on a bilateral basis (Guerin *et al.* 2011).

It is recognized that the EPA negotiations have polarized the continent with the LDC having much less interest in advancing the negotiations than non LCDs. However, some stakeholders have raised concerns over the capacity of Sub-Saharan African countries not only to implement the agreements but also to negotiate them (Guerin *et al.* 2011) since they are carried out by Regional Economic Communities (RECs) which are recognized to lack capacity as institutions (Kuhlmann, 2010). Overlapping regional memberships have caused conflicting requirements as each region has its own set of commitments (Collier and Venables 2007).

Most countries that have signed Interim EPA (IEPA) so far are non LDC African countries highly dependent for a very concentrated part of their exports on their preferential access to the European market: Ivory Cost (banana and cocoa), and Ghana (cocoa) for Western Africa, Cameroon (banana) for Central Africa, Bostwana, Swaziland, Zimbabwe (cattle) and Mozambique for Southern Africa, Kenya (textile) and Seychelles (fish) for Eastern Africa. Some African LDCs such as Burundi, Rwanda, Tanzania, Uganda, Mozambique, Madagascar and Lesotho also signed. All countries whose governments initialed the IEPA (such as the ones previously signed plus Namibia) have benefited from the maintenance of traditional trade preferences. But since January 1 2008, all countries that have refused to sign interim agreements have been transferred to the GSP schemes. The LDCs such as Benin, Burkina Faso, Gambia, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Senegal, Sierra Leone and Togo export under the EBA initiative, which only means more restrictive rules of origin. But the non LDCs such as Gabon, Congo, Nigeria have changed status from Cotonou preferences receiver to normal GSP receivers and now faces higher tariffs on their exports to the EU. The current state of play leaves all possibilities open for the realization of the EU-ACP FTAs.

The transformation of non reciprocal CPA into reciprocal FTA have fuelled concern that ACP countries might loose from trade diversion from more efficient third country suppliers to EU exporters, that more competitive EU imports would undermine local industry

and agriculture production and the loss of tariff revenue on EU imports would hamper the provision of government services and, in general, that it would exacerbate rather than reduce overall poverty levels (Boysen and Matthews 2009).

Since the beginning of the EPA negotiations, there have been several studies that have tried to assess ex-ante the economic impact of EPAs (see Cali and te Velde 2006 for a survey). Quantitative simulations point to the fact that for Sub-Saharan Africa to experience a positive welfare effect of the EPAs, regional integration needs to be achieved (see for instance Wolf 2000, Keck and Piermartini 2005, Berisha-Krasniqi *et al.* 2008, Tekere and Ndlela 2002, Perez and Karingi 2007, Karingi *et al.* 2005, and Fontagné *et al.* 2008).

From a comprehensive literature review, Guerin *et al.* (2011) estimate that the convergent findings are that at the regional level West Africa, Central Africa, the Common Market for Eastern and Southern Africa (COMESA), and the Southern African Development Community (SADC) might benefit from trade creation and increased welfare, but welfare effects would be small and negative for EAC. At the country level, the agreement could have positive impacts on Ghana, Nigeria, Cameroon, Gabon, DR Congo, Kenya, Mauritius, Sudan, Ethiopia, South Africa, Zimbabwe but Cape Verde, Gambia and Swaziland could lose.

5.2.3. *the Doha Round*

The November 2001 declaration of the Fourth Ministerial Conference of the World Trade Organization (WTO) in Doha, Qatar, provides the mandate for negotiations known as the "Doha Round". The Doha Development Agenda (DDA) was to take into account the specific needs of developing countries. Since the agreement on the July 2008 package, no substantial achievement to conclude the Doha Round has been made. Hence, as negotiations on specific provisions are still ongoing, ex-ante simulations of the potential impact of the DDA differ by the assumption they make for instance on the tariff reduction formula and the flexibilities.

Several studies have estimated the potential gains from the conclusion of the Doha Round. But Bouët (2008) reviews the literature and shows that existing empirical assessments of trade integration differ by the data, behavioral parameters, or theoretical features and cannot be considered comparable. Considering that the extent to which Sub-Saharan Africa, as a region could gain is still largely debated, needless to say that the same goes for the individual countries considering the heterogeneity of the region (Thorbecke 2009).

An issue which has attracted much attention has been the potential effect of the reduction of agricultural "distorsions" in developed countries (domestic support and export subsidies), particularly in the EU. Indeed, in order to maintain a reasonable standard of living for workers employed in guaranteed prices were set high enough that even the least efficient producers could still make a living (Trebilcock and Howse 2005) and the EU has been buying agricultural products whenever prices fell below specified support levels, and giving production subsidies which have artificially kept EU food prices higher than world prices over the years. This gave the incentive to EU farmers to increase production in excess of domestic demand. As a result, the EU was faced with huge quantities of surplus production (milk, meat, butter, cereals) which were exported thanks to export subsidies (Guerin *et al.* 2011). According to Krugman and Obstfeld (2009) without this policy, the EU would rather have been a net food importer, hence the distortions have been driving down world price of the agricultural products exported by the EU while maintaining internal price higher than market price. According to Anania (2009), all the countries that have had preferential access to the EU market benefit from the higher EU prices for their exports while benefitting from the lower world prices for their imports. It is expected that as a consequence of agricultural policy reform removing those distortions, international price would increase and internal EU price would decrease. Under this narrative, the countries benefiting from preferential market access to the EU will see these benefits eroding, while seeing the price of their imports increase. On the other hand, net-exporters that do not have a preferential access to the EU agrifood market such as India or Brazil are expected to benefit from the reform. Panagariya (2005) was among the first to highlight the detrimental effect of the removal of developed countries agricultural support could have on poor net food importing countries, but the extent to which this will effectively be the case and the classification of which countries would be detrimentally affected is still debated (Bouët 2008).

By reducing tariffs worldwide, a DDA would entail additional market access for all countries. Developing countries would have reduced commitments and LDC would be exempted. It is a consensus that the reduction of existing tariff barriers would reduce the preferential margins of Sub-Saharan African countries. The debate lies on whether they would be able to take advantage of the new market access to compensate for the lost preferential margin (Bouët, Fontagné and Jean 2006). The answer to that question differs for each country according to several factors including the adjusted margin it had and its competitiveness, and requires country-level assessments.

5.2.4. *Duty Free Quota Free*

Recognizing that LDCs could be offered more in the DDA, it was agreed at the 2005 WTO Ministerial that all developed countries would offer a Duty Free Quota Free access to their markets for LDCs. Since 2001, some Organization for Economic Cooperation and Development (OECD) countries have already started implementing DFQF access to some LDCs. A number of emerging countries (Turkey, Korea, and China) have also put in place preferential market access albeit covering fewer products (Elliott 2010).

Some ex-ante analysis have studied the impacts of the preferential multilateral integration of Sub-Saharan Africa, in the form of fully unrestricted access to all the Quad developing countries (Canada, the European Union, Japan, United States) in Ianchovichina *et al.* (2001). Berisha-Krasniqi, Bouët and Mevel (2008) and more recently Bouët *et al.* (2010) and Bouët and Laborde (2011), using a general equilibrium model and partial equilibrium models, find that there is little to expect for LDCs from an additional DFQF market access if this market access does not cover 100 percent tariff lines and is not extended to as many preference-giving countries as possible, including emerging markets economies.

The extent to which Sub-Saharan African LDC will be able to take advantage of this increased market access will depend on the exact conditions of the agreements, specifically regarding Rules of origins and standards, and on Sub-Saharan African LDC competitiveness with other countries granted the same preferences.

5.2.5. *EU GSP reform*

As seen in previous section, most Sub-Saharan African countries benefit from the GSP scheme of the EU, and will probably turn to it if the EPA negotiations fail. From Yumkella *et al.* (2011), it appears that a few exports products, namely sugar, bananas and tobacco, were generating most of the value added returns on Sub-Saharan African, because of highly protective domestic policies on those products and specific import schemes for ACP countries. But the value of these benefits has fallen as the EU has reformed its domestic sugar policy and its banana import scheme.

Additionally, the latest reform of the GSP scheme, which will be applied starting in 2014 will tend to impose more stringent graduation rules from GSP scheme for non LDC countries (countries “graduate” out of the scheme under lower development standards and for lower threshold of products) according to Guerin *et al.* (2011). Those reforms are intended to

increase the "adjusted" preferential margin from GSP for the countries that benefit from it. But in reality, some countries and products face graduation out of the GSP, such as Namibia and Botswana since both are classified as an Upper Middle Income Country, and Kenya will face new tariffs on several key exports (Stevens *et al.* 2011). It might also erode existing preferences for Sub-Saharan countries currently under either EBA or an EPA if powerful competitors such as Pakistan become eligible for GSP. The aforementioned ODI research suggests that in the end gains risk being small and focused on a few states and products, such as Senegal for fish and Kenya for green beans.

In light of the other multilateral negotiations, including the Doha Round and the Duty Free Quota Free Proposal, the benefit from such preferential schemes is bound to decrease.

6. Conclusion

This chapter has presented some of the main stylized facts on Sub-Saharan African agricultural trade and has tried to highlight the challenges and opportunities from the changing global agricultural markets and the trade agreements currently negotiated.

The Sub-Saharan African region as a whole and a majority of countries within it are among the most trade dependent economies in the world, in terms of trade as a share of their GDP, of dependence on tax on international trade for their government revenue, but also of dependence upon primary exports. Considering that Sub-Saharan African countries are among the poorest countries of the world, the dependence on imports for their consumption, exports as a source of foreign exchange earnings and revenue at the national level, means that not only are they relatively more sensitive to changes in the global trade context than the rest of the world, but they are also much more vulnerable to trade shocks than other countries in the world. They heavy reliance on tax on international trade as part of their government revenue could explain some reluctance in reducing their import tariffs. The prospects of more volatile agricultural price drives thus legitimate concerns for the region considering the concentration of exports on agricultural products for a majority of countries but at the same time the fact that they are also expected to stay at higher level could be an opportunity.

The review of the literature finds little support for preferential and regional agreements, which until recently had been mainly analyzed in order to determine whether they were "building blocks" or "stumbling blocks" towards multilateral liberalization. But recently three elements have contributed to change that trend. First, the renewed political commitments to

make regional integration in Africa a priority by African governments has been supported by several economic analysis in favor of the development of regional value chains taking advantage of economies of scale, developing trade in task, and building complementary infrastructure. Secondly, it is also considered that in view of the high agricultural prices on international markets an increasing part of the agricultural demand growth in Africa could be met by regional production. Third, the context of the global economic recession has considerably shifted interest towards the African continent as a future leading growth pole.

But it appears that the trade agreements Sub-Saharan African countries have been pursuing regionally and the preferences they have been given historically by the EU more recently by the USA have been driven more by political than economic reasons. As a result, there a been a multiplication of overlapping regional initiatives and regional trade flows have stayed very low and tariff barriers on regional trade very high by international standards. Despite substantial trade margin on average, Sub-Saharan African countries face very different tariffs, with mineral and natural resource exporters benefiting from lower tariffs than the agricultural exporters, which face highly negative composition effect of their exports, skewed towards goods that are still protected overall. Indeed every region of the world consistently apply higher tariffs on agricultural imports than on other types of imports, with on average substantial escalation on more processed products. Hence looking at tariffs, there is still scope to substantially reduce them both at the multilateral and regional level for Sub-Saharan African exports, with the exception of the EU, the only partner to which Least Developed Countries from SSA already benefit from a duty free quota free access.

Several types of non tariffs measures and trade have been growingly recognized as significantly hampering trade. Recently, new databases with estimates of some of those costs have led to findings implying that their reduction could have significant impacts on the trade volumes, which could be higher than the effects of additional market access, especially for the Sub-Saharan African countries that already benefit from substantial market access. They results have important policy implications in light of the Aid for Trade policy agenda that has surfaced in official development assistance (ODA) to developing countries and in the Doha Round with the trade facilitation initiatives.

As the EU grants preferential market access to an increasing number of countries, Sub-Saharan African countries are slowly experiencing an erosion of their preference. Further multilateral liberalization would only increase more those preferences. Existing simulations of further multilateral liberalization (both Doha Development Agenda and Duty Free Quota Free

market access proposal) show that the net effect on each Sub-Saharan African country really varies, depending on the extent of this erosion and on whether they are successful in taking advantage of the new market access. Countries and sectors in SSA are expected to impacted hetegeroneoulsy. One cannot but notice that there is a lot of uncertainty on the distributional impacts of most trade negotiations, in particular on regional integration.

APPENDIX A: Top exports of Sub-Saharan African countries

TABLE I.A.1 — TOP THREE EXPORTS OF SUB-SAHARAN AFRICAN COUNTRIES

Country	Product (Share of total exports)	Number of products accounting for 75 percent of total exports
Angola	Petroleum oils and oils from bituminous minerals, crude (96.3)	1
Benin	**Cashew nuts, in shells (29.5), Cotton, not carded or combed (28.7),** Copper waste and scrap (6)	6
Botswana	Diamonds, nonindustrial, unworked or simply sawn or cleaved (27.9), Nickel mattes (19.9), Diamonds, nonindustrial, not mounted or set, not elsewhere specified (8.6)	16
Burkina Faso	**Cotton, not carded or combed (52.1)**, Gold, semi-manufactured, including platinum plated, nonmonetary (19.6), **Sesamum seeds (9.1)**	3
Burundi	**Coffee, not roasted, not decaffeinated (76.1), Black tea (fermented) and other partly fermented tea (9.3)**	1
Cameroon	Petroleum oils and oils from bituminous minerals, crude (39.6), **Cocoa beans, whole or broken, raw or roasted (18.7), Bananas, including plantains, fresh (8.4)**	5
Cape Verde	Tunas, yellowfin (16.4), Fish, whole or in pieces (13.5), Men's and boys' trousers and shorts, of cotton, not knitted (10.4)	9
Central African Republic	Logs, tropical hardwoods, not elsewhere specified (25.8), Diamonds, not mounted or set, unsorted (25.4), Logs, tropical wood specified in Subhe (16.7)	4
Chad	Petroleum oils and oils from bituminous minerals, crude (90.9), Petroleum oils and oils from bituminous minerals, noncrude (5.6)	1
Comoros	**Cloves (whole fruit, cloves and stems) (32.1)**, Vessels and other floating structures for breaking up (26.8), Essential oils, not elsewhere specified (18.6)	3
Congo	Petroleum oils and oils from bituminous minerals, crude (87.8)	1
Congo, Dem. Rep.	Cobalt ores and concentrates (20.7), Petroleum oils and oils from bituminous minerals, crude (16.6), Copper ores and concentrates (14.1)	6
Cote d ivoire	**Cocoa beans, whole or broken, raw or roasted (36.3)**, Petroleum oils and oils from bituminous minerals, crude (14.6), **Cocoa paste, not defatted (8)**	7
Equatorial Guinea	Petroleum oils and oils from bituminous minerals, crude (72.7), Liquefied natural gas (22.2)	2
Eritrea	Prefabricated buildings (19.3), **Sheep, live (14.2)**, Men's and boys' shirts, of cotton (6.9)	19
Ethiopia	**Coffee, not roasted, not decaffeinated (31), Sesamum seeds (24.9), Cut flowers and flower buds, fresh (10.9)**	7
Gabon	Petroleum oils and oils from bituminous minerals, crude (69.9), Manganese ores and concentrates (9.8), Logs, tropical hardwoods, not elsewhere specified (7)	2
Gambia, The	**Cashew nuts, in shells (44.5)**, Petroleum oils and oils from bituminous minerals, crude (), Titanium ores and concentrates ()	4
Ghana	**Cocoa beans, whole or broken, raw or roasted (49.7)**, Manganese ores and concentrates (8.5), Cocoa butter, fat and oil (5.6)	7
Guinea	Aluminum ores and concentrates (62.9), Aluminum oxide not elsewhere specified (11.2), **Coffee, not roasted, not decaffeinated (4.3)**	3
Guinea-Bissau	Cashew nuts, in shells (92.2)	1
Kenya	Black tea (fermented) and other partly fermented tea (14.3), Cut flowers and flower buds, fresh (13.8), Coffee, not roasted, not decaffeinated (5.9)	54
Lesotho	Diamonds, nonindustrial, unworked or simply sawn or cleaved (33.3), Men's and boys' trousers and shorts, of cotton, not knitted (13.8), Pullovers, cardigans, and similar articles, knitted of cotton (11)	6
Liberia	Cargo vessels and other vessels for transport of goods or persons (42.1), Tankers (19.3), Petroleum oils and oils from bituminous minerals, crude (13.3)	4
Madagascar	Shrimps and prawns (9.3), Women's and girls' trousers, overalls, breeches, and shorts, of cotton (6.7), **Vanilla (5.6),**	31
Malawi	**Tobacco, partly or wholly stemmed (63), Dried leguminous vegetables, shelled, not elsewhere specified (8.8), Black tea (fermented) and other partly fermented tea (6.3)**	3

TABLE I.A.1 continued

Country	Product (Share of total exports)	Number of products accounting for 75 percent of total exports
Mali	**Cotton, not carded or combed (39.3)**, Mineral or chemical fertilizers containing nitrogen, phosphorus, potassium (12.5), **Sesamum seeds (8.1)**	8
Mauritius	T-shirts, singlets, and other vests, knitted of cotton (13.4), **Cane sugar, raw (12.2),** Tunas, skipjack, and bonito (11.2)	36
Mozambique	Aluminum, unwrought, not alloyed (38.1), Electrical energy (10.5), Light oils and preparations (9)	8
Namibia	Natural uranium and its compounds (16.4), Unwrought zinc, containing by weight 99.99 percent or more of zinc (14.5), Uranium ores and concentrates (13.3)	7
Niger	Natural uranium and its compounds (70.5), Light oils and preparations (23.8)	2
Nigeria	Petroleum oils and oils from bituminous minerals, crude (86.3), Liquefied natural gas (7.5)	1
Rwanda	**Coffee, not roasted, not decaffeinated (29)**, Niobium, tantalum, and vanadium ores and concentrates (20.6), Tin ores and concentrates (11.2)	5
São Tomé & Príncipe	**Cocoa beans, whole or broken, raw or roasted (47.1)**, Wristwatches, other than automatic winding (12.3), Aircraft, unladen weight of 2,000–15,000 kilograms (9.7),	4
Senegal	Phosphoric acid and polyphosphoric acids (25.5), Fish, fresh and chilled, not elsewhere specified (6.8), Fish, frozen, not elsewhere specified (6)	19
Seychelles	Tunas, skipjack, and bonito (59.2), Tunas, bigeye (Thunnus obesus) (7.3), Skipjack and stripbellied bonito (5.4)	4
Sierra Leone	Diamonds, nonindustrial, unworked or simply sawn or cleaved (21.5), Titanium ores and concentrates (11.8), **Cocoa beans, whole or broken, raw or roasted (8.5)**	22
Somalia	**Goats, live (28.3), Sheep, live (24.3), Live bovine animals (21.6)**	4
South Africa	Platinum, unwrought or in powder form (9.3), Gold, unwrought, nonmonetary (6.4), Iron ores and concentrates, nonagglomerated (5.6)	103
Sudan	Petroleum oils and oils from bituminous minerals, crude (91.3)	1
Swaziland	**Cane sugar, raw (15.7), Mixtures of odoriferous substances for the food or drink industries (13.4), Food preparations not elsewhere specified (10.6)**	25
Tanzania	**Coffee, not roasted, not decaffeinated (9.6), Tobacco, partly or wholly stemmed (9.2)**, Precious metal ores and concentrates, other than silver (8.3)	31
Togo	**Cocoa beans, whole or broken, raw or roasted (47.1), Groundnuts (8.3)**, Gold, unwrought, nonmonetary (7.7)	5
Uganda	**Coffee, not roasted, not decaffeinated (35.4)**, Fish fillets and other fish meat, fresh or chilled (8.8), **Tobacco, partly or wholly stemmed (7.5)**	15
Zambia	Refined copper, cathodes and sections of cathodes (49.8), Copper, unrefined, and copper anodes for electrolytic refining (16.5), Copper ores and concentrates (7.8)	4
Zimbabwe	**Tobacco, partly or wholly stemmed (22.9)**, Ferro-chromium containing by weight more than 4% carbon (9.1), **Cane sugar, raw (8.3)**	19

Note: Include only products that account for more than 4 percent of total exports.
Source: African Development Indicator database

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Chapitre II

What are the agricultural exports growth perspectives offered to sub-Saharan countries by current trade negotiations? [25]

Abstract

Global general equilibrium simulations of "regional" (within Sub-Saharan Africa –SSA-) and "multilateral" (Doha and preferential) trade integration are compared to assess policy reform priorities. Their coherence with the objective of agriculture-led industrialization is tested. New results reveal that for SSA regional integration delivers as much as multilateral integration. Multilateral liberalization drives Sub-Saharan African countries further away from agricultural-led industrialization. On the contrary regional integration fosters the production and trade of processed agricultural products. Regional integration has heterogeneous impacts on countries in SSA and gains might be concentrated on a few countries. Accompanying redistributive policies to compensate the loosers might help bring the negotiations further.

JEL codes: F15, F47, O19, O24, O55, Q17

Keywords: Trade policy, market integration, agriculture, computable general equilibrium, trade preferences, Sub-Saharan Africa.

Note: Earlier versions of this chapter has benefitted from very useful comments and suggestions after several presentations including at the European Trade Study Group Conference, 9-12 September 2010, Lausanne (Switzerland), at IFPRI MaSSP Policy Seminar at the Ministry of Agriculture and Food Security of Malawi, 18 Novembre 2010, Lilongwe (Malawi), at the doctoral seminar of Sciences Po, 17 December 2010, Paris (France), at a brown bag seminar at IFPRI, 29 May 2011, Washington DC (USA), at the 14th conference of the Global Trade Analysis Project, 16-18 June 2011, Venezia (Italy), at the annual conference of Ecomod, 29 June-01 July 2011, Puerta Delgada (Portugal).
Future presentation include the triennial conference of the International Association of Agricultural Economists (IAAE), 18- 24 August 2012, Foz do Iguaçu (Brazil).
Additionally to the conference websites, published versions include the IFPRI Discussion Paper 1119 and the policy brief IFPRI MaSSP n°10with K. Pauw.
All result files and other necessary files to reproduce the simulations are available upon request.

[25] I wish to thank researchers from the MTID team at IFPRI and CEPII for their help and technical support in the modeling part with MIRAGE.

1. Introduction

Considering the proliferation of trade negotiations, there is little academic guidance in either the theoretical or empirical literature to help countries from Sub-Saharan Africa[26] (SSA) set priorities for trade policy reforms and ensure that their commitments are instrumental to broader development strategies. Based on the assumption that the pattern of trade integration affects agricultural development, this research starts to fill those gaps. First, rather than focusing on one specific trade agreement, the main ones that negotiators in SSA have to choose from are broadly considered and new comparable results are brought forward on the impacts of bilateral, regional (within SSA) and multilateral (global) agreements, and their interactions. This is a necessity since existing empirical assessments of trade integration differ by the data, behavioral parameters, or theoretical features and cannot be considered comparable (Bouët 2008). Second, it will depart from traditional trade literature by following up from insights of agricultural economics on agricultural-led industrialization (Reardon and Timmer 2005).

In a context of global economic and financial crisis governments in SSA are urged to avoid the luring food crisis and adopt a long term strategy to pull their countries out of food insecurity and poverty. Since on average in the region agriculture is still a major source of employment, an essential part of foreign exchange earnings and of government fiscal revenues (FAO 2010), governments[27], the donor community[28] and international institutions (World Bank 2008) are increasingly arguing that agricultural growth is the way to do so. Research on the spillover effects of agriculture growth on overall economic growth (among others Delgado *et al.* 1994, Haggblade, Hazell and Reardon 2007, Self and Grabowski 2007) have contributed to that recent shift. But academic debates on the strength of the intersectoral linkages in the context of globalized agricultural markets and on the pro-poor impacts remain (Christiaensen, Demery and Kuhl 2011). From an analytical point of view, computable general equilibrium (CGE) models, traditional tools of economic policy analysis, are convenient to capture those linkages.

[26] "SSA" refers here to all the countries in the African continent below the Sahara, as opposed to northern Africa. SSA is composed of Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Saint Helena, Sierra Leone, Togo Nigeria, Senegal, Ethiopia, Madagascar, Malawi, Mauritius, Mozambique, Tanzania, Uganda, Zambia, Zimbabwe, Botswana, South Africa, Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, São Tomé and Principe, Angola, Democratic Republic of Congo, Burundi, Comoros, Djibouti, Eritrea, Kenya, Rwanda, Seychelles, Somalia, Sudan, Lesotho, Namibia, Swaziland. Note that Mayotte and the Reunion are not assumed to be part of SSA but are included in some of the database used.

[27] See the African Union Maputo Declaration on Agriculture and Food Security of 2003.

[28] See the G8 l'Aquila Food Security Initiative in 2009 and the G20 "Action plan on food price volatility and agriculture" in 2011.

Poor performance of the agricultural sector is a long-term structural problem in Africa (Adesina 2010). SSA's share in agricultural global trade value decreased from five percent in 1960 to less than two percent in 2008. The trade literature concerned with this increasing marginalization of SSA in global trade highlights two common explanations that are either the poor economic performance of the region as a whole compared to other developing regions (Rodrik 1998); or the lack of competitive gains in primary and agricultural commodities (most of exports) leading to the erosion of historical market shares displaced by similar goods from competing countries (Ng and Aksoy 2008). Additionally, anti-agricultural and antitrade biases of past global and domestic policies in Africa have been highlighted by the recent research program on agricultural distortions of the World Bank (Anderson and Masters 2009) confirming earlier analyses (Krueger,Schiff and Valdes, 1988). Even if structural adjustment policies have reduced domestic bias against agriculture in most African countries since the 90s (Jensen, Robinson and Tarp 2010), some domestic distortions remained while increased supports and import barriers were provided to protect farmers in more well off countries. Development economics further emphasize the fact that macroeconomic policies in Africa have been insufficiently linked with micro-level realities (Bhorat, Hanival and Kanbur 2006), while the micro-level policies implemented with no consideration for the macroeconomic context have failed. Finally, political economy analysis have showed that since the 1980s economic reforms in Africa have been more driven by external political prescriptions of the World Bank than by the political economy influence of protectionist pressure groups (Jones, Morrissey and Nelson 2010). Several analyses have showed that severe analytical and negotiation capacity constraints hinder independent analysis and assessment of the potential implications of trade agreements for their economies (UNCTAD 2010). It is thus critical to compare trade policy opportunities based on their coherence with SSA priorities of agricultural growth and broader development objectives (de Janvry and Sadoulet 2010).

In the rest of the chapter, we will first present the CGE methodology. Second, we will justify the focus on the comparison of the regional and multilateral trade integration scenarios. The last part will present the main results, and discuss their comparative impacts, and their sensibility to alternative outcome of the negotiations with the EU.

2. Assessing the impacts of trade on the agricultural development strategy

According to the literature review of Harrison, McLaren and McMillan (2010), economic theory cannot predict the detailed impacts of trade liberalization. Thus the answer to our research question is empirical.

2.1. The rationale for global general equilibrium modeling

According to the empirical trade literature, the outcomes of trade policies depend on the relative impacts on competitors (Low, Piermartini and Richtering 2005 and Carrere and de Melo 2010). It is thus necessary to conduct empirical trade policy analysis at a global level in order to compare different trade integration levels. Global general equilibrium enables us to study the evolution of the agricultural sector together with changes in the socioeconomic and macroeconomic structures of open economies (Sadoulet and de Janvry 1995). We use the Modeling International Relationships in Applied General Equilibrium (MIRAGE) global model, initially developed by the Centre d'Études Prospectives et d'Informations Internationales (CEPII) (Decreux and Valin 2007) described in Appendix A.

Following Davis and Mishra's (2007) advice, far from taking advantage of all the specifications MIRAGE has to offer, we complexify the model only to the extent that it is needed to adequately answer our question. We consider perfect competition, since imperfect competition significantly affects results (Karam 2009) introducing a bias detrimental to countries' specialization in agriculture (Decreux and Valin 2007) which we want to avoid when focusing on countries where most households depend on agriculture and value the diversity of agricultural goods (Katungi *et al.* 2011), and a static mode, since the focus is on the comparison of the long-term effect of multiple scenarios.

All trade liberalization scheme produces contrasted impacts across sectors and countries (Winters McCulloch and McKay 2004) but the facts that, as most other global CGE models, MIRAGE has one representative agent and relies on the GTAP 7 database (Global Trade Analysis Project of Purdue University, which is the most used database for trade policy analysis) limit the analysis of distributional impacts. Indeed only 13 of the 52[29] countries of

[29] Individual countries are Nigeria, Senegal, Ethiopia, Madagascar, Malawi, Mauritius, Mozambique, Tanzania, Uganda, Zambia, Zimbabwe, Botswana, and South Africa.

Regions are Rest of Western Africa (Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Saint Helena, Sierra Leone, Togo), Rest of Central Africa (Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, São Tomé and Principe), Rest of South Central Africa (Angola, Democratic Republic of Congo), Rest of

SSA appear individually in the GTAP 7 database, and the rest are included in five regions, grouping highly heterogeneous countries. Furthermore, the agricultural sectors of specific importance for SSA, other than grains, are not detailed in the GTAP 7: Roots and tubers are not separated and traditional export crops such as coffee, cocoa, cotton, tea, and tobacco are aggregated into the "exportable other crops" sector.

There are several ways that previous studies address these issues, using alternative databases, and linking the global model to national or sub-national general equilibrium models and household data (Bourguignon, Bussolo and Cockburn, 2010). The easiest way to link the global model to the household level is through a poverty elasticity, a parameter supposed to express how poverty incidence is reduced when an index representative of what poor people gain increases as Bouët (2008) demonstrates, the main shortcoming of the poverty elasticity parameter is that it only accounts for the inequality effects of reforms to the extent that it is estimated for a wide range a different household types. By using a "country stratum-factor price-poverty line specific poverty elasticities" as in Hertel *et al.* (2007), there are strong shortcomings Furthermore applying the concept of poverty elasticity gives the impression that the relation between trade openness and poverty alleviation is mechanical. Thus, this chapter will not try to assess the impacts of trade integration on poverty, but will rather look at the contrasting impacts across countries and regions as in Bouët *et al.* (2005) based the changes in gross domestic product (GDP),equivalent variation of the consumer utility function as a measure of welfare (as defined in Sadoulet and de Janvry 1995), and other macroeconomic indicators. It will go further than previous studies by trying to also assess the coherence of trade reforms with the agricultural development strategies of countries in SSA.

2.2. Assessing the impacts of trade on the agricultural development strategy

The trade literature has not looked into the issue of agricultural-led industrialization so far. It rather classifies agriculture in Africa between "traditional agricultural exports", "food stuff" and "nontraditional exports" or "commercial" and compare the respective growth perspective from those different types of exports. For instance Diao and Dorosh (2007) look at the impact of different productivity growth in SSA and suggest that rapid agricultural growth in SSA could be constrained by current global demand, particularly for nontraditional exports. They also underline that productivity growth in foodstuff offers more potential for

eastern Africa (Burundi, Comoros, Djibouti, Eritrea, Kenya, Mayotte, Reunion, Rwanda, Seychelles, Somalia, Sudan), and Rest of South African Customs Union (Lesotho, Namibia, Swaziland).

major impacts on poverty and food consumption. The recent work by Poulton *et al.* (2009) summarizing the lessons learned from past experience of success and failure with commercial agriculture in Africa analyses the sources of competitiveness of African agricultural exports and finds that few African countries are competitive at the international level, but many of them are at the regional level. Both of those studies emphasize that the regional markets in SSA might represent more interesting opportunities for countries in SSA than international markets. Neither of those studies, however, look at the changing trade environment nor the impacts of increased market access for SSA.

According to the agricultural economic literature, global market composition has changed considerably over the years and has been characterized by an increasing level of processed goods. Reardon and Timmer (2005) have shown that those changes in demand patterns have driven the agrifood industry structural transformation within developing countries. From the GTAP 7 data, we find that SSA is the region of the world that is processing the least part of its agriculture production, with less than 50 percent in 2004; whereas more than 70 percent of its agriculture imports are processed, as compared to 80 percent of developed countries's agricultural imports. According to those data, there would already be scope for SSA to process more its agricultural production, and increase exports of processed products to answer an existing demand both from regional and international markets.

Reardon *et al (*2009) show that the overall growth and poverty effects of the development of those modern agricultural value chains are determined by the labor effects and more generally the spillovers effects in the economies. But analysis of the micro-level determinants of developing countries producers' integration in the global agricultural supply chains (Gomez *et al.* 2011) also highlight the complex supply side constraints they are facing. These supply-side constraints are due to inadequate transportation, storage and communication infrastructures in the countries, but also to the low levels of productivities of the farmers and their little technical or financial capacity to raise it on their own. It prevents many of them, and especially poor farmers within them, from taking advantage of any opportunities that arise (see for instance de Janvry, Fafchamps and Sadoulet 1991). Unfortunately, as in most CGE models, supply side constraints are not well represented in MIRAGE, despite assumptions of imperfect reallocation of factors of production. We thus rather consider that such CGE study enables comparing market opportunities from the demand-side.

In order to analyze the stake of agricultural led industrialization, we distinguish agricultural commodities according to whether they are sold raw or processed and according to the destination market whether regional in SSA or the rest of the world.

The regional and sectoral mapping, focusing on SSA agricultural sectors, is described in Appendix A. Results for each scenario are available for the 29 regions, of which 18 are SSA, and the 28 sectors, of which 18 are agricultural. In the remainder of the analysis, for simplicity, the results are presented aggregated in five "zones of interest" as detailed in Table II.B.2 and "sectors of interest" in Table II.B.1, but detailed results are available upon request.

3. The trade scenarios

There is a renewed interest by all governments in SSA and some development agencies in accelerating regional integration[30]. While some observers see this desire for increased regional integration as purely politically motivated, some of the economic arguments include the newly recognized growth potential of domestic and regional consumer markets (UNECA 2010), and the scope in SSA to intensify agricultural processing activities domestically before exporting goods to regional and international markets, presented above. Apart from those arguments, and despite a large literature on regional trade integration in Africa, evidence on the expected impacts from implementing the regional agreements currently negotiated is scarce (te Velde and Meyn2008). Economic theory predicts from Viner (1950) that the effects of regional trade integration can be either net trade creating or net trade diverting depending whether trade created among partner countries is additional or replace trade with the rest of the world. Few global general equilibrium studies have simulated the impacts of regional integration within SSA, because of the lack of reliable data, the problem of informal, unreported trade, but maybe also because of the consensual theoretical predictions from the Vinerian framework (and further developments) that multilateralism is superior to regionalism since it does not entail risk of trade diversion and that in any case developing countries are better off integrating with developed countries than with other developing countries as is apparent in the conclusions of Schiff and Winters (2003) summarizing World Bank research on regional integration and development.

[30] See the Outcome Statement of the "Joining up Africa: Regional Integration" conference agreed in London, United Kingdom on March 4th 2010 by representatives from the African Development Bank, the World Bank, the European Commission, the WTO and the Department for International Development (DFID). See also the declarations at the 18th African Union Summit on "Boosting Intra-Trade" on 23-30 in Addis Ababa, Ethiopia.

On the contrary a large strand of the empirical trade literature focus on the prospects from further trade liberalization at the global level. Since results of the general equilibrium studies looking at the global trade liberalization have been used in the political negotiations at the World Trade Organization (WTO) they have been surrounded by many debates (Derajavan and Robinson, 2005). A lot of attention has been devoted to try to test the political argument that the Doha Development Agenda (DDA) would be beneficial for development by looking at its impacts on developing countries and SSA in particular. As a consequence many studies have focused on this question, testing the impacts of slight variations on the terms of the agreement, and of each component of the negotiations (Anderson Martin and Van der Mensbrugghe, 2006).

Two main mechanisms have been identified as having potential negative effects on some developing countries. The first one is the anticipation that net food importing countries would be negatively impacted by increased international price of food commodities (Panagariya 2005). Considering that distorting domestic policies (agricultural supports and export subsidies) from developed countries for some staples (mainly meat, milk, wheat, maize, rice) have contribute towards an excess production, artificially lowering international prices for those commodities, de Janvry and Sadoulet (1992) showed that the elimination of these distortions will increase international prices of those commodities. Bouët *et al.* (2005) further show that net food importing low income countries can still benefit from increased trade liberalization if increases in food prices are more than compensated by increases in the prices of their exports.

The second mechanism is the prediction that the countries currently granted high preferential margins, such as Sub-Saharan African countries, would experience an erosion of those preferences from multilateral liberalization and terms of trade loss with increased competition on their exports (Bouët, Mevel, and Orden 2007). It is the development of a new database taking into account the existing preferential agreements, the Market Access Maps database developed by the CEPII and the International Trade Center (ITC) (MAcMapHS6) (Bouët *et al.* 2008) that has enabled to capture those effects in global simulations framework. MAcMapHS6 2004 represents the full structure of protection, bound, MFN applied, and preferential[31] applied duties in 2004 at the bilateral level.

[31] Rules of origin are not taken into account and thus supposed to be fully used, even though there is some evidence that developing countries are not able to fully take advantage of those preferences.

With the recognition that some poor countries, especially Least Developped Countries (LDC) might suffer from adverse effects from the DDA, a Duty-Free Quota-Free (DFQF) market access towards LDCs was recently included in the Doha Round negotiations. This addition to the Doha "package" is now used as a definitive argument that a successful conclusion of a Doha Round is bound to be highly beneficial for African countries (Lamy 2011).

Considering the high political stakes involved in the regional and multilateral negotiations, it seems essential delivering quantitative results to fuel the debates on whether multilateral and regional trade integrations are coherent with development objectives, coherent with one another and whether one type of trade integration should be a priority over the other.

Numerous simulations of the impacts of agricultural trade liberalization on Sub-Saharan African countries have been produced in the past, but only few of them compare different levels of trade agreements. The few ones that do highlight that different levels of trade integration have distinct impacts, and that interaction effects of simultaneous integration are important to take into account. Among those, Fontagné Mitaritonna and Laborde (2011) test the interaction effect of the Economic Partnership Agreement (EPA) with regional integration, Keck and Piermartini (2005) and Berisha-Krasniqi, Bouët and Mevel (2008) compare EPA with multilateral liberalization, and Kowalski and Shepherd (2006) compare North–South to South–South multilateral integration. None of them compare potential impacts of the regional and multilateral integration schemes. Since simultaneously to the regional and multilateral negotiations, EPA negotiations between the EU and countries in SSA are ongoing, it seems important to include sensibility analysis over whether potential outcomes of the EPA could impact those results.

We first analyze the scopes from further regional and multilateral market integration for SSA based on an updated version of the MAcMapHS6 2004 database MAcMapHS6. Then the scenarios and the tariff changes they imply are presented.

3.1. Scopes for further regional and multilateral market integration

First the database is updated ("pre-experiment") to include the main trade agreements between SSA and its trade partners concluded since 2004 (such as expanded DFQF by India, China, Turkey, and Korea to some LDCs; some new free trade agreements –FTAs-; and the phasing out of the EU protocols for sugar, rice, and bananas). Gains from increased

liberalization can be substantially overestimated without this step (Bouët 2008). This baseline is the reference point to which our scenarios will be compared.

TABLE II.1 — AVERAGE BILATERAL APPLIED TARIFFS BY SECTOR AND REGION

		Exporter				
Importer	Sector	DC	EC	ODC	NA	SSA
DC	Raw ag	0.14	0.17	0.12	0.11	0.10
	Processed ag	0.18	0.17	0.16	0.11	0.14
	Fish	0.04	0.04	0.05	0.04	0.05
	Other	0.03	0.04	0.03	0.03	0.02
EC	Raw ag	0.13	0.13	0.11	0.09	0.19
	Processed ag	0.24	0.21	0.25	0.18	0.32
	Fish	0.14	0.11	0.13	0.10	0.20
	Other	0.08	0.11	0.09	0.06	0.07
ODC	Raw ag	0.12	0.20	0.17	0.20	0.15
	Processed ag	0.19	0.32	0.21	0.25	0.22
	Fish	0.22	0.21	0.21	0.14	0.21
	Other	0.07	0.11	0.08	0.07	0.09
NA	Raw ag	0.21	0.25	0.26	0.17	0.12
	Processed ag	0.40	0.26	0.37	0.18	0.82
	Fish	0.25	0.26	0.26	0.11	0.25
	Other	0.14	0.18	0.17	0.07	0.16
SSA	Raw ag	0.11	0.16	0.13	0.16	0.18
	Processed ag	0.26	0.24	0.23	0.34	0.28
	Fish	0.16	0.11	0.10	0.05	0.15
	Other	0.10	0.16	0.12	0.12	0.14

Source: MAcMapHS6 2004 after pre-experiment, reference-group weight aggregating method.
Notes: DC = developed countries; EC = emerging economies; ODC = other developing economies; NA = northern Africa; SSA = Sub-Saharan Africa. Raw ag = raw agricultural products; Processed ag = processed agriculture products; Fish = fishing products; Other = primary and manufactured products and services.

Table II.1 illustrates the stylized facts of the preferential margin of SSA and of tariff escalation.

Developed countries apply lower tariffs on exports from SSA than from other regions of the world in particular on raw agricultural imports. This preferential margin of SSA is linked to the fact that the region benefits from a preferential access to the EU which is in the MacMaps 2004 dataset the destination of the region's agricultural exports.

The tariff escalation is the fact that higher tariffs are applied on more processed goods. It is suspected to some extent to have hampered the export-led industrialization possibilities of developing countries (Matthews 2005).

Despite the existing economic integration processes (UNECA 2010) countries in SSA apply a higher level of protection on regional trade than other regions.

Hence there is still scope to increase market integration both at the regional and multilateral level with possible beneficial impacts on agricultural-led industrialization.

Several scenarios of multilateral and regional agreements are simulated and compared with this baseline. There are summarized in the Table II.2 and presented below.

TABLE II.2 — SCENARIOS SIMULATED

Scenario	Description
Multiletral scenarios	
DDA	Successful conclusion of the Doha negotiations: Multilateral reduction of bound tariff barriers of all countries except LDC according to the December 2008 modalities.
DFQF	Complete elimination of all applied tariff barriers imposed by OECD countries, Brazil, China, and India on imports from all LDCs.
DDA+DFQF	Combined tariff reductions of the DDA and the DFQF scenarios.
Regional Scenarios	
Reg FTA	Constitution of four subcontinental FTAs in SSA: Complete elimination of applied tariff barriers between countries of the same FTA.
SSA FTA	Constitution of one subcontinental FTA in SSA: Complete elimination of applied tariff barriers between Sub-Saharan African countries.
Interactions	
DDA+ Reg FTA	Combined tariff reductions of the DDA and the Reg FTA scenarios.
DFQF+Reg FTA	Combined tariff reductions of the DFQF and the Reg FTA scenarios.
DDA+DFQF+Reg FTA	Combined tariff reductions of the DDA, the DFQF and the Reg FTA scenarios.
Alternative baselines	
EPA	Bilateral EPA concluded between each ACP country and the EU: Elimination of applied tariffs between the EU and each ACP country. Tariffs applied on the imports of some sensitive products from the EU as defined by each ACP country (IEPA) are unchanged.
GSP	Each ACP country is transferred to the corresponding preferential scheme of the EU: EU eliminates applied tariff barriers on all imports from ACP LDCs. Applied tariffs on imports from ACP non LDCs are set the level of the GSP agreement.

3.2. "DDA" scenario: multilateral liberalization in the form of a "Doha Development Round"

The November 2001 declaration of the Fourth Ministerial Conference of the World Trade Organization (WTO) in Doha, Qatar, provides the mandate for negotiations known as the "Doha Round". The Doha Development Agenda was to take into account the specific needs of developing countries. The July 2008 package is considered a stepping-stone on the way to concluding the Doha Round, and the December 2008 draft modalities text seems to be widely accepted by WTO members as the basis for further negotiations.[32]

Since then, no substantial achievement to conclude the Doha Round has been made, and trade liberalization has, on the contrary, evolved at the bilateral and regional level.

[32] Based on latest updates of http://www.wto.org/.

The "DDA" scenario[33] is based on the December 2008 modalities (WTO 2008a, 2008b) in a similar scenario to Bouët and Laborde (2010). The tariff reduction formula is applied on base rates equal to existing bound tariffs or for currently unbound tariff lines, to average applied MFN rate for 2004 (from MAcMapHS6-2.1) plus 25 percent. Details of the state of the negotiations and the tariff reduction formulas and the flexibilities are described in Laborde and Martin (2011a, 2011b).

The simulation of Doha in this research does not include all flexibilities. For nonagricultural products, the Swiss tariff-cutting formula with an 8 percent coefficient is used for all developed countries and a 23 percent coefficient is chosen for developing countries. Small and vulnerable economies, as defined by the WTO, are allowed to only cut their tariff to the mean between the value found with the Swiss formula with 23 percent coefficient and their base rate. For agricultural products, the tiered formula is used with the proportional cuts for each tariff band. For developed countries, the cut is 0.685 for tariffs above 0.75, 0.685 for tariffs between 0.75 and 0.50, 0.575 for tariffs between 0.50 and 0.25, and 0.50 for tariffs under 0.25. Developing countries have larger bands (1.3, 0.8, and 0.3) and cuts in each band are two-thirds those of the developed countries. Small and vulnerable economies can make reductions 10 percent smaller in each band than other developing members. Additional flexibilities are available for the sensitive and special products, defined using the Jean, Laborde, and Martin (2010) method[34]: cuts for sensitive products are two-thirds those for other agricultural products for both developed and developing countries, and developing countries can make reductions of 15 percent for special products. The cotton initiative adds free market access by developed countries to LDCs for cotton.

[33] Detailed formula available upon request.

[34] Thanking David Laborde for having made that list available.

TABLE II.3 — DDA SCENARIO: PERCENTAGE TARIFF CHANGE ON APPLIED TARIFFS BY SECTOR AND REGION

		Exporter				
Importer	Sector	DVD	EC	ODC	NA	SSA
DC	Raw ag	-32.15	-35.58	-36.23	-43.03	-34.49
	Processed ag	-36.24	-43.03	-39.46	-37.66	-35.37
	Fish	-51.47	-55.23	-40.55	-51.16	-51.29
	Other	-33.03	-41.31	-41.49	-43.73	-26.61
EC	Raw ag	-0.21	-0.23	-0.28	-0.54	-0.11
	Processed ag	-5.04	-1.62	-2.83	-6.27	-9.95
	Fish	-25.78	-22.81	-30.39	-27.21	-35.38
	Other	-27.17	-21.27	-29.22	-22.66	-12.90
ODC	Raw ag	-0.03	-0.28	-0.09	-0.21	-0.22
	Processed ag	-3.93	-2.29	-3.51	-4.28	-7.02
	Fish	-39.58	-28.56	-30.45	-27.15	-29.64
	Other	-12.95	-21.22	-14.77	-12.36	-9.64
NA	Raw ag	-0.03	-0.64	-0.09	-0.05	-0.23
	Processed ag	-4.62	-4.81	-6.88	-1.32	-3.04
	Fish	-46.58	-45.65	-51.40	-23.74	-47.99
	Other	-31.16	-35.07	-31.58	-30.59	-35.66
SSA	Raw ag	-7.85	-8.38	-5.04	-23.08	-15.35
	Processed ag	-8.42	-12.92	-12.62	-25.21	-22.87
	Fish	-24.70	-5.37	-9.10	-21.25	-4.77
	Other	-4.21	-7.09	-6.20	-4.88	-5.19

Source: Author's calculations, reference-group weight aggregating method.

Table II.3 shows that tariff escalation is reduced except for agricultural exports from northern African countries to developed countries. Nevertheless the fact that in the structure of most developing economies' protection pattern, a few highly protected tariff lines accounting for most of the average protection can be excluded from liberalization through the sensitive products clause substantially reduces the effective liberalization of tariff cuts as was underlined by Bouët (2008).

LDC's are exempted from tariff reduction, but non LDCs in SSA have to decrease their tariffs, although less than developed countries according to the special and differential treatment at the WTO. For instance, Nigeria has to reduce its tariffs to the benefit of other countries in SSA such as South Africa (Table II.C.1). Since non LDCs are also the countries trading the most in SSA, at the aggregate level SSA reduces its tariffs towards the rest of the World, especially on imports from Northern Africa (-23 percent on raw and processed agricultural products), and SSA (-15 percent on raw agricultural exports, -23 percent on processed agricultural exports).

3.3. "DFQF" scenario: preferential multilateral liberalization for Least Developed Countries

It was agreed at the 2005 WTO Ministerial that all developed countries would offer at least 97 percent DFQF access for LDCs. Since 2001, some Organization for Economic

Cooperation and Development (OECD) countries have already started implementing DFQF access to some LDCs. A number of emerging countries (Turkey, Korea, and China) have also put in place preferential market access albeit covering fewer products (Elliott 2010). It is crucial to take those preferential agreements that have already happened into account in the pre-experiment because they reduce the potential gains from the DFQF proposal.

Without specifically testing the interaction effects of those different agreements, Berisha-Krasniqi, Bouët and Mevel (2008) and more recently Bouët *et al.* (2010) and Bouët and Laborde (2011), using a general equilibrium model and partial equilibrium models, find that there is little to expect for LDCs from DFQF market access if this market access does not cover 100 percent tariff lines and is not extended to as many preference-giving countries as possible, including emerging markets economies. Building from their results, a very ambitious "DFQF" scenario is implemented where OECD countries and Brazil, China, and India grant a 100 percent DFQF market access to all LDCs.

TABLE II.4 — DFQF SCENARIO: AVERAGE CHANGE IN POINTS OF APPLIED TARIFFS BY SECTOR AND REGION

		Exporter	
Importer	Sector	ODC	SSA
DC	Raw ag	-0.52	-18.69
	Processed ag	-0.59	-9.37
	Fish	-2.75	-16.82
	Other	-5.34	-2.92
EC	Raw ag	-17.35	-41.67
	Processed ag	-1.76	-23.79
	Fish	-8.94	-44.45
	Other	-1.64	-14.28
ODC	Raw ag	-0.68	-14.15
	Processed ag	-0.31	-4.22
	Fish	-3.39	-9.21
	Other	-0.62	-5.29

Source: Author's calculations, reference-group weight aggregating method.
Notes: DC = developed countries; EC = emerging economies; ODC = other developing economies; NA = northern Africa; SSA = Sub-Saharan Africa. Raw ag = raw agricultural products; Processed ag = processed agriculture products; Fish = fishing products; Other = primary and manufactured products and services.

"DFQF" is mostly favorable to SSA (Table II.4) for which the equivalent average tariff cuts are much higher than from DDA. Despite higher initial tariffs for processed than for raw agricultural products, tariff cuts are more important for the former (Table II.1). This apparent paradox reflects that LDCs export more raw agricultural products than processed ones to OECD countries and emerging economies. India, "other Asian countries", and the United

States are the destinations which would have to reduce the most their tariffs on agricultural exports from SSA.

3.4. "DDA+DFQF" scenario

The DFQF market access proposal is now part of the DDA negotiation as compensation toward LDCs for the erosion of preferences they experience in the DDA. Hence a combination of the two is also simulated.

Adding "DFQF" to the "DDA" scenario brings additional tariff cuts of interest to SSA (Table II.5).

TABLE II.5 — DDA + DFQF SCENARIO: AVERAGE CHANGE IN POINTS OF APPLIED TARIFFS BY SECTOR AND REGION

		Exporter				
Importer	Sector	DVD	EC	ODC	NA	SSA
DC	Raw ag	-32.16	-35.58	-36.56	-43.03	-42.41
	Processed ag	-36.26	-43.03	-39.76	-37.66	-40.86
	Fish	-51.87	-55.23	-42.82	-51.16	-61.67
	Other	-33.04	-41.31	-43.6	-43.73	-28.92
EC	Raw ag	-0.24	-0.23	-17.59	-0.54	-41.69
	Processed ag	-5.12	-1.62	-4.47	-6.27	-29.56
	Fish	-29.13	-22.81	-36.48	-27.21	-66.49
	Other	-27.31	-21.27	-30.55	-22.66	-25.41
ODC	Raw ag	-0.33	-0.28	-0.78	-0.21	-14.36
	Processed ag	-4.01	-2.29	-3.69	-4.28	-9.91
	Fish	-49.74	-28.56	-32.19	-27.15	-34.27
	Other	-13	-21.22	-15.17	-12.36	-14.48
NA	Raw ag	-0.03	-0.64	-0.09	-0.05	-0.23
	Processed ag	-4.62	-4.81	-6.88	-1.32	-3.04
	Fish	-46.58	-45.65	-51.4	-23.74	-47.99
	Other	-31.16	-35.07	-31.58	-30.59	-35.66
SSA	Raw ag	-7.85	-8.38	-5.04	-23.08	-15.35
	Processed ag	-8.42	-12.92	-12.62	-25.21	-22.87
	Fish	-24.7	-5.37	-9.1	-21.25	-4.77
	Other	-4.21	-7.09	-6.2	-4.88	-5.19

Source: Author's calculations, reference-group weight aggregating method.
Notes: DC = developed countries; EC = emerging economies; ODC = other developing economies; NA = northern Africa; SSA = Sub-Saharan Africa. Raw ag = raw agricultural products; Processed ag = processed agriculture products; Fish = fishing products; Other = primary and manufactured products and services.

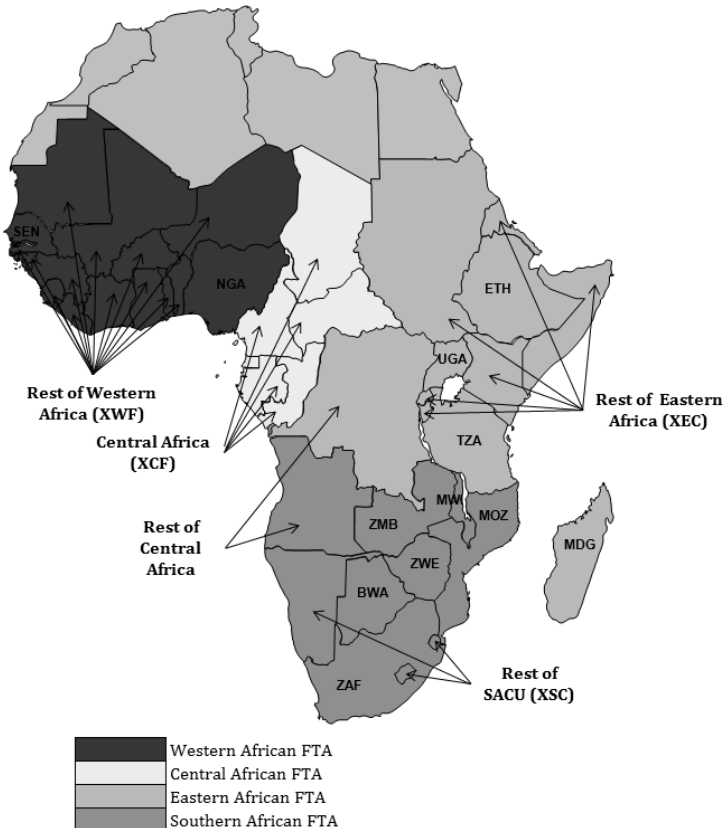
It is noteworthy in Table II.5 and Table II.C.3 that the equivalent tariff cuts are not the exact sum of tariff cuts from the two scenarios alone, since some sources of tariff reduction are the same in both agreements. For instance, an important tariff cut for Malawi is the complete elimination of tariff on the tobacco exported to the United States. But some reductions are the same in both agreements.

3.5. "Regional FTA" scenario: four regional Free Trade Agreements in Sub-Saharan Africa

Despite the substantial number of trade agreements signed among Sub-Saharan African countries, progress in regional integration is uneven across the continent (UNECA 2010). In terms of future prospects, it seems most likely that regional integration will continue, but the pace will highly depend on the willingness of the respective governments to enforce the agreements they have signed.

Considering the number of overlapping memberships of countries in SSA, the choice of a combination of regional economic communities that covers all Sub-Saharan African countries with no overlap is problematic (Figure II.1). We choose the four groups used for the EPA regional negotiations in Africa, namely, a western African group based on Economic Community of West African States (ECOWAS) members plus Mauritania; a central African group based on Monetary and Economic Community of Central Africa (CEMAC) members plus Democratic Republic of Congo and São Tomé and Principe; a southern African group named the Southern African Development Community (SADC) group based on the Southern Africa Customs Union (SACU) members plus Malawi, Mozambique, Zambia, Zimbabwe and Angola; and an eastern African group considered as one region based on two negotiating groups, one being based on the East African Community (EAC) members and the other one named the ESA (eastern and southern Africa) based on some Common Market for Eastern and Southern Africa (COMESA) members.

FIGURE II.1 — REGIONAL FTA SIMULATED AND GTAP 7 REGIONS IN SUB-SAHARAN AFRICA



Source: GTAP 7 database region listing.

Because data on the effective applied tariff and the commitments of various agreements are hard to gather and consolidate, rather drastic regional integration scenarios were chosen. For each country in SSA, all *ad valorem* equivalent tariffs applied to imports from other countries of the same region are set to zero, creating four FTAs.

TABLE II.6 — REGIONAL FTA SCENARIO: AVERAGE CHANGE IN POINTS OF APPLIED TARIFFS BY SECTOR

Importer	Sector	Exporter
		SSA
SSA	Raw ag	-20
	Processed ag	-23
	Fish	-31
	Other	-24

Source: Author's calculations, reference-group weight aggregating method.
Notes: SSA = Sub-Saharan Africa. Raw ag = raw agricultural products; Processed ag = processed agriculture products; Fish = fishing products; Other = primary and manufactured products and services.

This scenario cuts tariffs by less than 30 percent on average in SSA (Table II.6) because countries do not trade only with the countries within the same FTA.

Table II.C.4 illustrates some of the major tariff cuts for SSA agricultural exports from regional FTAs. It reveals that some countries, such as Nigeria, Mozambique, and countries in eastern Africa, will have to drastically decrease some of their tariffs.

3.6. "SSA FTA" Scenario

An extended version of regional integration is also chosen in the form of a Sub-Saharan African Free Trade agreement ("SSA FTA"). For each country in SSA, *ad valorem* equivalent tariffs applied on imports from other countries in SSA are set to zero.

Table II.C.5 illustrates some of the major tariff cuts for SSA agricultural exports from the "SSA FTA" scenario. Most of the tariff cuts benefit exports from South Africa and western Africa.

3.7. Testing alternative baselines and interactions

All the possible interactions between the previously presented scenarios are tested. From each interaction we find what has been seen with the "DDA+DFQF": There is an interaction effect, and the outcome of simultaneous scenarios it is not a mere sum of what happens independently in the each scenario.

From the initial scenarios presented above, two alternative baselines are built depending on the outcome of the EPA negotiations. The initial results are compared with the corresponding scenarios with alternative baselines.

3.7.1. *"EPA" scenario: bilateral Economic Partnership Agreements between the EU-ACP*

According to the MAcMapHS6 database, in 2004 17 Sub-Saharan Arican countries depended on the EU for more than 50 percent of their agricultural exports. Since the EU is the main trade partner for Sub-Saharan African countries, the impacts of the potential outcomes of the current negotiations between the EU and Sub-Saharan countries should be tested on the baseline and on other scenarios.

In 2007 the WTO waiver for the Cotonou Agreements[35] ended, without the expected conclusion of the EPA being successfully signed. Initiated as regional negotiations between regional communities in the African, Caribbean, and Pacific (ACP) countries and the EU (which required countries that had overlapping memberships to those regional communities to decide with which to negotiate), the negotiations have for some time been pursued on a bilateral basis with the EU.

We consider either that EPA negotiations are successful and applied *ad valorem* equivalent tariffs between the EU and each ACP country are set to zero (Table II.C. 6). Tariffs of the sensitive products are excluded from any cuts. As, only the countries that signed Interim EPA (IEPA) have published their list of sensitive products, these lists are extended to the other countries of the same regional group who have not signed the IEPA[36]

Overall the "EPA" scenario is equivalent to tariff cuts ranging from 4 to 19 percent (Table II.7) on tariffs applied by countries in SSA on imports from all developed countries, and tariff cuts ranging from 11 to 35 percent on tariffs applied by all developed countries on imports from countries in SSA.

35 The Cotonou Agreement signed in 2000 had replaced the Lomé Convention, which had been the basis for ACP-EU development cooperation since 1975, providing non reciprocal preferential access for all ACP countries to the EU market. The Cotonou Agreements, however, were supposed to be transitional toward the EPAs in which ACP countries would also provide duty-free access to their own markets for EU exports.

36 Specifically: In the western African group, Ghana and Côte d'Ivoire have their own exclusion lists from their individual IEPA. For the other countries, we use Ghana's list. For all central African countries we use the list of Cameroon's IEPA. In eastern Africa, EAC countries, Comoros, Madagascar, Maurice, Seychelles, Zambia, and Zimbabwe all use their own IEPA exclusion list. For the other countries, we use the EAC exclusion list. For all southern African countries, we use the SAD-1 IEAP exclusion list. All lists were found at http://ec.europa.eu/trade/wider-agenda/development/economic-partnerships/.

TABLE II.7 — BILATERAL ACP-EU EPA SCENARIO: AVERAGE CHANGE IN POINTS OF APPLIED TARIFFS BY SECTOR AND REGION

Importer	Sector	Exporter		
		DC	ODC	SSA
ODC	Raw ag	0.00		
	Processed ag	0.00		
	Fish	-0.01		
	Other	-0.02		
SSA	Raw ag	-0.15		
	Processed ag	-0.19		
	Fish	-0.04		
	Other	-0.17		
DC	Raw ag		0.00	-0.15
	Processed ag		-0.02	-0.35
	Fish		-0.01	-0.11
	Other		-0.01	-0.29

Source: Author's calculations, reference-group weight aggregating method.
Notes: DC = developed countries; ODC = other developing economies; NA = northern Africa; SSA = Sub-Saharan Africa. Raw ag = raw agricultural products; Processed ag = processed agriculture products; Fish = fishing products; Other = primary and manufactured products and services.

3.7.2. *GSP Scenario: The counterfactual scenario*

Considering the difficulties in bringing negotiations forward in the EPA, it is necessary to devise a counterfactual scenario for the case in which the EPA negotiation fails. Since 2008, all countries whose governments initiated the IEPA have benefited from the maintenance of traditional trade preferences from Cotonou. Only the ones that have refused to sign, such as Gabon, Congo, and Nigeria, are no longer Cotonou preference receivers.

Indeed, the EU has preferential programs for developing countries, an everything but arms (EBA) initiative granting all eligible LDCs DFQF access for all products but arms[37] and a Generalized System of Preferences (GSP)[38] for other developing countries. In terms of preferences, the EBA is equivalent to the Cotonou Agreement for ACP LDCs, but for the other ACP countries, the GSP would mean an increase in the tariffs they face for their exports to the EU.

A drastic counterfactual to the EPA scenario is chosen where no EPA is signed and all ACP countries are transferred to the GSP[39] scheme (LDCs are granted EBA). Considering the

[37] I consider that the delayed implementation for sugar, rice, and bananas has ended, and includes the end of the product protocols in the pre-experiment. Indeed, for sugar, from October 1, 2009, to September 30, 2015: ACPs have free access to the EU market, the only restriction being an automatic safeguard clause for non-LDC ACPs (Commission Regulation [EC] No 828/2009 of September 10, 2009, laid down detailed rules of application for the marketing years 2009/10 to 2014/15 for the import and refining of sugar products of tariff heading 1701 under preferential agreements). Since January 1, 2006, the EBA initiative grants DFQF access for bananas from LDCs to the EU market. Non-LDC ACP countries benefit from DFQF access under the EPA trade regime since January 1, 2008. All ACP banana exporters concluded negotiations on a full or interim EPA at the end of 2007.

[38] Note that the GSP plus scheme is not considered.

[39] The GSP plus scheme is not considered.

latest developments in the negotiations (Dalleau 2012), the most likely outcome of the EPA negotiations is actually an halfway situation where some countries and regions do sign the EPA and liberalize trade with the EU some others do not.

TABLE II.8 — ACP GSP SCENARIO: AVERAGE CHANGE IN POINTS OF APPLIED TARIFFS BY SECTOR AND REGION

Importer	Sector	Exporter	
		ODC	SSA
DC	Raw ag	0.00	0.00
	Processed ag	0.03	0.05
	Fish	0.00	0.01
	Other	0.00	0.00

Source: Author's calculations, reference-group weight aggregating method.
Notes: DC = developed countries; ODC = other developing economies; SSA = Sub-Saharan Africa. Raw ag = raw agricultural products; Processed ag = processed agriculture products; Fish = fishing products; Other = primary and manufactured products and services.

Overall, the increase in the tariffs applied by the EU would mean a 5 percent increase in equivalent average tariffs on processed agricultural products exports to all developed countries (Table II.8). Nevertheless, this average increase hides that impacts would be concentrated on the few ACP non-LDCs and on some specific sectors, as illustrated in Table II.C.7, such as sugar (+ 251 percent for Mauritius, + 229 percent for Zimbabwe) or vegetables and fruits (+ 19 percent central Africa, + 11 percent western Africa).

4. Analysis of the results

The different scenarios are first compared in terms of their macroeconomic impacts on real GDP and welfare at the world level and on the different "zones" of the world. This enables comparisons with results and interpretations from previous studies. Some insights on the diversity of the distributional impacts at the country level will also be given. Beyond this first step, the analysis will focus on the structure of agricultural and agro-industrial exports promoted by the integration schemes for Sub-Saharan African countries. Finally, the sensitivity of our conclusions to the scenarios modeled and to some key specifications and parameters is discussed.

4.1. Comparative impacts on aggregate real GDP and welfare

As found in previous studies such as Bouët *et al.* (2005), global gains from trade liberalization are small when expressed in terms of percentage of GDP. In our results, they

amount globally to a maximum of $[40]53 billion of real gross domestic product (GDP) growth or $32 billion of welfare[41] growth (respectively 0.13 percent of 2004 world GDP or 0.10 percent of 2004 world welfare), reached with a combination of a DDA and a Duty-Free Quota-Free (DFQF) (see Table II.9 for aggregate real GDP change, Table II.10 for aggregate welfare change[42], and Table II.D.1 for detailed real GDP impacts on SSA).

TABLE II.9 — IMPACTS OF SCENARIOS ON REAL GDP ($ BILLIONS)

	Absolute change (Percent change)						
	DDA*	DFQF*	DDA+ DFQF*	Reg FTA	SSA FTA	DDA + Reg FTA*	DFQF +Reg FTA*
DC	40.62 (0.12)	0.63 (0.00)	40.95 (0.12)	-0.02 (0.00)	-0.07 (0.00)	40.60 (0.12)	0.61 (0.00)
EC	7.60 (0.26)	-0.04 (0.00)	7.63 (0.26)	-0.02 (0.00)	-0.06 (0.00)	7.58 (0.26)	-0.07 (0.00)
ODC	2.18 (0.09)	0.37 (0.02)	2.46 (0.11)	-0.01 (0.00)	-0.02 (0.00)	2.17 (0.09)	0.35 (0.02)
SSA	0.49 (0.09)	0.23 (0.04)	0.69 (0.13)	0.33 (0.06)	0.65 (0.12)	0.80 (0.15)	0.55 (0.10)
NA	1.27 (0.47)	0.00 (0.00)	1.27 (0.47)	0.00 (0.00)	0.00 (0.00)	1.27 (0.47)	0.00 (0.00)
World	52.16 (0.13)	1.18 (0.00)	53.00 (0.13)	0.28 (0.00)	0.51 (0.00)	52.42 (0.13)	1.45 (0.00)

Source: Author's calculations from the results of the MIRAGE model.
Notes: *Scenario with specific treatment of GTAP data issues. DC = developed countries; EC = emerging economies; ODC = other developing economies; NA = northern Africa; SSA = Sub-Saharan Africa.

[40] All amounts thereafter are in US dollars.

[41] As defined by the change in equivalent income.

[42] In this section we first look at the world level welfare change as compared to the world level real GDP change. Detailed regional welfare impacts are interpreted in the next section.

TABLE II.10 — CHANGES IN WELFARE ($ BILLIONS)

	Absolute change (Percent change)						
	DDA*	DFQF*	DDA+ DFQF*	Reg FTA	SSA FTA	DDA + Reg*	DFQF +Reg*
DC	33.58 *(0.12)*	0.13 *(0.00)*	33.58 *(0.12)*	-0.08 *(0.00)*	-0.17 *(0.00)*	33.51 *(0.12)*	0.05 *(0.00)*
EC	-0.99 *(-0.05)*	-0.21 *(-0.01)*	-1.11 *(-0.06)*	-0.03 *(0.00)*	-0.08 *(0.00)*	-1.02 *(-0.05)*	-0.24 *(-0.01)*
ODC	0.02 *(0.00)*	0.46 *(0.03)*	0.28 *(0.02)*	-0.02 *(0.00)*	-0.04 *(0.00)*	0.00 *(0.00)*	0.44 *(0.02)*
SSA	0.15 *(0.03)*	0.46 *(0.11)*	0.53 *(0.13)*	0.23 *(0.05)*	0.51 *(0.12)*	0.37 *(0.09)*	0.69 *(0.17)*
NA	-0.56 *(-0.28)*	0.00 *(0.00)*	-0.56 *(-0.28)*	0.00 *(0.00)*	0.00 *(0.00)*	-0.56 *(-0.28)*	0.00 *(0.00)*
World	32.20 *(0.10)*	0.84 *(0.00)*	32.73 *(0.10)*	0.09 *(0.00)*	0.22 *(0.00)*	32.30 *(0.10)*	0.94 *(0.00)*

Notes: *Scenario with specific treatment of GTAP data issues. DC = developed countries; EC = emerging economies; ODC = other developing economies; NA = northern Africa; SSA = Sub-Saharan Africa.

4.1.1. ***Small changes at the global level***

The range of our global real GDP and welfare changes for the "DDA" scenario are similar to those of other studies with the Modeling International Relationships in Applied General Equilibrium (MIRAGE) model but differ from other more positive estimates of the World Bank and GTAP or HRT models for several reasons (Bouët *et al.* 2005; Anderson, Martin and Van der Mensbrugghe 2006). First, the studies using the MAcMapHS6-2.1 database (most studies with MIRAGE) take into account a precise measurement of protection worldwide, especially taking into account the trade preferences, regional agreements, and the gap between applied and bound protection (Bouët *et al.* 2008). Second, the choice of conservative estimates of behavioral parameters (lower elasticities of substitution for developing countries based on econometric estimations) yields lower trade flows and thus lower gains from liberalization (Bouët 2008) especially in terms of welfare. More complex theoretical assumptions (such as the imperfect mobility of factors allowed in MIRAGE) hamper reallocation of factors according to the comparative advantage and thus decrease gains (Gérard and Piketty 2008). Third, like all static simulations, our results lack the *dynamic gains of liberalization* (to start with, the increase in factor supply) that increase the results of dynamic simulations (Bouët 2008). Fourth, more importantly, by following Bouët and Laborde (2011) and excluding Asian travelers' expenditures in Africa from the exports flows being liberalized, more realistic results from multilateral liberalization are found (all scenarios with "*" at the end). 0 explains the issues and the treatment applied in this chapter and

illustrates the impacts of that treatment on the results from multilateral scenarios. It shows that the world-level welfare increase is 83 percent smaller for DFQF than without that treatment.

4.1.2. *Multilateral liberalization erodes existing or proposed preferences*

In terms of comparative impacts, a combination of the Doha Development Agenda and the DFQF Market Access, the most ambitious scenario in terms of tariff cuts, results in higher global increase both of welfare and real GDP. But looking at the regional real GDP change driving the global change in Table II.9, we find that in the global changes in the "DDA" scenario are mostly driven by the increase in the real GDP of developed countries, whereas in the "DFQF" scenario the increase in the real GDP of LDCs (in "SSA" and "other developing economies") is of the same order of magnitude than of developed countries. When combining different trade agreements, the interactions effects that we had already identified when looking at the extent of the tariff cuts is apparent: for instance if we look for each region, none of the real GDP or welfare change from the "DDA+DFQF" scenario is the arithmetic sum of the two scenarios alone, since some changes of "DDA" and "DFQF" are similar. In the case of LDCs, the preferential access from the "DFQF" is eroded with "DDA" and some benefits of the "DFQF" alone are not found in the "DDA+DFQF" scenario. It is particularly apparent when looking at the welfare change for "SSA" in Table II.10. This illustrates two crucial points: First, simulating interactions is necessary to grasp the complicated effects of simultaneous trade agreements; second, any preferential trade agreement is jeopardized by increased multilateral trade liberalization as a consequence of erosion of preferences

4.1.3. *The drivers of the diverging evolution of real GDP and welfare*

For most aggregate regions, GDP and welfare impacts have the same sign, except for "Rest of Africa" and "Emerging Economies" for which the diverging evolution of real GDP and welfare in the "DDA" scenario are not straightforward to interpret.

The "Rest of Africa" region is actually composed of all the Northern African countries, which share similar pattern. The "Emerging Economies" aggregate is composed of China, India and Brazil, nevertheless it appears that the changes in the aggregate real GDP and welfare are driven by China. From Table II.3, it is apparent that in the "DDA" scenario both regions have to decrease their tariffs, although less than developed countries under the special and differential treatment, while they also benefit from an increased market access. Both regions respond to that increased market access by increasing their exports, by 9 percent for

"Rest of Africa" and by 8 percent for China. Export led growth reorganizes producing activities, eventually leading to the overall increase in real GDP of respectively 0.47 percent for "Rest of Africa", and 6.5 percent for China driving the 7.6 real GDP growth of the "Emerging Economies". But global price change as a result of multilateral liberalization leading their terms of trade to deteriorate by respectively 1.20 percent and 0.39 percent. In both cases, their own tariff reduction on imports concern mainly processed foods (a decrease in tariffs applied on imports by around 5 percent) and primary products, manufacturing and industrial goods (around 30 percent of "Other"), which represent the bulk of their imports. Import demand increases as a result of tariff reduction but not enough to compensate for the loss in tariff and the tariff revenues decrease respectively by more than 20 percent for "Rest of Africa" and almost 30 percent in China. In the end, those negative changes are not totally compensated by the increased activity created by additional exports and induce a welfare decrease of respectively 0.28 percent for "Rest of Africa" and 0.10 percent for China and the "Emerging Economies".

4.1.4. *Proposed interpretations of the aggregate results*

The interpretation of those figures can lead to diverging conclusions[43]. In the past, beyond the results of the simulation exercises per se, political debates have been fueled by the classifications of "winners" and "losers" that they imply. They largely diverge between studies based on the level of aggregation, with a higher aggregation of regions and sectors hiding the contrasted distributive impacts, but also on the interpretation of the results in terms of welfare or GDP. For instance, Anderson, Martin and Van der Mensbrugghe (2006) seem to consider that the conclusion that the DDA is "development friendly" holds as long as the overall percentage increase in GDP or welfare for developing countries is higher than for developed nations or as long as their share of overall gains is higher than their initial share of global GDP. We find that, in percentage terms, GDP increases more in developing countries than developed countries (respectively, 0.20 percent and 0.12 percent) in from "DDA+DFQF". But the absolute increase in GDP is US$46 billion for developed countries and only US$12 billion for developing countries. Furthermore, based on the headcounts and the repartition of the population worldwide, 20 percent of the worldwide population in developed countries obtain 78 percent of the gains (31$/capita), when the 80 percent of the

[43] In the Marrakesh Agreement Establishing the World Trade Organization, it is recognized that "there is need for positive efforts designed to ensure that developing countries, and especially the least developed among them, secure a share in the growth in international trade commensurate with the needs of their economic development", which leaves the interpretation opens to debate.

world population living in developing countries only gain 22 percent of the gains (2.2$/capita).

The main conclusion from this analysis stems from looking at the real GDP and welfare changes for SSA: it appears that an ambitious regional integration ($510 million in welfare for a subcontinental FTA) could deliver as much as multilateral integration ($530 million for a combined "DDA+DFQF") for the region.

4.2. Some insight on the contrasted country-level impacts within SSA

Despite similar initial preferential schemes, countries in SSA are heterogeneously affected by the scenarios simulated as is apparent in Table II.11 on their welfare and Table II.D.1 on real GDP growth.

TABLE II.11 — IMPACTS ON WELFARE ($ MILLIONS) FOR SSA COUNTRIES

		Absolute change						
	Initial	Reg FTA	*SSA FTA*	*DDA**	*DFQF**	DDA+ DFQF*	DDA+ Reg FTA*	DFQF+ Reg FTA*
Botswana	6,000	0.94	-5.35	23.64	-0.36	23.40	24.28	0.52
Central Africa	24,338	-1.56	-24.04	-48.83	5.23	-44.42	-50.24	3.71
Ethiopia	7,417	-0.12	-0.50	2.48	-0.11	2.46	2.34	-0.24
Madagascar	3,375	-0.14	-1.93	-12.08	11.69	-1.48	-12.28	11.50
Malawi	1,958	-13.18	-14.32	-7.29	32.32	21.42	-20.66	17.87
Mauritius	4,691	-0.18	-30.24	-7.01	-0.77	-6.70	-7.16	-0.71
Mozambique	5,165	-9.44	-11.55	2.05	15.10	14.33	-7.61	7.25
Nigeria	38,263	-93.75	-125.08	140.51	-14.60	128.43	64.73	-106.52
Rest of Eastern Africa	45,921	9.72	-56.05	25.10	193.42	169.01	35.68	204.12
Rest of SACU	6,038	18.79	28.19	-24.71	-3.32	-25.35	-5.70	15.84
Rest of Western Africa	50,051	157.76	125.12	-5.52	40.37	31.62	132.96	196.40
Senegal	7,783	4.81	5.97	6.95	51.36	53.14	11.35	55.03
South Africa	173,614	213.87	682.43	91.19	8.39	97.73	301.11	226.77
South Central Africa	19,620	-18.91	-17.71	-51.84	33.56	-20.41	-70.70	14.29
Tanzania	10,624	15.06	-7.07	10.32	58.03	65.34	24.92	71.30
Uganda	6,086	2.19	4.54	5.39	19.66	18.91	7.47	21.91
Zambia	4,428	-16.10	-1.64	-1.90	10.87	7.71	-18.24	-5.51
Zimbabwe	3,452	-41.90	-43.56	-3.15	1.85	-2.20	-42.21	-40.68
SSA	418,823	227.86	507.21	145.30	462.69	532.94	370.04	692.85
Numbers of "losers"		10	13	9	5	6	9	5

Source: Author's calculations from the results of the MIRAGE model.
Note: *Scenario with specific treatment of GTAP data issues.

4.2.1. *Impacts of "DDA"*

Multilateral liberalization brings additional market access for all countries in SSA. But the extent to which it is of interest depends on the specialization of each country. Indeed the "DDA" is only a partial liberalization since countries are given the possibility to exclude some tariff lines from liberalization. The opportunities that the "DDA" would bring for each country depends on the structure of its exports. As most countries in SSA are very specialized in the exports of very limited type of products which often are sensitive products, it means that many products of interests for African countries will be excluded from liberalization. Table II.C.1 shows example of the biggest tariff cuts for the agricultural sectors in SSA as a result of the DDA.

Those who are able to take advantage of these new opportunities can expand their exports. The extent to which each country is able to do it depends on its level of competitiveness compared the rest of the World. As shown in Table II.11, in SSA, it is the strongest economic powers of the subcontinent who gain most from DDA, namely Nigeria and South Africa which expand exports of primary and industrial products, and traditional export crops to the Quad (EU, USA, Japan, Canada), but also to emerging countries.

On the contrary, the LDC countries that were initially benefiting from relatively high initial preference margins tend to experience erosion of their preferences which contributes to decrease their terms of trade, other things being equal. It is the case for instance of Mauritius and Malawi who experience a growing competition on their sugar exports to the EU, and textile exports to the USA, and as a consequence decrease their exports.

But as most countries in SSA are small players at the international level, it is also important to take into account the effects of changing global prices as a result of "DDA": global raw agricultural prices decrease by 0.02 percent, primary goods by 0.08 percent and manufacturing goods by 0.05 percent. On the contrary, processed goods overall increase by 0.23 percent. Changes in those global prices will also make the terms of trade of each country vary depending on its structure of imports and exports.

In the end, excluding gains from Nigeria and South Africa, the rest of SSA experience decreases of 11 million in real GDP and 86 million in welfare[44] because of erosion of preferences, lack of competitiveness and declining terms of trade.

[44] The Central African region composed of Cameroon, Gabon, Central African Republic, Chad, Equatorial Guinea, Sao Tome is particular since in absolute value it experiences a very slight increase in real GDP (0.11 million) and a relatively larger decrease in welfare (-

4.2.2. *Impacts of "DFQF"*

The "DFQF" scenario is particularly beneficial for the LDC countries specialized in the export of products initially highly protected and usually considered sensitive and excluded from existing preferential schemes. Those new opportunities arise from the fact that the scenario chosen covers very ambitiously (and unlikely) 100% of the products. Hence agricultural exports from LDC such as sugar, tobacco, or rice benefits from a free market access in the OECD countries, and emerging economies.

The only countries excluded from "DFQF" in SSA are the non-LDC, but only Mauritius, Nigeria, SACU, Bostwana and South Africa appear separately in the GTAP database. The other ones are aggregated in regions with LDC, so the model considers average increased market access for the regions, overestimating how the LDCs from that region might reply to that increased market access. It is the case of the "Rest of Eastern Africa" which includes Kenya, "Western Africa" including Ivory Coast and Ghana, and "Central Africa" including Cameroon, Congo and Gabon.

There are also cases where change in welfare and GDP do not match[45]. The case of Malawi is particular since despite its slightly negative real GDP change (-0.34 percent), welfare increases by 1.65 percent. The negative GDP growth can be explained by the little overall economic activity that is created in answer to the new export opportunities according to the model. Malawi mostly reallocates its production factors towards producing more traditional export crops and reallocates their destination accross exports partners out of the EU, the rest of the world and other countries in SSA towards the USA and emerging economies. But at the results of "DFQF", world price change drastically leading to a appreciating of terms of trade by 6 percent and an increase tariff revenue for the states by 15 percent driven by an increase in imports. Malawi's representative household is enable to consume more, hence welfare increase.

Apart from Malawi, the majority of LDC in SSA experiences both an increase in GDP and welfare as a result of DFQF. Additionally, although South Africa is excluded from the "DFQF" market access as a non LDC, it benefits from the increased growth of LDC who

49 million). This is due to the fact the timid export led growth due to the new market access of the "DDA" does not compensate the larger terms of trade loss due to the increase in price of consumption goods, including of food which leads to a decrease in imports from the Quad countries in particular, and decreases real revenue, explaining the decrease in welfare.

[45] Contrary to Malawi, Ethiopia and Bostwana experience a slightly negative welfare change (respectively -0.001 and -0.01 percent) despite a small increase in real GDP (0.002 and 0.0005 percent). In spite of the slight economic activity created by the reform (due to expanding exports to other Sub-Saharan African countries benefiting from DFQF in the case of Bostwana), the price of the consumption basket increases more the revenue of the representative household and it is not able to achieve the same level of utility.

increase their demand for imports from South African, as it is one of their main partners initially.

4.2.3. *Impacts of regional integration*

At the regional level, the level of tariff barrier that countries apply to each other is diverse and generally high. Initial intra-continental trade is also fairly low, which is why regional integration is feared to divert more trade than it creates. Additionnaly, at the subcontinental level, because of similar histories and agroecological conditions, countries tend to produce similar agricultural products; hence, competition among them is a real issue.

When the regional FTAs are created, independently of its scale, the trade creation will spur activities for the countries which are competitive within the FTA and displace partly imports from rest of the world leading to trade diversion and a tendancy to decrese terms of trade for the importing countries. The countries reaping the most from the FTA are the ones the most competitive at producing the goods demanded by the other countries at the level of the FTA, in particular consumer's goods. In both "Reg FTA" and "SSA FTA", most of the gains are in favor of South Africa and "Western Africa".

Additionally, one very important impact is the diminution of tariff revenue due to the reduction of tariff on imports. Considering the dependence of many African countries on tariff revenue for their government budget, it is a very sensitive issue. Table II.12 highlights that it is mostly Mozambique, Malawi, Zimbabwe and Zambia who suffer drastic loss of tariff revenue. Similarly, changes in terms of trade can affect many countries negatively due to trade diversion.

Countries in "Central Africa", Madagascar, Mauritius, and countries in "South Central Africa" are negatively affected by the "Regional FTA" scenario. Those countries are the ones that initially trade the least with the other countries from SSA. Overall trade diversion thus dominates for those countries. Enlarging the FTA to the rest of SSA, induces some of them ("Central Africa", Madagascar, and "South Central Africa") to benefit from the opportunities of export led growth and slightly increase their real GDP, although they still experience negative welfare changes

In the case of Malawi, Mozambique, Nigeria, Zambia and Zimbabwe, welfare and real GDP growth diverge in both "Regional FTA" and "SSA FTA" scenarios. One common feature of all those countries is that they are the ones who experience the most important

terms of trade losses according to Table II.12, together with experiencing significant tariff revenue losses. Those two evolutions are linked to the trade diversion effect on the FTA for those net importers of consumer's good. As a consequence of the FTA, those countries decrease their imports from the rest of the world on which they use to earn some tariffs revenue and rather import from within the FTA from less competitive partners, decreasing their terms of trade. Hence even though economic activity increases as they are given opportunities to exports to other countries within the FTA, overall it's more costly to import consumption goods, and other things being equal the utility of their representative agent decreases.

Additionally in the "SSA FTA", Bostwana and Tanzania, who benefited from the "Reg FTA" still experience a positive real GDP change but now also a welfare loss. In both cases, this is linked to an increase in trade diversion. This trade diversion traduces by the additional loss in terms of trade for Bostwana, and for Tanzania in the fact that the terms of trade, while still positive, is much lower than for "Reg FTA", and tariff revenue losses are significantly higher.

Ethiopia is a particular case since data on tariffs are lacking hence it is not affected by the tariff decrease, but by the changes of its trading context.

TABLE II.12 — IMPACTS ON TARIFF REVENUE AND TERMS OF TRADE FOR COUNTRIES IN SSA

	Per cent change in total tariff revenue				Per cent change in terms of trade			
	Reg FTA	SSA FTA	DDA*	DFQF *	Reg FTA	SSA FTA	DDA*	DFQF *
Botswana	-2.3	-0.6	-0.5	-0.1	0.0	-0.4	0.9	0.0
Central Africa	-0.1	-16.6	-2.2	0.2	0.0	-0.4	-0.4	0.0
Ethiopia	0.0	0.0	0.0	0.0	0.0	-0.1	-0.3	0.0
Madagascar	-0.4	-7.4	-3.5	0.7	0.0	-0.1	-0.6	0.7
Malawi	-49.3	-52.2	2.4	15.4	-1.6	-1.7	1.0	6.3
Mauritius	-0.3	-19.0	0.0	-0.1	0.0	-0.8	-0.1	0.0
Mozambique	-54.5	-55.1	0.4	1.8	-0.9	-1.0	0.1	0.7
Nigeria	-7.0	-13.2	-8.5	-0.1	-0.2	-0.4	-0.5	0.0
Rest of Eastern Africa	-3.3	-11.6	-1.5	4.1	-0.1	-0.6	0.1	1.5
Rest of SACU	-1.3	-1.1	-4.3	-0.6	0.3	0.3	-0.4	0.0
Rest of Western Africa	-4.0	-8.5	0.3	0.6	0.9	0.7	-0.1	0.2
Senegal	-1.6	-4.2	0.3	5.4	0.3	0.3	0.2	2.6
South Africa	0.9	3.1	-6.0	0.1	0.3	1.0	-0.1	0.0
South Central Africa	-9.8	-11.6	-0.3	0.7	-0.2	-0.3	-0.4	0.3
Tanzania	-6.1	-26.3	1.0	7.0	0.7	0.1	0.2	3.4
Uganda	-7.4	-21.3	0.9	3.8	0.3	0.4	0.3	1.5
Zambia	-62.2	-62.7	0.2	2.1	-1.9	-1.3	0.0	0.5
Zimbabwe	-68.8	-68.8	-2.2	0.5	-2.5	-2.6	0.2	0.0
Sub-Saharan Africa	-6.2	-11.7	-3.4	1.2	0.1	0.1	-0.2	0.3

Source: Authors's calculations from the results of the MIRAGE model

4.2.4. *Distributional impacts*

As was just described, the distribution of gains and losses differs depending on the type of trade integration, but also depending whether one looks at the effects on GDP or welfare.

It is noteworthy that South Africa comes out as one of the big winner from all scenarios, reaping most of the gains from regional integration, "DDA", and being also positively affected by "DFQF". As a consequence, any combination of those scenarios also brings positive significant changes for the country.

Nigeria would be negatively affected by regional integration, but gains the most from the DDA. On the contrary, Rest of Western Africa does benefit the most from regional integration and DFQF, but is negatively affected by a DDA.

Looking at the number of loosers in terms of welfare, both types of regional integration have a negative impact on a higher number of countries than multilateral integration would have, which could explain why regional integration is harder to agree on for those countries. DFQF reduces the number of losers the most, leading to losses only for some of the non-LDCs of the region.

4.3. Comparative impacts on increased value-added in agriculture

The modalities and level of trade integration impact the structure of production and the composition and destination of exports across regions and sectors.

In terms of exports structure, initially, Sub-Saharan Africa is the only region in the world exporting more raw agricultural products than processed agricultural products. Considering the stake of agricultural-led growth, the trade integration process should be coherent with the objective of increased value-added in agriculture.

Looking at the evolution of exports of Sub-Saharan African countries presented in Table II.13, regional integration creates more trade in volume than the multilateral scenarios, mainly because of the creation of trade in "other" goods (driven by "primary," "other manufactured products," and "textiles").

TABLE II.13 — CHANGE IN THE IN EXPORT VOLUME ($ BILLIONS) OF SSA

	Absolute increase (Percent change)							
	DDA*	DFQF*	DDA+ DFQF*	Reg FTA	SSA FTA	DDA + Reg FTA*	DFQF +Reg FTA*	DDA+ DFQF+Reg FTA*
Raw ag	0.22 (1.53)	0.84 (5.72)	0.79 (5.35)	0.26 (1.77)	0.38 (2.58)	0.51 (3.43)	1.14 (7.74)	0.02 (0.10)
Processed ag	0.16 (1.42)	0.56 (5.09)	0.64 (5.82)	0.53 (4.80)	0.99 (8.95)	0.67 (6.08)	1.08 (9.8)	0.22 (2.03)
Fish	0.01 (2.77)	0.00 (-1.25)	0.01 (1.59)	0.00 (-0.05)	0.00 (0.10)	0.01 (2.75)	0.00 (-1.26)	0.00 (0.37)
Other	1.02 (0.63)	-0.22 (-0.14)	0.92 (0.57)	2.85 (1.76)	5.78 (3.58)	3.71 (2.30)	2.58 (1.60)	5.23 (3.23)
Total	1.41 (0.75)	1.18 (0.63)	2.36 (1.26)	3.64 (1.94)	7.15 (3.81)	4.90 (2.61)	4.80 (2.56)	5.47 (2.91)

*Scenario with specific treatment of GTAP data issues.
Source: Authors's calculations from the results of the MIRAGE model

Raw ag = raw agricultural products; Processed ag = processed agriculture products; Fish = fishing products; Other = primary and manufactured products and services.

In terms of additional volume of processed agricultural exports, there are broadly equivalent between "DFQF" and "Reg FTA", with an ambitious regional integration in the form of a "SSA FTA" bringing a 30 percent higher level of exports than the ambitious "DFQF" scenario proposed. Both types of regional integration further increase the total volume of exports with a large increase in manufactured and primary exports. Adding regional integration to the multilateral scenarios will more than double the export volumes from the region.

Table II.D.2 presents the distribution of changes in agricultural export volumes across Sub-Saharan African countries. The source of additional export changes depending on the type of exports and scenario. Mostly, additional raw agricultural exports come from South Africa, eastern Africa, Zimbabwe, and Malawi and additional processed agricultural exports come from South Africa, Rest of SACU, Zimbabwe, eastern Africa, and Tanzania.

TABLE II.14 — IMPACTS ON THE SHARE OF PROCESSED OVER TOTAL AGRICULTURAL GOODS IN SUB-SAHARAN AFRICAN PRODUCTION, EXPORTS AND IMPORTS OF SSA

			Additional							
		Initial	DDA*	DFQF*	DDA+ DFQF*	Reg FTA	SSA FTA	DDA + Reg FTA*	DFQF +Reg FTA*	DDA+ DFQF+ Reg FTA*
Production		46%	25%	34%	45%	128%	112%	67%	44%	31%
Exports to all destination		43%	41%	40%	45%	67%	72%	57%	49%	94%
Exports to	DC	41%	38%	38%	46%	52%	57%	26%	34%	63%
Exports to	EC	10%	15%	8%	9%	0%	0%	11%	8%	1%
Exports to	ODC	18%	28%	90%	84%	0%	0%	20%	87%	1%
Exports to	NA	18%	0%	9%	100%	47%	0%	100%	11%	0%
Exports to	SSA	66%	85%	0%	69%	66%	72%	66%	64%	72%
Imports from all destination		74%	90%	67%	77%	66%	72%	66%	63%	72%
Imports from	DC	74%	64%	73%	72%	n.	n.	0%	65%	n.
Imports from	EC	79%	100%	61%	89%	n.	n.	100%	37%	n.
Imports from	ODC	79%	0%	70%	70%	n.	n.	n.	0%	n.
Imports from	NA	66%	85%	0%	69%	66%	72%	66%	64%	72%
Imports from	SSA	89%	97%	73%	92%	n.	n.	99%	0%	n.

Source: Authors's calculations from the results of the MIRAGE model
Notes: *Scenario with specific treatment of GTAP data issues.
DC = developed countries; EC = emerging economies; ODC = other developing economies; NA = northern Africa; SSA = Sub-Saharan Africa.

The structure of production does not necessarily change in the same way the structure of exports does (Table II.14), since changes in production depend on changes in the exports, imports, and consumptions structures. Nevertheless, in the end, it is critical to take the structure of production into account to make sure which economy captures the value addition of the final goods created.

Multilateral integration concentrates the exports in raw agricultural products (Table II.14): additional agricultural exports created by trade integration are composed of 41 percent of processed agricultural goods for "DFQF." On the contrary, regional integration increases

the ratio of processed agricultural goods in total agricultural exports. The additional agricultural exports created with "Regional FTA" are composed of 67 percent of processed agricultural goods, and 72 percent with "SSA FTA"

The pattern of SSA agricultural exports and production observed can be further explained in light of the structure of the destination exports market. The ratio of processed agricultural goods changes drastically depending on the destination market, ranging initially from only 10 percent of agricultural exports to emerging economies being processed to 66 percent of agricultural exports to other Sub-Saharan African countries being processed. Indeed, looking at the composition of the agricultural trade created, the only destination market where Sub-Saharan Africa always exports more processed agricultural goods than unprocessed goods is the regional market. Three factors affect the evolution of the exports structure from increased trade integration. First, additional exports to a given destination follow the initial composition of exports to that destination. Hence, regional trade tends to foster more processed exports than trade to emerging economies or developed countries. Second, the composition of exports tends to follow the evolution of the tariff structure. By setting all tariffs to zero, regional integration and DFQF lead to higher cuts on processed goods than on raw products because of the existing tariff escalation (Table II.1). The ratio of processed to unprocessed agricultural exports to Sub-Saharan Africa will thus increase slightly in those scenarios. Third, competition from other exporters receiving similar preferences or benefiting from the same increased market access is crucial. With DDA and DFQF, the additional exports from SSA toward developed countries and emerging economies present an increased share of raw agricultural products. We can conclude that SSA cannot take advantage of the market access granted for processed products because it is less competitive than the Asian competitors benefitting from the same market access.

In the end one advantage of regional integration is that it increases the gains of SSA, in terms of GDP growth, welfare growth and share of agricultural production and exports that are processed, even when combined with multilateral integration.

4.4. Sensitivity to the outcomes of EPA negotiations

Considering that the EU is the main trade partner for Sub-Saharan African countries, the impact of potential outcomes of the current negotiations between the EU and Sub-Saharan countries is tested on the baseline and on other scenarios. The main results compared to the previous ones are presented in Table II.15.

TABLE II.15 — COMPARISON OF MAIN RESULTS FOR SUB-SAHARAN AFRICA WITH ALTERNATIVE SCENARIOS OF EPA NEGOTIATIONS

	Welfare (percent change)			Number of losers in SSA (welfare)			share processed in increased agricultural export volume		
	none	EPA	GSP	None	EPA	GSP	none	EPA	GSP
Baseline	n.a.	-0.01	-0.03	n.a.	13	8	n.a.	46%	0%
DDA*	0.03	0.02	0.01	9	11	9	41%	46%	0%
DFQF*	0.11	0.10	0.08	5	5	4	40%	43%	12%
Reg FTA	0.05	0.05	0.03	10	12	8	67%	54%	24%

Source: Author's calculations from the results of the MIRAGE model.
Note: *Scenario with specific treatment of GTAP data issues.

It is noteworthy that both the EPA and GSP would decrease overall SSA welfare and lead to a high number of losers. Thus it seems logical that their interaction with other scenarios could decrease welfare.

Similarly to previous results, we find that in terms of welfare, gains are of similar order of magnitude for regional integration and multilateral integration, DDA being the most beneficial in terms of GDP volume, closely followed by regional FTA. But DFQF is the most beneficial followed by regional FTA. Regional integration still fosters a higher share of processed agricultural exports, even if it is reduced by the interaction with either EPA or GSP. Independently of the outcome of EPA negotiations, regional integration brings twice as many losers as DFQF, but is closely followed by DDA.

Contrary to previous results, a combined regional and multilateral integration would highly decrease GDP and welfare gains, leading to losses in most Sub-Saharan African countries; the gains being concentrated in South Africa and Rest of Western Africa.

4.5. Discussion on the assumptions of the modeling framework

In order to determine to what extent the previous results can be the base of policy prescriptions, limitations of the modeling framework are examined with a particular attention to their impacts on the results, specifically as regards to the comparative impacts of multilateral and regional trade integration.

Many assumptions influence the absolute size of the results, but overall it is hard to tell whether impacts from trade integration tend to be over or underestimated. Indeed, as stated above, the choice of the static mode tends to decrease impacts by not considering the dynamic gains from trade, so does the perfect competition hypothesis which restricts gains from an increase in the number of varieties. But on the contrary, the close to perfect mobility of factors and full employment assumptions tend to be unrealistically high considering the

employment issues there is in all Sub-Saharan African countries. Nevertheless there is no reason why these assumptions should impact the regional and multilateral trade scenarios differently, hence the comparative analysis could be considered robust to change in those assumptions.

On the contrary, the data used could have influenced the comparative impacts at several levels.

i. Informal trade being mostly composed of unprocessed agricultural goods in Sub-Saharan Africa, CGE analysis based on official data will undermine the importance of agriculture in the economy of those countries, and will not consider the impact of the shocks implemented on this unrepresented sector. Thus we underestimate initial internal trade, and our results tend to underestimate further prospects from regional integration compared to multilateral liberalization.

ii. By considering full rate of utilization of preferences (by not considering non trade measures such as sanitary and phytosanitary standards SPS and rules of origin), we implicitly assume that Sub-Saharan African countries fully take advantage of future market of access. But in reality, those non trade measures will indeed hamper some countries to increase exports especially for trade in processed and value added products towards developed countries as part of preferential schemes –Duty Free Quota Free-. Hence, we tend to overestimate the prospects from increased trade integration at that level and for those products. On the contrary, if the agreement negotiated included effort to maximize the utilization rate, our results would rather tend to underestimate the expected gains.

iii. Similarly, by not taking into account the trade costs, we implicitly assume that access to future markets is not constrained by physical and administrative costs. Hence we tend to overestimate the gains from all types of agreements. It might be that those costs are higher for intra regional trade, since they might be high for both trade partners. But it could also be assumed that cross border trade with regional partner within the same economic community might not be as expensive as exports to the rest of the world. It is actually very likely that the trade costs vary extensively across products and countries.

iv. An additionnal factor that could impact the results is the value of the Armington elasticities. Typically changing the Armington elasticities induced substantial variations in the trade flows created by the tariffs cuts (Bouët 2008). Compared to other multicountry CGE model, MIRAGE introduces two specific features regarding the treatment of trade elasticities. First, products coming from developed countries and those from

developing countries are supposed to belong to different quality ranges, with a lower substitutability among products coming from different quality range. Second, domestic products are less substitutable for foreign products than foreign products are among one another within a given quality range. The highest elasticities used in the model are based on GTAP 7 elasticities, which are themselves lower than standard World Bank's elasticities. Since these features means that actually most elasticities applied on trade flows are lower than the standard GTAP ones, hence our results tend to be smaller than they would have been without those assumptions. Additionally these assumption tend to favor South-South trade (belonging to the same quality range), but the impact on a scenario such as the DFQF is ambiguous as increased market access is offered both developed countries (different quality range) and emerging economies from the same quality range as other Sub-Saharan African countries. Considering the important uncertainty surrounded Armington values, it is difficult to know which assumptions to test. Provided time, we could have controlled for the impact of not assuming different quality ranges among imported products, and different level of higher elasticities.

In the end, some of the assumptions have led to a tendency to underestimate the impacts from regional integration, hence taking into account these assumptions tend to even reinforce our results in favor of a strong potential from regional integration, but other assumptions have more ambiguous effects. The safest conclusion is that the overall effects of those elements on the comparative values of our results is ambiguous. Hence precautions should be adopted if using those results for policy recommendations.

5. Conclusions

The shifting trade context induces complex challenges and opportunities for Sub-Saharan African (SSA) countries pursuing agricultural-led industrialization. General equilibrium modeling is a convenient way to assess impacts of trade policies in a consistent framework. Many simulations in the past have considered SSA interests and constraints, and have highlighted important features of the trade liberalization proposals such as the erosion of preferences from multilateral integration, and the risk of tariff revenue and terms of trade losses at the regional level. But they have not compared the different schemes of trade integration. As there is no consensus on whether Sub-Saharan Africa should focus on regional or multilateral integration first, this chapter brings new comparable results to fuel the debate

on setting priorities for trade policy reforms coherently with broader development strategies. Building from the most recent results of the agricultural economic literature, it assumes that increasing the transformation of agricultural goods is coherent with sustainable growth.

First, by simulating the Doha Development Agenda, an ambitious Duty-Free Quota-Free (DFQF) and a combination of the two agreements, we show that the DFQF proposal would indeed rebalance the gains from the Doha Round toward LDCs. But even in a "DDA+DFQF" scenario, developed countries would reap most of the gains.

Second, this chapter reveals that regional integration could deliver as much as multilateral integration for SSA in terms of gross domestic product (GDP), welfare growth (defined as equivalent variation of the utility of the representative agent), and agricultural exports volumes.

Third, it highlights that patterns of agricultural export growth differs between trade integration schemes since they depend on initial trade patterns and are driven by the relative competitiveness of other exporters granted same market access. The simulations show that this consideration is crucial for perspectives of agricultural growth in SSA, since any multilateral integration would encourage further specialization of the region in the export of unprocessed agricultural exports. This trend is not coherent with the view that countries in SSA should not only diversify their export products and destinations, but also capture more value-added on their exports. On the contrary, deeper regional integration would foster the processing of agricultural exports. The implication of those results is that in order for a multilateral integration, even preferential such as the "DFQF," to be coherent with the stake of agricultural-led industrialization, countries in SSA need to first increase their competitiveness. Regional integration could be a way to do so, since it would enable most countries to combine increased exports volume and increase transformation of agricultural exports.

Fourth, looking at the distribution of gains and losses across Sub-Saharan African countries in terms of welfare, attention is drawn to the fact that more countries would experience a decrease in their welfare with regional integration than with multilateral integration, especially compared to "DFQF". But "DDA" would bring almost the same numbers of "losers" as regional integration. Accompanying policies to mitigate those losses might help the countries be more favorable to the regional option.

Finally, we wish to call GTAP data users to exercise caution when simulating drastic market access opening for Sub-Saharan African countries. Some well-documented data issues can contribute to "virtual trade flows" being created, leading to bias toward a significant overestimation of the potential benefits from multilateral trade integration.

APPENDIX A: Description of the MIRAGE Model

This chapter uses the Modeling International Relationships in Applied General Equilibrium (MIRAGE) model, which is a multisector, multiregion economic model initially developed by the Centre d'Études Prospectives et d'Informations Internationales (CEPII), and the International Food Policy Research Institute (IFPRI) for trade policy analysis. It is a relatively standard, neoclassical model that assumes constant returns to scale and perfect competition in the agricultural sectors and allows for the assumption of imperfect competition in industry and services. The model has a sequential dynamic recursive set-up solved in a sequence of static equilibria linked by population and labor force growth, capital accumulation and productivity. The production function assumes perfect complementarity between value-added and intermediate consumption. On the value-added side, production makes use of five factors: land, skilled labor, unskilled labor, capital, and natural resources. Skilled labor and capital are perfectly mobile across sectors, but land is specific and imperfectly mobile in primary agriculture, and natural resources are specific to the extractive sectors.

Full employment is assumed for all factors except for land. The supply of land is endogenous and depends on the land supply elasticity of the country and on the real rate of remuneration. Skilled labor is perfectly mobile across sectors. Unskilled labor is imperfectly mobile between agricultural and nonagricultural sectors according to a constant elasticity of substitution (CES) function. Growth rates of labor supply are set exogenously. The supply of capital is modified each year by depreciation and investment. Installed capital is sector specific, but new capital is allocated among sectors according to an investment function that depends on the rates of return and the sector stock of capital.

The sectoral composition of the intermediate consumption aggregate stems from a CES function. For each sector of origin, the nesting is the same as for final consumption, meaning that the sector bundle has the same structure for final and intermediate consumption. On the demand side, the model assumes that each region has a representative agent whose utility function is intratemporal and allocates a fixed share of regional income to savings and uses the rest to purchase final consumption. Below the first-tier Cobb-Douglas function, the preferences for final consumption across sectors are represented by an LES-CES function.

The model assumes that products from developed and developing countries belong to two different quality ranges and the substitutability between products from the same quality range is stronger than between those from different quality ranges. Additionally, within a given quality range, there is less substitutability between domestic products and foreign products than between foreign products from different origins. The model's macroeconomic closure assumes endogenous real exchange rates while maintaining fixed trade balance, equal to the initial value for each region.

APPENDIX B: Supplementary Tables

TABLE II.B.1 — MAPPING OF THE SECTORAL DECOMPOSITION: 28 SECTORS OF WHICH 18 ARE AGRICULTURAL

Type of sector of interest	Sectoral decomposition	GTAP 7 sectoral abbreviation
Raw agricultural products	Cattle	ctl, cmt
	Cereals	gro
	Export crops	ocr
	Milk	rmk
	Oilseeds	osd
	Paddy rice	pdr
	Plants for fibers	pfb
	Sugar plant	c_b
	Vegetables and fruits	v_f
	Wheat	wht
Processed agricultural products	Beverages and tobacco	b_t
	Dairy	mil
	Meat	oap
	Other food products	ofd
	Oils and fats	vol
	OMeat	omt
	Processed rice	pcr
	Sugar	sgr
Fish	Fishing	fsh
Other	Animal fibers	wol
	Other Manufactured products	crp, nmm, omf
	Primary products	coa, oil, gas, omn, p_c, i_s, nfm, fmp
	Services	ely, gdt, wtr,
	Textile	tex, wap, lea
	Trade	trd
	Transport	otp, wtp, atp, cmn

Source: GTAP 7 database sectoral listing.

TABLE II.B.2 — MAPPING OF THE REGIONAL DECOMPOSITION: 29 REGIONS OF WHICH 18 ARE FROM SUB-SAHARAN AFRICA

Type of Zone of Interest	Regional decomposition	GTAP 7 regional abbreviation
Developed	EU	AUT, BEL, DNK, FIN, FRA, DEU, GRC, HUN, IRL, ITA, LUX, NLD, POL, PRT, ESP, SWE, GBR, NOR, ROU, BGR
	U.S.A.	USA
	Japan	JPN
	Rest of the World	AUS, NZL, XOC, CAN, XNA, CYP, CZE, EST, LVA, LTU, MLT, SVK, SVN, CHE, XEF, ALB, BLR, HRV, RUS, UKR, XEE, XER, KAZ, KGZ, XSU, ARM,
Emerging Economies	Brazil	BRA
	China	CHN
	India	IND
	Asian Tiger	HKG, KOR, TWN, MYS, SGP, THAI
Other Developing Countries	Rest of Asia	XEA, KHM, IDN, LAO, MNR, PHL, THA, XSE, BGD, PAK, LKA, XSA
	Rest of Southern America	MEX,ARG,BOL,CHL,COL,ECU,PRY,PER,URY,VEN,XSM,CRI,GTM,NIC,PAN, XCA, XCB
North Africa	Northern Africa	EGY, MAR, TUN, XNF

Sub-Saharan Africa	Botswana	BWA
	Ethiopia	ETH
	Madagascar	MDG
	Mozambique	MOZ
	Mauritius	MUS
	Malawi	MWI
	Nigeria	NGA
	Senegal	SEN
	Tanzania	TZA
	Uganda	UGA
	South Africa	ZAF
	Zambia	ZMB
	Zimbabwe	ZWE
	Rest of South Central Africa	XAC
	Central Africa	XCF
	Rest of Eastern Africa	XEC
	Rest of South African Customs Union	XSC
	Rest of Western Africa	XWF

Source: GTAP 7 database regional listing.

TABLE II.B.3 — DETAILS OF THE FOUR REGIONAL GROUPS AND THE CORRESPONDING GTAP 7 REGIONS AVAILABLE

EPA regions	Country	GTAP 7 regions	EPA regions	Country	GTAP 7 regions
Western African group	**Nigeria**	NGA	Eastern African group	**Ethiopia**	ETH
	Benin			**Madagascar**	MDG
	Burkina Faso			**Mauritius**	MUS
	Cape Verde			**Tanzania**	TZA
	Ivory Coast			**Uganda**	UGA
	Gambia			Burundi	
	Ghana			Comoros	
	Guinea			Djibouti	
	Guinea Bissau	XWF		Eritrea	
	Liberia			Kenya	XEC
	Mali			Rwanda	
	Mauritania			Seychelles	
	Niger			Somalia	
	Sierra Leone			Sudan	
	Togo			Congo (Democratic Republic)	XAC
	Senegal	SEN	Southern African group	Angola	XAC
Central African group	Cameroon			**Botswana**	BWA
	Central African Republic			**Mozambique**	MOZ
	Chad			Lesotho	
	Congo	XCF		Namibia	XSC
	Equatorial Guinea			Swaziland	
	Gabon			**Malawi**	MWI
	Sao Tome and Principe			**South africa**	ZAF
				Zambia	ZMB
				Zimbabwe	ZWE

Source: GTAP 7 database regional listing and latest update of www.acp-eu-trade.org.

APPENDIX C: Top 20 tariff cuts for SSA agricultural exports in the scenarios

TABLE II.C.1 — TOP 20 TARIFF CUTS FOR SSA AGRICULTURAL EXPORTS IN THE DDA SCENARIO

Exporters	Importers	Sectors	Tariff cut (as percent of initial tariff)	Equivalent tariff reduction	Tariff in the DDA scenario	Initial trade (10^6 $)
Malawi	U.S.A.	Exports Crops	-60.79	-0.32	0.20	55.58
Rest of Eastern Africa	Asian Tigers	Oilseeds	-67.71	-0.71	0.34	20.40
Rest of Eastern Africa	Rest of the World	Cattle	-19.01	-0.02	0.08	209.06
Rest of Eastern Africa	Rest of the World	Exportable crops	-35.08	-0.06	0.12	132.19
Rest of Western Africa	Japan	Other food products	-41.10	-0.02	0.04	130.66
Rest of Western Africa	Nigeria	Other food products	-25.96	-0.07	0.19	67.00
Rest of Western Africa	Nigeria	Vegetables and fruits	-50.00	-0.50	0.50	8.35
Rest of Western Africa	Nigeria	Beverages and tobacco	-64.50	-0.90	0.50	3.48
South Africa	Asian Tigers	Vegetables and fruits	-52.39	-0.10	0.09	71.54
South Africa	Asian Tigers	Other food products	-50.22	-0.07	0.07	69.67
South Africa	Asian Tigers	Sugar	-52.13	-0.11	0.10	40.92
South Africa	Japan	Other food products	-47.21	-0.06	0.07	64.97
South Africa	Japan	Vegetables and fruits	-49.54	-0.06	0.06	43.01
South Africa	Japan	Sugar	-30.25	-0.36	0.83	28.46
South Africa	Nigeria	Beverages and tobacco	-59.73	-0.69	0.47	21.27
South Africa	Nigeria	Other food products	-35.26	-0.16	0.30	16.81
South Africa	Rest of the World	Vegetables and fruits	-31.51	-0.04	0.09	203.83
South Africa	Rest of the World	Other food products	-15.98	-0.02	0.12	153.94
South Africa	Rest of the World	Beverages and tobacco	-17.71	-0.06	0.29	75.39
Zimbabwe	U.S.A.	Exports crops	-66.51	-0.37	0.18	14.06

Source: Author's calculations, reference-group weight aggregating method.

TABLE II.C.2 — TOP 20 TARIFF CUTS FOR SSA AGRICULTURAL EXPORTS IN THE DFQF SCENARIO

Exporters	Importers	Sectors	Tariff cut (as percent of initial tariff)	Equivalent tariff reduction	Tariff in the DFQF scenario	Initial trade (106 $)
Malawi	India	Vegetables and fruits	-100	-0.44	0.00	3.45
Malawi	Rest of South America	Other food products	-87	-0.26	0.04	8.44
Malawi	Rest of the World	Other food products	-15	-0.02	0.14	63.84
Malawi	U.S.A.	Other food products	-100	-0.52	0.00	55.58
Mozambique	India	Vegetables and fruits	-100	-0.31	0.00	23.85
Mozambique	India	Sugar	-100	-1.00	0.00	2.43
Rest of Eastern Africa	Asian Tigers	Oilseeds	-94	-0.99	0.06	20.40
Rest of Eastern Africa	India	Vegetables and fruits	-45	-0.16	0.20	9.61
Rest of Eastern Africa	Japan	Exports crops	-84	-0.06	0.01	53.14
Rest of Eastern Africa	Rest of South America	Exports crops	-41	-0.07	0.10	29.19
Rest of Eastern Africa	Rest of the World	Cattle	-46	-0.05	0.06	209.06
Rest of Eastern Africa	Rest of the World	Oilseeds	-46	-0.04	0.05	94.94
Rest of Western Africa	Asian Tigers	Oilseeds	-65	-0.23	0.12	5.43
Rest of Western Africa	India	Vegetables and fruits	-50	-0.16	0.17	157.55
Rest of Western Africa	India	Plant for fibers	-95	-0.09	0.01	47.91
Rest of Western Africa	Japan	Other food products	-14	-0.01	0.05	130.66
Tanzania	India	Vegetables and fruits	-100	-0.31	0.00	67.55
Tanzania	India	Plant for fibers	-100	-0.10	0.00	13.04
Tanzania	India	Exports crops	-100	-0.78	0.00	2.79
Uganda	U.S.A.	Exports crops	-100	-0.15	0.00	17.36

Source: Author's calculations, reference-group weight aggregating method.

TABLE II.C.3 — TOP 20 TARIFF CUTS FOR SSA AGRICULTURAL EXPORTS IN THE DDA+DFQF SCENARIO

Exporters	Importers	Sectors	Tariff cut (as percent of initial tariff)	Equivalent tariff reduction	Tariff in the DDA+ DFQF scenario	Initial trade (10^6 $)
Malawi	U.S.A.	Exports crops	-100	-0.52	0.00	55.58
Mozambique	India	Vegetables and fruits	-100	-0.31	0.00	23.85
Rest of Eastern Africa	Asian Tiger	Oilseeds	-98	-1.02	0.02	20.40
Rest of Eastern Africa	Rest of the World	Cattle	-47	-0.05	0.06	209.06
Rest of Eastern Africa	Rest of the World	Exports crops	-36	-0.07	0.12	132.19
Rest of Eastern Africa	Rest of the World	Oilseeds	-53	-0.05	0.04	94.94
Rest of Western Africa	India	Vegetables and fruits	-50	-0.16	0.17	157.55
Rest of Western Africa	India	Plant fiber	-95	-0.09	0.01	47.91
Rest of Western Africa	Japan	Other food products	-50	-0.03	0.03	130.66
Rest of Western Africa	Nigeria	Other food products	-26	-0.07	0.19	67.00
Rest of Western Africa	Nigeria	Vegetables and fruits	-50	-0.50	0.50	8.35
South Africa	Asian Tiger	Vegetables and fruits	-52	-0.10	0.09	71.54
South Africa	Asian Tiger	Other food products	-50	-0.07	0.07	69.67
South Africa	Asian Tiger	Sugar	-52	-0.11	0.10	40.92
South Africa	Japan	Sugar	-30	-0.36	0.83	28.46
South Africa	Nigeria	Beverages and tobacco	-60	-0.69	0.47	21.27
South Africa	Rest of the World	Vegetables and fruits	-32	-0.04	0.09	203.83
South Africa	Rest of the World	Beverages and tobacco	-18	-0.06	0.29	75.39
Tanzania	India	Vegetables and fruits	-100	-0.31	0.00	67.55
Zimbabwe	U.S.A.	Exports crops	-67	-0.37	0.18	14.06

Source: Author's calculations, reference-group weight aggregating method.

TABLE II.C.4 — TOP 20 TARIFF CUTS FOR SSA AGRICULTURAL EXPORTS IN THE REGIONAL FTA SCENARIO

Exporters	Importers	Sectors	Tariff cut (as percent of initial tariff)	Equivalent tariff reduction	Tariff in the regional FTA scenario	Initial trade (10^6 $)
Rest of SACU	Rest of Southern Africa	Beverage and tobacco	-83	-0.23	0.05	67.50
Rest of Eastern Africa	Rest of Eastern Africa	Other exportable crops	-100	-0.11	0.00	47.62
Rest of Eastern Africa	Rest of Eastern Africa	Other food products	-100	-0.10	0.00	28.36
Rest of Eastern Africa	Rest of Eastern Africa	Vegetables and fruits	-100	-0.17	0.00	16.41
Rest of Western Africa	Nigeria	Beverage and tobacco	-100	-1.40	0.00	3.48
Rest of Western Africa	Nigeria	Cattle	-100	-0.19	0.00	40.37
Rest of Western Africa	Nigeria	Oil fats	-100	-0.69	0.00	6.16
Rest of Western Africa	Nigeria	Other food products	-100	-0.26	0.00	67.00
Rest of Western Africa	Nigeria	Vegetables and fruits	-100	-1.00	0.00	8.35
Rest of Western Africa	Rest of Western Africa	Oil fats	-100	-0.04	0.00	75.12
Rest of Western Africa	Rest of Western Africa	Other food products	-100	-0.08	0.00	213.22
Rest of Western Africa	Rest of Western Africa	Plant for fibers	-100	-0.05	0.00	182.43
Rest of Western Africa	Rest of Western Africa	Vegetables and fruits	-100	-0.12	0.00	39.14
South Africa	Mozambique	Other food products	-100	-0.19	0.00	33.10
South Africa	Mozambique	Vegetables and fruits	-100	-0.22	0.00	16.56
South Africa	Rest of Southern Africa	Beverage and tobacco	-55	-0.13	0.10	86.37
Tanzania	Rest of Eastern Africa	Other exportable crops	-100	-0.21	0.00	17.88
Tanzania	Rest of Eastern Africa	Other food products	-100	-0.28	0.00	28.25
Uganda	Rest of Eastern Africa	Other exportable crops	-100	-0.11	0.00	35.71
Zimbabwe	Rest of Southern Africa	Sugar	-100	-0.20	0.00	15.86

Source: Author's calculations, reference-group weight aggregating method.

TABLE II.C.5 — TOP 20 TARIFF CUTS FOR SSA AGRICULTURAL EXPORTS IN THE SSA FTA SCENARIO

Exporters	Importers	Sectors	Tariff cut (as percent of initial tariff)	Equivalent tariff reduction	Tariff in the SSA FTA scenario	Initial trade (10^6 $)
Mozambique	Malawi	Exports crops	-100	*-0.22*	0.00	26.13
Rest of SACU	Rest of Southern Africa	Beverage and tobacco	-100	*-0.28*	0.00	67.50
Rest of Eastern Africa	Rest of Eastern Africa	Other foodcrops	-100	*-0.11*	0.00	47.62
Rest of Western Africa	Nigeria	Other foodcrops	-100	*-0.26*	0.00	67.00
Rest of Western Africa	Nigeria	Cattle	-100	*-0.19*	0.00	40.37
Rest of Western Africa	Nigeria	Vegetable and fruits	-100	*-1.00*	0.00	8.35
Rest of Western Africa	Nigeria	Beverage and tobacco	-100	*-1.40*	0.00	3.48
Rest of Western Africa	Rest of Central Africa	Other foodcrops	-100	*-0.24*	0.00	34.31
Rest of Western Africa	Rest of Western Africa	Other foodcrops	-100	*-0.08*	0.00	213.22
Rest of Western Africa	Rest of Western Africa	Plant for fibers	-100	*-0.05*	0.00	182.43
South Africa	Mauritius	Sugar	-100	*-0.80*	0.00	10.32
South Africa	Mozambique	Other foodcrops	-100	*-0.19*	0.00	33.10
South Africa	Nigeria	Beverage and tobacco	-100	*-1.16*	0.00	21.27
South Africa	Nigeria	Other foodcrops	-100	*-0.46*	0.00	16.81
South Africa	Rest of Eastern Africa	Sugar	-100	*-0.31*	0.00	20.16
South Africa	Rest of Southern Africa	Beverage and tobacco	-100	*-0.23*	0.00	86.37
South Africa	Zimbabwe	Cereals	-100	*-0.25*	0.00	61.75
South Africa	Zimbabwe	Other foodcrops	-100	*-0.29*	0.00	30.27
South Africa	Zimbabwe	Exports crops	-100	*-0.60*	0.00	13.29
Tanzania	Rest of Eastern Africa	Other foodcrops	-100	*-0.28*	0.00	28.25

Source: Author's calculations, reference-group weight aggregating method.

TABLE II.C. 6 — TOP 20 TARIFF CUTS FOR SSA AGRICULTURAL EXPORTS IN THE EPA SCENARIO

Exporters	Importers	Sectors	Tariff cut (as percent of initial tariff)	Equivalent tariff reduction	Tariff in the SSA FTA scenario	Initial trade (10^6 $)
Mauritius	EU	Other food products	-33	-0.03	0.05	0.12
Nigeria	EU	Exports crops	-52	-0.01	0.01	0.73
Nigeria	EU	Other food products	-63	-0.07	0.04	0.45
Rest of Central Africa	EU	Vegetable and fruits	-26	-0.04	0.10	0.21
Rest of Eastern Africa	EU	Exports crops	-22	-0.02	0.05	1.22
Rest of Eastern Africa	EU	Other food products	-40	-0.03	0.04	1.34
Rest of Eastern Africa	EU	Vegetable and fruits	-12	-0.01	0.08	0.30
Rest of SACU	EU	Other food products	-39	-0.07	0.11	0.62
Rest of Western Africa	EU	Exports crops	-41	-0.01	0.01	8.67
Rest of Western Africa	EU	Oilseeds	-32	-0.01	0.02	0.38
Rest of Western Africa	EU	Other food products	-33	-0.02	0.04	9.76
Rest of Western Africa	EU	Vegetable and fruits	-17	-0.01	0.06	0.21
South Africa	EU	Beverage and tobacco	-45	-0.13	0.16	0.06
South Africa	EU	Exports crops	-45	-0.05	0.06	1.15
South Africa	EU	Meat	-37	-0.02	0.03	1.04
South Africa	EU	Oilseeds	-68	-0.07	0.03	0.06
South Africa	EU	Other food products	-43	-0.08	0.10	0.75
South Africa	EU	Sugar	-54	-0.11	0.10	5.11
South Africa	EU	Vegetable and fruits	-45	-0.08	0.10	2.33
Zimbabwe	EU	Exports crops	-53	-0.08	0.07	11.12

Source: Author's calculations, reference-group weight aggregating method.

TABLE II.C.7 — TOP 20 TARIFF INCREASES FOR SSA AGRICULTURAL EXPORTS TO THE EU IN THE GSP SCENARIO

Exporters	Importers	Sectors	Tariff increase (percent of initial tariff)	*Ad valorem* equivalent tariff increase	Tariff in the GSP scenario	Initial trade (10^6 $)
Mauritius	EU	Other food products	13	0.01	0.09	0.12
Mauritius	EU	Sugar	251	0.26	0.37	0.11
Nigeria	EU	Other food products	2	0.00	0.11	0.45
Rest of Central Africa	EU	Oilseeds	2	0.00	0.09	0.00
Rest of Central Africa	EU	Other food products	6	0.01	0.18	0.02
Rest of Central Africa	EU	Vegetables and fruits	19	0.03	0.16	0.21
Rest of Eastern Africa	EU	Oilseeds	0	0.00	0.04	1.16
Rest of Eastern Africa	EU	Other food products	3	0.00	0.07	1.34
Rest of Eastern Africa	EU	Vegetables and fruits	0	0.00	0.09	0.30
Rest of SACU	EU	Cereals	9	0.01	0.18	0.00
Rest of SACU	EU	Meat	1	0.00	0.06	0.01
Rest of SACU	EU	Other food products	10	0.02	0.19	0.62
Rest of SACU	EU	Sugar	228	0.21	0.30	0.13
Rest of SACU	EU	Vegetables and fruits	1	0.00	0.19	0.02
Rest of Western Africa	EU	Exports crops	0	0.00	0.03	8.67
Rest of Western Africa	EU	Oilseeds	3	0.00	0.04	0.38
Rest of Western Africa	EU	Other food products	2	0.00	0.06	9.76
Rest of Western Africa	EU	Vegetables and fruits	11	0.01	0.08	0.21
Zimbabwe	EU	Other food products	14	0.01	0.09	0.01
Zimbabwe	EU	Vegetables and fruits	7	0.01	0.13	0.02

Source: Author's calculations, reference-group weight aggregating method.

APPENDIX D:Country-level impacts on SSA

TABLE II.D.1 — IMPACTS ON THE REAL GDP OF SUB-SAHARAN AFRICAN COUNTRIES

		Absolute real GDP change (mln $)						
	Initial	Reg FTA	*SSA FTA*	*DDA**	*DFQF**	DDA+ DFQF*	DDA+ RegFTA*	DFQF+ Reg FTA*
Botswana	8,696	0.8	1.9	0.7	0.0	0.8	1.4	0.9
CentralAf	38,273	-1.1	26.3	0.1	1.6	1.3	-1.0	0.5
Ethiopia	7,019	-0.1	-0.2	-0.8	0.1	-0.7	-0.9	0.0
Mada	4,417	0.0	0.0	-2.5	0.6	-1.8	-2.6	0.6
Malawi	1,842	1.3	1.9	-15.4	-6.2	-11.0	-14.6	-8.1
Mauritius	6,240	-0.1	-7.0	-3.9	-0.5	-3.6	-4.0	-0.4
Mozambique	6,072	10.2	10.6	0.7	8.0	7.1	10.9	18.6
Nigeria	68,819	34.9	83.8	330.9	-3.9	327.7	363.1	32.0
RoEastAf	50,600	9.1	-2.1	32.6	113.0	116.4	42.4	123.4
RoSACU	9,103	5.8	9.0	-8.7	-1.6	-9.1	-2.8	4.3
RoWestAf	50,843	83.0	85.4	-0.9	27.5	24.3	69.5	109.8
Senegal	7,222	3.3	4.5	1.1	27.9	26.1	4.1	30.3
SthAfrica	214,356	114.0	346.3	173.3	7.8	179.8	284.3	124.3
SthCentAf	24,785	-6.5	10.3	-12.7	12.7	-2.4	-19.2	5.8
Tanzania	11,537	10.6	11.2	2.9	25.7	27.3	13.2	35.0
Uganda	7,298	0.6	4.8	0.9	6.4	5.0	1.4	7.0
Zambia	5,432	31.6	37.2	-1.4	4.2	2.7	30.1	35.3
Zimbabwe	4,121	29.2	29.9	-4.4	1.6	-3.4	23.6	30.2
SSA	526,675	327	654	492	225	686	799	550

Source: Author's calculations from the results of the MIRAGE model

TABLE II.D.2 —IMPACTS ON THE AGRICULTURAL EXPORTS VOLUME ($ MILLIONS) OF SUB-SAHARAN AFRICAN COUNTRIES

		Initial	Absolute change							
			Reg FTA	SSA FTA	DDA*	DFQF*	DDA+ DFQF*	DDA + Reg*	DFQF +Reg*	DDA+ DFQF+ Reg*
Botswana	Raw ag	70	0.10	0.09	-0.44	-0.05	-0.47	-0.35	0.05	-0.04
Botswana	Processed ag	63	1.09	1.72	-0.93	-0.13	-0.99	0.18	0.96	-1.71
Central Africa	Raw ag	855	-0.75	30.94	15.12	4.06	17.97	14.22	3.28	15.37
Central Africa	Processed ag	191	-0.29	12.18	2.33	14.16	6.52	2.08	13.88	-19.56
Ethiopia	Raw ag	437	-0.52	-1.51	-10.76	0.55	-10.03	-11.35	-0.03	-12.52
Ethiopia	Processed ag	95	-0.36	-0.68	-2.25	0.24	-2.10	-2.61	-0.13	-1.71
Madagascar	Raw ag	285	-0.05	0.92	-6.19	-0.19	-3.15	-6.30	-0.45	-10.16
Madagascar	Processed ag	290	0.75	2.34	14.38	10.58	13.73	14.80	11.40	-0.01
Malawi	Raw ag	336	43.49	48.70	53.34	208.73	180.06	104.59	278.15	48.32
Malawi	Processed ag	76	6.44	3.44	-4.40	-14.66	-14.50	1.79	-9.78	1.78
Mauritius	Raw ag	11	0.16	0.45	0.79	-0.06	0.72	0.95	0.09	1.22
Mauritius	Processed ag	843	-1.86	17.70	-22.18	3.36	-20.16	-23.83	1.55	-275.33
Mozambique	Raw ag	156	45.85	48.77	6.15	63.94	57.06	54.23	121.21	45.38
Mozambique	Processed ag	157	16.27	18.19	-0.08	4.96	4.33	15.89	20.98	9.37
Nigeria	Raw ag	413	12.09	18.90	19.23	1.32	19.39	28.77	13.35	14.91
Nigeria	Processed ag	146	10.46	16.99	7.08	0.64	7.64	17.51	11.20	17.74
Rest of Eastern Africa	Raw ag	2,046	42.00	95.37	56.02	338.61	241.10	97.29	379.84	-77.38
Rest of Eastern Africa	Processed ag	994	65.92	89.26	48.72	171.72	245.11	114.77	238.31	61.47
Rest of SACU	Raw ag	237	1.07	-1.28	9.99	0.97	10.38	10.83	2.14	5.72
Rest of SACU	Processed ag	1,104	48.71	108.70	31.06	7.82	35.81	74.99	57.05	93.79
Senegal	Raw ag	74	0.15	0.20	-0.09	0.92	0.66	0.03	1.14	-2.58
Senegal	Processed ag	402	5.36	13.67	6.01	45.79	39.09	11.29	50.08	-19.28
South Africa	Raw ag	2,708	73.50	78.85	66.86	9.35	73.64	139.48	84.38	-48.83
South Africa	Processed ag	3,488	167.17	392.28	49.29	8.04	56.50	218.08	178.28	210.31
South Central Africa	Raw ag	23	0.97	1.81	0.05	15.92	15.75	1.02	17.58	1.27
South Central Africa	Processed ag	62	2.72	15.01	1.65	43.28	19.94	4.36	47.38	11.44
Tanzania	Raw ag	535	20.26	36.28	4.87	112.57	107.61	25.30	130.37	22.38
Tanzania	Processed ag	375	52.06	60.45	9.48	229.18	226.38	61.41	269.28	40.42
Uganda	Raw ag	398	9.24	10.98	3.31	18.75	16.98	12.37	27.79	7.86
Uganda	Processed ag	217	12.74	24.78	5.32	28.65	10.66	17.96	40.51	22.29
Zambia	Raw ag	317	-3.55	-13.17	4.96	10.42	9.74	1.47	6.15	-18.60
Zambia	Processed ag	65	5.42	29.38	0.49	0.33	0.35	6.12	5.75	29.20
Zimbabwe	Raw ag	677	85.92	80.15	26.85	3.21	27.96	113.44	89.87	103.31
Zimbabwe	Processed ag	300	45.18	51.99	-2.86	0.75	-2.16	38.16	46.05	-41.42

Source: Author's calculations from the results of the MIRAGE model

TABLE II.D.3 — IMPACTS ON TARIFF REVENUE, TERMS OF TRADE AND ALLOCATION EFFICIENCY

	Per cent change in total tariff revenue				Percent change in terms of trade				Percent change in allocation efficiency			
	Reg FTA	SSA FTA	DDA *	DFQF*	Reg FTA	SSA FTA	DDA *	DFQF*	Reg FTA	SSA FTA	DDA *	DFQF*
Botswana	-2.3	-0.6	-0.5	-0.1	-0.03	-0.38	0.87	-0.02	0.01	0.02	0.01	0.00
Central Africa	-0.1	-16.6	-2.2	0.2	-0.01	-0.39	-0.40	0.04	0.00	0.10	0.00	0.00
Ethiopia	0.0	0.0	0.0	0.0	-0.02	-0.06	-0.25	0.03	0.00	0.00	0.00	0.00
Madagascar	-0.4	-7.4	-3.5	0.7	-0.01	-0.10	-0.59	0.66	0.00	0.00	-0.05	0.01
Malawi	-49.3	-52.2	2.4	15.4	-1.56	-1.73	0.96	6.30	0.08	0.10	0.10	0.72
Mauritius	-0.3	-19.0	0.0	-0.1	0.00	-0.84	-0.13	-0.01	0.00	0.08	-0.03	-0.01
Mozambique	-54.5	-55.1	0.4	1.8	-0.87	-1.02	0.06	0.67	0.09	0.09	0.00	0.05
Nigeria	-7.0	-13.2	-8.5	-0.1	-0.25	-0.43	-0.53	-0.05	0.14	0.23	0.45	-0.01
Rest of Eastern Africa	-3.3	-11.6	-1.5	4.1	-0.05	-0.57	0.06	1.47	0.02	0.02	0.07	0.17
Rest of SACU	-1.3	-1.1	-4.3	-0.6	0.27	0.34	-0.36	-0.05	0.06	0.09	-0.09	-0.02
Rest of Western Africa	-4.0	-8.5	0.3	0.6	0.87	0.69	-0.08	0.23	0.08	0.08	0.00	0.03
Senegal	-1.6	-4.2	0.3	5.4	0.30	0.35	0.23	2.60	0.02	0.03	0.00	0.16
South Africa	0.9	3.1	-6.0	0.1	0.31	0.98	-0.09	0.01	0.05	0.14	0.08	0.00
South Central Africa	-9.8	-11.6	-0.3	0.7	-0.22	-0.33	-0.37	0.27	-0.04	0.05	-0.05	0.04
Tanzania	-6.1	-26.3	1.0	7.0	0.68	0.15	0.22	3.41	0.06	0.06	0.02	0.12
Uganda	-7.4	-21.3	0.9	3.8	0.29	0.45	0.33	1.48	-0.01	0.05	0.01	0.05
Zambia	-62.2	-62.7	0.2	2.1	-1.94	-1.26	-0.04	0.55	0.60	0.70	-0.03	0.06
Zimbabwe	-68.8	-68.8	-2.2	0.5	-2.50	-2.63	0.22	0.05	0.75	0.77	0.10	0.03
Sub-Saharan Africa	-2.1%	-3.9%	-1.1%	0.4%	0.06	0.13	-0.16	0.26				

Source: Author's calculations from the results of the MIRAGE model.

APPENDIX E: Treatment of some data issues in GTAP 7

As already documented by David Laborde[46] and other contributors of the GTAP network, there are several issues in the GTAP 7 database that if combined can lead to a strong overestimation of gains from trade liberalization. Following is a description of those issues, an explanation of the way they are treated in this chapter suggested by David Laborde and an example of the extent to which they can affect the results of trade liberalization scenarios. A reference to this issue is the forthcoming Bouet and Laborde (2011.).

Starting from the GTAP 6 database, travelers' expenditures were added to merchandise trade flows by sector instead of being attributed to a tourism sector. For instance, it means that the consumption by Asian tourists and temporary workers in Africa is accounted in the GTAP 7 database as exports of goods from Africa to Asia. These virtual trade flows increase the bilateral trade flows on which tariff barriers are applied. Thus by comparing trade databases, we can see that the trade flows from some African countries (mainly eastern Africa, Tanzania, Senegal, and Madagascar) to some Asian countries (mainly Japan, China, and India) of goods in GTAP 7 are higher than in other trade databases such as COMTRADE.

Since by default tariff barriers are applied to the overall trade flows, if those tariffs are reduced following liberalization, such as in the DFQF scenario (and to some smaller extent the DDA scenario), those virtual export flows will also expand. The extent to which they will expand is linked to the height of the initial tariff applied,

46 See https://www.gtap.agecon.purdue.edu/databases/v7/v7_data_issues.asp.

the importance of the demand for the good in the importing country, and the supply capacity of the exporting country.

If initially the sectors were protected by prohibitive tariffs and the demand in importing countries is high, such as rice in Japan, then this export market becomes attractive to countries that were already exporting despite the high tariff (Senegal Tanzania, Madagascar, and Rest of Eastern Africa, for instance), and those countries are considered competitive in exporting there. In the end, the extent to which those countries will increase their rice exports to Japan will depend on their supply capacity. As in MIRAGE, land is perfectly substitutable among agricultural sectors, and we will observe a shift in agricultural production toward rice in those countries (which is not realistic since rice should be irrigated in Africa). But if additionally in the country-level input/output data of GTAP 7 rice production requires low quantity of production factors and intermediate inputs, then the supply increases disproportionally: It is specifically so for Senegal, where imported wheat is the main intermediate input of processed rice (16 percent of intermediate consumption and only 12 percent of paddy rice), and Tanzania, where processed rice is exclusively made of paddy rice (which does not require a lot of land) and almost no factor of production. Those discrepancies are common in developing countries' input/output tables in GTAP 7 and stem partly from bad contributed tables and partly from error in the sectoral repartition of intermediate consumption and factor uses.

In this chapter, the treatment applied was to consider all trade flows from Sub-Saharan African countries to Asian countries in paddy rice, processed rice, and raw milk as virtual flows that should not be liberalized in the multilateral scenario. The impacts on welfare by countries are shown in Table E.1.

TABLE II.E.1 — IMPACTS ON WELFARE ($ MILLIONS)

	Initial Welfare	Absolute change								
		DDA	DDA*	DDA* /DDA	DFQF	DFQF*	DFQF* /DFQF	DDA+ DFQF*	DDA+ DFQF	DDA+DFQF* /DDA+DFQF
EU	10,593,543	13,794	13,795	100%	-294	-125	42%	13,541	13,712	101%
U.S.A.	10,037,684	4,719	4,720	100%	185	175	94%	4,762	4,754	100%
Japan	3,445,072	10,919	10,890	100%	1,963	69	4%	12,113	10,948	90%
Rest of the world	3,228,432	3,585	3,585	100%	-23	8	-33%	3,571	3,604	101%
Rest of Latin America	1,204,656	-544	-544	100%	-60	-31	52%	-583	-552	95%
Asian Tiger	893,668	597	596	100%	71	3	4%	615	562	91%
China	892,423	-1,007	-1,007	100%	-85	-105	125%	-1,060	-1,072	101%
Rest of Asia	579,493	563	564	100%	538	491	91%	857	834	97%
India	509,224	11	11	102%	-50	-61	122%	-19	-23	123%
Brazil	461,614	7	7	100%	-22	-41	192%	3	-15	-594%
North Africa	202,237	-558	-558	100%	15	-1	-5%	-547	-559	102%
South Africa	173,614	91	91	100%	60	8	14%	146	98	67%
Rest of Western Africa	50,051	-5	-6	105%	73	40	55%	60	32	53%
Rest of Eastern Africa	45,921	25	25	100%	239	193	81%	209	169	81%
Nigeria	38,263	141	141	100%	-11	-15	139%	132	128	97%
Central Africa	24,338	-49	-49	100%	2	5	302%	-48	-44	93%
South Central Africa	19,620	-52	-52	100%	32	34	106%	-22	-20	93%
Tanzania	10,624	11	10	94%	1,729	58	3%	1,671	65	4%
Senegal	7,783	7	7	99%	459	51	11%	429	53	12%
Ethiopia	7,417	2	2	100%	0.1	-0.1	-157%	3	2	93%
Uganda	6,086	5	5	100%	37	20	53%	34	19	55%
Rest of SACU	6,038	-25	-25	100%	1	-3	-481%	-21	-25	118%
Botswana	6,000	24	24	100%	-1	-0.4	28%	23	23	104%
Mozambique	5,165	2	2	100%	15	15	99%	14	14	99%
Mauritius	4,691	-7	-7	100%	3	-1	-28%	-3	-7	195%
Zambia	4,428	-2	-2	100%	14	11	78%	11	8	72%
Zimbabwe	3,452	-3	-3	100%	8	2	24%	3	-2	-73%
Madagascar	3,375	-12	-12	103%	79	12	15%	61	-1	-2%
Malawi	1,958	-7	-7	100%	30	32	107%	19	21	110%
World	32,466,867	32,233	32,203	100%	5,009	843	17%	35,974	32,726	91%

Source: Author's calculations from the results of the MIRAGE model.
Note: The symbol "*" indicates scenarios with the treatment of virtual flows.

We can see that this does not change the results from DDA much, but that it does reduce the world gains from DFQF by 83 percent. Indeed, most of the gains from untreated DFQF are driven by Tanzania (39 percent), Japan (35 percent), Rest of Asia (11 percent), and Senegal (9 percent), which are reduced respectively by 97 percent, 96 percent, 9 percent, and 89 percent by the treatment. In the DFQF* simulation, most of the gains are then driven by Rest of Asia, in which most of Asian LDCs are aggregated, and in Africa by Rest of Eastern Africa.

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Chapter III

Trade and agricultural policies in Malawi: Not all policy reform is equally good for the poor[47]

Abstract

The reduction of the existing global distortions to agricultural incentives is sometimes stated as a priority to fight poverty worldwide. But the impacts of global trade policy and domestic development policy reforms are rarely, if ever, compared. Despite technical limitations hindering rigorous comparison of the overall growth effects, also hampering cost-benefit analysis, this chapter contributes at filling this gap by focusing on the comparison of the distributional poverty impacts of both types of policies. It uses the MIRAGE global computable general equilibrium –CGE- model feeding a national CGE model representing Malawi in 2007 linked to household survey to examine how different trade policy reforms by Malawi and the rest of the world would impact poverty in Malawi. The country's recent agricultural growth history due to the Fertilizer Input Subsidy Program is replicated and compared with a more broad-based sectoral approach. The effects of accelerating growth in agriculture and downstream sectors are compared with those of integrating in the regional and multilateral markets. Non preferential trade policy reforms are found to be less favourable for poverty reduction of the poorest than regional integration or preferential integration. Faster intensification and diversification of agriculture is found to enable targeting the poorest that are less likely to be connected to international markets. Therefore, while policy reforms generating growth in general may be good for some poors, it is found that that not all policy reforms are equally good. Thus, despite the fact that trade policies could help fight poverty in Malawi, there are no substitute to development policies, and if undertaken simultaneously, their coherence should be checked thoroughly.

JEL codes: D58, O55, F13, O47 and Q17.

Keywords: Malawi, Economic Growth, Trade policy, Agricultural Policy, Poverty, Computable General Equilibrium

Note: Earlier versions of this chapter has benefitted from very useful comments and suggestions after being presented at the annual conference of the Centre for the Study of African Economies (CSAE), 18- 20 March 2012, Oxford (UK). Various versions were accepted by international conferences: the 15th Global Trade Analysis Project Conference, 27-29 June 2012, Geneva (Switzerland), the Xe European symposium of the International Farming Systems Association, 1 -4 July (Denmark), and the annual Ecomod Conference, 4-6 July 2012, Sevilla (Spain).

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1. Introduction

Considering the proliferation of trade agreements concerning poor African countries such as Malawi and the difficulties those countries have to fund domestic development policies, surprisingly there seems to be little academic guidance in either the theoretical or empirical literature to help them set priorities for policy reforms and ensure that the commitments they negotiate with other countries are instrumental to their broader development strategies.

Our concern is that in Malawi, like in many other poor countries, analytical capacity constraints have hindered independent analysis and assessment of the potential implications of multiple policy reforms, while negotiation capacity constraints have limited effective engagement in trade negotiations by local policymakers (UNCTAD 2006). Development economics emphasize the fact that macroeconomic policies in Africa have been insufficiently linked with micro-level realities (Bhorat, Hanival and Kanbur, 2006), while the micro-level policies implemented with no consideration for the macroeconomic context have failed. For instance, supply-side constraints risk preventing Malawi from seizing new market access opportunities (Chalira 2007). It is thus critical to test trade policy opportunities based on their coherence with Africa's priorities of agricultural growth and broader development objectives of poverty and food insecurity reduction as described by de Janvry and Sadoulet (2010).

The latest major policy reform in Malawi has been the significant upscaling of the fertilizer subsidy program aimed at resource-poor farmers in response to the particularly severe food emergency of 2004. Successful at doubling the production of maize, the main staple of the country from the first year and increasing maize production in the following years according to official estimates (MOAFS 2010a), the Farm Input Subsidy Program (FISP) is now largely financed by foreign aid. But international financing institutions and foreign aid donors were initially reluctant to support such large scale direct policy intervention grounded on past experiences of inefficiencies and capture by political interests. Historically strong drivers of economic reforms in Africa since the 1980s (Jones, Morrissey and Nelson 2011), they have rather recommended beneficiary countries to follow prescriptions from public economics literature that find that any policy intervention leads to dead-weight losses, is subject to "government failures" and rent seeking (Krueger, 1990). Additional internal limitations in the governance system, scarcity of information on the agreements between the donors and the executive and the lack of technical capacities of

parliamentarians have prevented the parliament from ensuring accountability on resources allocations especially from Overseas Development Aid (Resnick 2012). In the case of Malawi, diverging views have appeared on whether to respond to the problem of deficient markets for inputs and financial services for poor smallholders with purely market based promotion of the development of private agro-dealers or through direct state intervention with input subsidies (Chisinga 2012). The direct subsidy was introduced by the former President Mutharika for political reasons in 2005. In the following years maize yields have grown by 20 percent per year and GDP has increased by almost 8 percent per year. Evaluations have find that subsidizing inputs has been an effective short term answer to low profitability of the maize activity linked to the very high prices of inputs, but that it has tackled the core problem of the lack of accessibility of maize for the poor deficient families only to the extent that it has increased their self sufficiency in maize, their income (through other crops such as tobacco) or reduced the hunger season peak in prices by expanding the market. But to this date further integrating the private sector in the scheme to spur the growth of the seed producers, fertilizer retailers and financial institution remains a challenge (Dorward and Chirwa, 2011). The positive yields and GDP growth have also been attributed to favorable weather conditions, increased world demand for the tobacco exported and macroeconomic stability (World Bank 2009).

Nowadays, debates on the FISP include its governance including manipulation by the incumbent President to gain electoral support in 2009 (Resnick 2012), lack of exit strategy and options for beneficiaries to graduate out of the scheme (Chirwa, Dorward and Matita 2011), displacement of private sector (World Bank 2011), and its cost (Buffie and Atolia 2009) which has peaked at 16.2% of the national budget in 2008/9 because of the increased volume of inputs supplied and the spike in the price of imported fertilizers (Dorward and Chirwa 2011). In fact, with a cost of less than 10 percent of GDP each year (ibid.), it has barely met the political commitments made at Maputo[48]. Nevertheless, the main challenge is to decrease its opportunity cost by transitioning to the more broad-based agricultural sector wide approach (ASWAp) that was designed by the government of Malawi together with International Financing Institutions (IFI) and donors in 2010 (MOAFS 2010b) which costs is double that of the FISP but includes a much broader range of agricultural, commercial and agro-industrial as well as service development. Considered one of the most ambitious and

[48] See the African Union Maputo Declaration on Agriculture and Food Security of 2003.

expensive programs in Malawi's history, in light of the fiscal constraints of Malawi, the ASWAp will depend on the availability of foreign aid.

Even though the donor community and international institutions have committed to increase spending in agriculture[49], our concern is that in the wake of the economic and financial global crisis restricting their financial capacities, the debates on which policy reforms should be set as priorities might tend to focus on the relative costs of the proposed policy reforms rather than on the comparison of their impacts. Indeed, despite the absence of any empirical comparison of the impacts of trade policy and poor countries domestic development policy reforms, we find many statements in the literature that trade policy reforms could be cost-effective pro-poor policies. For instance, Winters, McCullogh and McKay (2004) conclude an empirical survey where they state that the evidence between trade liberalization and reduction in poverty are context specific stating that "*although trade liberalization may not be the most powerful or direct mechanism for addressing poverty in a country, it is one of the easiest to change. […]. While many pro-poor policies are administratively complex and expensive to implement, the most important bits of trade reform -tariff reductions and uniformity and the abolition of nontariff barriers-are easy to do and will frequently save resources. Thus trade reform may be one of the most cost effective anti-poverty policies available to governments*." Another more recent empirical study on the effects on trade policy reforms on poverty also concludes that trade liberalization should be a priority to foster growth and reduce poverty in the poorer countries because *"[domestic development strategies] generally represent a greater net drain on the treasury, which may be a challenge in low-income countries that still rely heavily on trade tax revenue [even though they would be] more efficient than trade policies in this effort"* (Part I Introduction and Summary p41 of Anderson, Cockburn and Martin, 2010). In those studies, the focus on trade liberalization is justified by the potential gains from the removal of global distortions. Indeed, the historical poor performance of the agricultural sector and slow economic growth in Malawi as in the rest of Africa has been linked to the adverse effects on incentives of producers and consumers of tradable of the global and domestic distorsionist policies (Anderson and Masters 2009).

Malawi is already considered one of the most liberalized countries in Southern Africa (WTO 2011). Since 1981, it has implemented at least seven successive Structural Adjustment

[49] See the G8 l'Aquila Food Security Initiative in 2009 and the G20 "Action plan on food price volatility and agriculture" in 2011.

Programmes supported by the International Monetary Fund and the World Bank. A member of World Trade Organization since 1995, it has also gradually reformed its trade policies towards more liberalization. Today it benefits from many preferential agreements such as African Growth and Opportunity Act (AGOA) with the United States, the "Everything but Arms" (EBA) with the EU and free trade agreements with South Africa, Zimbabwe, Mozambique and Bostwana. Ongoing negotiations include the Doha Development Round at the multilateral level, the Economic Partnership Agreement (EPA) with the European Union (EU) and further regional integration within the Common Market for Eastern and Southern Africa (COMESA), and the Southern African Development Community (SADC). According to a report by UNCTAD Malawi's motivations to engage in those trade arrangements have been mostly driven by political rather than economic imperatives, with almost no local in-depth analyses of their possible economic impacts, and insufficient attention paid to developing the institutional capacity necessary to be able to take full advantage of the arrangements (UNCTAD 2006). Furthermore, a recent global study focusing on trade policy reforms that would affect Sub-Saharan Africa (SSA) showed that an hypothetical ambitious regional integration within SSA, which is now high on the political agenda of many African countries and development agencies[50], could deliver similar gains to SSA than the multilateral alternative currently under negotiation at the WTO (Douillet 2011). National level results for Malawi showed important implications for Malawi (Douillet and Pauw, 2012).

But to our knowledge none of the existing empirical studies compare the distributional impacts of different trade arrangements on Malawi nor are there comparable estimates of the impacts of the agricultural investments policies with those of trade policies. We aim at contributing to fill that gap.

From an analytical point of view, CGE models, traditional tools of economic policy analysis, are convenient to capture the linkages effects of all types of policy reforms and thus adequate to undertake comparative policy analysis (Sadoulet and de Janvry 1995). Despite new data and analytical tools gradually enabling to investigate macro-micro linkages (Bourguignon, Bussolo and Cockburn, 2010), some challenges remain to compare the impacts of domestic and rest of the world policy reforms hampering any rigorous cost-benefit comparison. We will thus rather focus on distributional impacts of policies. Drawing from

[50] See the Outcome Statement of the "Joining up Africa: Regional Integration" conference agreed in London, United Kingdom on March 4th 2010 by representatives from the African Development Bank, the World Bank, the European Commission, the WTO and the Department for International Development (DFID).

previous country case-studies which demonstrated that "not all growth is equally good for the poor" (Thurlow and Wobst 2006), it is based on the hypothesis that the choices of trade and development policy reforms will affect differently the structure of growth and thus of poverty reduction in Malawi.

A national CGE model linked to household survey data representing the economy of Malawi in 2007 is used to simulate the economy-wide impacts of various domestic policy reforms by Malawi. The two development policies considered are a policy concentrated on maize and tobacco inspired by the FISP and an hypothetical broad-based agricultural investment policy inspired from the Malawi's ASWAp. Shocks of global trade reforms are modeled with a global computable general equilibrium (CGE) model and then transmitted to the national model as in Anderson, Cockburn and Martin (2010). But this research will go further than was previoulsy done by considering a wide range of trade agreements in which negotiators from Malawi are currently involved, thus including other country policy reforms as sources of shocks for Malawi. Two multilateral trade liberalization agreements are simulated, namely the Doha Development Agenda (DDA) and a Duty Free Quota Free (DFQF) agreement, both currently under negotiation at the WTO. Combined effects of a DDA+DFQF as currently negotiated is also simulated. Regional integration scenarios include a simulation of the combined impact of the hypothetical simultaneous implementation of four regional free trade agreements (FTA) in SSA, as well as a hypothetical subcontinent-wide FTA scenario.

The rest of the chapter is structured as follow: The structure of the economy of Malawi is described in section 2. Section 3 will present the national CGE model, the necessary adjustment required by the implementations of the global trade scenarios and the main limitations of such a modeling framework. Section 4 will present the recent agricultural growth history on which are based the two domestic policy reform scenarios, the trade policy reform context, and the eight trade scenario chosen. Section 5 discusses the results and their sensibility to the assumptions of the modeling framework. Section 6 concludes.

2. The economy of Malawi

Malawi is one of the poorest countries in the world, and agriculture and the processing of agricultural products are major sources of income, employment, an essential part of foreign exchange earnings, and of government fiscal revenues (World Bank 2010). After decades of

erratic growth performance, the country has started a successful growth path since 2005. Following, some drivers of the recent growth of the country are presented. Then structure of the economy in 2007 based on the new available Social Accounting Matrix for the country is described, with a specific focus on households.

2.1. The recent growth success in the historical context of Malawi

According to statistics from the Ministry of agriculture and food security of Malawi, the agriculture sector is the most important sector in the country since it employs about 80% of the country's total workforce, accounts for 39% of GDP, and contributes more than 80% of foreign exchange earnings (MOAFS 2010b). The agricultural sector is divided into a smallholder sub-sector and an estate sub-sector. Little is known about the estate sector since most surveys focus on the smallholder sector and but according to estimates from the Ministry of Economic Planning and Development (MEPD, 2006), they respectively contribute about 70% and 30% to agricultural GDP The smallholder sub-sector is primarily subsistence-oriented with the main staple being by far maize followed by cassava, and sweet potatoes. Land holdings are small, highly fragmented and managed by customary land tenure. In contrast, the estate sector focus on exportable, high-value cash crops, such as tobacco, tea, sugar, and to a lesser extent coffee and macadamia nuts, and their land is managed under freehold and leasehold tenures.

Drivers of the historical growth in Malawi have been analyzed in details in the Country Economic Memorandum (World Bank 2009). It appears that in the last 30 years growth has been strongly influenced by the maize and tobacco subsectors which contributed in 2007 respectively 25 per cent and 14,5 per cent to agricultural GDP. Since combined they amount close to 15 percent to national GDP, it explains why growth volatility can be traced directly back to either volatility of maize production or of tobacco export prices (World Bank 2009).

Dependence on rain fed agriculture for households income, employment, and foreign exchange earnings explains the country's sensibility and vulnerability to climatic shocks. The increased frequency of those shocks in the last 25 years and the punctual poor management of grain stocks following the reforms of maize markets since the 90s have caused a history of recurrent food crisis in Malawi (Devereux 2007, Pauw, Thurlow and van Seventer 2010).

Malawi's growth performance between 2005 and 2010 represents a marked improvement over the previous one and a half decades. Preliminary estimates suggest that national growth averaged more than 8 percent (MODPC 2009), driven largely by strong

growth in agriculture, which in turn was driven by maize yield growth of about 20 percent per annum (MOAFS 2010a). Official figures also show a much improved nonagricultural growth performance, with growth exceeding 5 percent in the mining and industry sectors (5.5 percent) and construction and services sectors (5.9 percent).

The main policy change in 2005 was the introduction of the FISP promoting maize production through seed and fertilizer subsidies with the aim of achieving food self-sufficiency. The FISP has also benefitted tobacco, the country's major export crop, through fertilizer subsidies. Implemented in an innovative way through "smart subsidies" (Minot and Benson 2009), it is considered to have been successful in increasing maize yields, almost tripling production in the first two years according to official statistics (MOAFS 2010a) and increasing calorie intake from maize, the primary staple in Malawi (Ecker and Qaim 2011). But according to the analysis of the Country Economic Memorandum (World Bank 2009) it is also thanks to a stabilized macroeconomic environment since 2003 leading to the investment recovery and resumed growth of domestic credit to the private sector since 2004, that the growth of the smallholder agriculture has diffused out through to financial services, distribution, manufacturing, transport and communication and eventually through to construction.

Considering the risk of further concentrating its economy on maize and tobacco, the government of Malawi and its main aid partners designed the Malawi's Agriculture Sector Wide Approach (ASWAp) (MOAFS 2010b) as the new priority policy reform to diversify out of the narrow focus of the FISP on those two crops. The ASWAp draws on elements of the Malawi Growth and Development Strategy (MGDS) in setting a priority investment strategy for the agricultural sector, but include agro-industrial and services development and also incorporates elements such as infrastructural development and rehabilitation, land administration and environmental management, technology development and dissemination, institutional development and capacity building, agro-processing and marketing development. The largest single component of ASWAp is the Greenbelt Initiative (GBI), a large-scale irrigation scheme motivated by the fact that Lake Malawi constituting one of world's largest bodies of fresh water, is an abundant source of unutilized water. Despite an apparent consensus on the importance of implementing the ASWAp as a priority in Malawi, political economy reasons have hampered the transition from the FISP to the ASWAp (Chisinga 2012).

2.2. Malawi's economic structure in 2007

In order to be able to analyze the impacts of various policies on Malawi, a new Social Accounting Matrix (SAM) has been recently built (Douillet, Pauw, Thurlow, forthcoming,) representing Malawi in the year 2007. It is therefore the most up-to-date representation of Malawi's economic structure.

2.2.1. *Technical steps to build the SAM*

A 'macro SAM' was constructed using the latest available aggregate information from national accounts and other macroeconomic databases, and then disaggregated across sectors, including aggregate factors and households to derive a more detailed 'national SAM'. One of the major advances of the 2007 SAM over previous SAMs for Malawi (in particular Thurlow, Dia and McColl, 2008) is that the Input Output table was updated and additional agricultural and agroindustrial sectors were added. The SAM now identifies 54 sectors (presented in Table III.A.2), of which 23 are in agriculture. Agricultural production is divided into crop agriculture (19 subsectors), livestock (2), fisheries and forestry. Industrial sectors are separated into mining, manufacturing (16) of which 7 agro-industrial sectors, utilities (2) and construction. Finally, the SAM also contains information on 11 different service sectors, including private services (8 subsectors) and public or government services (3).

As expected, the prior national SAM built was inconsistent (i.e., there were inequalities between receipts and payments). Data had to be reconciled so that row and column totals were equal (i.e., 'balancing' the SAM) using cross-entropy estimation techniques inspired from Robinson, Cattaneo and El-Said (2001), and presented in details in Douillet, Pauw, and Thurlow (forthcoming). In summary, the balancing was done in two stages. First, based on the observed inequalities between row and column accounts and the reliability of the various data sources used to build the prior national SAM, the confidence in each of the cells of the prior SAM was assessed. This prior SAM provided the initial 'best guess' for the estimation procedure. A balanced SAM was then estimated by minimizing the entropy 'distance' measure between the final SAM and the initial unbalanced prior SAM, taking into account additional information, including knowledge about aggregate values from national accounts and technology coefficients. After balancing the national SAM, it was then disaggregated across factors and households. Since at that stage the aggregate national SAM was already balanced, this resulted in imbalances for the household accounts only. These household accounts were again balanced using cross-entropy, but holding all other non-household-

related entries of the national SAM constant. Given the imbalances in the household survey between incomes and expenditures, the target household income/expenditure total for the final balanced SAM was the expenditure totals in the unbalanced prior SAM. Various constraints were imposed on the model according to the perceived reliability of the data. Certain values that appeared in the supply-use table and national accounts were maintained in order to remain consistent with the overall macro structure of the economy. Table III.A.1 presents the final macrostructure of the SAM.

2.2.2. *Sectoral production and trade structure*

Table III. 1. shows the sectoral structure of gross domestic product (GDP) according to the SAM. In 2007, agriculture accounts for 32.3 percent of total GDP in Malawi, most of which is generated by crop agriculture, particularly maize. One of the advantages of this new SAM is that it includes more details on the links between agricultural production and the downstream agro-industrial processing sectors. For example, it shows that while Malawi exports some raw tobacco, most tobacco is passed downstream to the tobacco curing and processing sector. Although this sector contributes relatively little to national GDP (only 0.71 percent), it generates a disproportionate amount of the country's export earnings (16.2 percent). Not all sectors have this strong "forward production" linkages. For example, we see from the table that there is very little processing of the other domestically-produced exports crops such as sugar, groundnuts and other export crops. While those crops generate 6.3 percent of total GDP, much of this is exported directly without being passed to the downstream agro-industrial processing sector. Accounting for these kinds of upstream and downstream production linkages will allow us to determine how changes in the performance of a sector will affect other sectors of the country, as well as the external balance and overall availability of foreign exchange.

TABLE III. 1 – SECTORAL PRODUCTION AND TRADE STRUCTURE

Sectors	Share of total (%)			Import
	GDP	Imports	Exports	Tariffs
Total	100.00	100.00	100.00	4.82
Agriculture	32.29	1.80	43.05	3.74
- Crops	26.38	1.69	42.95	3.91
'-- Maize	6.81	0.23	11.75	0.01
'-- Rice	0.76	0.05	0.18	7.53
'-- Other cereals	0.43	0.81	0.08	0.92
'—Cassava	1.56			
'-- Other roots	1.37			
'-- Pulse and oilseeds	5.10	0.12	6.31	7.65
'—Horticulture	6.09	0.06	0.02	12.95
'—Tobacco	2.22	0.38	15.78	9.18
'—Coton	0.80	0.00	1.04	2.01
'—Sugar	0.55	0.00	4.50	1.01
'-- Other export crops	0.69	0.04	3.29	8.00
- Livestock	3.84	0.06	0.05	1.37
- Fisheries	0.97	0.05	0.03	0.78
Industry	20.05	84.14	34.28	5.65
- Mining	1.26	0.00		1.08
- Manufacturing	13.27	84.14	34.28	5.65
'-- Agro-industrial processing	7.89	4.79	25.01	5.72
'--- Meat processing	0.29	0.04		4.31
'--- Grain milling	1.59	0.82	0.51	4.89
'--- Sugar refining	1.18	0.03	0.44	2.39
'--- Tea processing	0.52	0.02	6.45	14.49
'--- Other food processing	1.98	3.05	1.17	3.01
'--- Beverages	1.60	0.09	0.29	11.06
'--- Tobacco curing and processing	0.71	0.74	16.14	17.15
'-- Textiles and clothing	1.29	6.67	1.77	11.59
'-- Wood and paper	0.97	4.94	1.94	1.65
'—Chemicals	2.34	24.12	3.52	4.64
'--- Petroleum		10.57		5.50
'--- Fertilizer	0.06	6.72	0.04	
'--- Other chemicals	2.28	6.83	3.48	7.88
'-- Non-metals	0.46	1.98	0.09	2.97
'—Metals	0.02	16.09	0.11	8.54
'-- Machinery	0.17	25.41	1.39	4.17
- Construction	3.54			
- Utilities (electricity & water)	1.98			
Services	47.67	14.06	22.67	
- Trade, hotels and catering	16.78	1.11	13.56	
- Transport and communications	6.05	3.08	3.06	
- Private business services	9.08	9.87	6.05	
- Public administration and services	11.58			

Source: 2007 Malawi social accounting matrix v1.

2.3. Households in Malawi

At the time of writing the new Integrated Household Survey (IHS3) has not been released yet, so households characteristics in our new Social Accounting Matrix of Malawi for 2007 are still based on the on the 2004-05 Integrated Household Survey (IHS2) (NSO 2005).

i) Main characteristics

According to the IHS2 data, 90 percent of the households in Malawi were dependent on agriculture for part of their income and 52.4 percent of them fells under the poverty line of US$115 per person per year. Based on the estimates of the Malawi demographic and health survey (NSO and ICF Macro 2010), we assume that the poverty headcount had dropped to 40 percent in 2007[51].

Households in Malawi are divided in 70 household groups according to the size of land they farm (small-scale, medium-scale, large scale), where they live (rural/urban areas, in the North, Center or South regions) and to which expenditure quintiles they belong. In depth analysis of the livelihood profiles of households in Malawi (MVAC 2005) have shown that indeed location and size of land cultivated and asset holdings such as livestock are important discriminating factors between households. Malawi being the third most populous country in SSA, with 2.3 rural people per hectare of agricultural land compared to 0.4 people for the sub-continent as a whole, it is explainable that the size of land cultivated, the location and the agro-ecological conditions of the farm would be important determinants of the cropping patterns and hence the opportunities of farmers. Ideally more complex factors explain differential responses to exogenous change, such as the seasonality of access to paid labor outside of agriculture, and access to cash, credit and inputs, proximity to markets, and occurrence of hazards (MVAC 2005). Nevertheless, integrating the diversity and complexity of those livelihoods at the country level in the tools of policy analysis such as national CGE models is difficult because of data constraints and of current technical limitations in developing country-wide adequate representative farm/household typologies (Dorward *et al.* 2004). The main characteristics of households in the SAM are summed up in the following Table III.2.

Although all farm households dedicate part of their land to grow food for they own consumption, and most are almost self sufficient in maize, all of them complement with some food from the market. According to the Malawi Baseline Livelihood Profiles (MVAC 2005) almost one third of the population in Malawi cannot rely on its farm and must rely on *ganuy* (casual agricultural labour) for between two to six month per year to earn enough income to buy food. The share of expenditure dedicated to food is different across groups as is apparent

[51] As explained in more details later, in our poverty analysis rather than assume that poverty remained unchanged, we artificially set our poverty line so as to find the Malawi demographic and health survey (NSO 2010) poverty level.

in Table III.2, but it is also true across quintiles with the poorest spending on average 67 percent of their expenditure on food items, and the richest quintile only 44 percent.

According to the IHS2, close to all farmers allocate some land to maize foremost for their own consumption since it is the main staple crop of the country and can be grown anywhere. Thus although the pattern of crops differs by farm groups, all farm groups in the SAM dedicate part of their land to maize. Tobacco is the most widespread cash crop among smallholders, although it tends to be geographically concentrated in regions with higher agronomic potential for cash crops which are concentrated in the central region (World Bank 2009). Hence in the SAM farm households groups living in the Central region use a larger share of their land to grow that crop.

ii) Urban farms

Specific urban conditions in Malawi justify singling out urban farms. In the SAM, they appear in 15 farm groups (5 expenditure quintile groups for each of the three regions of Malawi). They account for 6 percent of harvested land, and 6 percent of the population. Urban farm households tend to be much more heavily engaged in off-farm activities than rural households with 52 percent of their income coming from enterprise earnings, thus, at similar sizes and agricultural revenues they earn a higher average per capita income than the rest of farm households and dedicate a much lower share of their expenditure to food items. Only 2 percent of the poors are assumed to belong to that group in 2007 (3 percent in 2005 according to IHS2).

iii) Rural farms

The remaining farm population is divided in 45 groups (5 expenditure quintiles for each of the three size groups in each of the three regions of Malawi, see regional map in Appendix A).

The majority of the population of Malawi belongs to the households group farming between 0.5 and 2 hectares of land. They tend to cultivate rather diverse cropping patterns, with maize, non-maize food crops, and export-oriented crops, particularly tobacco. They dedicate more than half of their expenditure to food items and self produce almost all the maize they eat. Their income comes primarily from labor and land. In 2007, 47 percent of them is estimated to fall below the national poverty line, which is above the national poverty

incidence of 43 percent (respectively 56 and 52 percent according to ISHN2 in 2005). In 2007, 64 percent of all the poors in Malawi are assumed to belong to that category.

The small-scale farmers (under 0.5 ha harvested) are specific in the sense that they dedicate most of their land to staple crops including horticulture for self consumption and they are the only one not usually producing tobacco (on average this group dedicate 5% of its land to tobacco against 23 percent on average nationally), and almost not producing other types of cash crops. In terms of localization, more than half of rural small-scale farmers are concentrated in the southern region. Their poverty rate is estimated to reach 52 per cent in 2007 (against 61 in 2005 according to the ISH2). In 2007, they are estimated to account for one quarter of the poors in Malawi.

On the contrary, large-scale rural farmers (with more than two hectares of land) have higher-than-average per capita expenditure, and their incidence of poverty is lower than other size groups with 30 percent of poors estimated in 2007 (31 in 2005 according to the ISH2). Only 4 percent of Malawi's poor people live on large-scale farms. They tend to be more heavily engaged in export-oriented crop production which, are even more concentrated than tobacco within very limited agro-ecological zones. For example, tea production takes place mainly within the Blantyre district in the Southern region, while sugar production occurs mainly in Salima district in the Center region. Their average size is 8 hectares in size, although this is biased upward by a small number of very large farms, such that the median farm size for this group lies well below the mean.

iv) Non-farm households

The remaining urban and rural nonfarm households account for only 9 percent of the population, and 6 percent of the poors in 2007 (5 percent in the ISH2). They are very distinct from the farming households in the way they generate their incomes, earning more than half of their incomes from nonfarm enterprise profits, and another third from secondary and tertiary-educated labor wages and salaries.

v) Differences across quintile

What is not apparent in the table is that within each of the household types described in Table III.2., income and expenditure profiles vary depending on the quintile. Farm households in lower-income quintile (Quintile 1) rely heavily on lower-skilled labor incomes and on agricultural profits as captured by land earnings. Capital, especially non agricultural is also

less important for lower-income households. For example, while households in the top expenditure quintile receive a 41,4 percent of their income from capital, this accounts for only 19.9 percent of incomes for households in the lowest quintile.

TABLE III.2 –. SUMMARY STATISTICS BY REGIONS AND FARM HOUSEHOLDS IN THE ECONOMYWIDE MODEL OF 2007

	National (estimates)	Urban		Rural						
		Urban farming	Urban non-farm	Rural farming by region			Rural farming by farm size (hectares / ha)			Rural non-farm
				North	Center	South	Small (<0.5ha)	Med. (0.5-2ha)	Large (>2ha)	
Population (1,000)	12,865	786	673	1,235	4,715	4,898	2,568	7,576	713	558
Quintile 1	2,569	62	35	288	666	1,429	699	1,595	89	89
Quintile 2	2,572	74	74	270	909	1,163	535	1,708	98	82
Quintile 3	2,574	107	109	248	1,058	959	531	1,619	114	94
Quintile 4	2,576	154	162	232	1,122	793	469	1,506	173	112
Quintile 5	2,575	277	406	195	960	554	358	1,122	230	182
Poverty incidence (%)	40	14	17	46	34	53	48	44	28	34
National poverty share (%)	100	2	2	11	31	50	24	65	4 0	4
Average per capita expenditure ($US)	151	387	361	127	145	115	48	127	177	180
spend on food	52%	32%	27%	67%	58%	63%	64%	62%	46%	62%
maize own produced	92%	82%	0%	99%	98%	98%	98%	98%	99%	0%
Income share from land (%)	13	3	5	24	21	20	31	18	18	0
from labor educated primary or less(%)	12	3	1	15	19	26	10	23	27	7
from more educated labor (%)	34	30	51	31	30	24	29	29	24	34
from capital (incl. livestock) (%)	6	2	0	13	11	12	14	12	5	0
from enterprise (%)	29	54	37	12	13	12	11	12	19	52
from transfers (%)	7	9	6	5	6	5	5	6	6	6
Average farm land (ha)	1.13	1.31	-	2.93	4.12	3.58	0.69	1.44	8.02	-
Maize	0.27	0.31	-	0.44	0.96	1.12	0.30	0.36	1.21	-
Pusles	0.08	0.09	-	0.14	0.34	0.19	0.06	0.11	0.36	-
Other staple food	0.07	0.07	-	0.23	0.18	0.29	0.07	0.10	0.18	-
Horticulture	0.17	0.16	-	0.22	0.38	1.14	0.17	0.26	0.42	-
Tobacco	0.26	0.33	-	0.94	1.08	0.36	0.04	0.28	2.86	-
Other export crops	0.28	0.36	-	0.97	1.17	0.48	0.05	0.32	2.99	-

Source: Malawi 2007 Social Accounting Matrix (Douillet, Pauw and Thurlow) and author's calculations using official agricultural production data (MOAFS 2010a) and the Integrated Household Survey (IHS2) of 2004/05 (NSO 2005).

Note: Population in 2007 was estimated based on population growth rates from Malawi Demographic and Health Survey (2010). Per capita expenditure is mean expenditure unadjusted for adult equivalence from IHS2; all poverty figures were obtained by changing the national poverty line to reproduce poverty figures from the Malawi Demographic and Health Survey (2010).

3. Modeling policy reforms

As in Anderson, Cockburn and Martin (2010), we rely on a macro-micro CGE framework linking the global and the household levels. Following the main characteristics of this framework is presented, the scenarios modeled are detailed and the main limitations of this framework are assessed.

3.1. The modeling framework

The methodology we use is to implement the domestic policy reforms in a national computable general equilibrium model representing Malawi that is linked to household survey data to produce estimates of change in poverty. For the global trade policy reforms, after being simulated in a global general equilibrium model, border shocks are transmitted to the national model linked to the household data.

3.1.1. *The main features of the national CGE model of Malawi*

The national CGE model we use is based on the standard IFPRI static single country CGE model initially developed by Löfgren (2001) on Malawi and later version developed in Pauw, Thurlow and van Seventer (2010).

i) Production side

Producers in each sector and region produce a level of output by employing the factors of production under constant returns to scale (exogenous productivity) and fixed production technologies (fixed factor shares). Factors are combined with fixed-share intermediates using a Leontief specification. Profit maximization implies that factor payments are equal to average production revenues. Under profit maximization, the factors receive income such that marginal revenue equals marginal cost based on endogenous relative prices.

In the main simulations, labor supply, land supply, livestock supply and capital supply are fixed and fully employed at flexible real wages with some exceptions. Unskilled laborers are unemployed at fixed nominal wages to capture the underemployment of lower-skilled workers in Malawi. Land for rice, sugar and other export crops and capital in the mining, metals and electricity sectors, are immobile and earning sector-specific returns. The former captures the specificity of those crops in terms of agro-ecological zones while the latter reflects a dependence on foreign direct investment. By default under a long-run specification,

labor market equilibrium is defined at the national level as mobile across both sectors and regions meaning wages are equalized nationally. Regional land, livestock and capital market equilibrium implies that there are mobile across sectors but assumed immobile across regions meaning rental rate varies by regions.

ii) Modeling international trade

International trade is determined by comparing domestic prices to world prices. A world demand for Malawian export function is defined as presented below. The decision of producers is governed by a constant elasticity of transformation function that distinguishes between exported and domestic goods to capture any time or quality differences between the two types of products. If the ratio domestic prices on world export prices falls, then exports increases.

Conversely, imported and domestic final or intermediate goods are substitutable under a constant elasticity of substitution Armington specification. Under the small country assumption, Malawi faces an infinitely elastic world supply at fixed world prices. If the ratio of the domestic prices on world import prices (adjusted by exchange rate) falls, then the quantity of imports increases. Trade elasticities are taken from the Global Trade Analysis Project (Dimaranan 2006).

iii) Institutions

The model distinguishes among various institutions, including enterprises, the government, and the 70 representative household groups that were presented above. Households and enterprises receive incomes in payment for the use of their factors of production by producers. Households and enterprises pay direct taxes to the government (based on fixed tax rates), save (based on marginal propensities to save), and make transfers to the rest of the world. Enterprises pay their remaining incomes to households in the form of dividends. Households use their incomes to consume commodities under a linear expenditure system of demand which elasticities were estimated using the ISH2 as in King and Byerlee (1978).

Factor incomes are distributed to households in each region using fixed income shares based on the households' initial factor endowments. Total household incomes are then either saved (based on marginal propensities to save) or spent on consumption (according to marginal budget shares). The government receives income through imposing activity, sales

and direct taxes, and import tariffs and then makes transfers to households, enterprises, and the rest of the world. The government also purchases commodities in the form of government consumption expenditures. The remaining income of government is (dis)saved. All savings by households, enterprises, government, and the rest of the world (foreign savings) are collected in a savings pool from which investment is financed (meaning savings-driven investment closure). Finally, a national price equilibrates product markets, thus avoiding the necessity of modeling interregional trade flows.

The model includes three broad macroeconomic accounts: the government balance, the current account, and the savings and investment account. To bring about balance among the various macroaccounts, a set of macroclosure rules must be specified. Consistent with Anderson, Cockburn and Martin (2010) in both the global and national model, we assume a savings-driven closure to balance the savings and investment account. Under this closure, the marginal propensities to save of households and enterprises are fixed, while investment adjusts to changes in incomes to ensure that the level of investment and savings are equal. But the national saving rates varies when income distribution varies. For the current account, we assume that a flexible exchange rate adjusts to maintain a fixed level of foreign savings (so as to avoid foreign debt considerations). Thus, the external balance is held fixed in foreign currency terms. This assumption implies that government cannot simply increase foreign debt but instead must generate export earnings to pay for imported goods and services. In the case of Malawi this assumption realistically underlines the importance of the export sector in generating foreign exchange. Finally, in the government account, we assume that the fiscal deficit remains unchanged and that government revenues and expenditures are balanced through changes in the direct tax rates on households and enterprises.

The model's variables and parameters are calibrated to data from the regional social accounting matrix (Douillet, Pauw and Thurlow forthcoming).

3.1.2. *Modeling the policy reforms*

i) Domestic agricultural policy reforms

Domestic agricultural policy reforms are modeled very basically through an increase in aggregate productivity of the activities targeted, as described in details in section 3 below. Productivity growth is imposed on the model by adjusting the productivity parameter. Increasing the value of this parameter to more than one increases production and decreases product prices and the returns to factor resources. This may then change allocation of factors

depending on their mobility, production patterns and international trade flows and affect households' real income and consumption depending on their income and expenditure patterns.

ii) Rest of the world and domestic trade policy reforms

Trade policy reforms are modeled by simultaneously imposing exogenous world market shocks resulting from other countries trade policy reforms onto the national model together with the change in Malawi domestic trade policy that are directly implemented in the national model.

There are various ways to transmit the results derived from a global CGE model such as MIRAGE to a single-country CGE model. Like Hertel and Winters (2006) and Anderson, Cockburn and Martin (2010), we adopt the approach developed by Horridge and Zhai (2006). The aim is to use a global CGE model to determine the changes in world demand implied by the rest of the world policy reform, and allow the single country model to determine the export supply behavior of Malawi as a consequence.

In our case, all the exogenous shocks to border prices and export demand are based on the results provided by the Modeling International Relationships in Applied General Equilibrium (MIRAGE) global model initially developed by the Centre d'Études Prospectives et d'Informations Internationales (CEPII), described in Decreux and Valin (2007). To transmit those exogenous shocks onto the national model, the small country assumption of infinite world demand for Malawi's export standard in the IFPRI national models has to be relaxed. Instead following Horridge and Zhai (2006,), we specify an export demand function, based on its slope—approximately equal to the elasticity of substitution among imports— and the shift (*fp*) of the world demand, where *fp* is computed as follows:

$$fp = p * q^{Tradelas(C,'SIGMAT')}$$

while p is the percentage change in export prices, and q is the percentage change in export quantities and *Tradelas(C,'SIGMAT')* is the slope of the demand curve, considered equal to the GTAP elasticity of substitution among imports as in Horridge and Zhai.

In the end, the global model already takes into account Malawi's reaction to rest of the world policy reform through a change in the composition of exports which impacts the change in world demand for Malawi's exports, but it does not include potential domestic policy reforms. Horridge and Zhai show by comparing the results between the same policy reforms

implemented in the global model and in a national model based on the exact same data and parameters that the results are bound to be different. Their working assumption which we will adopt is that this difference is desirable as long as we assume that the Malawi single-country model represents the Malawian economy better than the Malawian part of the global model.

3.1.3. *Measuring poverty impacts*

The results of the CGE model are passed back down to the household survey on which the model is based and in which the poverty measures are calculated. More specifically, the changes in the real commodity expenditures of each representative household in the CGE model are applied to the expenditures of the corresponding household in the survey. Total expenditures are compared to real expenditure poverty lines, and standard poverty measures are recalculated.

In 2005, the poverty headcount was 52.4 percent at the poverty line of US$115 per person per year (IHS2). But since the latest Malawi demographic and health survey (MDHS, NSO 2010) estimates that between 2005 and 2007 poverty dropped to 40 percent of the population, and despite uncertainties on those figures (Mussa and Pauw, 2011), in our poverty analysis rather than assume that poverty remained unchanged, we artificially set our poverty line so as to find the MDHS poverty level. Our reported national poverty headcount rate for 2007 therefore differs from official estimates. However, since our analysis will focus on changes in poverty rather than absolute levels, this should not hamper its scope.

3.2. The trade and development policy reforms scenarios

Our agricultural policy scenarios are inspired from the results of Benin *et al.* (2008) and Ecker, Breisinger and Pauw (2011) that have modeled past growth trends of Malawi and potential options, trade policy reforms scenarios are taken from the global analysis of the previous chapter.

3.2.1. *The agricultural growth scenarios: replicating the success of the Fertiliser Input Subsidy Program and beyond*

In reproducing national accounts growth statistics (as reported by NSO 2010) in a dynamic framework, Ecker, Breisinger and Pauw (2011) closely approximated reported crop production statistics (as reported by MOAFS 2010a). They assume a slightly more conservative growth trajectory than what preliminary national accounts estimates suggest and

find a 7.2 percent GDP growth, driven by strong growth in the cereals subsector (16.5 percent).

i) Scenario 1 "FISP": the Fertiliser Input Subsidy Program

Our first scenario will be to roughly replicate the productivity shocks in the agricultural subsector experienced by the country in 2007 due to the FISP, as in Ecker, Breisinger and Pauw (2011). It is the outcomes of the agricultural policy in terms of productivity growth that are directly modeled without modeling the way through which such a productivity growth is obtained. This straightforward framework is chosen for simplicity in this research which focuses on the downstream distributional impacts of sectoral growth, but would need to be refined if we wanted to evaluate the cost-benefit of such a policy. As shown in Table III. 3 we assume that smallholder maize productivity improves by 20 percent, smallholder tobacco by 3 percent and horticultural crops 3 percent.

ii) Scenario 2 "ASWAP": the Agriculture Sector Wide Approach

Similarly to Ecker, Breisinger and Pauw (ibid.), we implement a broad-based productivity growth path in which cereals productivity growth slows down, but overall agricultural growth is maintained through promotion of a larger range of subsectors. Thus the "broad based" agricultural growth scenario considers rapid expansion of other agricultural and non agricultural sectors. Smallholder maize and smallholder root crops productivities increase by 10 percent, followed by a 8 percent productivity increase of other cereals, and 5 percent productivity increase of estate maize, horticulture and smallholder tobacco. The focus on infrastructure translates in an increase by 4 percent in retail and transports sectors productivities.

TABLE III. 3 – EXOGENOUS TOTAL FACTOR PRODUCTIVITY (TFP) GROWTH IMPOSED ON THE NATIONAL MODEL TO SIMULATE AGRICULTURAL POLICIES

	TFP growth from agricultural policy	
Activities	1FISP	2ASWAp
Maize (smallholder)	20.0	10.0
Maize estate	2.0	5.0
Other cereals	0	8.0
Root crops (smallholder)	0	10.0
Root crops (estate)	0	2.0
Pulses and oilseeds (smallholder)	0	5.0
Pulses and oilseeds (estate)	0	2.0
Horticulture	3.0	5.0
Tobacco (smallholder)	3.0	5.0
Tobacco (estate)	0	1.0
Cotton	0	2.0
Sugarcane	0	1.6
Other export crops	0	1.6
Seed production and distribution	0	2.0
Livestock	0	1.0
Forestry	0	1.0
Fisheries	0	1.0
Mining	0	0.0
Agroindustries	0	3.0
Retail and wholesale trade	0	4.0
Transport and storage	0	4.0
Communication, financial and business services	0	2.0
Government administration	0	2.5
Other public and privates services	0	2.0

Source: Author's calculation from the model, inspired from Ecker, Breisinger and Pauw (2011)

3.2.2. *Modeling global trade liberalization*

We chose to illustrate the diversity of trade policy options available to Malawi, both hypothetically or closely following current negotiating texts. The shocks imposed from the different trade scenarios are presented in Table III. 4 and Table III. 5 below.

i) Scenario 3"Regional FTA": Four Regional Free Trade Agreements in SSA

As this scenario we designed foremost for the purpose of a global modeling the constraint was to choose a combination of regional economic communities that covered all Sub-Saharan African countries with no overlap. Hence, the four groups used were the Economic Partnership Agreement regional groups in Africa, in which Malawi belongs to the

southern African group named the Southern African Development Community (SADC) group, based on the Southern Africa Customs Union (SACU) members plus Malawi, Mozambique, Zambia, Zimbabwe and Angola. All the other countries in SSA were grouped either in the Western African region, the Central African region or the Eastern African region.

This scenario is hypothetical because in reality Malawi is pursuing in parallel two regional integration processes, one with the SADC but also with the Common Market for Eastern and Southern Africa (COMESA).

In the regional FTA scenario, for each SSA country, all *ad valorem* equivalent tariffs applied to imports from other countries of the same region are set to zero, creating four FTAs. Malawi thus liberalizes trade with the other countries from SADC. We can see in Table III. 4 that export and import prices decrease as prices in the regional market decrease, and that demand for Malawian exports mostly rise except for maize, as according to the GTAP7 database underlying the global model the country is not competitive for maize at the regional level.

ii) Scenario 4 "SSA FTA": Sub African Free Trade Agreement

In this very hypothetical scenario, all countries in SSA liberalize. For each country in SSA, *ad valorem* equivalent tariffs applied on imports from other Sub-Saharan African countries are set to zero. Price and demand shocks on Malawi are similar to those from the regional FTA scenario except that demand is lower for sugar but higher for pulses, food processing, beverage and tobacco and textile.

TABLE III. 4 – CHANGES IN THE TARIFFS APPLIED BY MALAWI IN THE TRADE SCENARIOS

	Tariff Applied by Malawi		
	Initial tariff	Change with agreement	
Commodity	(2007)	1.Reg	2.SSA
Maize	0%	0%	0%
Rice	11%	-7%	-7%
Other cereals	1%	-18%	-18%
Cassava	9%	-11%	-100%
Other roots	5%	-96%	-96%
Pulses and oilseeds	11%	-21%	-28%
Horticulture	19%	-42%	-43%
Tobacco	13%	-97%	-98%
Cotton	8%	-99%	-99%
Sugarcane	0%	0%	0%
Other export crops	9%	-43%	-65%
Livestock	5%	0%	0%
Poultry	0%	-16%	-16%
Forestry	0%	0%	0%
Fisheries	1%	-68%	-87%
Mining	1%	0%	0%
Meat processing	1%	0%	0%
Grain milling	8%	-23%	-29%
Sugar refining	0%	0%	0%
Tea processing	18%	-83%	-90%
Other food processing	10%	-29%	-33%
Beverages	13%	-42%	-45%
Tobacco curing and processing	7%	-83%	-90%
Textiles and clothing	28%	-5%	-13%
Wood and paper	8%	-29%	-31%
Petroleum	4%	-79%	-80%
Fertilizer	0%	0%	0%
Chemicals	7%	-23%	-27%
Non-metals	6%	-19%	-35%
Metals	8%	-33%	-37%
Machinery and vehicles	8%	-16%	-20%
Other manufacturing	14%	-16%	-19%
Construction	20%	-22%	-23%

Source: Author's calculation from MAcMap-HS6 2007, trade weighted average

iii) Scenario 5 "DDA": Multilateral Liberalization in the Form of a "Doha Development Round"

The DDA scenario is based on the December 2008 modalities (Bouët and Laborde 2010) widely accepted by WTO members as the basis for further negotiations. Detailed formula[52] used in this research are available upon request. Malawi like other LDCs is exempted from tariff reduction but benefits from increased market access in other countries. Trade preferences the country already benefits particularly in the EU and the United States are nevertheless eroded since other countries experience an improved market access to those

[52] Thanking David Laborde for making his list of sensitive and special products defined using the Jean, Laborde, and Martin (2010) available.

same markets, thus Malawi experiences an increased competition on those markets, which is apparent in Table III. 4 by the large negative demand volume shocks except for traditional export crops for which Malawi is competitive which are raw tobacco, beverage and processed tobacco and tea.

iv) Scenario 6 "DFQF": Preferential Multilateral Liberalization for Least Developed Countries

A rather ambitious DFQF scenario is implemented (Bouët *et al.* 2010): 100 percent DFQF market access by OECD countries and Brazil, China, and India to all LDCs including Malawi.

DFQF is very favorable to Malawi for which the equivalent average tariff cuts are much higher than from DDA. Very large export price and demand shocks are induced by this agreement as Malawi finally gets a free access for its tobacco exports to the very protected markets of the USA and the UE. It also benefits from a very large demand shock for horticulture coming from India. Compared with DDA, Malawi earns a very large price premium thanks to the preferential access. The corollary is an increase competition and large negative volume shocks for exports for which Malawi is not competitive with the Asian LDCs.

v) Scenario 7"DDA+DFQF"

This scenario assumes that both DDA and DFQF are concluded jointly.

In Malawi like for the rest of SSA, while the DFQF brings additional tariff cuts of interest to SSA compared to the DDA scenario alone, the joint scenario is less favorable than the DFQF alone, because Malawi is not able to fully take advantage of the increased market access for lack of competitiveness with other countries of the world. This traduces by smaller price and demand shocks for all sectors than in the DFQF scenario.

TABLE III. 5 – EXOGENOUS DEMAND AND PRICE SHOCKS TRANSMITTED FROM MIRAGE TO THE NATIONAL MALAWI MODEL

	Exports	Imports	Per cent change														
			1.Reg			2.SSA			3.DDA			4.DFQF			5.DDA+DFQF		
			Exports		Imp	Exports		Imp	Exports		Imp	Exports		Imp	Exports		Imp
	(Millions of Malawian Kwacha)		Price	Vol	Price	Price	Vol	Price	Price	Vol	Price	Price	Vol	Price	Price	Vol	Price
Agriculture	75,502	5,683	-1.2	4.6	0.0	-1.1	6.5	0.0	0.8	7.0	0.0	5.9	25.8	0.1	4.7	22.3	0.0
Maize	12,457	164	-0.8	-10.0	-1.5	-0.8	-5.8	-0.8	1.1	-3.7	0.0	8.8	-13.9	0.8	7.0	-11.3	0.6
Rice	195	101	-1.1	5.1	0.0	-1.1	7.4	0.0	0.9	-13.4	-1.1	7.8	-40.6	0.0	6.1	-38.0	-1.1
Other cereals	57	3,804	-0.3	4.2	0.2	-0.1	5.9	0.1	0.6	-6.4	-0.2	5.2	-34.2	0.6	4.0	-29.2	0.4
Root	0	0	-0.4	0.0	-0.5	-0.2	5.0	-0.4	0.8	-3.2	-0.6	7.9	-22.5	0.0	6.1	-18.2	-0.2
Pulses and oilseeds	6,796	222	-0.4	0.0	-0.5	-0.2	5.0	-0.4	0.8	-3.2	-0.6	7.9	-22.5	0.0	6.1	-18.2	-0.2
Horticulture	26	106	-0.9	2.9	-0.5	-0.9	2.9	-0.3	1.0	-4.8	0.0	9.1	8.1	0.8	7.4	12.6	0.7
Tobacco	42,513	710	-1.7	11.2	-0.3	-1.7	12.5	0.0	1.0	14.4	0.1	6.0	55.3	1.5	4.9	47.4	1.2
Cotton	2,789	0	-0.6	0.0	-1.5	-0.6	-0.7	-0.7	0.6	-5.5	0.0	6.6	-23.0	0.7	5.0	-20.5	0.6
Sugarcane	7,646	2	-1.3	11.0	-0.5	-1.3	6.0	-0.7	0.7	-6.3	0.1	5.9	-20.0	0.8	4.6	-20.1	0.7
Other export crops	2,722	85	-0.6	4.0	-0.7	-0.6	4.4	-0.1	0.3	5.1	0.2	2.1	19.6	3.0	1.7	16.8	2.4
Livestock and poultry	50	109	-1.2	8.9	-0.4	-1.2	8.5	0.0	0.9	-14.9	0.2	7.7	-39.5	0.5	6.1	-38.5	0.5
Forestry	25	2	-1.4	-1.2	0.0	-1.3	0.3	0.2	0.8	-3.8	0.0	6.3	-27.0	0.0	5.0	-21.8	0.0
Fisheries	33	90	-1.0	3.7	0.0	-1.0	3.8	0.0	1.2	-5.8	0.0	9.6	-28.8	0.0	7.6	-24.8	1.4
AgroIndustries	21,305	10,033	-1.3	7.3	-0.2	-1.3	8.5	0.1	0.7	8.4	-0.2	4.7	30.9	0.5	3.8	26.6	0.2
Meat processing	0	68	-1.4	5.8	-1.5	-1.3	6.2	-0.9	0.9	-13.6	-0.1	7.5	-29.9	0.2	5.9	-30.5	0.1
Grain milling	1,384	964	-1.5	2.9	0.0	-1.7	8.1	-0.1	0.6	-3.5	-2.4	6.0	-20.9	0.0	4.7	-17.6	-2.3
Sugar refining	477	64	-1.3	11.0	-0.5	-1.3	6.0	-0.7	0.7	-6.3	0.1	5.9	-20.0	0.8	4.6	-20.1	0.7
Tea processing	6,999	37	-0.6	3.6	-0.3	-0.5	4.0	0.0	0.3	4.7	0.1	1.9	17.8	1.5	1.6	15.3	1.2
Other food processing	1,262	5,739	-1.4	-1.2	0.0	-1.3	0.3	0.2	0.8	-3.8	0.0	6.3	-27.0	0.0	5.0	-21.8	0.0
Beverages	317	167	-1.4	4.4	-1.4	-1.4	10.6	-1.1	0.6	8.0	0.1	5.7	16.9	0.2	4.5	18.1	0.3
Tobacco curing and processing	10,866	2,995	-1.7	11.2	-0.3	-1.7	12.5	0.0	1.0	14.4	0.1	6.0	55.3	1.5	4.9	47.4	1.2
Textiles and clothing	4,760	7,841	-2.1	48.6	0.0	-2.1	51.5	0.1	0.8	-25.0	-0.4	6.4	-36.6	0.3	5.0	-44.1	-0.2
Other Industries and manufacturing	8,077	144,139	-1.6	4.5	0.0	-1.5	7.4	0.2	0.7	-3.1	0.0	5.6	-25.6	0.1	4.4	-20.2	0.0

Source: Author's calculation from the model

3.3. Discussion on the assumptions of the modeling framework

From an analytical point of view, CGE models, traditional tools of economic policy analysis, are convenient to capture the growth linkages effects of all types of policy reforms. Until recently they had been developed either to analyze global trade policy reform or domestic policy reform but rarely compare both.

Analysis of global trade reforms other than unilateral liberalization by a given country require by scope global models because the outcomes of trade policy reforms on each country depend on the relative impacts on competitors (Low, Piermartini and Richtering 2005 and Carrere and de Melo 2010). But most global models rely on the GTAP database (Global Trade Analysis Project of Purdue University), the only available database representing the global economy in equilibrium. However, there are three main limitations when using this database for poverty analysis, first many developing countries are not individually represented in the database (although the number of countries is gradually increasing with each new version released), second data availability for developing countries being scarce, many social accounting matrix from developing countries are ten years of older (Malawi's data in the GTAP 7 version used in the global modeling of this analysis dates back from 1994) and third it does not encompass household level disaggregated data within regions. As a result, by default, most global CGE models are built with one representative agent which hinders the analysis of distributional impacts of policy reforms.

Since domestic policy analysis requires high level of sectoral and household disaggregation, it is mostly done at the national level. But thanks to the growing availability of detailed household surveys and new analytical tools (either directly integrating the households in the global models such as the Global Income Distribution Dynamics GIDD, described in chapter 3 in Anderson, Cockburn and Martin -2010- or the MIRAGE Households developed by, Bouët, Estrades and Laborde -2011-, or by linking macro and micro models) a new empirical literature on the prospects of trade policy reforms on growth and on poverty reduction in developing countries has recently emerged (Hertel and Winter, 2006 , Cling *et al.* 2009, Anderson, Cockburn and Martin, 2010). But some challenges remain to compare the impacts of domestic and rest of the world policy reforms. The main ones limiting the scope of our research are presented below.

First because it is the outcomes of the agricultural policy in terms of productivity growth that are directly modeled without modeling the way through which such a productivity growth is obtained, this framework is not able to capture the financial costs of the agricultural policies. Thus no cost-benefit analysis can rigorously been undertaken with such a simple framework.

Both the global and the national CGE model used in this chapter are applied in the comparative static mode, and they assume constant returns to scale and perfectly competitive markets. This application of a standard set of assumptions derived from Anderson, Cockburn and Martin (2010) further increase the possibility to compare the results with other country case studies but sensibility analysis on their impacts on the results still are needed. Furthermore, as opposed to the productivity growth generated by the agricultural policy, no account is taken of any dynamic gains arising from the opening of trade. These assumptions are imposed because of insufficient empirical evidence, technical limits or lack of consensus on how to model investment behavior, trade induced productivity growth, firm heterogeneity, economies of scale, or other type of responses to changes in policy. Anderson, Cockburn and Martin (2010) argue that the absence of dynamics implies that the results of such analysis "*grossly underestimate the potential poverty-reducing consequences of liberalization and might, in some situations, indicate poverty increases when, in fact, they would be decreases had the growth consequences been incorporated*" (Part I Introduction and Summary, p13).

Although, we agree that many of the previously cited specifications tend to lower impacts of the reforms, on the contrary the factor market assumptions, which have been shown to be crucial determinants of the income distributional effects of trade policies (Gérard and Piketty, 2008) are too optimistically flexible to reflect Malawian reality of imperfect credit, output, land and labour markets and adjustment costs of economic policy reform. Furthermore, both the national and global models assume "*unrealistically*"(Dorward *et al.* 2004) that farmers are able to respond to any price incentives they receive by substantially increasing their supply, since they do not capture other constraints such as liquidity constraints on purchasing inputs when credit is not available, risk and uncertainty, which induce farmers to keep their scarce land and other resources spread across a "portfolio" of income activities rather than concentrate them in activities that may be more profitable.

Furthermore, the choice of a form for the world demand for Malawian exports is far from trivial. The most commonly used form for domestic policy reforms analysis is a small open country assumption which implies that demand for Malawian exports is infinite and increase in Malawian supply would not depress world prices. In fact, the small country assumption might not be well suited in the case of Malawian burley tobacco exports, since it is a major actor on international market, the burley tobacco market is very tight and according to experts, it might be affected by unfavorable trends in the future (World Bank 2009).

Thus, we consider that the overall effect of all those specifications is not straightforward, and that sensibility of our results to those specifications is needed.

4. Results and discussion

All the scenario considered in this chapter are presented in Table III.6. First macroeconomic impacts of the different scenario are compared, then the analysis focuses on the sectoral and production impacts. Eventually sensibility analysis are run.

TABLE III.6 – THE SCENARIOS MODELED

Scenario	Description
Domestic Sectoral Investment in Agriculture in Malawi	
1. FISP	Replication of national accounts growth statistics (as reported by NSO 2010) for Malawi
2. ASWAP	Broad-based agricultural growth path in Malawi
Regional integration	
3. Reg FTA	Constitution of four sub-continental FTAs in SSA: Complete elimination of applied tariff barriers between countries of the same FTA.
4. SSA FTA	Constitution of one sub-continental FTA in SSA: Complete elimination of applied tariff barriers between Sub-Saharan African countries.
Multilateral liberalization	
5. DDA	Successful conclusion of the Doha negotiations: Multilateral reduction of bound tariff barriers of all countries except LDC according to the December 2008 modalities.
6. DFQF	Complete elimination of all applied tariff barriers imposed by OECD countries, Brazil, China, and India on imports from all LDCs.
7. DDA+DFQF	Combined tariff reductions of the DDA and the DFQF scenarios.

4.1. Main macroeconomic results

All the scenario modeled bring some real GDP growth to Malawi according to **Erreur ! Référence non valide pour un signet.**

Comparing impacts of similar policies, it appears that a broad based productivity increase as in "ASWAp" bring twice as much real GDP growth as a productivity increase concentrated on maize and tobacco as in the "FISP". Under ASWAp trade deficit decreases more than with the FSIP especially thanks to a larger exports of processed agricultural products, food but also tobacco, and decreasing manufactures and industrial deficit. World price index decreases more as a result of a larger export increase and real exchange rate appreciates more, while terms of trade deteriorate also more. Overall consumer price index increases slightly contrary to FISP where it increases.

TABLE III.7 – MACROECONOMIC RESULTS

	Initial (Mn MKW)	Change from base						
		1FISP	2ASWAp	3RegFTA	4SSaFTA	5DDA	6DFQF	7EDDA
GDP	494,833	1.40	3.34	0.06	0.05	0.05	0.11	0.08
- Consumption	429,592	2.05	3.59	-0.15	-0.31	0.44	2.46	1.95
- Investment	103,458	-2.61	-2.33	0.96	1.01	0.64	2.89	2.41
- Trade balance	-80,385	-0.96	-4.29	0.03	-0.70	2.88	16.12	12.98
-- Raw food crops	17,451	16.87	15.93	-6.62	-5.78	-6.68	-24.61	-20.92
Maize	10,399	25.68	17.72	-10.84	-10.62	-6.93	-23.68	-20.06
-- Processed food	-5,384	-2.10	-7.85	4.97	3.42	12.67	57.86	48.65
-- Raw exports crops	25,715	1.41	8.54	4.51	3.56	3.03	8.48	7.93
-- Processed export crops	23,316	0.12	0.35	-0.61	-0.72	-0.32	-1.42	-1.18
Processed tobacco	15,988	-1.34	2.14	-11.05	-11.01	3.53	5.77	6.92
-- Other manufactured goods	-112,197	-0.73	-2.00	-1.25	-1.32	-0.71	-4.23	-3.19
-- Industrial goods	-27,097	-3.52	-7.53	-4.91	-4.79	-4.88	-22.90	-18.85
Consumer price index		0.35	-0.07	-0.09	-0.10	-0.04	-0.11	-0.09
Real EXR		1.77	3.38	-0.65	-0.20	-2.63	-11.24	-9.39
Terms-of-trade		-1.56	-3.54	0.18	-0.25	2.78	13.55	11.06
World price index		-0.57	-1.29	-0.16	-0.02	0.98	5.58	4.49

Source: Author's calculation from the model

Additionally, by comparing trade scenarios, we find that a continental wide regional integration "SSA FTA" does not bring more than a Southern African regional integration to Malawi "RegFTA" in terms of GDP growth, it rather creates trade diversion leading to terms of trade loss while slightly decreasing trade balance deficit thanks to trade creation. In both case world price and consumer price index decrease. Both regional integration policies are equivalent to a multilateral integration in the form of a "DDA" in terms of GDP growth, promoting raw traditioal exports crops, at the expense of food crops. They differ by the fact that regional

integration mostly decreases international price index, when DDA rather increases it leading to an appreciation of terms of trade. Comparatively a "DFQF", with a twice larger world price index increase and substantial increase in terms of trade, brings twice as much real GDP growth to Malawi. Interestingly a "DFQF" alone is more beneficial than an extended "DDA" ("EDDA") combining a "DDA" and a "DFQF", as additional preferences granted with the "DFQF" are eroded by the "DDA".

4.2. Sectoral growth results

The policy reform considered have distinct impacts on the growth of agricultural production as is apparent in Table III.8.

TABLE III.8 – INITIAL PRODUCTION (1000 MT) AND PERCENT CHANGE WITH SCENARIO

		Base	1FISP	2ASWAp	3RegFTA	4SSaFTA	5DDA	6DFQF	7EDDA
Maize	smallholder	3,226	12.3%	7.4%	-2.4%	-2.5%	-1.4%	-4.3%	-3.8%
	Estate	206	-30.4%	-6.4%	-3.9%	-3.7%	-3.1%	-8.5%	-7.8%
Rice		113	1.9%	2.7%	6.3%	-0.2%	-0.4%	-0.3%	-0.1%
Other cereals		101	1.5%	2.1%	8.4%	0.1%	0.2%	-0.9%	-3.5%
Cassava		3,285	1.8%	2.4%	7.6%	0.2%	0.1%	0.2%	1.1%
Other root crops		2,901	1.9%	2.5%	7.2%	0.1%	-0.1%	0.1%	0.7%
Pulses and oilseeds		696	1.8%						
Horticulture		1,354	2.8%	2.4%	6.0%	-0.1%	0.3%	-1.7%	-6.9%
Tobacco	smallholder	117	3.9%	4.8%	0.1%	-0.1%	0.3%	1.4%	1.1%
	estate	28							
Cotton		63	0.8%	3.7%	10.6%	8.1%	8.7%	10.0%	32.2%
Sugarcane		2,500	-1.0%	-1.6%	1.6%	6.0%	7.0%	6.3%	17.4%
Other export crops		52	-0.2%	1.0%	4.0%	0.9%	1.0%	-2.5%	-4.8%

Source: Author's calculation from the model

Comparing trade reform scenarios (2 to 10), we find that regional integration induces a larger spread increase in the production of the cash-crops (cotton and tobacco, and sugarcane), than multilateral integration, which is favourable only for tobacco. Indeed, at the global level Malawi is considered competitive only for tobacco (see Poulton *et al.* 2009, World Bank 2009).

As described in section 3 above and coherently with what was observe in National Accounts, in our simulation 1, the FISP delivers a growth foremost on smallholder maize and tobacco which is favorable to all other crops through reallocation of factors of production, except maize grown by estate which are excluded from the subsidies and sugarcane and other export crops with are mostly grown in plantations away from the land receiving the subsidized fertilizer.

In scenario 2 ASWAp, the broader agricultural growth brings a production increase more widely distributed across crops, much less focused on smallholder maize, and includes export crops.

4.3. Poverty results

According to the results presented in the following table, poverty reduction is higher with agricultural policies than with most trade policies, except surprisingly for "DFQF" (and thus "EDDA") which reduces poverty more than the agricultural policies. The elasticity of poverty reduction to GDP growth is thus much higher for trade policies than agricultural policies. But distributive impacts among households differ.

TABLE III.9 – INITIAL POOR HEADCOUNT AND CHANGE IN INCIDENCE WITH SCENARIOS

	Pop (1000)	Poors (1000)	1FISP	2ASWAp	3 Reg FTA	4 SSA FTA	5DDA	6DFQF	7EDDA
National	12,865	5,193	-5.3	-9.4	-1.7	-1.7	-2.4	-13.2	-11.2
Rural	11,406	4,945	-5.1	-9.2	-1.7	-1.7	-2.3	-12.9	-11.0
Non-farm	558	176	-11.0	-13.4	-3.2	-2.7	-3.9	-16.0	-13.4
Farm	10,848	4,769	-4.9	-9.0	-1.6	-1.6	-2.3	-12.8	-10.9
North	1,235	568	-4.5	-10.0	-2.4	-2.4	-2.7	-12.9	-10.9
Center	4,715	1,589	-5.5	-11.4	-1.9	-1.9	-2.9	-16.9	-14.6
South	4,898	2,612	-4.6	-7.3	-1.3	-1.3	-1.8	-10.3	-8.7
Large-sc.	713	199	-0.2	-5.6	-1.1	-1.1	-3.4	-24.5	-22.8
Med-sc.	7,576	3,338	-5.0	-9.6	-1.9	-1.9	-2.4	-12.6	-10.7
Small-sc.	2,568	1,242	-5.2	-7.8	-1.1	-1.0	-1.6	-11.5	-9.5
Urban	1,459	248	-9.2	-14.4	-1.8	-1.6	-3.3	-19.2	-15.0
Farm	786	113	-13.3	-17.2	-3.4	-2.8	-6.7	-23.5	-20.2
Non-farm	673	135	-5.7	-12.0	-0.5	-0.5	-0.5	-15.6	-10.6
Quintile 1	2,569	2,569	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quintile 2	2,572	2,572	-8.7	-17.0	-1.4	-1.4	-2.7	-24.6	-20.6
Quintile 3	2,574	53	-96.4	-100.0	-100.0	-98.3	-100.0	-100.0	-100.0
Quintile 4	2,576	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quintile 5	2,575	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Author's calculation from the model

In the multilateral trade scenarios poverty reduction tends to be larger for larger scale households which is logical since the larger the households, the more they are linked to markets and grow the export crops demanded. Due to the concentration of exports crops in certain parts of the country, poverty reduction is also concentrated in the central region where poverty

incidence was already smaller than in the rest of the country. Of all the trade scenarios, DFQF is particularly effective in reducing poverty for all types of households considered, because it drives a very large increase in demand for tobacco increasing tobacco production and tobacco is grown by all farm households. Nevertheless poverty reduction for large scale households is more than twice that of other types of households. Regional integration drives a more evenly distributed poverty reduction, with the poverty incidence of medium and small-scale farmers groups decreasing more than large-scale farmers group. Poverty reduction is also more evenly distributed towards the Southern region.

On the contrary, thanks to the targeting of maize subsidies on poor households, the effects of the FISP are more important on smaller scale farm households and have almost no effect on large scale ones. The focus of the AsWAP on staple crops also enables a decrease in poverty more important for medium and small scale farmers than on large ones. Both agricultural policies bring a more evenly spread poverty reduction across the country. Furthermore since both agricultural policies increase the production of staples also consumed by poor nonfarm households, the poverty decrease for nonfarm households is much larger than in the trade scenario (except the ones with DFQF).

TABLE III.10 CHANGE IN POVERTY GAP

	Initial base	Change in poverty gap 1FISP	2ASWAp	3RegFTA	4SSaFTA	5DDA	6DFQF	7EDDA
National	11.99	-7.40	-12.66	-2.71	-2.63	-3.65	-17.78	-14.61
Rural	12.98	-0.93	-1.62	-0.35	-0.34	-0.47	-2.27	-1.87
Non-farm	9.40	-1.67	-1.71	-0.17	-0.06	-0.38	-1.79	-1.47
Farm	13.16	-0.89	-1.62	-0.36	-0.36	-0.47	-2.30	-1.89
North	13.78	-0.74	-1.81	-0.40	-0.39	-0.53	-2.54	-2.10
Center	8.84	-0.55	-1.20	-0.26	-0.27	-0.37	-1.75	-1.45
South	17.17	-1.26	-1.97	-0.44	-0.42	-0.55	-2.77	-2.26
Farm (large-scale)	7.74	-0.01	-0.83	-0.31	-0.33	-0.48	-1.91	-1.64
Farm (medium-scale)	12.82	-0.83	-1.59	-0.34	-0.35	-0.46	-2.24	-1.84
Farm (small-scale)	15.77	-1.31	-1.91	-0.41	-0.37	-0.51	-2.59	-2.10
Urban	4.30	-0.56	-0.72	-0.16	-0.12	-0.23	-1.02	-0.85
Farm	3.26	-0.51	-0.62	-0.15	-0.11	-0.22	-0.96	-0.80
Non-farm	5.52	-0.62	-0.83	-0.16	-0.13	-0.23	-1.10	-0.90
Q1	45.12	-1.97	-3.32	-0.64	-0.62	-0.86	-4.62	-3.72
Q2	14.92	-2.46	-4.27	-0.98	-0.95	-1.32	-6.04	-5.04
Q3	0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01

Source: Author's calculation from the model

4.4. Sensibility analysis [53]

All other things being equal, changing the form of the export demand as described above is found to decrease by 30% the overall poverty effects of the agricultural policies modeled in section 3 than compared with a small country assumption for export demand. This assumption is required to be able to take into account the impacts on the volume of Malawian exports demanded by other countries additionally to the change in world prices from rest of the world trade reforms. Eventually, while the changes in world prices represent the evolution of the market opportunities, it is the changes in the volume exported that really captures how Malawi is able to take advantage of those opportunities. Unfortunately, they are highly dependent on the economic data underlying the representation of Malawi in the global model, based on the GTAP 7 database in which Malawian data date as far back as 1994. Nevertheless, retaining the small country assumption for Malawi and only shocking price and tariffs appears problematic in the case of the regional integration scenarios. Indeed since they bring decreasing export prices and losses of tariff revenue, they have mostly a negative impact on real GDP, and poverty. In the case of "DDA", the price increase leads to a smaller but still positive real GDP growth and a much smaller poverty decrease, and for the "DFQF", the GDP growth is similar but the poverty reduction is only half that of the base simulation.

We also test the impact of changing the mobility of the factors. Since initially mobility is already pretty high, making all factors fully mobile does not have a big impact. The biggest changes in results are driven by the unemployment assumption, which when released leads to a lower real GDP growth in all cases, but especially lower for the "DFQF" where it is reduced to a level similar to the GDP growth of the regional integration scenarios. The impact on changes in poverty is more mixed.

Compared to results when factors are fully mobile, introducing rigidities in the factor market has divergent impacts on the real GDP change of the trade and agricultural policies: for agricultural policies, real GDP growth with fixed factors is higher than with mobile factors. On

[53] Additionnal sensitivity analyses were run on the macroeconomic closures. Alternative closures mainly change the strength of GDP impact, sometimes even the sign, but have very little impact on sectoral growth and the distribution of poverty. Hence the choice was made to rather present the sensitivity analysis of the other elements of the model. Results are available upon request.

the contrary, in the case of the trade scenarios, introducing fixities reduces the real GDP growth. Additionally, poverty reduction is found to be always lower when factors are fully mobile, except in the case of the FISP where it is the opposite. In the case of the FSIP, mobility of factors brings additional maize growth with leads to higher decrease in maize prices and thus higher poverty reduction effects on the urban and non-farm households.

A common feature is that introducing rigidities increases the differences in impacts across quintile groups and land holding sizes, leading to higher gains for poorer households, and small-scale farmers than richer households and larger scale farmers. On the contrary, when factors are allowed to move freely as a consequence of changes in the returns, poverty reduction is more homogenous across types of households.

Elasticities of substitution are known to be very important parameters that drive the results of the models. Unfortunately due to lack of data, there are among the least robust data of the model. We test increasing and decreasing by a factor of four the elasticities of substitution between inputs in the production functions, and increasing fourthfold the elasticities of substitution between domestic goods and imports (Armington).

For all types of policies, decreasing the elasticity of substitution among inputs, decreases the relative real GDP increase, since it is harder for producers to adjust to the shocks, and vice versa. But impacts on poverty diverge: in the case of agricultural policies, higher elasticities of substitution bring both higher GDP gains and poverty reduction. In the case of trade policies, higher elasticities of substitution among inputs will rather decrease poverty reduction, despite leading to a higher increase in GDP than lower elasticities. Conversely a lower elasticity of substitution will lead to a lower GDP increase and higher poverty reduction for all types of households except small-scale farmers. This negative effect on small-scale producers is larger for multilateral liberalization than regional integration. Interestingly, changing the elasticities of substitution for inputs reduces in all case the high gains from DFQF which are similar to those of regional integration.

Increasing the Armington elasticities, brings slightly higher GDP increase for agricultural policies and higher poverty reduction, lower GDP increase for trade integration, except for "DFQF" where the half lower increase in the trade deficit leads to a almost double GDP increase.

Poverty reduction is lower for all trade scenarios. In all cases nevertheless, poverty reduction becomes much higher for large scale farmers compared to small scale farmers.

TABLE III.11 – SOME RESULTS OF THE MAIN SENSITIVITY ANALYSIS

			Change from base						
				Model with infinite demand for exports	Factor mobility		Elasticities of substitution of inputs		Armington elasticities
	Initial	Scenario	Main simulation		Fully mobile	Fixed	divided by 4	multiplied by 4	multiplied by 4
Real GDP	494,833	1FISP	1.40	1.42	1.31	1.36	1.35	1.64	1.51
		2ASWAp	3.34	3.41	3.25	3.25	3.28	3.59	3.40
		3RegFTA	0.06	0.00	0.06	0.04	0.05	0.08	0.05
		4SSaFTA	0.05	0.00	0.05	0.03	0.04	0.07	0.04
		5DDA	0.05	0.03	0.04	0.03	0.04	0.07	0.05
		6DFQF	0.11	0.11	0.06	0.03	0.06	0.07	0.20
National poverty headcount (percent)	40	1FISP	-5.28	-7.72	-5.62	-5.13	-5.72	-7.59	-8.35
		2ASWAp	-9.41	-13.04	-9.81	-9.99	-8.20	-11.69	-12.93
		3RegFTA	-1.70	-0.09	-1.69	-2.24	-2.66	-1.65	-0.27
		4SSaFTA	-1.67	0.02	-1.55	-2.13	-2.66	-1.50	-0.20
		5DDA	-2.36	-0.57	-2.30	-2.83	-3.16	-1.50	-0.86
		6DFQF	-13.21	-6.88	-12.99	-15.02	-14.95	-2.54	-8.74
National poverty gap (percent)	12	1FISP	11.1	10.7	11.0	11.0	11.0	10.7	10.7
		2ASWAp	10.5	9.8	10.4	10.3	10.6	10.0	9.9
		3RegFTA	11.7	12.0	11.7	11.6	11.5	11.7	11.9
		4SSaFTA	11.7	12.0	11.7	11.6	11.5	11.7	11.9
		5DDA	11.6	11.8	11.6	11.5	11.5	11.7	11.8
		6DFQF	9.9	10.9	9.9	9.5	9.6	11.5	10.7
Small-scale poverty headcount / large-scale poverty headcount	1.74	1FISP	1.65	1.70	1.64	1.51	1.50	1.64	1.89
		2ASWAp	1.69	1.89	1.70	1.62	1.70	1.77	1.93
		3RegFTA	1.74	1.73	1.73	1.72	1.77	1.73	1.75
		4SSaFTA	1.74	1.74	1.74	1.72	1.77	1.74	1.75
		5DDA	1.77	1.75	1.77	1.75	1.95	1.74	1.75
		6DFQF	2.03	1.95	2.03	1.95	2.28	1.72	2.15

Source: Author's calculation from the model

In the end there are indeed parameters and specifications that have diverging effects on agricultural policies and trade policies and thus impact our conclusions.

We see for example that the standard model is not adequate to simulate impact of regional integration since by only considering the decrease in price and not the increase in demand, it drastically underestimate the potential of GDP growth and poverty reduction.

Furthermore, if labor is fully employed then the specificity of "DFQF" in bringing a much higher real GDP increase than the rest of the trade policies is dampened, but "DFQF" still brings much more important poverty reduction effects than other trade reforms.

Changing the elasticities of substitutions between inputs and the elasticities of substitution between domestic and imported goods (Armington elasticities) has an important impact on the relative size of poverty reduction brought by agricultural and trade policies and the distribution of poverty reduction among household groups. Lower elasticities of substitutions between inputs tend to accentuate the difference between the types of policies, agricultural policies reducing primarily poverty reduction of the smaller scale farmers, regional trade reducing slightly more poverty reduction of the smaller but bringing the smallest poverty reduction effects and multilateral integration reducing more poverty of the larger-scale famers with "DFQF" bringing the highest poverty reduction effects. If elasticity of substitution among inputs is higher, then the overall poverty reduction effects of trade policies decrease, especially for "DFQF" which brings much lower poverty reduction effects than the agricultural policies modeled. Similarly ifArmington elasticities are higher, then the overall effects of agricultural policies is increased both in terms of GDP growth and poverty reduction as compared to the effects of trade policies, even "DFQF"brings less poverty reduction. When those elasticities of substitution are higher the poverty effect of growth of trade policy decreases and the one of agricultural policy increases.

In light of those elements, we consider that such modeling framework has several limitations that we have to keep in mind when comparing the overall growth and poverty reduction effects of trade and agricultural policies. Nevertheless, it is useful to represent the distributional structure of those policies within the economy because even though changes in the specifications and parameters value have an impact on the strength of distributional effects, the general implications we have drawn from our analysis are robust according to our sensibility analysis.

In terms of policy implications, this sensitivity analysis reveals first that the much higher GDP gains from "DFQF" than from other trade integration policies is critically linked to the assumption that there is excess unskilled labor in Malawi, and that "DFQF" will decrease unemployment by making them start working for the "tobacco activity". In reality like in all agricultural countries, the excess labor in Malawi is highly seasonal, and thus the extent of the

engagement of this extra labor considered unemployed in a new activity will depend on whether this new activity is itself highly seasonal, and if so whether it fits with their current agricultural calendar. Tobacco is a very labor intensive crop, especially at the picking and processing stage, which requires the most attention, but in most of Malawi happens at the same time when other crops, mostly staple crops, need weeding, fertilizing, and bunding. Therefore, competition for labor is a real issue in tobacco producing regions, and thus we might consider that the gains from "DFQF" linked with the employment of extra labor in the tobacco activity is unlikely to occur in Malawi.

Secondly, if we consider that "real life" factors market in Malawi are less flexible than modeled and that producers have a harder time accessing the knowledge, the finance, the technologies, the inputs to substitute between inputs as a result of policy shocks, then it is likely that the differences in the distributional impacts between agricultural policies, reaching all households which increase their productivity and trade integration policies, reaching the larger ones that are connected to the markets more, is even higher.

Third, interventions aimed at facilitating producer substitute more easily between inputs, such as access to training, credit, technologies, and markets for the inputs themselves, will increase the economic activity spurred by increasing productivity of some crops through agricultural policies and trade integration policies, but they will lower the poverty reducing impact of trade policies while increasing the poverty reducing impact of agricultural policies. This can be explained by the fact that the productivity increase from the agricultural policies is modeled as reaching all producers, and a higher elasticity of substitution between inputs will enable all of them to be even more efficient, whereas trade policies transmit to producer that are the most linked to the markets (the larger scaled ones) and if enabled to switch inputs they might be able to capture even higher parts of the markets using the cheapest inputs, putting pressure on the ones less linked to the market that might be hurt by the change in input prices.

5. Concluding remarks

In the current economic context, the view that trade policy reforms could be more cost-effective pro-poor policies than costly subsidization policies promoting local agricultural production is gaining momentum. The reduction of the existing global distortions to agricultural

incentives is sometimes stated as a priority to fight poverty worldwide. In particular, Malawi, a small participant in international market, benefits from a rather large import markets for its main export crop, tobacco, in which it is very protected. But despite the consensus that growth can lead to very distinct poverty outcomes, with different parts of the population being able to grasp the opportunities that are presented to them, and the development of a dynamic macro-micro literature, the impacts of global trade policy and domestic development policy reforms are rarely, if ever, compared.

In this chapter we have used the MIRAGE global computable general equilibrium –CGE-model feeding a national standard CGE model representing Malawi in 2007 thanks to a new Social Accounting Matrix, linked to data from the 2004 household survey to examine how different policy reforms by Malawi and the rest of the world would impact the distribution of poverty reduction in Malawi.

The country's recent agricultural growth history due to the productivity impact of the Fertilizer Input Subsidy Program is replicated and compared with the effects of a broader productivity growth including the upstream and downstream sectors of the agricultural value chains and those of integrating in the regional and multilateral markets.

A broader based agricultural productivity growth scenario is found to have more favorable impacts on both real GDP growth and poverty reduction than the current policy concentrated on a few crops. The overall growth and poverty effects of agricultural policies are found to be generally higher than those of trade integration policies. But interestingly trade policies are found to have much larger growth elasticities of poverty reduction, particularly the preferential 100% duty free quota free market access.

Distribution of the poverty reduction effects of policy reforms is found to be very different between the agricultural and trade policies.

Among trade policies, the preferential 100% Duty Free Quota Free market access and the multilateral integration in the form of a successful Doha Development Agenda are found to be more favourable for poverty reduction than regional integration within Sub-Saharan Africa, but regional integration offers a relatively more balanced poverty reduction of the poorest and smaller scale farmers. Indeed Malawi is comparatively more likely to take advantage of the new market access to expand a larger range of goods at the regional level than at the global one.

Multilateral integration rather induces Malawi to further specialize in the production and exports on tobacco since it is one of the only good for which it is competitive at the global level. The "Duty Free Quota Free" scenario is found to systematically have the larger GDP growth and poverty reduction effect, but the relative strength of the impacts of the other trade reforms on overall GDP growth and national poverty incidence are found to be significantly dependent on the assumptions of the model.

If faster intensification and diversification of agriculture, induces a similar productivity increase by all households, then the poorest and smaller-scale households that are less connected to international markets, and thus benefit relatively less from new trade opportunities, will benefit relatively more from agricultural policies, whatever the assumptions of the model.

It is expected that the differences in the distributive impacts found between trade and agricultural policies would widen if we consider that factors are less mobile and producers adjust less in real life than in the main simulation. Furthermore accompanying policies aiming at enabling factors to move more freely or producers to adjust more easily will tend to change the strength of the policies on poverty reduction, increasing the effect of agricultural policies and dampening the effects of trade policies.

Therefore, in the case of Malawi where the main export crop, tobacco, for which the country is competitive at the global level is grown by all types of farmers, some trade policy reforms are found to be efficient at generating large poverty reduction effects from growth. But since their overall growth effects depends on the capacity of Malawi to take advantage of the new market access brought by trade integration, it is found lower than policies directly aimed at increasing productivity, and their distributive impacts are bound to favor the households more linked to the markets, which are the larger-scaled ones. Hence, not all policy reform is equally good to reduce the poverty of the poorest medium and smaller scale farmers which make up most of the poor in Malawi.

But if we consider both types of policies as complementary to spur GDP growth while reducing poverty of the poorest, the question changes to which trade integration policy is the most coherent with the broad-based agricultural policy? From our analysis, it seems that despite bringing higher GDP and poverty reduction impacts at the national level, multilateral integration, even preferential, also brings the risk for Malawi to specialize further on tobacco. On the

contrary, regional integration policies open opportunities to export a larger range of agricultural products, especially processed ones, and seem more coherent with the broad based agricultural vision of the country.

APPENDIX A

TABLE III.A.1 – 2007 MACRO SAM FOR MALAWI (MWK BILLIONS)

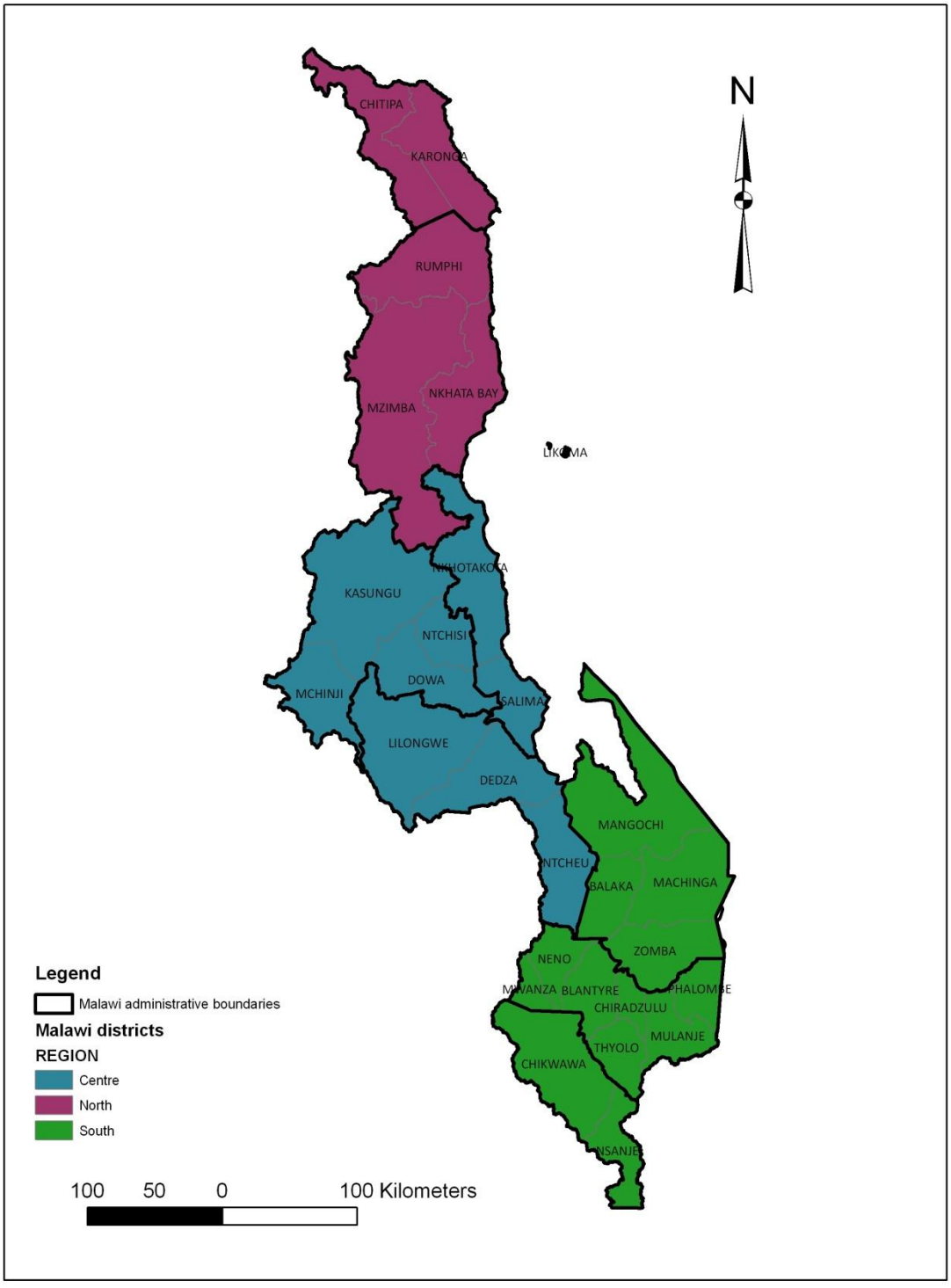
	Activities	Commod-ities	Factors	Enterprises	Households	Government	Investment	Rest of the World	Total
Activities		718,026			181,222				899,247
Commodities	450,498	124,874			248,370	42,167	103,458	107,741	1,077,109
Factors	448,749							564	449,313
Enterprises			145,665			1,871			147,536
Households			300,053	126,416		21,185		9,485	457,139
Government		46,084		20,601	25,385	81,093		70,767	243,929
Savings				519	585	75,361	2,443	26,993	105,901
Rest of the World		188,126	3,595		1,577	22,252			215,549
Total	899,247	1,077,109	449,313	147,536	457,139	243,929	105,901	215,549	

Source: 2007 Malawi social accounting matrix.

TABLE III.A.2 – SECTORS IN THE 2007 MALAWI SAM

No	Code	Description	No	Code	Description
Agriculture					
1	mloc	Maize (smallholder local)	13	hort	Horticulture
2	mcom	Maize (smallholder composite)	14	tobs	Tobacco (smallholder)
3	mhyb	Maize (smallholder hybrid)	15	tobe	Tobacco (estate)
4	mest	Maize (estate)	16	cott	Cotton
5	rice	Rice	17	sugr	Sugarcane
6	ocer	Other cereals	18	oexp	Other export crops
7	cass	Cassava (smallholder)	19	seed	Seed production and distribution
8	case	Cassava (estate)	20	live	Livestock
9	pots	Other roots (smallholder)	21	poul	Poultry
10	pote	Other roots (estate)	22	fore	Forestry
11	puls	Pulses and oilseeds (smallholder)	23	fish	Fisheries
12	pule	Pulses and oilseeds (estate)			
Industry					
24	mine	Mining	35	fert	Fertilizer
25	meat	Meat processing	36	chem	Chemicals
26	gmll	Grain milling	37	nmet	Non-metals
27	sref	Sugar refining	38	metl	Metals
28	ptea	Tea processing	39	mach	Machinery and vehicles
29	food	Other food processing	40	oman	Other manufacturing
30	beve	Beverages	41	cons	Construction
31	ptob	Tobacco curing and processing	42	elec	Electricity
32	text	Textiles and clothing	43	watr	Water
33	wood	Wood and paper			
34	petr	Petroleum			
Services					
44	trad	Retail and wholesale trade	50	real	Real estate
45	hotl	Hotels and catering	51	gsrv	Government administration
46	tran	Transport and storage	52	educ	Education
47	comm	Communication and post	53	heal	Health
48	fsrv	Financial services	54	osrv	Other private services
49	bsrv	Business services			

FIGURE III.A.1 – AGRICULTURAL DEVELOPMENT DISTRICTS AND REGIONS IN MALAWI



Source

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General conclusion

This doctoral research has taken some initial steps towards a comparative analysis of the impacts of trade and agricultural policies in Sub-Saharan Africa from a policy coherence point of view. The general introduction establish the framework for the research by reviewing historically the policies implemented in Sub-Saharan Africa linking them to the history of economic thought. The debates on the role of agriculture for development and on the use of public intervention and trade policies to promote development strategies are explored, with no pretention to settle them. Rather, the aim is to highlight the need for prioritizing potential policy reforms based on their impacts on agriculture and economic growth. Our focus is on comparative ex-ante analysis of the trade options for Sub-Saharan African countries with a framework enabling to follow the multi-sectoral growth linkages, and we choose computable general equilibrium model as our main tool.

Chapter I illustrates some stylized facts on Sub-Saharan African agricultural trade trough key indicators and highlighted the main challenges and opportunities stemming from the changes in the global agricultural markets and the trade agreements currently negotiated, laying the ground for the empirical questions studied in the following chapters.

Chapter II showed that the global CGE framework provides a useful way to compare different trade policy reforms at the regional -within SSA-, bilateral and multilateral level, in terms of their impacts on GDP and welfare but also in terms of sectoral growth distribution. It also highlights how the availability of data is currently the most limiting constraint, especially to study African countries.

In Chapter III the framework is adapted to more closely examine the question of the distributional impacts of trade policies based on the hypothesis that the pattern of trade integration chosen will affect the reduction of poverty through the structure of growth. The methodology chosen is to transmit the shocks of the global trade reforms to a single country CGE linked with household data. The case study chosen is Malawi, a landlocked resource-poor populous country with favorable agricultural potential, where the main export crop, tobacco, is grown by all types of farmers. Based on the analysis of the trade opportunities for Malawi, it examines how different trade policy reforms by Malawi and the rest of the world

would impact poverty in Malawi, and compares the growth and poverty effects with those of increasing productivity in agriculture.

The purpose of this final general conclusion is twofold. First, it presents and discusses the general policy implications from the results, with the aim of contributing to a broader discussion on the prioritization of regional and multilateral negotiations for Sub-Saharan African countries, and on the respective effects of trade and investment policies in agriculture. Secondly, it examines some possible directions that could usefully be explored by future research.

1. What are the main policy implications?

From the analysis of key indicators in chapter I, it appears that the Sub-Saharan African region is more trade dependent than the rest of the world, especially of agricultural trade in the case of countries that are not resource-rich. Hence the new context of higher and more volatile agricultural prices is a matter of concern particularly for the poorest Sub-Saharan African countries that are the most vulnerable.

Prospects for tariff and non tariff barriers reduction still arise both from regional and multilateral trade liberalization. Prospects for economic growth from regional integration have recently attracted a renewed attention, despite the little support from the economic literature. Indeed there is a new economic rationale to regional economic integration in Africa to respond to the increasing regional demand and shelter from the global economic crisis.

The economic modeling of chapter II and III bring new comparable results to fuel the debate on setting priorities for policy reforms coherently with broader development strategies. It should be kept in mind that the limitations of the modeling framework, in terms of theoretical assumptions, data used, and scenario modeled have been carefully considered before driving policy implications from the results. None of the following assessment are intended to be considered as sole drivers of policy reforms, as additional analysis with the same tools and improved, data, scenario and etc., but even better with other complementary tools would be needed.

That being said, the most important result of the dissertation comes from the finding in Chapter II that for Sub-Saharan African countries as a whole an ambitious regional trade integration could deliver as much as multilateral integration in terms of gross domestic product (GDP), welfare growth (defined as equivalent variation of the utility of the

representative agent), and agricultural exports volumes. Given the simplifying theoretical assumptions and missing and uncertain data for Africa, the main interest of this result is to comfort the intuition from the analysis of chapter I that economic gains from regional integration are far from being negligible and could under some assumption be equivalent to that of multilateral integration.

Furthermore, the comparative analysis of different policies in the CGE framework makes possible to identify differences in the distributional aspects of growth.

For instance, through the simulation of the Doha Development Agenda, of an ambitious Duty-Free Quota-Free (DFQF) and a combination of the Doha Development Agenda and the Duty-Free Quota-Free, chapter II further finds that the DFQF proposal would be very beneficial for Sub-Saharan Africa. But even in a scenario combining the Doha Development Agenda and the Duty free Quota Free, developed countries are expected to reap most of the gains from trade liberalization. Even when looking at the distribution of gains and losses across Sub-Saharan African countries, attention is drawn to the fact that gains are highly concentrated on a few countries, often the most competitive ones such as South Africa and Nigeria. Considering the uncertainty regarding the quality of those data, it should not be relied directly on those results to determine which countries and sectors would gain or lose from the trade agreements. The more important implications is that country to country impacts will differ, thus requiring particular attention and additional analysis.

Chapters II and III further illustrate that the patterns of agricultural export growth differ between trade integration schemes. The outcome of trade integration depends on the initial trade patterns and are driven by the relative competitiveness of other exporters granted the same market access.

In chapter II, the multilateral integration scenarios are found to encourage further specialization of the Sub-Saharan African region in the export of unprocessed agricultural exports. This trend is not coherent with the view that countries in SSA should not only diversify their export products and destinations, but also capture more value-added on their exports. On the contrary, deeper regional integration is found to foster the processing of agricultural exports.

Similarly in chapter III, Malawi is found comparatively more likely to increase exports of a larger range of goods thanks to new market access at the regional level than at the global one. Multilateral integration rather induces Malawi to further specialize in the production and

exports of tobacco since it is one of the only good for which the country is competitive at the global level. Coherently it is found that regional integration offers a relatively more balanced poverty reduction of the poorest and smaller scale farmers that produce a larger share of the staple crops traded regionally. But overall growth and poverty reduction effects are found larger with multilateral integration. Nevertheless, the strength of the growth impacts are found to be significantly dependent on the assumptions of the model, so should be taken with caution.

The implication of those results is that in order for a multilateral integration, even preferential such as the generous Duty Free Quota Free to be coherent with the stake of agricultural-led industrialization, countries in SSA need to first increase their competitiveness. Regional integration could be a way to do so, since it would enable most countries to combine increased exports volume and increase transformation of agricultural exports and enable learning by doing. Another option would be for the granting countries to help Sub-Saharan African countries to reduce their trade costs, comply with the sanitary and phytosanitary and technical standards, increase their competitiveness and upgrade in the value chains. But since agricultural products are often sensitive products for the importing countries, the 100 percent Duty Free Quota Free is not likely to be politically feasible, and the agricultural processed products are the most likely to be excluded from it.

In Malawi, as the main export crop, tobacco is grown by all types of households including the poorer ones, poverty is reduced in all the trade integration scenarios. But growth generated by the trade policies favors the households more linked to the markets and dedicating larger land to the exported crop, which are the larger-scaled ones. This is all the more apparent when comparing the distributional impacts of the trade integration possibilities with the current agricultural policy and the new one envisioned by the Government of Malawi. Trade policy reforms are found to be efficient at generating large poverty reduction effects from growth. But since their overall growth effects depends on the capacity of Malawi to take advantage of the new market access brought by trade integration, and the only crop for which the country is competitive at the global level is tobacco, overall growth effects are found much lower than with agricultural policies directly aimed at increasing agricultural productivity.

Both agricultural policies are found to have higher growth and poverty effects than the trade scenarios, but interestingly trade reforms are found to have much larger growth elasticities of poverty reduction, particularly the preferential 100% Duty Free Quota Free

market access. Moreover the future broader based agricultural policy is found to have more favorable impacts on both real GDP growth and poverty reduction than the current agricultural policy concentrated on maize and tobacco. In terms of distribution of the poverty reduction effects, agricultural policies are assumed to induce faster intensification and diversification of agriculture through a similar productivity increase in all the households targeted so poverty reduction effects are directly linked with the crops targeted rather than by the size of the household. On the contrary in the trade integration scenarios, the poorest and smaller-scale households that are less connected to international markets benefit relatively less from new trade opportunities. This is robust across all the specifications of the modeled tested. It is expected that the differences in the distributive impacts found between trade and agricultural policies would widen if we consider that factors are less mobile and producers adjust less in real life than in the main simulation. Furthermore it is found through different model assumptions that accompanying policies aiming at enabling factors to move more freely or producers to adjust more easily would tend to increase the poverty reduction effect of agricultural policies and dampen the poverty reduction effect of trade policies.

Even though those specific results are surrounded by the uncertainty linked to the data and the assumptions of the model, the general implication is that not all policy reform is equally good to reduce the poverty of the poorest medium and smaller scale farmers which make up most of the poors and vulnerable in Sub-Saharan Africa.

2. Directions for future research

Much could be learned from alternative economic tools from experimental economics, to gravity modeling, and partial equilibrium. We will here rather illustrate our main leads to pursue this research with general equilibrium models.

There are many ways in which the simulations undertaken could be improved since new data, and more advanced versions of the models are constantly being developed by teams of researchers. For instance, a new module enabling systematic sensitivity analysis[54] would be of the utmost use considering the number of parameters which are uncertain. More robustness checks could give more insights on the limitations of the policy implications and on which parameter estimation is the most urgent to improve.

54 LABORDE D. and H. VALIN. 2011.Assessing the EU biofuel land use change effects: estimates with the MIRAGEBioF: model and sensitivity analysis. Paper presented at the 14th GTAP conference, Venice, Italy.

The tariff and economic data sets could be updated with the GTAP 8[55] and MAcMaps 2007[56] databases, and the Integrated Household Survey 3 for Malawi, all of which have been released in the last few months. Actually, updating the Malawi 2007 SAM with the new Integrated Household Survey that was pre-released in last May 2012 is already underway. Although having up-to-date data is always better, it is by integrating the new data on trade costs and distorsions that the robustness of our results with regards to trade integration could really be improved.

Using MIRAGE Households, the new version of the MIRAGE developed by IFPRI that integrates directly for some countries national households surveys[57], or the Global Income Distribution Dynamics GIDD[58], would give more insight on the distributional issues. Obviously this is providing more household datasets are available for our countries of interest. But using those frameworks to undertake comparative analysis of the distributional impacts of different policies on sectors and households is challenging, both in terms of tools to manage the huge number of results and computational power to run the simulations.

Other development concerns could be integrated such as food security, environmental sustainability and gender inequality. This could be done through the World Bank MAMS (Maquette for MDG Simulations) model looking at the Millenium[59] Development Goals.

In terms of scenarios, alternative, more realistic regional trade integration scenarios could also be developed, for instance more closely following the liberalization steps negotiated.

Concerning chapter III, the current agricultural policy could be simulated, through direct fertilizer subsidies for the farmers rather than endogenously imposing productivity growth. This would have the advantage of enabling to undertake cost-benefit analysis of the policy. It is more challenging for the alternative policy as it is mostly defined as productivity and sectoral production goals rather than by its means. But looking into those aspects is part of a new project already underway.

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55 AGUIAR A., R. MCDOUGALL and B. NARAYANAN G. (Eds).2012. Global Trade, Assistance, and Production: The GTAP 8 Data Base, Center for Global Trade Analysis, Purdue University.

56 GUIMBARD H., S. JEAN, M. MIMOUNI, and MINOT. 2012. MAcMap-HS6 2007, an exhaustive and consistent measure of applied protection in 2007. GTAP 8 Data Base Documentation - Chapter 10D. Purdue: Global Trade Analysis Project.

57 BOUET A., C. ESTRADES and D. LABORDE. 2011. "Households heterogeneity in a global CGE Model: an illustration with the MIRAGE poverty module", Paper presented at 14th Annual Conference on Global Economic Analysis, Venice, Italy. 2011.

58 BUSSOLO, M., R. DE HOYOS, and D. MEDVEDEV (2010). "Economic Growth and Income Distribution: Linking Macro Economic Models with Household Survey Data at the Global Level," *International Journal of Microsimulation*, 3 (1), 92-102.

59 LOFGREN H. 2009 Development strategy analysis with MAMS, World Bank

Eventually, considering the new context of agricultural markets, price volatility and climate variability are two aspects that have started to be taken into account in CGE modeling.[60]

More generally, improving the supply-side of CGE models are of the utmost importance when studying agricultural production in developing countries. More detailed household typologies, improved behavioral predictions regarding technologies and land use changes, imperfect credit and input markets would make clearer why improving price incentives is not always enough to spur production growth. This research agenda obviously goes way beyond research in CGE modeling and

Adequate analysis would help identify the bottlenecks and determine which policy intervention is required as a priority to improve the ability of producers to respond to the market incentives.

[60] VERMA, T. W. HERTEL and E. VALENZUELA. 2011. "Are The Poverty Effects of Trade Policies Invisible?," *World Bank Economic Review*, Oxford University Press, vol. 25(2), pages 190-211, May. And

PAUW K.,THURLOW J., B. M. and D.E. VAN SEVENTER. 2011. "The economic costs of extreme weather events: a hydrometeorological CGE analysis for Malawi," *Environment and Development Economics*, 16(02):177-198.