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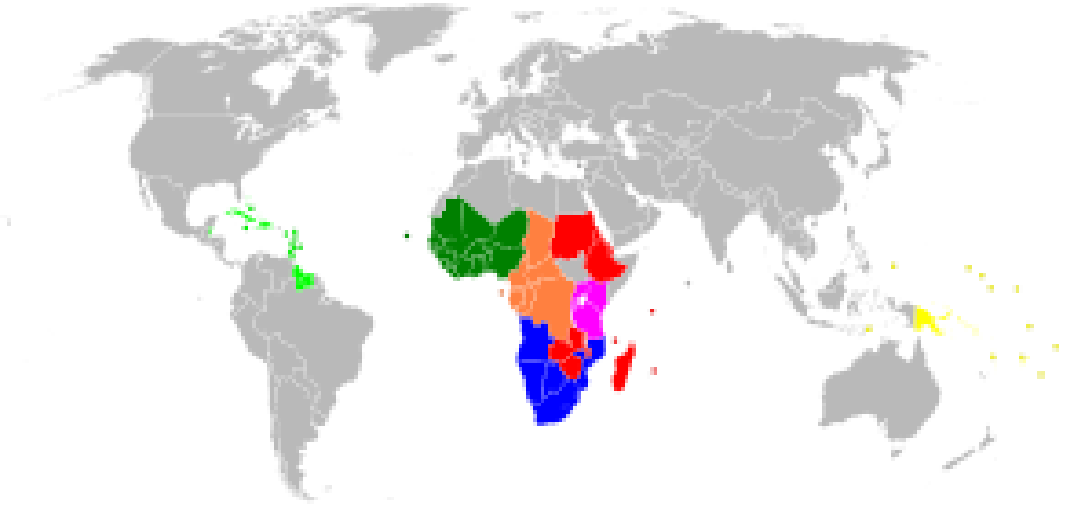
Department of Economics

The Implication of Economic Partnership Agreement for Africa, Caribbean and Pacific groups:

A General Equilibrium Analysis

Alemnesh Angelo Adamu



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The Implication of Economic Partnership Agreement for Africa, Caribbean and Pacific Groups – General Equilibrium Analysis

Alemnesh Angelo Adamu

Supervisor: Yves Surry, Swedish University of Agricultural Sciences, Department of Economics

Assistant Supervisor: Christine Wieck, University of Bonn, Institute of Food and Resource Economics

Examiner: Ing-Marie Gren, Swedish University of Agricultural Sciences, Department of Economics

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Abstract

European Union (EU) is the major trading partner for Africa, Caribbean and Pacific (ACP) countries. The trade relationship between the two regions has been based on the non-reciprocal trade preference granted by EU through series of Lome conventions. However the non-reciprocal preference did not conform to the WTO article which necessitated a new negotiation called Economic Partnership Agreement based on reciprocity. The purpose of this study is to evaluate the economic implications of EPA and the alternative general preference scheme considering tariff preference offsetting impact of rules of Origin. The result show that EPA increase imports and exports disproportionately deteriorating of balance of trade for all ACP regions. Imports from EU increase by the range of 12% in Pacific to 52% in Central Africa and the corresponding revenue loss lie between 2.3% and 48%. As result of the increased completion from import, industrial value added decrease from 4.5% in SADC to 12.2% Central Africa. However, deep intra- regional integration helps to buffer the deindustrialization effect. Under the alternative scenario, imports decreases more than exports leading to trade surplus. The trade restricting effect of the rules of origin, which is measured by the reduction of ACP export to EU, ranges from 5% to 11%. Overall the results suggested that EPA tend to leave most ACP regions better off than the alternative option in terms of real GDP growth and welfare. Trade creation dominates trade diversion except for Central Africa, West Africa and the rest of non-ACP region under EPA. The sensitivity analysis indicate that the improvement of welfare is robust for EU, SADC and West Africa at 75% level of confidence with EPA and the welfare deterioration tend to be robust under the alternative scenarios for most ACP groups.

Abbreviations

ACP- Africa, Caribbean and Pacific
BOT-Balance of Trade
CARICOM- Caribbean Community
CEPII- Centre d'Etudes Prospectives et d'Informations Internationales
CIF-Cost, Insurance and Freight
COMESA- Common Market for Eastern and Southern Africa
CU- Custom Union
CGE- Computable General Equilibrium
EAC- East Africa Community
EBA- Everything but Arms
ECDPM- European Center for Development Policy Management
ECOWAS- Economic Community of West African States
EU- European Union
FAO- Food and Agriculture Organization of the United Nation
FOB- Freight on Board
FTA- Free Trade Agreement
FTZ-Free Trade Zone
GDP- Gross Domestic Product
GSP- General Scheme of Preference
GTAP-Global Trade Analysis Project
IFPRI- International Food Policy Research Institute
IMF- International Monetary Fund

ITC- International Trade Center
LDC- Least Developed Countries
OECD- Organization for Economic Co-operation and Development
MACMAP- Market Access Map
MFN- Most Favored Nations
PTA- Preferential Trade Agreement
ROO-Rules of Origin
SADC- South Africa Development Community
SSA- Sub Saharan Africa
TOT-Terms of Trade
UNCTAD- United Nation Conference on Trade and Development
WB- World Bank
WTO- World Trade Organization

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1. Introduction

This chapter presents the background of the study, statement of the problem, objective, limitation and disposition of the study.

1.1 Background of the Study

The Africa, Caribbean and Pacific (ACP) group brings together 79 countries from Africa, Caribbean and Pacific regions which comprise 39% of the number of nations in the world. In 2007 the ACP population, approximately 850 million, where 802 million (94%) were in Sub Sahara Africa, 38million were in the Caribbean and the rest, about 10 million, were in the Pacific Islands (ACP secretariat, 2011). Despite the large number of countries, ACP group accounts for a small part of the world economy, taking less than 2% of global Gross Domestic Product (GDP) and world trade.

Trade between European Union (EU) and ACP had been governed by a non-reciprocal regime granted by EU to support the development endeavor of ACP countries through various Lomé Conventions from 1975 to 2000. These conventions were based on the principle of equal partnership and comprised economic and development cooperation which was gradually eroded to conditionality[1](Brown, 2000). Nonetheless, both parties were not satisfied with the outcome of these agreements. On one side, ACP demanded more market access for their agricultural products and simplified rules of origin. EU, on the other side, did not satisfied by slow progress of ACP countries towards good governance and human rights protection (Keck et al., 2005).

The non-reciprocal preference has offered very limited real benefit for ACP countries. ACP trade performance deteriorated from 6.7 % import share in 1976 to 1.4% in 2000 and 60% of total exports are concentrated in only ten products that showed the limited diversification of exports away from traditional products (ECDPM, 2002). This deteriorating performance was partly attributed to the supply side constraint in ACP countries and erosion of EU preference due to multilateral tariff liberalization and preferential agreements(Borrmann et al., 2005). Additionally, non-reciprocal preferences usually exclude products with greater export interest

[1] Brown(2000) argues that political and economic conditionality was apparent in Lomé IV and subsequent negotiations.

which restricts market access and diminish the potential gain for developing countries. The strict rules of origin that accompanied special preference also served as a potential barrier to trade (Burfischer et al., 2004).

Furthermore the preferential tariff applied by EU on imports from ACP countries did not conform to the WTO article of non-discrimination. The Lomé preferences neither include all developing counties nor restricted to least developing countries. The need to reform the Lomé trade preference regime had become apparent with the temporary grant of WTO waiver in 1994 which was extended to 2007. The reform proposal of EPA as a trade regime to replace the non-reciprocal preference was initiated by EU commission publication of Green book in 1996 (Delpeuch and Harb, 2008).

In 2000 the Cotonou agreement was signed, which redefined the relation between EU and ACP countries and lied down the basis for Economic partnership Agreement (EPA). It also introduced the principle of reciprocity that requires ACP countries to reciprocate trade concessions given by EU. This marked a new step in EU trade policy towards ACP countries that established a framework which is compatible with the WTO rules (Fontagné et al., 2008). The EPA negotiation is undertaken between EU and six ACP groups such as Western Africa, Central Africa, Eastern & southern Africa, SADC, Caribbean and Pacific that consists of an overlapping free trade area and custom union. The underlying idea is to create North-South-South integration that would help to reduce the so called *hub and Spock trade integration*[2](Delpeuch and Harb, 2007) as well as to reduce the administrative costs and increase transparency in the course of negotiations (Borrmann et al., 2005).

It was only Caribbean region that managed to conclude the comprehensive regional EPA by the end of 2007. The progress in other regions has been sluggish due to a multiple of factors like inter-regional rivalries, difference in national interest and priority, lack of commitment by some government and global economic situation(Khumalo and Mulleta, 2010). Additionally, most of

[2]Hub and spock integration describes a phenomena where many small countries(spocks) form trade integration with a large country (hub) that will divert trade among the small countries(Delpeuch and Harb, 2007).

the negotiating regions encountered difficulties to agree on the list of sensitive products to be excluded from preferential liberalization (Borrmann et al., 2005).

Some of ACP countries individually and others as regions have signed the interim EPAs (IEPA) while others did not[3]. IEPAs are temporary measures to avoid trade disruptions following the expiration of the Lomé prefernce while negotiations on comprehensive EPAs continue by including additional elements such as trade in services, government procurement, investment, competition and patent right (Khumalo and Mulleta, 2010).

EPA includes trade, aid for trade, investment, and trade facilitation as a comprehensive approach to development in ACP regions. The potential benefits of EPA are welfare gains from cheaper consumption, allocative efficiency gain, dynamic gains from increased competition, capital inflows and technological spillover effect (Borrmann et al., 2005). However, it also creates potential challenges for ACP regions to deal with forgone tariff revenue, worsening terms of tread, deindustrialization and trade diversion (Hinkle and Schiff, 2004). The expected welfare gain may not be realized if the small markets in ACP countries fail to allow sufficient competition that will merely transfer of tariff revenue to EU producer. The focus of this study is the trade component of EPA and estimating its economic impacts on the six ACP regions using multi-regional and multi-sector general equilibrium model called Global Trade Analysis Project (GTAP) model.

1.2 Statement of the Problem

The increasing trend towards preferential trade agreements (PTA) has been a salient feature of international trade policy in recent times. However, the proliferation of PTA did not generate corresponding expansion in trade that received preferential treatment (WTO, 2011). PTA has been a subject of debate over their welfare implications and their impact on the global trade. Some scholars view PTAs as discriminatory instrument which reduce welfare for their members and detracting from efforts to expand multilateral liberalization(Bhagwati and Panagariya, 1996;

[3] The list of countries that signed interim EPA and that revert to other alternative trade regime is given in an appendix.

Bhagwati et al., 1998; Panagariya, 2000). Others, such as Ethier (1998) argue that it is beneficial for members and that it facilitates a move towards multilateralism.

The overall impact of PTA is ambiguous as it depends on a multiple of factors such as initial tariff levels, existing degree of trade dependence, initial cost differences and the degree of complementarity in their production structures, besides trade creation, trade diversion and terms-of-trade effects(UNCTAD, 2007). Given the inconclusive implication of theoretical models, the desirability of creating a particular PTA from the perspective of either member country or of the rest of the world depends on empirical work (Burfischer et al., 2004).

A number of studies have analyzed the potential impact of EPA on ACP countries or group. The results of these studies differ, depending on the type of approach employed, aggregation level and scenarios implemented. Some of the studies that applied a partial equilibrium approach are Karingi et al. (2005), Milner et al. (2006) and Fontagné al. (2008) assess the effects on welfare, trade flows and revenues. Despite the fact that partial equilibrium approach enables to conduct detailed analysis, it is most suited for sectoral policy analysis that represents small share of national income. Moreover, it does not take in to account the resource constraints of the economy.

General equilibrium analysis is an appropriate approach to study the economy wide impact of a general trade policy that addresses wide range of sectors in an economy (Francois and Reinert, 1997). As nearly one third of ACP trade flow is directed towards EU, a trade policy change to reciprocal preference affect the economy as a whole. Thus it is relevant to use a consistent model that takes in to account all the interaction, resource constraints and ripple effects in the economy and the spillover effects on other regions as a result of tariff changes.

A multi-regional CGE model is well suited for trade policy analysis. One of the widely used and publicly available multi-country CGE model is GTAP. The model is written in the GEMPACK software with Run GTAP interface which is a menu driven that simplifies the burden of programming. There is a hand full of empirical studies using a multi-country CGE model to assess the potential effects of EPA arrangements on the ACP countries (Berisha-Krasniqi et al., 2008; Keck and Piermartini, 2008; Perez and Karingi, 2007; Rocha, 2003). Most of these studies only compare post simulation result to the reference point that includes Lomé preference which

is no longer available. By taking this fact in to consideration, Bouët et al.(2007) and Perez (2006) estimated the counterfactual assuming that ACP countries use general schemes of preference. However this will bias the results as it overlooked the impact of Rules of Origin (RoO). The research question this study attempts to answer is:

- What are the economic consequences of EPA compared to the counterfactual incorporating the impact of rules of origin on ACP regions?

With the reduction of tariff through multilateral and bilateral negotiations as well as unilateral process, non-tariff barriers are such as rules of origins have emerged as a trade policy instrument. ROOs specify requirements that a product should satisfy to get preferential treatment. An econometric study show that it reduces trade flows in a considerable way (Augier et al, 2005). In order to meet the requirement of rules of origin producers might have to change the input mix from cheaper source to expensive local or partner country sources that will decrease the efficiency of production and increase transaction costs (Productivity commission, 2010; Georges, 2008). Due to the difficulty of complying with the requirement most of the exported goods that are eligible for GSP actually enter EU market under MFN tariff (Brenton, 2003).

1.3 Aim of the Study

The aim of this study is to compare the policy options for ACP groups of countries by simulating scenarios associated with EPA and the alternative scenarios. The two major scenarios are complemented by regional liberalization with in ACP regions to look at the effect of south-south integration. Specifically, this study estimates the potential effects of the scenarios on trade flows, tariff revenue, production structure, employment of resource, real GDP growth, overall welfare effect and checks the robustness of key results.

1.4 Limitation of the study

The GTAP model used in this study is highly aggregated both in terms of region and products. Thus it cannot tell us country or product specific effect of reciprocal tariff liberalization or the alternative arrangement despite the persistent heterogeneity across ACP countries. In addition, the study only takes in to account the comparative static effect of tariff distortion. The dynamic

effect such as economies of scale, increased incentive for innovation, transfer of information and knowledge, induced saving and investment are not taken in to account in the analysis.

There are some issues that shadow the results of the study. The first weakness is that many ACP countries are captured in the GTAP database through regional composites, which neither include all countries in the region nor exclude other that are not member of ACP. This in turn limits the accuracy and details of the simulation results. The other issue is the lack of link between government expenditure and tax revenues in the model (Hertel, 1997). As a result tax cut does not imply a reduction in government expenditures. Perhaps it may lead to a reduction in welfare loss, increase in regional real income and consequently government expenditure may also increase which is the case for some of ACP regions in this study.

1.5 Disposition of the study

The study is organized in five chapters. Chapter one presents the background of the study, statement of the problem with research question, aim, limitation and dispostion of the study. Chapter two gives the review of theoretical and empirical literature. We begin by discussing the economic theory of PTA, and then why countries prefer to join PTA, and the role of rules of origin. The empirical literature review covers studies that used partial and general equilibrium models to estimate the potential impact of EPAs.

Chapter three outlines the methodology and data employed in this study. It starts by providing an overview about the GTAP model, then it describes the database, presents regional and sectoral aggregation. The fourth chapter presents the main characteristics of ACP regional economies focusing on size of the economies, structure of production and trade as well as tariff protection. Chapter Five describes the simulation scenarios, discusses the results of the simulation and sensitivity analysis with illustrations. And last but not the least, the fifth chapter provides the summary, conclusion and hints for future studies.

2. Literature Review

2.1 Theoretical Literature review

This section aims at providing theoretical underpinnings of this thesis. The academic discussion on Preferential Trade Agreement (PTA) directed towards addressing the welfare implications of PTA and the question how the increasing trend of regionalism (PTA) is related to multilateralism. This section reviews some of the theories of PTA, highlights on the debate of preferential vs multilateral liberalization and discusses the role of rules of origin in trade.

2.1.1 Economic Theory of PTA

PTA refers to a union created by two of more countries among which lower or zero tariffs are imposed on goods produced in the member country relative to tariffs imposed on non-member countries(Panagariya, 2000).These countries do not need to share boundary (WTO, 2011).Thus in this study the generic term, PTA is used to include other narrower arrangements of regional trade agreements such as free trade area(FTA) and custom union(CU)[4].

Theoretical analysis of PTA was pioneered by Viner (1950) in his work of the custom union issue. His static welfare analysis focuses on changes in the locus of production after the formation of PTA to determine trade creation or trade diversion effects. When PTA relocates production towards more efficient producers then the change is trade creation and it improves welfare. On the other hand, when the sourcing shifts towards the high cost supply, it is trade diversion that deteriorates welfare. The impact on world welfare depends on the relative size of the two effects. When trade creation is predominant, the whole world benefit from PTA. The converse would be the case when trade diversion outweighs trade creation.

[4]According to WTO article on regional integration (24), FTA refers to a group of countries in which tariffs and non-tariff barriers of trade are eliminated on substantial amount of trade between the countries in products originating from the region. Whereas, CU includes the substitution of single custom territory for the group of countries in addition to the removal of tariff and non-tariff barriers on substantial amount of trade in products originating in the region.

Lipsey (1957) argues that negative welfare effect of trade diversion in Vinerian analysis comes from the implicit exclusion of consumption effect. He explains that the gain in consumption from the reduced import prices could offset the loss from a shift import from cheap sources outside the PTA to high cost sources in PTA. The implication is that a member country might gain from PTA where the production effect is only trade diversion. Bhagwati (1971) argues that the lack of substitution in consumption does not necessarily make trade diversion to be welfare deteriorating. According to him welfare worsening effect of trade diversion occurs with the restriction of import rather than consumption pattern.

Panagariya (2000) points out those welfare effects of PTAs are not exclusively determined by the trade creation and diversion effects. The extent of cost saving by the newly created trade and the additional cost incurred as a result of trade diversion also matters. Furthermore, the tariff revenue loss following the abolition of tariff on intra-PTA trade could outweigh any net gains from trade creation and consumption effect. This situation is more apparent especially when tariff dismantling does not transfer into lower domestic prices. The higher the tariff preference, the larger would be the welfare loss from PTA. Moreover, PTA may induce members to increase protection such as anti-dumping measures against non-members. As a result the endogenous protection converts any trade creation within PTA to trade diversion(Bhagwati and Panagariya, 1996; Panagariya, 2000).

Panagariya (2000) indicates indirect welfare implication of trade creation and diversion. Trade diversion might be beneficial through the terms of trade gain it brings. Similarly, trade creation might generate a harmful effect subsequently through the terms of trade loss. Moreover, he suggests that the more the country imports from the members and the higher the magnitude of tariff preference, the more it loses. This indicates that creating PTA with a large country is likely to be more harmful than otherwise. In contrast, Michaely (1976) argues that a preferential trade arrangement with a large country is more beneficial since it leads to smaller losses from trade diversion and larger gains from trade creation. The argument is that the large country is likely to be highly diversified and its relative price will be closer to international relative price under *ceteris paribus*. Hence opening up with large country will be advantageous for small country.

Besides the static trade creation and diversion effects, PTA could also generate dynamic gains in welfare through accumulation and location effects. The accumulation effect describes the mechanism by which a PTA affects economic growth. The effect on growth would occur when it changes the return on investment in physical and human capital and thus stimulates factor accumulation. It is reasonable to anticipate an increase in capital inflows to members of PTA at the expense of non-members which would lead to investment creation and diversion effects. This effect would be temporary if diminishing returns to accumulation kicks in otherwise it would be permanent (Baldwin and Venables, 1995; WTO, 2011).The location effect takes in to account the possibility that PTA may alter the dispersion of economic activity within the PTA and thereby aggravating inequality among them. The more firms are located in a region, the larger would be the share of demand, which in turn induce other firms to locate more in that region leading to agglomeration of firms (Kerugman, 1990).

In the new trade theories that incorporate various innovations to the conventional models such as increasing returns to scale and imperfect competition based on product differentiation, the welfare implications of preferential liberalization are mixed. Increasing returns to scale are repeatedly cited as a source of dynamic gain from preferential liberalization through the accesses to large market which allow firms to operate at lower cost owing to higher level of output. Baldwin and Venables (1995) point out that PTA may promote technological spillovers within members either as a result of increased trade flows or policy designed to encourage scientific exchange. Deraniyala and Fine (2001) criticize the relevance of such dynamic gains as scale economies concentrated in protected sector declines with trade liberalization. Besides, they argue that the mechanism that link trade liberalization with productivity and technological spillovers is ambiguous as it lacks sound theoretical foundations.

The Heckscher-Ohlin-Stolper-Samuelson(HOSS)[5] general equilibrium theory of trade has been largely used as a framework to analyse the potential impact of PTA where the gains from liberalizing trade come from the adjustment in resource allocation, production and consumption (Robinson and Thierfelder, 2002). These days' multi country CGE models are very popular in

[5] A HOSS theorem rests on restrictive assumptions such as homogenous products, identical production technology and preference that are not fulfilled in applied CGE models. Trade is determined by the relative factor abundance of countries and factor intensity in production(Shoven and Whalley, 1984).

trade policy analysis in general and in studying the economy wide effect of PTA in particular as they allow to capture the realistic characteristics of an economy such as trade patterns, product and factor market structures (Francois and McDonald, 1996; Shoven and Whalley, 1984).

2.1.2 Why countries join PTA

Theoretical analysis in this regard geared towards two approaches: exogenously and endogenously determined formation or enlargement of PTA. The former takes membership and expansion of PTA as exogenously while the latter links the expansion of membership to the incentives for forming and joining PTA(Bhagwati et al., 1998).

Kemp and Van(1974) advocate that given any initial world trade equilibrium, a subsequent formation or enlargement of PTA with a system of common external tariff and lump sum compensatory payments, no country will be worse off in the process and at the end of the expansion of PTA worldwide free trade could be achieved. Bhagwati et al.(1998) criticize the idea that regionalism facilitates multilateralism by arguing that the PTA might not necessarily expand since as it is determined exogenously rather it results in *spaghetti bowl phenomenon* of numerous overlapping PTAs with immeasurable applicable tariffs .

Krugman (1993) argues that the consolidation of regional trade blocks could work either for or against multilateral liberalization. On one side, as trade blocks become more concentrated, it would be easier to reach an agreement through negotiation. The reasons he mentioned are: the large number of participants in multilateral negotiations raise the cost of cooperation; more sophisticated and complex trade barriers make multilateral bargaining and monitoring problematic and institutional difference across countries make implementation of negotiations difficult. On the other side, larger trade blocks are more likely to impose higher tariff on imports from the rest of the world due to their temptation to protect domestic market. Given the uncertainty surrounding multilateral agreements, the consolidation of such trade blocks will undermine the sustainability of multilateralism.

There have been theoretical developments that try to identify the incentives to create or to join PTA endogenously following a political economy framework. Grosman and Helpman(1995) examined the interaction between industry lobbying groups and government in trade policy

decision making process. PTA shifts the payoffs of export industries and import-competing industries associated with any given level of protection. If there is substantial bilateral trade and exclusion of sensitive sectors, PTA may emerge as an equilibrium outcome as the lobbying groups are more interested to preserve the existing markets.

Baldwin (1993) demonstrates the domino effect which motivates countries to eagerly accept regionalism. According to him the stance of a country about PTA is determined by the political equilibrium between pro and anti- membership interest groups. The formation of PTA is expected to damage the profits and market shares of firms in non- member countries. The secured market access may divert foreign direct investment towards member countries. Additionally, the deeper integration within PTA and its enlargement will amplify the losses of non-member countries and thereby triggering membership request.

Krishna (1998) shows how trade diversion provides a principal motive for forming such PTA by demonstrating trade diversion effect as a key determinant of political support for PTA since producers are deriving forces in formulating trade policy. The greater the trade diversion from the rest of the world, the higher the probability that politicians would support the preferential trade arrangement. Levy (1997) indicates that, when discriminatory liberalization is expected to offer large gains to key producers, the chances of joining PTA are higher. This impact of the preferential arrangement is likely to reduce the incentives for multilateral liberalization.

Freund (2000) explores the relationship between multilateral and preferential tariff reduction using an oligopolistic model. He finds out the relation to be bi-directional. In one hand the formation of PTA alters the incentives of multilateral liberalization as indicated above. On the other hand multilateral liberalization gives impetus to the formation of PTA because the low tariff reached multilaterally makes tariff revenue and profit losses of preferential arrangements lesser. It also allows member states to transfer the loss to non-member countries, which makes it more attractive than multilateral reduction. This partly explains the wave of regionalism in the face of sluggish multilateralism.

2.1.3 The role of Rules of Origin

Usually, beneficiaries of preferential schemes or members of PTA maintain their external tariff policy with respect to third countries. This may create free riding opportunities for the non-member countries to take advantage of the tariff. This phenomenon is referred in the literature as trade deflection. The principal instrument used to curb trade deflection and the resulting tariff war as countries attempt to attract such trade is the rules of origin (RoO). The rules of origin specify the condition that has to fulfill to get the preferential market access. Product that satisfies the conditions face preferential tariff otherwise it will be subject to the MFN tariff(Anson et al., 2005; Augier et al., 2005).

The complex conditions and the difficulty of quantifying rules of origin added with the assertion that it does not matter for trade had contributed for the overlook of the topic by researchers (Augier et al., 2005). However the claim that RoOs do not matter has been proven to be incorrect. RoOs affect trade through two channels: First, they increase the transaction cost of exporters by rising administrative cost to get certification thereby limiting trade creation, second, they may affect productivity of firms by inducing changes in their input mix to comply with the requirement which also has trade diverting effect in intermediate goods(Augier et al., 2005; Georgus, 2008; Krueger, 1993; Productivity Commission, 2010).

There are two views in the literature that links efficiency cost of RoO with the extent of tariff preference, which is given by the difference between the MFN and preferential tariffs. The two views are participation constrained and revealed preference approaches. According to the former, preferential agreements are meant to leave members countries indifferent between signing and not signing the PTA. Thus, there is substitution between tariffs and RoO. The deeper the tariff preference, the stricter RoO would be so that partner country stays close to its participation constraint (Anson et al., 2005). In the revealed preference approach, exporters will try to qualify for RoO only if the benefit from tariff preference is higher than the cost of satisfying the requirement, which is the increase in unit cost of production due to a change in intermediate input mix. Thus, the extent of tariff preference approximates the cost of complying to the rules of origin requirements (Cadot et al., 2006)

Krishina (2005) has summarized the salient features of RoO in to three prepositions. First, RoOs are hidden protection that can be used to insulate industries from the effect of PTA since they are negotiated by industry by industry. Second, the precise form of RoO matter which is evidenced by the importance given to the details of negotiated RoOs. Third, time period matters for the response to RoO. The short run partial equilibrium effect differs from medium or long rum general equilibrium effects.

Falvey and Reed (2002) applying a partial equilibrium approach show the common feature of RoO and tariff that create price wedges in intermediate goods. They observe that it would benefit the importing country that imposed RoO through a terms of trade effect. Georges(2008) using a computable general equilibrium approach demonstrated that RoOs constraints serve as an implicit subsidy on the use of factors of production and intermediate goods originating within PTA and as explicit penalty on those originated outside the PTA.

2.2 Empirical Studies of EPA

Several studies examined the potential impact of EPA on ACP countries focusing on different policy options and regional dimensions using different analytical approaches. A considerable body of empirical studies asses the economic effects of EPA applying partial equilibrium approach (Busse and Grossmann, 2004; Fontagné et al., 2008; Milner et al., 2005).These authors claim that the partial equilibrium approach is appropriate in the face of lack of reliable and detailed data on the structure of ACP economies. While some of the studies use a general equilibrium approach by pointing out the limitation of partial equilibrium approaches to take in to account the ripple effects of preferential liberalization on the rest of the ACP economies (Bershina et al., 2000;Karingi et al., 2005; Keck and Piermartini, 2008).This section reviews these empirical literatures[6].

Busse and Grossmann (2004) using a differentiated product partial equilibrium model analyze the impact of EPA on ECOWAS with three different elasticity scenarios where they consider the results of low and high elasticity as lower and upper bound of the effects. The result of complete

[6] The review exclusively focuses on ex-ante analysis of EPA. There is also growing body of Ex-post analysis of PTA. Cipollina and Salvatici (2010) summarize large number of studies that employed gravity mode using meta-anaysis.

liberalization indicates an increase in EUs exports in the range of 5% to 21% and decrease in fiscal revenues in from 4% to 9% in Guinea-Bissau and Nigeria, respectively. They find evidence that trade creation effect dominates trade diversion for all ECOWAS member countries. The authors point out that the estimated trade effects occur only if European exporters lower their export prices in line with the tariff elimination. Otherwise it would leave market prices unchanged and increase their profits despite the elimination of tariffs. As a result the importing country will lose import duties without gaining the advantage of lower import prices that will lead to decrease in welfare.

Milner et al.(2005) analyze the impact of a full liberalization scenario on trade and welfare focusing on EAC. They estimate that imports from EU to EAC to increase from 16% to 23% in sectors where EU is a dominant supplier .The potential losses of tariff revenue range from 60 % in Ugandan to 71% in Tanzania. It also diverts intra-EAC trade toward EU that negatively affects Kenya which is a major source of export in the region. In terms of welfare gains, they predict a positive gain for Uganda from the displacement of less efficient import and welfare loss for Tanzania and Kenya as a result of regional market share loss.

Karingi et al. (2005) evaluate the potential effect of dismantling tariff on COMESA countries. The result show an increase in exports from EU in to COMESA mainly from United Kingdom, France, Germany, Italy and Belgium which would be realized at the expense of regional trade. The extent of diversion from intra-COMESA trade is estimated to be quarter of the total creation. Consumers in the region would benefit from the EU imports as a result of trade creation while governments have to deal with a considerable fiscal imbalance.

By taking a sample of 34 countries from ACP, Morrissey and Zgovu(2009) estimate the impact of reciprocal tariff liberalization. The result indicates that the overall welfare effect is positive due to the consumption effect but the magnitude is very small, about 0.01% of GDP. Nonetheless, the overall gain falls to 0.002 % of GDP when sensitive products that account 20 % of imports from EU are excluded and the revenue losses reduced from 31% to 28%. They observe that trade diversion is crucial for the outcome as the countries that obtain the highest benefit relatively have low trade share with the rest of the world.

Fontagné et al.(2008) compare the potential impact of EPA and the alternative EBA and GSP, which are a legally available option if ACP groups fail to sign EPA, using a dynamic partial equilibrium model. They predict a 4.9 % fall in ACP exports to EU in the counterfactual scenario where the largest decline is observed for Caribbean, Pacific and COMESA. However in case of EPA, the authors estimate that ACP export will be 10 % higher than EBA/GSP and revenue loss will range from 58% in SADC to 70% in ECOWAS on imports from EU which is exacerbated by the trade diversion effect.

Vollmer et al. (2009) investigate the welfare impact of the interim EPA of nine SSA countries using a partial equilibrium model of Armington type by estimating elasticities from bilateral trade data. They observe that under full trade liberalization in most of the case trade creation offset trade diversion effect with the exception of Ghana, Ivory Cost and Kenya where the manufacturing sectors encounter intensive completion from EU imports. Government revenue loss proves to be an important concern for SSA countries given that trade with EU account 40% of total trade.

In addition to the partial equilibrium approach, Karingi et al. (2005) applied a general equilibrium to simulate the reciprocity on preferential tariffs between SSA and EU, regional integration without reciprocity with in SSA and the establishment of FTZ between SSA and EU, using GTAP version 5.2. They found out that the reciprocity scenario leads to contraction of industrial production, an overall shortfall of trade balance that resulted in the deterioration of terms of trade. The integration scenario without reciprocity boosts trade within SSA, increased GDP and welfare despite a marginal fall in trade balance. The FTZ scenario yields the highest benefit for SSA in terms of more favorable terms of trade, GDP growth and Welfare in the face of the associated deindustrialization risk.

Keck and Piermartin (2005) assess the impact of EPA on SADC using a static general equilibrium model based on GTAP 6 database aggregated into 15 regions and 9 sectors. The result shows huge potential of expansion for bilateral trade partly accounted by trade diversion from the rest of the world. Agriculture, mainly livestock and processed food will experience growth at the cost of light manufacturing industries in most SADC countries. In terms of welfare,

almost all SADC countries gain mainly driven by the improvement in terms of trade and allocative efficiency. Nonetheless the results also suggest that the potential gain from EU-SADC integration will be significantly lower when taking in to account EU-Mercosur integration due to the presence of preference erosion.

Perez (2006) compared the potential impact of existing alternatives such as EPA, GSP, and regional integration within ACP to replace Cotonou preference taking in to account multilateral liberalization. The author used GTAP 6 six by aggregating the database into 10 regions and 12 sectors. Given the asymmetry in protection and competitiveness of the partners, highly diversified and competitive EU gains more than small and protected ACP countries from reciprocal liberalization. Perez (2006) demonstrates that the negative effect in terms of trade balance, deindustrialization and tariff revenue could be reduced considerably if the reciprocation is asymmetrical. In contrast, the alternative GSP predicted to improve the balance of trade, raise industrial output and preserve public revenue.

Perez and Karinigi (2007) examined the implication of EPA by simulating various scenarios using the GTAP Model. They estimate that creating free trade with EU will lead to a drop of GDP and welfare of Non-SADC African economies by 3.4% and 1.5 Billion USD, respectively. While SADC economies would benefit would from the increased welfare as a result of improvement in terms of trade. With respect to the impact on industrial structure, agriculture and food processing would expand at the expense of industrial production particularly light and heavy industry production would fall by 8.9%. Perez and Karinigi (2007) also looked at the implications of EPA for intra-regional trade within ACP and predict a 18% shrinkage of intra-Africa ACP trade.

Bouet et al. (2007) employed the dynamic global general equilibrium model to simulate multilateral and EPA scenarios focusing on six ACP regions and other four important WTO actors. The result pointed out that the implementation of EPA has a very different effect across ACP group. Most ACP regions export experience small growth except for SADC where the export growth is relatively high whereas EU experiences boost in exports to ACP. Under GSP

scenario, Caribbean and Pacific region incur considerable loss of market share due to the erosion of sugar preference.

Similarly, Bershina et al.(2008) simulated two scenarios; multilateral full liberalization and EPA scenario with 100% liberalization on the EU side and with 80% liberalization on ACP side excluding sensitive products. They find out that SADC, East and South Africa, and the Caribbean and Pacific countries reap the greatest benefits in terms of real income, export growth within the regions. West and central Africa will experience a decrease in real income, deterioration in terms of trade, a considerable (about 37%) loss of public revenue and diversion of trade toward EU.

To sum up, partial equilibrium studies indicate that EPA leads to a moderate expansion of exports to and imports from EU, a decrease in intra-regional trade, domination of trade creation effect over trade diversion and fiscal revenue losses in ACP regions. The general equilibrium studies further highlighted the deterioration effect on balance of trade as result of disproportionate change in exports and imports, the expansion of agricultural and food processing sectors at the expense of industry sectors . The overall welfare effect varies across ACP regions, where SADC, East and South Africa and Caribbean tend to gain the most. Studies that compared the reciprocal preferential liberalization with the alternative GSP scenarios concluded that the latter improves trade balance, increase industrial production and has negligible effect on public revenue for most ACP groups.

3. Methodology

This study uses the Global Trade Analysis Project (GTAP) model to anticipate the implications of EPA for ACP regional economies. GTAP is an applied multi-regional and multi sector computable general equilibrium model developed and coordinated by the Center for global trade analysis at Purdue University. The general equilibrium approach is well suited to examine international trade policy issues since the domestic resource allocation is sensitivity to changes in external sector (De Melo, 1988). Moreover, it provides a rigorous and theoretically consistent framework to analyze the impact of liberalization on; structures of production through inter-secoral linkages, bilateral trade flows, and welfare among other things. The following sections present the overview of model, the sources of GTAP database and the aggregation scheme.

3.1 Overview of GTAP model[7]

The GTAP is a comparative static general equilibrium model based on perfect competition and constant returns to scale. Like any other CGE model it consists of behavioral and accounting equations. The behavioral equations describe the optimization of economic agents based on microeconomic theory. The accounting equations on the other hand ensures the balance between expenditure and receipts of agents also that the model solve for equilibrium set of prices by equating quantity demanded and supplies (Brockmeier, 2001; Burfisher, 2011).

3.1.1 Demand structure

The model assumes a regional household that maximizes utility subject to the income generated in the economy. The regional household exhausts expenditure over private, government and savings according to Cobb-Douglas utility function so that each component of the final demand has a constant regional income share. Private household preferences represented by non-homothetic constant difference elasticity (CDE) utility function which allows income elasticity of demand to vary across commodities. Whereas government spending behavior represented by Cobb-Douglas function that impose a constant budget share across commodities. The savings are

[7] The discussion draws extensively on the book edited by Hertel (1997)

completely spent on investment that represents future consumption possibilities. However it does not enhance the productive capacity in the model.

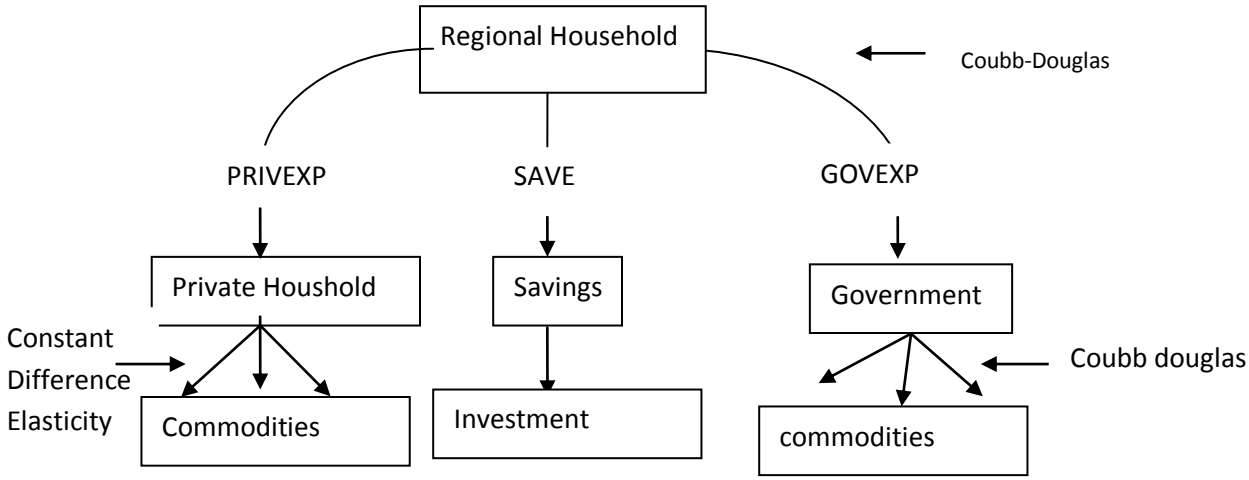

Figure 3.1a Demand structure (own version based on Brockmeier 2001, PP. 6)

McDougall (2003) introduced a modification to the demand system at the top regional level that allocate fixed cost of private utility as implied by Cobb-Douglas function because it is incompatible with the non-homothetic CDE function as the cost of private utility depend on the level of private consumption expenditure. He provides a new mechanism for the allocation of regional income by treating all the demand subsystems as components of a representative regional household demand system rather than as a conglomerate of demand system of different household. This in turn allows the shares of private, government and savings to vary in response to changes in income and consumer prices

In general domestic consumption decision is made in two independent stages. In the first stage, decision is made on the quantity of each composite commodity given the preference and income. In the second stage, the share of domestic and imported commodity is decided. This indicates that the model adapts Armington specification that differentiates commodities on the basis of region of origin. Hertel et al. (2007) empirically estimated the Armington elasticites for the 42 tradable commodities.

3.1.2 The supply structure

The production side is represented by nested Constant Elasticity of Substitution (CES) function that exhibits constant returns to scale. The nature of production technology in the GTAP is well described by a technology pyramid (see figure 3.1b). At the top of the pyramid, the intermediate input bundles and value added bundles are combined in fixed proportions according to Leontief technology to produce the final output.

At the center of the pyramid, the intermediate bundles are formed by combining imported bundles and domestic goods using constant Elasticity of substitution. Similarly, value added bundles are formed using factors of production such as labor, capital and land according to a Constant Elasticity of Substitution (CES) function. At the bottom of the pyramid, imported commodities from different regions are combined using Armington Elasticity Function.

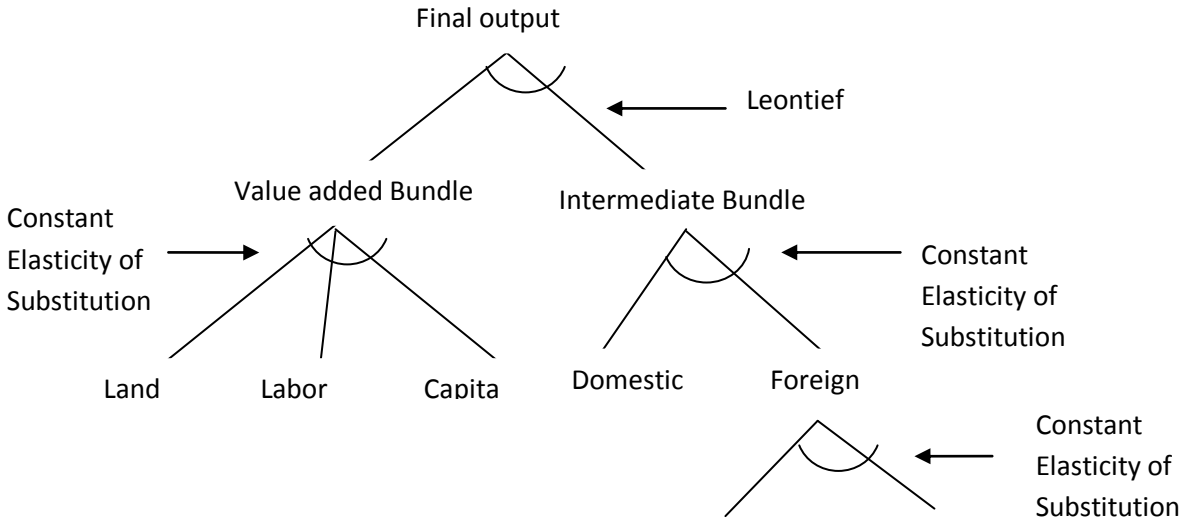

Figure 3.1b Production technology tree **(**own version based on Hertel and Tsigas 1997, PP.48)

3.1.3 Factor Market and Macroeconomic Closure

The standard GTAP factor market closure follows the neoclassical tradition requiring supply and demand of factor to be equal. As factor endowment is considered to be exogenous, it is the factor price that will respond to shocks to clear factor market and equalize factor price across sectors (Burfisher, 2011). However, in this study the factor market closure is modified in line with the structuralist CGE model to take in to account the institutional characteristics and capture the economic reality of ACP countries(Taylor, 1990). Accordingly, the unemployment closure is adopted for unskilled labor, which permits supply of unskilled labor to adjust to meet the labor demand at fixed wage level.

The macroeconomic closure describes whether saving or investment adjusts to maintain the identity that investment equals saving. It also reflects the different assumption about the current account balance. In the standard GTAP model, saving rate is fixed so that any income change would change savings. Investment is assumed to respond to changes in saving to equate expected rate of returns across regions. Therefore, current account balance is not forced to be exogenous. The alternative macroeconomic closure is that investment is fixed at initial level and saving rates are assumed to change until the macroeconomic identity is achieved and the current account balance remain unchanged (Burfisher, 2011). This study adopts the standard macroeconomic closure which imply that the fixed saving rate reveal the subjective preference of regional household.

3.2 Sources of Data

The study utilizes the eighth version of the GTAP Data Base which consists of bilateral trade, transport, and protection matrices for the entire world economy. In addition it includes input-output tables, trade margins, trade taxes, commodity taxes, income taxes, savings, capital stocks, depreciation, and population data for each country/region. The current version was released in 2012 covering 129 countries, 57 sectors and 5 factors such as land, natural resources, skilled labor, unskilled labor and capital. The base year is 2007(Walmsley et al., 2012).

The data in GTAP comes from different sources. The Input-output data are contributed by individuals in the GTAP network and supplemented by FAO agricultural data. The data on income taxes are based on IMF data. Agricultural domestic support data is contributed by OECD. Commodity trade data is taken from the COMTRADE database while service trade data are collected from OECD and IMF. Tariff and protection data are taken from MAcMap database compiled by CEPII and the ITC-Geneva. The comprehensive export subsidy data are compiled by IFPRI. Macroeconomic data are collected from the World Bank in order to make sure that the countries input output data match the macro data for the base year. Despite the fact that the data are obtained from different sources, GTAP database is consistent (Narayanan et al., 2012).

3.3 Aggregation scheme

The regional and sectoral aggregation is created by using the GTAPagg utility. As it can be seen from table 3.3, the 129 regions and 57 sectors in the GTAP database are condensed into 10 regions and 10 sectors. The five factor endowments are aggregated into four factors such as land including natural resource, skilled labor, unskilled labor and capital.

Table3.3a Regional and sectoral Aggregation

Regions	Description	Sectors	Description
ESA	East and Southern Africa	GRAN	Grain and crops
SADC	South Africa Development Community	FOPR	Food processing
CA	Central Africa	LIVS	Livestock
WR	West Africa	VEBE	Vegetable and beverage
CAR	Caribbean	AGPR	Agro processing
PAC	Pacific	EXTR	Oil and Mineral
EU	European Union	TEXT	Textile and clothing
EUP	Countries that have PTA with EU	LMNF	Light Manufacturing
RDC	Rest of Developing country	HMNF	Heavy manufacturing
ROW	Rest of the World	SERV	Service

Source: Own aggregation from GTAP database

4. Overview of ACP Regional Economies

This chapter describes the main characteristics of ACP regional economies. The discussion covers the relative GDP size, resource endowment, structure of production, composition of external trade and tariffs based on the reference GTAP database. Additionally, the dynamics of ACP–EU bilateral trade flows are also presented.

4.1 The Size of ACP Economies

As can be seen from figure 4.1a, ACP countries account for a very small part of global GDP. While EU accounts for 30% of world GDP, the rest of developing and developed countries contribute nearly 21% and 41%, respectively. About 60% of total value added in ACP regions came from Caribbean and West Africa which amounts to 1% of global GDP. The remaining four regions share 0.6% of world GDP.

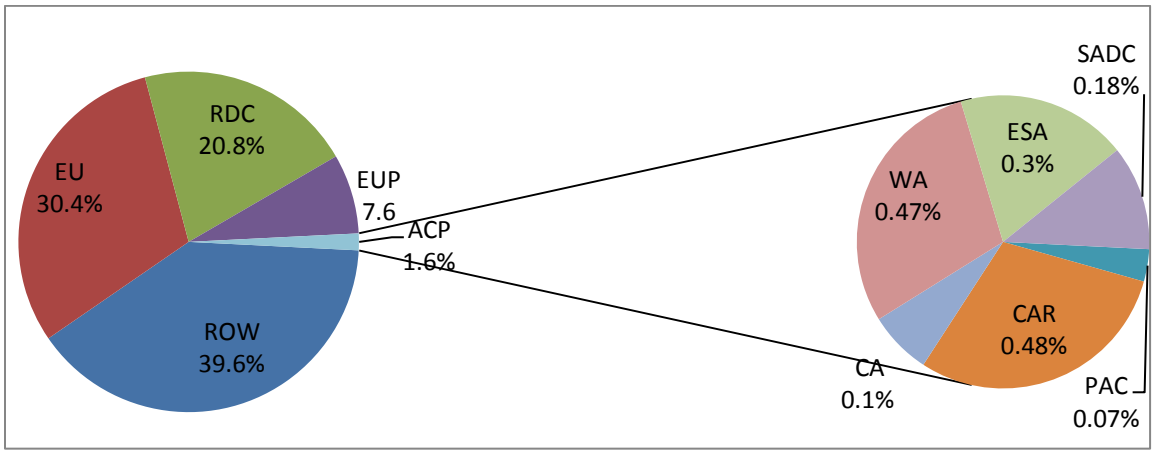

Figure 4.1a Global GDP share of ACP and its regional groups (own version based on GTAP 8 database)

In terms of factor shares to value added, capital and unskilled labor make the highest contribution in all ACP regions. Particularly, capital alone account for 41% in East and Southern Africa and 51% in SADC. This surprisingly high share of capital is partly attributed to the incorporation of self-employed workers into the capital category in GTAP database (Hertel, 1997). Thus the high share of capital implicitly signals the importance of self-employment.

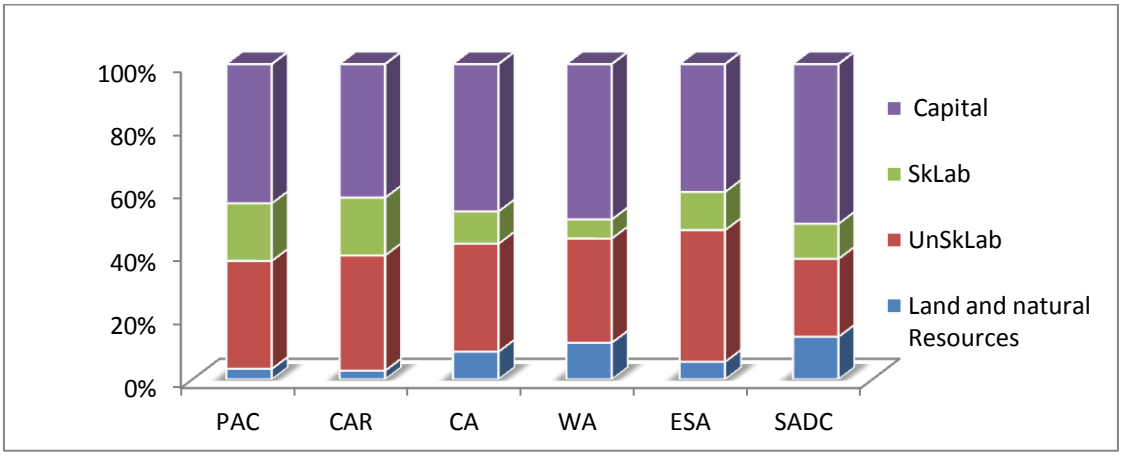

Figure4.1b Value Added by Factor of Production for ACP regions (own version based on GTAP 8 database

Skilled labor and land (including natural resource) combined contribution ranges from 18% in East and South Africa to 25% in SADC. Relatively skilled labor takes the highest share 18 % in Caribbean and Pacific regions where as land and natural resource together take 14% in SADC. The factor abundance, which is calculated from the ratio regional to global factor endowment, is reported in table 4.1. There is abundance of land and natural resource in West Africa, SADC, East and South Africa, Caribbean and Central Africa owing to its highest share compared to other factors of production. Unskilled labor is also abundant after land and natural resource in most ACP regions. This implies that ACP regions will have a comparative advantage in sectors that intensively use these abundant factors. On the other hand, EU is endowed with skilled labor and capital that are relatively scarce in ACP regions. This gives the evidence for the advantage that EU has over high tech and skill industries. Thus it is reasonable to expect complementarily in bilateral trade flows between ACP and EU.

Table 4.1 ACP regions share of global factor endowments

	PAC	CAR	CA	WA	ESA	SADC	EU
Land and natural resource	0.08	0.58	0.45	2.4	0.74	1.15	8.81
Unskilled labor	0.06	0.52	0.13	0.58	0.41	0.16	23.5
Skilled labor	0.05	0.41	0.06	0.15	0.19	0.11	26.79
Capital	0.06	0.50	0.14	0.56	0.31	0.25	31.26

Source: GTAP 8 database

4.2 Production structure of ACP regions

Production structure shows the pattern of specialization in ACP groups, which is one of the determinants of trade simulation results. Moreover, it may reflect the comparative advantages of ACP regions as it is involved in trade. Complementarily in patterns of specialization may increase the gain for producers from liberalization as opposed to substitutability which may cause displacement of production.

Table 4.2 Sectoral Production share of ACP and EU (%)

	PAC	CAR	CA	WA	ESA	SADC	EU
GRAIN	0.2	1	1.9	4.4	4.4	2.2	0.2
VEGE	1.2	1.4	5.2	17.9	6.9	7.4	0.6
LIVE	1.1	2	1.5	2.1	3	1.8	0.6
AGRO	2.4	0.7	2.9	2.2	2.3	1.5	0.2
EXTR	5.6	2.5	15.9	18.7	6.1	9.5	0.6
FOPR	5.4	8.1	9.3	4.9	12.1	6.8	4.8
TEXT	0.8	1.6	1.4	1.6	2.4	1.5	1.4
LMNF	4.8	6.2	4.6	4.3	4.7	5.2	7.9
HMNF	13.5	10.1	9	6.8	13.1	9.3	19.8
SERV	65	66.4	48.3	37.2	45.2	54.8	63.9

Source: GTAP 8 database

The similarity of EU and ACP regions production structure lies on the principal importance of service sector (see table 4.2). Service production accounts for about 37% of total domestic production in Central Africa, 45% in East and South Africa, 65% in Pacific and 64% in EU. Nevertheless, Extraction industries play a bigger role in ACP groups of Africa than elsewhere. Extraction activity in West Africa and Central Africa contribute close to 19% and 16% of the domestic production, respectively. Additionally, food processing industry has relevant share of production ranging from about 5% in Pacific to 12% in East and South Africa. On the other hand, the heavy manufacturing plays a bigger role in the EU, Caribbean and Pacific after service.

However the high level of aggregation may hide the real specialization pattern in specific agricultural and food commodities in ACP region.

4.3 Trade Flows

ACP region has failed to cope with the dynamics of world trade as indicated by its deteriorating export performance. Their share in world export declined from 4.4% in 1970 to 2% in 2007. Similarly the share of ACP in EUs´ import fell from 5.1% in 1970 before the creation of Lomé preference to 1.3% towards the end of Lomé preference in 2007. The other salient future ACP-EU trade is the asymmetric nature of the trade relationship. Recent EUROSTAT data shows that EU is the dominant trading partner absorbing 25% ACP exports while ACP only absorbs 3.6% of EU exports in 2011.

Table 4.3 Trade pattern of ACP groups

Regions	1970	1980	1990	2000	2003	2007
Share ACP in world exports	4.4	3.2	2.1	1.6	1.8	2.0
Share of regional ACP groupings' exports to the EU in % of group's total exports						
West Africa	67.8	60.3	43.8	31.4	34.2	23.7
Central Africa	70.7	54.1	55.0	32.7	30.1	34.3
East and South Africa	54.3	57.6	51.8	37.9	37.3	25.2
SADC	57.9	46.0	35.6	20.9	20.1	20.9
Caribbean	21.7	19.9	24.6	16.9	16.6	26.1
Pacific	33.8	34.1	23.3	11.1	10.3	25.7
Share of regional ACP groupings' imports from the EU (25) in % of group's total imports						
West Africa	61.8	54.3	49.2	41.6	39.9	35.8
Central Africa	74.1	70.2	67.0	55.3	50.9	34.2
East and Southern Africa	51.2	43.3	42.4	27.0	26.6	24.2
SADC	57.3	51.3	60.1	32.5	37.2	34.7
Caribbean	28.4	15.4	16.8	14.0	17.5	19.8
Pacific	13.4	9.0	8.0	3.4	3.1	32.7
EU export to ACP(%)	5.0	4.3	1.9	1.4	1.4	1.5
EU import from ACP(%)	5.1	4.5	2.2	1.5	1.5	1.3

Source: Borrmann et al.(2005) and GTAP 8 database

The above table also reports EU´s share in terms of ACP groups' imports and exports. In 1970, EU accounted for the majority of trade for African groups than Caribbean and pacific. At that time EU´s import from these groups range from 54% in East and South Africa to 71% in Central Africa of their total exports. Similarly imports from EU represented 51% in East South Africa and 74% in Central Africa of their total import. After nearly four decades of trade, the share of EU in ACP regional import and export has been more balanced partly because of the rapid decline of its share in the Africa groups as the latter switch towards other trading partner like China and US.

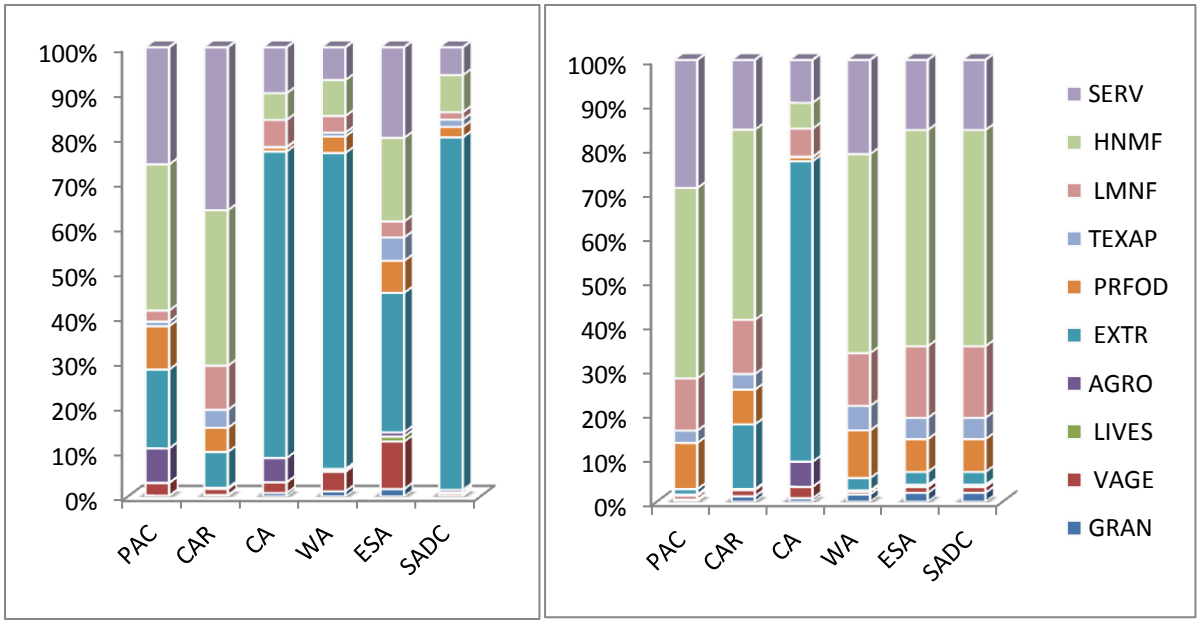

Figure 4.3a Structure of Exports and Imports in 2007(own version based on GTAP 8 database)

According to the baseline data, the extraction industry is a dominant player in the export of African ACP groups, accounting from 31% in East and South Africa to close to 70% in West Africa, Central Africa and SADC of total exports. Light manufacturing, processed food and vegetables also make an important part of their exports. On the other hand, ACP groups' imports are concentrated in heavy manufacturing commodities and services. Together they represent about 58% to 70% of export and imports in Pacific and Caribbean. Light manufacturing, processed food and textile are an important component of imports.

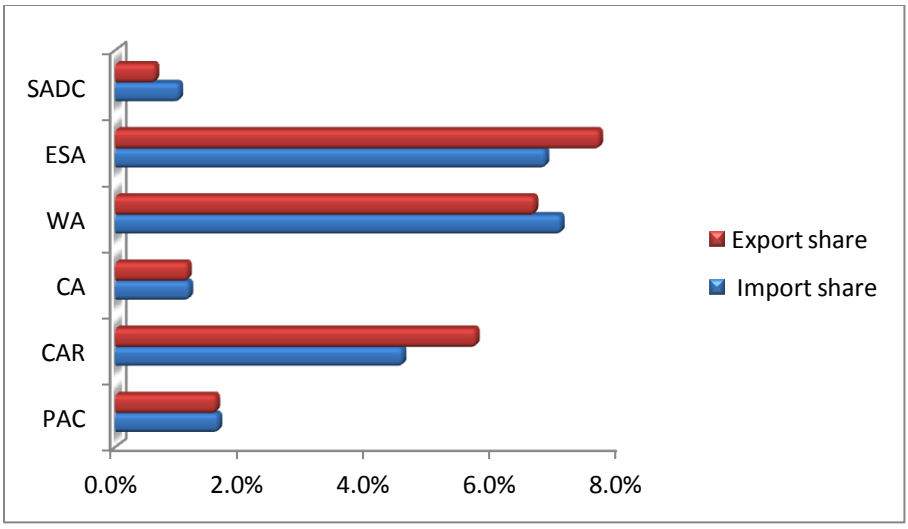

Figure 4.3b Share of intra-regional trade in 2000 (own version based on GTAP 8 database)

Intra-regional trade within ACP groups has been very small despite the existence of overlapping regional agreements in each region. As figure 4.3.3 shows relatively the higher intra-regional trade flow exist in ESA and WA taking about 7 to 8 % of total import and export share of the region. The main regional agreements in these regions are COMESA and ECOWAS. The former comprise all of the countries in ESA plus three countries from SADC. The later contains all ACP countries in West Africa minus Mauritania. The modest intra- regional trade flow takes place in Caribbean (Caricorm) where export and import with in the region account about 5-6% of the total. In the rest of ACP regions, trade with in the region lies below 2% of their total flows.

4.4 Structure of protection

The structure of tariff protection is an important determinant of simulation results. The higher tariff rate creates higher distortion and the larger would be the efficiency gain (decrease in deadweight loss) from tariff dismantling. The protection rates computed from GTAP database is reported in Tables 4.4a, 4.4b and 4.4c. The majority of the protection rates of EU on ACP group imports are very low compared to other regions as it basically corresponds to the Lomé preference, which indicates a potential small gain for ACP from EU´s preferential liberalization.

Table 4.3a EU import tariff on ACP regions (%)

Regions	Average	GRAN	VAGE	LIVES	AGRO	EXTR	PRFOD	TEXAP	LNMF	HMNF
PAC	4.6	5.1	0.14	0.83	0.53	0	28.3	6.2	0.21	0.03
CAR	7.3	9.43	7.89	8.8	1.56	0	33.14	2.23	1.34	0.86
CA	0.5	0.07	3.67	0.02	0	0	0.84	0	0	0
WA	0.2	0.02	0.73	0.02	0	0	1.29	0	0	0
ESA	1.3	0.22	0.26	0.01	0	0	11.58	0	0.01	0
SADC	2.6	0	1.71	0.01	0	0	22.06	0	0	0

Source: GTAP 8 database

In general, protection rates on processed food are high on imports coming from all regions. Particularly Caribbean and pacific face 33% and 28% tariff on processed food. Other commodities that are relatively protected include livestock, vegetables, grain and crops for Caribbean. On the other hand, extraction commodity imported from all regions in to EU faces zero tariffs. The tariffs on light and heavy manufacturing commodities are among the lowest. The average tariff varies across regions. Relatively the average tariff on Caribbean is large (7.3%) as a considerable part of their exports to EU constitute of processed food, particularly sugar with an applied tariff of 134%. The lowest average tariff is faced by West Africa and Central Africa (0.2% and 0.5%, respectively) where more than 50% of their export to EU composed of extraction commodities.

Table 4.3b ACP regions Protection tariff on EU exports (%)

Regions	Average	GRAN	VAGE	LIVES	AGRO	EXTR	PRFOD	TEXAP	LNMF	HMNF
PAC	1.1	0.0	0.7	0.2	0.3	1.0	3.5	2.3	0.7	1.4
CAR	7.2	1.4	11.0	3.8	4.3	2.9	18.1	12.0	6.5	5.3
CA	14.9	10.0	16.5	15.1	11.0	9.8	20.1	24.0	12.7	15.0
WA	9.8	5.2	10.2	10.4	5.1	6.1	15.2	18.1	8.8	9.4
ESA	12.0	3.9	9.4	16.1	6.1	0.3	41.6	13.1	8.4	8.7
SADC	8.2	3.0	8.3	9.2	4.7	2.3	16.0	14.2	10.0	5.9

Source: GTAP 8 database

Table 4.3b presents the sectoral protection rates faced by EU in each of ACP region. Generally, ACP protection rates are high compared to EU´s reflecting the non-reciprocal preference regime. Thus the preferential liberalization of ACP will create potential efficiency gain. Among ACP groups, Central Africa and East and South Africa are highly protected with the average tariff of

14% and 12%, respectively. The highest protection rates are applied in food processing and textile sectors. These sectors include products that are listed as sensitive by ACP groups. Additionally, tariff on import of vegetables, livestock and light manufacturing products are relatively high.

The sectoral protection rate on intra- regional trade in all sectors is low compared to the tariff applied on EU with the exception of Pacific region as shown in table below. This would be explained by the tariff concessions made in the regional agreements. There is heterogeneity across the groups where tariffs are commonly very low in CA and differs by sectors in other ACP groups. Nonetheless, there are potential advantages that can be obtained from further liberalization in ACP groups in agro processing, light and heavy manufacturing sectors.

Table 4.3c ACP tariff on intra-regional imports (%)

Regions	GRAN	VAGE	LIVES	AGRO	EXTR	PRFOD	TEXAP	LNMF	HMNF
PAC	12,65	4,24	1,03	0,07	1,46	13,63	6,57	6,53	8,06
CAR	2,09	3,75	0,82	1,64	0,65	4,01	12,71	1,95	1,96
CA	0,16	0,3	0	0	0	0,6	1,41	0,15	0,07
WA	3,91	3,57	6,78	6,87	0,19	9,12	10,42	9,49	9,79
ESA	0,38	3,57	8,07	9,44	0,61	5,71	3,53	2,44	2,99
SADC	1,49	12,62	2,98	1,99	22,73	15,73	11,8	10,28	6,97

Source: GTAP 8 database

To recapitulate, ACP regions and EU has a very different economic characteristics. EU account for one-third of global GDP whereas ACP accounts for less than two percent. Relatively the most abundant factors are natural resource and unskilled labor in ACP while capital and skilled labor are in EU. This in turn reflected in the production and trade structures of the two regions where the former production and export concentrated in primary commodities while the latters dominated by industrial and service commodities. The asymmetry is also revealed in the flow of trade and tariff structure. EU imports 1.3% from ACP while ACP import one-third from EU. Intra-regional trade account about 60% in EU but in ACP it lies within 1% to 8% of trade flow. The higher tariff applied by ACP region compared to lower tariff applied by EU on ACP export indicates that EU would be the major beneficial of EPA arrangements.

5. Analysis of Simulation Result

This chapter starts by describing the implemented scenarios in GTAP model and discusses the results. The discussion focuses on the relevant aspects of the results by comparing the pre and post shock steady state situations of the economies. The shocks take in to account north-south, north- south-south integration and the corresponding alternative scenarios[8].

5.1 Simulation scenarios

Upon the expiration of the Lomé preference at the end of 2007, Some ACP countries have started implementing the interim EPA while the negotiations for the comprehensive regional EPA are ongoing. The simulation scenarios are inspired by the interim agreement for the trade coverage and exclusion of sensitive products. Accordingly the Preferential liberalization coverage ranges from 86 to 89 percent of commodities imported from EU into ACP group. Selection of sensitive products, which are considered to be exempted from preferential liberalization is done based on the applied tariff ranking (Perez and Karingi, 2007). Commodities with the highest tariff protection rate are excluded from the preferential liberalization which happens to be food processing and textile sectors for all ACP regions. The following two major scenarios are simulated.

1. EPA: EU grants duty-free access to all ACP commodities to its markets while the ACP groups eliminate their tariffs on a substantial portion of their imports from the EU excluding processed food and textiles.

2. ALT: ACP group switch to the alternative trade regime (GSP or EBA). However, it would be unrealistic to consider all ACP exports to enter in to EU under such preferential treatment. In fact empirical studies showed that most of LDC´s and developing countries exports enter in to EU market at the MFN rate[9]. Here it is assumed that the increased

[8] The analysis emphasisze on the standard and standard plus integration scenarios for the sake of simplicity and clarity. The welfare impact of standard plus unlateral libralization scenarios (both EPA and ALT) are lower compared to the other scenarios. The main results of EPA 3 and ALT 3 is provided in the appendex.

[9] Brenton (2003) shows substantial part of actual exports which are eligible for preferences do not enter the partners market with zero or reduced duties but actually pay the MFN tariff.

transaction cost and inefficiency as result of restrictive rules of origin offset the margin of tariff preference[10]. Thus exports of ACP enter the EU market at applied MFN tariff rate with the exception of primary commodities such as extraction and grain where the tariffs remain unchanged since the issue of rules of origin is less appealing[11].

There are two supplementary scenarios to consider the policy option for ACP Groups. The first one is complementing the EPA scenarios by elimination of intra-regional tariffs on all traded commodities within each group. Likewise, ALT scenario is also complementing by full liberalization of intra-regional trade. Table 5.1 gives the description of simulated scenarios.

Table 5.1: Simulation Scenarios

Name	Description	Details
EPA1	Standard EPA	EU removes all import tariffs on ACP while ACP groups remove tariffs on 85 to 90 % of import from EU
EPA2	Standard EPA - integration	EU removes all import tariffs on ACP while ACP groups remove tariffs on 85 to 90 % of import from EU and all tariff on intra-regional trade
ALT1	Standard Alternative	EU charges MFN tariff rate on ACP groups export
ALT2	Standard Alternative -integration	EU charges MFN tariff rate on ACP groups export and ACP removes tariffs on all intra-regional trade

Source: Own formulation

[10] According to Cadot et al.(2006) the difference of MFN tariff and Preferential tariff gives the approximation for the cost of complying with the rules of origin. Ghosh and Rao(2005) used MFN tariff rate to capture effect of rules of origin in Canada- US FTA

[11] The MFN tariffs for ACP groups are calculated using WITS program developed by the World Bank.

5.2 Effect on Trade Flows

The immediate direct effects of tariff change occur on the value of trade flows. As seen from table 5.2a, the EPA scenarios have similar effects on the trade flow across ACP groups. They result in a higher percentage increase of import more than export that lead to the deterioration of their balance of trade. These large increases in import relative to export directly attributed to the asymmetric tariff structure between ACP and EU. The standard EPA increases aggregate export and import by 0.5% and 9.6% in Central Africa, 0.7% and 2.2% in West Africa, and 3.5% and 4.4% in Pacific, respectively. The resulting change in trade deficit is about 132 million USD in Pacific, 1.5 billion USD in Central and West Africa.

The effect is much stronger on bilateral trade between the ACP groups and EU (see appendix II). For instance, import from EU increase by 30% and 52% in West and Central Africa while the export to EU only increases by 2% and 4%, respectively. Other ACP regions relatively register relatively modest increase in export to EU with the exception of Caribbean (40.5% increase in exports and 28.5 increase in imports), where the change in export to EU is larger than import from EU due to the removal of higher applied tariff rates (sugar) compared to the tariff that other region face on their exports.

Table5.2a: Effect on aggregate trade Flows

Regions	EPA1			EPA2			ALT1			ALT2		
	Export (%)	Import (%)	BOT	Export (%)	Import (%)	BOT	Export (%)	Import (%)	BOT	Export (%)	Import (%)	BOT
PAC	3.5	4.4	-133	4.0	5.11	-160	-0.2	-0.39	23	0.3	0.4	-7
CAR	1.02	4.8	-3248	1.6	5.94	-3849	-0.1	2.5	-2121	0.5	3.7	-2722
CA	0.54	9.6	-1478	0.6	9.6	-1476	0.1	-3.20	563	0.1	-3.2	567
WA	0.7	2.2	-1459	2.4	4.8	-2366	-0.5	-0.93	374	1.4	2.1	-671
ESA	2.5	2.9	-471	3.5	3.4	-605	-1.3	-1.74	373	-0.3	-0.6	225
SADC	0.8	3.5	-969	1.13	4.1	-1072	-0.4	-1.0	176	-0.1	-0.2	55
EU	0.2	0.17	1409	0.19	0.1	1926	0.00	-0.01	408	0.0	-0.01	967

Source: Own computation using GTAP8

Note: the unit of measurement for Balance of Trade (BOT) is million USD.

With standard EPA- integration, the change in aggregate trade flows varies from marginal 0.02% increase for Central Africa to a tripling of export and a doubling of import for West Africa owing to the difference in intra-regional tariffs. These in turn slightly improve the trade deficit for Central Africa by 2.4 million USD and significantly worsens trade deficit by raising it to 2.3 billion USD for West Africa. The effect of regional integration on ACP-EU bilateral trade flows is very negligible. It generally tends to lower export to and from EU by small amount and increase the trade within each region.

Under the standard alternative scenario (ALT1), both aggregate exports and imports fall for ACP regions that improved the current account balance for most ACP countries. The drop in export is the result of loss in competitiveness due to the increased tariff that implicitly captures the impact of RoO. Whereas the decline of imports may be associated with the decrease in income attributed to the fall of export earnings. The extent of decline in ACP exports specifically to EU gives the approximation of the trade restricting effect of RoO, which ranges between 5.1% in Pacific, 5.6% in Central Africa 7.6% in SADC and 11.5% in West Africa.

Another relevant issue with regard to simulation scenarios is the impact on intra-regional trade. As it can be seen from the appendix II, the result shows that the standard EPA alone has nothing to do with promoting regional integration with in ACP group. Rather it reduces intra-regional trade on average by 2.1% in East and South Africa compared to 10.3% in Central Africa. Whereas complementing EPA by removing intra-regional tariff promotes deep regional integration in most of ACP regions. The potential increase in trade is 14% in East and South Africa, 20% in Caribbean, 34% in West Africa, over 40% in Pacific and SADC. The exception is Central Africa where the trade erosion effect of standard EPA (-10.3%) is much power full than the trade boosting effect of the integration (2%) which lead to an average decline in regional trade by about 8 %. The standard alternative scenario has little to do with promoting regional trade within ACP groups. It slightly increases by 0.1% in East and South Africa and 0.7% in Central Africa following reduction of Export to EU due to RoO. Perhaps it is the removal of regional tariff that significantly boost intra- regional trade. As a result trade on average increases by 12% in Pacific, 32%in SADC, and over 70% in East and South Africa and West Africa.

5.3 Tariff Revenue effects

One of the major concerns for ACP groups is the impact on revenue that follows the elimination of import tariffs on EU´s Export and the resulting rise of import from EU. Table 5.4 shows that both EPA scenarios reduce the revenue from import tariff by a substantial amount. The percentage loss of revenue is approximately closer to the initial share of tariff revenue collected from commodities exported by EU in Central, West; East and South Africa. The standard EPA results in a revenue loss of 48% (about 758 million USD) in Central Africa, 34% (about 2.8 billion USD) in West Africa and 30% (about 1 billion USD) in East and South Africa. Similarly the loss in West Africa and East and South Africa reach to 40.6 % and 25% of the revenue which is equal to 3.3 and 1.2 billion USD under the standard EPA - integration scenario.

Table 5.3 Effect on ACP regions tariff revenue

		EPA1		EPA2		ALT1		ALT2	
Regions	Initial share	Absolute change	% change	Absolute change	% change	Absolute change	% change	Absolute change	% change
PAC	4.8	7.4	0.9	-18	-2.3	-2	-0.2	-27	-3.5
CAR	16.0	-506	-10.6	-637	-13.4	171	3.6	43	0.9
CA	46.0	-758	-47.9	-759	-48.0	-54	-3.4	-55	-3.5
WA	31.0	-2811	-34.4	-3319	-40.6	-73	-0.9	-648	-7.9
ESA	23.0	-1072	-21.9	-1238	-25.3	-98	-2.0	-273	-5.6
SADC	37.0	-542	-30.0	-590	-32.7	-15	-0.9	-68	-3.8

Source: Own computation using GTAP8

Note: the absolute change is measure in terms of millions of USD

The trade flow effects of the alternative scenarios (ALT1 and ALT2) reflect the likely impact on the fiscal revenue. The revenue declines following the fall in the volume of import for all ACP groups. Central Africa, West Africa, and East and South Africa lose 54 million USD (3.4%), 73 million (1%) and 98million USD (2%), respectively without removing any tariff. By removing intra- regional tariff the revenue loss reaches 55 million USD (3.5), 648 million USD (8%) and 273 million USD (5.6%) for Central Africa, West Africa and East and South Africa, correspondingly.

5.4 Effect on Economic Structure

5.4.1. Effect on production Structure

One of the advantages of a general equilibrium model is that it permits to study the implications of the simulation scenarios on the production structure. As showed in table 5.4, EPA scenarios increase production of agriculture, processing and service sector while decreasing the output of industry. The effect is stronger on the value added contributions of the sectors (see table 5.4b in appendix 3). The increase in agriculture and food processing sector output might be linked to the comparative advantage that ACP groups have, which is indicated by the abundance of land and unskilled labor. While the increase in service production may be associated with the use of capital and skilled labor freed from the industry sector. Under standard EPA scenario, production of agriculture and processing increase by 5.6% and 14.8% in Pacific, 1.8% and 5.8% in Caribbean and 1.7% and 8.5% in SADC, respectively. These positive effects on the production of agriculture, food processing and service are magnified under the standard EPA- integration scenario attributed to the rise in regional market access.

Table 5.4a Effect on Sectoral Production under different Scenarios

Scenarios	Sectors	PAC	CAR	CA	WA	ESA	SADC
Standard EPA (EPA1)	Agriculture	5.58	1.84	0.2	-0.04	0.41	1.7
	Processing	14.77	5.76	0.02	0.32	2.1	8.48
	Industry	1.01	0.13	-3.99	-0.98	-0.22	-1.16
	Service	1.21	1.68	1.81	0.29	0.25	0.67
Standard EPA Plus (EPA2)	Agriculture	5.75	1.85	0.2	0.32	0.49	1.84
	Processing	15.17	5.95	0.03	1.58	2.38	8.94
	Industry	1.36	1.83	-4.01	3.86	0.11	-0.8
	Service	1.36	2.01	1.81	1	0.41	0.81
Standard Alternative (ALT1)	Agriculture	0.04	1.49	-1.32	0.44	-0.33	-0.13
	Processing	1.16	5.77	-0.55	-3.14	-1.44	-1.04
	Industry	-0.87	-2.34	-1.98	-0.33	-2.89	-1.21
	Serivce	-0.11	1.17	-1.31	-0.34	-0.5	-0.3
Standard Alternative (ALT1)	Agriculture	0.04	1.49	-1.32	0.44	-0.33	-0.13
	Processing	0.58	2.88	-0.28	-1.57	-0.72	-0.52
	Industry	-0.33	-0.39	-1.1	-0.22	-1.13	-0.5
	Service	0.11	4.98	-4.83	2	-0.7	-0.55

Source: Own Simulation using GTAP 8

As the result of the intense competition from the EU manufactures, industry output shrinks largely under EPA than the alternative scenarios. The deindustrialization effect is stronger under the standard EPA reducing value added by 12.3% in Central Africa, 6.3% in Caribbean, 4.5 in SADC and 4.4 in Pacific. However the standard EPA plus(EPA2) scenario counters it by increasing the industry value added by 2.7% in West Africa and minimizing the extent of deindustrialization in the rest of ACP groups. With regard to the alternative scenarios, both production and value added of industry tends to decline following the decline in access to EU market as result of Rules of origin. Once again, regional integration helps to offset the decline in market access by increasing internal access.

5.4.2 Effect on resource Employment

The total employment of factors such as capital, skilled labor, land and natural resources remain unchanged because of the adopted full employment model closure. Since unskilled labor supply for the ACP group is allowed to adjust at fixed wage rate, its aggregate employment changes following the change in demand by sectors. As it can be seen from figure 5.4, there are increases in unskilled labor employment under the standard EPA scenario ranging from 0.6% in East and South Africa to 4.1% Caribbean. The regional integration further increases unskilled labor employment to 1% in East Africa and 4.9% in Caribbean. These expansions are linked to the increase in production of agriculture and food processing. The converse is true under the alternative scenarios by leading to unemployment of unskilled associated with contraction of production. It is also observed that employment increases in West Africa by about 0.7% under the standard alternative- integration.

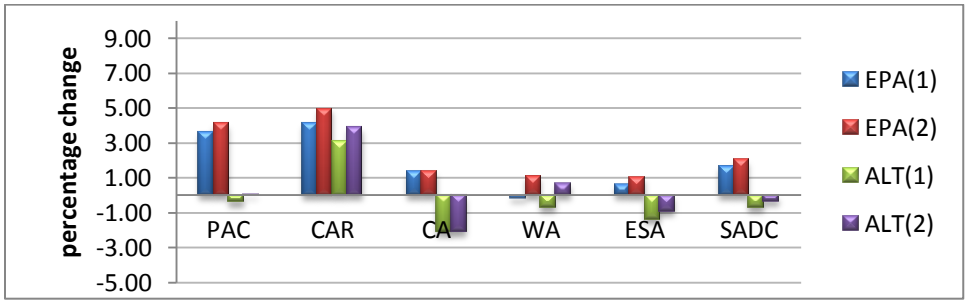

Figure5.4 Percentage change in unskilled labor employment (own Simulation using GTAP 8)

5.5 Effect on Welfare and Income

5.5.1. Welfare Effect

Welfare effect in the GTAP framework is given by equivalent variation (EV) which is a monetary metric that estimate the amount of money that has to be taken away (given) from (to) regional household at initial prices in order to leave the regional household as well off as after the change in price. In general EPA scenarios leave all ACP groups better off than the alternative scenarios. The alternative scenarios involve reversal of liberalization for some commodities that involve processing in an attempt to capture the implicit cost of complying with the requirements of rules of origin. Caribbean is a special case where the applied MFN tariffs calculated by WITS are lower than the applied tariff in GTAP data base.

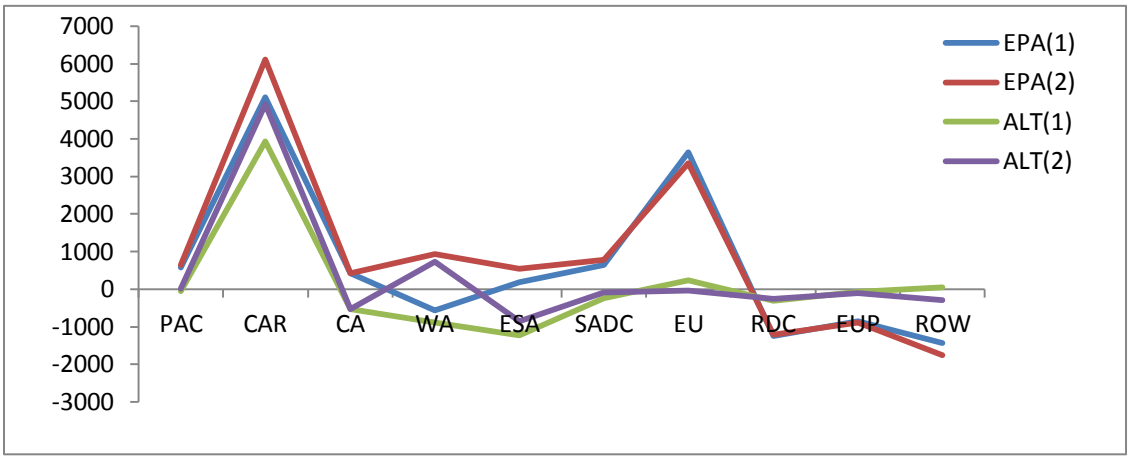

Figure 5.5a welfare effect of different scenarios in million $ in 2007(own simulation using GTAP 8)

As expected, EU is a major gainer from EPA since it has a well-diversified and competitive economy that already has lower import tariffs on ACP exports. The expansion of market access to protected ACP region through EPA generates welfare gain of 3638 million USD in standard EPA and 3361 million USD in Standard EPA-integration. The welfare effect is mainly due to allocative efficiency, which is associated with the reduction is deadweight loss of tariff, and terms of trade effect, which is a rise in export prices (FOB) relative to import prices (CIF). The endowment effect is ruled out as a result of the full employment closure adapted to EU which kept the factor supply fixed.

From the ACP group, it is the Caribbean that derives large benefit. The possible explanation for such stems from the combined effect of the tariff protection structure and the exclusion of processed food from preferential liberalization. As presented it the previous chapter, the weighted tariffs in Caribbean for all commodities imported from EU is lower (average tariff 7.2% compared to 12% in East and South Africa and 14% in Central Africa) while the tariff imposed by EU on CAR is highest compared to the other ACP groups because of higher share of processed food export to EU, specifically sugar. Under such circumstance the preferential liberalization likely to generates higher welfare gains for Caribbean. In contrast West Africa, which face relatively low weighted tariffs and impose high tariffs on EU´s export, experiences welfare loss of 560 $ million under the standard EPA scenario.

Table 5.5a Welfare Decomposition of Different Scenarios (%)[12]

Regions	EPA 1			EPA2			ALT 1			ALT 2		
	A.Efficiency	TOT	Endowment	A.Efficency	TOT	Endowment	A.Efficency	TOT	Endowment	A.Efficency	TOT	Endowment
PAC	129	170	272	145	184	306	-18	-11	-31	-1	4	5
CAR	1319	647	2850	1582	765	3427	1062	580	2115	1322	698	2681
CA	81	-16	237	80	-14	238	-143	-92	-369	-144	-89	-368
WA	-303	-201	-103	208	13	672	-313	-127	-444	223	106	406
ESA	-153	-45	332	-80	7	555	-248	-194	-738	-173	-138	-498
SADC	167	67	321	211	101	385	-70	-63	-142	-23	-25	-71

Source: Own Simulation using GTAP 8

All the remaining ACP regions experience relatively smaller welfare gain from the standard EPA ranging from 181 million USD for East and South Africa to 650 for SADC. The endowment effect, which accounts for the change in employment of factors of production, is the main component of the welfare as shown by table 5.5a. This is attributed to the unemployment closure that fix wage and allow supply to adjust to changes in demand for unskilled labor in ACP groups. The welfare loss from the standard alternative scenarios reach 60 million USD for Pacific, 237million USD for SADC, 527million USD for Central Africa, 887 Million for West Africa and 1235 million USD for East and South Africa. The estimated welfare cost of RoO as percentage of export earning is 0.4% in SADC, 1% in West Africa, 2.2% in Central Africa and 2.7% in East

[12] The allocative efficiency captures the effect on the deadweight loss, terms of trade(TOT) shows the change in export price relative to import price and the Endowment effect accounts for the effect change in the use of factors of production (Burfisher,2011).

and South Africa. It is worth to report from GTAP sub total utility that the reciprocal tariff removal generates very small welfare gain only for Central Africa and SADC.

5.5.2 Trade Creation and trade Diversion Effects

Most of the discussion in the literature centered on trade creation and trade diversion effects of preferential liberalization. In GTAP model, these effects are associated with the allocative efficiency gain or loss as a result of change in import tariff (Hertel et al., 2007). As it can be seen from the first and second column of table 5.1b, the trade creation effect dominates trade diversion under the EPA scenarios. The standard EPA lead to a positive efficiency gain of 33 million USD for Pacific, 124 million USD for Caribbean, 7 million USD for Central Africa and 12 million for SADC. While West Africa, East and South Africa along with other regions outside EU-ACP experience a net trade diversion effect. Overall trade creation effect is strong leading to global efficiency gain of 146 and 156 million USD under the standard EPA and standard EPA-integration, respectively.

Table 5.5b Trade Creation and Trade Diversion Effects (USD Million)

EPA3	EPA 1	EPA2	ALT 1	ALT 2
PAC	33,44	32,57	-1,86	-2,84
CAR	124,78	139,14	169,67	185,98
CA	7,86	6,92	-53,41	-54,24
WA	-378,52	-352,33	-71,45	-73,63
ESA	-109,68	-122,36	-97,08	-114,54
SADC	12,21	23,51	-15,3	-5,1
EU	699,69	694,47	118,73	108,42
EUP	-163,39	-185,38	-0,78	-24,1
RDC	-34,04	-35,76	-2,99	-4,94
ROW	-45,89	-48,02	8,78	6,48
Total	146.46	152.76	54.32	21.49

Source: Own computation Using GTAP 8

From the third and the fourth columns of table 5.1b, we see that there is a net efficiency loss for five of ACP regions and two of non ACP regions under the alternative scenarios. However, the

extent of trade diversion is reduced for non ACP regions compared to the corresponding loss under the EPA scenarios and generating smaller total positive efficiency gain.

5.5.3 Real GDP growth Effect

It is interesting and informative to look at the potential consequences of the scenarios on growth of real GDP. Figure 5.5b displays the impact on real GDP growth of different scenarios. As it can be seen from the figure the effect of EPA and alternative scenarios are more pronounced. For most of the ACP groups with the exception of West and Central Africa, the growth of real GDP is positive under the EPA scenarios. Particularly Pacific and Caribbean register an average 3.0% and 3.5%, respectively. The ACP groups in SSA experience very small real GDP growth ranging from 0.22% in East and South Africa to 0.8% in SADC under standard plus integration scenario.

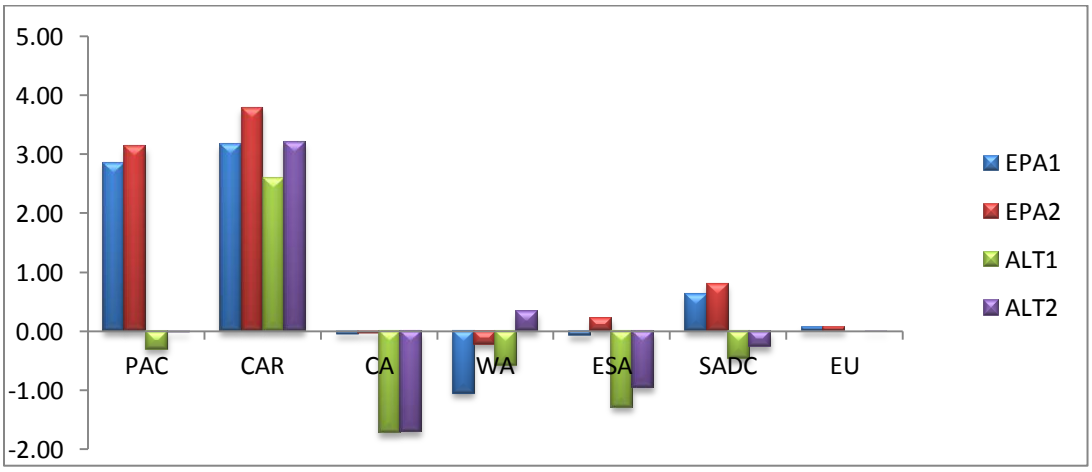

Figure 5.5b Real GDP growth effects of different Scenarios (Own Simulation using GTAP 8)

Whereas under the alternative scenarios all of ACP groups register negative real GDP growth rate with the exception of Caribbean with an average growth rate of 2.9% and West Africa with rate of 0.33% under the standard alternative-integration scenario. The declines in market access as a result of RoO lead to the contraction of exports and thereby production and employment of unskilled labor. These in turn resulted in the reduction of real GDP. It is observed that West Africa registers better real GDP growth under the alternative scenario with integration which indicates that the regional market has good potentials to outweigh the adverse effect of RoO.

5.6 Sensitivity Analysis

The main critics of general equilibrium results are that the magnitude and the directions of simulation result largely being determined by the size of elasticity parameters and the type of factor market closure assumed (Francois and Reinert, 1997). This section presents the sensitivity test of key results with respect to elasticity of substitution between imported and domestic goods and model closure.

5.6.1 Sensitivity Analysis With respect to Elasticity

In trade policy analysis particularly, import substitution elasticity is a crucial parameter of the model since it defines how easy it is to shift between domestically produced and imported commodities. For this study the sensitivity analysis of the results, with respect to elasticity of substitution between domestic commodity and imports are performed using GTAP utility called systematic sensitivity analysis by varying the elasticity value between 0% and 100 %[13](Burifisher,2011).

The sensitivity test of trade flows confirms the expansion of exports for East and South Africa, SADC and EU under both EPA scenarios and for West Africa only with the integration with 75% confidence level (see table 5.5a in appendix 4). Similarly the contraction of exports is robust for East and South Africa and SADC under the alternative scenarios except for West Africa that experience an increase in export at 75% confidence level with the integration scenario. The increase in the value of imports is robust for all ACP groups and EU.

The sensitivity analysis of welfare revealed that at 75% confidence level only SADC and EU experience welfare improvement under the standard EPA (see figure 5.5a). Although the model result suggest that Pacific, Caribbean and East and South Africa also derive welfare gain, we cannot be 75 % confident that welfare improves instead worsening. Under the standard EPA – integration, welfare increases at 75% level of confidence for West Africa in addition to EU and

[13] The utility generates the mean and standard deviation for every exogenous variable. The confidence levels of the results are calculated using Chebyshev´s theorem that states for any set of observation; 75% lie within the two standard devations of the mean, 89% lie within three standard deviation of the mean and 95% lie within 4.47 standard devations of the mean.

SADC. It is interesting to note that none of the ACP group register welfare decline that is robust at 75% level of confidence under either of EPA scenarios.

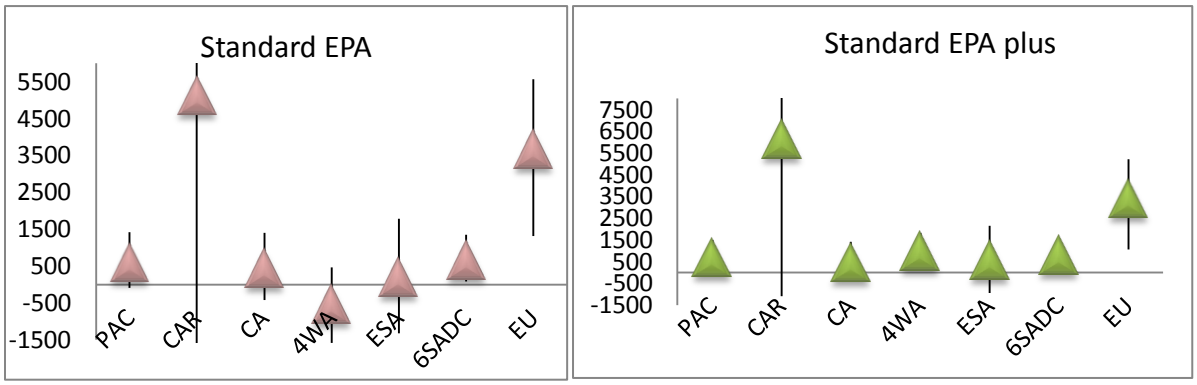

Figure 5.6a Sensitivity Analysis of Welfare under EPA Scenarios (own computation)

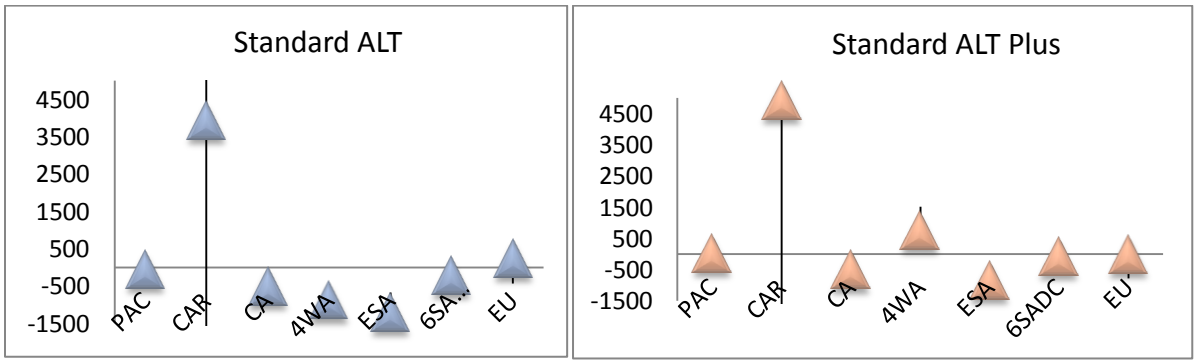

Figure 5.5b Sensitivity Analysis of Welfare under Alternative Scenarios (own Computation)

Likewise under the standard alternative, which meant to approximate the cost of rules of origin, there will be welfare reduction for all ACP regions except Caribbean at 75 % level of confidence. The positive welfare gain for EU is not robust enough in both scenarios. Nonetheless, complementing the standard scenario with regional integration helps West Africa to jump from welfare decline to robust increase at 75% level of significance.

The sensitivity analysis of real GDP growth suggests that under EPA scenarios, neither the increase nor the decrease in real GDP is found to be robust for all ACP regions at 75% confidence level except for EU. As it can be seen from table 5.5a, the decline of real GDP growth is confirmed at 75% confidence level in Central Africa, West Africa, East and South Africa, and SADC under the standard alternative scenario.

Table 5.6a Sensitivity Analysis of real GDP growth with respect to elasticity of substitution

Regions	EPA(1)		EPA(2)		ALT(1)		ALT(2)	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
PAC	-0.57	7.07	-0.32	7.4	-0.59	0.01	-0.27	0.29
CAR	-1.4	9.44	-1.02	10.46	-1.95	8.77	-1.48	9.68
CA	-3.09	3.39	-3.08	3.4	-3.24	-0.48	-3.21	-0.49
WA	-1.75	-0.35	-0.73	0.39	-0.88	-0.28	-0.03	0.85
ESA	-1.66	1.58	-1.35	1.89	-1.89	-0.69	-1.5	-0.42
SADC	-0.5	1.98	-0.35	2.21	-0.65	-0.29	-0.37	-0.13
EU	0.01	0.13	0	0.12	-0.03	0.01	-0.03	0.01

Source: Owen computation using GTAP8

5.5.2 Sensitivity Analysis With respect to Factor Market Closure

Factor market closure is another crucial assumption that affects the simulation results. Switching from unemployment to full employment model closure for unskilled labor has two effects. On one hand, it reduced the projected welfare gains and real GDP growth at least by 371 million USD and 1.05% in Pacific, 4.1 billion USD and 1.6% in Caribbean, 294 million USD and 0.5% in Central Africa, 414 million USD and 0.21% in East and South Africa and 432 million USD and 0.34% in SADC under EPA scenarios effects (see table 5.5b in appendix 4). As unskilled labor is assumed to be fully employed producers has to compete with each other to increase production which bids up wages and increase cost of production that is transmitted to consumers in the form of higher prices. As result exports decline. The decrease in income due to lower exports earnings will in turn decrease the demand for imports and thereby consumer welfare.

On the other hand, the extent of the welfare loss and real GDP contraction are minimized by 42 million USD and 0.1% in Pacific, 467 million USD and 0.9% in Central Africa, 623 million USD and 0.1 % in West Africa, 916million USD and 0.5 % in East and South Africa and 190 million USD and 0.15% in SADC under the standard alternative scenario. This is due to the fact that under full employment assumption there will be no loss of productive capacity (unemployment of unskilled labor) because of the reduced access to EU´s market. Instead the fall in the demand for unskilled labor as result of the decrease in production derives wages down which decrease production costs and passed to consumer through lower prices. Consequently, exports , income and then import tend to rise which will end up increasing welfare.

6. Summary and Conclusion

This study aimed at evaluating the economic impacts of a change in trade regime between the EU and the six ACP regions and testing the sensitivity of the results to elasticity and model closure using GTAP model. Four scenarios were implemented: the first is standard EPA where ACP groups reciprocate by removing tariffs on substantial amount (85% to 90%) of export from EU, the second is standard EPA plus where the ACP complement the standard EPA with deep regional integration, the third is the standard alternative where most of ACP export to EU assumed to face MFN tariff in order to approximate the cost of rules of origin, the last one is standard alternative plus by which ACP groups remove intra-regional tariffs.

The immediate effects of tariff changes are revealed on the trade flows. All of the ACP regions experience an expansion of imports higher than exports which resulted in balance of trade deficit under the EPA scenarios. As many of empirical studies pointed out, the extent of trade expansion is more evident between ACP and EU (Keck and Piermartini, 2008; Perez and Karingi, 2007). The share of import from EU rose by 24% in Caribbean to 52% in Central Africa. ACP group export to EU increased by 2% in West Africa to 40% in Caribbean. Under the standard alternative scenario, ACP exports to EU declines. The extent of trade restriction due to rules of origin lies between 5% to 11% , which is in the lower bound estimate (8 % to 22%) found from gravity model (Augier et al., 2005). The increase in imports from EU coupled with the elimination of tariff on substantial part has worsen the revenue loss which amounts to 48% in central Africa, 34% in West Africa, 30% in SADC and 22% in East and South Africa.

The effect on the structure of production signaled that EPA alone would lead to deindustrialization and may end up promoting the sectors that ACP regions have comparative advantages. The estimated reduction in industrial value added is 4.5% in SADC, 6.3% in Caribbean and 12.2% in Central Africa. It is also observed that such effects are not peculiar to EPA scenarios. Industrial production shows decline for most ACP regions under alternative scenarios. In this regard implementing deep regional integration help to reduce the deindustrialization effect and further promotes industrialization in West Africa.

In terms of welfare, it is observed that standard EPA scenarios tend to leave most of ACP groups better off than the alternative scenarios. With the exception of West Africa, all ACP regions experience welfare improvement under the standard scenario. The welfare improvement is further enhanced with deep regional integration delivering 425 million USD for Central Africa, 538 million USD for East and Central Africa, 582 Million for Pacific, 782 million USD for SADC and 943 million USD for West Africa. The main beneficiary under all scenarios is EU where the main source of the welfare gain is allocative efficiency and terms of trade effects.

Under the standard alternative scenarios most of ACP regions with the exception of Caribbean are worse off. This does not seem to be the case in studies where the counterfactual is simulated using GSP tariff rates that doesn´t consider the effect of RoO (Perez, 2007; Bouët et al., 2007). This indicates that switching to general preference trade regime may give rise to allocative inefficiency costs which are about 0.5% of export earnings in Pacific, 1% in West Africa, 2.2% in Central Africa and 2.7 % in East and South Africa. This approximation of aggregate cost of rules of origin is within the estimate ranging from 1.4% to 5.7% of the export earnings of European Free Trade Association (Goldfarb, 2003).

In GTAP framework, trade creation and diversion effects are associated with the efficiency gain or loss as a result of change in import tariff. The result show that trade creation is the dominant effect in Pacific, Caribbean, Central Africa, SADC and EU while trade diversion dominates in West Africa, East and South Africa and rest of the regions under EPA scenarios. In Contrast the efficiency loss under the alternative scenarios attributed to the rules of origin is a common case for most ACP countries while the non-ACP countries experience lower trade diversion and in some case trade creation. Overall, trade creation dominates trade diversion leading to a positive net efficiency gain under all secnarios.

The direction of real GDP growth effect on ACP regions follows the allocative efficiency effect. Most of the ACP regions register a positive real GDP growth under the EPA scenarios ranging from 0.2% in East and South Africa to 3% in Caribbean and slightly negative real GDP growth under the alternative scenarios. West Africa is a special case where the impact is negative as implied by the strong efficiency loss under EPA scenarios. Similar pattern of effect is also observed on employment of unskilled labor.

The main critics on general equilibrium results are centered on parametric uncertainty and the choice of factor market closure. The sensitivity of the key model results is tested with respect to elasticity of substitution between domestic and imported goods. The outcome indicates that given the framework of GTAP, the improvement of welfare is robust in West Africa, SADC and EU at 75% level of confidence only under EPA scenarios. However neither the positive nor the negative effects on real GDP growth is robust under all scenarios.

The change of factor market closure from unemployment to full employment generated two different effects for EPA and ALT scenarios. On one side, the estimated welfare and real GDP growth declines in case of EPA scenarios as the increase in labor cost transmitted to higher consumer prices that that decrease, export, income and consequently welfare. On the other side welfare and real GDP improved in case of the alternative scenarios as the decline in market access derives wages down, which decrease prices thereby rising exports, income and welfare.

In conclusion, this study pointed out that the trade components of EPA would not make of ACP regions worse off than the alternative considering rules of origin if not certainly well off as indicated by the welfare effects. However, the effect on production structure show that ACP regions may end up with specializing in agricultural and food processing sector and might leave ACP regions without industrial development which is a potential challenge of economic development. Perhaps, promoting deep integration within each region would help to counter the adverse effect on industry sector and foster the benefit of liberalization. Moreover, the substantial public revenue losses would have adverse effect on ACP regional economies, which is not integrated in this study because the limitation of the GTAP model.

This study tried to look at the economic implications of EPA focusing on preferential liberalization of merchandize trade in line with the old regionalism. The comprehensive EPA negotiations go beyond the scope of old regional integration and incorporate elements of new regionalism such as service trade, investment, public procurement and trade facilitations. Thus, considering these elements in future studies would give a comprehensive estimate of the economic impact of EPA.

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Appendix I: ACP countries Market Access outlook

	EPA (9 LDCs, 26 non-LDCs)	EBA (32LDCs)	GSP(10 non-LDCs)
Caribbean	Antigua & Barb Bahamas Barbados Belize Dominica Grenada Guyana Haiti Jamaica St Kitts & Nevis St Lucia St Vinc & Gren. Surinam Trinidad &Tob		
Central Africa	Cameroon	Central African Rep. DR Congo Chad Equatorial Guinea São Tome	Gabon Rep. Congo
Eastern and South Africa	Burundi Comoros Kenya Madagascar Mauritius Rwanda Tanzania Uganda Seychelles Zimbabwe	Djibouti Eritrea Ethiopia Malawi Somalia Sudan Zambia	
Pacific	Papua New Guinea Fiji	East Timor Kiribati Samoa Solomon Islands Tuvalu Vanuatu	Cook Isls Tonga Marsh. Isls Niue Micronesia Palau Nauru
West Africa	Côte d'Ivoire Ghana	Burkina Faso Cape Verde[2] Gambia Guinea Guinea Bissau Liberia Mali Mauritania Niger Senegal Sierra Leone Togo	Nigeria
SADC	Botswana Lesotho Namibia Mozambique Swaziland	Angola	

Appendix II: Regional and Sectoral Aggregation

Regions	Countries
Pacific	Cook Islands, Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga,Tuvalu, Vanuatu.
Caribbean	Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, St. Kitts and Nevis, St Vincent and the Grenadines, Surinam and Tobago.
Central Africa	Cameroon, Central Africa Republic, Chad, Congo, Equatorial Guinea, Gabon, Sao Tome and Principe.
West Africa	Benin, Burkina Faso, Cape Verde, Cote Divoire, Gambia, Ghana, Guinea-Bissau, Liberia, Mail, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo.
East and Southern Africa	Burundi, Comoros, Democratic Republic of Congo, Dijbuti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Uganda, Zambia, Zimbabwe.
SADC	Angola, Botswana, Lesotho, Mozambique, Namibia, Swaziland, Tanzania.
European Union	27 European Union member Cauntries
Countries that have PTA with EU	Argentina, Brazile,cyprus, paraguy, uraguay, Chile, Turky, Isarel, Egypt, Morocco, Tunisia
Rest of Developing country	Rest of Developing Countries
Rest of the World	Rest of developed Countries

Table 3.3b: Sectoral aggregation

Sectors	
Grain and crops	Paddy Rice, Wheat, Cereal Grains, Sugar Cane.
Food processing	Meat, Meat products nec, vegetable oil, Dairy Products, Processed Rice, Sugar, Food Products, Beverage and Tobacco.
Livestock	Cattle-sheep- Goats- Horses, Animal Products, Raw Milk, Wool
Vegetable and beverage	Vegetable- fruits- nuts, oil seeds, crops nec.
Agro processing	Forestry, Fishing.
Oil and Mineral	Coal, oil, Gas, Mineral Nec.
Textile and clothing	Textile, wearing Apparel.
Light Manufacturing	Leather products, wood products, paper products, petroleum, chemical.
Heavy manufacturing	Mineral Product, Ferrous metals, metals nec, metal products, motor vehicles, transport equipment, electronic equipment machinery, manufactures nec.
Service	Electricity, Gas Manufacture, water, constriction, trade, transport, sea transport, air transport, communication, financial services, insurance, business services, recreation, public administration, Dwellings.

Appendix III: Effect on Bilateral trade flows (%)

EPA1	PAC	CAR	CA	WA	ESA	SADC	EU
PAC	-0.827	-5.75	-20.485	-16.282	-12.04	-10.962	22.474
CAR	2.901	-1.958	-17.386	-12.763	-8.694	-7.143	40.496
CA	11.756	6.107	-10.324	-5.456	-1.143	0.81	4.25
WA	5.52	6.13	3.12	0.7	2.22	4.51	1.97
ESA	10.59	5.059	-11.221	-6.387	-2.148	-0.196	8.311
SADC	8.562	3.151	-12.762	-7.986	-3.812	-1.84	16.348
EU	12.869	28.55	52.474	30.397	28.706	26.749	-0.341
EPA2	**PAC**	**CAR**	**CA**	**WA**	**ESA**	**SADC**	**EU**
PAC	39.56	-6.989	-20.905	-18.246	-14.841	-12.721	21.849
CAR	2.11	20.43	-17.878	-14.904	-11.611	-9.036	39.42
CA	11.663	5.369	-8.471	-7.165	-3.679	-0.549	4.198
WA	2.46	3.52	-0.27	34.7	-0.57	1.55	-1.41
ESA	9.896	3.765	-11.601	-8.563	14.245	-2.068	7.665
SADC	8.036	2.041	-13.012	-9.981	-6.635	128.796	15.819
EU	12.859	28.11	52.758	28.547	25.279	25.04	-0.327
ALT1	PAC	CAR	CA	WA	ESA	SADC	EU
PAC	-0.014	5.094	-2.789	-1.451	-2.421	-1.092	-5.094
CAR	-6.312	-1.316	-9.139	-7.695	-8.535	-7.478	23.408
CA	3.786	9.032	0.763	2.208	1.171	2.545	-5.634
WA	1.48	5.17	-1.13	0.64	-0.26	0.74	1.9
ESA	2.829	8.101	-0.235	1.295	0.127	1.569	-11.804
SADC	1.338	6.518	-1.588	-0.166	-1.201	0.149	-7.686
EU	0.146	5.278	-2.65	-1.305	-2.294	-0.937	-0.013
ALT 2	**PAC**	**CAR**	**CA**	**WA**	**ESA**	**SADC**	**EU**
PAC	-0.014	5.094	-2.789	-1.451	-2.421	-1.092	-5.094
CAR	-6.312	-1.316	-9.139	-7.695	-8.535	-7.478	23.408
CA	3.786	9.032	0.763	2.208	1.171	2.545	-5.634
WA	1.48	5.17	-1.13	0.64	-0.26	0.74	1.9
ESA	2.829	8.101	-0.235	1.295	0.127	1.569	-11.804
SADC	1.338	6.518	-1.588	-0.166	-1.201	0.149	-7.686
EU	0.146	5.278	-2.65	-1.305	-2.294	-0.937	-0.013

Source: Own computation Using GTAP8

Appendix IV: Effect of EPA scenarios on value added by sectors (%)

Scenarios	Sectors	PAC	CAR	CA	WA	ESA	SADC
Standard EPA (EPA1)	Agriculture	9.9	4.7	0.4	0.1	0.6	2.6
	Processing	14.8	5.8	0.0	0.3	2.1	8.5
	Industry	-4.4	-6.3	-12.3	-2.7	-0.9	-4.5
	Service	0,04	1,49	-1,32	0,44	-0,33	-0,13
Standard EPA Plus (EPA2)	Agriculture	10.3	4.9	0.4	0.7	0.8	2.8
	Processing	15.2	5.9	0.0	1.6	2.4	8.9
	Industry	-0.9	-0.4	-3.1	2.7	0.0	-0.9
	Service	1,36	2,01	1,81	1	0,41	0,81
Standard Alternative (ALT 1)	Agriculture	0.6	4.1	-0.5	-0.6	-0.7	-0.4
	Processing	1.2	5.8	-0.6	-3.1	-1.4	-1.0
	Industry	-0.7	-3.2	-1.2	-0.1	-1.9	-0.8
	Service	-0,11	1,17	-1,31	-0,34	-0,5	-0,3
Standard Alternative (ALT2)	Agriculture	1.1	4.3	-0.5	0.2	-0.5	-0.2
	Processing	1.6	6.0	-0.5	-1.8	-1.1	-0.5
	Industry	-0.5	2.2	-1.2	3.4	-1.7	-0.5
	Service	0,04	1,49	-1,32	0,44	-0,33	-0,13

Source: Own computation using GTAP8

Appendix V: Sensitivity Analysis of Export and Imports under

Exports	EPA(1)		EPA(2)		ALT(1)		ALT(2)	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
PAC	-0.31	7.93	0.04	8.72	-0.52	0.08	-0.07	0.81
CAR	-0.89	2.91	-0.61	3.75	-1.4	1.2	-1.08	1.96
CA	-2.57	3.63	-2.55	3.65	-0.5	0.86	-0.48	0.88
WA	-0.05	1.47	1.01	4.01	-0.79	-0.27	0.51	2.55
ESA	1.08	4.16	1.69	5.53	-1.8	-0.8	-0.64	0.16
SADC	0.07	1.83	0.22	2.26	-0.54	-0.18	-0.18	0.1
EU	0.11	0.27	0.12	0.28	-0.02	0.02	-0.01	0.03
Imports	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
PAC	-0.22	9.86	0.35	10.83	-0.8	0.04	-0.08	0.92
CAR	0.42	10.82	1.46	12.3	-2.14	8.86	-1.05	10.23
CA	8.44	11.36	8.46	11.38	-5.36	-1.36	-5.35	-1.35
WA	1.62	2.86	3.39	6.63	-1.32	-0.52	0.89	3.65
ESA	1.46	4.54	2.19	5.91	-2.36	-1.08	-1.15	-0.03
SADC	1.54	5.9	2.02	6.78	-1.3	-0.58	-0.45	0.11
EU	0.08	0.24	0.07	0.23	-0.03	0.01	-0.04	0

Source: Own computation using GTAP8

Appendix VI: Sensitivity of Key results to full employment closure

Regions	EPA(1)		EPA(2)		ALT(1)		ALT(2)	
	welfare change	GDP gorwth change	welfare change	GDP gorwth change	welfare change	GDP gorwth change	welfare change	GDP gorwth change
PAC	-375.1	-1.05	-423.2	-1.19	42.2	0.11	-7.47	-0.02
CAR	-4101.1	-1.64	-4930.7	-1.98	-3063.2	-1.23	-3880.8	-1.57
CA	-294.53	-0.56	-298.75	-0.57	467.69	0.94	463.24	0.94
WA	131.5	0.01	-941.07	-0.15	623.09	0.09	-573.27	-0.09
ESA	-414.3	-0.21	-690.17	-0.35	916.8	0.46	618.31	0.3
SADC	-432.68	-0.34	-522.53	-0.42	*190.29*	*0.15*	*89.93*	*0.06*
EU	47.35	0.0	19.31	0,0	*85.95*	*0.0*	*64.78*	*0.0*
	Export	**Import**	**Export**	**Import**	**Export**	**Import**	**Export**	**Import**
PAC	-0.53	-1.06	-0.62	-1.21	0.06	0,12	-0,02	0,0
CAR	0.33	-1.87	0.37	-2.26	0.29	-1,39	0,34	-1,8
CA	0.27	-1	0.25	-1.02	-0.54	1,62	-0,55	1,6
WA	-0.01	0.05	-0.1	0.35	0.04	0,23	-0,05	-0,2
ESA	-0.13	-0.2	-0.21	-0.33	0.23	0,42	0,16	0,3
SADC	-0.11	-0.52	-0.14	-0.63	*0.04*	*0,23*	0,01	0,1
EU	-0.01	0.0	-0.01	0.0	*0.0*	*0,01*	0,00	0,0

Source; Own computation using GTAP8