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EFFECTS OF EU SUGAR TRADE REFORMS ON POOR HOUSEHOLDS IN AFRICA A GENERAL EQUILIBRIUM ANALYSIS

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Abstract

This paper analyses the effects of the EU sugar reforms on poor households in African countries. Our analysis will be based on a modified version of the GTAP computable general equilibrium (CGE) framework. This is a preliminary analysis of a broader study which has the intention to analyse the impact of the EU sugar regime reform in the Sugar Protocol (SP) which by 2008 will become one of the agreements of the Economic Partnership Agreements (EPA). The scope of the study is to evaluate the effects produced in those countries sugar cane producer signatories of the SP in terms of loss in export earnings and household incomes in the light also of the Everything but Arms initiative.

We will focus our analysis on Malawi (LDCs), Tanzania (LDCs), Zimbabwe (developing), Madagascar (LDCs), Uganda (LDCs), Botswana (developing) Mauritius (developing), Nigeria (developing) Zambia (LDCs) Rest of South African Customs Union (SACU) Rest of Southern African Development Community (SADC) and Rest of Sub-Saharan Africa. Moreover our data will include EU, Brazil, Rest of Developed, Rest of Developing and rest of LDCs. We will combine expenditure-distribution statistics with information contained in the GTAP data to identify several household groups by per capita expenditure. Expenditure groups will be different from each other due to differences in consumption patterns and income shares from different sources. We will also discuss insights learned from multiple households in the CGE model, and the importance of getting demand elasticities and resource ownership patterns right.

Preliminary results will be compared with results obtained from standard GTAP and further rooms of improvements and revisions will be underlined for future studies.

Keywords: sugar, preferences erosion, computable general equilibrium, Multi household income and expenditure distribution.

JEL Classification: F13 - Commercial Policy; Protection; Promotion; Trade Negotiations Q18 - Agricultural Policy; Food Policy, C68 - Computable General Equilibrium Models R20 – General Household Analysis.

This draft does not reflect the opinions of the USITC or any of its Commissioners

EFFECTS OF EU SUGAR TRADE REFORMS ON POOR HOUSEHOLDS IN AFRICA
A GENERAL EQUILIBRIUM ANALYSIS

> […] We are determined, particularly in the light of the global economic slowdown, to maintain the process of reform and liberalization of trade policies, thus ensuring that the system plays its full part in promoting recovery, growth and development […]
>
> *WTO Ministerial Declaration, Doha, 2001*

1. INTRODUCTION

The *Hamletian* question on whether trade liberalization is a vehicle for poverty reduction in developing economies has been extensively discussed in literature. [Winters (2004), Bourguingnon and Da Silva (2003)]. Poverty is an eclectic word, with semantically different definitions based on the indicator of poverty that is under evaluation.

Trade reforms are important variables in the analysis of anti poor or pro poor development effects, given the swift transmission of trade spillovers into government decisions and households behaviours. Thus, trade reforms are assuming a more important rule in the poverty analysis especially if commodities under reform account for a consistent share in terms of export earnings or are subject to eroded trade preferences that could have slacked the competitiveness of the country.

One of the main features in developing economies indeed is that relatively few commodities account for a large share of total export earnings. Often they depend on a single agricultural commodity for their merchandise export revenues and in a number of them, sugar is the leading export commodity. Geographically, countries depending on single commodities are concentrated mostly in Africa, Caribbean and Pacific (ACP) countries which had special trade relationship with those countries –sugar beet producers- that ensure shipments in order to pledge their commitments with ex colonies.

The fact that certain developing countries have sugar trade relationships with the European Union (EU) at the expense of other developing countries has created a twofold result. From one side, special preferences boosted production and imports of sugar independently to world price fluctuations, favouring therefore an internal sluggish competitiveness. On the other hand, developing countries that do not enjoy special preferences (e.g. Brazil), have addressed internal reforms to develop new sugar production strategies in order to strengthen comparative advantages by attracting foreign investment and by developing new refining technologies that are more cost efficient.

It should also be taken into consideration that sugar is one of the most heavily subsidized sector in many OECD countries (Gohin and Bureau, 2005). Nearly 80 percent of world sugar production benefit of some form of support (Mitchell, 2005). One of the main reasons for this could be deducted by the fact that identical or nearly identical sugar can be produced from different crops, according to different production costs. Certain countries therefore, in order to minimize production costs, support their production through policies that often alter the natural trend of the market.

An important part of the EU sugar policies is the preferences granted to certain countries. The historical roots of the EU's preferential trade policy can be traced back to the 1957 Treaty of Rome when signatories committed themselves to keep special trade preferences with colonies and Overseas Countries and Territories (OCT). The circumstances changed in the 1960s when colonies gained independence. The only way to satisfy the interests of both EU and ACP agricultural producers was to negotiate *ad hoc* protocols (incorporated in the Yaoundé and the Lomé Conventions) guarantying

preferential access for agreed quantities of imports for products that were also produced in the EU market (such as bananas, rice and sugar) at guaranteed prices.

The sugar industry in the EU has been supported and protected from imports for several decades and only recently have EU sugar policies become candidates for new policy initiatives or reforms.

The EU sugar reforms are expected to have repercussions not only for EU producers but also for producers in countries that have preferential trade relationships with the EU. The EU intervention price will be cut by 36 per cent over four years to ensure a sustainable EU market balance that is consistent with the EU's international commitments. The minimum guaranteed import price for ACP countries signatories of the Sugar Protocol (SP) will move in line with the EU intervention price.

The aim of this paper is to analyse the effects of the EU sugar reforms on poor households in ACP and least developed countries (LDCs) within a global trade, applied general equilibrium (AGE) model.

Our analysis will be based on an appropriately modified version of the GTAP global trade, AGE framework (Hertel, 1997). In particular, we will focus our analysis on Malawi (LDCs), Tanzania (LDCs), Zimbabwe (developing), Madagascar (LDCs), Uganda (LDCs), Botswana (developing), Mauritius (developing), Nigeria (developing), Zambia (LDCs), Rest of South African Customs Union (SACU), Rest of Southern African Development Community (SADC) and Rest of Sub-Saharan Africa. Moreover our data will include EU, Brazil, Rest of Developed countries, Rest of Developing countries and Rest of LDCs.

In our work we will combine expenditure-distribution statistics with information contained in the GTAP database (Dimaranan and McDougall, 2006) to identify several household groups by per capita expenditure. The expenditure-distribution statistics have been obtained from World Bank data. In addition to per capita expenditure differences, expenditure groups in our model are different from each other because of differences in consumption patterns and income shares from different sources. The GTAP data base contains the relationships to characterize consumption patterns and sources of income. Since we are interested in the effects on poor households, we identify several poor households groups and group all other households in a single income group.

In addition to our analysis of the effects of the EU sugar policy reforms on poor households in Africa, we will discuss what we can learn from the standard GTAP framework and what additional insights we learn from introducing multiple households in GTAP. Moreover special interest will be given to obtain the demand elasticities and the resource ownership patterns right. Attention will also be drawn in the importance of considering sluggishness in resource movements and differences in resource employment, by household.

2. THE EU SUGAR REGIME AND ITS REFORM EFFECT ON ACPS

Since the 16th century, sugar has always been considered a valuable commodity because of its historical, political, sociological, economic and geographical aspects.

Already in 2000 BC, historiography sources found sugar cane traces in the Polynesian island of the South Pacific. Sugar cane was well known in India a thousand years later and in Persia around 500 BC. One of Alexander the Great's generals came across it in Persia and called it "the reed which gives honey without bees". From around 100 BC it was

introduced into China and other Far Eastern countries and by AD 100 the art of sugar making was well advanced throughout those areas (Hannah and Spence, 1997).

Only in 1748 a German scientist, Andreas Sigismund Marggraf became the first person to discover the presence of sugar in the red and white beet plants. Europe's first commercial sugar beet factory has been built up two years later in Bohemia in Austria-Hungary (Hannah and Spence, 1997). Throughout the nineteenth century, the development of cane sugar industries in Africa and Oceania, as well as in the Western hemisphere, was a continuous process, evolving steadily, adapting to technical innovations and combating the competition from beet.

The eternal rival between beet and cane sugar may explain the current world sugar market, its policies, patterns of production and trade. Sugar has historically been a highly protected commodity in those countries sited in the temperate area of the hemisphere, at high capital intensive factors, beet producers to contrast the supply coming from tropical countries, at labour intensive factors, cane producers.

2.1. THE PRE REFORM REGIME

Sugar was first included in the CAP in 1968 (Council Regulation No 1009/67/EEC).

The sugar programme had the scope to afford EU sugar beet producers high and stable prices. This measure though had a twofold effect: from one side it was encouraging production, but to the other it was reducing consumptions and imports due to high prices. The sugar regime incurred scarcely in any budget expenditure since the sector was kept in profit by the prices consumers indirectly paid (European Commission 2004). Moreover, the expanded production contributed to making the EU the second largest sugar net exporter

after Brazil, bringing into light the EU peculiarity of being a top net sugar importer and exporter in the world.

The 1975 represented the cornerstone of the EU sugar trade policy. Entering in the EU, the United Kingdom (UK) transferred to the EU its commitment to the Commonwealth sugar producers. The Commonwealth Sugar Agreement became the SP and therefore the EU started to import raw sugar cane for refining and subsequent sale on the UK market. The SP became a bilateral agreement between 21 ACP countries and the EU in 1975 during the Lomé Convention. The SP provides ACP countries a total exemption from import duties on sugar for an indefinite duration. This intervention measure is limited to agreed quantities of sugar imported from ACP countries signatories of the SP. Guaranteed prices for ACP white or raw sugar are applied to specific quantities of sugar, cost insurance and freight paid (CIF), delivered to European ports per member countries. The price guaranteed to ACP countries is fixed each year by a Council of the EU decision.

Furthermore, at the time of the accession of Portugal and Spain to the EU in 1986, the ACP formulated a request to supply the raw sugar deficit of the Portuguese sugar refineries. It became clear then the urge to regulate imports entering into the EU sugar market aimed at supplying the EU sugar refineries. This is why in August 1992, the concept of Maximum Supply Needs (MSN) for the Community's refineries was brought into light through the redaction of a document known as "non paper". A total MSN of 1.779.000 tonnes was established for the seven refineries of raw cane sugar in Portugal, France and the UK which were officially allowed to import raw sugar cane for the functioning of their refineries. In order to meet the refiners' MSNs, raw sugar was supplied and imported under a system of "*hierarchy of preference*". MSN quantities were met firstly

through the SP quota of 1.294.700 tons from ACP countries signatories of the SP, and an Indian quota of 10.000 tonnes. Furthermore Finland had a MSN quota of 85.463 tonnes that represented a WTO commitment that preceded Finland's accession to the EU. The remaining tonnes were supplied by the OCT. In case OCT were not able to supply the amount required, ACP countries could fill the remaining part of the quota under the Special Preferential Sugar (SPS) agreement. This residual amount was then determined on an annual basis. Nearly 60 percent of all SPS supplies came from SADC countries with Swaziland, Zimbabwe and Malawi being priority suppliers under the SPS arrangement. The conditions for SPS imports were slightly less favourable compared to those under the SP. The price for the imported raw sugar was calculated by deducting € 81 per tonne from the guaranteed price under the SP (Malzbender 2003).

In the EU sugar regime, the unique features of trade concessions are that sugar under preferential import quotas can enter the EU market duty-free and the price paid for sugar equals to the high EU price for sugar. The EU has been able to prevent competition from imported sugar outside preferential trade agreements through the use of fixed standard tariffs and additional import duties under the Special Safeguard Provisions (SSP).

Since the EU is a net producer of beet sugar, it was necessary to establish a system able to guarantee each Member States (MS) a certain share of the EU sugar market and keep the overall production within certain limits despite the bulk of MSN sugar admitted into the market. Therefore a set of quotas was established. Two types of quota were set: A quota, initially determined in accordance with domestic consumption and B quota, set as an additional amount to fulfil export potential. The sugar producers could either export the out

of quota sugar, called C sugar or carry it forward for the next marketing year and, further, does not receive any support in term of export refunds.

The intervention price of € 632 per tonne for white sugar and € 524 per tonne for raw sugar represented the amount at which A and B quota sugar were sold to intervention agencies designated by each MS. EU growers were receiving € 47 per tonne as minimum price from sugar factories for the production of A quota sugar. To produce B quota sugar, the minimum price paid to growers was € 32 per tonne. The purpose of setting a minimum price for beet sugar was to ensure a fair income to the grower and a proper balance in the distribution of income from sugar between growers and factories.

The EU intervention prices have remained stable following two periods of increase in the mid 1970s and at the beginning of the 1980s coinciding with two world sugar crises when world prices rose sharply.

Moreover, in those countries where sugar production is lower than consumption, and growing cost are high, the Commission set a " derived" intervention price that beet growers received beside the minimum beet price. All surplus quota sugar were exported by compensating producers for the differences between the price of sugar on the domestic and world market. The price of C beet was freely negotiated between growers and manufactures.

In the EU, sugar is one of the very few sectors where the mechanism for supporting prices have remained intact, in spite of 15 years of deep reforms of the CAP (Gohin and Bureau, 2005). Sugar policy reforms, both addressed to erode trade preferences and domestic protective policies were recalled in order to rule a new sugar regime that does not negatively impact the development of less competitive exporting countries and able to meet

the domestic sugar policy with a trade policy in accordance with the commitments of the Uruguay Round (UR). Without a new regime all price provisions, all quota arrangements and the intervention system would cease to apply by 30 June 2006.

In November 2005, the EU reached agreement on a reform of the EU sugar policy. The EU reforms were in part a response to WTO Appellate Body findings (WTO, 2005) against the EU concerning a dispute brought by Brazil, Australia and Thailand. In October 2004, a WTO panel found that 2.7 million tonnes of exported EU C sugar was cross-subsidized by the high guaranteed prices paid for A and B quota sugar. Moreover the panel held that 1.6 million tonnes of refined sugar which the EU exported to the world market, corresponding to the amount of raw sugar it imported from India and ACP countries, should be treated as subsidised exports and be subject to reduction commitments.

Thus, policy questions arisen in recent years are pushing the EU to implement a new sugar regime which will have a domino effect on the world sugar market assets generating new trading partners and scenarios.

EU - ACP SUGAR REGIME

	A quota*	B quota*	Min. A Price**	Min. B Price**	Intervention Price WSE**	Intervention Price RSE**	MSN*
EU 25	**14,723**	**2,717**					**1,774**
AUSTRIA	314	73	46,72	32,42	631,9	524	
BLEU	675	145	46,72	32,42	631,9	524	
CZECH REP.	441	14	46,72	32,42	631,9	524	
DENMARK	325	96	46,72	32,42	631,9	524	
FINLAND	133	13	46,72	32,42	631,9	524	60
FRANCE	2,970	799	46,72	32,42	631,9	524	296
GERMANY	2,613	804	46,72	32,42	631,9	524	
GREECE	289	29	46,72	32,42	631,9	524	
HUNGARY	400	1	46,72	32,42	631,9	524	
IRELAND	181	18	46,72	32,42	631,9	524	
ITALY	1,311	247	46,72	32,42	631,9	524	
LATVIA	66	0	46,72	32,42	631,9	524	
LITHUANIA	103	0	46,72	32,42	631,9	524	
NETHERLANDS	684	180	46,72	32,42	631,9	524	
POLAND	1,580	92	46,72	32,42	631,9	524	
PORTUGAL	72	7	46,72	32,42	631,9	524	291
SLOVAKIA	190	18	46,72	32,42	631,9	524	
SLOVENIA	48	5	46,72	32,42	631,9	524	
SPAIN	957	40	46,72	32,42	631,9	524	
SWEDEN	335	33	46,72	32,42	631,9	524	
UK	1,035	104	46,72	32,42	631,9	524	1,126

* 000Tonnes WSE **€/tonne

Production Quotas and Prices

Imports Quotas and Prices

EVERYTHING BUT ARMS		
Country	**Prices €**	**Quotas****
ANGOLA	631,9	0
BANGLADESH	631,9	7
BENIN	631,9	4
BURKINA FASO	631,9	5
BURUNDI	631,9	0
CAMBODIA	631,9	0
CONGO DEM REP	631,9	8
ETHIOPIA	631,9	12
GUINEA	631,9	4
HAITI	631,9	0
LAO PEOPLE'S	631,9	0
MADAGASCAR	631,9	5
MALAWI	631,9	8
MALI	631,9	5
MOZAMBIQUE	631,9	8
NEPAL	631,9	7
NIGER	631,9	5
RWANDA	631,9	0
SENEGAL	631,9	5
SIERRA LEONE	631,9	6
SOMALIA	631,9	0
SUDAN	631,9	15
TANZANIA	631,9	8
TOGO	631,9	6
UGANDA	631,9	5
ZAMBIA	631,9	7

** 000Tonnes WSE 2005-2006 quota

SUGAR PROTOCOL		
Country	**Prices €**	**Quotas***
COTE D'IVOIRE	631,9	10
CONGO	631,9	10
KENYA	631,9	0
ZIMBABWE	631,9	30
MAURITIUS	631,9	491
SWAZILAND	631,9	118
BARBADOS	631,9	50
SAINT KITTS	631,9	16
TRINIDAD &	631,9	44
FIJI	631,9	165
BELIZE	631,9	40
JAMAICA	631,9	119
GUYANA	631,9	
SURINAME	631,9	0
BELIZE	631,9	
GUYANA	631,9	159
MADAGASCA	631,9	11
MALAWI	631,9	21
TANZANIA	631,9	10
UGANDA	631,9	0
ZAMBIA	631,9	0

* 000 Tonnes WSE

A small quota under the **MFN** System and from **OCT i**s also allocated. **India** enjoys SP privilegies.

Special Preferential Sugar quotas are allocated every year at zero duty if refineries can not source sufficient quantities via the Protocol or EBA

2.2. THE APPROVED REFORM

As a result of the Doha Round, it is likely that the EU will have to cease subsidising exports by 2013, and agree to a substantial reduction in its import tariffs.

On 20th February 2006, the Council Regulation No. 318/2006 on the Common Market Organization for sugar was issued with the intention to bring the sugar regime into line with the international commitments.

The whole EU sugar regime reform turn upon a fixed 36 percent price cut over four years beginning in 2006/2007 to ensure a sustainable market balance. A 20 percent cut in the first year, 27.5 percent cut in the second year, 35 percent in the third year and 36 percent cut in the fourth have been fixed. The price cut provision will reflect itself in a reduction of export subsidies. The scope of export refunds is to cover the gap between world market quotations and price fixed within the Community. Export refunds therefore are expected to decrease in accordance to the fall of the EU reference prices which will substitute the intervention prices. In order to relieve domestic support, the twofold quota systems currently adopted will be modified, merging A and B quota into one single quota. Moreover, countries currently C quota sugar producers will be granted of an additional 1 million tonne quota. Quotas cuts would not be made on a flat rate basis for all MS but the largest cuts would be reserved for those MS which held the largest quota of B sugar. This because levies on B quotas were much higher than A quotas, so due to the merging, the new regime will be beneficial for B sugar producer. Also in the new reform, MS may decide to carry forward all or part of its production in excess of its sugar quota. The main innovation then is to set a fixed amount of the ex -C quota and to levy the surplus amount exceeding the ex-C quota and the sugar carried forward.

To compensate EU farmers for this reduction (and loss of earnings), the farmers will be given a subsidy payment for taking care of the land. In other words this subsidy amount will be decoupled from their production of sugar.

The improving of market access through tariff reduction and TRQs revision will also be taken into consideration. Until 2009 the MSN will remain valid granting to ACP/India sugar the 75% of the already established quota of 1.796.351 tonnes.

It ought to be taken into account also that under the Everything But Arms (EBA) initiative the EU grants LDCs duty free access to its markets since 2001. Unlike for other products the access for sugar is not unlimited immediately but subject to quota limits that increase gradually until 2009 when unrestricted access is granted. However, it needs to be emphasised that EBA sugar is entering the EU market within the framework of the global quota under the MSN system. Any sugar entering under the EBA arrangement is therefore to be deducted from the SPS quota and does not at least at this stage lead to an overall increase in sugar exports to the EU.

Presently, a total of 17 ACP countries have preferential access to the EU's protected sugar market. Under the current rules, these countries can sell almost 1.3 million tonnes of sugar at Euro 524 per tonne. The EU proposes that this price of Euro 524 per tonne should be decreased by 36 percent. This shortfall is a major reduction in their export revenues.

The EBA initiatives, displacing the SPS will allow the introduction in the EU market of an unlimited quantity of duty free sugar from LDCs, forcing a reduction of EU production quotas in order to keep the market balances and to avoid an increase of EU prices. The reduction of the EU sugar quotas will have serious effect in the EU sugar industry. The EU commission estimated that at least 60 factories would close and 5.000 agricultural jobs,

25.000 jobs in the industry and 50 000 indirect jobs would be lost (The Common Agricultural Policy Sugar Reform, June 2005.)

EU- ACP SUGAR REFORM

EU SUGAR REGIME

	Merged Quota	Additional Quota	2006-07 Prices	2007-08 Prices	2008-09 Prices	2009-10 Prices	2006-10 % Variation
EU 25	**17.440.5**	**1.00.000**					
AUSTRIA	387.327	18.486	32.86	29.78	27.83	26.29	-20
AZORES	9.953		32.86	29.78	27.83	26.29	-20
BLEU	819.812	62489	32.86	29.78	27.83	26.29	-20
CZECH REP.	454.862	20.07	32.86	29.78	27.83	26.29	-20
DENMARK	420.745	31.72	32.86	29.78	27.83	26.29	-20
DOM	480.245		32.86	29.78	27.83	26.29	-20
FINLAND	146.086		32.86	29.78	27.83	26.29	-20
FRANCE (CONT)	3.288.747	351.695	32.86	29.78	27.83	26.29	-20
GERMANY	3.416.895	238.56	32.86	29.78	27.83	26.29	-20
GREECE	317.502		32.86	29.78	27.83	26.29	-20
HUNGARY	401.684		32.86	29.78	27.83	26.29	-20
IRELAND	199.26		32.86	29.78	27.83	26.29	-20
ITALY	1.557.443		32.86	29.78	27.83	26.29	-20
LATVIA	66.505		32.86	29.78	27.83	26.29	-20
LITHUANIA	103.01	8.985	32.86	29.78	27.83	26.29	-20
NETHERLANDS	864.559	66.875	32.86	29.78	27.83	26.29	-20
POLAND	1.671.926	100.551	32.86	29.78	27.83	26.29	-20
PORTUGAL(CONT)	69.718		32.86	29.78	27.83	26.29	-20
SLOVAKIA	207.432		32.86	29.78	27.83	26.29	-20
SLOVENIA	52.973		32.86	29.78	27.83	26.29	-20
SPAIN	996.96		32.86	29.78	27.83	26.29	-20
SWEDEN	368.262	17.722	32.86	29.78	27.83	26.29	-20
UK	1.138.628	82.847	32.86	29.78	27.83	26.29	-20

EVERYTHING BUT ARMS- NO TARIFFS from 2009

Country	2006-07 Prices	2007-08 Prices	2008-09 Prices	2009-10 Prices	2006-10 % Variation
ANGOLA	631.9	631.9	541.5	404.4	-36
BANGLADESH	631.9	631.9	541.5	404.4	-36
BENIN	631.9	631.9	541.5	404.4	-36
BURKINA FASO	631.9	631.9	541.5	404.4	-36
BURUNDI	631.9	631.9	541.5	404.4	-36
CAMBODIA	631.9	631.9	541.5	404.4	-36
CONGO DEM REP	631.9	631.9	541.5	404.4	-36
ETHIOPIA	631.9	631.9	541.5	404.4	-36
GUINEA	631.9	631.9	541.5	404.4	-36
HAITI	631.9	631.9	541.5	404.4	-36
LAO PEOPLE'S	631.9	631.9	541.5	404.4	-36
MADAGASCAR	631.9	631.9	541.5	404.4	-36
MALAWI	631.9	631.9	541.5	404.4	-36
MALI	631.9	631.9	541.5	404.4	-36
MOZAMBIQUE	631.9	631.9	541.5	404.4	-36
NEPAL	631.9	631.9	541.5	404.4	-36
NIGER	631.9	631.9	541.5	404.4	-36
RWANDA	631.9	631.9	541.5	404.4	-36
SENEGAL	631.9	631.9	541.5	404.4	-36
SIERRA LEONE	631.9	631.9	541.5	404.4	-36
SOMALIA	631.9	631.9	541.5	404.4	-36
SUDAN	631.9	631.9	541.5	404.4	-36
TANZANIA	631.9	631.9	541.5	404.4	-36
TOGO	631.9	631.9	541.5	404.4	-36
UGANDA	631.9	631.9	541.5	404.4	-36
ZAMBIA	631.9	631.9	541.5	404.4	-36
QUOTAS Euro/Tonne White Sugar	149213	171594	197334	197334	

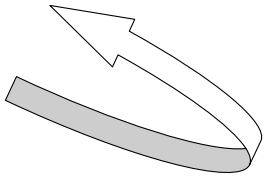
Full liberalisation will be phased in between 1 July 2006 and 1 July 2009 by gradually reducing the full EU tariff to zero. In the meantime, as for rice, LDC raw sugar can come in duty free within the limits of a tariff quota.

SUGAR PROTOCOL

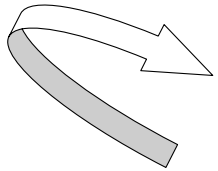
Country	2006-07 Prices	2007-08 Prices	2008-09 Prices	2009-10 Prices	**Quotas***
COTE D'IVOIRE	631.9	631.9	541.5	404.4	10
CONGO	631.9	631.9	541.5	404.4	10
KENYA	631.9	631.9	541.5	404.4	0
ZIMBABWE	631.9	631.9	541.5	404.4	30
MAURITIUS	631.9	631.9	541.5	404.4	491
SWAZILAND	631.9	631.9	541.5	404.4	118
BARBADOS	631.9	631.9	541.5	404.4	50
SAINT KITTS &	631.9	631.9	541.5	404.4	16
TRINIDAD &	631.9	631.9	541.5	404.4	44
FIJI	631.9	631.9	541.5	404.4	165
BELIZE	631.9	631.9	541.5	404.4	40
JAMAICA	631.9	631.9	541.5	404.4	119
GUYANA	631.9	631.9	541.5	404.4	
SURINAME	631.9	631.9	541.5	404.4	0
BELIZE	631.9	631.9	541.5	404.4	
GUYANA	631.9	631.9	541.5	404.4	159
MADAGASCAR	631.9	631.9	541.5	404.4	11
MALAWI	631.9	631.9	541.5	404.4	21
TANZANIA	631.9	631.9	541.5	404.4	10
UGANDA	631.9	631.9	541.5	404.4	0
ZAMBIA	631.9	631.9	541.5	404.4	0

* Tonnes WSE

Special Preferential Sugar quotas are allocated every year at zero duty if refineries can not source sufficient quantities via the Protocol or EBA initiative



EU INTERNAL PRICES AND QUOTAS REFORM



EU - ACP PRICES AND QUOTAS REFORM

3. MODEL SPECIFICATION - MULTIPLE HOUSEHOLDS IN AN AGE FRAMEWORK

The aim of this paper is to analyse the effects of the EU sugar reforms on poor households in ACP and LDCs within a global trade, applied general equilibrium (AGE) model.

Several studies have analyzed EU sugar policies with AGE models. Frandsen *et al.* (2001) analyzed the domestic effects of reforming EU sugar policies; Berkum *et al.* (2005), Chaplin and Matthews (2005), and Kerkelä and Huan-Niemi (2005) analyzed the likely impacts of EU sugar policy reform on the ACP countries and LDCs.

In a recent World Bank volume, edited by Hertel and Winters (2005), several applied general equilibrium (AGE) models were used to analyze the implications of trade liberalization for poor households in developing countries. The authors modified the standard, representative household approach found in AGE models. Other authors have adopted an alternative approach in which an AGE model generates aggregate changes that are then are communicated to a micro-simulation model based on a large unit record database.

Our analysis is based on an appropriately modified version of the GTAP global trade, AGE framework (Hertel, 1997). In particular, we changed the theory of the GTAP model which refers to the super household. In our model, each region consists of several households. Thus, our modifications involved the introduction of a *HOUSEHOLDS* set in the GTAP model; the introduction of an *h* index, with *h* in *HOUSEHOLDS*, in all household commodity demand and factor services supply variables and equations.

In our aggregation we identify 20 countries that will better help us in interpreting results. We divide countries into developing and developed, and within each specification we identify the main actors involved in the sugar trade.

GTAP Aggregation	Aggregation Description	Multi Household Region Identified
EU25	Austria; Belgium; Denmark; Finland; France; Germany; United Kingdom; Greece; Ireland; Italy; Luxembourg; Netherlands; Portugal; Spain; Sweden; Cyprus; Czech Republic; Hungary; Malta; Poland; Slovakia; Slovenia; Estonia; Latvia; Lithuania.	
X-Developed	Australia; New Zealand; Japan; Canada; United States; Rest of North America; Switzerland; Rest of EFTA; Rest of Europe; Albania; Bulgaria; Croatia; Romania; Russian Federation; Rest of Former Soviet Union; South Africa.	South Africa.
Brazil		Brazil
Botswana		Botswana
Mauritius		Mauritius
Nigeria		Nigeria
Zimbabwe		Zimbabwe
Caribbean	Rest of South America; Central America; Rest of FTAA.	
Pacific	Rest of Oceania.	
X-Developing	China; Hong Kong; Korea; Taiwan; Rest of East Asia; Indonesia; Malaysia; Philippines; Singapore; Thailand; Vietnam; India; Sri Lanka; Mexico; Colombia; Peru; Venezuela; Rest of Andean Pact; Argentina; Chile; Uruguay; Rest of the Caribbean; Turkey; Rest of Middle East; Morocco; Tunisia; Rest of North Africa	
X-Sub-Saharan	Benin, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia,Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya,Liberia, Mali, Mauritania, Mayotte, Niger, Reunion,Rwanda, Saint Helena, Sao Tome and Principe, Senegal Sierra Leone, Somalia, Sudan, Togo.	Burkina Faso, Central African Republic, Cote d'Ivoire, Djibouti, Ethipia, Guinea, Guinea Bissau, Ghana, Gambia, Mauritania, Mali, Niger, Senegal, Sierra Leone
Mozambique		
XSACU	Lesotho, Namibia, Swaziland	Lesotho, Namibia, Swaziland
Malawi		Malawi
XSADC	Angola, Congo, the Democratic Republic of the, Seychelles	Angola
Tanzania		Tanzania
Madagascar		Madagascar
Zambia		Zambia
Uganda		Uganda
X-LDCs	Rest of Southeast Asia; Bangladesh; Rest of South Asia.	

Botswana, Mauritius, Nigeria, Zimbabwe, Pacific and Caribbean are used as sample of developing countries sugar producers, EU 25 is identified as developed countries, Mozambique, Malawi, Tanzania, Madagascar, Zambia and Uganda are considered as sample in representation of LDCs sugar producers and recipients of preferences granted by the EBA initiatives.

Regarding the sector specifications we decided to distinguish sugar as crop and sugar as manufacture. Sugar crop includes both sugar cane which is produced in tropical areas and sugar beet, coming from the temperate area of the hemisphere. The processed sugar is then traded as raw or white sugar.

Box n. 1 How Raw Sugar differs from White Sugar?

The sugar contained in beet or cane is extracted by dissolving it in water. The resulting sugar juice is concentrated into sugar syrup that crystallises from a particular degree of saturation. Plant waste impurities retained on crystallisation colour the sugar: this is raw or brown sugar with a sweetening power less than that of white. Refining involves eliminating these impurities to less than 0.5% to obtain perfectly white sugar.

Raw beet sugar in not useable as such since the impurities give it a disagreeable taste. The industrial processing of beet is always continued to the white sugar stage of the marketed product.

Raw cane sugar, on the other hand, can be ingested. The impurities give it a particular taste, some nutritional value and a natural product image that is of weight with some consumers.

World trade in cane sugar is primarily at the raw sugar stage. Refineries, generally located close to the consumption zones, provide the whole quality range needed for the various industrial uses of white sugar. A tonne of "standard" raw sugar gives 0.92 tonnes of white sugar. But the raw cane sugar imported into the Community gives a yield close to 0.97.

GTAP Aggregation	Aggregation description
SgrCrops	Sugar cane, sugar beet.
OthCrops	Paddy rice; Wheat; Cereal grains nec; Vegetables, fruit, nuts; Oil seeds; Plant-based fibers; Crops nec
Lvstk	Cattle,sheep,goats,horses; Animal products nec; Raw milk; Wool, silk-worm cocoons.
NatReslnd	Forestry; Fishing; Coal; Oil; Gas; Minerals nec
SgrManuf	Sugar.
OthProFood	Meat: cattle,sheep,goats,horse; Meat products nec; Vegetable oils and fats; Dairy products; Processed rice; Food products nec; Beverages and tobacco products.
TCF	Textiles; Wearing apparel; Leather products
MachnEqui	Machinery and equipment nec.
OthMnfcs	Wood products; Paper products, publishing; Petroleum, coal products; Chemical,rubber,plastic prods; Mineral products nec; Ferrous metals; Metals nec; Metal products; Motor vehicles and parts; Transport equipment nec; Electronic equipment; Manufactures nec
Svces	Electricity; Gas manufacture, distribution; Water; Construction; Trade; Transport nec; Sea transport; Air transport; Communication; Financial services nec; Insurance; Business services nec; Recreation and other services; PubAdmin/Defence/Health/Educat; Dwellings.

3.1 DATA

In our work we have combined expenditure - distribution statistics with information contained in the GTAP database (Dimaranan and McDougall, 2006) to identify several household groups by per capita expenditure. The expenditure -distribution statistics have been obtained from World Bank data (World Bank).

It is almost impossible to give a unique definition of rural household since the concept itself changes according to the country observed. We collected household survey data on income and expenditures for 29 Sub Saharan countries. Data not always were up to date. The standardized welfare indicators have been obtained from the Africa Databank of the World Bank, or from the Living Standards Measurement Surveys.

In order to consider the economic situation of society, the households rather than the individual is commonly adopted as the basic unit of analysis (IWG.AgRI, 2005).

The UN in its guidelines for population and housing censuses describe a household as follows:

"The concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living. A household may be either (a) a one-person household, that is to say, a person who makes provision for his or her own food or other essentials for living without combining with any other person to form part of a multi-person household, or (b) a multi-person household, that is to say, a group of two or more persons living together who make common provision for food or other essentials for living. The persons in the group may pool their incomes and may, to a greater or lesser extent, have a common budget; they may be related or unrelated persons or constitute a combination of persons both related and unrelated" (UN, 1998).

Households differ in size and composition. A given level of income for a large family may represent a much lower standard of living per member than for a smaller family. (IWG.AgRI 2005)

HOUSEHOLDS SURVEYS USED IN THE STUDY:

Country	Sample Size	Average HLDS size	Year	Name of Survey
Angola	n/a	n/a	1992	*Poverty and Food Insecurity in Luanda*
Botswana			2003	*Household Income and Expenditure Survey*
Brazil	4940	3.9	1997	*Living Standard measurment Study of The World Bank*
Burkina Faso	8610	7.8	1995	*Household Priority Survey Enquête prioritaire sur les conditions de vie des ménages.*
Cent. Afri. Rep	7417	4.9	1993	*Household Priority Survey*
Cote D'Ivoire	1000	5.5	1995	*Enquête prioritaire sur les dimensions sociales de l'ajustement*
Djibouti	2380	6.7	1996	*Enquête Djiboutienne auprès des des ménages. Indicateurs sociaux*
Ethiopia	10960	5	1996	*Welfare Monitoring Survey and Household Budget Survey*
Gambia	2009	8.8	1992	*Household Priority Survey*
Ghana	14511	4.1	1995	*Enquête intégrale budget et consommation*
Guinea	4416	6.6	1995	*Enquête intégrale budget et consommation*
Guinea Bissau	1625	6.5	1992	*Inquerito ligeiro junto às familias*
Lesotho	4839	5.5	1995	*National Household Expenditure and Consumption Survey*
Madagascar	4500	4.9	1994	*Household Integrated Survey*
Malawi	6584	4.4	2005	*Integrated Household Survey*
Mali	9312	9	1994	*Enquête Maliene de onjoncture Economique et Sociale*
Mauritania	3413	5.6	1996	*Enquête permanente sur les conditions de vie des ménages*
Mauritius	6720	3.9	2002	*Household Budget Survey*
Namibia	244827	5.7	1994	*Household Income and Expenditure Survey*
Niger	4377	7.1	1995	*Enquête permanente de conjoncture économique et sociale*
Nigeria	8937	4.7	1992	*Consumer Expenditure Survey*
Senegal	3277	10	1995	*Enquete senegalaise aupres des menages*
Sierra Leone	3407	5.8	1990	*Survey of Household Expenditure and Household Economic Activities*
South Africa	7963	4.7	1993	*Living Standards and Development Survey*
Swaziland	6246	6.3	1994	*Swaziland Household Income Expenditure Survey*
Tanzania	5177	6.1	1993	*Human Resource Development Survey*
Uganda	9924	4.6	1993	*Household Integrated Survey*
Zambia	11601	5	1996	*Zambian Living Conditions and Monitoring Survey*
Zimbabwe	n/a	n/a	1995	*Achieving Shared Growth. Country Economic memorandum*

For our simulations we have taken into consideration expenditures. Dividing expenditures of each quintile by the total amount expended in the sample we obtained the percentage of the share of expenditure for each rural and urban quintile observed. The data has been included into the new GTAP model together with the share of population of each quintile.

In addition to per capita expenditure differences, income groups in our model are different from one another because of differences in consumption patterns and income shares from different sources. The GTAP data base contains the relationships to characterize consumption patterns and sources of income.

4. SOME PRELIMINARY RESULTS:

The aim of this chapter is to compare welfare decomposition obtained through standard GTAP with the outcome generated by a modified version of the model.

In standard GTAP, both percentage change in per capita utility from aggregate household expenditure for a given country (or region) and a money metric equivalent of aggregate utility change, [EV(*r*)] are computed. The utility measure indicates changes in welfare of the average individual in region *r*. The equivalent variation measure, EV(*r*), summarises the welfare changes resulting from a policy shock in dollar values. The new version of GTAP represents an extension of the standard framework that allows us to distribute welfare effect among 10 household groups in each region.

The results reported here are from simulations where the EU's tariff is reduced by 50 percent and ACP and LDC countries gain duty free access.

Table 1 provides regional welfare effects obtained from the standard GTAP model. Lesotho, Namibia and Swaziland, belonging to XSC aggregation, Zimbabwe and the EU are reporting an increase in their percentage change of welfare. Through welfare decomposition though we can see that the reasons of this growth is given by different

factors. The EU has large Allocative Efficiency gains ($586.4US million) because it reduces domestic support for sugar producers. The deterioration in EU's terms of trade amount ($ 99.6 US million) offsets much of the Allocative efficiency gains. The EU policy change will affect the African economies via price effects. Some African countries, such as Lesotho, Namibia and Swaziland, belonging to XSC aggregation, or Zimbabwe will gain in terms-of-trade while Malawi, Tanzania, Madagascar and Uganda will lose in terms-of-trade. This is explained by the fact the loss in terms of trade are reported by countries enjoying preferences through the EBA initiatives, while countries excluded by preferences are reporting a gain in terms of trade thanks to the new market access conditions.

Brazil and ROW are also reporting an increase in Allocative Efficiency but they will benefit in Term of Trade thanks to the erosion of preferences and the possibility to import sugar into the EU market at a lower tariff.

Table1: Welfare Results From Reducing Tariff of EU sugar Imports ($US million)

Region	% Change in Welfare	Welfare Effect	Allocative Effects	ToT Effects
XSC - All non LDC but ACP. Only Swaziland benefits from the SP	1.83	81.90	5.24	76.60
Malawi - LDC and SP	-0.07	-1.08	-0.25	-0.82
Tanzania - LDC and SP	-0.01	-0.67	-0.17	-0.50
Zimbabwe - SP	0.03	2.43	0.27	2.16
XSD - Seychelles ACP, non SP, Angola and Congo LDCs	-0.04	-7.52	-0.95	-6.57
Madagascar - LDC and SP	0.00	-0.11	-0.03	-0.08
Uganda - LDC and SP	0.00	-0.09	-0.02	-0.07
Brazil- Sugar exporter but neither ACP non LDC	0.00	20.98	4.92	16.06
EU25	0.01	486.81	586.45	-99.64
ROW	0.00	18.44	6.21	12.23

Analysing in deep welfare effects reported by Lesotho, Namibia and Swaziland, we can see that land prices increase substantially (table 2).

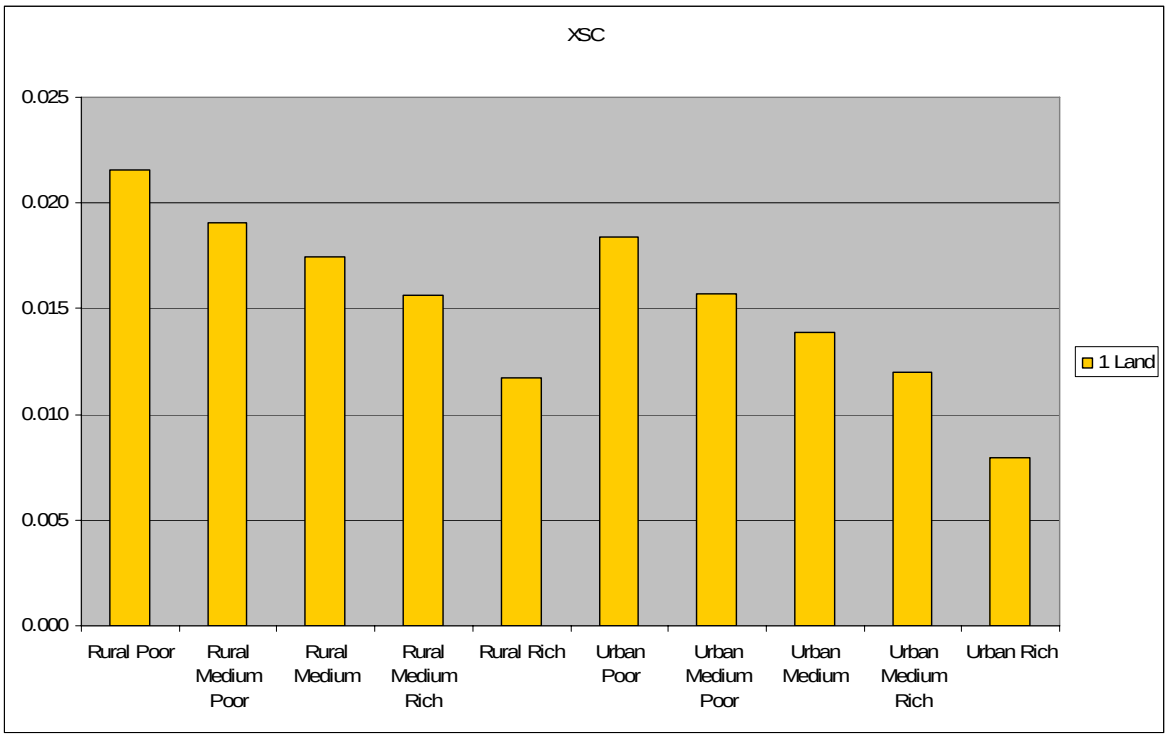
Table 2- Primary factor Prices

	XSC	Malawi	Tanzania	Zimbabwe	XSD	Madagascar	Uganda
Land	84.578	0.565	-0.026	0.935	-2.917	-0.021	0.006
UnSkLab	2.292	-0.166	-0.015	0.112	-0.127	-0.010	-0.001
SkLab	2.157	-0.245	-0.016	0.096	-0.052	-0.009	-0.004
Capital	2.110	-0.231	-0.015	0.093	-0.033	-0.007	-0.003
NatRes	-10.673	0.253	0.008	-0.533	0.130	0.003	-0.003

This is the reason why we are taking the above mentioned countries as sample for our survey. The new GTAP model has been extended in order to see who within the regional household (XSC in this case) would benefit more from the land price factor increase .

The poorest household in XSC aggregation gains the most because they own a relatively large share of land resources (Figure 1) and lend rents increase substantially.

Figure 1- XSC Aggregation Land Resources Share by Households



Next we discuss welfare effects obtained from the revised GTAP model which has 10 households in each region. We focus our discussion on the African economies.

Table 3 breaks down the welfare effect at household level in African countries. Both Zimbabwe and XSC aggregation are reporting a welfare improvement due to an EU sugar import tariff reduction and as it is shown in figure 1 Rural Rich and Urban Rich household will be the one gaining more. In Zimbabwe though the Urban Rich household

reports a higher gain compared to the one reported by the Urban Rich Rest of SACU households.

Table 3: Aggregated Welfare Results From Reducing Tariff of EU sugar Imports ($US million) by Household

	XSC	Malawi	Tanzania	Zimbabwe	XSD	Madagascar	Uganda
Rural Poor	2.54	-0.03	-0.03	0.07	-0.18	0	-0.01
Rural Medium Poor	4.36	-0.05	-0.04	0.12	-0.33	-0.01	-0.01
Rural Medium	6.15	-0.08	-0.06	0.17	-0.49	-0.01	-0.01
Rural Medium Rich	8.89	-0.12	-0.08	0.25	-0.75	-0.02	-0.01
Rural Rich	19.44	-0.35	-0.16	0.57	-1.84	-0.03	-0.02
Urban Poor	2.49	-0.02	-0.02	0.07	-0.19	0	0
Urban Medium Poor	4.26	-0.04	-0.03	0.12	-0.36	0	0
Urban Medium	6.09	-0.06	-0.04	0.18	-0.54	0	0
Urban Medium Rich	8.84	-0.09	-0.06	0.26	-0.83	-0.01	0
Urban Rich	19.33	-0.25	-0.14	0.61	-2.03	-0.02	-0.01

Figure 2: Welfare Results From Reducing Tariff of EU sugar Imports ($US million) by Household

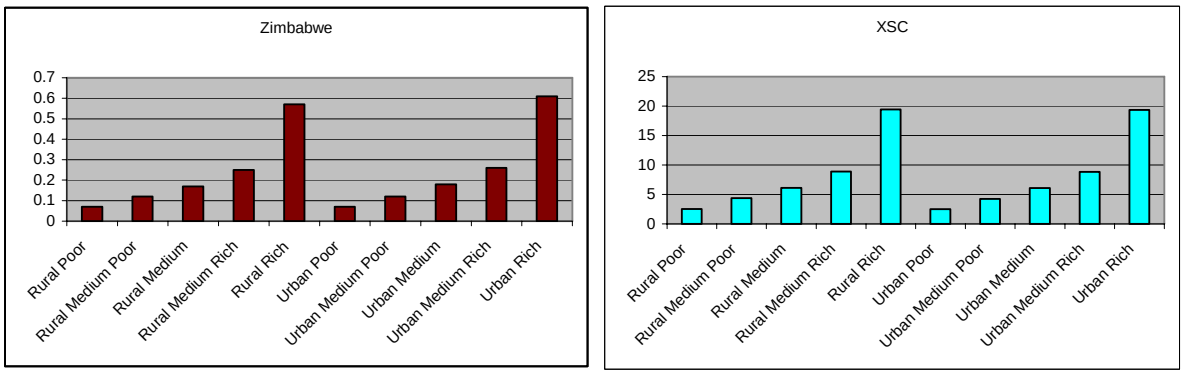
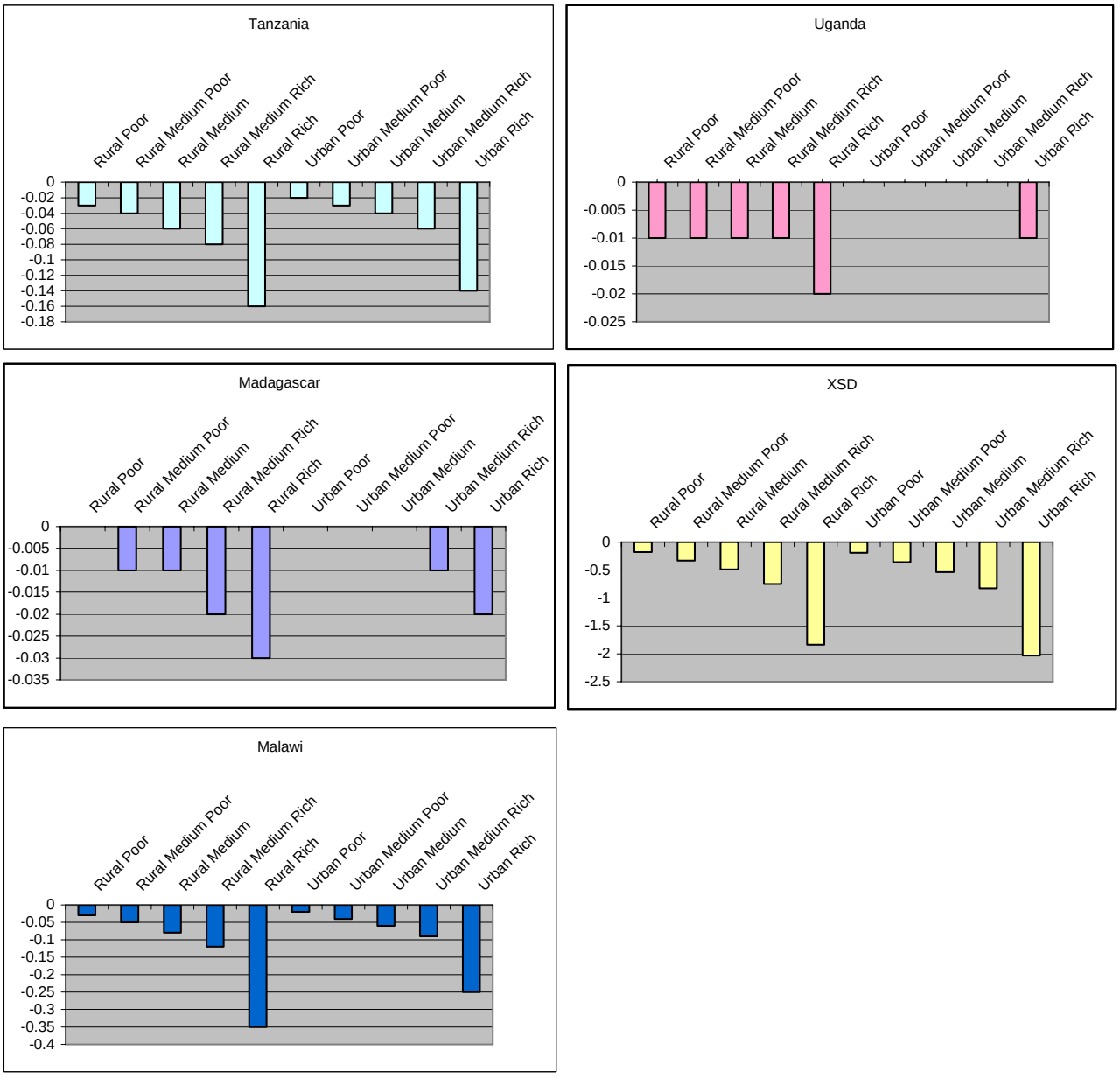


Figure 3: Welfare Results From Reducing Tariff of EU sugar Imports ($US million) by Household



Tanzania, Uganda, Madagascar and Malawi, together with the XSD aggregation are experiencing negative welfare impacts and the most affected are Urban and Rural Rich households of the regions (Figure 3). Interesting results are reported in Uganda, where welfare gains are equally distributed among the households, reporting a relevant increase in the Rural Rich household.

Income gains (table 4) in Lesotho, Namibia and Swaziland are reflected by an increase in consumer prices

Table 4:Disaggregated Household Income

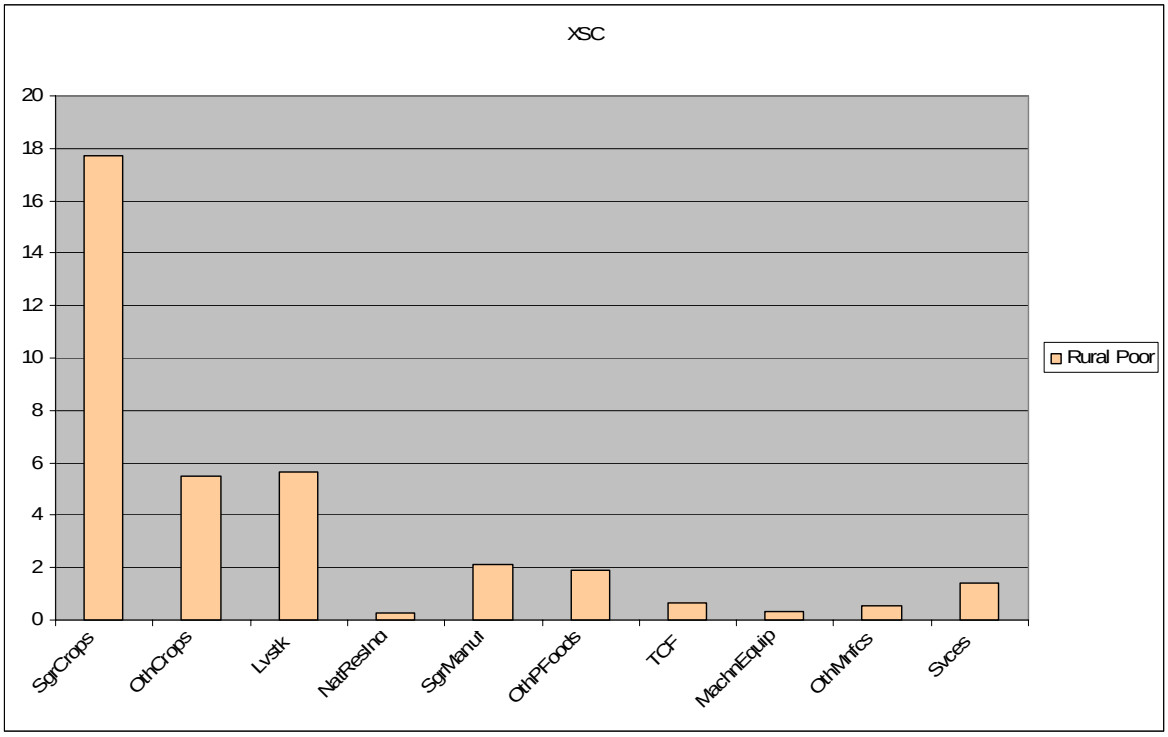
	XSC	Malawi	Tanzania	Zimbabwe	XSD	Madagascar	Uganda
Rural Poor	4.132	-0.165	-0.016	0.132	-0.106	-0.01	-0.002
Rural Medium Poor	3.932	-0.172	-0.016	0.128	-0.102	-0.01	-0.002
Rural Medium	3.805	-0.175	-0.016	0.126	-0.099	-0.01	-0.002
Rural Medium Rich	3.665	-0.179	-0.017	0.124	-0.096	-0.009	-0.002
Rural Rich	3.363	-0.186	-0.017	0.119	-0.089	-0.009	-0.002
Urban Poor	3.877	-0.178	-0.016	0.127	-0.101	-0.01	-0.002
Urban Medium Poor	3.67	-0.183	-0.016	0.124	-0.096	-0.009	-0.002
Urban Medium	3.531	-0.185	-0.017	0.122	-0.093	-0.009	-0.002
Urban Medium Rich	3.386	-0.189	-0.017	0.12	-0.09	-0.009	-0.002
Urban Rich	3.068	-0.196	-0.017	0.115	-0.083	-0.009	-0.002

Table 5 break down percentage change of consumer prices by household. The table shows that the consumer prices for rural poor in XSC will rise by 2.18% and this is because rural poor farmer will pay 17% more for sugar crop. (Figure 2)

Table 5: Consumer prices by Households.

	XSC	Malawi	Tanzania	Zimbabwe	XSD	Madagascar	Uganda
Rural Poor	2.18	-0.11	-0.01	0.10	-0.08	-0.01	0.00
Rural Medium Poor	1.97	-0.11	-0.01	0.10	-0.07	-0.01	0.00
Rural Medium	1.85	-0.11	-0.01	0.10	-0.06	-0.01	0.00
Rural Medium Rich	1.73	-0.11	-0.01	0.09	-0.06	-0.01	0.00
Rural Rich	1.53	-0.11	-0.01	0.09	-0.05	-0.01	0.00
Urban Poor	1.91	-0.11	-0.01	0.10	-0.07	-0.01	0.00
Urban Medium Poor	1.74	-0.11	-0.01	0.09	-0.06	-0.01	0.00
Urban Medium	1.63	-0.11	-0.01	0.09	-0.05	-0.01	0.00
Urban Medium Rich	1.54	-0.11	-0.01	0.09	-0.05	-0.01	0.00
Urban Rich	1.39	-0.12	-0.01	0.09	-0.04	-0.01	0.00

Figure 2- Private consumption Price in Poor Household in XSC aggregation.



The households which gain from the EU sugar reform are those that derive a large share of their income from factors that benefit from the reform.

5. IMPROVEMENTS AND REVISIONS:

The aim of this paper is to present some first outcome of a broader project that has the intention to analyse the impact of the EU sugar regime reform in the Sugar Protocol (SP) which by 2008 will become one of the agreements of the Economic Partnership Agreements (EPA). The scope is to evaluate the effects produced in those countries sugar cane producer signatories of the SP in terms of loss in export earnings and household incomes in the light also of the Everything but Arms initiative.

The achievement of this purpose is matched through the development of a new methodology, both on the data and modelling fronts. The modelling framework combines a global CGE model with micro-level income data at the global level.

In order to build this framework, several improvements and revisions have to be made:

- Improvement and expansion of the data available for poverty analysis
- Improvement of the treatment of household behaviour through a more realistic demand system;
- The inclusion of a Household-level framework in the global CGE model;
- TRQ Dimension (Elbehri *et al.*, 2005). The EU SP can be described as a tariff rate quota system. However the exporters under the EU SP receive the total quota rent because there is no in-quota tariff. Therefore there is no incentive for additional exports beyond the quota because over quota tariffs are very prohibitive.

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