Preferences Erosion and Trade Costs in the Sugar Market: the Impact of the Everything but Arms Initiative and the Reform of the EU Policy

Piero Conforti
George Rapsomanikis

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1. Introduction

Preferential trade agreements are thought of as an important instrument for integrating the developing (DCs) and least developed countries (LDCs) into the world trading system. The Everything But Arms initiative (EBA) of the European Union (EU) and the African Growth and Opportunity Act of the United States (US) consist of trade agreements that aim at increasing trade flows between developed countries and LDCs in order to stimulate growth.[1]

On average, the initial impact of EBA on LDCs total exports to the EU is small, whilst the limited export success is not uniform across countries due to a number of reasons. Firstly, rules that govern trade under the EBA, such as those on transport and the definition of the origin of the products, are thought to result in under-utilisation of preferences due to increasing trade costs (Brenton, 2003). Secondly, EBA has extended duty free access to a small number of agricultural products, whilst access for the majority of products was complete under the Generalised System of Preferences (GSP) and the Cotonou Agreement. In addition, a number of LDCs are unable to take advantage of EBA due to the current composition of their exports, as products that are traditionally exported to the EU markets have been receiving duty-free access under other agreements.

A number of studies focused on the potential impact of EBA on both the EU, and the beneficiary countries' sugar sectors. Among these, UNCTAD (2005) indicates that potential increases in sugar exports to the EU under the initiative are likely to be limited, due to the constraints arising from natural resource endowments and transport infrastructures, which are analysed in country case studies. Similarly, Stevens and Kennan (2001) suggest that total LDCs' sugar exports may reach some 300 to 500 thousand tonnes on top of the EBA quota. van Berkum *et al* (2005) suggest that these may reach 450 thousand tonnes. An opposite view is expressed, instead, by Witzke and Kuhn (2003), who calculate that LDCs' sugar exports to the EU market may reach 2 million tonnes in 2011.

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[1] Council Regulation (EC) No 416/2001of 28 February 2001 provide details on the Everything But Arms initiative. For a comprehensive description of the initiative see UNCTAD (2005).

Although informative, studies on the impact of the EBA initiative do not adequately cover important issues that relate to international trade and the trade costs countries face. Firstly, relative productivities and differences in technology concur in determining trade flows. Secondly, trade diminishes with distance, whilst infrastructure determines trade costs. Moreover, it is not only the natural trade barriers that determine trade costs and flows: import tariffs in the EU increase the cost of trade nearly twofold. Due to trade costs, few LDCs that are not subject to the Cotonou agreement between the EU and the African, Caribbean and Pacific countries (ACP) export sugar to the EU. Exports from Sudan, Mozambique and Ethiopia to the EU in 2003 amounted to about 42 thousand tonnes, whilst those originating from Burkina Faso, Chad, the Democratic Republic of Congo, Mauritania, Somalia, Niger and Sierra Leone amounted to 14 thousand tonnes. Apart from these countries, other LDCs do not export sugar to the EU.

In assessing trade costs, Anderson and Wincoop (2003, 2004) distinguish between border and non-border barriers. The former refer to barriers that involve rents such as tariffs and quotas, whilst the latter relate to natural trade barriers such as distance, infrastructure transport and communication technologies. Natural trade costs, therefore, include freight costs, information costs, contract enforcement costs, costs related to the use of different currencies, inventory costs, and regulatory costs that may be prohibitive for LDCs.

The present study takes into consideration trade costs that arise from both tariff and natural trade barriers in the context of EBA initiative, in order to assess the perspective volume of LDC-sugar exports to the EU, and the extent to which the EU policy reform may affect the LDCs as well as the ACP countries' exports that currently take place under the Cotonou agreement.

A baseline stretching to 2013 is simulated, incorporating the effect of the EBA initiative and its impact on the LDC and ACP countries, plus a policy scenario including the 39 percent reduction in the domestic support price of the EU, which translates in a reduction of the prices paid for export from LDCs and ACPs in the EU.

2. Model Framework

We utilise the non-spatial partial equilibrium COSIMO-AGLINK[2] recursive dynamic model of the world sugar market, in combination with a gravity model which is used to quantify the maximum potential export flows from LDCs to the EU under the EBA initiative. COSIMO-AGLINK contains 782 equations and identities and covers a total of 56 countries and regions[3], allowing two types of traded sugars, refined and raw sugar, and two sugar inputs, cane and beet[4]. The model is calibrated on the year 2003 and is utilised to generate a set of solutions up to 2013. World and domestic prices are determined endogenously by clearing the world market, as well as domestic markets of countries, such as the EU 25, Mexico, the United States and China, which are insulated in terms of world market price effects

In the ACP countries, the marginal economic incentive is calculated as a weighted pool - or blend price - of the price received for sugar exported under the Sugar Protocol (SP) and the Special Preferential Sugar (SPS), the price received for exports within the US tariff rate quota (TRQ), and of the world price for production exported to the world market. Thus, ACP countries are modelled as price-takers, with imperfect transmission of world price signals. For those ACP countries which are also classified as LDCs, where the EBA initiative implies a TRQ that increases by 15 percent per year between 2002 and 2008 and duty free unlimited access after year 2009, the price determination described above is applied until 2008 on the basis of the corresponding EBA TRQ. From 2009 onwards, it is assumed that ACPs and LDCs will be capable of exporting exclusively to the EU, thus being exposed to the EU reference price.

The gravity model is employed to determine the maximum amount of exports of the individual LDCs to the EU, on the basis of tariff and natural trade barriers. This is estimated on panel data for food and tobacco exports to the EU from 47 LDCs during the period 1988-2004, allowing the estimation of dynamic equations and the investigation of the adjustment

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[2] The COSIMO-AGLINK model was developed by the Organisation for Economic Cooperation and Development (OECD) and the Food and Agriculture Organization (FAO). Details of the AGLINK model are available in OECD (2004). COSIMO-AGLINK is an extension of the AGLINK model conducted by the FAO, covering, in addition to OECD Member States and main developing producing countries, 22 ACP countries and LDCs.

[3] Argentina, Australia, Austria, Bangladesh, Barbados, Belgium, Belize, Brazil, Burkina Faso, Canada, China, Cuba, Czech Republic, Denmark, Dominican Republic, Ethiopia, EU 6 (including Malta, Cyprus, Slovenia, Estonia, Latvia and Lithuania), Fiji, Finland, France, Germany, Greece, Guyana, Hungary, India, Indonesia, Ireland, Italy, Cote d'Ivoire, Jamaica, Kenya, Madagascar, Malawi, Mauritius, Mexico, Mozambique, Netherlands, other LDCs, Poland, Portugal, Russian Federation, Slovakia, South Africa, South Korea, Spain, Sudan, Swaziland, Sweden, Tanzania, Trinidad and Tobago, United Kingdom, USA, Vietnam, Zambia, Zimbabwe, and Rest of the World.

[4] In some major producing regions, such as Brazil and the USA, the model also includes sweetener substitutes on the demand side, ethanol and the joint product aspect of sugar and molasses.

process. Adjustment to a new trade relationship with the EU, characterised by no tariff barriers after 2009 may be gradual and not instantaneous for LDCs that, without doubt, face significant adjustment costs not only in increasing production to take advantage of the preferences, but also in administering exports under the EBA initiative.

Data on the value of food and tobacco exports to the EU and the relevant weighted tariff levels is collected from COMTRADE. We use food and tobacco exports instead of sugar exports because the latter are limited, and because the EBA initiative involves imports of all products. Data on infrastructure is collected from the World Development Indicators provided by the World Bank. Transport costs are collected in the form of the proportion of the value of exports that is dissipated in transportation.

The empirical gravity model is as follows:

$$x_{ie,t} = c + \alpha x_{ie,t-1} + \beta \left(\frac{y_i}{y_e} \right)_t + \sum_0^n \delta_n tar_{ie,t-n} + \sum_k \zeta_k z_{ie,t}^k + \left(\eta_{ie} + \varepsilon_{ie,t} \right) \tag{1}$$

where x_{ej}, y_i and y_e denote exports from country i to the EU in year t and the GDP of the exporting country and the EU respectively in the same year. The variable $tar_{ie,t}$ denotes the level of the *ad valorem* tariff faced by the exporting country in time t, whilst the k variables z_{ij} refer to several variables relating to natural tariff barriers. $\varepsilon_{ie,t}$ is a standard error term, whilst η_{ie} is an unobserved country-specific and time-invariant effect that can be thought of as an additional determinant of exports on the basis of characteristics that are idiosyncratic to each country. The lagged dependent variable and the lagged tariff terms capture the adjustment process to the new environment.

We estimate the gravity equation using the Generalised Method of Moments (GMM), a standard procedure for dynamic panel data models. GMM, as developed by Hansen (1982) and extended for first-differenced dynamic panels by Arellano and Bond (1991), consists of an asymptotically efficient estimator in this context. [5]

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[5] Details on GMM and its application on panel data are in Arellano and Bond (1991). Surveys on GMM are provided by Blundell, Bond and Windmeijer (2000) and Arellano and Honore (2001). An intuitive review is provided by Bond (2002). The method is robust to correlated country specific effects and endogeneity. It is a standard procedure for dynamic panel data models to transform the variables to their first differences in order to eliminate the country specific effects η_{ie} from the model. This transformation introduces correlation between the differenced lagged dependent variable and the differenced error term, rendering the OLS estimator inconsistent.

3. Results

The parameters of the gravity equation are presented in Table 1. We experimented with different natural barrier variables, such as the length of paved roads, the number of telephone lines per thousand inhabitants and other, but parameter estimates were not significant for all variables, due to the lack of variation of the series. The final specification is parsimonious. In addition to the GDP ratio, included lagged tariff terms and a transport cost variable.

INSERT TABLE 1 ABOUT HERE

Table 1: Dynamic gravity equation estimates

Estimates highlight the importance of tariff barriers in determining trade flows in the medium run. Reductions in the tariff level are expected to increase significantly the flow of exports from the LDCs to the EU; a 10 per cent reduction in the tariff level will result in a 20 percent increase of exports to the EU in the long run. The estimated parameter for transport costs also confirms the importance of well functioning and efficient infrastructure.

We calibrate the model to sugar exports to the EU for year 2003 for the LDCs that have exported to the EU during the period 1988-2004.[6] These are subject to tariffs that are determined by the EBA in-quota and out-of-the-quota tariffs, the corresponding GDPs, and transport costs.

The baseline generated with the COSIMO-AGLINK model shows an increase in the world reference price, following the application of the EBA initiative, together with a reduction in the EU domestic production and an increase in imports from the LDCs. The reform of the EU sugar regime results in an average 5 percent increase in the world prices for both raw and white sugar (Figure 1), and its impact on the rest of the world is relatively limited.

INSERT ABOUT HERE Figure 1

Instrumental variables estimators, such as 2SLS are consistent but not asymptotically efficient due to identification problems. In the context of dynamic panel data models, under the assumption that the error term $\varepsilon_{ie,t}$ is not serially correlated, GMM estimators are asymptotically efficient. In this paper, we adhere to the Arellano and Bond (1991) two-step GMM estimator, correcting for heteroscedasticity in a manner similar to the White period covariance estimation. We utilise the Sargan test for overidentifying restrictions to test the validity of the identifying assumption that there is no serial correlation in the residuals.
[6] Ethiopia, Sudan, Mozambique, Mali, Mauritania, Chad and Sierra Leone.

Figure 1: World price of sugar (US$ per tonne, raw)

Brazil is projected to export about 26 million tonnes in 2013, whilst the simulation of the EU reform suggests that Brazil will export an additional amount of about one million tonnes in that year. India's net trade position, which projects the country importing about 4 million tonnes in 2013, is only slightly improved by the EU domestic reform. Thailand is projected to export about 400 thousand tonnes more in the reform scenario, reaching 7.8 million tonnes in 2013.

The baseline suggests a reduction in the EU output due to EBA initiative imports. Total sugar imports in the EU are simulated to further increase following the domestic policy reform, albeit by a lower rate than that indicated by the baseline, particularly after 2009 (see Figure 2). In general, under both the baseline and the reform scenario, the EBA initiative results in an increase in imports by almost 700 thousand tonnes in three years. Towards the end of the simulation horizon, the effect of the EU reform causes imports under the EBA to slow down due to the reduction in the price paid to ACP countries under the Sugar Protocol, and the price imports that originate in LDCs receive under the EBA initiative.

INSERT FIGURE 2 ABOUT HERE

Figure 2: Sugar imports in the EU 25 (,000 tonnes)

The EU reform affects the preferential trade partners: trade is diverted away from countries which currently enjoy preferential access to the EU market, such as the higher cost ACP producing countries that export within the Sugar Protocol. These would be displaced by more efficient LDCs, some of which are also ACPs and enjoy duty-free unlimited-quota access to the EU market within the EBA initiative. In the simulation, the ability of these countries to export to the EU market is constrained by transport costs represented by the gravity equation.

Three country groups can be identified among those enjoying preferential access to the EU market. Firstly, ACP developing countries, which currently enjoy preferential access under the SP and the SPS are expected to be affected by both the abolition of the SPS, as well as by the reduction in the EU price. The latter will have a significant impact on high cost producers, such as Barbados, where both total exports and exports to the EU are falling dramatically (see Table 3), whilst the elimination of SPS will affect ACP low-cost producing countries such as Trinidad, Swaziland, Mauritius, Jamaica, Guyana, Fiji and the Cote d'Ivoire.

INSERT TABLE 2 ABOUT HERE

Table 2: Raw sugar exports of ACP countries and LDC

Secondly, for least developed ACP countries that export to the EU under the SP and SPS, the EBA initiative leads to unlimited duty-free access to the EU market. Malawi, Tanzania and Zambia are simulated to increase their exports to the EU significantly. Trade costs are assumed not to pose significant barriers to exports, as these countries have been exporting to the EU for long period of time.

A third group comprises those LDCs which are not SP and SPS signatories and, therefore, will obtain significant benefits from the EBA initiative. Some of these LDCs are important sugar producers, such as Ethiopia, Mozambique and Sudan. Exports from Ethiopia to the EU (see Figure 3) are simulated to reach 100 thousand tonnes by 2013, whilst those from Mozambique increase from 10 to 60 thousand tonnes during the same period. In a like manner Sudan is simulated to increase its exports to the EU nearly fivefold. EU policy reform is not expected to alter these export trends that are predominantly determined by the EBA initiative.

Other LDCs that are not significant sugar exporters, but have been exporting regularly small amounts of sugar to the EU in the recent years are Mali, Mauritania, Chad and Sierra Leone, that are included in the simulation as 'other LDCs', and Bangladesh. For these countries, the baseline indicates that exports may increase due to the EBA (Table 2), to a moderate level mainly due to the constraints imposed by transport costs, while the reform of the EU policy does not imply significant changes.

INSERT FIGURES 3 & 4 ABOUT HERE

Figure 3: Ethiopia – Exports to the EU (,000 tonnes)

Figure 4: Mozambique – Exports to the EU (,000 tonnes)

In total, sugar exports of the ACP countries to the EU are projected to increase by about 7 percent between 2001-03 and 2011-13, reaching 1.6 million tonnes; while those of the LCDs would increase threefold, reaching 427 thousand tonnes. Export of the ACPs toward non-EU destinations are projected to decrease by some 12 percent in the same period, while those of the LDCs would be reduced by over 40 percent.

Finally, the EU sugar policy reform, as proposed by the Commission, will without doubt worsen export revenues due to a reduction in the price received by the ACPs, while for the LDCs as a group export revenue would be 150 percent higher than that of the 2001-03 period (Table 3). ACP countries-signatories to the SP would also gain as a group, but solely due to countries that are calso classified as Least Developed and will export to the EU under the EBA initiative. Other ACP countries will experience substantial losses, such as Barbados, Zimbabwe and Cote d'Ivoire. In the same vein, wide potential gains arise for some of the LDCs, particularly Sudan, Tanzania, and the "other LDCs".

4. Concluding remarks

The results suggest that the EU sugar policy reform will imply an erosion of preferences for the ACP countries that export to the EU under the SP, and gains for the LDCs due to the implementation of the EBA initiative. In the baseline, export growth would be limited to little more than 500 thousand tonnes, given the combined effect of the natural trade costs and the price changes. In this respect, our results are consistent with the conclusions of UNCTAD (2005) and those of Steven and Keenan (2003), but not with the estimates provided by Witze and Kuhn (2003). At the same time, the reform proposed by the Commission seem to make a more significant difference in terms of export revenues for the LDC and for most of the ACP countries than in terms of exported volumes, given that its effect on the world price is too small to determine any significant trade creation and diversion outside the administered SP quotas and the EBA preferences, and given that the EU domestic price, however reduced, still remains far higher than the world market price.

Further analysis would be useful to deepen the understanding of the production and export perspectives of individual countries, both inside the ACP group and LDCs and among the other major producers, in at least two main areas. Firstly, our analysis does not address the possibility that other LDCs, which currently are not exporting sugar to the EU, could start doing so on the basis of the EBA initiative. Our assumption that these countries face prohibitive trade costs, as they have not exported sugar to the EU to date, is rather strong. UNCTAD (2005) has highlighted that in some of them it would also be possible that local production starts to be exported, while imports are increased to cover consumption. A more qualitative approach, focussing on the whole value chain, may improve the understanding

each individual country's potential to produce and export. Secondly, one of the limitations of the analysis presented is that sugar is mostly treated as an homogenous product. Despite a simple differentiation between raw and refined sugar is available in the COSIMO-AGLINK model, other forms of differentiation, especially on the consumption side, are not taken into account.

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Table 1: Dynamic gravity equation estimates*

$x_{ie,t-1}$	$tar_{ie,t-1}$	$tar_{ie,t-2}$	$\left(\dfrac{y_i}{y_e}\right)_{ie,t-1}$	$z_{ie,t}^{transport}$
0.3643	-0.0529	-0.0796	0.1283	-0.0859
(0.0052)	(0.0096)	(0.0068)	(0.0472)	(0.0156)
J-Statistic	51.26			
Instrument rank	55			
Sargan test *p-value*	0.42			
Sample	1990-2004			
Number of observations	539			

*Standard errors in parenthesis

Table 2. Raw sugar exports of ACP and ACP-LDC countries

(000 tonnes)

destination	EU under Sugar protocol				EU under SPS protocol, then EBA				rest of the world				TOTAL			
	1995-97	2001-03	2011-13b	2011-13s	1995-97	2001-03	2011-13b	2011-13s	1995-97	2001-03	2011-13b	2011-13s	1995-97	2001-03	2011-13b	2011-13s
Belize	40.3	40.3	40.3	40.3	9.6	5.2	0.0	0.0	57.4	57.0	70.6	76.3	107.4	102.5	110.9	116.7
Trinidad and Tobago	45.7	45.7	45.0	45.7	10.4	5.5	0.0	0.0	3.4	0.6	0.0	0.0	59.5	51.7	45.0	45.7
Swaziland	123.0	123.0	123.0	123.0	56.8	32.4	0.0	0.0	215.4	282.9	353.0	418.5	395.1	438.3	476.0	541.5
Mauritius	512.4	512.4	493.5	499.7	39.2	27.0	0.0	0.0	76.0	22.2	0.0	0.0	627.6	561.6	493.5	499.7
Jamaica	123.9	123.9	123.9	123.9	28.5	17.4	0.0	0.0	21.0	0.0	21.1	12.6	173.3	141.3	145.0	136.4
Guyana	166.3	166.3	166.3	166.3	37.3	17.8	0.0	0.0	39.8	114.9	130.9	117.4	243.4	299.0	297.2	283.8
Fiji	172.5	172.5	172.5	172.5	35.1	19.3	0.0	0.0	153.1	83.0	84.1	73.9	360.8	274.9	256.6	246.4
Dominincan Rep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	314.8	173.5	183.5	121.9	314.8	173.5	183.5	121.9
Cote d'Ivoire	10.6	10.6	10.6	10.6	12.0	9.1	0.0	0.0	26.5	42.0	33.5	30.5	49.1	61.8	44.2	41.2
Barbados	52.5	41.3	6.1	5.1	2.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	55.0	41.3	6.1	5.1
Kenya	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0	0.0	0.0	0.3	0.3	0.0	4.1	0.3	0.3
Zimbabwe	31.5	31.5	31.5	31.5	32.4	23.4	0.0	0.0	113.4	69.7	56.8	56.1	177.3	124.6	88.4	87.6
Mozambique*#	0.0	0.0	0.0	0.0	0.0	0.8	53.7	54.7	73.8	107.5	93.6	92.7	73.8	108.3	147.4	147.4
Ethiopia*#	0.0	0.0	0.0	0.0	0.0	15.0	113.6	113.6	43.7	74.2	0.0	0.0	43.7	89.2	113.6	113.6
Burkina Faso*	0.0	0.0	0.0	0.0	0.0	0.7	1.7	1.7	0.0	11.8	0.0	0.0	0.0	12.6	1.7	1.7
Tanzania*	3.1	10.6	10.6	10.6	1.5	2.2	39.6	39.6	0.0	7.1	0.0	0.0	4.6	19.9	50.2	50.2
Sudan*#	0.0	0.0	0.0	0.0	0.0	18.4	97.8	93.6	81.5	223.3	118.5	125.2	81.5	241.7	216.3	218.8
Malawi*	21.7	21.7	21.7	21.7	13.9	9.3	88.7	83.0	23.4	58.8	0.0	0.0	59.0	89.8	110.4	104.7
Zambia*	0.0	0.0	0.0	0.0	11.6	12.0	39.7	43.7	0.0	27.2	0.0	0.0	11.6	39.2	39.7	43.7
Madagascar*	11.2	11.2	0.0	0.0	12.2	9.9	20.8	27.0	0.0	0.0	0.0	0.0	23.4	21.1	20.8	27.0
total ACPs	1315	1311	1245	1251	303	230	456	457	1243	1356	1146	1125	2861	2897	2847	2833
Bangladesh	0.0	0.0	0.0	0.0	0.0	0.0	2.3	2.3	0.0	31.0	12.8	12.8	0.0	31.0	15.0	15.0
other LDCs	0.0	0.0	0.0	0.0	0.0	2.4	6.0	6.0	30.2	39.2	49.9	51.1	30.2	41.6	55.9	57.1
total LDCs	36	44	32	32	39	71	464	465	253	580	275	282	328	694	771	779

* ACP sugar exporters classified also as LDCs; #=EBA only
2011-13b = baseline
2011-13s = reform

12

Table 3. Changes in exports revenues of ACP
and ACP-LDC countries   100 = 2001-03

	2011-13b	2011-13s
Belize	92	56
Trinidad and Tobago	92	57
Swaziland	82	50
Mauritius	95	59
Jamaica	91	56
Guyana	94	57
Fiji	94	57
Dominincan Rep	n.a.	n.a.
Cote d'Ivoire	56	34
Barbados	15	8
Kenya	0	0
Zimbabwe	60	36
Mozambique*#	6959	4329
Ethiopia*#	787	481
Burkina Faso*	245	150
Tanzania*	409	250
Sudan*#	553	323
Malawi*	370	214
Zambia*	343	231
Madagascar*	102	81
total ACPs	115	70
Bangladesh **	100	61
other LDCs	265	162
total LDCs	452	277

* ACP sugar exporters classified also as LDCs; #=EBA only
** 100 = 2011-13b
2011-13b = baseline
2011-13s = reform

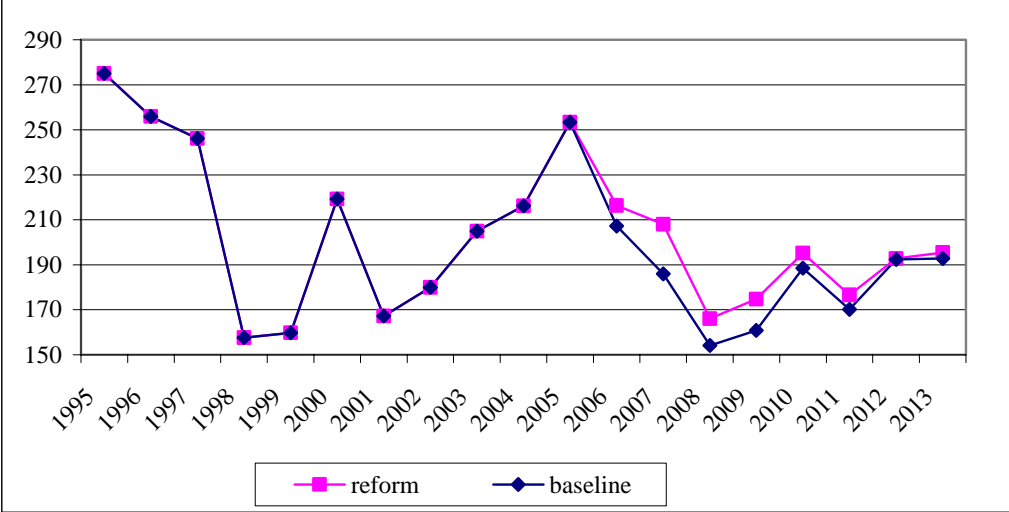**Figure 1. World price of raw sugar (US $per ton)**

Figure 2. Sugar imports in the Eu-25 (000 tons)

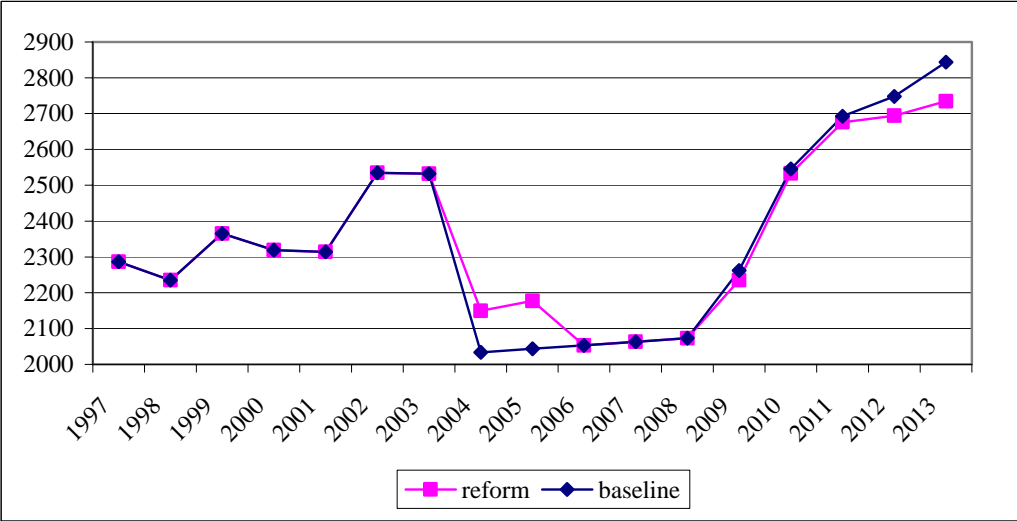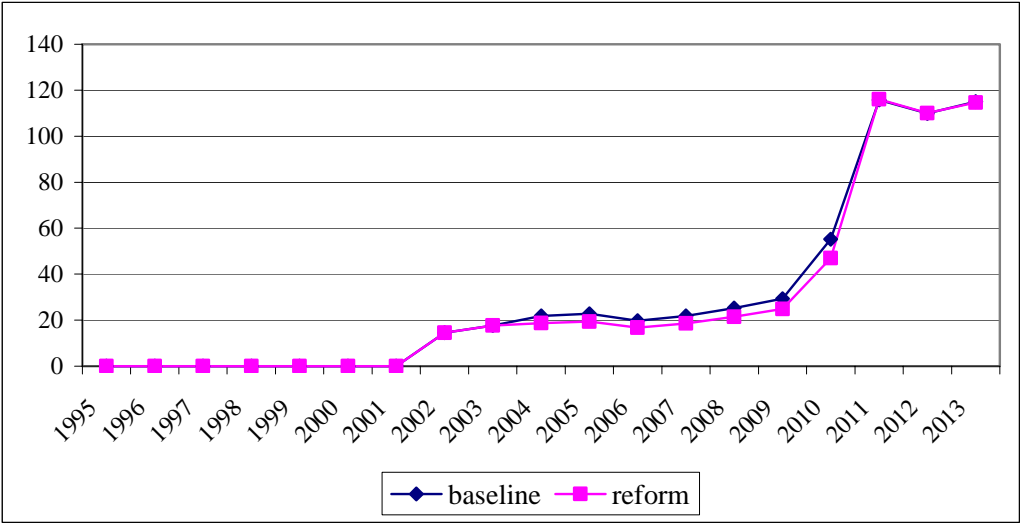**Figure 3. Ethiopia exports to the Eu (000 tons)**

Figure 4. Mozambique exports to the Eu (000 tons)