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Reforming the EU Sugar Policy

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by

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Abstract: This article presents and analyses the impacts of the EU sugar policy. Particular attention is given to the modelling of the quite complex policy and the calibration of the global general equilibrium model at the member state level. Two scenarios are analysed, namely a reduction in the intervention price of sugar and the sugar quota. It is found that the economic impacts of the two scenarios are quite different in terms of the effects on European production and trade in sugar as well in terms of efficiency. The impacts for developing countries also differ considerably across the two scenarios.

Keywords: EU sugar policy, general equilibrium modelling, reform scenarios
JEL. No.: C68, D58, Q17, Q18.

Reforming the EU Sugar Policy

1. Introduction

The EU is under pressure to reform its sugar regime. Following the Uruguay Round Agreement on Agriculture, the EU is bound to reduce border protection and to limit the quantity of supported exports of sugar. Also, there are serious concerns related to the ongoing WTO negotiations and the prospects of accommodating the interests of the developing countries and in particular the least developed countries. In addition, the prospective enlargements of the EU will greatly increase the potentials for surplus production of sugar in the EU, and make it difficult to comply with the commitments of the GATT (Huan-Niemi, 2001).

In an attempt to tackle these problems, the European Commission is heading for a major revision of the sugar regime, possibly involving price reductions and/or reductions of the EU sugar quota level (cf. European Commission, 2000a). As the sugar regime was scheduled for revision by 1 July 2001, the EU Agricultural ministers met in May 2001 to discuss a reform paper presented by the EU Commission. The outcome of that meeting was an interim continuation of the present regime for another 5 years. The EU ministers also agreed to discuss the EU sugar regime again in 2003.

The purpose of this paper is to present and analyse the rather complicated EU sugar policy and its impacts. To be able to analyse the effects of different policy options and to compare the economic effects of price cuts versus quota reductions, the instruments of the sugar policy is explicitly introduced into a (standard) global computable general equilibrium model and its database. This is no easy task and as it is the first of its kind in the literature (to the best of the authors' knowledge).

2. The EU sugar scheme

The objectives of the European Union's sugar policy are twofold: (1) to secure a sufficient and stable supply of sugar within the EU, and (2) to provide farmers with a stable income from the production of sugar beet or sugar cane. Both these objectives are intended to be met without imposing a significant financial burden on the EU budget. Further, it is implicitly understood that the regional dispersion of the production of sugar in the EU should be maintained, allowing for a broad spectrum of farmers to participate in this production, which is mainly based on sugar beet.

The EU sugar policy combines restrictions on imports of sugar from third countries with price guarantees for sugar produced for domestic consumption within the EU. The price to consumers is guided by an institutionally determined intervention price that has been 2-3 times above the world market price for a number of years. Producers receive differentiated prices for A- and B-quotas for sugar net of producer taxes. The taxes are determined such that the tax revenue will cover the cost of bridging the gap between the internal market price and the world market price for exports of B-sugar, making the scheme self financing. Production in excess of the A- and B-quotas (so-called C-sugar) is exported to the world market without any support from the EU. The costs of other exports of sugar (mainly raw sugar imported on preferential terms from ACP-countries and India, which has been refined within the EU) are, however, covered by the EU budget.

Although the producers of sugar are paid only the world market price for exports of sugar, the use of A- and B-quotas provides an incentive for expanding production beyond domestic consumption. This tendency is further strengthened by the fact that producers plan for excess production of sugar beet (given the variation in yields from year to year) so as to be able to fulfil the contractual agreements for deliveries of sugar beet to refineries. The costs of the sugar scheme are therefore shared

between consumers in the EU, who pay the high price for the product, and producers in countries outside the EU, who face lower world market prices due to the supported exports of sugar from the EU.

The principle of the EU sugar market regime is illustrated in Figure 1 where the total supply is divided into A- and B-quotas, preferential imports of sugar from ACP-countries and India (ACP) and C-sugar for which no support is provided from the EU. Domestic consumption of sugar in the EU (Q) is determined by the intersection of the intervention price (P_I) and the demand curve (D). Hence, part of the production of B-sugar is exported together with the equivalent of preferential imports and the production of C-sugar. The cost of the scheme is financed by the price to consumers (shaded area a), by producer taxes (shaded area b) and by the EU-budget (shaded area c). It should be noted that the provision of export support for B-sugar through taxes on production (cross-subsidisation of exports) is incompatible with the regulations of WTO and is therefore subject to reduction commitments according to the GATT-agreement.

Figure 1: The EU sugar scheme – EU total

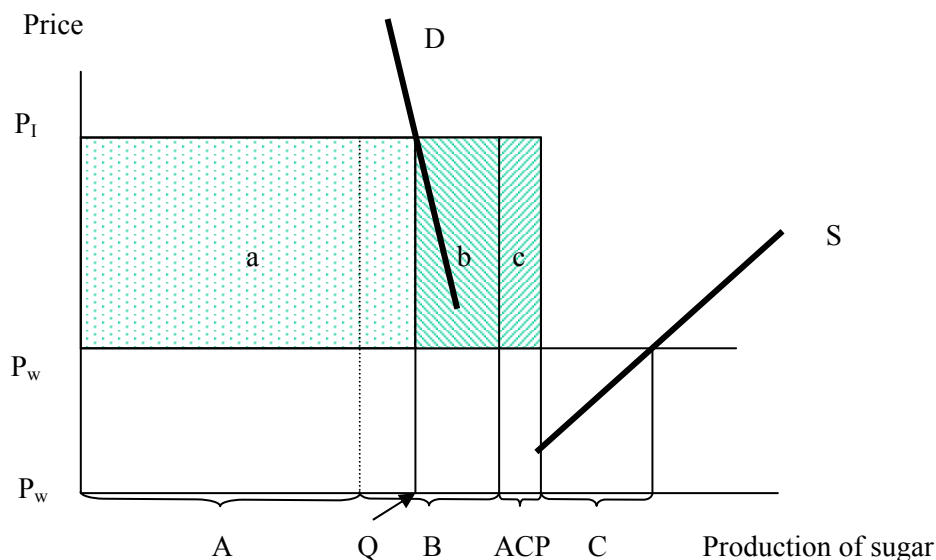
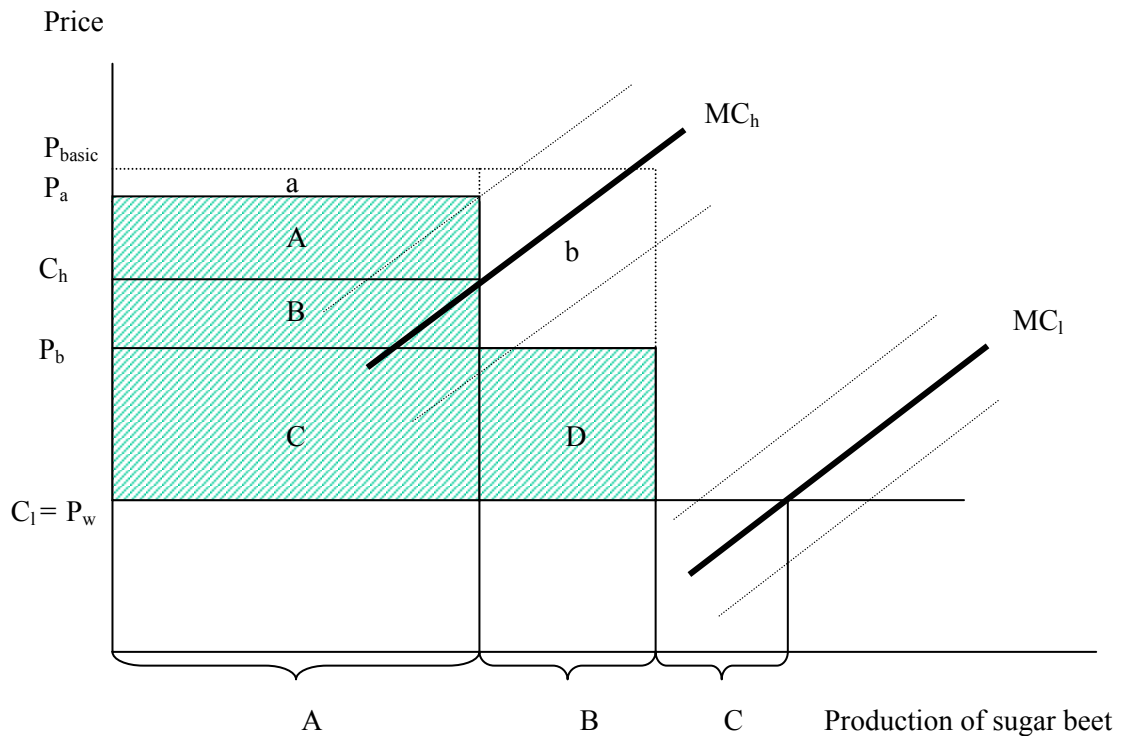


Figure 2 illustrates the market scheme for sugar as viewed from the primary producers. Producers are allocated A- and B-quotas of sugar beet for which they receive guaranteed prices net of producer taxes (P_a and P_b). The prices are linked to the basic price (P_{basic}) by charging the production of A-sugar beet a tax of 2% and the production of B-sugar beet a tax of maximum 37.5%.¹ The revenue from these taxes (areas a and b) is used to cover costs of exports of B-sugar as described in Figure 1.

A high cost producer (represented by the marginal cost curve MC_h in Figure 2) will thus receive the price P_a for all his production. With a marginal cost equal to C_h , the producer gets a quota rent cor

¹ The taxes are determined such that they just cover the costs of exports of B-sugar. If necessary, a supplementary tax (in addition to the A- and B-taxes) can be applied to cover losses in a marketing year caused by the disposal of Community production in excess of internal consumption.

Figure 2: The value of sugar quotas in primary production



Note: Dotted MC curves indicate variation in yields of production (see later).

responding to the shaded area A (the quota rent is equal to the difference between the price P_a and the marginal cost C_h multiplied by the production of A-sugar). A low cost producer (represented in the figure by the supply curve MC_l) will get the high price (P_a) for A-production, the lower price (P_b) for B-production, and production in excess of quota deliveries (C-production) is paid a price corresponding to the world market price for sugar. With marginal cost equal to the world market price, the quota rent will in this case be equal to the total shaded area ABCD.

Figure 2 indicates that the producers will react differently to price changes. The high cost producer will maintain his level of production as long as the quota rent (A) is positive, but the production will decline if the price P_a is reduced below the marginal cost C_h . In the case of the low cost producer, the production is determined by the world market price and is therefore unaffected by changes in the internal prices.² It is therefore crucial to know the position of producers with regard to cost of production when investigating the effect of policy changes.

3. Modelling the EU sugar regime

Modelling the EU sugar policy regime is a difficult task that requires both a correct specification of the institutional mechanism and calibration of the data at the EU country level. In our selection of the economic model we have chosen to analyse the sugar policy in an global general equilibrium model for two reasons. First, it allows us to take account of the possible economy-wide effects of the sugar policy, including the interactions between the different crops and sectors in the European economy and in the countries outside Europe. Second, we also wish to illustrate that it is possible

² The production may rise if the world market price increases as a result of the reduction in internal prices.

within a general equilibrium model to represent rather specific and detailed institutional mechanisms.

The model used is the GTAP model which is a standard multi-regional, static computable general equilibrium (CGE) model. Regional production is produced according to a constant return to scale technology in a perfectly competitive environment, and the private demand system is represented by a non-homothetic demand system (a Constant Difference Elasticity function)³. The foreign trade structure is characterised by the Armington assumption implying imperfect substitutability between domestic and foreign goods. The theoretical structure of the model is as outlined in Hertel (1997), with the addition of the following key components modelling the EU sugar regime:

- **A basic price for sugar beet (P_b) and the A- and B-quota system.** This is modelled as a “tax-quota system”, where different input taxes are levied on sugar refineries’ intermediate demand for domestically grown sugar beet, cf. Figure 1 and 2⁴.
- **An input tax levied on the input of beet in sugar refineries.** This tax - being endogenously determined - finances the EU costs of exporting B-sugar (export subsidies). Thereby the A- and B-sugar beet prices adjust endogenously in line with changes in the tax. In the case of no B sugar export, this imply that sugar beet growers will get the same price for both A- and B-sugar beet.
- **A quota rent** being generated from the gap between the basic price (adjusted for the tax) and the actual cost of production, cf. Figure 2.
- **A border protection (import tariffs, tariff rate quotas and export subsidies).** The border protection supports the high EU price for sugar and in our model the EU market price is determined endogenously by the world market price and the border protection. For the ACP countries – having preferential access to the EU market - the imports are determined endogenously by a tariff rate quota system (TRQs)⁵.
- **A contract agreement between the growers and the refinery.** It is assumed, given the rather complicated institutionally fixed relationship between the price of white sugar and the one for sugar beet, that the basic price of beet follows the changes in the market price for sugar. The allocation of the total quota rent is therefore endogenously determined. The total quota rent is divided between a pure economic rent accruing to the sugar refineries (modelled as an output subsidy) and a quota rent accruing to the land used for producing sugar beet (modelled as a subsidy to land)⁶.

4. Estimation and calibration of the supply response and quota rents

Following our modelling approach, the basic price, world market price, the three tax wedges, as well as each member country’s two designated quotas and marginal cost of production are needed

³ Hence, the present analysis abstracts from features such as imperfect competition and increasing return to scale, which may however, be important in certain sectors.

⁴ The tax quota system is modelled following an approach similar to Elbehri and Pearson (2000) TRQ modelling.

⁵ The rent associated with the tariff rate quota system is assumed to be divided between the ACP countries in question (the exporter) and EU (the importer) on a 80-20 per cent basis given the administration of the tariff rate quota system, cf. Walter-Jørgensen et al (2001). It is also assumed that the initial quota fill rate is one.

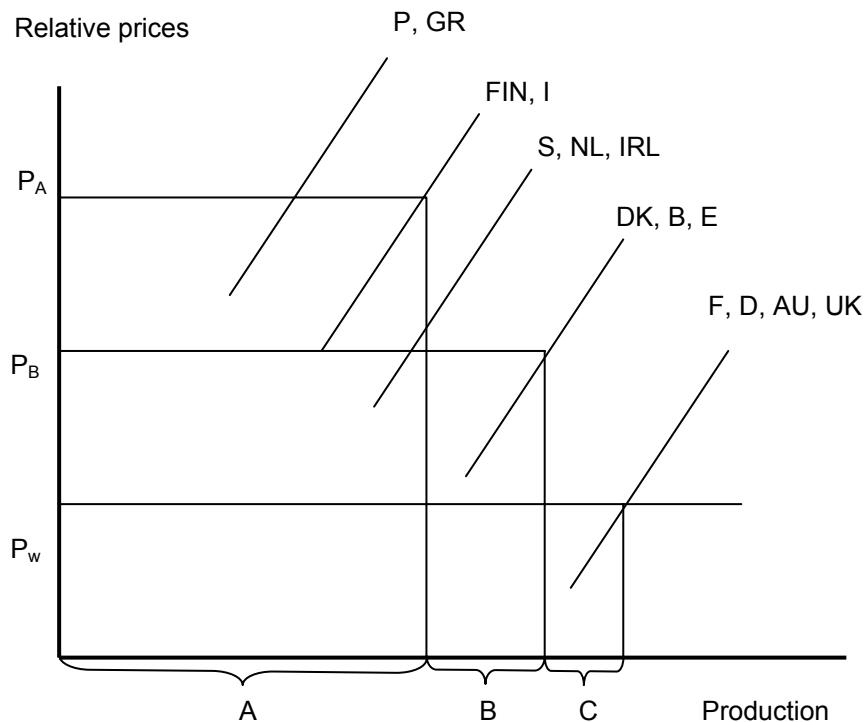
⁶ We are aware that in reality the split of the total quota rent between growers and refineries are much more difficult to determine. By splitting the total quota rent between the two agents we assume that the sugar refineries do have a willingness to pay (accepting a part of the adjustment) to avoid that the production of sugar beet decline “too much” (an excess capacity argument). The chosen strategy implies e.g. that a 20 per cent cut in the sugar price will be translated into a 20 per cent fall in the refinery’s purchase price of sugar beet.

to decide its position in the sugar regime. These data, together with the GTAP version 5 database (cf. Dimaranan and McDougall (2001)), form the basis for simulating the effects of alternative policy scenarios. In this section we estimate and calibrate the supply response and quota rent for each member country.

Bureau et al. (1997) have found that there is a considerable variation in quota values among member countries in the EU. Unfortunately, the study does not include all 15 Member countries of today and is therefore insufficient as basis for estimation of quota rents in the present study. Member countries are therefore ranked according to their production of C-sugar and the rate of quota fill, from which information on quota rent might be inferred.

The method builds on the observation that the pattern of supply seems to be quite stable over time, i.e. some Member countries produce C-sugar in quite large quantities year after year, whereas others never manage to fill their quota. To explain these differences, the countries must have different marginal cost functions as indicated earlier by Figures 2. However, it should also be taken into account that farmers are contractually bound to deliver a fixed portion of sugar beet to refineries each year regardless of variations in yield. Producers failing to fulfil the contract may forfeit their quota rights. The observed production of C-sugar may therefore reflect that farmers deliberately overshoot their quota in order to fulfil the contract in years of low yields.

Figure 3: Country position with regard to supply of sugar in the EU



Note: AU: Austria; B: Belgium; DK: Denmark; D: Germany; E: Spain; GR: Greece; F: France; IRL: Ireland; I: Italy; NL: Netherlands; P: Portugal; FIN: Finland; S: Sweden; UK: United Kingdom.

In the present analysis, it is assumed that the producers plan to fill their quota in all years (illustrated by the left-hand variation interval of the supply curves in Figure 2). In other words, the high

cost producer (S_h) is assumed to be aiming at filling the A-quota, but not to produce B-sugar beet, whereas the low cost producer (S_l) is planning for a certain production of C-sugar beet. In the calculation of the country positions, it is assumed that the farmers in their planning consequently overshoot their quota by an amount corresponding to two times the standard deviation of variation in total production for the country. The result of the analysis is presented in Figure 3, which illustrates schematically the ranking of member countries.

We assume that France, Germany⁷, Austria, and UK are capable of producing sugar for the world market. Furthermore that Denmark, Belgium, and Spain can fill the national quotas; that cost of production in Sweden, The Netherlands⁸, and Ireland may prevent these countries from utilising the B-quota; and that Italy and Finland and notably Portugal and Greece will have difficulties in filling the A-quota. This ranking has been tested using observable data and behaviour as well as it has been confirmed by Danish and European sugar experts, cf. Walter-Jørgensen et. al (2001).

5. Scenarios

Two scenarios are analysed to illustrate the effects of the above mentioned reforms: 25 per cent price reduction and reductions of quotas (Box 1). No compensation is given for the loss of income in either of the two scenarios. For both scenarios, the export of B sugar is eliminated.

Box 1
Scenarios and country representation

The basis for assessment is the actual situation in 1997 (comparative static analysis).

Scenario 1: Price reduction

The border protection for white sugar in the EU is reduced by 25 per cent, resulting in approximately the same reduction in the average market price for sugar. Because of the 'self-financing' system, the (endogenously determined) basic prices to producers of sugar beet may fall less, as the levies on A- and B-production will be reduced when the production and exports decline.

Scenario 2: Reduction of the EU sugar quota

The total quota of white sugar in the EU is reduced by 13,1 per cent, corresponding to an elimination of exports of B-sugar. The quota reduction is distributed on member countries relative to the stipulated coefficients for quota reduction in Regulation (EC) No 2038/1993 (both A- and B-quotas are reduced, but at different rates in different countries).

Countries represented in the analysis

EU-countries: Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Netherlands, Austria, Finland, Sweden, and United Kingdom. Luxembourg has no production of sugar and Portugal is omitted due to negligible production.

Non-EU countries: Australia, USA, Mexico, Central America and Caribbean, Brazil, India, China, Thailand, Rest of South Asia, Malawi, Tanzania*, Zambia, Zimbabwe, Uganda, Other South African Countries (incl. South Africa), and Rest of World.

⁷ The result for Germany is supported by studies of the cost of producing sugar beet in Bavaria (Zimmermann & Zeddies, 2000).

⁸ Bureau et al. (1997) have found that the production of sugar would cease in the Netherlands if the sugar quota was made transferable.

6. Results

Scenario 1: Price reduction of 25 per cent

A 25 per cent reduction in border protection for sugar in the EU reduces total production of sugar beet in the EU by almost 19 per cent (Table 1), eliminating exports of B-sugar. The impact on production varies, however, between the Member states. In Greece, Ireland, Italy, Finland and the Netherlands, production of sugar is reduced from 80 to nearly 100 per cent, whereas the production in other EU-countries with the exception of Sweden is little affected. The impact on the other primary agricultural sectors and industries in the European economy is minimal as sugar production and sugar refineries are of relative minor importance in general. The major adjustments are in terms of lower return to land used in the production of sugar beet, and declining quota rents. The differences across the individual EU countries in the production adjustment are explained partly by the mentioned country positions with regard to cost of production (Figure 3), and partly by different changes in the price to producers of sugar beet. As the exports of B-sugar cease in this scenario, producers of sugar beet receive only one price after the reduction of border protection (the reduced basic price), which then becomes the marginal price for producers in countries not producing C-sugar.

For Germany, France, Austria and United Kingdom, the price of sugar beet declines by 23-24 per cent, but - since the production at the margin is based on the world market price - production is only marginally affected. The results are illustrated for France in Figure 4 where the price of A sugar beet (measured relative to the basic price) is reduced from 0.98 to 0.76, whereas the price of B sugar beet increases from 0.68 to 0.76 (also measured relative to the basic price). The quota rent - being equal to the doubled shaded area in the figure before the price reduction - is reduced by the area (a) but increased by the area (b) corresponding to a reduction (per ha) in quota rent of 30%, cf. Table 1. A similar picture is observed for Germany, Austria and the UK.

For Greece, Italy, and Finland, the price of sugar beet falls by only 7 to 14 per cent. Since producers are assumed to plan for A-production only, there is no quota rent to exhaust (reflected in a zero change in quota rent in Table 1). The reduction in the price of sugar beet is therefore reflected in a stiff fall in production, causing land rent in sugar beet production to fall by up to 100 per cent.

In the case of Denmark, the price of sugar beet is reduced by 24 per cent. However, since the B-price is increasing, the quota remains binding and production is therefore not affected by the reduction in border protection. This is illustrated in Figure 5 where the A-price is reduced, and the B-price is increased like in France. Production is unchanged but the quota rent (per ha) declines by 71 per cent, and the land rent in sugar beet production is reduced by 45 per cent. A similar picture is observed for Belgium and Spain. For Sweden, the Netherlands and Ireland, the cost of production is somewhat higher (marginal cost is somewhere between the initial A- and B-price), which implies that quota rent is fully eliminated, production is reduced subsequently, and the land rent in sugar beet production declines accordingly.

As reported in Table 1, total EU exports to third countries are reduced by US\$0.7 billion whereas imports increase by US\$1.4 billion corresponding to a reduction in exports of 27% and an increase in imports of 146%. In all EU countries, exports to and imports from third countries, including the developing countries, are affected. Due to a significant geographical reallocation of the EU production of sugar, intra-EU- trade will increase, the fall in production in e.g. Italy being substituted by imports notably from France, Germany and UK.

Table 1: Scenario 1: 25 per cent price reduction

	EU total	Belgium	Denmark	Germany	Greece	Spain	France	Ireland	Italy	Netherlands	Austria	Finland	Sweden	United Kingdom
Production	Percent change													
Sugar beet	-18,7	-0,1	0,0	-1,6	-73,6	0,0	-0,7	-87,1	-30,5	-76,1	-0,7	-59,9	-24,4	-1,3
Sugar	-18,8	0,0	0,0	-1,6	-79,4	0,0	-2,1	-97,1	-97,7	-83,4	-1,6	-88,3	-24,8	-5,7
Cereals	0,1	0,2	0,4	0,3	0,0	0,1	0,1	0,3	-0,1	0,5	0,2	-1,2	0,3	0,5
Other crops	0,1	0,4	0,1	0,1	0,1	0,0	0,1	0,2	0,0	0,3	0,1	0,0	0,2	0,2
Export value (fob)	Change, Million US\$													
Total	-1059	-100	-17	-130	-11	-33	-342	-58	-95	-142	-3	-15	-52	-58
- Intra EU	-340	-31	3	-9	0	0	-165	-35	-40	-57	7	-3	-36	28
- Extra EU	-719	-69	-20	-120	-11	-33	-177	-22	-56	-85	-10	-12	-16	-87
Import value (fob)	Change, Million US\$													
Total	1009	-185	-36	-54	14	-101	-33	9	593	191	-4	561	25	27
- Intra EU	-340	-199	-48	-78	-14	-124	-71	-15	292	11	-19	3	3	-79
- Extra EU	1349	13	13	24	28	23	38	24	301	180	15	558	22	106
Prices	Percent change													
Sugar beet ¹	-	-24	-24	-23	-14	-24	-24	-9	-7	-16	-23	-8	-18	-24
Sugar ²	-	-24	-24	-23	-21	-24	-24	-23	-23	-22	-23	-22	-18	-24
Quota rent ³	-	-73	-71	-29	0	-79	-30	-100	0	-100	-29	0	-100	-31
Land rent ⁴	-	-51	-45	-24	-98	-40	-21	-100	-67	-99	-21	-94	-82	-25
Macroeconomic indicators	Percent change													
GDP	-	-0,1	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,4	0,0	0,0
Price of land	-	-9,8	0,3	-0,8	-0,2	-0,4	-0,4	-0,7	-1,0	-4,2	-0,6	-5,3	-2,8	0,7

Note: Portugal omitted due to negligible production.

¹ Basic price of sugar beet.

² Average market price.

³ Change in total quota rent divided by production.

⁴ Change in land rent (per hectare) for sugar beet.

Figure 4: Scenario 1, France

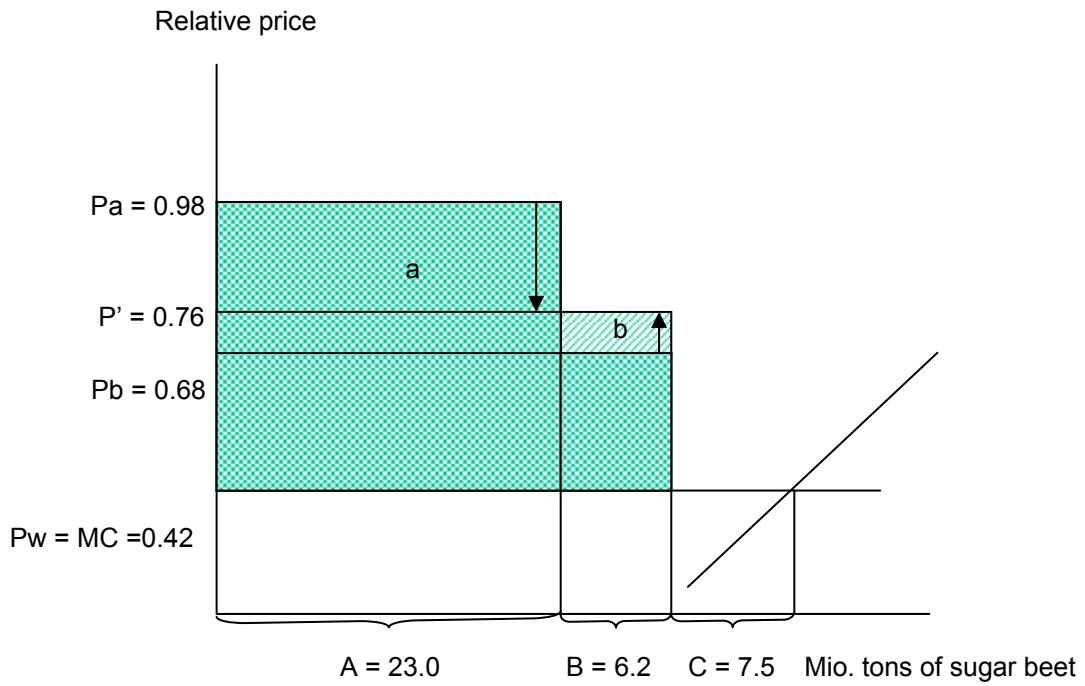
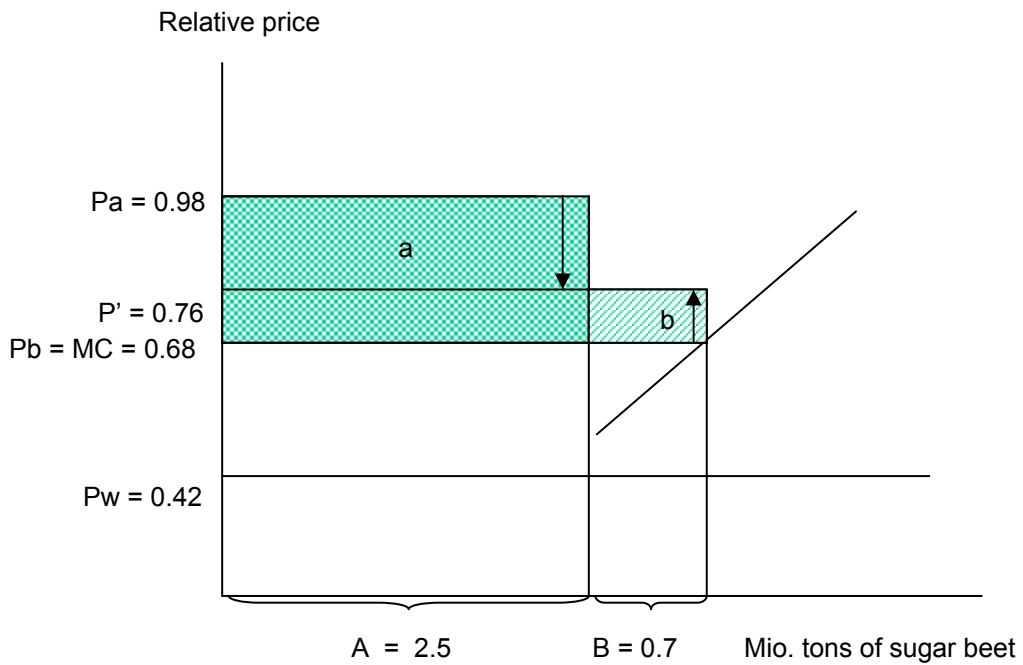


Figure 5: Scenario 1, Denmark



Legend: P_a = initial A-price; P_b = initial B-price; P_w = world market price; P' = common price after reduction of guaranteed prices; MC = marginal costs.

Scenario 2: Reduction in the quota

A 13 per cent reduction in the total EU sugar quota regime is distributed across the individual EU member countries in accordance with the stipulated coefficient for quota reduction as outlined in the EU regulation No. 2038/1993. It was found that a 13 per cent reduction in the total EU sugar quota (reducing exports of B-sugar by 100%) only leads to a 0.4% per cent fall in the overall EU production of sugar beet (Table 2). However, the effect on production varies considerably among Member countries.

For France, Germany, Austria and United Kingdom, production is hardly affected by the reduction in quotas, but the amount of production receiving the high prices will be reduced. As indicated by Figure 6 for France, producers will lose quota rent corresponding to the shaded area (a) in the figure. However, due to the elimination of exports of B-sugar, the A-price will increase from 0.98 to 1.00 and the B-price from 0.68 to 1.00 increasing the quota rent by the shaded areas (b) and (c). The production of sugar in France may even increase slightly because of higher prices on exports to third countries. The main effect for the mentioned countries is therefore a reallocation of A- and B-production to C-production.

In Denmark, where the quota initially is binding, the reduction of quotas will result in a proportionate reduction in the supply of sugar (14.1% reduction in the production of sugar beet). However, because of higher A- and B-prices and lower marginal cost of production, the total quota rent will be enhanced (shown by the shaded areas (a), (b) and (c) in Figure 9). The return to land in sugar beet production and the price of land will also increase. A similar picture is observed for Belgium and Spain although the effect on production is somewhat smaller.

For the remaining countries, production will increase when quotas are reduced. The increase in production is explained mainly by the self-financing system that has the effect of enhancing the price to producers when exports of B-sugar are reduced, making it more profitable for producers to fill their quotas. The Netherlands for instance is expected to increase its production by 7%, and Greece that has not filled its A-quota so far is expected to enhance production by 5.6%. The quota rent is expected to increase in Ireland, the Netherlands and Sweden but will remain zero in Greece, Italy and Finland.

The applied reduction in quotas has only a minor impact on the EU trade in sugar. Total exports to third countries decline by US\$93 million, whereas imports are hardly affected (Table 2).

7. Qualifications

Clearly, the present analysis like any other economic analysis, is subject to uncertainty. The results naturally depend on the assumptions applied and the chosen calibration of the model and, in particular, the identification of the individual member countries as either high, medium or low cost sugar beet producers. Nevertheless, given such a categorisation of the member countries, the model results – being quite rich in terms of interesting qualitative and quantitative results - clearly illustrate the very different regional impacts of a given reform scenario. We also believe, having confronted the results with other studies and other expert's view, that the qualitative story told and the magnitudes of the quantitative results found in this study correctly reflect the economic consequences of the analysed policy changes.

Table 2: Scenario 2: Reduction of quotas, change in production, trade and prices

	EU total	Belgium	Denmark	Germany	Greece	Spain	France	Ireland	Italy	Netherlands	Austria	Finland	Sweden	United Kingdom
Production	Percent change													
Sugar beet	-0,4	-12,9	-14,1	0,0	5,6	-2,0	0,1	0,8	1,3	7,0	0,0	0,3	1,1	0,1
Sugar	-1,2	-13,0	-15,9	0,0	6,0	-5,3	0,3	0,9	4,1	7,6	0,1	0,4	1,1	0,2
Cereals	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0
Other crops	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0	0,0	0,0	0,0
Export value (fob)	Change, million US\$													
Total	-85	-106	-44	2	3	-22	18	1	18	34	0	2	5	3
- Intra EU	8	-28	-14	2	0	-1	22	0	5	15	0	0	5	0
- Extra EU	-93	-78	-30	0	3	-21	-4	0	13	20	1	1	-1	3
Import value (fob)	Change, million US\$													
Total	11	26	10	0	0	18	-4	-1	-22	-14	1	-1	-2	-1
- Intra EU	8	25	9	0	1	15	-6	-1	-20	-12	2	0	-3	-1
- Extra EU	3	1	2	0	-1	3	2	0	-3	-1	-1	-1	1	0
Prices	Percent change													
Sugar beet ¹	-	3	4	0	-1	2	0	0	-2	-1	0	-2	0	0
Sugar ²	-	1	1	0	0	0	0	0	0	0	0	0	0	0
Quota rent ³	-	48	66	-1	-	21	-1	221	-	70	-1	-	26	-1
Land rent ⁴	-	13	15	0	33	5	0	46	19	41	-1	20	17	0
Macroeconomic indicators	Percent change													
GDP	-	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Price of land	-	2,5	0,5	0,0	0,1	0,1	0,0	0,6	0,2	2,2	0,0	0,3	0,8	0,0

Note: Portugal omitted due to negligible production.

¹ Basic price of sugar beet.

² Average market price.

³ Change in total quota rent divided by production.

⁴ Change in land rent (per hectare) for sugar beet.

Figure : Scenario 2, France

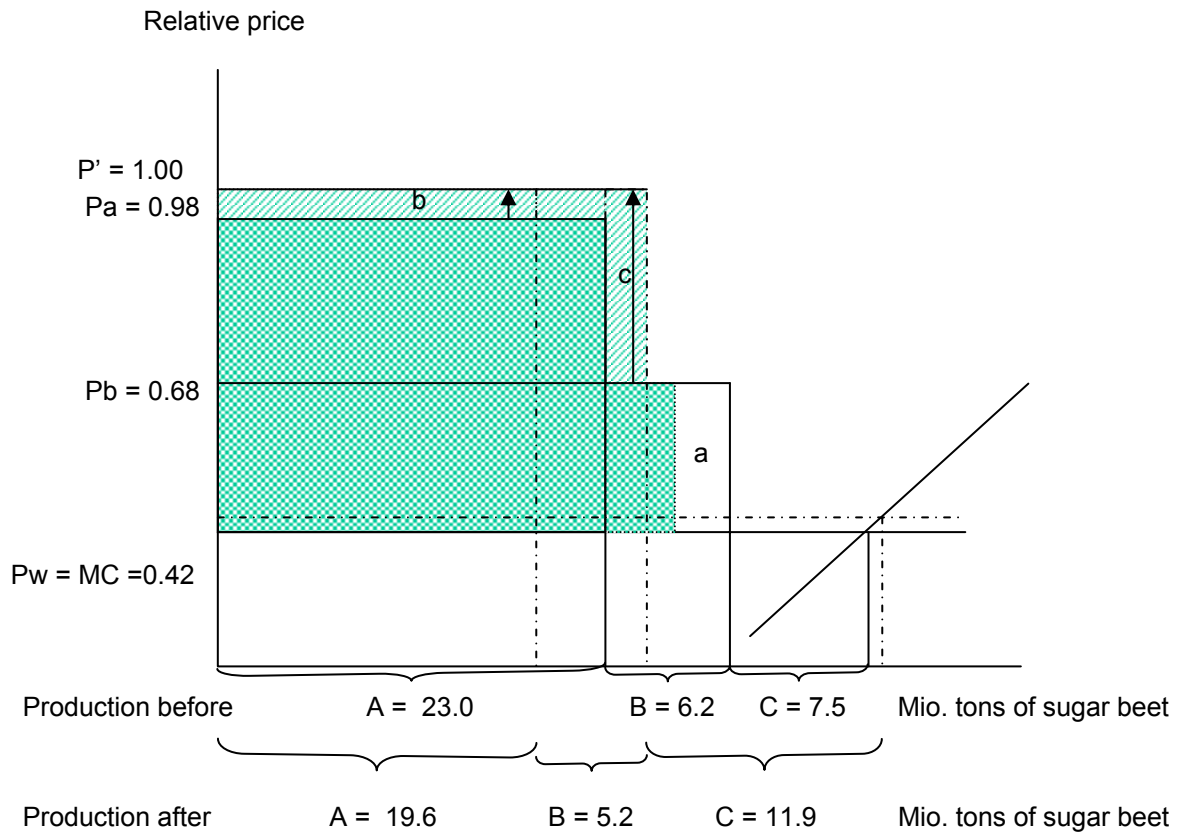
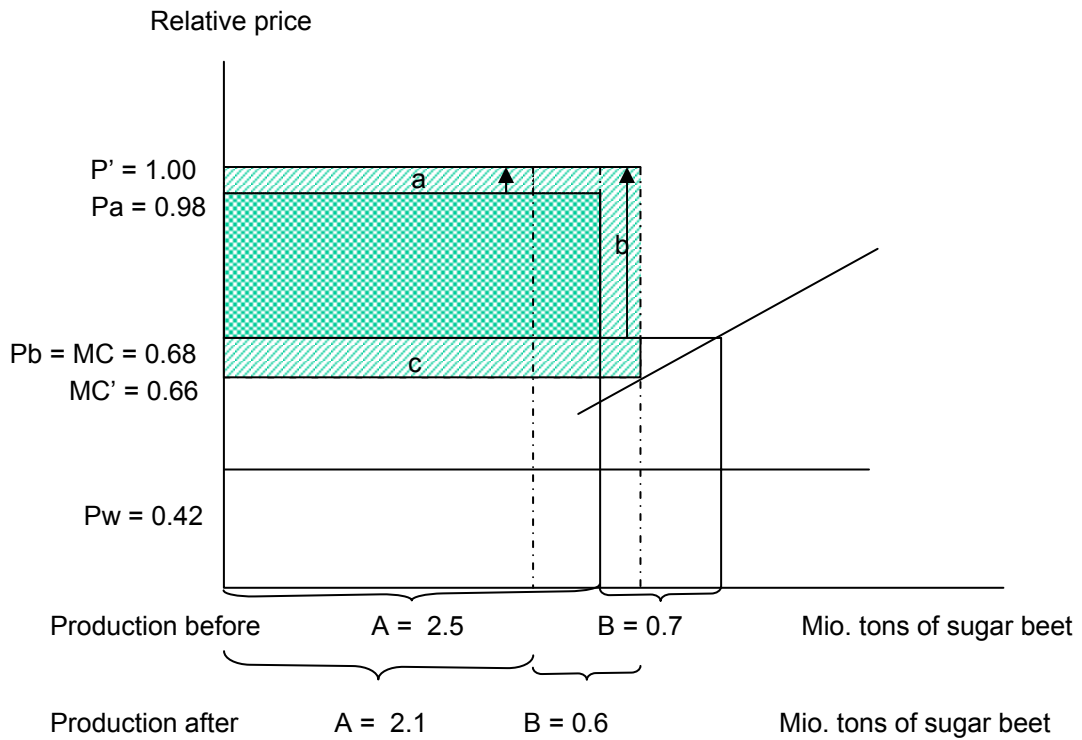


Figure 9: Scenario 2, Denmark



8. Conclusions and perspectives

The findings of the present analysis illustrate that the two policy reform options analysed here would impact significantly on the regional distribution of sugar production in the EU. The study also demonstrates that the impacts of the two options would have very different effects on the level of border protection and the degree of market access, thereby having significantly different consequences for countries outside Europe.

Policy option A: Reduction of quotas

If exports of B-sugar is sought to be eliminated by reducing the sugar quota, the analysis demonstrates that such a strategy would have only a limited impact on the total output of sugar in the EU as the production of C sugar being exported at the world market price would increase, while the production of A and B sugar would fall in some countries, but increase in others. This supply behaviour is a direct result of the self-financing system that reduces the need for producer taxes when exports of B-sugar are reduced or eliminated. Lower taxes will lead to higher prices provided to producers of A- and B-sugar beet, making it profitable to expand production within the established quota limits. Due to differences in production costs, the supply response will differ across the individual countries in the European Union.

In France, Germany, Austria and the United Kingdom, countries that are endowed with conditions favourable to growing sugar beet, it is profitable to produce sugar at the world market price. The production of sugar beet in these countries will therefore not be affected by an elimination of exports of B-sugar. In Belgium, Denmark and Spain, however, the production quota is binding. Although the cost of producing sugar beet is higher compared to the first group of countries, it still pays to fill the quota. A reduction of the sugar quota will therefore directly impact on the production of sugar beet, notably in Denmark and Belgium, where producers will reduce the total production of sugar in proportion to the reduction in the national sugar quota

For Ireland, the Netherlands, Sweden, Finland, Italy, Greece and Portugal, higher prices to producers (due to the elimination of exports of B-sugar) would overrule the impact of individual quota reductions. Despite higher costs of production compared to the first two groups of countries (Greece and Portugal do not fill the A-quota), production will increase in these countries when the quotas are reduced.

The elimination of exports of B-sugar through a reduction of the sugar quotas would lead to a more inefficient distribution of the sugar production within the EU. Furthermore, it will have virtually no impact on production and trade in the developing countries and countries outside Europe. The analysis therefore clearly demonstrates that a quota reductions is a very inefficient means of achieving improved market access to the European market and to reduce the cross subsidisation of sugar exports.

Policy option B: Reducing guaranteed prices

Reducing the guaranteed prices of sugar beet has a significant effect on the production of sugar in the EU. According to the analysis, a 25 per cent reduction in border protection will reduce the overall production of sugar by nearly 19 per cent, consumption will increase, and the production of A- and B-sugar will no longer cover the European domestic demand for sugar. The EU would still, however, be exporting C-sugar to the world market.

The production would fall most in high cost areas notably in Greece, Finland and Italy where the production of sugar beet would more or less cease. The production would also be reduced in Ireland, the Netherlands and Sweden, whereas Belgium and Denmark would maintain their present levels of production. The latter is explained by a buffer effect of the quota rents. The production of sugar beet in France, Germany, Austria and United Kingdom, being determined at the margin by the world market price, is not affected by the reduction of the guaranteed prices in the EU.

In conclusion, a strategy involving reductions in guaranteed prices is from an efficiency point of view clearly superior to reductions in the sugar quotas. A reduction of prices will have an immediate impact on production and will reduce the cross-subsidisation of exports of sugar. The impact of such a change of policy would vary from region to region within the EU. Elimination of exports of B-sugar through a reduction of prices could remove the economic basis for production of sugar beet in high cost areas, resulting in a concentration of the production in low cost areas, making the industry more fit for competition in international markets.

References

- Agra Europe (2001), *Agra Europe Weekly*, May 25, 2001.
- Bureau, Jean-Christophe, Hervé Guyomard, Laurent Morin & Vincent Réquillart (1997), "Quota mobility in the European sugar regime", *European Review of Agricultural Economics*, Vol. 24, pp. 1-30.
- Dimaranan, B. V. and R. A. McDougall (eds.) (2001). *Global Trade Assistance and Production: The GTAP 5 Data Base*, Center for Global Trade Analysis, Purdue University.
- Elbehri, A.E. and K. Pearson (2000), *Implementing Bilateral Tariff Rate Quotas in GTAP Using GEMPACK*. GTAP Technical Paper No. 18, Center of Global Trade Analysis Project, Purdue University.
- European Commission (2000a), *Proposal for a Council Regulation on the common organisation of the market in the sugar sector*, Brussels, 4. October 2000.
- European Commission (2000b), *The Agricultural Situation in the Community, Report 1999*.
- Harrison, W.J. and K.R. Pearson (1996), Computing Solutions for Large General Equilibrium Models Using GEMPACK, *Computational Economics*, 9, p. 83-127.
- Hertel, T.W. (1997), *Global Trade Analysis: Modeling and Applications*. New York: Cambridge University Press.
- Huan-Niemi, Ellen (2001), "Pressures for reforms in the EU Sugar Regime due to the Next WTO Round on Agriculture and the Enlargement of the EU", *Paper presented at the 77th EAAE/NJF Seminar No. 325 on International Agricultural Trade: Old and New Challenges*", August 17-18, Helsinki, Finland.
- OECD (2000) *Producer and Consumer Support estimates, OECD Database 1986-1999*, Paris.
- SFJI (1999), "Økonomien i landbrugets driftsgrene 1997/98 (Economics of Agricultural Enterprises 1997/98)", *Serie B nr. 82*, Danish Institute of Agricultural and Fisheries Economics.
- Walter-Jørgensen, A. H.G. Jensen and S. E. Frandsen (2001), Reform af EU's sukkerpolitik, Konsekvenser for EU og udviklingslandene, Report No. 126, Danish Institute of Agricultural and Fisheries Economics.
- Zimmermann, Beate & Jürgen Zeddies (2000), "Productivity Development in Sugar Beet Production and Economic Evaluation of Progress in Breeding", *Agrarwirtschaft* 49, Heft 5, p. 195-205.