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FUTURE POLICY OPTIONS FOR EU BEET PRODUCTION: QUOTAS - YES OR NO?

NOTE

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NOTE

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Abstract

Abolishment of EU sugar quotas will lead to lower sugar and sugar beet prices in the EU, leading to lower margins for farms. At the same time, expansion of sugar beet growing and processing in a quota-free situation can decrease fixed cost per ha of sugar beet and per kg of sugar, making both sugar beet growing and processing more efficient. Besides, lower sugar price levels will make Europe a more attractive continent for investments by sugar-based industries.

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EXECUTIVE SUMMARY

In this note, we present the results of two scenarios, besides a Status Quo scenario, predicting sugar beet acreage, sugar production, consumption and prices in mainly the EU in 2020. The two scenarios describe situations with a 70% lower import tariff ('Doha-Lower tariff scenario') and, additionally, the abolishment of sugar quota ('Quota free scenario').

In the Status Quo scenario, sugar production and acreage in the EU-27 will decrease in 2020 by 22% compared to 2004. However, this decrease has already taken place due to the EU sugar policy reform in 2006-2009. Sugar price will decrease by 12%. Compared to that scenario, lower import tariffs will lead to a 2% lower sugar production, a 1% lower acreage and a 6 – 9% lower sugar price in the EU in 2020. Abolishment of the sugar quota system in addition to lower import tariffs will lead to a 11% higher sugar production, a 11% higher sugar beet acreage and a 13 – 14% lower sugar price. This is the average of consumption sugar and industrial sugar price and production change.

Attention should be paid to integral and long-term effects of quota abolishment in the EU and elsewhere. Quota abolishment could lead to a more efficient sugar sector and a more attractive resource for sugar-based companies. However, under unfavourable market conditions, sugar price could decrease to a level which makes less competitive sugar companies vulnerable. To avoid damage to the local economies involved, it could be wise to maintain the minimum sugar and sugar beet prices. Otherwise, support measures could be required from a social point of view. Similar considerations between (macro-)economic welfare and (local) social effects should receive attention for the case of the poorest sugar producing countries in the world. Most of them have access to the EU-market.

1. INTRODUCTION

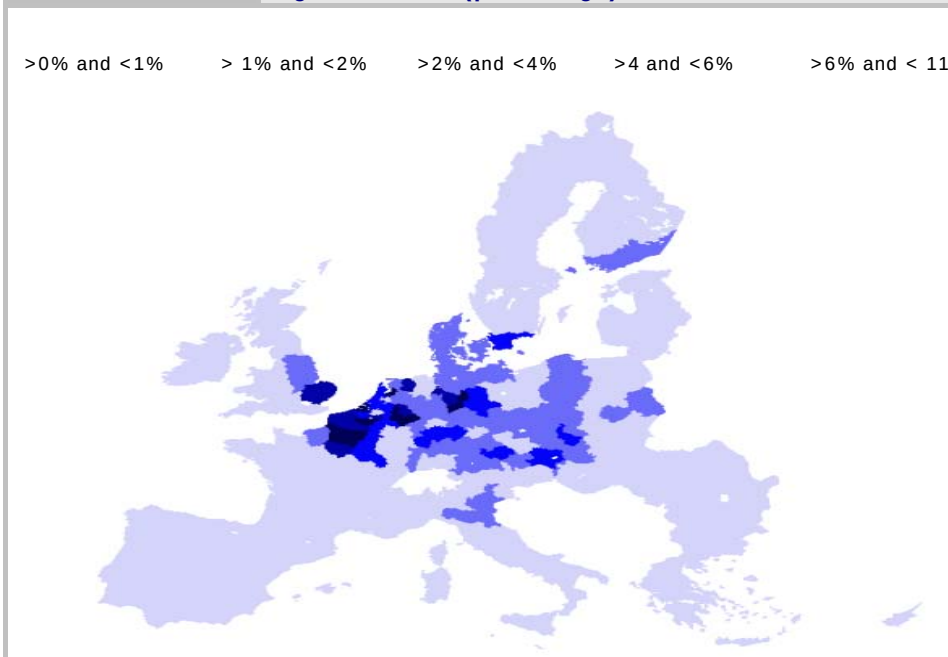
The current European sugar policy ends at the end of September 2015. In the autumn of 2011, the European Commission presented proposals for the EU sugar policy after 2015. In 2011, the Agricultural Economics Research Institute LEI in the Netherlands carried out an ex-ante scenario analysis for the Dutch ministry of Economic Affairs, Agriculture and Innovation (EL&I). The central question was: What are the consequences of a continuation or a fundamental change of the European sugar policy for the growers, processing industry, the other partners in the chain and other stakeholders, mainly in the Netherlands? The results of the study were based on a desk study, in which factors playing a role in the sugar market were studied, and on the application of a number of computer models. These models were used to estimate the effects of policy changes for e.g. the sugar production and sugar beet acreage, the income of sugar beet growers and the added value and employment in the Dutch arable agribusiness complex, based on a number of assumptions. In this note, similar results are shown, paying more attention to the other Member States compared to the original study (Smit and De Bont, 2011) and paying some attention to so-called soft landing measures proposed.

After this introduction, a brief overview of sugar beet production in the EU (Chapter 2) and of the sugar policy in a wider scope (Chapter 3) is given. In Chapter 4, the results of an analysis of three scenarios are presented. These results are discussed in Chapter 5. Conclusions and recommendations are given in Chapter 6. The note is completed with a reference list and an annex.

2. SUGAR BEET GROWING IN THE EU

Map 2.1 gives an impression of the allocation of the sugar beet production in the EU-27 in 2020 in the Status Quo scenario (see Chapter 4). The percentages show the shares of sugar beet in the total agricultural area by NUTS 2 region. Sugar beet production especially concentrates in northwest Europe. NUTS 2 regions with more than 4% sugar beet in their cropping plan can be found in the Netherlands, Belgium (Waals Brabant and Henegouwen (Hainaut)), France (Picardy, Nord-Pas-De-Calais and Ile de France) and Germany (Braunschweig, Köln and Düsseldorf). In 2012, the picture is more or less the same.

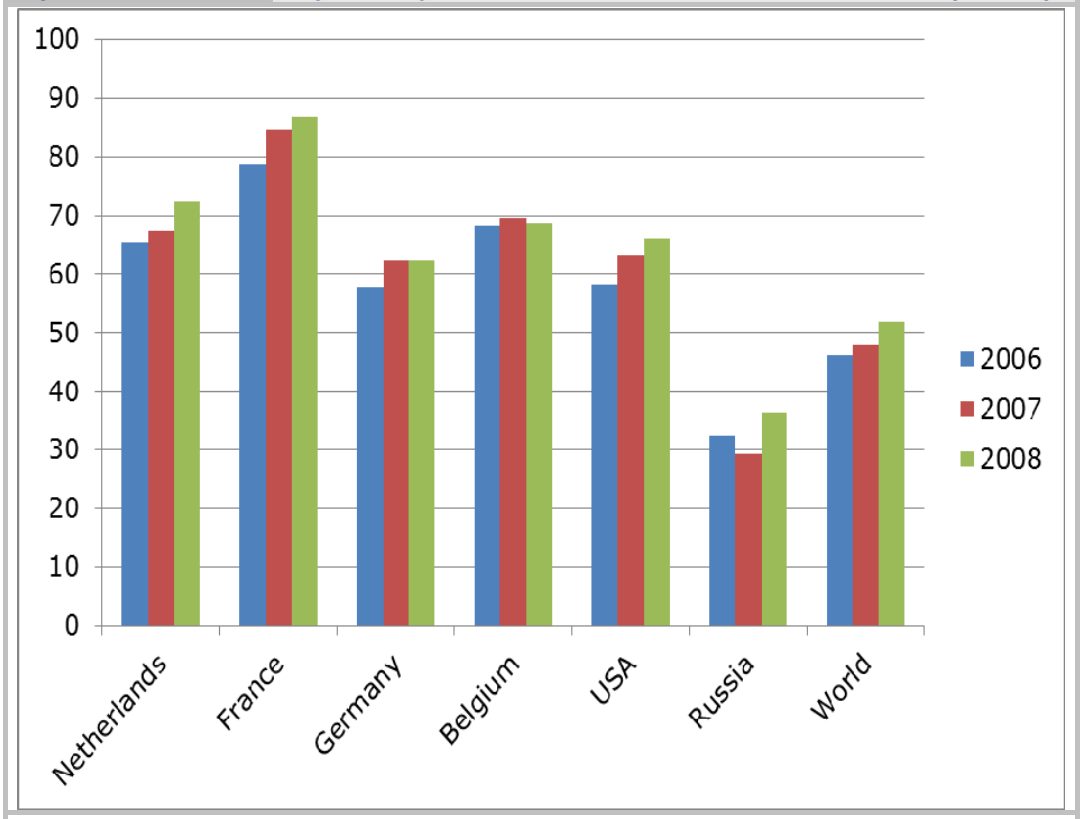
Map 2.1. **Share of sugar beet in total agricultural area per NUTS2 region in EU-27 (percentage)**



Source: CAPRI.

Within the EU, there is a great diversity in cropping plans and the share for sugar beet. There are also large differences in sugar beet production and therefore in margins per ha (Figure 2.1). As a consequence, changes in sugar policy will have different effects in different countries and country blocks in the EU.

Figure 2.1. **Sugar beet yield in different countries and in the world (ton/ha)**



Source: FAOSTAT in Van Galen et al. (2011).

3. SUGAR POLICY IN A WIDER SCOPE

3.1. European sugar policy

In the Sixties, the European sugar market policy was introduced, with an on average much higher price guarantee compared to the world market. The price guarantee was linked to a limitation of the size of the sugar production in the EU through the introduction of quota per processor. Between 2006 and 2009, the sugar policy was revised through significant decreases of the guaranteed sugar price; the income decrease was partly compensated for through the assignment of single income payments. Besides, the guaranteed sugar production amounts (quotas) in the EU were decreased by about one third. On 12 October 2011, the EC proposed to further reform the sugar policy (from 2016 onwards). This process may also include a possible abolishment of export restitutions in 2013, if the Doha Round is successfully completed. However, this is not expected to happen for the time being.

3.2. Sugar in the world

In the long term, production and consumption are expected to significantly increase, roughly by about 20% until 2020. The prices of sugar on the world market will be unstable through supply fluctuations and decreased reserves. Brazil is by far the largest sugar producer and exporter in the world. India is the second largest sugar producer but not the second largest exporter.

3.3. Sugar in developing countries

The EU has made promises to different groups of developing countries (ACP-African, Caribbean & Pacific and LDC-Least Developed Countries), allowing these countries to export sugar to the EU under favourable conditions. When the current sugar policy of the EU is continued, the size of these exports will increase in the coming years. Mainly countries with the lowest production costs have the greatest opportunities to really export more to the EU. Brazil is a major competitor in this field, especially when negotiations in the context of WTO (Doha Round) and of the EU with the Mercosur countries leads to a more liberalised world trade. Under conditions of high world market prices, developing countries may prefer to export sugar to countries other than the EU.

3.4. Bio-ethanol

In 2010, about 20% of the sugar produced in the EU was used for the production of bio-ethanol. This application can (slightly) increase depending among other things on oil and cereal prices and the EU policy on biofuel application. At the moment, the production of ethanol in the EU is much smaller than in the US and Brazil, the largest ethanol exporter. This is expected to stay unchanged in the future. The ethanol production in the US is based

on cereals, and in Brazil on sugar (cane). The ethanol production based on sugar beet will probably strongly increase in the EU only. Alternatively, the EU can import more ethanol from Brazil, where processors can easily switch between sugar and ethanol production.

3.5. Sugar in the EU

The EU has become increasingly dependent on sugar imports, due to the sugar policy reform in 2006, including a decrease of the sugar quotas by about 30% or 6 million tonnes (including iso-glucose). The EU has changed from a net sugar exporter into a net importer. The sugar production in the EU is now more concentrated in a smaller group of countries in northwest Europe.

4. RESULTS OF SCENARIO STUDY

4.1. Introduction to scenario study

In this study, three scenarios were examined with a series of LEI-models. The scenarios are summarised in Box 4.1. More background information on the dynamics of modelling sugar beet acreage and production in mainly the Quota free scenario is given in Annex I. The following sections contain the modelling results for the three scenarios.

Box 4.1 The selected scenarios were:

1. The 'Status Quo scenario' or the current policy including quotas, the current import tariffs from the Uruguay-round until 2020 and an estimation of 1 million tonnes extra imports at a minimum due to fully quota and tariff free sugar imports from ACP- and LCD-countries;
2. The 'Doha-Lower import tariffs scenario' is similar to the Status Quo scenario but with decreased import tariffs (-/- 70%, results from the Doha-round based on the EU-offer, July 2008);
3. The 'Quota free scenario' or an abolishment of the sugar quota system; the other conditions are equal to the Doha-Lower import tariffs.

4.2. Status Quo scenario 2020

The Status Quo scenario for 2020 gives the possible sugar production and acreages of sugar beet in the different countries of the EU-27 under current policies and competitive advantages. Under the Status Quo scenario, we assume unchanged sugar quotas and a standstill with respect to the WTO negotiations (Doha-round unfinished) until 2020. Sugar import tariffs are set as under the Uruguay round. Sugar imports from ACP- and LDC-countries into the EU can increase, following agreements between these countries and the EU.

Table 4.1 shows the sugar production in 2004 and 2020 and sugar quota in 2020. The sugar production includes quota sugar (or in-quota sugar) and industrial sugar (or out-quota sugar). Table 4.1 shows that in the Status Quo scenario, sugar production in the EU-27 will decrease by about 22% over the period 2004-2020. This decrease is mainly caused by the sugar policy reform in 2006 (EC, Regulations 2006 and 2007) and has already taken place. At the EU-27 level, the decrease in quota sugar due to the sugar reform is only partly compensated by increased production of industrial sugar. Table 4.1 also shows that the decrease in sugar production in the EU-10 exceeds the decrease in sugar production in the EU-15. This shows the limited competitiveness of sugar beet production and the sugar industry in the EU-10 as compared to the EU-15. The table also shows the development of the sugar production in a selected number of countries. In Germany, France and Great Britain, changes in sugar production over the period 2004 to 2020 range from 0% to -14%. Especially in Germany, this is due to a strong increase in the production of industrial sugar in the period 2004-2020 compensating for the decrease in sugar quota.

Table 4.1.	Sugar production (sum of quota and industrial sugar) and quotas in different country blocks and countries in the EU-27 in 2004 and in 2020 (Status Quo Scenario)				
Country (block)	Production (mln. tonnes white sugar)		Index	Sugar quota (mln. tonnes white sugar)	Ratio Production / sugar quota in 2020
	2004	2020	2004=100	2020	
EU-27	19.4	15.2	78	12.9	1.2
EU-15 a)	15.6	12.7	81	10.7	1.2
EU-10 b)	3.7	2.4	65	2.1	1.1
EU-2 c)	0.1	0.1	100	0.1	0.9
Belgium	1.0	0.7	70	0.7	1.1
Denmark	0.5	0.4	80	0.4	1.0
Germany	3.8	3.8	100	2.9	1.3
Austria	0.4	0.5	125	0.4	1.3
The Netherlands	0.8	0.8	100	0.8	1.0
France	4.4	3.9	89	3.1	1.3
Great Britain	1.4	1.2	86	1.1	1.1
Czech Republic	0.7	0.5	71	0.4	1.3
Poland	2.1	1.5	71	1.4	1.1
Other countries EU-27	4.3	1.8	42	1.8	1.0

a) EU-15: Belgium, Denmark, Germany, Austria, The Netherlands, France, Portugal, Spain, Greece, Italy, Ireland, Finland, Sweden, Great Britain; b) EU-10: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, Slovak Republic, Cyprus, Malta; c) EU-2: Bulgaria, Romania.

Source: CAPRI database and model.

The last column of Table 4.1 shows the ratio between the total sugar production and the sugar quota. The larger this ratio, the larger the share of industrial sugar in total sugar production. In the Status Quo scenario in 2020, industrial sugar production is relatively large in Germany, Austria, France and the Czech Republic.

Table 4.2 shows the acreage of sugar beet for quota sugar and industrial sugar in 2004 and 2020. Due to the decrease of total sugar production in the EU and higher sugar production per hectare, a strong decrease in the acreage of sugar beet must be expected. This decrease ranges from about -50% in Poland to about -14% in Austria. In some countries the production of sugar beet will totally disappear, which explains the strong average decrease in sugar beet hectares in the 'other countries' of the EU-27, namely -69%.

Table 4.2.	Acreage of sugar beet for quota and industrial sugar in different country blocks and countries in the EU-27 in 2004 and in 2020 (Status Quo Scenario)		
Country (block)	Acreage (* 1,000 ha)		Index
	2004	2020	2004 = 100
EU-27	2,137	1,287	60
EU-15 a)	1,624	1,040	64
EU-10 b)	485	227	47
EU-2 c)	28	20	73
Belgium	86	59	69
Denmark	45	38	85
Germany	414	314	76
Austria	42	36	86
The Netherlands	93	74	80
France	373	293	79
Great Britain	150	104	69
Czech Republic	71	45	64
Poland	286	144	51
Other countries EU-27	578	180	31

a) EU-15: Belgium, Denmark, Germany, Austria, The Netherlands, France, Portugal, Spain, Greece, Italy, Ireland, Finland, Sweden, Great Britain; b) EU-10: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, Slovak Republic, Cyprus, Malta; c) EU-2: Bulgaria, Romania.
Source: CAPRI database and model.

Table 4.3 shows the price for sugar beet, as the weighted average of the prices for sugar beet for quota sugar and for sugar beet for industrial sugar in the Status Quo scenario in 2020. Actual country specific quota sugar prices are based on FAO- and Eurostat data until 2010. Own estimates and development of sugar prices in the OECD outlook (OECD, 2011) are used for an estimation of the quota sugar price per country in the Status Quo scenario in 2020. The price of industrial sugar is correlated to the price of bio-ethanol and assumed equal to €20 per ton sugar beet in the Status Quo scenario in 2020[1]. Due to a lack of specific data, the price of industrial sugar beet is assumed equal in all Member States of the EU-27 in 2020.

In our study, the price of quota sugar in the EU-15 in the Status Quo scenario in 2020 is assumed to be set at €465 per ton white sugar. In the period 2009/2010, the producer price of quota sugar in the Netherlands was about €526 per ton white sugar. Thus, a decrease of about 12% is assumed.

Now, Table 4.3 shows large differences in prices of quota sugar in the different Member States of the EU-27. Prices of quota sugar are relatively high in Denmark, Germany and the Netherlands, and relatively low in Austria, France, Czech Republic and Poland. In our study these differences are not explained by differences in prices of quota sugar or industrial sugar as we assume that the prices of quota sugar and industrial sugar are the same in all countries of the EU-15 and the EU-12. The price differences predicted for quota sugar beet (see Table 4.3) are partly explained by differences in the efficiency of transport and

[1] www.liz-online.de/gi/bw/ruebenpreise1.htm; www.topagrar.com/news/Home-top-News-Neue-Ruebenpreise-bei-Suedzucker-inkl-Erschwerniszulage-131117.html;

processing of sugar beet into sugar, profit margins of the processing industry and the revenue of the by-products of sugar beet processing. Moreover, in the case of a sugar cooperative, the profits of other parts of the cooperative are important as well. For example, in the Netherlands, other business activities of the cooperative contribute to the relative high price for sugar beet for quota sugar (Table 4.3).

Table 4.3.	Sugar beet prices in Status Quo scenario in 2020		
Country	Sugar beet price (euro/ton sugar beet)		
	Quota sugar beet	Industrial beet	Weighted average
Belgium	35.0	20	34.3
Denmark	42.2	20	41.4
Germany	40.0	20	35.3
Austria	27.0	20	25.5
The Netherlands	42.5	20	42.2
France	30.2	20	28.0
Great Britain	35.0	20	33.3
Czech Republic	29.2	20	27.0
Poland	28.3	20	27.6

4.3. Doha and Quota free scenarios 2020

A decrease of the European import tariffs for sugar by 70% ('Doha-Lower import tariffs scenario', Table 4.4) will lead to an increase of sugar imports into the EU-27 from Brazil[1]. In the model, unlimited access is assumed, but in many FTAs (Free Trade Agreements), concluded by the EU, exceptions are included for so-called 'sensitive' products. Increasing imports from Brazil will lead to decreasing sugar imports from developing countries and to slightly lower internal production (2% for EU-27, see also Table 4.5) and acreage (1% for EU-27, see also Table 4.6). There is not much difference between different countries and country blocks for these predictions.

Table 4.4.	Market balance for sugar in EU-27 in 2020 under different scenarios (mln. tonnes of white sugar)						
Scenario	Production	Imports	Total Supply	Exports	Domestic consumption	Other Use	Total consumption
2009	15.0	4.5	19.5	1.1	n.a.	n.a.	n.a.
Status Quo scenario	15.2	5.2	20.4	0.9	16.3	3.2	20.4
Doha-Lower import tariffs scenario	14.9	6.4	21.3	1.6	16.5	3.2	21.3
Quota free scenario	16.8	5.7	22.5	2.2	16.5	3.8	22.5
Difference Quota free with Doha (%)	13.1	-11.5	5.7	36.2	0.3	17.7	5.7
Difference Quota free with Status Quo (%)	10.8	9.7	10.5	143	1.4	19.6	10.5
Source: CAPRI; 2009: Van Galen et al. (2011)							

www.agrarheute.com/zuckerpreise.

[1] This study does not take into account a possible Mercosur-agreement.

Sugar production in the EU-27 is expected to increase by about 10% after a decrease of the sugar imports tariffs ánd abolishment of the sugar quota system (Table 4.4). The sugar imports will further decrease compared to the Doha-Lower import tariffs scenario. Besides, the domestic use for food and bio-ethanol ('Other use', Table 4.1) will also increase due to a lower sugar price. Combining quota abolition with a decrease of sugar import tariffs of 70% will decrease income on arable farms in the Netherlands on average by 5 to 7% depending on the farm type. Income on arable farms on average will be about constant or decrease by 2% if only sugar quota abolition is considered, with sugar import tariffs unchanged. Sugar and sugar beet prices in the new situation will strongly be determined by the sugar demand development, which is partly a matter of human population development and consumption per capita and partly affected by the competitiveness of sugar cane and sugar beet for bio-ethanol production compared to oil, wheat, etc.

Table 4.5 shows that in the Quota free scenario, the production of sugar in the EU-15 will increase more than in the EU-10, namely by 14% and 8% respectively, compared to the Doha-Lower Tariff scenario. Compared to the Status Quo scenario this is 12% in the EU-15 and 6% in the EU-12. Table 4.6 shows the impact on area of sugar beet in the different scenarios.

A more detailed discussion about the background of effects at EU level and the elements determining the competitiveness of individual countries can be found in Annex I. Basically, the increase in sugar production and sugar area is determined by:

- the acreage of industrial sugar beet; we assume that first the area of industrial sugar beet is used to produce consumption sugar, before extra land is used for sugar beet growing.
- the price of in-quota sugar beet in the different Member States in the Status Quo scenario;
- the marginal revenue and the marginal cost of sugar beet production, including land costs;
- the room for extra sugar beet in the farm or regional cropping plan.

At country level, Member States who already produce far beyond the quota level in the Status Quo scenario (Austria, France and Czech Republic, Table 4.1), will react relatively moderately in terms of production expansion and extra land for sugar beet production on the abolishment of the sugar quota system. On the other hand, countries who produce at or just beyond quota level in the Status Quo scenario (Belgium, Denmark, the Netherlands, Great Britain, Table 4.1) will react more strongly on abolishment of the sugar quota system. It is expected that sugar production in Germany will strongly increase after the abolishment of the sugar quota system. This prediction is related to a relatively high price of sugar beet in Germany. The strong increase of sugar production in the Quota free scenario in the group 'other countries EU-27', e.g. Spain and Italy, is also remarkable. This increase seems a bit high and is explained through a relatively high sugar beet price in the initial situation.

Table 4.5.	Sugar production (quota and industrial sugar) in 2020 in different scenarios in different country blocks and countries in the EU-27				
Country (block)	Production (*mln tonnes white sugar) in scenario:			Index (Status Quo=100)	
	Status Quo	Doha-Lower import tariffs	Quota free	Doha-Lower import tariffs	Quota free
EU-27	15.2	14.9	16.8	98	111
EU-15 a)	12.7	12.5	14.2	98	112
EU-10 b)	2.4	2.3	2.5	98	106
EU-2 c)	0.09	0.09	0.10	99	107
Belgium	0.73	0.71	0.79	98	109
Denmark	0.39	0.38	0.51	97	131
Germany	3.84	3.78	4.54	98	118
Austria	0.45	0.44	0.46	98	103
The Netherlands	0.81	0.79	0.92	98	114
France	3.91	3.84	4.19	98	107
Great Britain	1.21	1.18	1.32	98	110
Czech Republic	0.49	0.48	0.52	98	106
Poland	1.51	1.47	1.56	98	103
Other countries EU-27	1.84	1.81	2.00	98	109

a) EU-15: Belgium, Denmark, Germany, Austria, The Netherlands, France, Portugal, Spain, Greece, Italy, Ireland, Finland, Sweden, Great Britain; b) EU-10: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, Slovak Republic, Cyprus, Malta; c) EU-2: Bulgaria, Romania.

Source: own calculations with CAPRI.

In the 'Doha-Lower import tariffs scenario' (Doha-scenario) the sugar price decreases by 9% and 6% in the EU-15 and EU-10 respectively as compared to the Status Quo scenario. Combining the Doha-scenario by abolition of the sugar quota will decrease the sugar price in the EU-15 and EU-10 with 14% and 13% respectively. This price effect seems rather limited but can be explained by the dampening effect of the changes in imports (decrease) and exports (increase)[1]. Moreover, the sugar price change is the average of consumption and industrial sugar price changes.

[1] Here it should be noted that under the quota free scenario, the export constraints are abolished as well.

Table 4.6.	Acreage of sugar beet for quota and industrial sugar in 2020 in different scenarios in different country blocks and countries in the EU-27				
Country (block)	Acreage (* 1,000 ha) in scenario:			Index (Status Quo=100)	
	Status Quo	Doha-Lower import tariffs	Quota free	Doha-Lower import tariffs	Quota free
EU-27	1,287	1,270	1,428	99	111
EU-15 a)	1,040	1,025	1,166	99	112
EU-10 b)	227	225	241	99	106
EU-2 c)	20	20	22	100	107
Belgium	59	58	64	98	109
Denmark	38	37	50	98	131
Germany	314	310	371	99	118
Austria	36	36	37	98	103
The Netherlands	74	73	84	98	114
France	293	289	314	99	107
Great Britain	104	102	114	98	110
Czech Republic	45	45	48	99	107
Poland	144	143	149	99	104
Other countries EU-27	180	178	196	99	109

a) EU-15: Belgium, Denmark, Germany, Austria, The Netherlands, France, Portugal, Spain, Greece, Italy, Ireland, Finland, Sweden, Great Britain; b) EU-10: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, Slovak Republic, Cyprus, Malta; c) EU-2: Bulgaria, Romania.
Source: own calculations with CAPRI.

Remark: The model predicts a relatively large increase in sugar production in the Quota free scenario in the group of 'other' countries. This is mainly explained by the high price for sugar beet in Italy and Spain in the Status Quo scenario, but the model predictions are a bit uncertain for these countries.

5. DISCUSSION

5.1. Results of the scenario study

In the Status Quo scenario, sugar production in the EU-27 in 2020 will expectedly be 15.2 million. tonnes of white sugar, 20% higher that the size of the sugar quotas in that year[1] but 22% lower than in 2004. The production decrease since 2004 is mainly due to the EU sugar policy reform in 2006. Therefore, in this scenario, about 20% of the production must be processed for industrial purposes like bio-ethanol or exported. However, the sugar exports are currently limited to 1.375 million tonnes, due to WTO-agreements. In the Status Quo scenario, a producer sugar price decrease of about 12% is assumed. Due to the decrease of total sugar production in the EU in this scenario and higher sugar production per hectare, a strong decrease in acreage of sugar beet must be expected, certainly when compared to 2004 (by 40%). In some countries the production of sugar beet will totally disappear, which explains the strong average decrease in sugar beet acreage in the 'other countries' of the EU-27, namely -70%.

In the Doha-Lower import tariffs scenario, the sugar imports into the EU, mainly by Brazil, will increase compared to the Status Quo scenario. Due to the export limitations, production will decrease by 2% and sugar beet area by 1% in total. Sugar prices in the EU will decrease with 9% and 6% in the EU-15 and EU-10 respectively as compared to the Status Quo Scenario.

In the Quota free scenario, which combines the Doha-Lower import tariffs scenario with sugar quota abolition, both sugar beet acreage and production in the EU-27 will increase by 11% compared to the Status Quo scenario. In this scenario, producer sugar price will significantly drop, namely by 14% and 13% in the EU-15 and EU-10 respectively. This will lead to lower profits for sugar beet growers.

However, income and production effects can be very different for individual sugar beet growers. In a study for the Dutch agricultural sector, it was shown that in the quota free scenario, sugar beet growers with relatively low sugar yields and high production costs per hectare, will decrease production by about 1%. On the other hand, given the abolition of the sugar quota and the freedom to produce, sugar beet growers with relatively high sugar yields and low production costs per hectare might expand their sugar beet area and production significantly, namely by about +20% compared to the Status Quo scenario. Moreover, income on these farms might increase compared to the situation of lower import tariffs and with sugar quota still in place (Smit and De Bont, 2011).

Gocht et al. (2012) predict that the income of German farmers can either increase or decrease through quota abolishment, depending on sugar demand and price development in and outside the EU and also depending on the opportunities to expand not only the acreage but also the exports to countries outside Europe.

[1] We assumed that the national sugar quotas would stay unchanged between 2009 (the final year of the former sugar policy reform) and 2020, the final year in our model study. We did not include so-called soft-landing measures like small step-by-step expansion of the quotas.

Table 5.1 shows the impact of quota abolition on EU sugar production and EU sugar prices according to different model studies.

Table 5.1. Effects of sugar quota abolition on sugar production and producer prices in the EU-27 in different studies: percentage changes compared to the Status Quo scenario with sugar quotas still in place.

	Smit and De Bont (2011)	Nolte et al. (2011)	IPTS (2012)
Sugar Production a)	+11%	+17%	+7%
Producer sugar price	-14%	-26%	-12%

a) This includes industrial (out-of quota) sugar and consumption (in quota) sugar in Smit et al. (2011). In Nolte et al. (2011) and IPTS this is only consumption (in quota) sugar.

In all studies cited, the developments in production are very different in the Member States (MS), showing the differences in competitiveness. Both the study of IPTS (2012) and Nolte et al. (2011) show an increase in MS with the lowest costs of production, which were particularly limited by the quota system, namely in France, Germany, Poland and the UK. Production increases in the Netherlands, Denmark, Sweden and Belgium are more limited. In Greece the production stops, and the production decrease is very large in Italy and Finland where the production costs are high. In Spain, the production drop is also significant. The same overall picture is given by Smit and De Bont (2011), although at MS level there could be some differences in the magnitude of the changes in total sugar beet production and area. In Smit and De Bont (2011), the increase in total sugar production is less pronounced in France and Poland and considerably higher in Denmark, Belgium and the Netherlands. These differences can be explained by differences in the models used and scenario definition. Smit and De Bont (2011) take into account a decrease of import tariffs and abolition of export constraints, combined with the quota abolition scenario. An important model difference is that Nolte et al. (2011) and IPTS (2012) effectively treat out-of-quota sugar production (used either for industrial use or bioethanol production) as exogenous and fixed. Smit and De Bont (2011) take into account that area for the production of industrial sugar can be used for the more profitable consumption sugar after quota abolition. Moreover, Smit and De Bont (2011) analysed total sugar production (consumption and industrial sugar) and the average sugar price, whereas Nolte et al. (2011) and IPTS (2012) exclude impacts on industrial sugar and present impacts on consumption sugar only.

5.2. Qualitative aspects of other issues

In this section, we make some remarks on more qualitative issues in the discussion on a sugar policy reform:

1. In our model study, we only calculated the final situation in 2020, not paying attention to the road from 2009 to 2020. Therefore, the study itself does not give an insight into the effects of timing of quota abolition. However, in general a longer transition period may give the different stakeholders more opportunity to adapt to

the new situation. The shorter the period between the moment of a policy change decision and the moment of (full) implementation, the stronger the differences in competitive power between sugar beet growers and sugar producers in the different Member States will show up. In this case, a short transition period (quota abolition in 2015) will be more difficult to handle for the EU-10 (Eastern European Member States) than for the EU-15 (Western European states). Keeping the transition period short may sooner cause a re-structuring urgency than extending it. A new restructuring process may make the European sugar industry as a whole stronger, but may also have negative effects on regional economies involved.

2. The Doha-Round may not lead to an agreement soon, but if it does, then an abolishment of the sugar quotas must be preferred above maintaining them. It is true that the sugar price will decrease more in the Quota free than in the Doha-Lower tariffs scenario. On the other hand, in a quota free situation, the European farmers and sugar industry will have the opportunity to expand sugar beet and sugar production. This will give them opportunities to decrease the cost price per kg of sugar beet and sugar produced. Such a process would make the sector more efficient and compensate at least part of the income loss of sugar beet growers due to lower price levels. However, depending on different other markets and therefore on the relative competitive position of sugar and its products (like bio-ethanol), extra exports of EU sugar to the world market and/or extra amounts for 'other use' in the EU may be limited. In other words, the market may not take up all additional sugar produced by the expansion predicted. In such a scenario, a further price decrease must be expected. In a worst case scenario, one or more sugar companies will give up, leaving farmers and the local economy involved with severe damage. In the case that the minimum sugar price level is maintained within the EU, such effects can be limited to a certain level. However, in that case, measures must also be taken to match sugar demand and supply.

3. 'Soft landing measures', e.g. slow expansion of the national sugar quotas, in the period between 2015 and the final abolition will in a sense soften the urgency to re-structure, which can be attractive for especially sugar beet growers and the sugar industry in the short run. For the European economy as a whole, however, a relatively high internal sugar price level may make the EU more unattractive for sugar-based industries like chocolate and soft drinks companies. They may consider moving their production facilities outside the EU.

4. Iso-glucose and other sugar substitutes have not been studied separately. Such products (may) substitute only part of the 'classical' sugar processed (not more than approximately 20%, due to 'technical' characteristics). Since all scenarios studied will lead to lower sugar price levels, the competitive power of substitutes will more likely decrease than increase.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

This research had to give insights into reasons for and against the continuation of the central element of the current sugar policy, the quota system, after September 2015. The central question in that issue was: What are the consequences of a fundamental reform of the European sugar policy for the growers, the processing industry, the other partners in the sugar chain and the other stakeholders, i.e.:
1. A decrease of the sugar import tariffs? Or:
2. A decrease of the sugar import tariffs combined with the abolishment of the sugar quota system at the same time?

The answer to question 1 is: The size of the European sugar production and the sugar beet acreage can slightly decrease compared to the Status Quo scenario, namely by about 2 and 1%, respectively. The sugar price will decrease by 9% and 6% in the EU-15 and EU-10 respectively, also leading to a (direct) decrease of sugar beet growers' income. The income effects differ per Member State, region and, as a consequence, with the total rural economy related. The imports of sugar in EU-27 from Brazil can strongly increase. This will mainly affect sugar imports from developing countries.

The answer to question 2 is:
After a decrease of import tariffs combined with the abolishment of the sugar quota system, the sugar production and sugar beet acreage in the EU can increase, namely by about 11% for both. The sugar imports will decrease compared to a situation with only a tariff decrease and the sugar exports will increase. Sugar price will decrease in the EU-15 and EU-10 by 14% and 13% respectively.

The abolishment of the quota system is expected to lead to production expansion, but the order of magnitude depends on many factors. The international sugar price development partly determines the production size.

Abolishment of EU sugar quotas will lead to lower sugar and sugar beet prices in the EU, leading to lower margins for farms. At the same time, expansion of sugar beet growing and processing in a quota-free situation can decrease fixed cost per ha of sugar beet and per kg of sugar, making both sugar beet growing and processing more efficient. Besides, lower sugar price levels will make Europe a more attractive continent for investments by sugar-based industries.

6.2. Recommendations

- If the Doha-Round indeed leads to a decrease of import tariffs by 70%, then it is wise to abolish the sugar quotas at the same time;
- Discern short-term and long-term effects of soft landing measures on economic development and competitive power of the sugar sector and regions involved;

- In a macro-economic view, a fully liberalised world will give maximum welfare. In such a view, not only sugar quotas but also minimum sugar and sugar beet prices should be abolished. However, from a more social point of view, such a measure could damage less competitive regions in Europe. Alternatively, such regions could be supported to soundly develop without sugar and sugar beet production;
- In this note, no attention is paid to the poorest sugar producing countries in the world. Liberalisation of the sugar market and abolishment of preferred suppliership of such countries to the EU may lead to economic damage in such countries, especially under market conditions of over-supply and relatively low sugar prices. From a social point of view, the interests of such countries should be taken into account as well (see for more details, Smit and De Bont (2011)).

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ANNEX. INTRODUCTION TO THE MODELLING WORK

Factors affecting competitiveness of sugar beet production in the EU-27

The impact of the Quota free scenario on the acreage and supply of sugar beet is mainly a function of:

- the acreage of industrial sugar beet in the Status Quo scenario in 2020: we assume substitution from industrial towards consumption sugar production, before extra land for sugar beet is taken into production;
- the difference between the prices of quota sugar beet and industrial sugar beet in the Status Quo scenario in 2020;
- the difference between marginal price of sugar beet and marginal costs of sugar beet production, including land costs in the Status Quo scenario in 2020;
- the supply elasticity of sugar beet in the Status Quo scenario in 2020. This supply elasticity is among others a function of the land share of sugar beet in the total utilised agricultural area.

The higher the price difference between quota and industrial sugar beet, the larger the average price of sugar beet and the larger the increase in acreage of sugar beet and supply of sugar beet after sugar quota abolition. This is true because in principle, after the abolition of the sugar quota, all European sugar beet will be processed into sugar for consumption; the growers will receive the higher quota sugar beet price. Given our price assumptions (see Table 4.3), the price increase compared to the Status Quo scenario is largest in regions with a large difference between quota and industrial sugar beet. As a consequence, we expect relative large increases in levels in Denmark, Germany and the Netherlands and relatively limited production effects in Austria, France, Czech Republic and Poland.

Table A.1. gives insights into the rent or marginal profitability of a hectare of sugar beet in the different member states. Important factors affecting this rent are the sugar yield from sugar beet per ha, the price of the sugar beet delivered, the land price and the share of industrial beets.

For the most important sugar beet producers, the marginal profitability of sugar beet production ranges from about €800 per ha in the Netherlands to about €250 per ha in France in the Status Quo scenario in 2020. Marginal profitability in Great Britain and Germany equal about €400 per ha. The higher marginal profitability, the higher the increase in acreage and supply of sugar beet after abolition of the sugar quota. Quota rents in the Status Quo scenario in 2020 are presented in Table A.1.

Another important aspect is the supply-elasticity of sugar beet or the possibility to include extra land for sugar beet in the farm and regional cropping plan. The supply-elasticity of sugar beet gives the ratio between the increase in supply and the increase in marginal costs, including the land costs, of sugar beet production. The larger this ratio the larger the increase in supply, until a new equilibrium between marginal costs and marginal revenue of sugar beet production is reached. The supply elasticity is empirically estimated using the CAPRI database (Jansson and Heckelei, 2011). Time series start in 1985 and run up to

2004. However, for many regions no data before 1990 are available. The estimation takes into account among other things the land share; e.g. the higher the land share of sugar beet, the lower the supply elasticity. Supply elasticity's range from about 0.62 in Belgium to about 2.25 in Germany. Thus, in Germany sugar beet production can expand with lower marginal costs compared to e.g. Belgium.

Table A.1 **Marginal profitability or rent per ha of sugar beet for a selected number of countries in the Status Quo scenario in 2020**

Country (block)	Marginal profitability (€/ha)
EU-27	374
EU-15 a)	411
EU-10 b)	227
Belgium	490
Denmark	541
Germany	441
Austria	176
The Netherlands	796
France	264
Great Britain	397
Czech Republic	154
Poland	212

a) EU-15: Belgium, Denmark, Germany, Austria, The Netherlands, France, Portugal, Spain, Greece, Italy, Ireland, Finland, Sweden, Great Britain; b) EU-10: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia, Slovak Republic, Cyprus, Malta; c) EU-2: Bulgaria, Romania.

Source: CAPRI.

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