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Modelling the EU cane refining sector after 2017

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The authors are all staff at the UK Department for Environment, Food and Rural Affairs (Defra). All errors are our own.

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Objective

This paper has been produced as a contribution to the current debate within the EU on the future of the sugar industry in the lead up to, and following, the abolition of the sugar beet production quota regime in 2017. It is particularly focussed on the likely impact on the cane refining industry, although there are important implications for the whole of the sugar industry.

Scope

The paper covers the effect of the ending of the quota regime on the price of white sugar within the EU. It includes modelling changing levels of production, imports (and import tariffs) and exports. However, it does not model any changes to the structure of either the beet or cane refining industries.

Executive summary

Beet quotas

1. The abolition of EU sugar beet quotas in 2017 is projected to lead to a modest increase in total EU sugar beet production of 6% by 2020 relative to a scenario in which the quota is maintained.
2. Beet quota abolition is also projected to have a substantial downward impact on the price of sugar in the EU (-15%) and beet returns to growers (-5%) with resulting cost benefits for EU food manufacturers and, where price changes are passed on, consumers.

Imports and refiners

3. Import restrictions on raw and white sugar, as well as other factors such as costs of transportation, are however likely to continue to keep the price of sugar higher than would otherwise be the case even after quotas have been removed. Post-2017, EU white sugar prices are projected around 15% above world prices.
4. After quota abolition, the EU refining margin is only positive in a scenario where refiners can access raw sugar at the world price, tariff-free. Given low or negative refining margins, EU imports of raw sugar (for sugar cane refiners) are projected to decline by 43% post-2017.

Introduction

5. This note sets out possible future scenarios for the EU sugar market following quota abolition in 2017. In each case, impacts on production and prices are recorded. The situation of cane sugar refiners post-2017 is also addressed. See Figure 1 for an overview of the EU sugar regime as background.
6. The model used for the analysis presented in this paper is the latest (2015) version of the OECD-FAO Aglink-Cosimo model¹ with beet and isoglucose production quotas extended from 2015 to 2017, and ending thereafter, reflecting the 2013 CAP agreement. Aglink-Cosimo is a partial-equilibrium model of the global agricultural sector with detailed policy coverage. The EU is treated as a block and Member States results are not available. Other notable characteristics of this model are as follows:
 - EU sugar consumption is projected to decline by around 0.3% per annum over the period 2014-2024. This is in line with longer-term trends.
 - The share of isoglucose in the EU sweetener market is projected to rise to 11.6% by 2024 as isoglucose production expands.
7. The model also assumes in its base case that beet and isoglucose quotas are abolished in 2017, WTO limits on EU sugar exports are assumed to expire with the quota system² and there are no additional import TRQs³ from 2014. This represents the sugar regime as agreed as part of the 2013 CAP reform. Coupled payments to the EU beet sector are not included in the analysis presented here. Whilst the coupled payments are relatively small in comparison to the size of the EU beet sector, their inclusion would bring added pressures at the margin because the payments will be granted to those producers that are considered to be vulnerable to exiting the industry.
8. According to the OECD-FAO 2015 Outlook, world sugar prices are projected to average around 362 USD/tonne (raw) and 438 USD/tonne (white) respectively over the next decade.
9. EU white sugar prices have historically been relatively disconnected from the international market, due to the combination of beet quotas and import tariffs although we have recently seen substantial price falls of nearly 40%,. Therefore, changes in

¹ The results of any analysis based on the use of the Aglink-Cosimo model by parties outside the OECD are outside the responsibility of the OECD Secretariat. Conclusions derived by third party users of AGLINK-COSIMO should not be attributed to the OECD or its member governments. More information on the model and its use in the OECD-FAO Agricultural Outlook can be found here <http://www.agri-outlook.org/>; the Outlook contains the model's main assumptions.

² Due to a WTO ruling as long as the quota system and minimum prices remain in place there is a quantitative limit on the amount of sugar the EU can export to the world market. This is because the EU sugar market regime, including the quota system, is deemed to indirectly subsidise EU sugar production and EU exports are hence regarded as subsidised.

³ Tariff Rate Quota. These provide exemptions from the normal tariff rates (i.e. a nil or reduced tariff for foreign suppliers for fixed volumes of imports).

global sugar prices are not transmitted directly to EU sugar prices in the model prior to 2017.

10. Post-2017 the relationship between EU and world prices is stronger because the EU is producing and exporting more sugar to the world market i.e. the EU is anticipated to be in a net-exporting position from 2018 onwards. If the EU price is much higher than the international price, then sugar that would have been exported will be diverted to the domestic EU market pushing EU prices back down towards international price-levels. Conversely, if in some years the EU is in a net-importing position then the price in the EU market will reflect the cost of imported sugar which, given the EU tariff regime, could be much higher than the international price.
11. At the time of writing, the latest available data was used in preparing this study. However, actual market conditions will naturally differ from those presented in the scenarios. Correspondingly, what is of most importance is the difference between scenarios rather than the absolute value of variables in any given scenario.
12. This paper is forward-looking and therefore does not cover previous reform of the EU sugar regime, such as the substantial restructuring that occurred in the EU beet sector following the 2006 reform. For an in-depth analysis of the impacts of the 2006 reform, readers are referred to the Scottish Agricultural College (SAC) 2011 study for Defra⁴.

⁴ Renwick et al (2011). Assessment of the impact of the 2006 EU sugar regime reforms. SAC report to Defra available here: <http://randd.defra.gov.uk/Document.aspx?Document=SugarFinalReportRevised.pdf>

Figure 1: The EU Sugar Regime

White (or 'refined') sugar in the EU is mainly produced from domestically grown sugar beets. Imports of raw sugar for refining purposes occur under preferential arrangements and tariff rate quotas. The EU sugar regime has been part of the CAP since 1968 but prior to 2006 had never been substantively reformed. The key features of the regime as it currently stands are:

Production

Production of sugar from beet is subject to national production quotas until 2017. Sugar produced in excess of the quota cannot be used in the food market and is accordingly used in ethanol and industrial manufacture. Isoglucose – a substitute for sugar in some food preparations and known in the US as High Fructose Corn Syrup (HFCS) – production is also subject to quotas.

Imports

Like many commodities, EU imports of both white and raw sugar are governed by a tariff rate quota (TRQ) system. Under such a system, lower tariffs are levied on imports below a set quantity (the in-quota tariff rate) and higher, usually prohibitive, tariffs are charged on imports above this level. The out-of-quota import tariffs on white and raw sugar are €419/tonne and €339/tonne respectively. The in-quota tariff for raw sugar - the so-called "CXL" duty – is €98/tonne on a quantity of up to 677kt. Under preferential agreements, tariff-free imports of raw sugar are allowed from African, Caribbean and Pacific (ACP) countries and least developed countries (LDCs). Other import quotas are also available from the Balkans and selected other countries under Free Trade Agreements.

Origin	Status and Duty Level	Quantity Allocated (mt)
ACP/LDC	Unrestricted, zero duty	1.8 - 2.1 (historic average)
CXL	TRQs, €98/t	0.7
Free Trade Agreements	TRQs, zero duty	0.5
Balkans	TRQs, zero duty	0.2
Total Preferential Imports		3.2 - 3.5

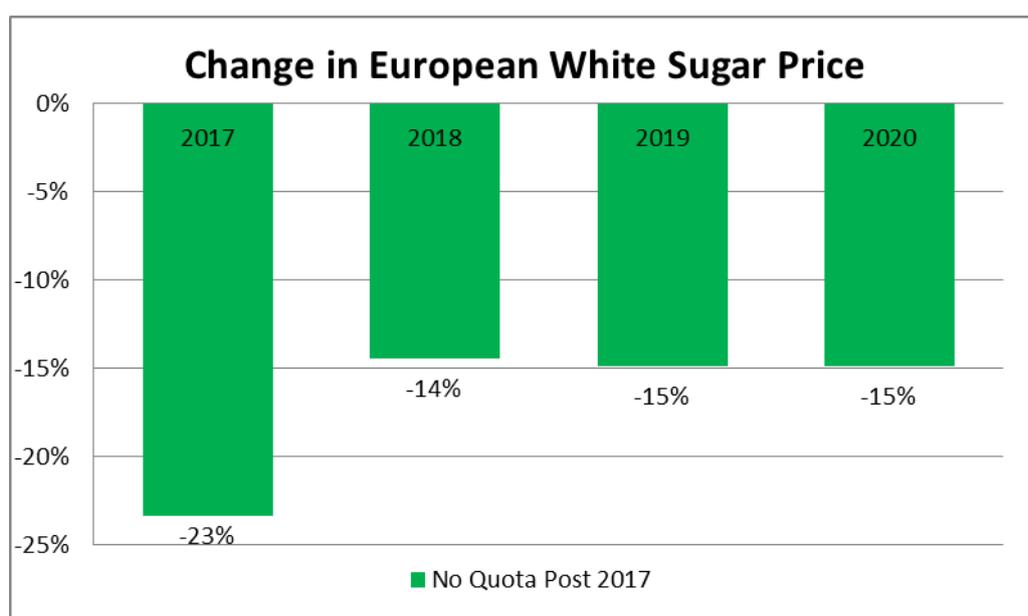
Exports

EU sugar exports are restricted by a WTO ruling which permits export of up to 1.4 million tonnes in a given marketing year. This is anticipated to remain the case as long as the EU beet quota system remains in place i.e. the limit will expire in 2017.

Impacts of quota abolition

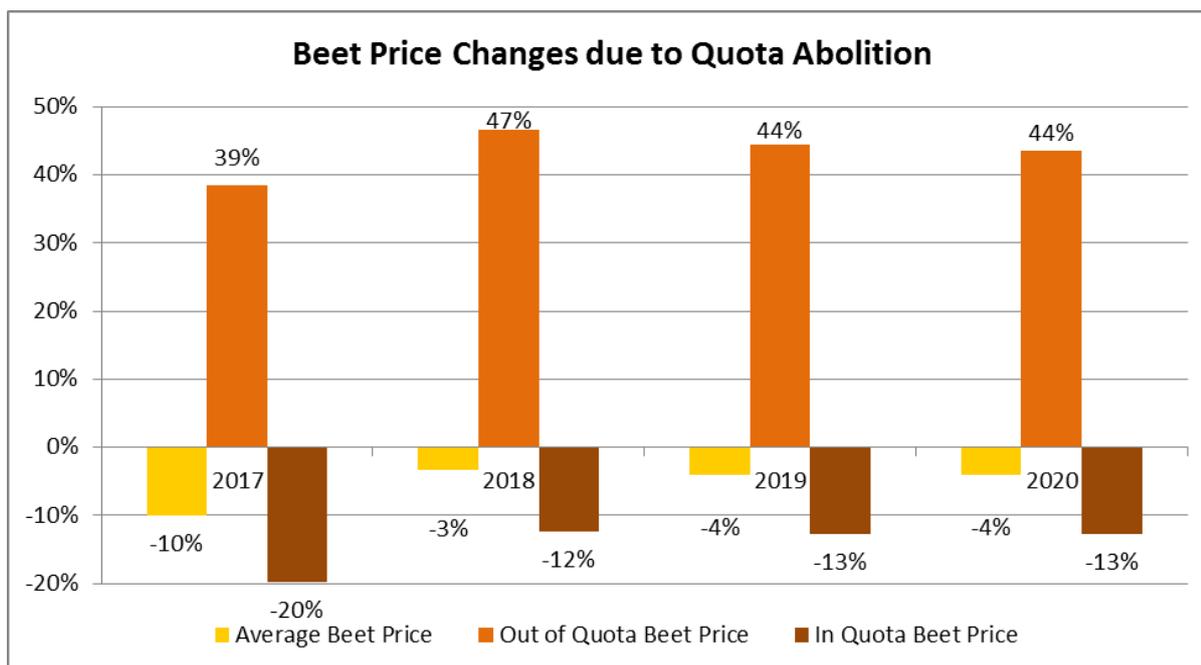
13. In the model's base case, EU beet quotas expire in 2017. To ascertain the impact of quota abolition it is therefore necessary to compare this outcome with a scenario in which the beet quotas were to be extended, all else equal.
14. Beet quota abolition is projected to lead to a relatively modest increase in total EU sugar production of 5% by 2020 **relative to a scenario in which the quota is maintained**. Abolishing the quota is projected to lower white sugar prices by around 16% by the end of the outlook. There is a more marked effect in 2017 as higher stocks (due to strong production in previous years and a build-up of stocks under the quota regime) are disposed of in the year of abolition (see Figure 2). Sugar prices fall by approximately 23%.

Figure 2: Projected impact of quota abolition on EU white sugar prices (source: OECD-FAO Aglink-Cosimo model)



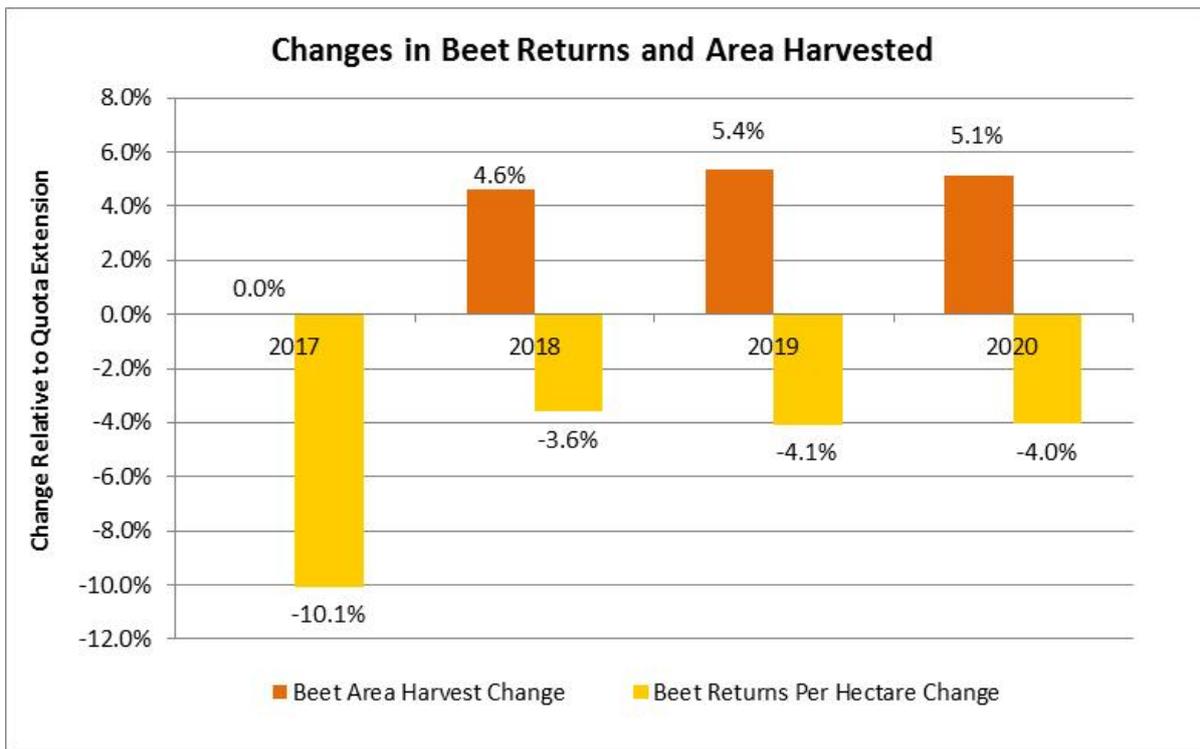
15. The fall in sugar prices feeds back to beet growers in Europe – see Figure 3.

Figure 3: Projected impact of quota abolition on EU sugar beet prices (source: OECD-FAO Aglink-Cosimo model)



16. Prices paid by processors to growers for sugar beet are subject to contractual negotiations between the two parties. Under the quota system, a lower price is generally paid for sugar beet produced in excess of the quota. Quota abolition is projected to decrease the price of sugar beet by 5% on average, but by 14% on average for beet previously produced within the quota limit.
17. Conversely, the price of previously out-of-quota sugar beet rises by over 40% reflecting its use in the food market now quotas have been removed. In some EU countries, the price of quota and out-of-quota beet has already been equalised in anticipation of quota abolition (but this does not occur until 2017 in the model, due to the EU being treated as a single block).
18. The rise in out-of-quota beet prices dampens any increase in sugar-ethanol manufacture post quota abolition. However, there are a number of factors which affect the profitability of ethanol production which we have not considered in this study such as energy and feedstock prices.
19. The projected changes in EU sugar beet area and beet returns per hectare are given in Figure 4. The beet return per hectare is the sugar beet price multiplied by the sugar beet yield, it thus measures the revenue to growers from planting beet.

Figure 4: Projected impact of quota abolition on sugar beet area and returns



20. Sugar beet area expands due to quota abolition by approximately 5% over the outlook; the accompanying lower prices are projected to reduce beet returns per hectare by 4%. Immediately following the abolition, these effects are far more substantial.

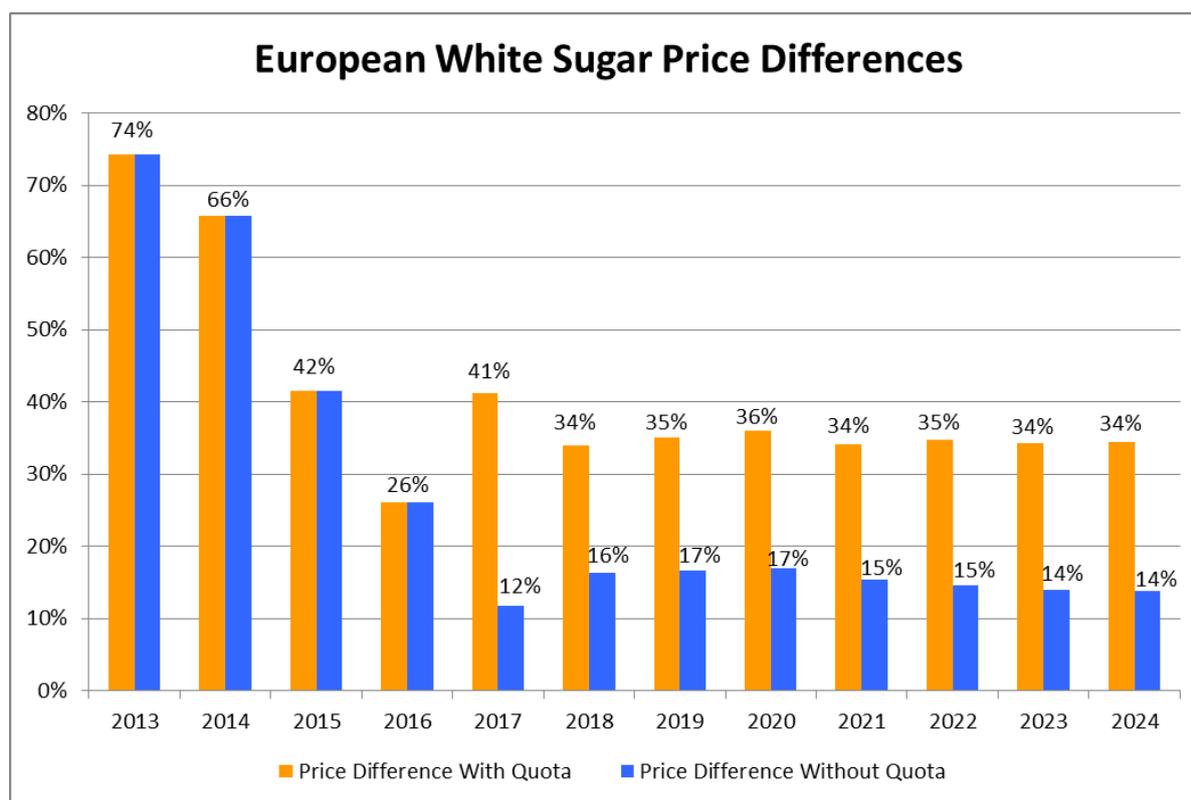
21. The results presented above for the EU market are commensurate with those from a recent in-depth study by the Joint Research Centre (JRC) for the EU Commission⁵, which suggests that sugar beet production will increase by approximately 4%. Importantly, unlike the analysis in this paper, the JRC study reports the projected effects of quota abolition on production, prices, acreage and revenue at the Member State level. For example, in the JRC study 75% of the increase in EU sugar production following quota abolition is projected to come from Germany (50% of the increase), France (15% of the increase) and the UK (10% of the increase).

⁵ Burrell et al (2014). EU sugar policy: A sweet transition after 2015?. JRC Scientific and Policy Reports. Available here: https://ec.europa.eu/jrc/sites/default/files/jrc_tr_sugar_study_pubsy_v6.pdf

Price gaps between the EU and the world market

22. Historically, the EU sugar regime has kept EU prices of sugar well-above the world price-level. Measuring the difference between domestic and world prices is commonly used to assess the degree of protection and distortion in a market. Although the world price for sugar itself is affected by policies in the markets of the major producers (e.g. Brazil and India), and by movements in their exchange rates, it is reasonable to assume that in the absence of policy in the EU the sugar prices in the EU would converge towards the world price.
23. Once the quota has been removed, EU white sugar prices are projected to move significantly closer to the world price. However, EU sugar prices have already begun to converge to the world price level prior to 2017 as shown in Figure 5. 2013 highs in response to strong production responses in the EU beet sector, exceptional measures taken by the Commission to increase availability on the EU market; and lower prices all contribute to this trend. The price 'gap' between the EU and world market falls from over 70% in 2013, to 26% in 2016, the year prior to quota abolition.

Figure 5: Projected price gap between EU and world white sugar price (source: OECD-FAO Aglink-Cosimo model)⁶



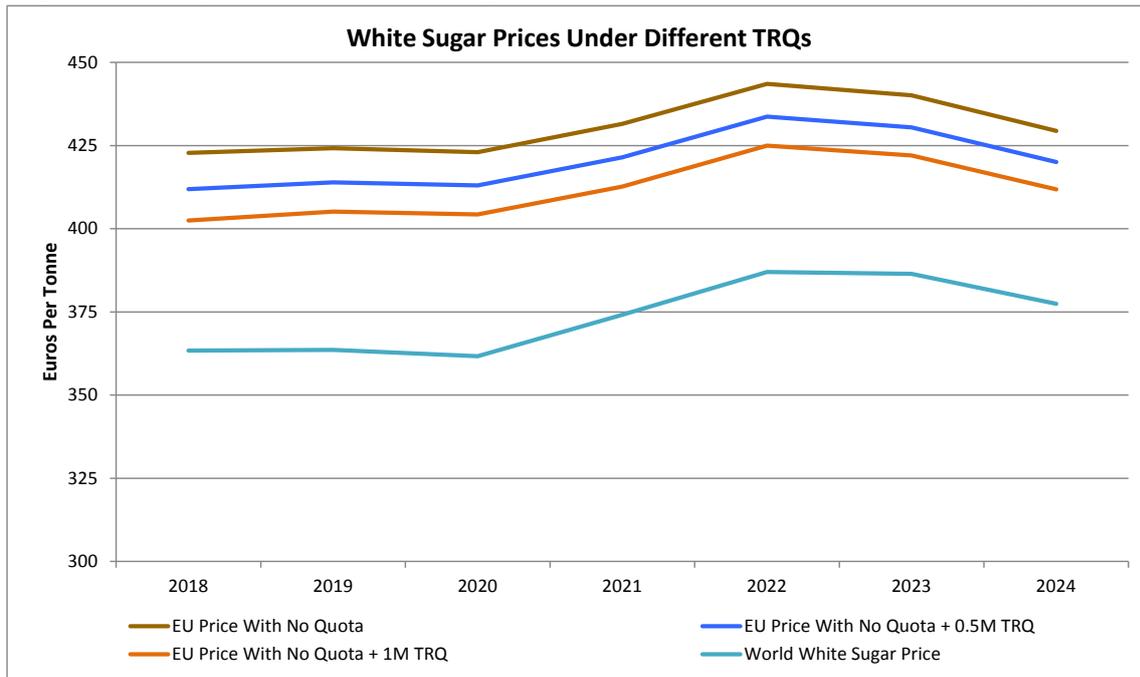
Post-2017

24. Even after quotas are removed, EU white sugar prices are still above the world price. Whilst much smaller than the price gap in earlier years of the projection period, this is still a price differential albeit more modest.

25. Increased duty-free TRQ access would move EU prices closer to the world price, though not significantly after the market had already been liberalised. The impacts of additional TRQs of 0.5 and 1 million have been simulated to demonstrate this effect in the model. The results are shown in Figure 6.

⁶ 2015* represents latest price data at time of writing (to March 2015)

Figure 6: Projected EU White Sugar Price Post-2017 under different import TRQs

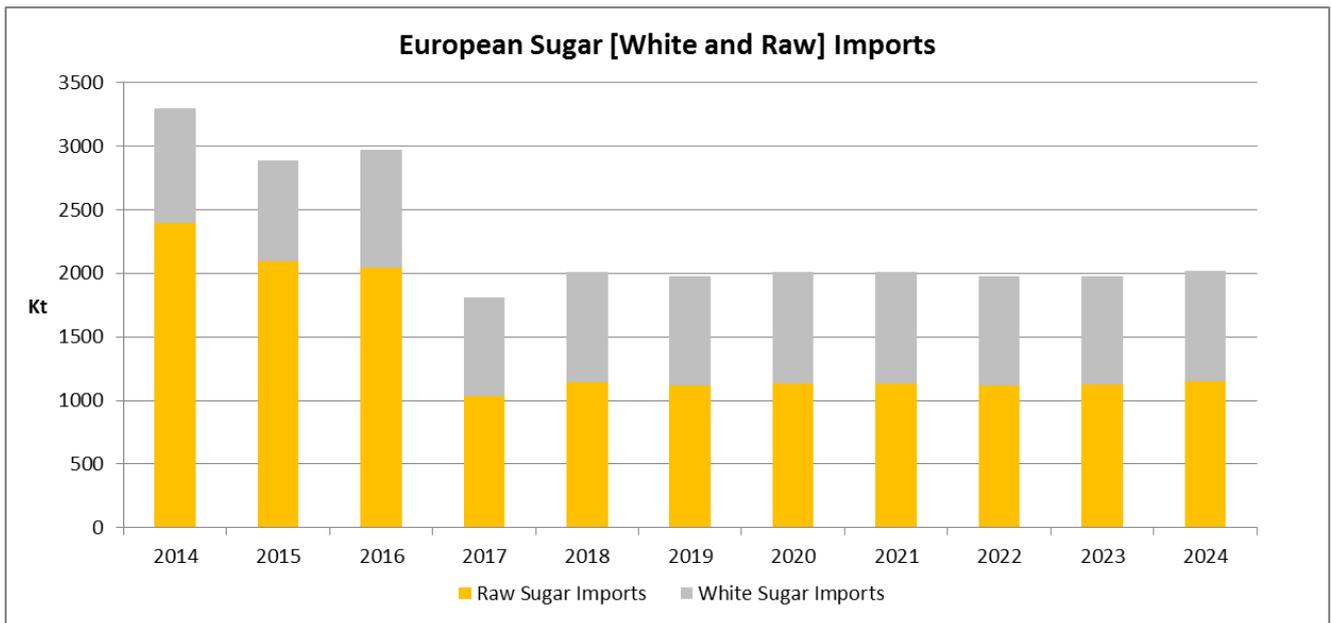


26. In the base case, the EU price of white sugar in 2024 is €432/tonne, compared to a world price in euros of €377. With the additional raw sugar imports of 0.5 and 1 million tonnes (provided by the TRQs), the EU price falls to €420 and €411 in 2024 respectively. The addition of these new TRQs does not eliminate the difference between EU and world white sugar prices.

Projections for raw sugar imports

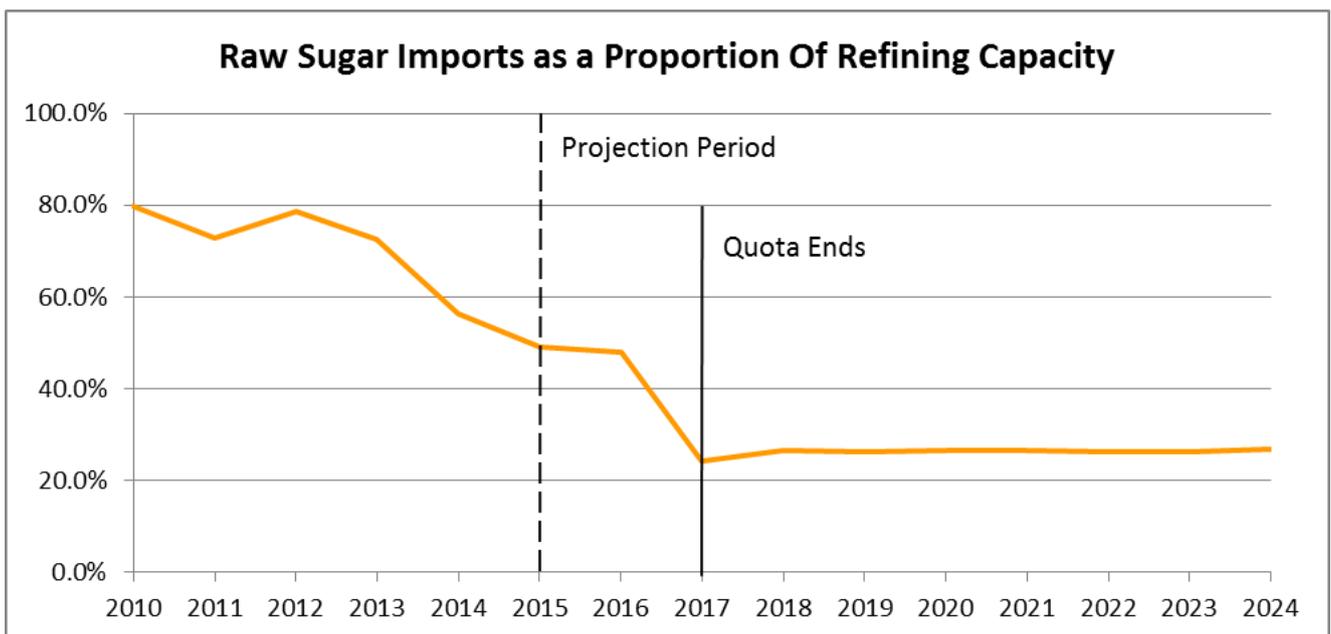
27. The rise in EU domestic production of beet sugar and isoglucose following quota abolition, with the consequent fall in the EU white sugar price, is anticipated to significantly reduce the quantity of raw sugar imports on the EU market. This will leave less room for EU refiners; the effect of this is particularly present immediately following the abolition of the quota. The projections for EU raw sugar imports are displayed in Figure 7. Following quota abolition, EU raw sugar imports are projected to fall by 44% come the end of the projection period (compared to 2016) with the largest drop in 2017.

Figure 7: Projected EU sugar imports (source: OECD-FAO Outlook 2015-2025)



28. Whereas the beet processing sector has restructured since 2006 to reduce capacity, EU refining capacity has substantially increased since 2006. This was largely due to beet processors being able to add refining capacity as well as the accession of Romania and Bulgaria, and prior to quota abolition the EU refining industry is already operating below capacity. A reduction in raw sugar imports will accentuate this situation as shown in Figure 8.

Figure 8: EU raw sugar imports as a proportion of EU refining capacity⁷



⁷ Refining capacity figures taken from RBB Economics.

29. In the post-quota environment, EU raw sugar imports are projected to decline to only 25-28% of refining capacity. Such a situation would lead to a significant decline in the economic size of the EU sugar cane refining sector.
30. The projected fall in raw sugar imports is expected to have a substantial negative impact on the sugar industries of the ACP/LDC group who traditionally supplied the EU market due to zero tariff imposed on ACP/LDC countries. ACP/LDC countries cannot be treated as a homogenous group and the model we have used means we are unable to assess these impacts as part of this paper, however analysis for the Department for International Development has examined the impact of EU sugar reform on the ACP/LDC under various assumptions around costs and prices⁸.

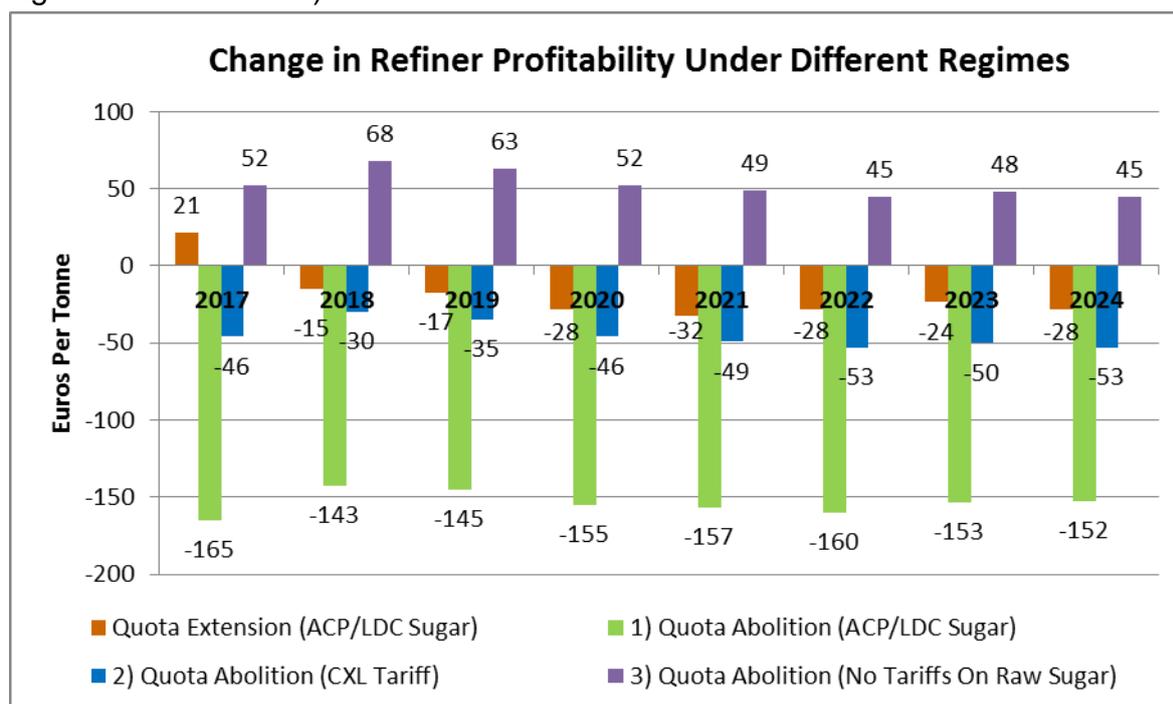
Impact on EU cane refiners

31. If the trade regime remains unchanged and raw sugar imports are restricted by duties then refiners will continue to face artificially high prices for raw material from the world market. This is because many countries who have duty-free access to the EU market have not historically supplied sugar at the world raw price and/or risk losing preference when EU prices are much closer to world levels. Countries that can supply at the world price of raw sugar are subject to tariffs, which means very little raw sugar can enter the EU market at the world price.
32. In such a situation, lower EU white sugar prices as a result of quota abolition will translate into reduced profitability for European refiners as their margins are reduced: The cane refiners are likely to continue operating at a loss. This means that removing quotas alone will reduce the profitability of refining in Europe.
33. Figure 9 shows the projected refining margin⁹ in Europe on a single tonne of sugar in four scenarios: (1) in which quotas are abolished and the raw sugar from ACP/LDC suppliers is imported; (2) in which quotas are abolished and the raw sugar is imported under the CXL tariff; (3) in which quotas are abolished and raw sugar is imported at the world price under a duty free TRQ (i.e. no tariffs); and a counterfactual of an extension of the current policy scenario.
34. An extra cost for ACP/LDC raw sugar supplies is assumed - €150 above the world raw sugar price – in line with recent historical trends for EU imports. Whilst this could change in the future, in particular if the EU imports of raw sugar fall to just over 1m tonnes, these scenarios serve to illustrate some of the implications for refiners of the abolition of quotas.

⁸ The Impact of EU Sugar Policy Reform on Developing Countries. (2012). LMC International/Overseas Development Institute. Report to Department for International Development. Available here [http://r4d.dfid.gov.uk/pdf/outputs/TradePolicy/LMC-ODI_SugarReportPublicVersion\(Final\).pdf](http://r4d.dfid.gov.uk/pdf/outputs/TradePolicy/LMC-ODI_SugarReportPublicVersion(Final).pdf)

⁹ Refining margin defined as EU white sugar price minus the price of raw sugar, import tariff and refining cost. It thus indicates the profitability of refining sugar in Europe.

Figure 9: Projected EU refining margins (source: calculations based on OECD-FAO Aglink-Cosimo model)



35. Macroeconomic fluctuations and changes can also have important effects. The recent depreciation of the euro; and increases in the world market price of sugar, has caused refiners to worry about more extreme losses they will soon face.

36. Refining margins fluctuate over the course of the projection period with changes in raw and white prices from year to year in the model. In all years post-2017, EU refining margins are strongly negative at between -€140 to -€165 €/tonne in S(i). These projections are reflected in the low and declining level of EU imports projected by the Commission post-2017.

37. With EU white sugar prices closer to world price levels when quotas have been removed, EU refining margins only become positive in a scenario where raw sugar can be sourced at the world price through a duty-free TRQ. This is represented by S(3) in Figure 9 with EU refining margins between €45 to €70 / tonne.

38. The refining sector is not limited to only producing for domestic consumption. ‘Toll’ refining allows EU refiners to import raw sugar, without any duty, and export white sugar to the world market. Such a refining model will be viable when the ‘white premium’¹⁰ is greater than the refining and transportation costs (both the cost of transporting the raw sugar import and the white sugar export) – although this is unlikely given current projections. In a scenario in which EU white sugar prices are close to international levels, and refiners can access raw sugar at the world price, then the toll

¹⁰ The white premium refers to the difference between the white and raw sugar price.

refining model will be similar to a refiners' 'normal' business model if transportation costs for import and export are low.