

FRC Food Brexit Briefing

Sugar reduction in post-Brexit UK: A supply-side policy agenda

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Contents

page

3	Summary
4	Recommendations
5	Introduction
6	Why address the supply-side of sugar?
7	What difference does Brexit make?
9	How is sugar currently regulated by the EU?
13	Would supply-side sugar reduction be compatible with other goals?
15	What are the policy options for sugar reduction post-Brexit?
21	Conclusion
22	References and notes

Abbreviations

ACP	African, Caribbean and Pacific
CAP	Common Agricultural Policy
DEFRA	Department for Environment, Food and Rural Affairs
EPA	Economic Partnership Agreement
FTA	Free Trade Agreement
HFSS	Foods High in Fat, Salt and Sugar
LDC	Least Developed Country
NDNS	National Diet and Nutrition Survey
SACN	Scientific Advisory Committee on Nutrition
SDIL	Soft Drinks Industry Levy
TRQ	Tariff Rate Quota
WHO	World Health Organization
WTO	World Trade Organization

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Summary

Too much sugar is still being consumed in the UK, with multiple diet-related diseases suffered as a result. The UK's Scientific Advisory Committee on Nutrition proposed in 2015 that sugar intake should account for no more than 5% of dietary calories. This has been accepted by the Government as the official dietary recommendation. We estimate that achieving this target requires a two-thirds reduction in average sugar consumption.

Two important policies have already been introduced by the Government to this end: the Soft Drinks Industry Levy and a voluntary Sugar Reduction programme for reformulating nine categories of sweetened food. Both are having an impact, but reformulation will be a long process, uneven between categories, and still insufficient. Additional policies are being considered, including tighter controls on advertising and promotional sales as proposed in the updated Childhood Obesity Plan. However, none of these address the supply of sugar in the UK food system. Supply-side policies that reduce the total availability of sugar and raise its price to the food industry have the potential to widen and strengthen the sugar reduction agenda, helping to create a healthier food environment for all.

Since joining the European Economic Community in 1973, the supply of sugar in the UK has been governed by European regulations. These were initially designed to provide secure supplies of sugar for consumers and high crop prices for sugar beet farmers, but they led to systematic over-production. By the 1980s this surplus sugar could only be removed from the domestic market through egregious levels of export subsidies. Triggered by an international trade dispute in the mid-2000s, sugar policy was overhauled through the liberalisation of domestic production, greater market access for imports and a shift from price supports to income payments for farmers. As intended, the EU has since been supplied with more and cheaper sugar, with prices falling to their lowest ever levels. This has undermined efforts to encourage food manufacturers to use less sugar and is expected to exacerbate existing public health problems.

The withdrawal of the UK from the EU means that new regulations must be put in place to govern the supply of sugar and other agricultural commodities. In light of this, we discuss five policy options that could help reduce sugar consumption in the UK. These are marketing quotas, minimum prices, excise taxes, subsidy reform, and regulation of product composition and labelling. The policy space available for these instruments will be contingent on the overarching post-Brexit arrangement between the UK and EU, particularly as it relates to import tariffs and regulatory divergence. But regardless of the final deal, there will be some scope for these policies to be applied. This should happen in ways compatible with other public policy goals, including affordable food for consumers and fair returns for farmers, and be contextualised within a broader post-Brexit reorientation of UK food and farm policy.

Recommendations

Policy-makers should consider five policy options opened up by Brexit to support the sugar reduction agenda:

- Limits on the supply of sugar to the UK market, which would be progressively tightened to reduce availability.
- A minimum price for refined sugar and/or sugar beet, raising the price of sugar to the food and drink industry.
- An excise tax on sugar or a levy on manufacturers using sugar in particular foods, similar to the Soft Drinks Industry Levy.
- A reform in farm subsidies to shift production away from sugar beet and toward the provision of foods that are currently under-consumed in diets.
- New compositional regulations setting maximum sugar content in certain foods plus mandatory labelling requirements.

Introduction

Frequent and excessive consumption of sugar has multiple adverse effects on health, incurred due to tooth decay, diabetes, and diseases linked to obesity.¹ In 2015 the UK’s Scientific Advisory Committee on Nutrition (SACN) concluded that consumption of ‘free sugars’ should not exceed 5% of total dietary calories – around 30 grams per day for those aged over 11, and less for younger children.² This is equivalent to seven teaspoons of sugar daily.³

Free sugars refers to all monosaccharides (most commonly glucose and fructose) and disaccharides (normally sucrose from sugar beet and cane) that are added to foods, plus sugars naturally present in honey, syrups and unsweetened fruit juices. Despite the variations in sugar intakes between people grouped by sex, age and income, all major

demographic groups consume significantly above the SACN recommendation.⁴ For the UK population as a whole, this recommendation equates to 0.7 million tonnes of free sugars consumed per year.⁵ At present, the supply of beet and cane sugar alone is more than three times that.

As shown in Table 1, over 2.4 million tonnes of beet and cane sugar were sold in the UK in 2017-18. We estimate that around 87% of this was purchased via manufactured food and drinks, including net imports.⁶ The remainder went to businesses in the out-of-home sector – comprising restaurants, cafés and institutional caterers – and to retailers as bagged sugar to be sold direct to consumers. As of 2017, there was no UK-based production of ‘isoglucose’, the term used in the EU for glucose-fructose syrups derived from starches.⁷ The key point is this: from the public health perspective there is an over-supply of sugar in the UK, which needs to be reduced by about two thirds.

Table 1: The supply of sugar in the UK, 2017-18

Source of supply	Amount
Beet sugar processed in the UK by British Sugar	1.36 million tonnes
Net import of sugar from EU (mainly in beet sugar)	0.37 million tonnes
Net import of sugar from rest of world (mainly in raw cane sugar refined by Tate & Lyle Sugars)	0.41 million tonnes
Net import of confectionery (based on 40% sugar content by weight), chocolate (50%) and bread, cakes, pastries & biscuits (20%)	0.28 million tonnes
Total	2.42 million tonnes

Source: data on sugar taken from Department for Food, Environment and Rural Affairs et al. (2018) *Agriculture in the United Kingdom 2017*, London: DEFRA; data on sugar-containing products calculated by authors from HMRC trade data. Note that volumes fluctuate from year to year.

This calculation is corroborated by adjusted estimates of sugar consumption. We use adjusted data since the figures on food consumption produced by the UK’s National Diet and Nutrition Survey (NDNS) rely largely on self-reporting via food diaries. As is well known in the nutrition literature, this data collection method leads to under-reporting.⁸ Tests using ‘bio-markers’ to obtain genuine consumption of NDNS participants found that males aged 16-49 under-reported their

calorie intake by 34% and females aged 16-49 under-reported it by 36%.⁹ For those aged 11-15, boys under-reported by 24% and girls 28%.¹⁰ Using these percentages as proxies for the consumption of free sugars by equivalent groups in the NDNS, we derive the adjusted figures shown in Table 2. The corresponding ‘real’ cut required to meet the SACN recommendation of 30g of free sugars per day matches the notional target derived from supply data: a two thirds reduction.

Table 2: The consumption of free sugars in the UK adjusted for under-reporting

Group	NDNS estimate	Adjusted	Real cut required
Women aged 19-64	50.0g	78.1g	-61.6%
Girls aged 11-18	62.4g	86.7g	-65.4%
Men aged 19-64	64.3g	97.4g	-69.1%
Boys aged 11-18	71.6g	94.2g	-68.2%

Source: NDNS data from Roberts, C., T. Steer, N. Maplethorpe, L. Cox, S. Meadows, S. Nicholson, P. Page, and G. Swan (2018) *National Diet and Nutrition Survey: Results from Years 7 and 8 (Combined) of the Rolling Programme (2014/15 - 2015-16)*, London: PHE Publications, p. 11.

Why address the supply-side of sugar?

The SACN recommendation was accepted by the UK Government in 2015 and has already helped inform health and nutrition policy. This has included revised dietary guidance in the Eatwell Guide, the introduction of the Soft Drinks Industry Levy in April 2018, consultations on legislation to restrict sales of energy drinks to children, and the Sugar Reduction reformulation programme.⁸⁹ This latter initiative has encouraged manufacturers to cut the sugar content of certain foods and drinks by 5%

in the first year of the programme, reaching 20% by 2020.⁹⁰ This target would remove 0.2 million tonnes of sugar per year from the collective diet of the UK population.⁹¹ Preliminary data on the effect of the levy suggest that 0.045 million tonnes have already been removed from soft drinks, a total likely to increase as newly reformulated drinks come onto the market.⁹² All of this is a start, but insufficient to reach the SACN recommendation, which would require an aggregate reduction from current consumption by around 1.7 million tonnes per year.⁹³

To achieve the SACN recommendation, current initiatives to reduce sugar consumption require other measures. We propose this be pursued through supply-side policies: regulations governing

the availability, accessibility and affordability of sugar and its substitutes. The need to integrate nutritional objectives into food production has been stressed by the World Health Organization (WHO) among other authorities. As far back as 1990, the authors of its expert group report *Diet, Nutrition and the Prevention of Chronic Diseases* recommended that national governments reconsider their agricultural, trade and investment policies in light of the population risks posed by diets high in free sugars.¹¹ There are also two good reasons to think that further demand-side policy might not have the desired effect.

Firstly, it is difficult to promote general reductions in consumption through targeted interventions on specific final products. As Public Health England acknowledged, the food and drink categories initially covered by their Sugar Reduction programme and the Soft Drinks Industry Levy accounted for only 58% of all sugar consumed at home.¹² Though coverage of the programme and levy have since widened, this should be seen in a context where sugar has been consistently moved around the food system, being taken out of some products and added to others in ways that escape regulatory initiatives and consumer awareness.¹³ The caloric sweetening of low-fat yoghurts, breakfast bars, fruit-filled muffins and ready-made sandwiches provides just a few recent examples. A parallel for this displacement effect can be found in the dairy industry, when UK consumers turned away from whole milk in the 1980s to low-fat skimmed and semi-skimmed versions, yet the butterfat avoided simply re-entered the diet in the form of processed dairy products, and was also incorporated into animal feeds.¹⁴

Secondly, as long as key regulatory initiatives like the Sugar Reduction reformulation programme remain voluntary, there will be powerful commercial incentives for food and drink manufacturers to maintain the status quo. In the first progress report on the reformulation programme, for instance, Public Health England stated that sugar content in the chosen product categories had fallen on average by 2% in the first year, short of the 5% interim target.¹⁵ While this should not be seen as a failure – lags in data and imminent reformulations that have yet to take effect mean that the picture is likely to improve – what we can conclude is that sugar reduction within this initiative may take longer than planned and produce insufficient results in particular product categories.

What difference does Brexit make?

Agricultural and trade policy are central to the supply of sugar. By leaving the EU the UK Government will have greater autonomy in these two policy areas, which have hitherto been subsumed within the EU's Common Agricultural Policy (CAP), the Common Commercial Policy covering external trade, and Single Market legislation covering internal trade.

Numerous studies and reports have concluded that public health concerns around nutrition have not been sufficiently integrated into EU agricultural or trade policy, with negative repercussions for the spread of diet-related disease within the EU.¹⁶ The CAP has been criticised for its promotion of the domestic dairy, red meat, sugar and alcohol

industries to the detriment of fruit and vegetable production. The Common Commercial Policy has been criticised for discounting the health costs of lowering tariffs on ‘junk food’ imports, undermining the use of policy instruments like product labelling on the basis that they would become technical barriers to trade, and including arbitration systems that provide investors with the right to sue governments if they introduce policies that can be considered a form of ‘expropriation’, e.g. plain packaging on cigarettes that reduces the expected returns of foreign investments made by tobacco companies. Single Market legislation has been used to challenge decisions by Member States to apply minimum unit pricing on alcohol and ‘traffic light’ labelling on meat, on the basis that such measures restrict or distort competition within the EU.¹⁷

Brexit creates an opportunity to address and avoid these problems. This was acknowledged explicitly in the consultation document launched by the Department for Environment, Food and Rural Affairs (DEFRA) entitled *Health and Harmony: The Future for Food, Farming and the Environment in a Green Brexit*. This stated that under the CAP “public health has been compromised” and that “[n]ow we are leaving the EU we can design a more rational, and sensitive agriculture policy which promotes environmental enhancement, supports profitable food production and contributes to a healthier society”.¹⁸

Despite these overtures, nothing in the consultation referred to human nutrition or dietary health, and neither did these concerns make their way into the Agriculture Bill presented to Parliament in 2018.¹⁹ In a separate statement, DEFRA recognised the tension between supporting the UK’s sugar industry

and meeting public health goals, but was unable to reconcile these in any meaningful way, stating only that it intended to create “...the conditions for the sugar industries to further improve competitiveness and innovation in response to any new market challenges that arise”.²⁰ In a personal communication to one of the authors, the Minister of State for Agriculture, Fisheries and Food, George Eustice, went further and made it clear that the impetus for sugar reduction lies with the Soft Drinks Industry Levy and the Childhood Obesity Plan, with agricultural policies considered “ineffective tools” for delivering public health objectives.²¹ Thus, one government department is trying to increase the production of sugar, while other parts are trying to reduce its consumption. Brexit creates the opportunity to design, adopt and implement a joined-up sugar policy.

In terms of trade policy, meanwhile, the Secretary of State for International Trade, Liam Fox, has celebrated Brexit as a chance to realise a deregulatory free trade agenda that will “...take an axe to red tape that can hinder businesses”.²² One strategy outlined by Fox to achieve this has been the removal of “non-tariff barriers to trade” with countries like the USA and Australia, with which the Department of Trade has already begun “informal dialogues” regarding post-Brexit Free Trade Agreements (FTAs).²³ During a speech in the USA, Fox appeared to dismiss concerns about removing non-tariff barriers as they related to food safety standards – chlorine-washed chicken in particular, an issue highlighted in previous Brexit Briefings²⁴ – though he later clarified, under some political pressure, that “we are not going to see reductions in our standards”.²⁵ Nevertheless, Fox and other prominent Brexit supporters have continued to present trade policy as a tool for lowering consumer

prices, suggesting that other socio-economic effects, such as impacts on food consumption and dietary health, are unlikely to receive a sympathetic hearing in any FTA negotiations.

How is sugar currently regulated by the EU?

To make the case that sugar reduction should be integrated into post-Brexit UK agricultural and trade policy as a core public health concern, it helps to know how sugar specifically has been regulated at the EU level and what needs to change. Key here has been the partial liberalisation of agricultural and trade policies over the past two decades that have driven down EU sugar prices to near world market levels and increased the availability of caloric sweeteners.

The Common Market Organisation in the Sugar Sector was established in 1968 as part of the CAP. From its inception to the early 2000s, sugar was chiefly regulated via five interrelated instruments: (1) a guaranteed minimum price to European producers; (2) production quotas specifying how much sugar could be sold at this price; (3) import tariffs that prevented cheaper sugar being brought from abroad; (4) intervention agencies that acted as a buyer of last resort; and (5) export subsidies applied to sugar produced in excess of the quota ('out of quota' sugar) to make it easier to sell to buyers outside the EU. These supply-side measures functioned to ensure stable and 'remunerative' prices for both sugar beet farmers and cane refiners. They also underpinned the Sugar Protocol agreement with certain countries in the African,

Caribbean and Pacific (ACP) group – mainly former British colonies – whereby a fixed amount of their raw cane sugar would be purchased by EU cane refiners at similar price levels.²⁶

This regime unravelled in 2006 when a decision was taken to cut the guaranteed minimum sugar price by 36% over three years, pay uncompetitive producers to leave the industry, and support beet farmers through direct income payments rather than managed crop prices.²⁷ Ostensibly this overhaul was made in response to a dispute at the World Trade Organization (WTO) in which the EU was judged to have been unfairly subsidising sugar exports.²⁸ This happened through egregious levels of export subsidy totalling €1.28bn in 2004 alone,²⁹ and through cross-subsidisation, meaning that producers were using the higher domestic prices obtained from sugar produced within the quota limit ('in quota' sugar) to offset the lower export prices received for out of quota sugar. However, research on the political economy of this reform has shown how European Commissioners both acquiesced in, and took advantage of, this legal defeat; one reason being the desire to assist food and drink manufacturers in the EU by providing them with greater access to cheaper sugar.³⁰

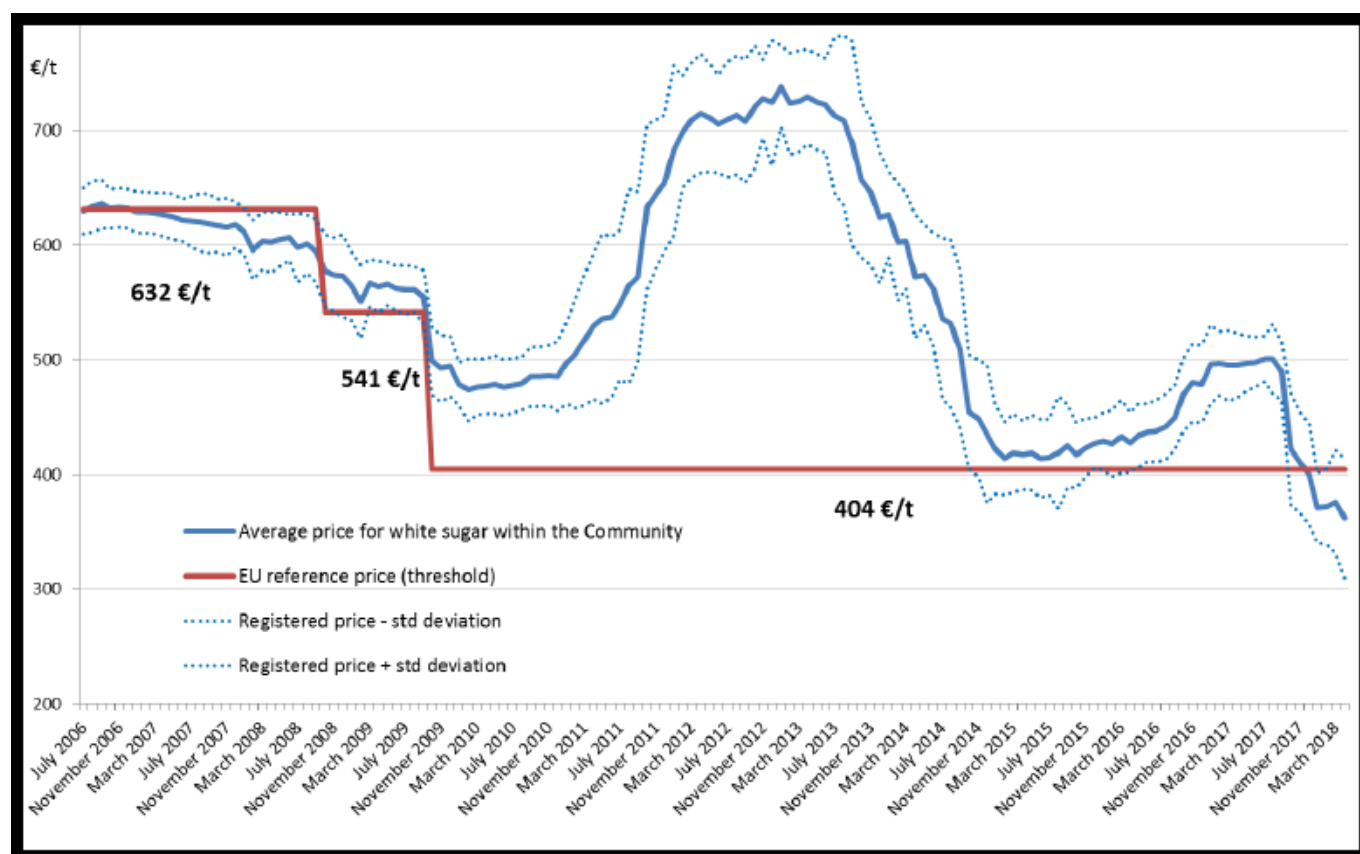
Also agreed in 2006 was the abolition of production quotas (and with it the difference between in quota and out of quota sugar). This reform came into effect in October 2017 and like the others was designed to make the EU sugar market more competitive, allowing the lowest cost producers to expand their output and force higher cost producers to either restructure or exit the industry. Since production quotas had been implicated in the cross-subsidisation of exports, it also meant that the export limit of 1.37 million

tonnes, which had been placed on EU sugar under WTO rules, could now be rescinded.³¹

As shown in Figure 1, notwithstanding the 2011-2012 spike caused by record world market prices diverting imports away from the EU, the objective to drive down domestic sugar prices has been fulfilled. Indeed, by June 2018, the price of EU sugar fell to the lowest level on record, €361 per tonne.³² By contrast, the guaranteed minimum price from 1993 to 2006 was €631 per tonne.³³ For big industrial buyers in the EU like food and drink manufacturers, sugar has become much cheaper.

Reform to the EU sugar regime also ended the longstanding quota restrictions on isoglucose production, which had been introduced to protect sugar producers from a competitor product. The effect of this historic restriction is evident in consumption data: in 2017-18 there was an estimated 0.86 million tonnes ‘white sugar equivalent’ of isoglucose consumed across the EU, compared to 15.5 million tonnes of sugar.³⁴ However, it is estimated that up to 30 per cent of current sugar usage within the EU could be substituted for isoglucose, namely in soft drinks, bakery products, jellies canned fruits and dairy products.³⁵ The European Commission has

Figure 1: EU reference price and EU market price for white sugar, 2006-2018 (in Euros per tonne)



Note: registered price standard deviation shows the variation in prices above and below the average as reported by different buyers across the EU. Source: DG AGRI (2018) ‘Sugar Price Reporting’, Slideshow prepared for Committee for the Common Organisation of Agricultural Markets, 28 June 2018. Available at: https://ec.europa.eu/agriculture/sites/agriculture/files/market-observatory/sugar/doc/price-reporting_en.pdf [Accessed 31 July 2018].

anticipated that isoglucose production could triple under the new rules to 2.3 million tonnes by 2026.³⁶ The types of isoglucose commonly used in the food and drink industry have essentially the same health consequences as sugar, if not worse.³⁷

During the reform process, concerns were raised by academics and members of the European Parliament among others about the public health implications of liberalising quotas for sugar and isoglucose.³⁸ These included the economic incentives for manufacturers to increase the total use of caloric sweeteners in processed food and drink, especially in cheaper products sold disproportionately to lower socioeconomic groups.³⁹ Yet the European Commission's response was simply that it would follow the debate on the specific health consequences of isoglucose, and continue to promote the voluntary reformulation of sugary products within intergovernmental forums.⁴⁰ Despite the urgent need to lower caloric sweetener intake, the EU's own agricultural forecast predicts that from 2017 to 2030 the aggregate consumption of sugar and isoglucose across Member States will remain unchanged.⁴¹

Sugar is now subject to the following EU regulations, which will remain in place in the UK until at least 2020, unless there is a 'no-deal' Brexit.⁴² In terms of agricultural policy, sugar beet farmers receive an income subsidy in the form of a direct payment based on the area farmed, subject to certain conditions. In England, the only nation in the UK where sugar beet is grown, this direct payment was €251 per hectare in 2014.⁴³ This subsidy was 'decoupled' from production, meaning that farmers do not have to grow specific crops to receive it, but it nonetheless equated to a de facto taxpayer support for sugar beet of €29 million

based on the acreage farmed that year.⁴⁴ Sugar beet farmers in some other EU Member States also receive 'coupled' direct payments from their governments, conditional on growing beet, totalling an additional €176 million in 2014.⁴⁵

In terms of trade policy, while the removal of production quotas will increase competition inside the EU, beet producers are still protected from some competition outside the EU. There is a series of Tariff Rate Quotas (TRQs) that allows a specified amount of sugar – mainly raw cane sugar – to be imported into the EU at reduced or zero tariffs. In 2017-18 there was one series of TRQs totalling 0.736 million tonnes, which was subject to a tariff of €98 per tonne. This is the tariff, known as the 'CXL duty', which Tate & Lyle Sugars has lobbied the EU to abolish. Another series of TRQs totalling 0.55 million tonnes was not subject to tariffs.⁴⁶ These are provided to selected countries that have signed FTAs with the EU. Both of these TRQs tend only to be filled when there are anticipated 'deficits' in the EU, and so supplies under them vary from year to year.

Beyond TRQs, a tariff of €339 per tonne of raw sugar and €419 per tonne of refined sugar applies to imports from countries outside this quota system. This effectively prohibits free trade in sugar with low-cost exporters like Brazil, Australia, Thailand, Guatemala and Colombia. The important exception to this trade protection is that all 47 Least Developed Countries (LDCs) and some non-LDCs in the ACP (i.e. countries in the African, Caribbean and Pacific group that have signed FTAs with the EU, known as Economic Partnership Agreements) have unrestricted market access, meaning no tariffs and no quotas.⁴⁷

Despite these various sources of imports, Tate & Lyle Sugars – the sole refiner of cane sugar in the UK – has struggled to obtain enough raw cane sugar at prices that would allow it to compete with EU beet sugar. This is essentially because those countries with unrestricted market access tend to be high cost and/or low volume exporters. From its point of view, EU policy has unduly favoured beet producers by liberalising the internal trade

in refined sugar whilst maintaining restrictions on the external trade in raw sugar. While the annual capacity of its refinery in London is 1.1 million tonnes, over the last couple of years production has been around 0.5 million tonnes.⁴⁸ This explains why the company wrote to its 800 staff prior to the Brexit referendum on the adverse impact of EU policy, and now refers to the post-Brexit era as a “golden opportunity” for reform.⁴⁹

Table 3: Ten biggest exporters of raw sugar to the UK by value, 2016

Country	Raw sugar exports to UK (£ million)	Total Export of Goods (£ million)	UK Sugar Exports as Percentage of Total Goods Export	Market Access Trade Regime
Brazil	36	137,074	>0.1%	Tariff Rate Quota
Mauritius	28	1,623	1.7%	Eastern and Southern Africa EPA (interim)
Belize	23	182	12.6%	CARIFORUM EPA
Fiji	19	685	2.8%	Pacific EPA (interim)
Kingdom of Eswatini	18	824	2.2%	Southern African Development Community EPA
Guyana	17	1,074	1.6%	CARIFORUM EPA
Guatemala	12	7,901	0.2%	EU-Central America FTA
Lao PDR	10	2,334	0.4%	EBA
El Salvador	8	3,948	0.2%	EU-Central America FTA
Jamaica	7	889	0.8%	CARIFORUM EPA
Malawi	5	799	0.6%	EBA

Source: authors. Data on sugar exports from HMRC, data on goods exports from World Bank WITS. * Former British colony. EPA stands for Economic Partnership Agreement; EBA for Everything But Arms.

The fate of Tate & Lyle Sugars also has implications for those sugar exporters dependent on the UK, chiefly the former British colonies of Mauritius, Belize, Fiji, the Kingdom of eSwatini (formerly known as Swaziland) and Guyana. As shown in Table 3, at least 1% of the total exports of goods from these Commonwealth countries is raw sugar sent to the UK.

Returning to the central issue of public health, there are two key points to highlight. Firstly, EU agricultural and trade policies have become increasingly orientated to the demands of food and drink manufacturers, ensuring them wider access to cheaper sources of sugar and sweetener. There has thus been little incentive from the supply-side for these companies not to use sugar to sweeten, bulk, colour and preserve their products.⁵⁰

Secondly, in contrast to the assumption made by many free traders and Eurosceptics, there is no ‘free market’ price of sugar that EU policy has interfered with and artificially inflated. Certainly the price of sugar in the EU market has been higher than that in the world market. But the world market trades sugar that has been explicitly dumped – i.e. benefitted from export subsidies – or else been supported by the state in some other way.⁵¹ Since all markets for sugar are politically constituted and affected by state policy in one way or another, it would be incorrect to see our proposed post-Brexit supply-side policies as distorting a ‘free market’. Rather, they offer a different way of managing market exchange so that it can help meet multiple social and economic goals.

Would supply-side sugar reduction be compatible with other goals?

If post-Brexit UK governments take seriously the SACN recommendation of reducing total sugar consumption by two thirds, then they must consider policies to control the total availability of sugar in the UK and raise its price to the food industry. While these changes are driven by new public health concerns, they are entirely compatible with other public policy goals, including affordable food for consumers and fair returns for farmers.

Producing less sugar at higher prices need not be a burden on consumers. As shown in Table 4, the cost of sugar accounts for only a tiny percentage of the retail price of even the most sugary food and drinks. Even if higher sugar prices were passed on in full, they would barely register in the weekly shopping bill. Rather than reducing sugar consumption by affecting the purchasing decisions of consumers, the intent of supply-side policies would be to target manufacturers by encouraging them to reduce the use of sugar across their product portfolios. This is especially the case for the hundred or so companies in the UK that routinely buy more than 10,000 tonnes of sugar per year and can be considered more price sensitive than other buyers of sugar.⁵²

Table 4: The cost of sugar in manufactured food and drinks at retail

Product (size)	Amount of sugar	Cost of sugar	Retail price	Cost of sugar in retail price
Kellogg's Frosties cereal (500g)	185g	6.1p	£2.50	2.4%
Cadbury Dairy Milk Choco-late single bar (45g)	25g	0.8p	£0.60	1.3%
Magnum Classic Ice Cream (4 x 110ml)	92.4g	3.0p	£3.20	0.9%
Jam doughnut (70g)	6.7g	0.2p	£0.30	0.6%
Coca-Cola Sprite (500ml)	16.6g	0.5p	£1.25	0.4%

Source: product data from Tesco website, accessed 8 June 2018. The amount of sugar is based on 'total sugars' detailed in the product's nutritional profile, though in these cases this can be equated to added sucrose sugar. The cost of sugar is based on the March 2018 average ex-factory price of white sugar across the EU, which was €376 per tonne or £0.33 per kg in UK prices. Data from DG AGRI (2018) 'Sugar Price Reporting', Slideshow prepared for Committee for the Common Organisation of Agricultural Markets, 31 May 2018. Available at: https://ec.europa.eu/agriculture/sites/agriculture/files/market-observatory/sugar/doc/price-reporting_en.pdf [Accessed 8 June 2018].

A higher price for sugar could also help offset lost revenue to domestic beet farmers through higher crop prices. For Commonwealth countries dependent on the UK sugar market, a parallel higher price for imports would support livelihoods and help forestall the job losses associated with sugar trade liberalisation.

A further implication of the supply-side approach is its potential to make relatively cheaper the range of ingredients that may be used in place of sugar during reformulation. While some scientists and consumers remain concerned about the safety of existing 'artificial' sweeteners, like aspartame, the current nutritional focus on sugar has already increased commercial interest, research and investment in new substitute ingredients, about which similar concerns over carcinogenicity, toxicity

and satiety have not yet been raised. They include new 'natural' sweeteners like stevia and monkfruit, improved polyols and dextrins, oligo-saccharides, sweet proteins, flavour enhancers, and even new forms of sucrose itself – as in 'hollowed out' sugar crystals.⁵³

All provide some degree of sweetness, from a fraction of sucrose to many multiples, but with fewer calories than sugar. Some claim to offer further health benefits like increased fibre content or not raising blood sugar levels.⁵⁴ Their principal promise is that they might be effective in foods – singly or in combination – where the use of substitutes has thus far proved technically difficult, thus enabling manufacturers to find cost-effective ways to reformulate their products in line with the Government's sugar reduction programme. As

noted below though, in recognising the relative benefits of reformulating sugar-sweetened products to reduce calorie intake, we should not lose sight of the additional nutritional gains to be had from rebalancing diets away from sweetened manufactured products in general and towards 'under-consumed' foods like fresh fruits and vegetables.

What are the policy options for sugar reduction post-Brexit?

There are several policy options to reduce sugar consumption that could be opened up by Brexit. We describe five major candidates: (1) a marketing quota; (2) a minimum price; (3) an excise tax; (4) subsidy reform; and (5) compositional regulation and product labelling.

1. Marketing quota

Marketing quotas are quantitative limits on the amount of a product that can be sold within a given market. Applied to the UK sugar market, they could cover sugar derived from cane and beet, as well as caloric substitutes like isoglucose.⁵⁵ To allow all parties in the food chain to adapt, they should begin with a modest cut, then progressively tighten, reducing aggregate availability over time. A marketing quota could be managed through controls on sugar production/imports or via licensing for major industrial buyers.

Controls on sugar production/imports would mimic the older EU sugar regime but without the

export refunds or cross-subsidisation. Establishing quotas would thus be nothing new or radical. The difference is that this time public health goals could be front and centre, replacing the 'productionist' goals of before.

Due to legal commitments under international trade law and moral obligations toward former British colonies, sugar should continue to be sourced from foreign as well as domestic suppliers. Thus, Brexit could also create an opportunity to achieve another long-standing goal of UK governments: equal treatment for the nation's cane and beet industries.⁵⁶ The exact split between them, and the new rules-of-the-game in detail, should be the subject of regular negotiations between industry representatives and relevant Government departments, including the Department of Health and Social Care, based not just on historical levels of supply but taking into account other pertinent factors including food security, environmental risks, consumption patterns, health trends, and changes in the global sugar and sweetener industry.

Over time, the volume of sales into the UK market from British Sugar's four beet factories and Tate & Lyle Sugars' sole cane sugar refinery would become smaller than they are today. This contraction should be seen in a context where total UK consumption has already flat-lined, meaning that the UK sugar industry has already become accustomed to definite limits on domestic market growth and is well aware of the likelihood of further reductions in sales due to the current sugar reduction agenda. Moreover, the UK is not the only market for these companies. As British Sugar has made clear in submissions to the Environment, Food and Rural Affairs Committee, one of its post-Brexit priorities is to increase exports to regions including the

Middle East and North Africa, given that it has now become price competitive with other world market suppliers.⁵⁷ As long as this sugar is not sold at below its average cost of production – i.e. dumped – the re-introduction of production quotas would not jeopardise this by limiting export sales under WTO rules, though it is worth noting that any significant expansion in UK sugar exports to such regions would have its own knock-on consequences, which are beyond the scope of this paper.⁵⁸ For its part, Tate & Lyle Sugars has made clear that the EU's current regulatory environment is commercially untenable and that a managed market where sugar prices are above world market levels would be acceptable.⁵⁹ Domestic isoglucose production, negligible at present but potentially increasing, should also be subject to restrictions.⁶⁰

In terms of external trade relations, the preferential treatment for ACP and LDC countries currently benefitting from duty-free quota-free access to the EU should continue due to the UK's development obligations. Under WTO rules some market access would also have to be granted to current TRQ beneficiaries, though how these will be split between the UK and EU-27 must be negotiated among the WTO membership. All exporters of raw sugar to the UK would in effect be covered by the quota applied to Tate & Lyle Sugars, since it would have to pass through their refinery, though could be re-exported if price competitive.⁶¹ While this means that the market size would diminish over time, quotas could provide a means of stabilising or raising the market price. This may be deemed an acceptable trade-off by the ACP/LDC exporters, who are currently being squeezed out of the UK market by low prices.⁶²

On the flip-side, to preserve the integrity of a UK marketing quota, import tariffs would be needed, especially with the EU-27. The UK has been routinely importing more than 0.4 million tonnes of sugar from the EU, mainly from France, as well as 0.08 million tonnes of isoglucose, mainly from Belgium.⁶³ Reciprocity can be expected, thus the EU-27 would be likely to apply prohibitive tariffs on UK sugar exports. As it stands, this is the situation that would arise in a 'no-deal' Brexit. Exceptions to the quota could be made for sugar-containing products bound for export – as used in the re-export programme of the USA, among other countries – so as not to adversely affect this segment of the manufacturing industry. This could also provide another market for the UK sugar industry, subject again to the same caveat regarding the knock-on consequences.

Any sugar produced or imported over the quota limit would have to be stored until the next marketing year at the company's expense without the storage subsidies that the EU provides. This would create an incentive for tight management to keep within the supply limits. Monitoring of 'pseudo-smuggling', wherein alleged exports never leave the country but are diverted covertly to the domestic market, would also be required. Here, the UK's experience with tobacco products is illustrative, for despite the challenges of preventing the illicit trade in cigarettes, the long-term effect of tobacco policy has been a substantial reduction in smoking and a major public health gain.

If the supply of sugar could not be controlled through quantitative limits on production and import, an alternative approach would be to adopt a licensing system. This would be necessary if tariffs could not be applied on agricultural trade with the

EU-27. Such an arrangement has been outlined in the ‘Political Declaration’ annexed to the Draft Agreement on the Withdrawal of the UK from the EU announced in November 2018.⁶⁴ This specified that the parties should “build on the single customs territory” put in place during the notional transition period to December 2020, which would mean “zero tariffs, no fees, charges or quantitative restrictions across all goods sectors”.⁶⁵ Were this achieved, it would mean that businesses in the UK could import as much cheap sugar as they liked from the continent.

In this context, what a licensing system would do is to set a limit on how much sugar any single company could purchase within a given year, reducing the accessibility of sugar. It could be applied in the first instance to the hundred or so companies that buy more than 10,000 tonnes of sugar, progressively tightening over time in terms of both the quantitative limit and the companies covered as and when they fell within the threshold. Unlike the allocation for quotas of sugar production/import, which would be beholden to a more complex set of concerns, this tightening could be done on a more straightforward basis such as an annual percentage reduction applied equally to all licensees. Licensing laws are well established in the UK in relation to alcohol and contain a complex set of conditions, including an Alcohol Wholesaler Registration Scheme to oversee sales of drinks to retailers. An equivalent for sugar would have fewer rules and apply to far fewer companies, making it relatively easier to administer.

2. Minimum price

Policy-makers could also raise the domestic price of sugar. This may happen anyway because of the shrinking supply. However, the UK price could be more deliberately controlled through the use of minimum price regulation. This would provide a second mechanism, alongside reduced availability, by which sugar reduction could be advanced.

A guaranteed minimum price for sugar, known as the ‘intervention price’, was in fact part of the EU sugar market until the 2006 CAP reform. It worked by setting a price at which intervention agencies in Member States would be obliged to buy in-quota sugar, though in practice, intervention purchases were only invoked during the early years of the EU sugar regime.⁶⁶ This policy effectively established a floor for the market price of sugar because if manufacturers did not pay at least this amount they would not obtain the supplies they needed. Applied differently, minimum price regulation in the post-Brexit UK could be used to promote public health by incrementally raising prices to food and drink manufacturers to encourage reformulation. It could also be linked to better crop prices and wages. The gradual tightening of the marketing quota in unison would prevent ‘sugar mountains’ from accumulating.

Another way to raise the price of sugar would be to reintroduce a minimum beet price. This could be part of a broader package of post-Brexit agricultural policies, akin to the current legislative proposals in France aimed at rebalancing market power between farmers and retailers, and alongside the inevitable reform to domestic farm subsidies (see below).⁶⁷ To the extent that additional raw material costs were passed on by British Sugar to its customers, this

would also help to reverse the recent falls in the price of beet sugar in the UK.

3. Excise tax

A third way to raise the price of sugar would be to levy specific extra charges, either in the form of an excise tax on the commodity itself or on manufacturers using it in particular types of food products. The UK has recently had an unexpected double success with its Soft Drinks Industry Levy, a graduated, three-tier charge on the sugar content of drinks, paid by the manufacturers and designed to stimulate their reformulation. Most soft drinks have been reformulated to evade the levy altogether with only two products of public health significance remaining liable to the full charge of £0.24 per litre: Classic Coca-Cola and full sugar (Blue) Pepsi. But the levy has also opened up a price differential between full sugar and no/low sugar drinks for the first time in the UK. It has made the nutritionally preferable choice the cheaper choice, giving consumers an economic incentive to reduce their sugar consumption. Over the longer term, the price advantage should shift sales towards products with less/no sugar, and because soft drinks are the major source of sugar in the British diet, this could contribute significantly to reducing total sugar consumption.⁶⁸

Similar levies could be applied to the manufacturers of sugar-sweetened food products.⁶⁹ They would provide additional force and incentives in support of Public Health England's voluntary programme to reduce the sugar content in nine categories of popular products. However, such levies might not work so well as with soft drinks, where the use of sweeteners is technically easier and has proved commercially acceptable to most

consumers over the past three decades. But as the technical options for sugar reduction in foods are changing, this barrier could also diminish.

Meanwhile, the simplest and most comprehensive option would be to impose an excise tax on sugar directly, either as it leaves the processor/refinery, or on the content of finished products. This would have the advantage of raising the price of sugar across the board, not just in some specific products. It would also raise revenue for the Government, which could be ring-fenced for specific health-related purposes, as with the hypothecation of proceeds from the Soft Drinks Industry Levy for school funding. The public health budget of local government, which has suffered significant cuts in recent years as part of the general squeeze on council spending, would be one obvious beneficiary. Like the marketing quota option, an exemption for sugar-containing exports could again be provided. One downside of this option, however, is the fact that a change in price only (i.e. with no reduction in availability) might not have as big an impact on manufacturers given the small cost of sugar in the final price, as noted in Table 4. Another downside is political, since the introduction of new taxes can be contentious. Marketing quotas, while intending to have a similar result, might achieve this in a more electorally palatable way.

4. Subsidy reform

Following Brexit, financial support from the state for agriculture, environmental improvement and rural development will continue. In the 2017-2019 Agriculture Bill now making its way through Parliament, it was stated that direct payments under the current CAP rules will be subject to a

seven year transition period in England from 2021. During this time, alternative payments made under a new Environmental Land Management system will be phased in.⁷⁰ Echoing the principle in the Health and Harmony White Paper of “public money for public goods”, under this proposed system it is “farmers and land managers who provide the greatest environmental benefits [that] will secure the largest reward”.⁷¹

As noted previously, there has been a lacuna in this legislative development as it relates to public health, human nutrition and what we might think of as the ‘food environment’. This should be redressed. In respect to sugar, the obvious starting point would be the gradual elimination of payments for land used to grow sugar beet. About 3,500 farmers in East Anglia and the East Midlands are currently paid around €29 million per year to grow sugar beet. This is equivalent to the amount spent each year by NHS England extracting rotten teeth from children under general anaesthetic – frequent sugar consumption being a major cause of dental decay.⁷² Denying subsidies to agricultural production that results in ‘negative externalities’ is entirely consistent with the public goods approach favoured by the current Government. The likely effect of doing this would be to dis-incentivise the cultivation of beet and reduce the crop volume available for processing into sugar.

The money saved on sugar beet subsidies could instead be used to support the increased production of foods that align with public health goals, especially horticultural products and pulses. Alternatively, it could be used to create rural development funds for farm shops, community-supported agriculture, and direct marketing for agro-ecological farming. Short-term, transitional

aid to sugar beet farmers and contractors as they move to other forms of agricultural production and/or non-farm employment provides a third option.⁷³ Worth noting here is that thousands of farmers have already stopped growing beet over the past two decades, due in part to the closure of British Sugar factories in Shropshire and Yorkshire following the 2006 EU reform, but also in response to wider pressures for economic concentration in the agricultural sector.⁷⁴

5. Compositional regulation and product labelling

The final option we consider goes beyond the main focus of this paper on supply, but is relevant in the post-Brexit context given that it has implications for trade policy. Compositional regulations would control the sugar content of individual types of sweetened foods and drinks sold in the UK, whether domestically produced or imported. This regulatory instrument has been widely used in the UK and beyond to ensure food safety, to protect against adulteration and counterfeiting, to generate tax revenue, and to set nutritional standards.⁷⁵ Ironically, in the light of current health concerns, during World War II the UK introduced a compositional regulation prescribing the minimum amount of sugar in soft drinks to encourage sufficient calorie intake, which was only removed in the 1990s. A more recent example is the 2013 decision to lower the minimum sugar content of jam from 60% to 50%. Maximum amounts of sugar could instead be prescribed for certain products, such as children’s breakfast cereals and commercial baby foods.⁷⁶

A challenge for compositional regulations is that they have often been used as a means of

protecting domestic industries by excluding non-compliant imports from the market, or else functioned unintentionally as ‘technical barriers to trade’. For example, Italy once prohibited the importation of fish fingers from the UK because the colouring used in the coating was not permitted under its food regulations. EU regulation on this matter was shaped by a landmark legal decision by the European Court of Justice in the 1979 Cassis de Dijon case, which concerned the minimum percentage of alcohol that liqueurs should contain. The decision affirmed that Member States must mutually recognise different compositional standards, and could only insist that their own regulations be followed if these were necessary to meet ‘mandatory requirements’.⁷⁷ Such requirements include the protection of public health and the defence of consumers. This encouraged the European Commission to shift its position on internal trade policy: from seeking to harmonise food and drink products themselves through compositional regulation, to harmonising product labelling and marketing claims instead.⁷⁸

Any product legally made in any Member State can now be sold anywhere in the EU as long as it is labelled properly. But labelling requirements have themselves been interpreted as barriers to trade, resulting in challenges to the UK’s traffic light system as noted earlier. The EU’s Food Information to Consumers Regulation passed in 2011 did create some common rules among the Member States. But due in no small part to industry lobbying by manufacturers of foods high in fat, salt and sugar (HFSS), these common rules did not include mandatory front-of-pack labelling or the display of ‘added sugars’ and ‘trans fats’ in the back-of-pack nutritional information.⁷⁹

The UK Government’s position in its 2018 White Paper *The Future Relationship between the United Kingdom and the European Union* was that the wider food policy rules that set marketing and labelling requirements within the EU are not necessary to incorporate into the ‘common rulebook’ – the phrase used to refer to the proposed “ongoing harmonisation with the relevant EU rules” covering the trade in goods.⁸⁰ The plausibility of this particular arrangement notwithstanding, the key point is that post-Brexit, the UK Government might be in a position to revisit alternatives for clearer product labelling to reduce sugar consumption.⁸¹ In such a scenario the Government could also set compositional regulations on sugar-sweetened products, following the recent example set by Portugal and Netherlands that have each adopted schemes to limit the use of ingredients, including salt and sugar, in the national diet.⁸²

Compositional regulation and product labelling must also be considered in terms of external trade policy. For instance, one point of opposition to the Transatlantic Trade and Investment Partnership, the EU’s proposed FTA with the USA, was that it would restrict such public health measures through regulatory provisions that would potentially entail downward harmonisation of legal differences, the recognition of lower standards, or restrictions being imposed on policy space.⁸³ This must be avoided in any post-Brexit UK FTAs too, not least with the USA given its attempt in the renegotiation of the North American Free Trade Agreement to preclude the introduction of health warnings on HFSS foods,⁸⁴ and its insistence in consultations with the EU that compliance with the UK’s traffic light labelling remain voluntary.⁸⁵ Another aspect of FTAs to guard against are Investor-State Dispute

Settlement provisions that restrict states' right to regulate by foreclosing attempts to govern trade in the interests of public health through 'regulatory chill' or outright legal challenge.⁸⁶ Providing sector-specific exemptions from such arbitration systems or removing them from FTAs altogether are two possible responses.⁸⁷

Conclusion

Excessive sugar consumption is likely to be a public health problem for many years. So too are the economic costs and personal suffering that follow in its wake. Changes to the collective diet to meet the SACN recommendation are not happening quickly enough. Sugar is an ingredient deeply embedded in the UK food system. Reducing consumption of it by two-thirds requires more ambition.

There are many proposals to expand the policy instruments used, some of which are being actively pursued by national and local government in the UK, such as the restriction of price promotions or advertisements of products that are high in salt, fat and sugar. But almost all of these concentrate on influencing demand and getting consumers to continuously monitor their purchases. That is an understandable starting point but likely to prove a hard, slow and incremental process. Actions to control the supply of sugar via agricultural and trade policy would provide a much needed complement, denying sugar its historically privileged position in the food system and making it easier for people to acquire healthier and wider-ranging diets.

The purpose of this paper has been to outline what those policies could look like. They are being presented at a uniquely favourable moment, when changes in these policy areas are not only possible, but inevitable. Following Brexit, the UK will have to legislate a new agricultural regime to replace the EU's Common Agricultural Policy and agree on a new trade arrangement with the EU-27. It also seems likely that the UK will regain the ability to negotiate independent FTAs with other countries.

In making concrete suggestions on what policies to adopt, we have sought to be pragmatic, proposing instruments and regulations that have been employed already. Precedents make political change easier. We have also gone beyond the defensive options that seek to prevent the further cheapening of sugar and isoglucose, such as opposing their liberalisation in new FTAs. We propose policies that could actively drive sugar reduction.

It is vital that post-Brexit UK governments do not undermine existing EU legislation protecting public health, but also that they address the evident dysfunctions that arose from the EU's agricultural and trade policy. Affirming public health as one of the public goods underpinning a new agricultural subsidy regime is one example.⁸⁸ Addressing excessive sugar consumption through supply-side policies ought to be another.

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FRC Food Brexit Briefing

Sugar reduction in post-Brexit UK: A supply-side policy agenda

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53 See Geller, M. (2016) 'Nestlé Touts New Technology to Reduce Sugar in Chocolate', *Reuters*, 1 December 2016. Available at: <https://www.reuters.com/article/us-nestle-sugar-idUSKBN13Q3FF>

54 See the 'stevia solutions' offered by Tate & Lyle (the food ingredient manufacturer, not the sugar refiner) which it claims does not raise blood pressure. Tate & Lyle (no date) 'Stevia Solutions' webpage. Available at: <https://www.tateandlyle.com/ingredient/stevia-solutions> [Accessed 25 October 2018].

55 We leave aside the trade in sugar-containing products since this accounts for a small proportion of total sugar supply as shown in Table 1. However, this decision would need to be monitored and reviewed if necessary.

56 See for instance the statement by the Minister of State for Trade and Investment, Greg Hands, to the EFRA Committee in 2018: "The UK Government strongly believes that having at least two

FRC Food Brexit Briefing

Sugar reduction in post-Brexit UK: A supply-side policy agenda

sources of sugar is good for competitiveness, and that cane and beet sugar should be able to compete on an equal basis". Horseman, C. (2018) 'UK Will Retain Beet and Cane Sugar Mix after Brexit', *Farmers Guardian*, 8 June 2018.

57 British Sugar has said it will export approximately 0.25 million tonnes in 2017-18. See AB Sugar (2018) 'Written Evidence Submitted by AB Sugar', EFRA Committee Inquiry on Trade in Sugar post-Brexit, 28 February 2018, p. 2. Available at: <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environment-food-and-rural-affairs-committee/postbrexit-trade-in-sugar/written/78720.pdf> [Accessed 31 July 2018].

58 The potential consequences include competition with developing country exporters and contribution to dietary-related disease in importing countries. From the perspective of UK public policy these issues are best approached through international governance, namely changes to multilateral trade and health policy, e.g. support for the putative Global Convention to Protect and Promote Healthy Diets in the World Health Organization.

59 Tate & Lyle Sugars (2018) 'Written Evidence Submitted by Tate & Lyle Sugars', EFRA Committee Inquiry on Trade in Sugar post-Brexit, 28 February 2018, p. 2. Available at: <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environment-food-and-rural-affairs-committee/postbrexit-trade-in-sugar/written/78678.pdf> [Accessed 31 July 2018].

60 US-company Cargill has recently invested £30m in its wheat processing plant in Manchester to increase its production of syrup sweeteners. Bamford, V. (2016) 'Cargill Spending £30m to Ramp Up Glucose-Fructose Production', *British Baker*, 14 November 2016. Available at: https://bakeryinfo.co.uk/news/fullstory.php/aid/17084/Cargill_spending_A330m_to_ramp_up_glucose-fructose_production.html [Accessed 1 August 2018].

61 The small amounts of refined cane sugar and other direct consumption sugars currently exported to the UK may also have to be included in the marketing quota.

62 See ACP/LDC Sugar Industries Group (2018) 'Written Evidence Submitted by the ACP and LDC Sugar Industries Group', EFRA Committee Inquiry on Trade in Sugar post-Brexit, 28 February 2018, p. 2. Available at: <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environment-food-and-rural-affairs-committee/postbrexit-trade-in-sugar/written/78499.pdf> [Accessed 31 July 2018].

63 Data from DEFRA (2018) and HMRC database.

64 Department for Existing the European Union (2018) 'Outline of the Political Declaration Setting Out the Framework for the Future Relationship Between the European Union and the United Kingdom', Policy Paper, 14 November 2018. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/756378/14_November_Outline_Political_Declaration_on_the_Future_Relationship.pdf [Accessed 16 November 2018].

65 *Ibid.*, p. 1.

66 European Commission (2004) 'EU Sugar Sector: Facts and Figures', Press Release, Brussels, 14 July 2004. Available at: http://europa.eu/rapid/press-release_MEMO-04-177_en.htm?locale=en [Accessed 20 August 2018].

67 This option would not necessarily require a complementary marketing quota to prevent domestic beet sugar from being under-cut by competition, but by the same token might result in some substitution, e.g. sugar for isoglucose. Nor would it directly address the availability of sugar.

68 See Winkler, J. T. and Fry, T. (2018) 'Making the Healthy Choice the Cheaper Choice', *BMJ Opinion*, 14 May 2018. Available at: <https://blogs.bmj.com/bmj/2018/05/14/j-t-winkler-and-tam-fry-making-the-healthy-choice-the-cheaper-choice/> [Accessed 2 August

2018].

69 So that manufacturers of soft drinks were not taxed twice over for the same purpose, this would involve repealing the Soft Drinks Industry Levy and reincorporating it within a broader excise tax.

70 Department for Environment, Food and Rural Affairs (2018) 'Landmark Agriculture Bill to Deliver a Green Brexit', Press Release, 12 September 2018. Available at: <https://www.gov.uk/government/news/landmark-agriculture-bill-to-deliver-a-green-brexit> [Accessed 26 October 2018].

71 *Ibid.*

72 In 2017 this was estimated at £37m. Therrien, A. (2018) 'More Children Having Teeth Out in Hospital in England', *BBC News*, 13 January 2018. Available at: <https://www.bbc.co.uk/news/health-42662425> [Accessed 1 August 2018].

73 One of the biggest challenges is recovering sunk costs on machinery specific to beet production.

74 Those that have stayed in farming have turned to other crops like wheat or oilseed rape, or other farm activities like egg production. See Richardson, 'Sugar Shift'.

75 Compositional regulation was first introduced in the UK in 'The Sale of Food and Drugs Act 1875'.

76 Maximum sugar content levels for processed cereal-based foods for infants and young children of 7.5g per 100kcal have been prescribed at the EU level by the European Food Safety Authority (EFSA) and appear set to be transposed into UK law, but beyond this, product-based limits to sugar content have not been applied in the UK. The Chief Medical Officer for England has recently recommended that the UK government "take action to eliminate added sugar in commercial infant and baby foods". See Davies, S. (2018) *Annual Report of the Chief Medical Officer, 2018*. London: Department of Health and Social Care, p. 6.

77 See Alter, K. J. and Meunier-Aitsahalia, S. (1994) 'Judicial Politics in the European Community: European Integration and the Pathbreaking Cassis de Dijon Decision', *Comparative Political Studies*, 26: 4, pp. 535-561.

78 European Commission (1997) 'The General Principles of Food Law in the European Union', Commission Green Paper, COM (97) 176. Available at: <http://aei.pitt.edu/1182/> [Accessed 25 October 2018].

79 In the WTO's Technical Barriers to Trade committee, the EU also supported the US and others in questioning Chile's decision to introduce 'High in Sugar' and 'High in Salt' warnings on products. WTO (2013) 'Members Discuss Guidelines for Trade-Friendly Regulation and STOP Sign for "Junk Food"', *WTO News Item*, 13 March 2013. Available at: https://www.wto.org/english/news_e/news13_e/tbt_13mar13_e.htm#concernslist1 [Accessed 3 August 2018].

80 HM Government (2018) *The Future Relationship between the United Kingdom and the European Union*. London: Her Majesty's Stationery Office, p. 8.

81 As stated in the Plan: "The UK's decision to leave the European Union will give us greater flexibility to determine what information should be presented on packaged food, and how it should be displayed. We want to build on the success of our current labelling scheme, and review additional opportunities to go further and ensure we are using the most effective ways to communicate information to families. This might include clearer visual labelling, such as teaspoons of sugar, to show consumers about the sugar content in packaged food and drink." HM Government (2016) *Childhood Obesity: A Plan for Action*, pp. 9-10. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/546588/Childhood_obesity_2016_2_acc.pdf [Accessed 3 August 2018].

82 In the Netherlands the National Agreement to Improve

FRC Food Brexit Briefing

Sugar reduction in post-Brexit UK: A supply-side policy agenda

Product Composition 2014-2020 commits food industry stakeholders to introduce maximum contents for salt, saturated fat, and sugar and/or calories, with the benchmark for yoghurt, for example, set at 11.6g per 100g.

83 De Ville, F. and Siles-Brügge, S. (2017) 'Why TTIP is a Game-Changer and its Critics Have a Point', *Journal of European Public Policy*, 24: 10, 1491-1505.

84 See Ahmed, A., Richtel, M. and Jacobs, A. (2018) 'In NAFTA Talks, US Tries to Limit Junk Food Warning Labels', *The New York Times*, 20 March 2018. Available at: <https://www.nytimes.com/2018/03/20/world/americas/nafta-food-labels-obesity.html> [Accessed 3 August 2018].

85 See United States Trade Representative (2018) 2018 National Trade Estimate Report on Foreign Trade Barriers. Washington D.C.: USTR, p. 163. Available at: <https://ustr.gov/sites/default/files/files/Press/Reports/2018%20National%20Trade%20Estimate%20Report.pdf> [Accessed 3 August 2018].

86 An often cited example is the successful challenge under NAFTA rules by US-based corn syrup producers to Mexico's introduction in 2001 of a sales tax on soft drinks that contained any sweetener other than cane sugar, though arguably this was less a public health policy than a protectionist measure to support Mexican agriculture.

87 See Hawkins, B. and Holden, C. (2016) 'A Corporate Veto on Health Policy? Global Constitutionalism and Investor-State Dispute Settlement', *Journal of Health Politics, Policy and Law*, 41: 5, pp. 969-995.

88 Sharpe, R., Cramer, S., Dalmeny, K. and Hird, V. (2018) Letter to Right Honourable Michael Gove MP, Secretary of State for Environment, Food and Rural Affairs on behalf of Sustain, Royal Society for Public Health and Food Research Collaboration, 20 July 2018. Available at: <http://foodresearch.org.uk/public-health-and-the-agriculture-bill/> [Accessed 3 August 2018].

89 Sugar Reduction is led by Public Health England, but with input from the devolved administrations and supported nationwide by the UK Food Standards Agency.

90 Public Health England (2018) Sugar Reduction and Wider Reformulation Programme: Report on Progress Towards the First 5% Reduction and Next Steps, London: PHE Publications

91 Ibid.

92 Figure cited by a spokesperson for the Department of Health and Social Care in Campbell, D. (2018) 'Cases of Type 2 Diabetes Among Young People Rise 41% in Three Years', *The Guardian*, 18 August 2018. Available at: <https://www.theguardian.com/society/2018/aug/18/cases-of-type-2-diabetes-among-young-people-rise-41-in-three-years> [Accessed 20 August 2018]. Total sugar usage in soft drinks is estimated at 0.55 million tonnes. See Mead, A. (2016) 'The Soft Drinks Industry Levy', Slideshow prepared by the British Society of Sugar Technologists, 20 October 2016. Available at: <http://www.thermalenergysystems.com/bsst/papers/2016atm3.pdf> [Accessed 27 July 2018].

93 Public Health England (2017) 'Guidelines on Reducing Sugar in Food Published for Industry', PHE Press Release, 30 March 2017.

94 World Health Organization (1990) 'Diet, Nutrition and the Prevention of Chronic Diseases', Report of a WHO Study Group, WHO Technical Report Series 797, WHO: Geneva.

95 Note that this percentage is higher for children than for adults given that it is the diets of under 18s that have been targeted, and that additional categories of sweetened milk drinks and fruit juices have since been added. The initial food categories were: biscuits; breakfast cereals; cakes; chocolate confectionery; ice cream, lollies and sorbets; morning goods (e.g. pastries, buns and waffles); puddings (including pies and tarts); sweet confectionery; sweet

spreads and sauces; and yogurt and fromage frais. No data was available for the out of home sector. Public Health England (2017) Sugar Reduction: Achieving the 20%. London: PHE Publications, pp. 12-13.

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