Arndt-Corden Department of Economics
Crawford School of Public Policy
ANU College of Asia and the Pacific

Australian National University

Loss of preferential access to the protected EU sugar market: Fiji's response

Kym Anderson

University of Adelaide
and
Australian National University
kym.anderson@adelaide.edu.au

October 2022

Working Papers in Trade and Development

No. 2022/11

This Working Paper series provides a vehicle for preliminary circulation of research results in the fields of economic development and international trade. The series is intended to stimulate discussion and critical comment. Staff and visitors in any part of the Australian National University are encouraged to contribute. To facilitate prompt distribution, papers are screened, but not formally refereed.

Copies are available at https://acde.crawford.anu.edu.au/acde-research/working-papers-trade-and-development

Loss of preferential access to the protected EU sugar market: Fiji's response

Kym Anderson*

Abstract

The Fiji Government's response since 2010 to the loss of preferential access to the European Union's previously highly protected sugar market has been to increasingly support its producers. That support is now much higher than most other countries' assistance to the sugar sector. This study provides detailed estimates of the changing extent of those transfers to producers from both taxpayers and consumers during 2010-21. In doing so it estimates for the first time an annual time series of nominal rates of assistance to producers and consumer tax equivalent rates (NRAs and CTEs, but they are also converted to producer and consumer support estimates as defined by the OECD). Those NRA and CTE estimates may well now exceed 100%. The level of support was equivalent to 10% of Fiji's agricultural value added in 2018-21 and is around 5% of its government's consolidated revenue – at a time when the government has had one of the highest debt-to-GDP ratios, at 80% in 2021. Since the nature of the support is economically inefficient, inequitable, environmentally damaging and fiscally unsustainable given foreseeable market prospects, suggestions are made as to how that support might be gradually re-purposed to provide better economic, social and environmental outcomes.

Keywords: agricultural subsidies, consumer taxation, international competitiveness, preferential market access
JEL codes: F14, F54, H21, O13, Q18

Author contact address:
Professor Kym Anderson
School of Economics and Public Policy
University of Adelaide
Adelaide SA 5005 Australia
Phone +61 414 254 121
kym.anderson@adelaide.edu.au

* The author is grateful for data assistance from Fiji government officials and for helpful comments on an earlier draft by participants in a 2022 World Bank mission to Fiji. The views expressed are the author's alone and not necessarily those of the Government of Fiji or the World Bank.

Loss of preferential access to the protected EU sugar market: Fiji's response

1. Introduction

For decades many former colonies of European powers enjoyed preferential access to the high-priced protected agricultural markets of European Union (EU) member countries. In the case of sugar, EU consumer prices were nearly three times international prices up to the mid-2000s. That meant export prices for sugar from countries such as Fiji were well above what they would have been if the EU had not provided duty-free and quota-free import market access. But the liberalization of the EU's sugar market that began in 2006 (and which eventually involved removing EU export subsidies and then quotas on EU production from 2017) led to the effective tax of EU consumers and assistance to EU producers dropping precipitously (OECD 2022). That, and the formal ending of the Cotonou Agreement and its Sugar Protocol on 30 September 2009, were predicted to shock Fiji's sugar sector (Lal and Rita 2005; Stoler 2005; Mahadevan 2009). In the event they caused Fiji's export price to plummet in the late 2000s down to the international price. Sugar consumer prices in the EU27 (and in the United Kingdom following Brexit) have since come down to less than 10% above world market prices over the past decade (OECD 2022), two effects of which can be seen in Figure 1: the gap between Fiji's fob export price and the world indicator export price had closed by 2014, having been very wide from the mid-1990s to the late 2000s; and the volume of Fiji's sugar exports in the decade of the 2010s was only half that of the 2000s. This halving of exports occurred despite the Fijian government committing considerable public funds to increasingly support the sugar sector during the past dozen years – notwithstanding numerous reports suggesting the need to restructure its rural sector away from sugar (ADB 2005, 2009; LMC International 2005, 2016; Deloitte 2010; EU 2010).

[insert Figure 1 around here]

This paper provides estimates of the extent of growth in government assistance to Fiji's sugar sector since 2010, and the associated rise in the effective tax on consumers and transfer from the government's consolidated tax revenue. It first reviews key features of the

Fiji's sugar sector, its changing place in the national economy, and components of its declining competitiveness (Section 2). It then focuses on the various forms of public expenditure on the sugar sector over time before estimating the precise elements involved in the transfers from taxpayers and domestic consumers (Section 3). In section 4, nominal rates of assistance to producers and sugar consumer tax equivalents (NRAs and CTEs) are estimated for the most-recent fiscal years for which data are available (2010 to 2020/21). Section 5 then examines medium-term prospects for Fiji's sugar sector: they do not suggest a reversal of fortune is imminent. Since the current forms of assistance to the sector are both inefficient and inequitable, and since there appears to be little prospect for a reversal of the sector's decline in competitiveness, the final section explores possibilities for re-purposing current supports for more-sustainable and more-inclusive economic growth in Fiji – bearing in mind that the government had one of the world's highest debt to GDP ratios in 2021, at 80%.

2. Sugar's evolving place in Fiji's economy

Historically sugar production has been the major agricultural activity and a key source of income and export earnings in Fiji. The sector expanded significantly in the latter 1970s and continued to provide the majority of the country's merchandise export earnings, before it plateaued over the 1980s and 1990s. Since the turn of the century the sector has shrunk though. Its share of merchandise exports was between one-quarter and one-third in the 1990s, but it is now just 4 -5%. As of 1995, sugar cane production accounted for 48% of Fiji's agricultural GDP and, with the processing of cane into sugar, the sector contributed 11% to total GDP; but by 2021 those shares were down to 11% and 1%, respectively (Ministry of Economy 2022). In the 1990s there were more than 20,000 active cane growers, but since 2016 there have been less than 12,000 (although more people are engaged in the sugar value chain at least part-time and would be part of the 30% of the population that were below the national poverty line in 2019).

Meanwhile, the share of raw sugar and molasses in Fiji's merchandise export earnings has fallen from two-fifths in 1995 to 17% in 2012-14 and 5% by 2021, and its share of all goods and services exports was just 2% in 2018 and 2019 before COVID-19 decimated tourism exports (down >90%) in 2020 and 2021. Following the export price slump in 2010, the Sugar Cane Industry Action Plan 2013-2022 was expected to stimulate sugar output and export growth and turn the industry around into a viable and vibrant commercial entity.

Indeed, the volume of sugar exports did recover somewhat in the first half of the 2010s, but it has since been declining again and in 2021 was below the previously lowest level of 2010 (Figure 2).[1]

[insert Figure 2 around here]

The sources of competitive stress have been several, affecting both supply and demand. On the supply side for sugar and for agriculture generally, climate change is causing extreme weather events to become more frequent and more damaging. Sugar technological change and productivity growth are occurring less rapidly in Fiji than elsewhere, as reflected in cane yields per hectare which were 94% of the global average in the 1980s but are barely 60% of them now (FAO 2022). Most farm land devoted to sugar cane in Fiji has been owned by ethnic (iTaukei) Fijian extended families and much was leased, mainly to Indo-Fijians, for thirty-year periods (Lal and Rita 2005). The bulk of those leases have expired in the past decade and many have not been renewed. Indo-Fijians are leaving farms, and ethnic Fijian owners evidently are not taking up sugar farming in their place, as alternative cash crops plus non-farm earning opportunities have steadily attracted resources away from sugar cane growing. Despite the number of cane growers declining, the share of all farms with less than one hectare has grown from 44% in 2009 to 69% in 2020 and the share with more than 5 hectares has shrunk from 18% to 4% (FAO 2010, 2020), suggesting farm consolidation to reap economies of size is regressing.

On the export demand side, growth in global demand outpaced global supply in the 2000s for sugar and numerous other commodities, pushing up international prices before they fell again in 2014. However, Fiji had been fortunate in having preferential access to the high-priced protected markets of European Union (EU) member countries,[2] so most of its exports

[1] Some of the labor and other resources previously employed in the sugar sector have moved to non-agricultural pursuits, as reflected in the more-than-halving since 1995 of agriculture's share of real national GDP, which is now below 7%. The rest have been moved into production of other crops (particularly horticultural and root crops) and livestock (Singh 2020). The major alternative crop commodities (and their 2019 share of agricultural GDP) are kava (28%), cassava (6%) and taro (7%). By contrast, the traditionally important copra and paddy rice industries also have declined. The livestock subsector now contributes around one-tenth of agricultural GDP and is dominated by beef, dairy and poultry production. Fiji is close to self-sufficient in poultry but remains heavily dependent on imports of beef and dairy products. The processing of food products other than sugar has steadily increased too, from contributing 1.4% of GDP in 1995 to 4.2% in 2018 and providing off-farm employment opportunities for some farm household members.

[2] The 1951 Commonwealth Sugar Agreement between the United Kingdom and former British colonies was succeeded in 1973, when the UK joined the EEC (now EU), by the Sugar Protocol that was part of the various Lomé Conventions and then the Cotonou Agreement between the EU and former African, Caribbean and Pacific (ACP) colonies.

were sent to the United Kingdom and a few other EU countries where consumer prices were nearly three times international prices up to the mid-2000s. Thus Fiji's export price for sugar was well above what it would have been if the EU had not provided Fiji with duty-free and quota-free import market access. But the liberalization of the EU's sugar market that began in 2006, and the formal ending of the Cotonou Agreement and its Sugar Protocol on 30 September 2009, caused Fiji's export price to plummet in the late 2000s down to the international price, before rising with them at the start of the 2010s (Figure 1). These policy and price changes have added to the above supply-side factors in contributing to the dramatic decline in the area harvested and production of sugar cane in Fiji over the past 15 years (Figure 3).

[insert Figure 3 around here]

Furthermore, costs of sugar cane production are falling in the rest of the world. In Australia, for example, the average cash cost of producing a tonne of cane in 2014 was equivalent to about F$53, but by 2021 it was about F$45 when converted at official currency exchange rates (ABARES 2015, 2021) – or barely half the supported price paid to Fijian growers in recent years of F$85/tonne. The cane yield in Australia during 2016-20 averaged 89 tonnes per hectare harvested, compared with Fiji's 43 tonnes. Technical efficiency in milling sugar by the FSC also seems to be deteriorating, as the tonnes of cane used to produce one tonne of raw sugar keeps rising in Fiji, unlike in major exporting countries. For example, Fiji's ratio was very close to Australia's in the mid-1970s and again in the mid-1980s at just under 8, but for Fiji it rose to an average of 9.0 in the 1990s, to 10.3 in the first two decades of this century, and to 11.4 in 2020 – while the average in Australia since 2000 has been 7.1 (ABARES 2022), close to the global average in the past decade of just under 7 (FAO 2022).

Fiji and other Pacific Island countries, like all ACP developing countries, have had the opportunity to negotiate a WTO-compatible regional Economic Partnership Agreement (EPA) with the EU. To be WTO compatible, such agreements must be reciprocal, rather than unilateral as was the Cotonou Agreement. Fiji and others have struggled to reach an acceptable agreement because it involved opening its domestic markets to competition from EU imports, so they signed interim agreements in 2009 (available at https://mcttt.gov.fj/wp-icationntent/uploads/2018/10/IEPA-Full-Text.pdf). Fiji delayed ratification of its interim EPA agreement until July 2014, just ahead of parliamentary elections in September 2014. That meant access to EU aid for the reform of Fiji's sugar sector (24 million Euros in 2009 alone) was suspended at the time of the constitutional crisis of April 2009 (following the

military coup d'état of December 2006). Negotiations to convert the interim EPA into a permanent agreement are still on-going.

Meanwhile, Australia signed a free trade agreement (FTA) with the United Kingdom (UK) in 2021 that provides a steady phase-in to duty-free and quota-free access to the UK sugar market by 2030; and Australia is currently negotiating an FTA with the European Union that may soon also provide it with freer access to EU27 sugar markets. Before that, the South African Development Community signed an Economic Partnership Agreement with the EU in 2016 that allows South Africa duty-free access for 100kt of raw sugar exports (and 50kt of refined sugar exports) to the EU each year. Hence not only did the diminishing support provided to Fiji sugar production and exports from past ACP unilateral preferential trading agreements disappear entirely after 2017, but stronger competition from newly preferred suppliers is growing in the UK and EU27. Any new FTA between Fiji and the UK or EU27 would at best only partially offset the negative effect on Fiji of Australia's and South Africa's new preferential trading arrangements with those major sugar-importing countries.

In short, Fiji's sugar sector is at a pivotal moment in the history of policies affecting its international competitiveness. Now is therefore an appropriate time to evaluate the Fijian Government's policy developments that have been and are currently assisting the sector and re-assess its prospects.

3. Fiji's public expenditure on its sugar sector

As mentioned at the outset, the extent of support provided to Fiji sugar production and exports from EU protection and preferential trading agreements has been greatly diminished over the past 15 years (Nolte, Buysse and van Huylenbroeck 2012; Kopp, Prehn and Brümmer 2016). The squeeze on profits of both growers and the Fiji Sugar Corporation (FSC) prompted the Government of Fiji to step in from 2010.[3] It appointed Deloitte to undertake an independent review of FSC's performance and capital structure to help it identify the level of financial support required to keep FSC operating. The key

[3] Since 2011 the FSC has been the sole manufacturer and seller of raw sugar in Fiji. Earlier that monopoly was held by CSR. FSC also sells molasses, a by-product of the sugar milling process. FSC has been one of the largest employers in Fiji, with a workforce of up to 1700 people during the peak (crush) season. It has a monopoly on the milling of cane as well as on the import of sugar (subject to a WTO-bound MFN tariff of 32%) and the export of sugar that was subject to a 3% export tax until 2011 but is now traded freely (WTO 2016). Most of the cane that is processed into raw sugar is exported (85% during 2016-20, mostly to the European Union), while small amounts of raw and refined sugar are imported.

recommendation by Deloitte (2010) was for the Government to take over FSC's debt and to take 100% ownership and control of FSC. FSC was de-listed from the South Pacific Stock Exchange on 24 February 2011, when F$123m was provided by the Government to revive the sugar sector.

As well, to help stem the previous decade's drift of farmers away from growing sugar cane, fertilizer and weedicide subsidies were introduced, and they have gradually increased over the past dozen years: on a per hectare basis in the late 2010s they were more than three times what they were in the early 2010s. Various other forms of support for growing and milling sugar also have been channeled through FSC. They range from funds to maintain cane access roads, support farm mechanization and farmer advisory services, provide small grants to individual cane growers, assist new growers, and subsidize cane cartage. These supports are on top of funds to cover operational expenditure each year of the Ministry of Sugar Industry and to contribute an average of one-quarter of the income of the Sugar Research Institute of Fiji (Figure 4).

[insert Figure 4 around here]

The fiscal cost of all public expenditure on the sugar sector averaged F$79 million per year during 2017/18 to 2021/22 (see Supplementary Table S1 for details). That is equivalent to 3.3% of the Government's expected revenue in 2021/22 (Ministry of Economy 2022). If it all went to growers, it would be equivalent to F$2135 per hectare of cane and F$7850 per active grower (without counting the transfer from sugar consumers – see Section 4 below).

Sugar productivity growth is the goal of investment in sugar R&D. SRIF's annual budget has averaged a little over F$3.1 million over the past dozen years, or around 3% of value added by sugar cane growing and processing. By the standards of developing countries that is a very high rate of investment, with an average of one-quarter being contributed by the government, one-quarter from each of FSC and cane growers, and the remaining one-quarter from the EU and other aid donors. The average public investment for developing countries' farm sectors has been just 0.5% of sectoral value added for decades (Beintema, Nin Pratt and Stads 2020), with another 0.25% from the private sector (Fuglie 2016; Table 3.1 of Fuglie et al. 2020). That is not to say Fiji has an excessive level of investment necessarily, because the marginal rates of return from agricultural R&D investment is extremely high in most developing countries (Rao, Hurley and Pardey (2020), suggesting they are hugely

underinvesting in this source of economic growth; and Fiji's R&D investment in 2019 and 2020 was 20% lower than in the previous five years. Since much of the benefit from its sugar research is captured by sugar producers and little by the rest of the economy, just one-quarter of the SRFI's budget coming from the government is a reasonable share.[4]

After further FSC losses in 2015-17 and then the export price falling further, the Government introduced in 2018 a Sugar Stabilization Fund. Its purpose to date has been to continue to provide a deficiency payment to ensure the price received by growers each year does not fall below F$85 per tonne of cane. The government has also allowed the FSC to set a high wholesale price for raw sugar (FCC 2017, FCCC 2022). With FSC having monopoly control of the raw sugar market including over imports, the wholesale price has been maintained well above what it would have been in a free market – and in January 2022 it was raised even higher, from F$1490 to F$2300 per tonne. That effective tax on domestic consumers helps to finance the deficiency payment to producers, reducing the extent to which the Government would have to draw on revenue from taxpayers.[5]

Thanks to the Sugar Stabilization Fund, the grower price of sugar (ignoring processing and transport costs) has gone from one-third below the export price during the 2000s and one-sixth below in 2010-17 to one-third *above* during 2018-20. Being one-third below the export price is consistent with no producer price support, as that is the ratio used in contracts in the free-market setting in Australia, for example (MSF Sugar 2016, page 3); being one-third *above* the export price, as in 2018-20, implies very considerable assistance to cane growers from taxpayers and/or consumers (see Section 4 below).

With this as background, we turn now to estimate the extent to which producers have been assisted, domestic sugar consumers have been taxed, and tax revenue has been affected by the Sugar Stabilization Fund and other government transfers and sugar market interventions.

[4] Australia spends about 5% of its sugar industry's value added on sugar cane research (SRA 2021), with additional R&D on sugar milling done separately by Australia's not-for-profit Sugar Research Institute (www.sri.org.au). Only one-quarter of Australia's sugar cane research budget (p. 84 of SRA 2021) and none of its milling research budget comes from government. As in Fiji, this is appropriate because the sector is very much export focused and so most of the benefit from that research accrues to producers and little to the rest of the economy (Edwards and Freebairn 1984).

[5] This type of policy is what in Australia was called a home consumption price scheme (Longworth 1966, 1967; Parmenter, Sams and Vincent 1982; Mauldon 2021). In effect it is a disguised form of export subsidy, funded in part by domestic consumers whereby the producer price is a sales-weighted average of the high domestic wholesale price and the lower export price (as depicted in Figure 5 below).

4. Rates of assistance to cane producers and taxation of sugar consumers

4.1 Basic methodology

There are standard ways to estimate the rates of distortion to markets due to government policy interventions. These were pioneered by the Australian Government in the latter 1960s as nominal and effective rates of assistance to agricultural and manufacturing industries and their consumer tax equivalents (IAC 1987). That approach has been used by the World Bank to estimate 50+ years of agricultural producer and consumer rates of assistance or taxation for scores of farm products, including sugar, in 82 countries (Anderson 2009; Anderson et al. 2008). In the mid-1980s the OECD Secretariat developed a similar approach to annual monitoring and evaluation of agricultural policies of its member countries, differing mainly in that rates of assistance or taxation are expressed relative not to what the value of production would be under free markets but rather as a percentage of the producers' assistance-inclusive earnings, which means they have a maximum value of 100% -- and similarly for consumer tax equivalents (OECD 2016, 2022). The OECD calls its indicators producer and consumer support estimates (PSE and CSE). They are closely related to the nominal rate of assistance (NRA) and the consumer tax equivalent rate (CTE) though. Specifically, in what follows we report estimates of both sets of indicators which, when they are expressed in percentages, are:

- NRA = PSE/(100-PSE), and
- CTE = -CSE/(100+CSE).

The OECD has provided annual estimates from 1986 for its member countries and more recently for 13 major emerging economies. Sugar is monitored in 19 of those countries plus the EU-27. The most-recent three years of their estimates are 2018-2020, which are compared with the estimates below for Fiji.

The process of calculating these policy indicators is laid out in the first column of Supplementary Table S2. Data for a few variables are not yet available for the latest years, so assumed values are included by shading them yellow in that table. Rows are numbered with Roman numerals for ease of citing in the formulae reported there.

When there is no consumer price intervention other than a border measure such as an import tariff or export subsidy, the OECD compares the wholesale price of sugar (which includes the cost of processing) with the border price of a 'like' processed product. That generates an NRA (or PSE) that is equal to the CTE (or the negative of the CSE) at the

wholesale point in the value chain. That method needs to be modified slightly to capture the features of Fiji's sugar policies, however, as Fiji's wholesale price of raw sugar has been regulated by the Fiji Competition and Consumer Commission (FCCC) and its predecessors to be above the producer price equivalent, rather than market determined. Hence the available cane grower price has to be first converted to a price that is comparable with fob export price of raw sugar.

4.2 Fiji's sugar market

Fiji's current sugar market is depicted in Figure 5, where DD is the domestic demand curve, SS is what the domestic supply curve would be in the absence of government policies affecting production costs, and SS' is the domestic supply curve in the presence of government policies such as fertilizer subsidies that lower production costs. The horizontal line at the export price, P_e, is the foreign demand curve, P_c is the regulated domestic consumer price, and P_p is the regulated domestic producer price. Thus C is the quantity of raw sugar consumed domestically, Q is the quantity produced, and Q-C is the quantity exported. Not shown is the cane growers' supply curve.

[insert Figure 5 around here]

At those regulated prices, the area abP_eP_c is the transfer from consumers to producers, area cdhg (= area cdP_eP_p minus area abP_eP_c , where area abP_eP_c is identical to area ghP_eP_p) is the transfer from taxpayers for output price support, the area Sjc represents the transfer from taxpayers to producers that lower their marginal costs, and area cdP_eP_p plus area Sjc is the total transfer to producers where area afP_pP_c equals area bfgh and a and g are on a rectangular hyperbola with its origin at P_e.

In addition to setting the regulated domestic price of raw sugar and producer price equivalent of cane above the average border price of raw sugar (so-called market price support, or MPS),[6] there are numerous other forms of assistance provided to the sector by the government, mostly via the FSC. How much of the overall assistance that is passed through to growers from FSC and SPF is not known, but for present purposes it is assumed to be 70%. This share is chosen because the FSC is obliged to redistribute 70% of its net revenue to growers (and has done so since the 1990s, see Sugar Industry Tribunal 2018).[7]

[6] MPS to producers is the component of assistance derived from ensuring the producer price is above the border price. In this case, in aggregate it is area cdP_eP_p and, when expressed in percentage terms, it is $100*(P_p-P_e)/P_e$.
[7] This is a little above what prevails in Australia where the sugar markets are undistorted: in the standard contract there, one-third of the raw sugar export price is retained by the processor and the other two-thirds is paid to the cane grower (MSF Sugar 2016). That ratio is also consistent with the value added to cane sugar by

4.3 NRA and CTE estimates

The results summarized in Table 1 and reported in detail in Supplementary Table S3 suggest the following about the dozen years to 2021:

- The NRA to sugar cane growers is very high, averaging 86% in 2018-21 which is three times that for 2014-17. It amounts to a transfer from consumers and taxpayers of F$10,060 per active grower, or F$3,090 per hectare.
- Only about two-fifths of that 86% NRA is contributed through market price support in those years (36 of the 86 percentage points), the rest coming from various domestic subsidies to producers as listed in Supplementary Table S1.
- Total transfers to producers averaged F$116 million per year, which equates to 10% of agricultural value added and 1% of total GDP in 2018-21. Almost 70% of that involved transfers from taxpayers, the remainder from domestic consumers. The direct taxpayer portion represents 3.7% of budgeted government revenue in 2021/22. If the transfer from consumers to growers is treated as foregone consumer tax revenue, that cost to government consolidated revenue rises to 5.1%.
- The rate of consumer taxation (CTE) is considerably higher than the NRA, at 121% -- and, with the regulated wholesale price of raw sugar being raised by two-thirds in January 2022, the CTE is projected to be 156% in 2022-23.
- For the sugar sector as a whole (including the processing of cane into raw sugar), the NRA averaged 81% under the assumption that only 70% of overall assistance is transferred up the integrated value chain to cane growers.

These numbers for the most-recent four years are all higher than those for the two previous four-year periods, 2010-13 and 2014-17. They were able to be lower earlier in part because the consumers' share of the total support to producers earlier was 47% instead of just 29%, at which time the CTEs were 53% and 96% in 2010-13 and 2014-17, compared with 121% in 2018-21. Those rates over the previous decade are huge compared with the average rates in that decade for the EU, and are projected for 2022-23 to be approaching the rates that prevailed in the EU in the decade prior to the start of its sugar policy reforms in 2006 (Figure 6).

[insert Figure 6 around here]

sugar manufacturers in Australia: during 2018-20, cane's share of the raw sugar value of production averaged 68% (ABARES 2022, ABS 2021).

4.4 Comparisons with other countries

In Figure 7, the average rates producer assistance and consumer taxation in 2017/18 to 2019/20 for Fiji's sugar sector as a whole (including processing) are compared with those estimated for many other countries by the OECD for 2018-20. The sugar sector's NRA and CTE for Fiji are 1.4 times and roughly double the OECD averages, respectively. Only five of those countries have a higher CTE than Fiji (China, Japan, the United States, Ukraine and Indonesia), and only six countries (those same five plus the Philippines) have a higher NRA. Figure 8 reports earlier estimates of at least the nominal rates of protection at the border of several other developing countries. Among those in the earlier years (but not in 2018-20), the extent of producer support is higher than in Fiji for Kenya, Jamaica and Guatemala; but support is zero or negative for Belize and Dominican Republic – the two countries that have been able to expand their cane-growing area over the past decade. Evidently Fiji has been highly protective by international standards for more than a decade in terms of its support for its sugar sector, although that support has been provided by transfers from domestic consumers in addition to that from taxpayers.[8]

[insert Figures 7 and 8 around here]

Since Mauritius was very similar to Fiji in many respects, how has it managed the adjustment to the reform of EU sugar policy? Past similarities are in terms of cost of cane production, the high share of sugar in total exports, dependence on the EU market, and the projected fall in its sugar price due to EU sugar policy reform (LMC International 2016). Also, the decline in Mauritius' sugar area is only slightly greater than Fiji's. But the similarities end there. Mauritius had a slightly lower per capita income than Fiji around 1980 but it is now twice as prosperous as Fiji; and its political and social development also has been far faster than Fiji's (Howes and Surandiran 2021a). This is partly because Mauritius has diversified its economy, more than has Fiji, beyond sugar and tourism and toward a wider range of services (Howes and Surandiran 2021b). More to the point, unlike Fiji, Mauritius has not chosen to provide huge government support for cane growers, nor to tax its sugar

[8] Whether/by how much consumers are transferring support to producers in those other middle-income countries shown in Figure 8 is unknown. Fiji's sugar sector is also likely to be a clear outlier compared with support for Fiji's other farm sectors, although there are no NRA/CTE estimates for other farm sectors within Fiji to compare with those for sugar.

consumers as an alternative way of supporting growers (Peña 2020). Instead its governance has encouraged foreign direct investment, and mobile resources previously employed in its sugar sector have been attracted to more-lucrative employment, improving the efficiency of overall resource allocation in Mauritius and boosting its economic growth and structural transformation.

4.5 Impacts of support on farmers, landowners and the environment

Regardless of whether the current annual deficiency payment and other cane producer support is financed by taxpayers or domestic consumers, the transfer aimed at reducing the sector's decline will need to continue to rise over time if producer competitiveness keeps declining. And while the producer price of sugar cane ($F85/tonne) is not subject to quality adjustments, there is no incentive for cane growers to improve the quality (as distinct from quantity) of cane they deliver.

It also needs to be kept in mind that assisting the production of one farm sector alone is both inefficient and inequitable. This is because assistance to just sugar growers is equivalent to taxing the production of all other farm products that could employ those same land, labour and capital resources. That assistance also reduces the extent of risk-spreading diversification by rural households. Even so, Fiji's farmers evidently have found numerous other crops to be more profitable than sugar cane – despite the assistance currently provided to sugar growing. Singh (2020), for example, finds for the Lomawai area that sugar farmers who have been diversifying their crop mix are reaping profits from those alternative crops that average well over twice those from sugar.

Assisting sugar production with fertilizer and weedicide subsidies is also inefficient and inequitable, because it encourages their use relative to that of other farm inputs, and it benefits most those with the largest farm areas (Jayne and Rashid 2013; Ghins, Mas Aparisi and Balié 2017; Giné et al. 2022). The sole supplier of fertilizers and weedicides to cane growers, South Pacific Fertilizers Ltd, also is likely to retain some of the benefit of subsidized use of those inputs, since that distribution service is regulated so as to be not contestable. Moreover, if those chemical inputs are pollutive of soil, water and air, the optimal intervention would be a tax rather than a subsidy on their use in farming. Apart from improving the environment, such a policy swop would also make it easier for those farmers wishing to avoid chemical inputs to claim to be organic producers.

Assistance to sugar producers is inequitable also because it raises the profitability and hence value of sugar-growing land in direct proportion to the size of each person's holding,

thus benefitting the largest/wealthiest most and the poorest cane growers least (as found in simulations by Rakotoarisoa and Chang 2017, p. 39). Around 80% of land planted to cane in Fiji is leased, and 60% of those growers are aged 55 years or over, with the younger generation showing less interest in cane farming (LMC International 2016). Insofar as lease payments are eventually raised in step with the degree of subsidization of the sector, the benefit of the government's support would be ultimately captured by landowners – and in proportion to the size of their landholding, thus benefitting the wealthiest most (Ciaian et al. 2021).

Even if the price-stabilizing component of the Sugar Stabilization Fund was able to perfectly stabilize sugar prices domestically, that would not stabilize farmer incomes completely because there would still be weather-induced yield fluctuations (which also destabilize FSC and national foreign exchange earnings), and sugar contributes only a part of farmers' net incomes (especially if one includes remittances). More-targeted instruments for dealing with rural income fluctuations are available at much lower social cost, as discussed below in Section 5.

4.6 Impacts on sugar consumers

While there may be a social benefit in terms of human health from setting a high consumer price for raw sugar, the present mechanism is not the optimal way to achieve that social benefit. This is because the revenue from that consumer tax goes to sugar producers rather than into consolidated revenue for more generic uses. As well, many imported processed foods and beverages that contain sugar would escape that tax and so crowd out local manufacturing of sugar-rich products, unless a border tax adjustment was introduced to prevent that (or if instead an excise tax was imposed on all sugar-rich processed foods, both domestic and imported). Even then, a limit on the sugar content of foods might also be required for the intervention to be optimal from a health viewpoint (Thow et al. 2011; Alston and Okrent 2017; Calcott 2022).

5. Sugar sector prospects and ways to re-purpose government support

5.1 Sugar price prospects

According to the agricultural outlook to 2030 provided by OECD-FAO (2021, p. 153), real international sugar prices are expected to resume their long-term decline thanks to productivity growth in major producing countries. Price levels are expected to be below the

average of the past two decades. This projection is consistent with that of the World Bank (2021), which also foresees a slight decline in real sugar prices through to 2035.

One contributor to those price projections has to do with ethanol demand: it was boosted in the first two decades of this century by subsidies and mandates to expand its use as an alternative fuel, especially in the US and EU, but that source of demand is fading thanks to rapid technological advances in producing fuel from other renewable sources such as wind and sun, and to concerns that such subsidies and mandates have been pushing up the price of food globally (de Gorter et al. 2013; Le Page 2022).

Competition in the UK and EU27 sugar markets will remain intense from local producers and from those gaining new preferential access to those market, including Australia and South Africa. Since the EU sugar policy reforms began in 2006, its sugar production adjusted initially to the stepwise lowering of prices and the eventual removal from 2017 of EU production quotas which allowed beet growing to re-locate to the regions within the EU that are better suited to it (Sections 3.1 and 5.4 of EC 2022).

Sugar consumption globally is being adversely affected by more widespread dissemination of health warnings and, in numerous countries, the taxing of consumption of sugar-based foods and beverages (Calì, Nolte and Cantore 2013; Lane, Glassman and Smitham 2021; Lane and Bhardwaj 2021; Calcott 2022). Some analysts project that its use will decline in a manner similar to tobacco's, as health lobbies sharpen their focus on the product.

These sober prospects, plus the attributes of Fiji's current sugar policy regime noted at the end of the previous section, raise the question of whether there are better ways to encourage more-sustainable and more-inclusive economic growth in Fiji than transferring funds from taxpayers and consumers to cane growers.

5.2 Re-purposing farmer supports

Re-purposing farmer supports has been shown to be feasible in many settings, and is becoming more of a focus of policy makers and their advisors in both high-income and developing countries and in major international organizations (FAO, UNDP and UNEP 2021; World Bank and IFPRI 2022; IMF, OECD, World Bank and WTO 2022). While one size does not fit all countries, the most common proposals involve transforming those production-expanding transfers currently going to producers, as a private good coupled to production, into decoupled payments that can contribute more to public goods or the community more broadly.

As reported above, over the four years to 2021 there was an annual average transfer of F$116 million to sugar producers, equivalent to 5.1% of Fiji's expected government revenue. How might that government revenue be better spent within and beyond the sugar sector portfolio to improve the welfare of Fijians? Possibilities include the following.

First, integrating the Sugar Research Institute of Fiji into an all-encompassing Crop and Livestock (or Farming Systems) Research Institute involving both biological and social sciences may well boost the welfare of all (not just cane) farmers and landowners and also of consumers insofar as the farm productivity growth that it stimulates lowers prices for net buyers of foods that are not traded internationally.

Second, the expenditure on cane access roads and cane cartage and FSC trucks could instead be used to generally improve rural transport infrastructure, thereby reducing transport/logistics costs in rural areas, the benefits are shared between all farmers – whose net returns rise and costs of commuting to part-time off-farm jobs fall – and consumers (whose retail food prices fall). Such broadening of transport infrastructure investments would reduce inequality, partly because it would increase the opportunities for subsistence farmers to sell their outputs and labor to a broader range of markets (Gollin and Rogerson 2014).

Third, subsidies to fertilizer and weedicides just for cane growers are inefficient and inequitable on multiple grounds. Within the sugar sector they are inefficient in that they encourage the use of those purchased inputs relative to other inputs (Warr 1977); and they are inequitable in that the larger the grower, the bigger the benefit. If there is suboptimal use of those yield-improving inputs in Fiji due, for example, to lack of farmer knowledge of their economic benefits, investing more in extension efforts to disseminate such information more widely would be far cheaper than subsidizing those chemical inputs. And if the use of these chemicals is pollutive, the optimal policy is not a subsidy but rather a tax on those chemicals, thereby adding to rather than drawing on government revenue.

Fourth, more-targeted instruments for dealing with rural income fluctuations are available at much lower social cost (IAC 1978; Byerlee, Jayne and Myers 2006). Credit markets and private markets for index-based weather insurance are more likely to be developed in the absence of a sugar price stabilization scheme. Both price risk and yield/ha risk could be offset somewhat by allowing farm income tax averaging over several years or, for reaching the poorest households, countercyclical social safety nets/trampolines (Alderman and Haque 2006).

Fifth, with some of the current expenditure freed up, more could be spent on building human capital in the poorer rural households. Specifically, greater investment in basic

education and health in rural areas, and in vocational training for the less-skilled, would help sugar growers and other farm families to become better farm managers or laborers and, for those wishing to migrate to non-farm areas and occupations, to make the transition easier and more lucrative in the long run. Such investments could be financed to facilitate adjustment by retaining the current high consumer price of sugar for, say, five years and using the gap between it and the producer price to provide grants or loans to cane growers to assist their adjustment.

Finally, insofar as there are social benefits in terms of human health from maintaining a high consumer price for sugar, a lowering of sugar sector supports need not involve reducing the current wholesale sugar price, but could instead maintain it indefinitely via an excise tax (revenue from which would go into consolidated revenue), plus a comparable tariff on the most sugar-rich of imported processed foods and beverages so they don't unfairly crowd out local manufacturing of such products. Alternatively, that excise tax could be imposed on all sugar-rich processed foods, both domestic and imported.

An example of a phased reform package involving adjustment assistance is the following:

- Announce that subsidies to the industry are to be replaced by a direct payment from government, that would reduce each year from 2023 to 2027, and go (a) to cane growers based on their production in 2019-21 and (b) to owners of leased cane-growing land based on their average earnings from that land in 2019-21; and
- The cost of those direct payments is financed by replacing the FSC's monopoly on raw sugar production and imports with an excise tax on domestic raw and refined sugar sales (plus an equivalent tax on imported sugar-rich processed food and beverages).

Basing the producer direct payments on past production would ensure those incentives are completely decoupled from current production; and basing part of the financing of those payments on an excise tax on consumers need not raise the cost to consumers if it is set no higher than the recent consumer tax equivalent. Table 2 illustrates the costs of this direct payment system (in F$ million) based on the estimated levels of support provided to producers during 2018-21 from taxpayers (F$81m/year) and consumers (F$35m/year), as reported earlier. Its cost net of the excise collected from sugar consumers would fall from the recent (2018-21) level of $81million in 2022 to zero by 2026, and thereafter it would provide new revenue of F$35 million per year from the excise tax. Hence

the net fiscal gain from the reform would rise from F$21 million in 2023 to F$116 million per year from 2027.

6. Conclusion

Moving away from coupled support to a sector, however inefficient and inequitable it has been, will always be politically difficult, and more so the longer that support has been in place to entrench its value in the sector's most immobile assets. Should that supported sector's share of the economy shrink, as has been the case for Fiji sugar, the political opposition to supporting it may decline initially as the economic cost of that support becomes more affordable (Hillman 1982). But if the international competitiveness of that sector is destined to continue to decline despite that support, again as seems to be the case for Fiji sugar, the day will come when the political cost of withdrawing that support is less than the political support received from the rest of the community from doing so (Cassing and Hillman 1986). That day can be brought forward if a roadmap for reform is clearly designed to include compensation to the potential losers, and if the reform package is announced in advance of its implementation. Sugar policies have been amongst the most difficult sectoral support policies to reform, but substantial progress was made around the world in the closing years of the 20th century (Larson and Borrell 2001) and far more since then, most notably in the EU (EC 2022). How soon that day may arrive in Fiji only time will tell.

References

ABARES (2015), *Australian Sugarcane Farm Businesses: Financial Performance, 2013-14,* Research Report 15.14, Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences, December.

ABARES (2021), *Financial Performance of Sugarcane Farms, 2020-21 to 2021-22,* Research Report 21.19, Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences, December.

ABARES (2022), *Australian Commodities,* Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences, March Quarter.

ABS (2021), *Australian Industries,* Catalogue No. 81550DO003, 28 May.

ADB (2005), *Fiji Islands Alternative Livelihoods Development Project: Report and Recommendation of the President*, RRP FIJ 32541, Manila: Asian Development Bank, March.

ADB (2009), *Fiji Islands: Alternative Livelihoods Development Project: Completion Report*, Project Number: 32541, Manila: Asian Development Bank, June.

Alderman, H. and T. Haque (2006), "Countercyclical Safety Nets for the Poor and Vulnerable", *Food Policy* 31(4): 372-83, August.

Alston, J.M. and A.M. Okrent (2017), *The Effects of Farm and Food Policy on Obesity in the United States*, New York: Palgrave Macmillan.

Anderson, K. (ed.) (2009), *Distortions to Agricultural Incentives: A Global Perspective, 1955-2007*, London: Palgrave Macmillan and Washington DC: World Bank.

Anderson, K., M. Kurzweil, W. Martin, D. Sandri and E. Valenzuela (2008), "Measuring Distortions to Agricultural Incentives, Revisited", *World Trade Review* 7(4): 675–704, October.

Beintema, N., A. Nin Pratt, and G.-J. Stads (2020), *Key Trends in Global Agricultural Research Investment*, ASTI Update, Washington DC: IFPRI, September.

Byerlee, D., T.S. Jayne and R.J. Myers (2006), "Managing Food Price Risks and Instability in a Liberalizing Market Environment: Overview and Policy Options", *Food Policy* 31(4): 275-87.

Calcott, P. (2022), "Regulating Ingredients in Sin Goods", *American Journal of Agricultural Economics* 104(3): 1120-39, May.

Calì, M., S. Nolte and N. Cantore (2013), "Sweet and Sour Changes in Trade Regimes", *The World Economy* 36(6): 786–806, June.

Cassing, J.H. and A.L. Hillman (1986), "Shifting Comparative Advantage and Senescent Industry Collapse", *American Economic Review* 76: 516-23.

Ciaian, P., E. Baldoni, D.A. Kancs, and D. Drabik (2021), "The Capitalization of Agricultural Subsidies into Land Prices", *Annual Review of Resource Economics* 13: 14.1–14.22.

de Gorter, H., D. Drabik, D.R. Just and E.M. Kliauga (2013), "The Impact of OECD Biofuels Policies on Developing Countries", *Agricultural Economics* 44(4): 477–86.

Deloitte (2010), *Restructuring Fiji Sugar: Report to the Fiji Government Sugar Taskforce on Restructuring the Fiji Sugar Corporation's Debt and Reforming the Fiji Sugar Industry*, Suva: Deloitte, August.

EC (2022), *Study on the Adaptation Strategies of the Sugar Supply Chain After the End of the Sugar Quotas*, AGRI/2020/OP/0001. Luxembourg: Publications Office of the European Union.

Edwards, G.W. and J.W. Freebairn (1984), "The Gains from Research into Tradable Commodities", *American Journal of Agricultural Economics* 66(1): 41-49, February.

EU (2010), *National Adaptation Strategy for the Fiji Sugar Industry*, Draft Report by a consultant to the European Union, Brussels, 18 September.

FAO (2010), *2009 Fiji Agricultural Census*, Rome: FAO and Suva: Parliamentary Paper.

FAO (2020), *2020 Fiji Agricultural Census*, Rome: FAO and Suva: Parliamentary Paper.

FAO (2022), FAOSTAT, Rome: FAO, https://www.fao.org/faostat/en, accessed 21 March.

FAO, UNDP and UNEP (2021), *A Multi-Billion-Dollar Opportunity: Repurposing Agricultural Support to Transform Food Systems*, Rome: FAO.

FCC (2017), "Final Authorization on Price for the FSC", Fiji Commerce Commission, Suva, 3 July.

FCCC (2022), "Price Review for FSC's 'Sugars of Fiji'", media release, Fiji Competition and Consumer Commission, Suva, 19 January.

FSC (2021 and earlier), *Annual Report 2020*, Suva: Fiji Sugar Corporation.

Fuglie, K. (2016), "The Growing Role of the Private Sector in Agricultural Research and Development World-wide", *Global Food Security* 10: 29–38.

Fuglie, K., M. Gautam, A. Goyal and W.F. Maloney (2020), *Harvesting Prosperity: Technology and Productivity Growth in Agriculture*, Washington DC: World Bank.

Ghins, L., A. Mas Aparisi and J. Balié (2017), "Myths and Realities About Input Subsidies in Sub-Saharan Africa", *Development Policy Review* 5(S2): 0214-0233, October.

Giné, X., S. Patel, B. Ribeiro and I. Valley (2022), "Efficiency and Equity of Input Subsidies: Experimental Evidence from Tanzania", *American Journal of Agricultural Economics* 24 March, early view, https://doi.org/10.1111/ajae.12314

Gollin, D. and R. Rogerson (2014), "Productivity, Transport Costs, and Subsistence Agriculture", *Journal of Development Economics* 107: 38-48.

Hillman, A.L. (1982), "Declining Industries and Political-support Protectionist Motives", *American Economic Review* 72(5): 1180-87.

Howes, S. and S. Surandiran (2021a), "Mauritius has just become a high-income country; Fiji is less than halfway there", DEVPOLICYBLOG, Australian National University, Canberra, 29 April. https://devpolicy.org/mauritius-has-just-become-a-high-income-country-fiji-is-less-than-halfway-there-20210429-2/

Howes, S. and S. Surandiran (2021b), "Why has Mauritius left Fiji so far behind?", DEVPOLICYBLOG, Australian National University, Canberra, 5 May. https://devpolicy.org/why-has-mauritius-left-fiji-so-far-behind-20210505

IAC (1978), *Rural Income Fluctuations*, Report No. 161, Canberra: Industries Assistance Commission (now called Productivity Commission).

IAC (1987), *Assistance to Agricultural and Manufacturing Industries*, Canberra: Industries Assistance Commission (now called Productivity Commission). Updated March 1995.

IMF, OECD, World Bank and WTO (2022), *Subsidies, Trade and International Cooperation*, Washington DC: International Monetary Fund, April.

Jayne, T.S. and S. Rashid (2013), "Input Subsidy Programs in Sub-Saharan Africa: a Synthesis of Recent Evidence", *Agricultural Economics* 44(6): 547-62, November.

Kopp, T., S. Prehn and B. Brümmer (2016), "Preference Erosion - The Case of Everything But Arms and Sugar", *The World Economy* 39(9): 1339-59, September.

Lal, P. and R. Rita (2005), "Potential Impacts of EU Sugar Reform on the Fiji Sugar Industry", *Pacific Economic Bulletin* 20(3): 18-42.

Lane, C., A. Glassman and E. Smitham (2021), "Using Health Taxes to Support Revenue: An Action Agenda for the IMF and World Bank", CGD Policy Paper 203, Washington DC: Center for Global Development, March.

Lane, C. and V. Bhardwaj (2021), "Meeting the Global Health Challenge to Reduce Death and Disability from Alcohol, Tobacco, and Sugar-Sweetened Beverage Consumption with Corrective Taxes", CGD Policy Paper 240, Washington DC: Center for Global Development, November.

Larson, D.F. and B. Borrell (2001), "Sugar Policy and Reform", Policy Research Working Paper 2602, World Bank, Washington DC, May.

Le Page, M. (2022), "Cutting Biofuels Can Help Avoid Global Food Shock from Ukraine War", *New Scientist*, 22 March.

LMC International (2005), *An Assessment of the Financial Assistance Required by the Fiji Sugar Industry in Light of the EC's Reform Proposals*, report to European Commission, December.

LMC International (2016), *Study on Current and Forecast Market Developments for ACP Sugar Suppliers to the EU Market: Final Report*, Specific Contract 2015/370301, Brussels: European Commission, June.

Longworth, J.W. (1966), "The Australian Wheat Industry Stabilization Scheme: An Analytical Model", *Economic Record* 42(98): 244-55.

Longworth, J.W. (1967), "The Stabilization and Distribution Effects of the Australian Wheat Industry Stabilization Scheme", *Australian Journal of Agricultural Economics* 11(1): 20–35.

Mahadevan, R. (2009), "The Withdrawal of EU Sugar Preferences and the Bittersweet Reform Pill for Fiji", *Pacific Economic Bulletin* 24(2): 82-94, July.

Mauldon, R.G. (2021), "Early Analytical Agricultural Economics in Australia", *Australian Economic History Review* 61(1): 45-63, March.

Ministry of Economy (2022), *Revised Budget Estimates 2021-2022, as Approved by Parliament,* Suva: Ministry of Economy, 24 March.

Ministry of Sugar Industry (2021), *Annual Report 2018-19,* Parliamentary Paper No. 35 of 2021, Suva.

MSF Sugar (2016), *Cane Pricing Guide,* Gordonvale Qld: MSF Sugar. https://www.msfsugar.com.au/sugar-marketing/

Nolte, S., J. Buysse and G. van Huylenbroeck (2012), "Modelling the Effects of an Abolition of the EU Sugar Quota on Internal Prices, Production and Imports", *European Review of Agricultural Economics* 39(1): 75–94.

OECD (2016), *OECD'S Producer Support Estimate and Related Indicators of Agricultural Support: Concepts, Calculations, Interpretation and Use (The PSE Manual),* Paris: OECD, March.

OECD (2022), *Producer and Consumer Support Estimates*. Online database accessed at www.oecd.org/agriculture/topics/agricultural-policy-monitoring-and-evaluation/.

OECD-FAO (2021), *OECD-FAO Agricultural Outlook 2021-2030*, Paris: OECD, July.

Parmenter, B.R., D. Sams and D.P. Vincent (1981), "Who Pays for Home Consumption Pricing Schemes?" *Economic Record* 57: 168–78.

Peña, H. (2020), "Agricultural Policy Review of Mauritius: The Case of Sugar", mimeo, World Bank.

Rakotoarisoa, M.A. and K. Chang (2017), "The Sugar Sub-sector in Africa-Caribbean-Pacific (ACP) Countries in the Post-2017 Era: Impacts of European Union Production Quota Elimination and ACP-EU Reciprocal Preferential Access on ACP Sugar Market and Trade", Rome: FAO.

Rao, X., T.M. Hurley, and P.G. Pardey (2020), "Recalibrating the Reported Returns to Agricultural R&D: What if We All Heeded Griliches?" *Australian Journal of Agricultural and Resource Economics* 64: 977–1001.

Singh, A. (2020), "Benefits of Crop Diversification in Fiji's Sugarcane Farming", *Asia and the Pacific Policy Studies* 7(1): 65-80, January.

SRA (2021), Annual Report 2020-21, Indooroopilly, Qld: Sugar Research Australia.

SRIF (2021 and earlier), *Annual Report,* Parliamentary Paper No. 50 of 2021 (and earlier years), Drasa: Sugar Research Institute of Fiji.

Stoler, A. (2005), "Fiji: Preparing for the End of Preferences?", Ch. 13 (pp. 189-200) in *Managing the Challenges of WTO Participation: 45 Case Studies,* edited by P. Gallagher, P. Low and A. Stoler, Cambridge and New York: Cambridge University Press.

Sugar Industry Tribunal (2018), *Annual Report 2015,* Lautoka, Fiji: Sugar Industry Tribunal.

Thow, A.M., C. Quested, L. Juventin, R. Kun, A.N. Khan and B. Swinburn (2011), "Taxing Soft Drinks in the Pacific: Implementation Lessons for Improving Health", *Health Promotion International* 26(1): 55–64.

Warr, P.G. (1977), "Tariff Compensation via Input Subsidies", *Economic Record* 53 (144): 508–16.

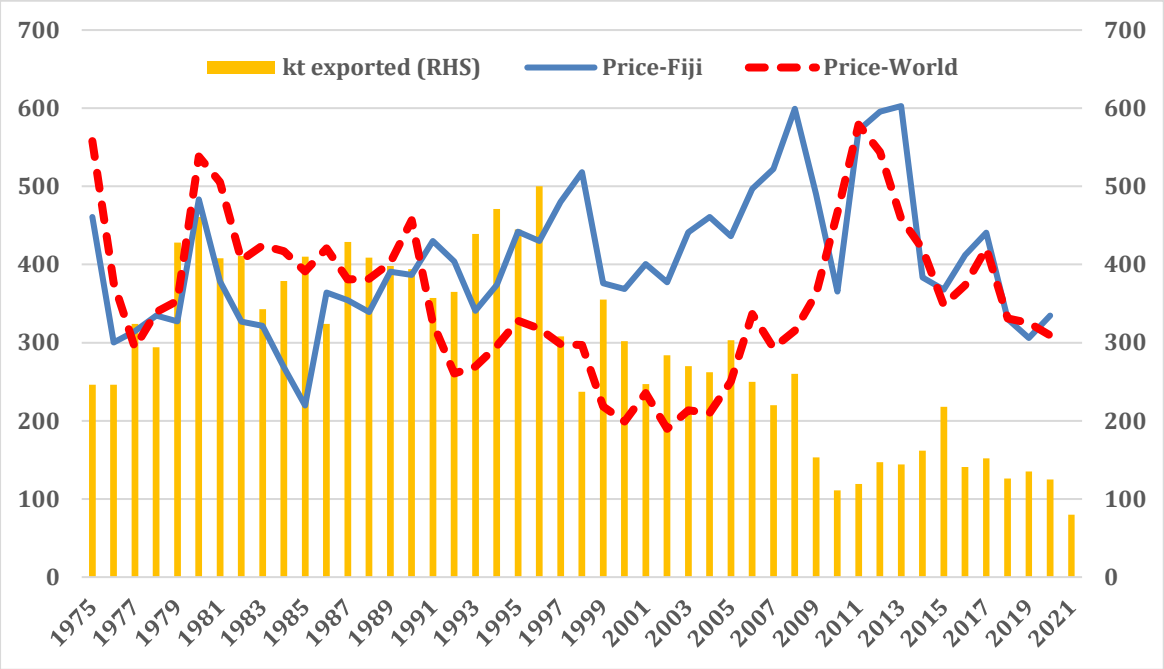
World Bank (2021), *Commodity Markets Outlook,* Washington DC: World Bank, October.

World Bank (2022), *World Development Indicators,* accessed 21 March.

World Bank and IFPRI (2022), *Repurposing Agricultural Policies and Support: Options to Transform Agriculture and Food Systems to Better Serve the Health of People, Economies, and the Planet,* Report No: AUS0002236, Washington DC, January.

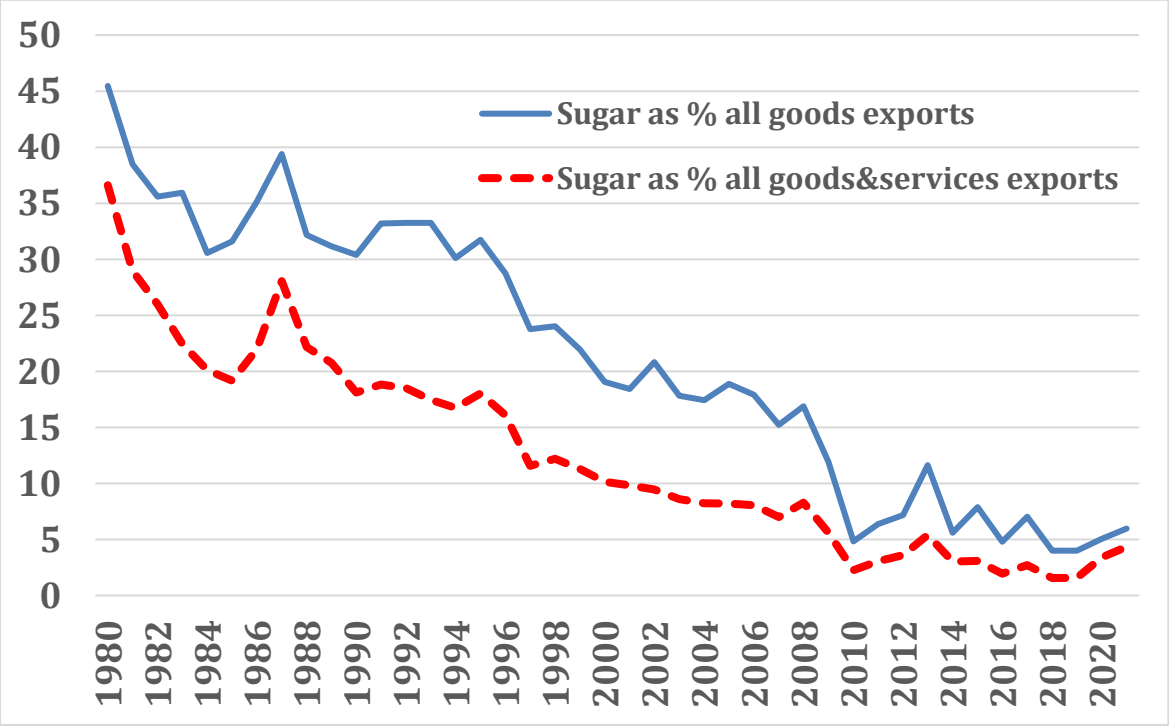
WTO (2016), *Trade Policy Review: Report by the Secretariat,* WT/TPR/S/330, Geneva: World Trade Organization, 19 January.

Figure 1: Export price of raw sugar, Fiji and the world, and volume of Fijian exports, 1975 to 2021 (nominal US$/tonne and KT)



Sources: Compiled from FAO (2022) and (from 1999) Fiji Bureau of Statistics data.

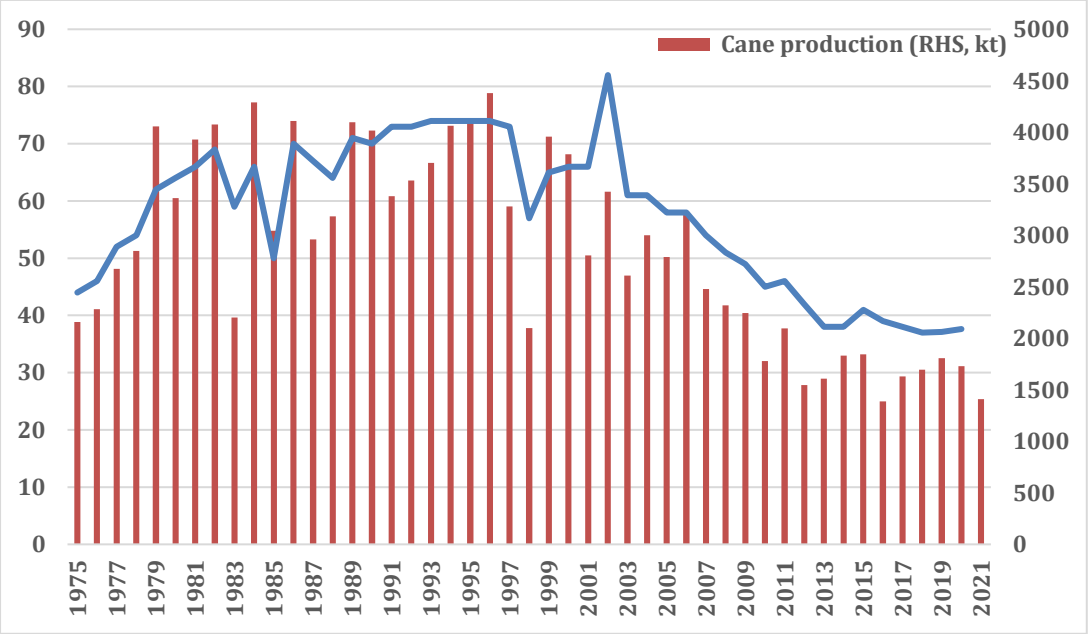
Figure 2: Share of sugar in Fiji's merchandise exports and in total exports of all goods and services, 1980 to 2021 (%)



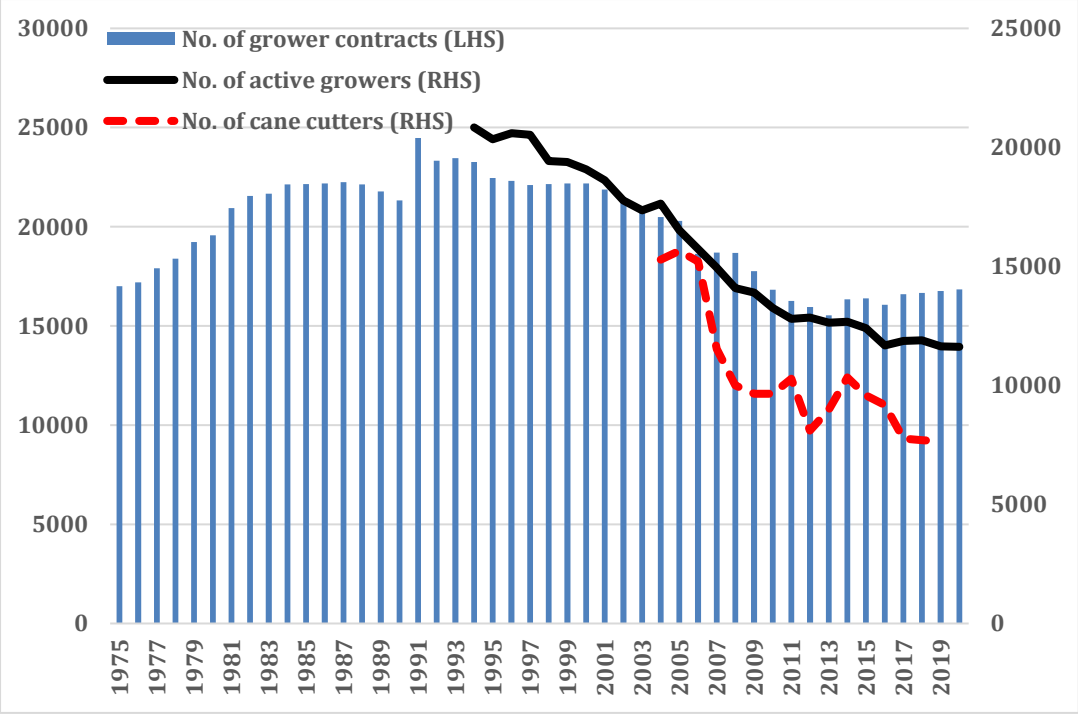
Source: Compiled from World Bank (2022) and Fiji Bureau of Statistics data

Figure 3: Area harvested, production of sugar cane, and numbers of growers and cutters, Fiji, 1975 to 2021

(a) Area harvested and production of sugar cane ('000 ha and kt)

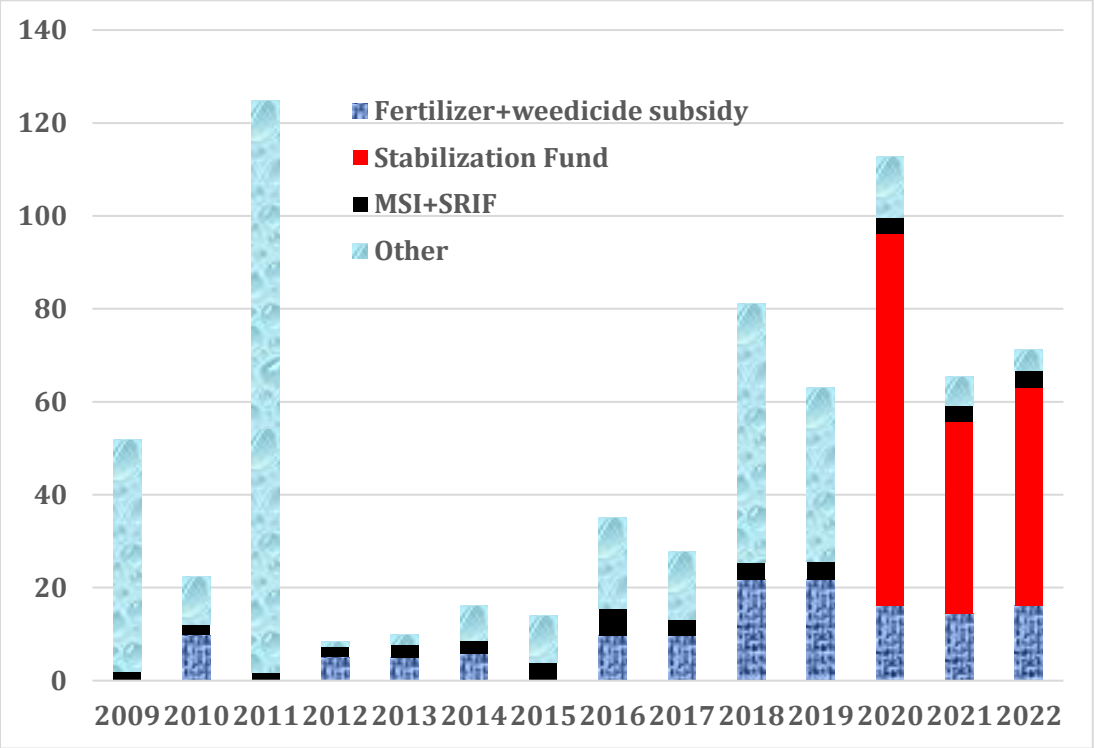


(b) Numbers of grower contracts, active growers, and cane cutters



Source: Compiled from Fiji Bureau of Statistics and FSC data.

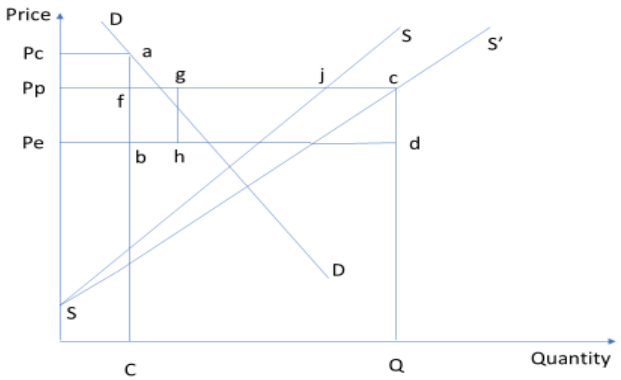
Figure 4: Public expenditure on the sugar sector, Fiji, 2009 to 2021/22[a] (F$ million)



[a] Fiscal years ending 31 July from 2017, calendar years prior to that. Actual expenditures except for 2021/22 which is budgeted. SRIF budget transfer in 2020/21 and 2021/22 assumed to be F$0.7m.

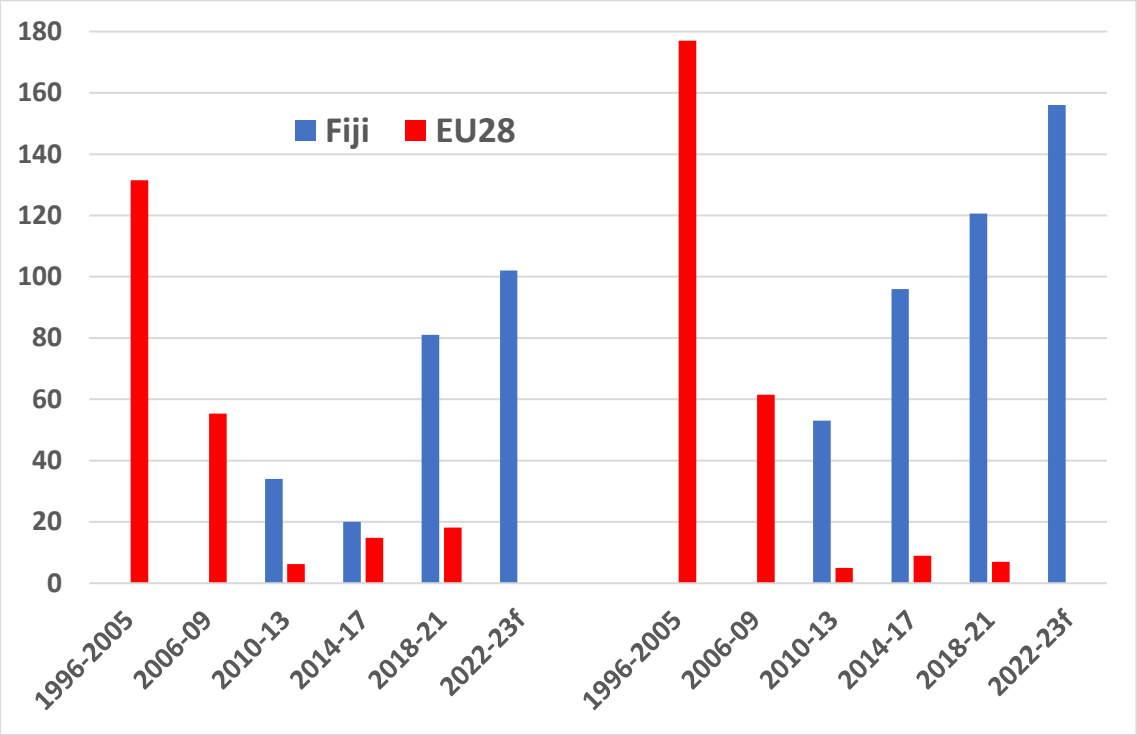
Source: Compiled from FSC (2021 and earlier), Ministry of Sugar Industry (2021 and earlier), SRIF (2021 and earlier) and Ministry of Economy (2022).

Figure 5: The market for sugar in Fiji



Source: Author's depiction.

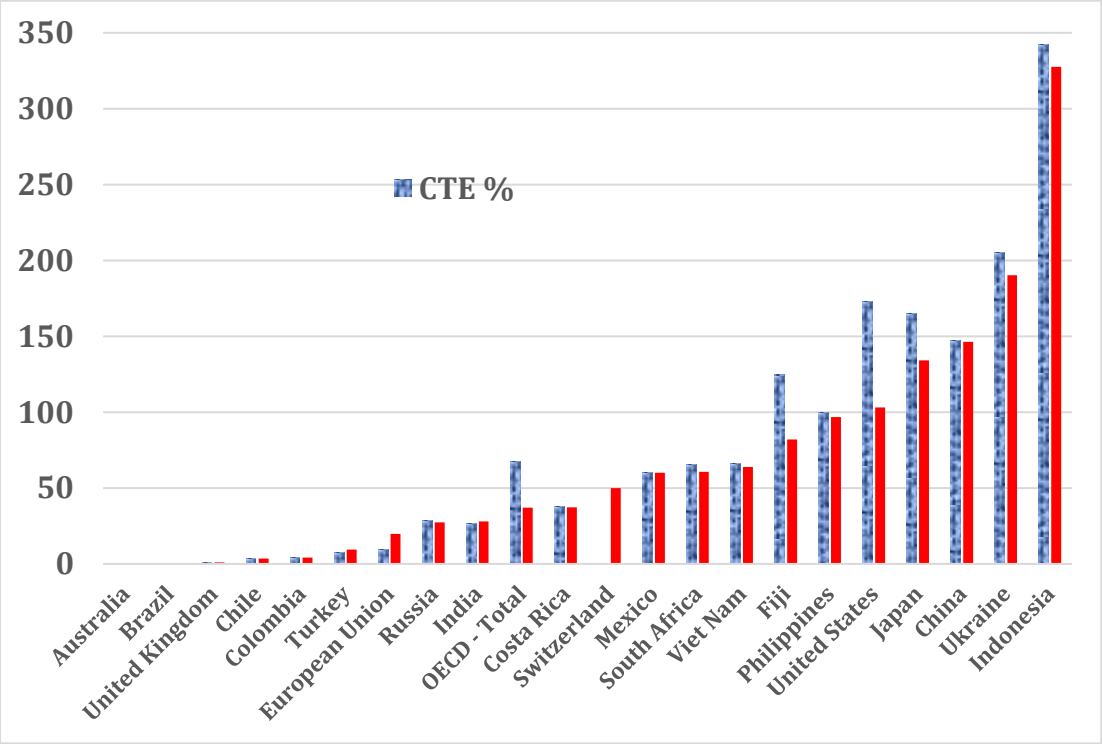
Figure 6: Nominal rates of assistance and consumer tax equivalents of sugar policies, Fiji from 2010 to 2021 and forecast to 2023, and EU28 from 1996 to 2021 (%)



NRA (%) **CTE (%)**

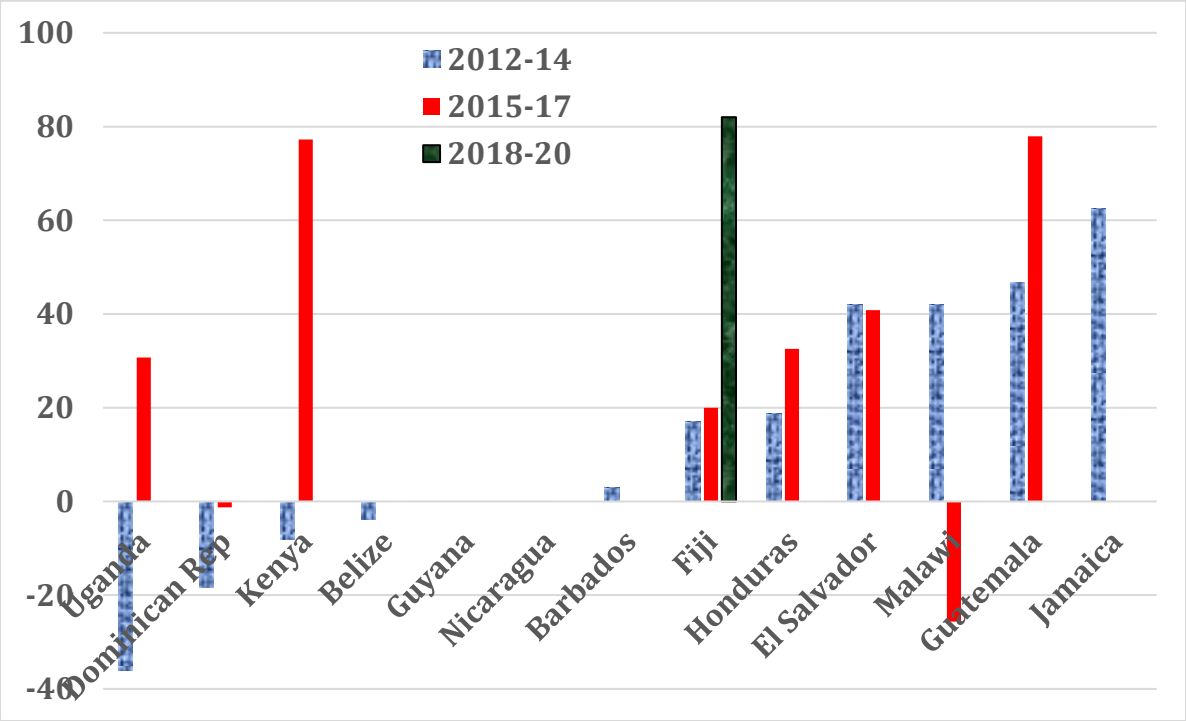
Source: Compiled from PSE and CSE estimates in OECD (2022) plus (for Fiji) Supplementary Table S3.

Figure 7: Nominal rates of assistance and consumer tax equivalents of sugar policies, Fiji and other countries, 2018-20 (%)



Source: Compiled from PSE and CSE estimates in OECD (2022) plus (for Fiji) Supplementary Table 2.

Figure 8: Nominal rates of protection of sugar, Fiji and other middle-income countries, 2012-21[a] (%)



[a] Belize and Nicaragua are zero in 2012-14, as is Nicaragua in 2015-17. Estimates for Belize, Barbados, Guyana and Jamaica are unavailable for 2015-17. Only Fiji is available for 2018-20.

Source: www.ag-incentives.org (accessed 12 April 2022).

Table 1: Sugar NRAs, PSEs and CTEs, Fiji, 2010 to 2023 (%)

	2010-13	**2014-17**	**2018-21**	**2022-23[a]**
NRA for cane growers (%)	40	28	86	102
PSE for cane growers (%	28	22	44	
NRA for total sugar sector (%)	34	20	81	59
PSE for total sugar sector (%)	23	16	43	
CTE (%)	53	96	121	156
Share of support from taxpayers (%)	47	47	69	59
Transfer per grower per year (F$)	5008	4103	10061	11471
Transfer to grower per ha. per year (F$)	1468	1285	3092	3472

[a] Forecast
Source and notes: See Supplementary Table S3.

Table 2: Fiscal costs of Fiji's sugar producer support in 2022 and potential savings from a gradual switch to a direct payment system decoupled from current sugar production, 2023 to 2027 (in F$ million)

	2022	2023	2024	2025	2026	2027+
Excise tax on consumers, paid to producers	35	35	35	35	35	0
Other direct payment to producers from govt	81	60	40	20	0	0
Total direct payments to producers	116	95	75	55	35	0
Govt revenue savings relative to 2018-21	**0**	**21**	**41**	**61**	**81**	**116**

Source: Author's computations drawing from Supplementary

Table S2.**Supplementary material: for online availability**

Table S1: Public expenditure on Fiji's sugar sector, actual, 2017/18 to 2021/22 (F$)

(a) Sugar Research Institute of Fiji (SRIF) and Ministry of Sugar Industry public expenditures

	2017/18	**2018/19**	**2019/20**	**2020/21**	**2021/22**
Stabilization Fund			80,000,000	41,158,619	46,984,334
Fertilizer subsidy	15,354,000	15,354,000	15,620,136	14,420,136	15,577,136
Weedicide subsidy	6,318,000	6,318,000	500,000	96,090	500,000
SRIF	594,000	713,000	699,000	700,000?	700,000?
Ministry of Sugar	3,170,000	3,201,000	2,773,000	2,814,000	2,911,000

(b) Other subsidies to lower producer costs/raise net incomes, 2017/18

Cane Cartage (Penang to Rarawai)- FSC	4,230,733
Support to FSC	8,000,000
Sugarcane Development & Farmers Assistance - FSC	22,031,729
Cane Access Roads -FSC	7,254,248
Grant to SPC - Farm Advisory	15,000
Grant to SPC - Rarai Project	100,000
New Farmers Assistance - FSC	1,000,000
Sugarcane Farm Mechanisation -FSC	1,890,000
Top-up payment 2017 cane crop	10,277,644
Sugar Individual Small Grants Scheme	1,015,000
Total	**55,814,354**

(c) Other subsidies, 2018/19

Tractor- Mounted Harvester - FSC	500,000
Cane Cartage (Penang to Rarawai)-FSC	5,659,930
Sugarcane Development & Farmers Assistance - FSC	18,534,295
Cane Access Roads -FSC	10,654,165

Sugarcane Farm Mechanisation- FSC	1,215,000
Sugar Individual Small Grants Scheme	1,000,000
Total	**37,563,390**

Table S1 (continued): Budgetary support to Fijian sugar sector, 2018 to 2020 (F$)

(d) Other subsidies 2019/20

Purchase of Trucks FSC	5,940,000
Cane Cartage (Penang to Rarawai)-FSC	4,000,000
Sugarcane Development & Farmers Assistance - FSC	500,000
Cane Access Roads -FSC	2,000,000
New Farmers Assistance - FSC	277,911
Sugarcane Farm Mechanisation - FSC	250,000
Sugar Individual Small Grants Scheme	2,000
Grant Sugarcane Growers Fund	300,731
Total	**13,270,642**

(e) Other subsidies 2020/21

Cane Cartage (Penang to Rarawai)-FSC	3,000,000
Disaster Rehabilitation Fund	1,153,910
Sugarcane Development and Farmers Assistance - FSC	1,200,000
Cane Access Roads - FSC	1,000,000
Total	**6,353,910**

(f) Other subsidies 2021/22

Cane Cartage (Penang to Rarawai) - FSC	3,768,823
New Farmers Assistance - FSC	250,000
Sugarcane Development and Farmers Assistance - FSC	500,000

Cane Access Roads - FSC	2,000,000
Total	**4,518,823**

Source: Ministry of Sugar Industry (2021), SRIF (2021 and earlier), and Ministry of Economy (2022).

Table S2: Estimates of PSE/NRA, CSE/CTE and dollar transfers from consumers and taxpayers to producers, Fiji, 2017/18 to 2021/22 (fiscal years ending 31 July, in nominal Fijian dollars)

	2017/18	2018/19	2019/20	2020/21	2021/22f
I. Level of production of sugar cane (kt)	1,697	1,807	1,729	1,410	1,700
II. Level of production of raw sugar from that cane (kt)	160	169	152	134	157
III. Tonnes of cane per tonne of raw sugar (I/II)	10.6	10.7	11.4	10.5	10.8
IV. Grower price of sugar cane ($/t)	85	85	85	85	85
V. Grower price in raw sugar equiv. (IV*III, $/t)	901	910	968	892	918
VI. Level of raw sugar consumption (3-yr average of Q+NM, kt)#	42	41	47	43	43
VII. Wholesale price of raw sugar ($/t)##	1,490	1,490	1,490	1,490	1,900
VIII. Value of domestic consumption (VI*VII, $ 000)	62333	61197	69332	64070	81700
IX. Border price of raw sugar (FOB minus 4.3% transport etc cost, $/t)	657	652	683	712	800
	144245	153561	146965	119850	144500
TRANSFER FROM CONSUMERS TO PRODUCERS:					
X. Transfers from consumers to producers (VI*(VII-IX), $ 000)	34,862	34,402	37,556	33,445	47,300
PUBLIC EXPENDITURE TRANSFERS TO PRODUCERS:					
XI. Contribution to output price support/Stabilization Fund###	18278		80000	41159	46984
XII. Fertilizer price support to producers ($ 000)	15354	15354	15620	14420	15577
XIII. Weedicide price support to producers ($ 000)	6318	6318	500	96	500
XIV. Sugar Research Institute (net of producer contribution, $ 000)	594	713	699	700	700
XV. Ministry of Sugar Industry ($ 000)	3170	3201	2773	2814	2911
XVI. Other domestic support to producers ($ 000)	37537	37563	13271	6354	4519
XVII. TOTAL budget transfers to producers ($ 000)	81250	63149	112863	65543	71191
XVIII. Transfer to producers other than output price support (XVII-XI, FS	62973	63149	32863	24384	24207
POLICY INDICATORS:	80	64	102	83	82
XIX. PSE for producers (X+XVII, $ 000)	116113	97551	150419	98988	118491
XX. PSE for cane growers (70*(XIX/(XVIII+(IV*I)), %)####	39	32	59	48	49
XXI. NRA for cane growers (100*XX/(100-XX), %)####	65	46	141	92	97
XXII. PSE for total sugar sector (100*XIX/(XVIII+(VII*II)), %)	39	31	58	44	37
XXIII. NRA for total sugar sector (100*XXII/(100-XXII), %)	63	45	138	79	58
XXIV. Share of PSE from taxpayers (100*XVII/XIX, %)	70	65	75	66	60
XXV. Cane MPS from consumers & taxpayers (100*(V-IX)/IX, %)####	37	39	42	25	15
XXVI. CSE (-100*X/VIII, %)	-56	-56	-54	-52	-58
XXVII. CTE (-100*X/(100+X), %)	127	128	118	109	138
XXVIII. Number of active cane growers	11412	11638	11500	11500	11500
XXIX. Number of hectares harvested ('000)	37	37	38	38	38
XXX. Transfer per grower (1000*XXIII/XXVIII, $)	10175	8382	13080	8608	10304
XXXI. Transfer to grower per ha. (XXIII/XXIX, $)	3138	2629	3995	2605	3118
# Q+NM = raw sugar production plus imports net of exports and re-exports.					
## Wholesale sugar price was raised to $2300 for the second half of fiscal year 2021/22 (FCCC 2022).					
### Included in 2017/18 a top-up payment of F$10.3 million for 2017 cane crop.					
#### Assuming arbitrarily that 70% of all producer support is passed to cane growers.					

Note: Yellow-shaded numbers are the author's assumed values.
Source: Compiled from Government of Fiji data including that detailed in Supplementary Table S1.

Table S3: Estimates of PSE/NRA, CSE/CTE and dollar transfers from consumers and taxpayers to producers, Fiji, 2010-13, 2014-17 and 2017/18 to 2021/22 (fiscal years ending 31 July from 2018; in nominal Fijian dollars)

	2010-13	2014-17	2018-21
I. Level of production of sugar cane (kt)	1758	1674	1661
II. Level of production of raw sugar from that cane (kt)	158	192	154
III. Tonnes of cane per tonne of raw sugar (I/II)	11	9	11
IV. Grower price of sugar cane ($/t)	63	82	85
V. Grower price in raw sugar equiv. (IV*III, $/t)	691	722	918
VI. Level of raw sugar consumption (3-yr average of Q+NM, kt)#	48	35	43
VII. Wholesale price of raw sugar ($/t)##	1405	1515	1490
VIII. Value of domestic consumption (VI*VII, $ 000)	67982	53524	64233
IX. Border price of raw sugar (FOB minus 4.3% transport etc cost, $/t)	933	782	676
TRANSFER FROM CONSUMERS TO PRODUCERS:			
X. Transfers from consumers to producers (VI*(VII-IX), $ 000)	23050	26600	35066
PUBLIC EXPENDITURE TRANSFERS TO PRODUCERS:			
XI. Contribution to output price support/Stabilization Fund###	0	0	34859
XII. Fertilizer price support to producers ($ 000)	4950	6299	15187
XIII. Weedicide price support to producers ($ 000)	0	0	3308
XIV. Sugar Research Institute (net of producer contribution, $ 000)	549	873	677
XV. Ministry of Sugar Industry ($ 000)	1785	3109	2990
XVI. Other domestic support to producers ($ 000)	34050	12987	23681
XVII. TOTAL budget transfers to producers ($ 000)	41334	23268	80701
XVIII. Transfer to producers other than output price support (XVII-XI, F$ 000	41334	23268	45842
POLICY INDICATORS:			
XIX. PSE for producers (X+XVII, $ 000)	64384	49868	115768
XX. PSE for cane growers (70*(XIX/(XVIII+(IV*I)), %)####	28	22	44
XXI. NRA for cane growers (100*XX/(100-XX), %)####	40	28	86
XXII. PSE for total sugar sector (100*XIX/(XVIII+(VII*II)), %)	23	16	43
XXIII. NRA for total sugar sector (100*XXII/(100-XXII), %)	34	20	81
XXIV. Share of PSE from taxpayers (100*XVII/XIX, %)	47	47	69
XXV. Cane MPS from consumers & taxpayers (100*(V-IX)/IX, %)####	-23	-7	36
XXVI. CSE (-100*X/VIII, %)	-34	-48	-55
XXVII. CTE (-100*X/(100+X), %)	53	96	121
XXVIII. Number of active cane growers	12881	12158	11513
XXIX. Number of hectares harvested ('000)	43	39	37
XXX. Transfer per grower (1000*XXIII/XXVIII, $)	5008	4103	10061
XXXI. Transfer to grower per ha. (XXIII/XXIX, $)	1468	1285	3092
# Q+NM = raw sugar production plus imports net of exports and re-exports.			
## Wholesale sugar price was raised to $2300 for the second half of fiscal year 2021/22 (FCCC 2022).			
### Included in 2017/18 a top-up payment of F$10.3 million for 2017 cane crop.			
#### Assuming arbitrarily that 70% of all producer support is passed to cane growers.			

Sources: Author's compilation from Government of Fiji data including from the Ministry of Sugar Industry (2021), SRIF (2021 and earlier), Ministry of Economy (2022) and Fiji Bureau of Statistics to extend back in time the estimates in Supplementary Table S2.