PCC Issues Paper
No. 04, Series of 2020

ISSUES PAPER

Issues Paper on the Sugar Industry in the Philippines

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PHILIPPINE COMPETITION COMMISSION

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Published by:

Philippine Competition Commission
25/F Vertis North Corporate Center 1
North Avenue, Quezon City 1105

* This project was sub-contracted by the All-Asian Centre for Enterprise Development (ASCEND) Inc. to Dr. Briones

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I. INTRODUCTION

A. The sugar industry value chain

The sugar industry involves a value chain from farming to processing and distribution, covering a range of products and marketing outlets (**Figure 1**). In the Philippines, sugar is mostly produced from sugarcane grown by planters. The sugarcane is harvested and transported to processing plants or mills. Processing of the cane results in several outputs:

- *Raw sugar* consists of sucrose crystals covered by a fine film of cane molasses. It is obtained from partially purified cane juice by centrifugation and crystallization. To qualify as raw sugar, the content of sucrose by weight, in a dry state, must correspond to a polarimeter reading of less than 99.5 degrees (PNS-BAFPS 81-2010).
- The syrup separated from raw sugar is called *molasses*. It contains sugar as well as other compounds from the cane juice.
- *Muscovado sugar* is a non-centrifugal sugar which is obtained from evaporating fresh cane juice until the desired consistency has been obtained (PNS–BAFS 144-2015). It is crystallized sugar with molasses intact, resulting in a product that is dark and moist.
- *Refined or white sugar* is raw sugar that has undergone further purification and crystallization, achieving polarity not less than 99.5 degrees at mill grade (PNS-BAFPS 82-2010).
- *Bagasse* is obtained as a by-product of cane crushing. It is typically burned for fuel by the sugar mill. Another potential source of energy is the fermentation of cane juice or molasses into ethanol.

Box 1: The ethanol industry in the Philippines

A total of 14 ethanol refineries are operating in the country. Only two (Green Future Innovations in Isabela and San Carlos Bioenergy in San Carlos City, Negros Occidental) use sugarcane as feedstock; the remainder use molasses. Sugarcane mills compete with ethanol refineries in only two areas of the country; in the rest of the country, ethanol refineries bid for molasses held by mills, planters, and traders. The mandatory blend of ethanol for gasoline is 10 percent; previously, imports were the dominant source of ethanol. Since 2012, domestic capacity has grown; by 2019 only about half of the ethanol requirement of the country was imported.

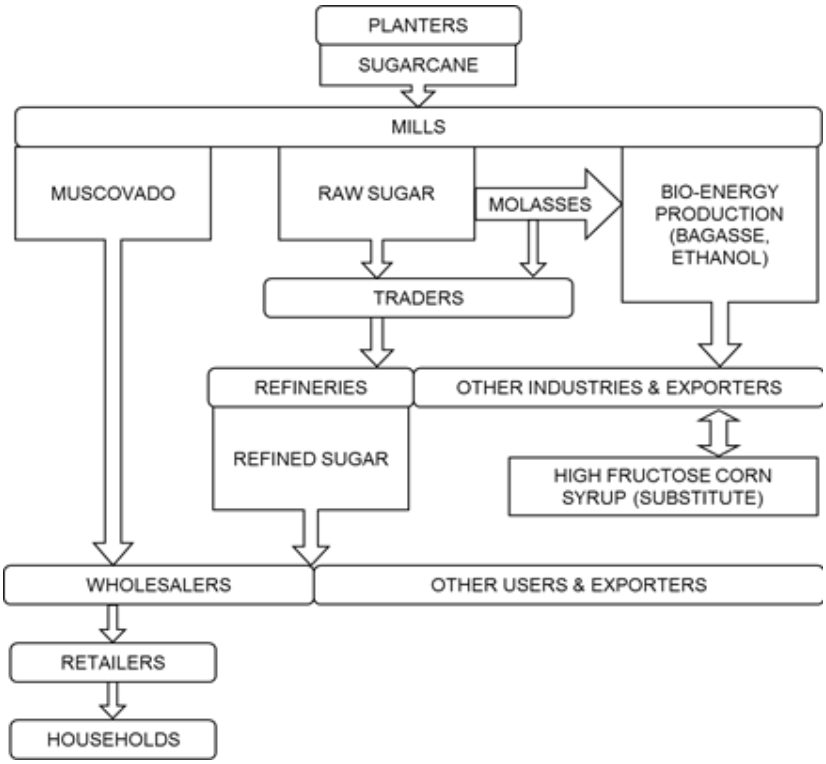
Sources: Ang (2019); Corpuz, P. (2019)

- *Ethanol* results from the fermentation of sugars, either in the cane juice or in molasses. The distillation process can be aimed at producing either potable ethanol (for the beverage industry), or non-potable ethanol, as biofuel, or for household or industrial use (**see Box 1**).

Sugarcane is one of the country's major crops. At present, there are 27 sugar mills and 8 sugar refineries, majority of which are in the Visayas, which accounts for approximately 73% of sugar production. Mindanao and Luzon account for about 17% and 10% of production respectively.

Almost all of the sugar production in the Philippines is locally consumed; the rest is exported, mostly to the United States. Households account for only

Figure 1. Schematic of the sugar industry



32% of domestic consumption and about 18% is purchased by institutional users (i.e., restaurants, bakeries, hospitals), while half of domestic production can be attributed to industrial users, namely food and beverage manufacturers (Ang, 2019; Philippine Statistics Authority, 2018).

B. Potential sources of deviation from a competitive market

There are two major features of the industry which raise potential competition concerns, namely: (1) the presence of scale economies in processing and perhaps elsewhere in the value chain, and (2) the restrictive quedan system and excessive licensing and permit requirements. Each of these features is discussed below.

Economies of scale

As of March 2020, there are only 27 mills throughout the country; in most regions, only one or two mills are in operation to serve all of the planters therein. The reason for the low number of mills is the large fixed investment outlay, in the order of Php 2 billion or more for a new factory) which requires a large production scale in order to remain economical. Moreover, planters may face limited choices in terms of processors, as high transport and transaction costs may prevent planters from finding alternatives. This creates a likely situation in which mills can become dominant in their respective localities, raising the possibility of abuse of their dominant position. If, on the other hand, there are a few mills in a mill cluster, the clustered mills may enter into anti-competitive agreements.

For instance, in February 2019, the PCC blocked the attempt of Universal Robina Corporation (URC), which owns a mill in Balayan, Batangas, from acquiring a nearby mill in Nasugbu, owned by Central Azucarera Don Pedro Inc. (CADPI). The merger would have caused a merger-to-monopoly in the market and would have therefore posed an increased risk of a substantial lessening of competition. The assessment of the merger adopted a *theory of harm* should the planters shift from a market with two competing players, to a market of one player, in terms of the following potential actions of the sole player (PCC, 2019), namely: unilateral decrease in planter's share; unilateral decrease in sugar recovery rates; and unilateral decrease in incentives for planters.

Pervasive government intervention

The second major feature is the pervasiveness of government intervention, which has historically arisen from the need to arbitrate between the interests of the planters and the millers. At present, the Sugar Regulatory Administration (SRA) is mandated (under Executive Order No. 18, s. 1986) to regulate the sugar industry.

Quedan system. Unique among the agricultural products of the country, warehoused raw sugar is issued a mandatory warehouse receipt called a *quedan*, under SRA regulation. Quedans are classified by the SRA to limit the movement and trade of sugar, as follows:

- Classification A: for export to the United States of America (USA);
- Classification B: for sale in the domestic market;
- Classification C: for storage;
- Classification D: for export to countries other than the USA; and
- Classification E: for use in food products for export.

Only raw sugar with quedan B may be legally sold within the country; only raw sugar with quedan A may be cleared for export to the United States; only raw sugar with quedan D may be cleared for export to the world market (aside from the USA); and raw sugar with quedan C may not be sold at all. The quedan system thereby creates legal barriers to entry into each segment. The aforementioned classification scheme also applies to imported sugar and a sugar substitute, namely high fructose corn syrup (HFCS), which the SRA has prevented from freely competing with domestically produced sucrose. The SRA also requires a storage certificate for molasses (but no segmentation unlike for sugar).

Licenses and permits. The SRA imposes licensing requirements for traders and processors of raw sugar, molasses, refined sugar, and ethanol. The movement of raw or refined sugar across islands requires a shipping permit. These regulations may impose entry barriers into the business of trading and processing of these products, as well as from one island market to another island market.

The SRA also requires a Clearance for Release of Imported Sugar and Allocation. In the case of imported sugar for use in the domestic market, clearances are issued according to an SRA Import Program authorized by a Sugar Order.[1] The Order specifies the type of sugar to be imported, import ceiling, and how the imports are to be allocated. The import clearance system raises two concerns related to competition:

- Domestic producers are shielded from competition with foreign producers of sugar; traders of domestic sugar are shielded from competition from traders of imported sugar.
- The qualification criteria for obtaining an import allocation limits access to the import quota to a select group of traders and food and beverage industry (FBI) manufacturers. These players who gain access acquire a cost advantage denied to

1 Sugar may be imported duty-free as imported D sugar, but only for use in food export, whether in raw or refined form, by an accredited food exporter with a customs-bonded warehouse (CBD).

their competitors who are unable to gain access to the import quota.

C. Structural screening exercise

Structure-conduct-performance framework

The pervasiveness of government regulation and large economies of scale warrant a closer examination for potential competition issues in the sugar industry. To organize an evidence-based evaluation of the current state of the sugar industry, the study used the Structure-Conduct-Performance (SCP) framework.

SCP is a market-based measure that focuses on the relationship between the structure of the market, the behavior of the firms that participate in that market, and the extent of their influence on the market itself. Typically, studying the market structure focuses on establishing how concentrated or distributed the shares of the market are. On the other hand, determining the conduct of the participating firms focuses on how competitive or collusive they tend to be. These factors then serve as the basis for determining the economic performance of the industry (Devine et al, 1985). Application of the SCP framework to the sugar industry is summarized in **Table 1**.

Sources of information and analytical method

For the green cells in **Table 1**, the following measures were used in the analysis:

- 4F concentration ratio and Herfindahl index (Processing): data on production by mill (SRA)
- Nominal Protection Rate (NPR): annual wholesale price (SRA) and border price (Trademap)
- Domestic-world market integration: monthly wholesale price and border price
- Price-cost margin: Annual Survey of Philippine Business and Industry (ASPBI), Philippine Statistics Authority (PSA)

Meanwhile for the yellow and blue cells, respondents for the study are located in mill districts of Cagayan, Isabela, Tarlac, and Pampanga (Regions II and III). These areas were selected in order to present a situational contrast between the markets of Northern and Southern Luzon.

The mill districts in Region II are spread out over two provinces, ranging from Sto. Niño, Cagayan in the north, to the relatively southern Isabela, which is around 60 kilometers away. The production in the region is typically brought to either Cagayan Robina Sugar Milling Company (CARSUMCO) or Green Future Innovation, Inc. (GFII), a bioethanol factory in Isabela that is operated by the Lorenzo group. The planter's associations are as follows:

- Association of Itawes Cagayan Sugar Planters Inc. (AICSUPLA)
- Northern Farmers Cooperative (NORFARCO)
- Northern Philippines (NORPHIL)
- United Sugar Planters Cooperative Inc. (USPACI)

All four planters' associations participated in one Focus Group Discussion (FGD).

Table 1. Application of SCP Framework to Sugar Industry Issues Paper

		Cane	Sugar	
STRUCTURE	Concentration	Land concentration	4F concentration ratio Herfindahl index	4F concentration ratio
	Differentiation	Cane variety Production, post-harvest practice	Uniform	Branding
	Entry barrier	Land restrictions Economies of scale	Economies of scale Access to credit, technology	Economies of scale Access to credit, technology
CONDUCT	Pricing practice	Statutory share in raw sugar price	Sugar content test Agreement with trader	Cost build-up
	Business service practice		Brix test feedback (planters)	
PERFORMANCE	Price efficiency		Nominal Protection Rate (NPR) Domestic-world price integration	
	Profitability		Price-cost margin	

Use desk review, KII/FGD (qualitative)

Use quantitative analysis based on secondary data

Use KII with structured questionnaire

In Region III, the mill districts used to be located in Pampanga and Tarlac. However, given the closure of Sweet Crystal Integrated Sugar Mill (SCISM) earlier this year, Central Azucarera de Tarlac (CAT) is the only remaining mill in the region. In Tarlac, the mill district covers the areas surrounding CAT and sugarcane farms further north, in municipality of Paniqui (around 40 kilometers from the mill site). The planters' associations are as follows:

- Central Azucarera de Tarlac Planters Association (CATPA)
- North Cluster Planters Association Tarlac (NCPAT)
- Association of Sugar Planters of Central Luzon, Inc. (ASUCAL)

The NCPAT and ASUCAL participated in separate FGDs.

Within each FGD, planters were asked to provide stakeholder opinions about competition-related economic conditions, with respect to transactions with the mill and traders (both of raw sugar and molasses). The elicitation of stakeholder opinions is widely used in competition assessment; for instance, the Australia Competition and Consumer Commission (ACCC) utilized a stakeholder survey in its inquiry into digital platforms in 2018 and in its assessment of its own effectiveness in 2019.

II. DESCRIPTION OF THE INDUSTRY AND RELEVANT POLICIES

A. Industry profile

Global trends

From 2017 to 2018, global production of sugar amounted to 185 million metric tons. In the same year, global consumption was 174 million metric tons, with 77% attributable to developing countries. Over the past 10 years, global consumption has followed an upward trend, expanding by around 1.8% yearly. This trend has been attributed to a number of factors, namely, population growth, rising incomes, and shifting dietary patterns. (International Sugar Organization, 2018).

Among the countries that utilize sugarcane, Brazil has the highest volume of production, followed by India, China, and Thailand (**Figure 2**). The Philippines is the 11th top producer of sugarcane worldwide at 29 million tons.

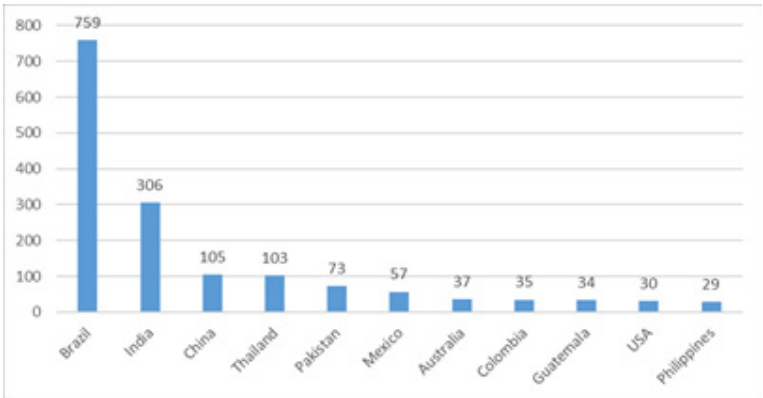
Total sugar exports worldwide in 2018 reached 56 million tons, about 30 percent of global production. The biggest exporter by far (accounting for more than half of global exports) is Brazil, with Thailand a distant second (**Figure 3**). Importation is more evenly spread (**Figure 4**): the world's biggest importer in 2018 was Indonesia, followed by the USA and China. The list of top importers is rounded out by various countries from Africa, Middle East, Asia, and Europe.

The imposition by the Philippines of trade barriers and other distortions is by no means unique. The world market for sugar is subject to numerous trade-related distortions owing to policies implemented by the big sugar trading countries. The USA and the European Union (EU) implement a tariff rate quota scheme by which preferential tariffs are given up to a quota, beyond which high duties are charged on additional imports. These economies are also providing considerable production subsidies, though the EU has been reforming its agricultural policy since 2013. India implements a domestic price support scheme and export subsidy. Thailand offers a price guarantee for sugar sold domestically up to a quota; the remainder can be exported in unlimited quantities to the world market. This serves as an indirect export subsidy since sugar planters in Thailand are incentivized to ensure sufficient harvest to reach the domestic quota, while unplanned above-quota harvests can be dumped into the world market.

Production trends in the Philippines

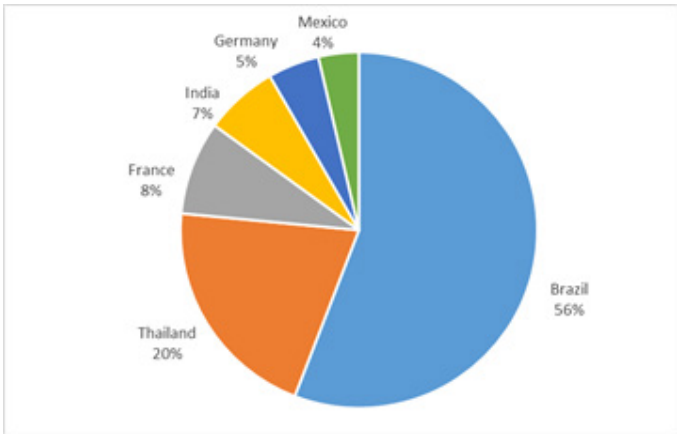
Value of output measured in terms of gross value added (GVA) is shown in **Figure 5**, together with share of sugarcane GVA in the overall GVA of agriculture, fishery and forestry. From a low base in 1998 of Php 9.8 billion (fixed 2000 prices), sugarcane GVA has risen to Php 15.7 billion in 2018. The industry peak was reached in 2017 (Php 18.8 billion), with a local peak as well in 2011 (Php 18.2 billion).

Figure 2: Production of sugarcane, million tons, 2017



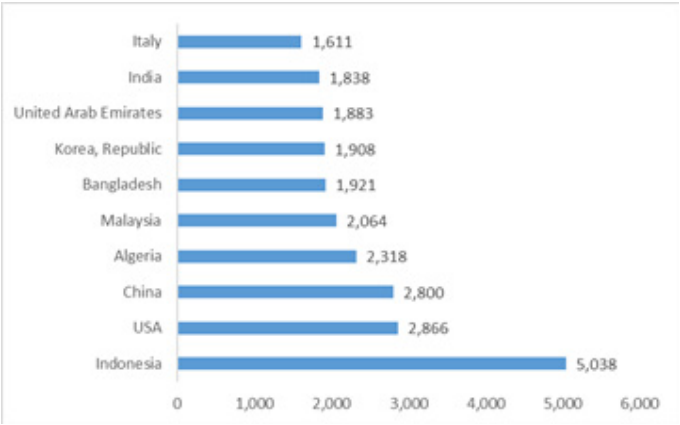
Source: FAOStat (2019).

Figure 3: Shares in world exports, top six exporters, 2018



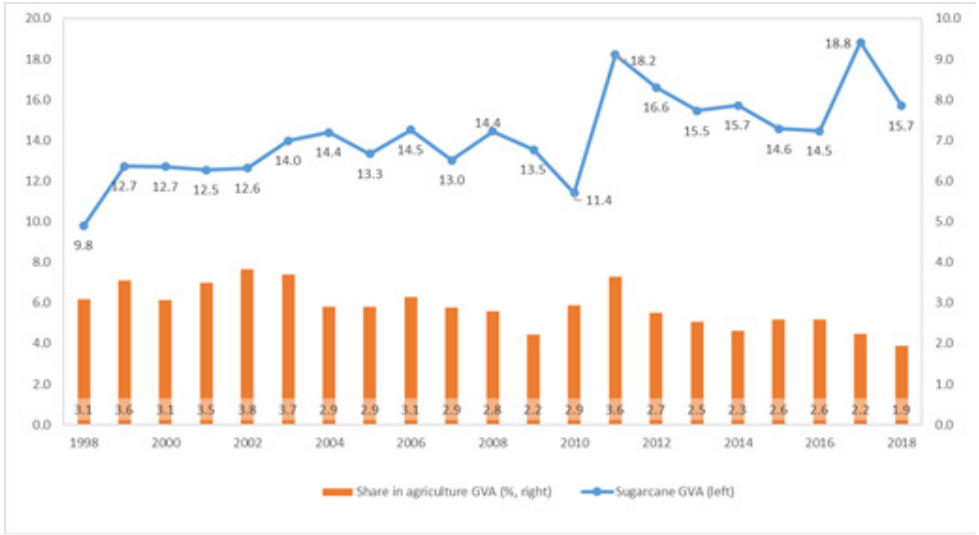
Source: Trademap.

Figure 4: Sugar imports of top ten sugar importing countries, 2018 ('000 tons)



Source: Trademap.

Figure 5. GVA of sugarcane, 1998 – 2018, Php billions (2000 prices)



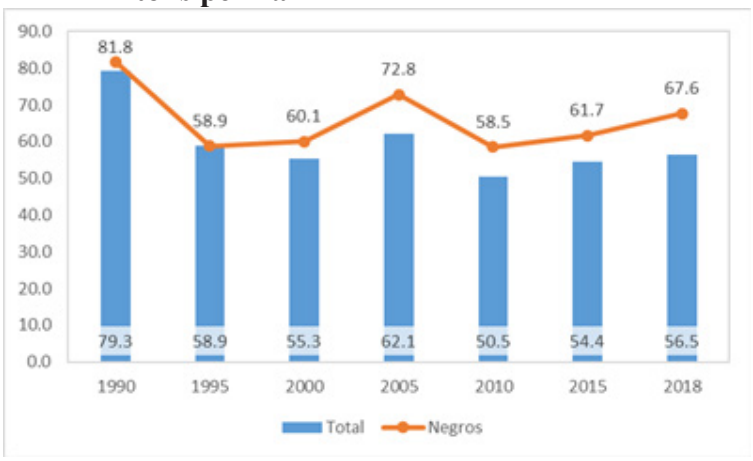
Source: PSA.

Table 2. Production of sugarcane, Philippines, 1990 – 2018, million tons

	1990	1995	2000	2005	2010	2015	2018	Growth (%)
Negros Occidental	9.92	9.16	10.16	11.49	8.70	11.74	12.85	1.5
Bukidnon	1.23	1.36	1.93	2.87	2.55	3.07	3.07	5.2
Negros Oriental	0.85	1.27	1.61	1.67	1.21	1.70	2.18	5.4
Batangas	1.26	1.51	1.81	1.74	1.63	1.65	1.56	1.2
Iloilo	0.83	0.74	0.77	0.88	0.64	1.18	1.36	2.8
Other provinces	4.59	3.73	4.94	4.26	3.20	3.60	3.71	-1.2
Philippines	**18.67**	**17.77**	**21.22**	**22.91**	**17.93**	**22.93**	**24.73**	**1.6**

Source: PSA.

Figure 6. Yield of sugarcane, Philippines, 1990-2018, tons per ha

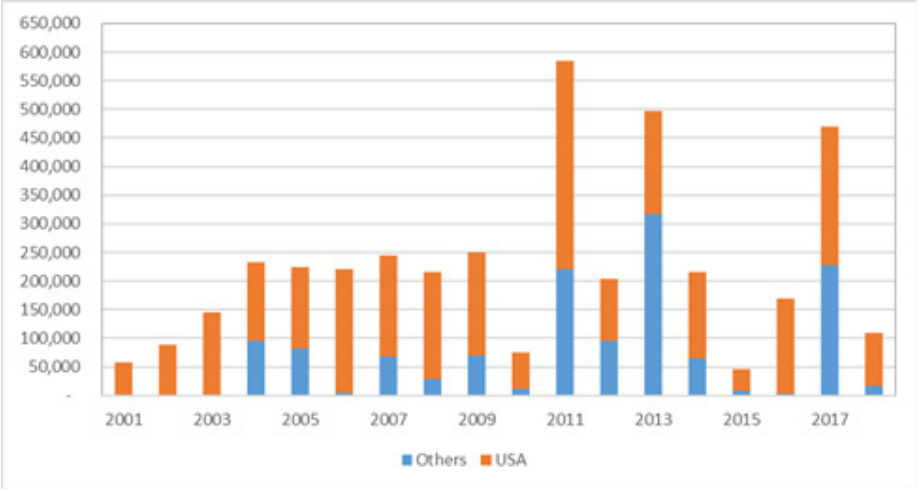


Source: PSA.

Figure 7: Sugar imports, 2001 – 2018, tons

Source: Trademap.

Figure 8. Sugar exports, Philippines, 2001-2018, tons



Source: Trademap.

Note that over the twenty-year period, the growth of the sugarcane industry has fallen behind the growth in the rest of agriculture, hence its shrinking share in agricultural GDP, which had fallen to 1.9 percent by 2018, from a peak of 3.6 percent in 1999.

Over time, sugarcane output in the entire country has been growing (**Table 2**), from 18.7 million tons in 1990, up to 24.7 million tons in 2018 (corresponding to a 1.5 percent annual growth). There are also some dips, such as in the years 1999 and 2010 (due to El Niño episodes).

Also shown in **Table 2** are the sugarcane outputs of the top five producing provinces and the rest of the Philippines. In the top five provinces, production has been increasing, with the fastest growth in Bukidnon and Negros Oriental; however, production outside the top provinces has actually been declining.

Yield has been falling as well, nationwide and in the top growing province of Negros (**Figure 6**). Yield fell steeply from 79 tons per ha. nationwide in 1990 to just 59 tons per ha. by 1995. Likewise, yield fell in Negros to a similar extent. Since then, yield has been stagnant, with a few years of moderate recovery followed by declines. Given the rising production of sugarcane for most of the country, the fall in yield must be due to the disproportionate expansion in area harvested.

Import and export trends

Import trends are shown in **Figure 7**. Imports are usually held under 100,000 tons, though breaching this level occasionally – the latest in 2018 where imports reached an all-time high, exceeding 400,000 tons.

As a ratio to total production (in percentage), imports are usually kept below 5 percent, but the ratio can breach 10 percent during import surges. In 2018, the ratio reached its highest level at 15 percent. Thailand began as only a minor source of imports in the early 2000s, eventually becoming the dominant source especially from 2011 onward. From 2015 onward, Thailand's market share averaged 86 percent.

Since 2001, exports have fallen within a 50,000 - 250,000 - ton range (**Figure 8**), with one exceptionally low year (2015), and several exceptionally high years (2011, 2013, 2017). The US market accounts for the majority of Philippine exports on account of the US sugar quota, with the US share averaging 76 percent.

Historical background of the industry

Large-scale farming of sugarcane began back in the Spanish colonial period during the 1700s. Initially, Luzon was the center of sugarcane farming and sugar production. The industry flourished in the mid-1800s as plantations expanded in the Visayas. In the 1900s, the Philippines became an American colony, opening the US market to preferential and, eventually, free trade in Philippine sugar. In 1937, the Philippine Sugar Administration was established; it became the Sugar Quota Administration (SQA) upon Philippine Independence in 1946. The SQA was tasked to allocate the administration of exports, domestic reserves, and world sugar quotas, and the issuance of negotiable warehouse receipts or quedans.

The Philippines continued to maintain its preferential access to the US market even after independence, becoming the top exporter to this market. New centrifugal technologies led to the establishment of large-scale sugar mills. Initially, mill investors went into output sharing agreements with planters. These agreements became the precedent for the mandatory sharing scheme under The Sugar Act of 1952 (RA 809). Whereas sharing was statutorily fixed between planters and millers, share tenancy was phased out in the plantations, where wage labor and mechanized farming were preferred. These changes, together with the reliance on direct-to-mill railways to deliver cane, weakened competition and led to the formation of mill districts for collective bargaining between the planters and the mills (Larkin, 1993; Padilla-Fernandez and Nuthall, 2009).

The US Sugar Act provided a guaranteed market for Philippine sugar up to 1974. Production soared from 1960-61 to 1971-72, and mill capacity more than doubled (by 1974-75 output had reached 2.4 million tons). Despite the expiration of the US Sugar Act, Philippine exports continued to enjoy high world prices; the bubble however popped in 1977 when prices fell by 90 percent of their 1974-75 level. President Marcos activated the Philippine Sugar Commission (PHILSUCOM) and formed the National Sugar Trading Corporation (NASUTRA) as its attached agency. NASUTRA was tasked with monopolizing the export of sugar to the world market. In 1985, the NASUTRA was converted to a marketing board under the private ownership of sugar producers, called the Philippine Sugar Marketing Corporation (PHILSUMA).

The restoration of democracy in 1986 led to another policy shift. The export monopoly of PHILSUMA was abolished. President Aquino legislated the establishment of the Sugar Regulatory Administration (EO 18) with the following mandates:

1. To institute an orderly system in sugarcane production for the stable, sufficient and balanced production of sugar for local consumption, exportation and strategic reserve;
2. To establish and maintain a balanced relation between production and requirement of sugar and marketing conditions to ensure stabilized prices at a level reasonably profitable to producer and fair to consumers;
3. To promote the effective merchandising of sugar and its products in the domestic and foreign markets so that those engaged in the

sugar industry will be placed on a basis of economic viability;

4. To undertake such relevant studies as may be needed in the formulation of policies and in the planning and implementation of action programs required in attaining the purposes and objectives of EO 18.

B. Sugar industry policies

Mill districts and output sharing

The historical development of the sugar industry accounts for a set of institutional features that makes it unique among the agricultural industries of the country. The production of cane and raw sugar is geographically consolidated into mill districts. Once a mill is licensed by the SRA and is set up in a location, a mill district is formed in the surrounding region, initially organized by the mill. Within the mill district, planters' associations are organized for coordinating deliveries, facilitating flow of information, delivery of services (such as preparation of quedans), and application of SRA regulations.

In the absence of a milling agreement that provides otherwise, the Sugar Act mandates the sharing of raw sugar and molasses within a milling district between the sugar mill and the sugar planters. The split is adjusted based on the output of the mill. The planter's share is summarized in **Table 3**. Note that the planter's share rises with the output of the mill district; the reason is that higher output brings down cost per unit of raw sugar, and the sharing scheme is the mechanism for appropriating for planters some of the benefit from lower average cost. Conversely, lower output raises the cost per unit of raw sugar, hence the sharing scheme shifts benefits to the mill in order to preserve its economic viability.

Sharing is also enforced by the quedan; that is, the planter delivers cane, and receives the amount corresponding to his or her share in the form of a quedan. The amount extracted from the cane is estimated from a sample of the delivery traceable to a specific planter.

Table 3: Planters' share by range of sugar production of mill district

Range (tons)[a]	Planters' share (%)
Below 25,300	60.0
25,300 – 37,950	62.5
37,950 – 56,925	65.0
56,925 – 75,900	67.5
Above 75,900	70.0

[a] *Originally piculs, converted using the conversion 1 picul: 63.25 kg.*

The sharing system is an intermediate between the extremes of cane procurement and toll processing. In the former, mills purchase sugarcane per unit quantity (with adjustments for sugar content) and keep all the sugar. In the latter, planters purchase the mill service and keep all the sugar. Under cane procurement, planters are locked out of the market for raw sugar, unless they buy it from the mill or from a trader; the reverse holds true for toll processing, where mills are locked out of the market for raw sugar, unless they buy it from planters or from a trader. The sharing system allows both planters and millers to participate in the market for raw sugar.

However, the sharing system is subject to well-known inefficiencies owing to a disincentive effect of the forced sharing. At the optimum, a mill should expand its investment until the incremental investment equals the marginal output stream (discounted to present value); however, under RA 806, the mill will only receive 30% to 40% of its marginal output stream. Likewise, for the planter, the optimum is reached when the marginal cost of producing cane equals the marginal product; however, under RA 806, the planter is paid only 60% to 70% of its marginal product.

Quedan System and Market Segmentation

The SRA requires all raw sugar produced or marketed within the country be covered by a quedan issued by the SRA; similar regulation applies for molasses (in the form of a molasses storage certificate), and even high fructose corn syrup (HFCS) in the form of a clearance for release. The quedan is proof of ownership of a certain amount of sugar available at a specific warehouse (typically at a sugar mill). The SRA allows the quedan to be used as a negotiable instrument backed up by the value of the sugar in stock. The quedan therefore reduces transaction costs and facilitates trade, and serves as debt collateral, thereby facilitating financing as well.

However, the quedan is also used by the regulatory agency to segment the market for sugar. At the beginning of each milling season, the SRA issues a Sugar Order (SO), which mandates mills to divide all planters' shares and mill shares into various classifications (see II.B.2) according to given percentages. Sugar with A-classification is allowed to be exported only to the US market; sugar with D-classification can only be marketed for export (outside of USA); sugar with B-classification is allowed to be sold only in the local market; sugar with C-classification is not allowed to be sold (unless reclassified by SRA); and so on.

The classification is justified under the SRA mandate of maintaining a balanced relation between production of sugar for local consumption, exportation, and strategic reserve, as well as ensuring price stability. Historically, the quedan grew out of the need to allocate the preferential market access to the US market during the colonial period until the early 1970s; however, even as the US market premium mostly vanished, the allocation mechanism was kept largely to stabilize domestic prices. Hence, if SRA anticipates an undersupply of sugar in the domestic

Table 4: Schedule of SRA registration and licensing fees

Activity to be registered	Cost (Php)	Unit
As domestic trader in sugar or molasses	15,000	Per trader
As international trader in sugar or molasses	20,000	Per trader
As converter or trader of muscovado	6,000	Per trader
As operator of a sugar mill	0.05	Per short ton

market, which will cause the price to increase, it may reduce the allocation for B-sugar and raise it for the other classifications. On the other hand, if the SRA anticipates an oversupply of sugar for the local market, which will cause the price to fall, it can set a lower percentage for B-sugar and raise it for A-sugar and C-sugar. For example, in SRA's Sugar Order No. 1 s 2018-19, it provides for the following:

- "A" Sugar 5 percent;
- "B" Sugar: 95 percent;
- "C", "D", and "E" sugar: No allocation.

Regulations

Licensing and registration. The SRA imposes registration requirements over various sugar industry-related activities. Registration (renewed annually) takes 2-5 days to process and is subject to the payment of registration fees (**Table 4**). Registration and licensing identifies who the key players are in the production and merchandising of sugar, thereby supporting SRA's ability to enforce its policy in maintaining supply-demand balance and price stabilization.

Imports and exports. As mentioned earlier, the export of sugar is restricted to sugar A or D. The more restrictive policy is however applied to importation, mainly to ensure price stability; restrictions on imports are imposed to prevent domestic prices from falling, thereby protecting producers; however, imports are allowed when there is an anticipated shortage leading to an increase in domestic price, thereby protecting consumers and end-users. As with registration and the quedan system, these restrictions are all in line with the SRA's legal mandate to maintain supply-demand balance and stabilize the price of sugar.

The amount of imports is determined for each milling season by an Import Program. Typically, the introductory part of the Sugar Order stating the Sugar Import Program cites a demand shortage based on raw sugar withdrawal and a spike in the B sugar price. **Table 5** summarizes the last three rounds of the most recent import programs (2017 to 2019).

CY 2017-18 import program: Noting the increase in B sugar price to Php 1,963 per LKG[2] (from Php 1,300 per LKG at the beginning of the crop year), the SRA set the ceiling for sugar imports in CY 2017 at 200,000 tons. This quota was allocated as follows:

The imported sugar was initially designated as C-sugar, for storage only; the importer must take the additional step of applying for reclassification to B-sugar in order for imported sugar to be sold in the domestic market.

CY 2018-19 first import program: Again citing prices of Php 1,968 per LKG, in crop year 2018-19, the SRA authorized the importation of up to 150,000 tons of raw or refined sugar. Individual traders may apply for a maximum of 15,000 tons of sugar as their portion in the quota, but a minimum of 2,500 tons. Just as in 2017-18, imported sugar is initially classified as C, for subsequent reclassification as B upon application.

CY 2018-19 second import program: Taking note of the request of FBI stakeholders for additional imports, and to head off potential price spikes, SRA authorized a second round of importation in CY 2018-19. The quota was for a maximum of 250,000 tons of refined sugar (standard grade or bottler's grade), divided between industrial users and other users.

Table 5: SRA Import programs, 2017 to 2019

	2017-18	2018-19
Raw or refined sugar		150,000[a]
Refined sugar		
Industrial users		100,000[b]
Others (consumers, end-users, producers)		150,000[b]
Refined sugar (bottler's grade)	100,000	
Refined sugar (standard grade)	50,000	
Raw sugar	50,000	
TOTAL	200,000	400,000

[a] *First import program*
[b] *Second import program*

2 1 LKG = 50 kg

Lastly, importation of molasses is normally allowed subject to import clearance and payment of fees (Molasses Order No. 1, 1996-97). Furthermore, Molasses Order No. 1 of 2014-15 placed an additional restriction that importation of molasses for the purpose of biofuel production is prohibited. Clearances ordinarily take up to 2 days of processing time upon payment of the fees summarized in **Table 6**.

Table 6: Schedule of SRA Clearance fees for import and export transactions

Activity	Cost (Php)	Unit
Export (sugar or molasses)	50	Per ton
Import		
Refined sugar	33	Per LKG
Raw sugar	30	Per LKG
Molasses	450	Per ton

Certificate of sugar requirement. The Certificate of Sugar Requirement of Food Processors/ Manufacturers of Sugar-based Products for Export approves the release of imported D sugar or local D sugar to food processors/manufacturers of sugar-based products for export. The latter requires an initial step of re-classification from local D to E sugar.

The Volume of Sugar Allocation for New Application is based on the projected sugar requirement based on plant capacity, purchasing orders, as well as export declaration and the previous year's sugar utilization, as applicable. After the New Application, the Total Sugar Requirement (TSR) equals withdrawals in the previous year, net of the year-end inventory of the preceding year; hence, any unused allocation is used to reduce the annual TSR. The Certificate of Sugarcane Requirement takes only 2-5 days to process at the cost of Php 5,000 per application.

Shipping permit. Sugar may be shipped by sea or by air across the islands of the Philippines by any licensed sugar trader, subject to the issuance of a shipping permit. According to SRA Head of Regulation Division, the permit system aims to ensure that sugar that is being shipped across islands has not been smuggled into the country; once domestic origin has been ascertained by SRA, there are no further requirements imposed on inter-island shipping. Processors of sugar-based products may ship imported sugar provided that the imported sugar is covered by a Customs Bonded Warehouse. A shipping permit is normally issued within 20 minutes of application, if all papers are in order; the permit fee is Php 1.50 per LKG of shipment.

Domestic and border taxes

Value added tax. Refined sugar is subject to the payment of a 12 percent value added tax (VAT).

Note that raw sugar does not pay VAT, hence the refined sugar manufacturer is unable to earn tax credits on the raw material. This is partially offset by the presumptive input tax credit granted under the National Internal Revenue Code Section 111 (as amended), for manufacturers of sardines, mackerel, milk, refined sugar, cooking oil, and packed noodle-base instant meals, equivalent to 4 percent of the gross value of purchases of primary agricultural products.

Customs duties. Imports are subject to a customs duty payable to the Bureau of Customs according to the two-tier tariff scheme negotiated under the WTO. The Minimum Access Volume (MAV) of sugar is 64,050 tons, for which the tariff rate is 50 percent; above the MAV, the rate is 65 percent, the second-highest rate of customs duty levied on any product entering the Philippines.[3]

However, imports from ASEAN member states are levied only a 5 percent duty consistent with the ASEAN Trade in Goods Agreement (ATIGA). The ASEAN rate was initially set at 38 percent in 2010, before it was gradually reduced in subsequent years to 28, 18, 10, and finally 5 percent from 2015 onward. As Thailand is the only major sugar exporter within ASEAN, the ASEAN rate explains why Thailand is the biggest source of imports into the Philippines.

III. ANALYSIS OF THE VALUE CHAIN

A. Sugarcane to raw sugar

Production of cane is done by sugarcane planters who raise the cane, harvest it, and deliver it to the sugar mill. Upon arrival, the trucks are weighed and then the cane is offloaded. An estimate of the sugar content of the cane is given to the planter. One week later, the planters' share in the sugar and molasses is given by the mill (usually through the association), in the form of quedans. Other payments and services may also be given by the mill, such as production incentives (payment per ton of cane delivered), a trucking allowance, and harvesting services (at subsidized rates).

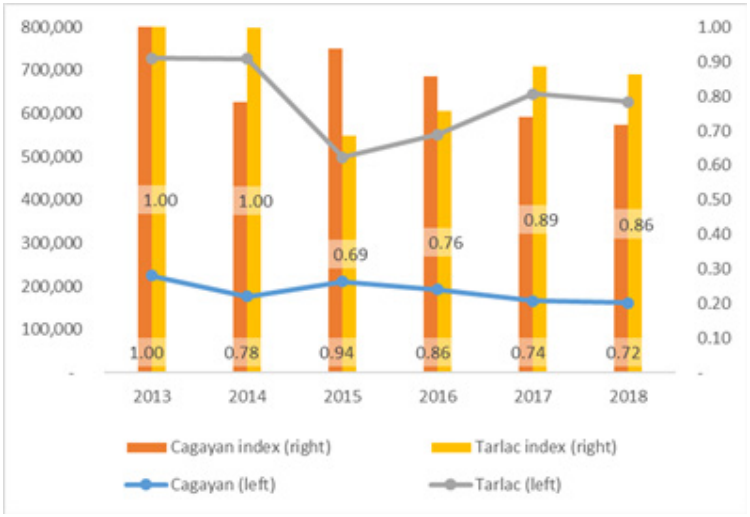
Production trends in the mill districts

In the mill districts covered by the study, cane production has fallen over a five-year period (**Figure 9**). In 2013, cane production in Tarlac was much larger than that of Cagayan (728 thousand versus 225 thousand tons); the decline was 14 percent for Tarlac, while the decline was 28 percent for Cagayan.

The mill districts in Region II are spread out over two provinces, ranging from Sto. Niño, Cagayan in the north to the relatively southern Isabela, which is around 60 kilometers away. The production in the region is typically brought to either Cagayan Robina Sugar Milling Company (CARSUMCO) or Green

3 Republic Act 11203.

Figure 9: Cane production in tons, and cane production index (2013=1.00), Cagayan and Tarlac, 2013-18



Source: PSA

Table 7: Number of farmers and area by landholding size category, 2013-14

	Number of farmers	Share in total farmers (%)	Area (ha)	Share in total area (%)
0.00 - 5.00	63,761	81.5	120,364	28.4
5.01 - 10.00	7,851	10.0	56,745	13.4
10.01 - 25.00	3,730	4.8	63,806	15.1
25.01 – 50.00	1,637	2.1	62,837	14.8
50.01-100.00	911	1.2	56,755	13.4
100.01 and higher	386	0.5	62,656	14.8
Total	78,276	100.0	423,163	100.0

Source: SRA Roadmap.

Future Innovation, Inc. (GFII), a bioethanol factory in Isabela that is operated by the Lorenzo group. Over the past several years production has been declining; the loss was aggravated by a series of natural calamities (e.g., Typhoon Lawin in October 2016, drought from June to September 2018, Typhoon Ompong in September 2018) that occurred over several milling seasons, which typically run from January to April. Currently, CARSUMCO only processes 1,500 Ton Container (TC)/day, a far cry from its maximum processing capacity of 4,000 TC/ day.

Historically, in the main production areas, landholdings have been consolidated under a hacienda system with a few large planters owning huge tracts of land and selling to a sugar mill. Starting from the late 1990s, the hacienda system has been transformed into a largely smallholder system owing to the Comprehensive Agrarian Reform Program (CARP) enacted by RA 6657. The CARP redistributed landholdings in excess of five hectares and awarded it to tenants, farmworkers, and other landless beneficiaries (with no beneficiary receiving more than three hectare) **Table 7** provides a breakdown of the number of planters and the area by size category of landholding. The smallest size category hosts the largest number of farmers (82 percent of the total); the same category also has the largest share in the total by area, at 28 percent (far lower than the farmer share). In contrast, 28.2 percent of landholding area is held in the large category of 50 ha and higher; this same bracket only accounts for 2 percent of farmers.

In Region III, the mill districts used to be located in Pampanga and Tarlac. However, given the closure of Sweet Crystal Integrated Sugar Mill (SCISM) in 2020, Central Azucarera de Tarlac (CAT) is the only remaining mill in the region. Despite deliveries from Pampanga planters to CAT, mill production had continued to decline. The fall in production was triggered by the breakup of Hacienda Luisita (around 4,500 ha.) due to CARP. The land fragmented among 10,000 beneficiaries. Many sold the land, which is now undergoing massive land conversion owing to rapid development in Central Luzon. Some stopped planting sugarcane, shifting instead to rice and corn; staff of the CAT are now trying to persuade farmers to switch to sugarcane. Of the original Hacienda, only forty percent of the area is still planted with sugarcane.

Increasing output collectively at the level of a mill district requires, in part, the realization of efficiencies to reduce the cost per ton of cane. However, planters face numerous obstacles to reducing cost and raising output.
First are poor production practices. According to SRA

Mill District Officers, these include lack of spacing, burning of cane to eliminate weeds, premature cane harvesting, excessive ratooning (which leads to low yield), inappropriate selection of cane varieties, and inappropriate nutrient management considering soil conditions. Many sugarcane planters tend to adhere to tradition in terms of nutrient management and other practices, rather than adopt scientific advice from extension agents.

Second is the perennial issue of mechanization and land consolidation. There is a need to mechanize in order to save on labor cost; in Luzon especially, labor has become ever scarcer and more expensive in recent years. In previous years, planters were able to recruit gangs of laborers from the Visayas region to harvest cane during the milling season; however, tighter labor regulations have essentially ruled out this option.

Under the *hacienda* system, landowners can acquire large equipment themselves; this option is not feasible under a fragmented system. There are three ways to work around this. First is rental of machineries, such as harvesters; second is to organize small hold landowners into an association and have the association purchase the machines. Third is for a planter to purchase machineries and rent enough sugarcane land to make ownership of the machines feasible;

For the first option: the machinery rental market in the Philippines is at a nascent stage owing to the huge cost of each unit, hence few businesses are making the investment. During the interviews, the authors encountered two mills renting out harvesters to planters, but the latter said there were only a few units so not many could avail of the machines.

For the second option: the SRA itself has targeted the grant of farm machineries under the Sugar Industry Development Act (SIDA) to "block farms" which are associations of smallholders. However, SRA has hitherto been unable to provide large farm equipment to block farms since 2015, the year SIDA was enacted, owing to procurement problems.

For the fourth option: it turns out that rental of sugarcane land is fairly common. Many of the planters who were interviewed confirmed that they are renting land, some of them from agrarian reform beneficiaries. This appears to be the most realistic

way to operationalize the mechanization of large tracts of sugarcane lands.

Planters' perspectives on milling

Table 8 summarizes the subjective ratings by planters on the relationship between planters and mills and how well competition attenuates any dominant economic position in their relationship. On average, planters expressed moderate agreement that the sharing scheme, as well as the payments and the services of mills, is fair. With regard to the measurement of sugar content, the sharing scheme, and other payments and services, there is substantial agreement on the claim that mills are **not** abusing their dominant market position. CARSUMCO, for example, has a sharing ratio of 60-40, planters agreed that this is fair considering the low output of the mill district. Due to higher output, CAT is able to obtain a slightly larger share of 42 percent.

The agreement is stronger in Tarlac compared to Cagayan, despite the fact that now, CAT is the monopoly processor of sugarcane; and that normally only refined sugar is withdrawn from its warehouses (while charging toll processing). It is possible that planters are more sympathetic to CAT given its large excess capacity problems, and the precedent of Sweet Crystal already exiting the processing industry; perhaps the exit of CAT is the least preferred outcome even by the sugar planters.

For the sugar planters who participated in the interviews, the perceived distortion in the measurement of sugar content is at worst, moderate. The planters with the most unfavorable assessment are in Cagayan, while those with a more favorable assessment are in Tarlac. In all cases, the association deploys an employee to cross-check the measurement of sugar content of cane juice. For both Cagayan and Tarlac, at least one association deploys a licensed chemist for that purpose. For Tarlac, the leader of one association even undertakes an independent measurement of sugar content using a handheld device called a refractometer.

Conditions governing the production of sugarcane matter greatly in the degree of competition at the level of the planter. A planter who has few choices other than sugar in terms of choice of crop may be rendered vulnerable to the abuse of dominant position by the mills and/or traders. On the other hand, planters that act collectively to boost output per mill district, and coordinate cane selling decisions, can achieve significant bargaining power

Table 8: Average ratings of services and payments from the mill by planters (0 = strongest disagreement, 4 = strongest agreement), 2019

	Accurate estimate of sugar content	Fair sharing scheme	Payments and services are satisfactory	Mill abuses dominant position
All	2.5	2.7	2.8	1.7
Tarlac associations	2.3	3.0	3.2	1.5
Cagayan associations	3.0	2.2	2.2	1.9

with the mill. In fact, planters do have various choices in crop planting; in Luzon the main alternatives to sugar are other temporary crops such as rice and corn. When the price of sugar drops relative to the other crops, planters are readily able to shift to the more profitable crops.

B. Processing: raw and refined sugar

Upon delivery, sugarcane is crushed to extract the cane juice. The juice then undergoes treatment then evaporation to become concentrated juice. It then undergoes crystallisation through a process of boiling in a vacuum; the crystals are separated from molasses by use of a centrifuge. The separated crystals that constitute the raw sugar, colored brown, is already ready-to-use. The entire process requires large-scale equipment especially the huge centrifuges needed for crystal separation. Raw sugar produced by a mill is typically of uniform quality, though quality of raw sugar may vary by mill. The two main grades are raw (brown) sugar and washed (raw) sugar. Refineries produce refined (white) sugar.

Users often prefer refined over raw sugar. The raw sugar is first made into syrup by mixing with water; another centrifuge is used to separate the remaining molasses from the syrup; the nearly pure syrup is then further crystallised until it becomes white sugar. A sugar refinery will typically also require large-scale machines similar to those found in raw sugar production.

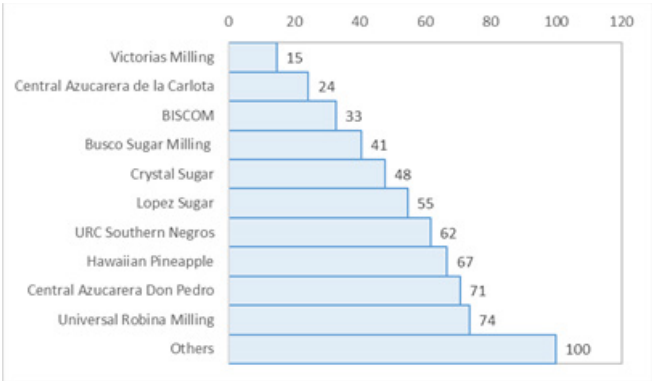
During the milling season, mills will need to manage deliveries to have the cane crushed and its juice extracted as soon as possible after harvesting. At the peak of the harvest season, they will often assign schedules to planters to avoid congestion.

The mill operators also try to avoid underutilization of their mill by persuading farmers to plant sugarcane and deliver to them. Aside from obtaining quedans and molasses certificates, mills realize cost savings by utilizing the bagasse to generate power and save on their electricity consumption from the grid. Some sugar mill power plants are large enough to sell some of their excess electricity back to the grid, and therefore earn supplementary income.

Figure 10 presents the market shares of the top sugar-producing mills. Here output is inferred from SRA data on mill shares in raw sugar, and the sharing scheme under RA 809. The top producing mill in the country is Victorias Milling Company with a 15 percent market share. The four-firm concentration ratio is only 41 percent, less than half of industry output. The Herfindahl-Hirschman index is 104.24, way below the cut-off for a competitive market which is equal to 1,500.

On the other hand, the top ten firms account for 74 percent of the market, which appears to be a cause for concern. The concern turns more serious when we consider the top-firm market share by mill district

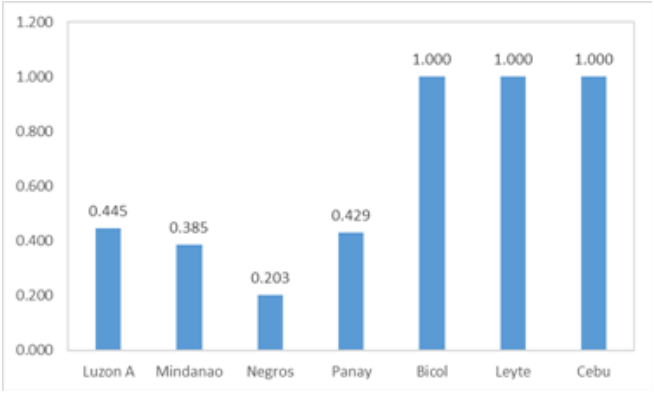
Figure 10. Cumulative market share based on mill's sugar allocation, 2017-18 (%)



Source: SRA.

cluster, namely Luzon-A (Regions II, III, and IV-A), Bicol, Panay, Negros, Cebu, Leyte, and Mindanao (**Figure 11**). For the three smallest mill clusters, there is only one mill district, hence the lone sugar mill accounts for 100 percent of production. Meanwhile for the biggest mill district cluster, which is Negros, the market share of the top producer is lowest (only 20.3 percent), owing to the large number of mills present. The next largest mill cluster is Mindanao, which has the second lowest top producer share at 38.5 percent.

Figure 11. Market share of top firm by mill district cluster, 2017-18 (%)



Source: SRA.

Whereas PCC (2018) has observed the potential abuse of dominant position by mill by adjusting planters' share, it also notes this abuse is checked by the limits stipulated by RA 809; the mills may offer better than the RA 809 shares, but not worse. Moreover, planters possess most of the sugar (60–70 percent share of the industry output). Upon receipt of their quedan, planters are free to transact with traders as they wish.

There was one issue for which planters voiced a complaint against CAT, which is vertically integrated with a refinery. The mill allegedly forced raw sugar to be withdrawn only as refined sugar. The mill has clarified though that raw sugar withdrawal is allowed anytime because of the quedan regulations; however, they have persuaded traders to withdraw refined sugar as much as possible in order to keep the mill financially afloat. As seen in planters'

feedback, the refining requirement is not seen as an onerous imposition.

The other way for millers to potentially exploit the lack of competition is by monopolizing the purchase of quedans held by the planters. However, mills do not have a monopoly in trading, as domestic traders are also in the market. The SRA lists the registered domestic sugar traders by region of registration (see **Table 9**).

C. From processors to end-users

End-users consist of either firms, such as in the FBI, or households. Sugar needed by end-users is classified into three quality grades: refined white sugar; washed raw sugar; and basic raw sugar. Households buy either white or washed raw sugar; FBI users typically use refined sugar.

Retailers/wholesalers

Retail involves the sale of refined white sugar, raw (washed) sugar, or raw (brown) sugar (listed in decreasing order of price) to households. The key informant in this segment also sells wholesale to other commercial establishments such as bakeshops, tikoy makers, carinderias, and halo-halo makers. Most sales are retail to households; margins are lower for wholesaling but prices are more stable because these are agreed upon ahead of time. Other commercial users do not bother to go straight to mills, planters, or traders owing to lack of information and stable relationships.

Some customers (especially commercial users) prefer white to brown sugar, as the latter leaves an aftertaste. However, within white sugar or brown sugar, customers make little distinction by brand (despite labeling to the contrary). Buyers tend to go for the price; only the elite A and B segment are conscious about branding for health reasons.

Prices are set not by brand, but rather based on the prices of the nearest retail competitor. The retail outlet itself serves as a brand, i.e., high end retailers can charge a much higher price even for unbranded sugar that is offered by low end retailers. Within market segments, competition is intense and margins are very thin.

Industrial user/importer

Some large multinationals in the FBI have very large-scale requirements for refined sugar. The FBI key informant orders an average of 70,000 tons of sugar annually; this is almost all locally sourced as the SRA limits the importation of sugar. Usually, the supply of sugar is secured through multi-period contracts (rather than spot purchase orders), where demand per unit time, quality standard, and price are fixed. The informant rarely obtains sugar from planters' quedans as they are unwilling to enter into extended contracts.

The price includes the fee for transportation and refining (occasionally the company provides for its own transportation from refinery to factory). The informant fixes the price by bidding out the contract. Settlement is usually every two months; hence the supplier must be able to advance a significant amount of working capital.

The most critical requirement for sugar is quality; they impose strict standards on particle size, color, and presence of contaminants. Not all the sugarcane mills of the country are able to meet this key informant's quality standard; the ones who cannot qualify are usually those with old machines. The informant sources its sugar only from accredited sugar mills, whether directly, or from traders (who must supply sugar obtained only from accredited mills). Traders are only a small part of the supply of raw sugar, as they have sugar available only intermittently. They have many other activities, hence they shift in and out of the market depending on price conditions.

The FBI company interviewed has registered as a trader as well in order to take advantage of cheap foreign sugar whenever the SRA does open up importation. The SRA has adopted a first-come, first served policy for obtaining an individual quota to import (in the most recent program the quota was 15,000 tons). There are numerous documentary requirements for merely applying for the quota. In the end, the applicant must be physically present to queue at the SRA; they describe the ordeal as having to literally "camp" outside SRA premises to get the allocation. The SRA regulation key informant confirms that such a scenario does take place under their import programs. Under the new Department of Agriculture Secretary, they are exploring a shift to a more rationalized allocation such as auctioning off the allocations.

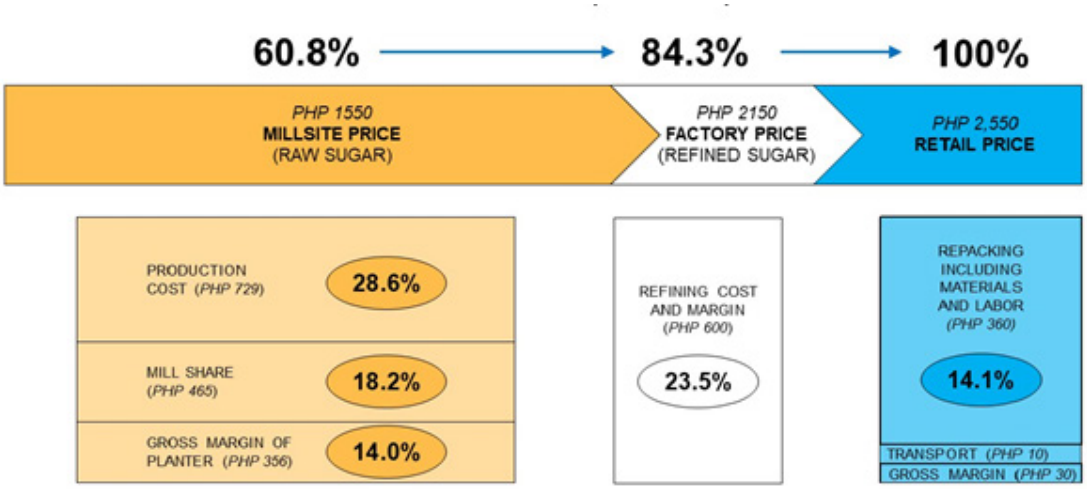
The FBI company claims that the bigger problem is the existence of the quality restriction itself. This is allowing domestic prices to remain high by locking out cheaper but nonetheless high-quality sugar.

IV. ANALYSIS OF PRICE FORMATION

A. Cost build-up

The average price of refined sugar as of end-February 2020, based on PSA data, is Php 51 per kg, equivalent to Php 2,550 per LKG. (Note that the suggested retail price of DTI is now Php 50 per kg, the prevailing price in end-2019). A breakdown of the retail price build-up along the value chain is shown in **Figure 12**. The first stage collapses cane production and raw sugar, owing to the nature of planter and miller's compensation. The second stage is refining the raw sugar; the third stage is repacking and

Figure 12: Cost build-up along value chain for retail sugar, 2019



Sources: SRA Roadmap and key informant interview.

distribution of refined sugar to various retail outlets such as supermarkets and sari-sari stores.

The mill-site price of raw sugar is already about 61 percent of the retail price; the factory price of refined sugar is 84 percent. Production cost of cane (estimated using SRA data for 2012, corrected for CPI inflation to 2019) accounts for about 29 percent of the retail price; processing cost (imputed as the mill share) is another 18 percent. The refining stage (combining processing cost and refiner's margin) is another 24 percent. Finally, retailing involves repacking and distribution (14.5 percent), while the retailer's gross margin is 15 percent.

Note that each of the gross margin items themselves include costs, the breakdown of which is beyond the scope of this study. The 15 percent gross margin of the retailer includes cost of shelf display, storage, cost of capital, transaction cost, and associated labor; the gross margin of the cane producer includes the time cost of farm and business management, the opportunity cost of capital, and so on.

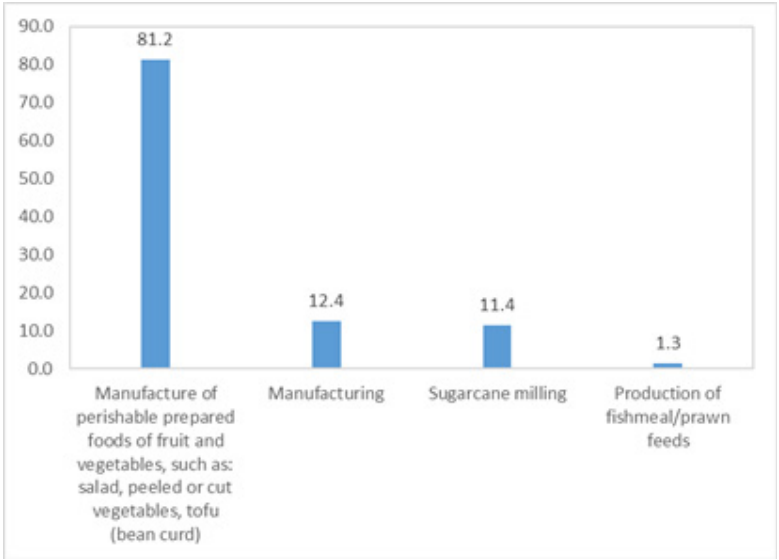
At the milling stage, the price-cost margin or PCM for manufactured sugar is obtained from revenues R and direct costs C as follows:

$$PCM = \frac{R - C}{C}$$

The PCM may be expressed in percentage. The PCM can be calculated from 2015 ASPBI figures and is summarized in **Figure 12**. For the manufacture of sugar, the PCM is 11.4 percent. Assuming the 27 mills have an average capital stock of Php 28 billion (Php 2 billion investment in a new plant at 50 percent depreciation), and an opportunity cost of capital of 6% (equal to the bank lending rate in 2015), an adjustment of PCM for return on capital leads to a lower figure of 7.2 percent. The PCM shows no evidence of excess returns for the industry.

In fact, the PCM of 11.4 percent is in fact the median PCM for food and beverage manufacturing (negative returns excluded), which ranges from the highest (manufacture of perishable prepared

Figure 13. Price-cost margin for selected manufacturing establishments, by product and establishment size, 2015 (%)



Source: PSA.

foods) at 81 percent, all the way down to production of fishmeal at only 1.3 percent. The average for all types of manufacturing is 12.4 percent. The estimate for sugarcane milling averages for both large manufacturing establishments (11.4 percent) and small manufacturing establishments (19.4 percent).

B. Price formation

For raw sugar, price is determined on a weekly basis. The reference price is that in Negros Occidental that is obtained via a "bidding" process. According to the marketing manager of a sugar mill, this is initiated by planters' associations offering their quedan to traders. The traders in the area then communicate their bids; the price of the transaction is posted electronically and made available to other planters' associations. The price is posted on Friday for Thursday's bidding. Prices distinguish between washed sugar, and commercial grade (raw) sugar. In Tarlac, the mill produces only commercial grade sugar; mills such as Hawaiian and SONEDCO produce premium raw; Victorias can switch between premium raw and commercial grade.

In Tarlac, transactions are done on Friday, when quedans are made available to the planters' associations. The mill provides a space for traders to conduct their transactions. The Negros price is used as a reference but may not actually be the price of the transaction, which is an outcome of bargaining; usually the Tarlac price is set at least at the Bacolod price.

Most planters (both in Tarlac and Cagayan) however, opt to leave sales in the hands of their respective association marketing agents. The sale of quedans is done by obtaining the price quotation of the trader. Usually the trader is willing to purchase the entire inventory of quedans in bulk, implying the large working capital endowment of these traders. After receiving the quotation, the association decides whether to accept the price or not; the bases for comparison are the price bulletins mentioned earlier. In their experience, the quotation and the mill site prices elsewhere in the country are very close (differing say by just Php 50 per LKG), hence, the association usually takes the trader's offer. The association sells the inventory of quedans in bulk at the agreed price. Individual planters who retain stock are subject to several disadvantages. Unsold stock remains in the mill and thereby incurs storage fees and the possible loss of quality. The storage fee in CARSUMCO is Php 1.50 per LKG per month starting the second month; then Php 3.00 per LKG per month thereafter (the first month of storage is free). Moreover, the association members recount instances in the past when they had opted to hold on to their quedan in anticipation of a higher price. Instead, the price of sugar had actually dropped, which had inflicted a loss.

Traders do try to leverage access to capital to bargain with planters. For instance, some planters who need financing during the planting season may approach a trader to borrow money in exchange for quedans in the forthcoming milling season. The agreement already stipulates the loan amount, the settlement price or pricing formula, and the date of settlement (or how the date will be determined). However, many planters, especially ones who are better off, opt to self-finance in order to avoid disadvantageous deals with traders.

Table 9 shows the number of registered domestic sugar traders by region of registration as per the listing of the SRA. There are apparently enough traders active in the raw sugar market to prevent price manipulation. In Regions II and III, 13 registered traders are competing for quedans; in Region V, 8 traders are competing; and so on. Moreover, these traders are free to operate in various regions outside their place of registration (as no doubt the NCR traders are doing). The concentration ratios at the wholesale level however cannot be computed owing

Table 9: SRA-registered traders by region as of 2018

Region	Number of traders
II & III	13
NCR	62
IV	14
V	8
VI	29
VIII	7
IX	7
X	15
XI	3
Total	158

Source: SRA.

Table 10. Average rating for trade in sugar and molasses (0 = strongest disagreement, 4 = strongest agreement)

	Fair pricing of sugar	Fair pricing of molasses	Choice in selling sugar	Choice in selling molasses	Collusion among buyers of sugar	Collusion among buyers of molasses
All Planters	2.3	2.8	2.4	2.3	1.8	1.5
Tarlac planters	2.6	2.8	2.2	2.0	1.3	1.1
Cagayan planters	1.9	2.7	2.8	2.8	2.4	1.9

to the lack of data on market shares by trader and miller.

Table 10 describes the subjective ratings of the planters regarding the state of competition in sugar and molasses trading. Regarding the fairness of pricing, the interviewed planters moderately agree that the pricing of raw sugar is fair, although they tend to feel that molasses pricing is less fair. They perceive that there is little collusion to keep the buying price low.

These perceptions are consistent with the description by a key informant who works in marketing for a sugar mill. Price differences across mills are small and mostly due to freight cost, according to the informant. For instance, if the price is Php 1,500 per LKG for commercial grade sugar in Negros, the same product will fetch Php 1,420 per LKG in Mindanao once the freight cost is factored in. There has been no episode of a sustained market manipulation where a price was kept artificially high for an extended period; any abnormal movements can be explained by some other conditions. For instance, 2 weeks prior to the interview, refined sugar price went down by Php 20 per LKG, whereas raw sugar price continued to climb. However, this was simply due to the fact that warehouses were unloading their excess inventory of refined sugar.

Meanwhile, refined sugar price is determined as a margin over raw sugar price; and retail price likewise is set as a margin over refined sugar price, with mark-up for cost of repacking. At the retail level, the supermarket owner claims that Department of Trade and Industry (DTI) is trying to impose a 5 percent margin; this is too small, but the retailers' margin is not much higher than that in practice. Retailers are approached by traders, who prefer to deal with large chains who can entertain the large transactions. These traders do not transact with small retailers (sari-sari stores) owing to the low volumes; the latter tend to obtain their sugar from wholesalers. Aside from volume, traders prefer supermarkets, which impose fewer transportation requirements.

However, payments are usually done on a staggered basis; for instance, the marketing manager of a sugar mill claims that some customers pay only after 60 days (the FBI company states that their payments schedule is similar). Traders who are unable to sustain financing over this period cannot stay in the market.

C. Assessment of price gaps between domestic and world markets

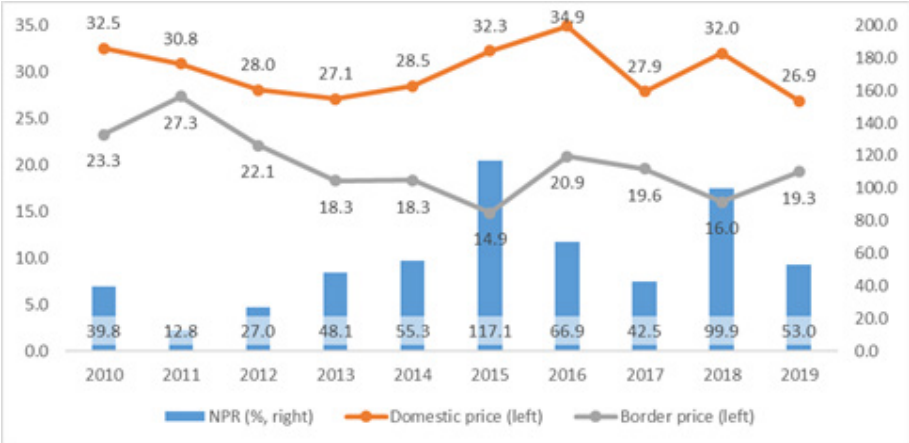
Price formation is seen to be independent of world price owing to government policy. We examine the implications of this policy by estimating the Nominal Protection Rate (NPR), a measure of openness to competition in the form of imported sugar. NPR therefore compares the domestic price (DP) and border price (BP) of sugar, which is the world price of sugar with a margin added for bringing imported sugar to the Philippine border, using the following formula:

$$NPR = \frac{DP - BP}{BP}$$

Figure 14 shows the NPR (in percent) together with the raw sugar domestic price in the Philippines, which is "mill site" or factory price. This is the same price received by planters owing to the sharing system (and is therefore the farmgate price). The border price is the daily price from the International Sugar Agreement free-on-board (FOB), with a 10 percent margin for freight, insurance, and other costs (before tariffs).

The NPR averaged 56 percent since 2010; however, 2010-12 were years of elevated world price with unusually low NPRs. From 2013 onwards the NPR averaged 69 percent. Note that the NPR measure possibly underestimates the actual rate of protection; in 2018, the monthly mill site price of B sugar was 134 percent higher than the monthly price of D sugar (for the world market), whereas "the NPR measure was 100 percent. The wedge between domestic and world price is not due to tariffs; since 2015, NPRs were far in excess of 50 percent, though most imports from that period onward were from the ASEAN where

Figure 14: NPR of sugar, 2010 – 2019 (%)



Sources: PSA; World Bank Pink Sheet.

the applied tariff rate was only 5 percent. The wedge must therefore be due to non-tariff barriers, namely the QR policy being applied by the SRA. According to OECD (2016), the QR has effectively transferred a surplus of around 35 percent of gross market value from consumers to producers in 2012-2014.

Statistical analysis (see Annex) provides an estimate of the average effect of a one-percent increase in the border price on the domestic price one month later. The estimate is a 0.19 percent increase in domestic price. The range for the estimate is 0.05 to 0.33 (with 95 percent probability). The estimate is far below unity, which is the value consistent with full integration between domestic and world market. The results show that changes in the world price of sugar play a minor role in determining domestic prices. This is fully consistent with the fact that non-tariff barriers constitute a formidable barrier to entry for foreign suppliers into the Philippines. The state of competition in the sugar industry therefore depends mostly on the interaction among the local players.

D. Assessment of price gaps between mill sites

Although the domestic price remains persistently above the world price, prices may still be set competitively among domestic players. One way to check this is if indeed mill site prices are set as to rule out geographic arbitrage, i.e., if uncompetitive price-setting in one mill district can be nullified by seeking out better terms of trade in other mill districts. The narrative on price formation described above suggests a tight link between mill site prices in Negros Occidental and those of other regions.

First, we checked the deviations between mill site prices relative to that of Negros Occidental (using PSA estimates). **Figure 14** highlights the provinces of Batangas, Leyte, and Bukidnon (in addition to that of Negros), which have the most number of data entries for the period (1990 – 2018) from Luzon, Visayas (outside Negros Island), and Mindanao. Using the Negros price as a base, the price index of provincial prices is shown in the blue bars of **Figure 14**. Note that prices in the other provinces are on average lower than in Negros (perhaps reflecting quality differences). However, discrepancies vary across provinces from 3.9 percent in Bukidnon to just 0.2 percent in Leyte. Moreover, the standard deviations of these discrepancies are also very large, ranging from 9 percent in Bukidnon to 19 percent in Leyte.

Further statistical analysis (see Annex) determines the impact of the Negros price on the Leyte price only. In the long run, the Negros price affects the Leyte price on a close to one-for-one basis (in percentage terms). However, further analysis of the speed of adjustment shows that the Leyte price adjusts to changes in the Negros price gradually rather than quickly. Geographic arbitrage eventually dissipates price differences across mill districts (accounting for

Figure 15: Measures of differences between monthly sugar prices in Negros and selected provinces, 1990 - 2018

transport cost), but the adjustment process is slow and uncertain.

V. CONCLUSION

A. Summary

The sugar industry of the Philippines is only weakly affected by competition from producers outside the country. Import penetration into the domestic market has been historically low; domestic prices tend to be much higher than world prices (often double or more); and changes in world price translate only weakly to changes in domestic price. The absence of foreign competition is due to the application of non-tariff barriers by the SRA which effectively serve as the industry QR.

Institutions have evolved to countervail the abuse of market power of millers. Planters' associations formed to serve as a unified bargaining agent on behalf of planters; for one, they are able to station inspectors to check the veracity of the sugar content measurements made by the mill, attenuating the problem of asymmetric information. Similarly, the sugar sharing agreement enforced by the SRA protects planters from the abuse of market power by the millers; however, it has its own drawbacks as a source of inefficiency in the sugar industry.

Planters have a moderate view of the exercise of market power and the abuse of a dominant position in sugar processing and trading of quedans. While planters would tend to agree that processors and traders do coordinate among each other to reduce buying price and gain other advantages, planters are only moderately dissatisfied about the state of competition, fairness of pricing, and the other payments and services of the mills. Apparently, the countervailing institutions are functioning to moderate the anti-competitive tendencies inherent in sugar marketing and processing.

There is limited evidence that sugar is mobile enough across mill districts to eliminate arbitrage opportunities. Even as key informant interviews suggest that prices are competitively set across mill

districts, further analysis of PSA data on provincial prices show only weak evidence that geographic price discrepancies have been arbitraged away. This deserves further study and suggests that the movement of sugar across space is constrained. We rule out regulation as a barrier, given that the inter-island permit is used to regulate only the movement of imported sugar and not of domestic sugar. This leaves high freight cost and geographic segmentation in sugar trading as the possible explanations for persistent price discrepancies across mill districts.

B. Recommendations

The following recommendations are oriented towards the competition policy of the Philippines as provided under the Philippine Competition Act (PCA). The PCA prohibits setting up barriers to entry or acts that prevent competitors from growing within the market **except** those resulting from superior product or process, business acumen, or legal rights or **laws** (Section 15(b)). Notwithstanding this exception, it remains the function of the PCC (Section 12(r)) to advocate pro-competitive policies of government, including advising the Executive Branch on the competitive implications of government actions, policies, and programs. Without minimizing the legitimate social objectives pursued by existing laws (such as EO 18), namely price stability and preserving the economic viability of the sugar industry, the following recommendations are framed consistent with this function of the PCC:

Liberalize the importation of raw and refined sugar at ATIGA and MFN tariff rates. The closure of the domestic market to competition from foreign suppliers is a key factor behind the vulnerability of the domestic industry to competition failures. As with the fertilizer industry and other sectors, the presence of large domestic processors due to economies of scale need not vitiate competition if foreign suppliers can compete freely with domestic processors and send prices down to world market levels plus freight cost and tariffs (equal to 5 percent for imports from ASEAN, and 65 percent for imports from outside the ASEAN).

Reexamine the sharing system and consider the shift to sugarcane procurement. The sharing scheme places a rigid market arrangement between planters and mills. A more straightforward way to create market flexibility and open up competition is to shift to sugarcane procurement; in the case of mill district clusters (such as found in Negros island), this will lead to competitive price bidding for sugarcane. Moreover, the shift out of the sharing system will remove a key source of inefficiency in the sugar industry. Boosting efficiency and competitiveness of the domestic sugar industry is even more critical if and when the preceding recommendation on liberalizing imports is adopted.

Government may need to support domestic price stability by setting a price floor, as done in Brazil and India; this may be especially needed in areas where only a single mill is in operation (rather than a mill cluster). Ideally, the price floor is set to where planters are paid the value of marginal product, while mills still obtain a reasonable return on investment at the long run equilibrium price of sugar.

A shift to a cane purchase system should be accompanied by a prohibition on forward integration of mills to trading. Under a cane purchase system, mills will come into possession of all the sugar stocks; currently they are also owners of all the warehouses for sugar. These advantages may confer on them a market leadership position and open opportunities for coordinating stock-release and price-setting. The prohibition on the purchase of additional stocks will open up opportunities for other players to enter the marketing chain of the sugar industry.

Continue and strengthen the quedan as a warehouse receipt system and not a means to segment markets. The quedan explicitly divides the market, poses entry barriers to market segments and would constitute a direct violation of competition law were it not for the exception provided in Section 15(b). Note though that the liberalization of sugar importation will nullify the industry segmentation enforced by the sugar classifications. Users of sugar will be able to freely purchase cheap world market sugar, eventually enforcing a single prevailing price in the domestic market. However, the quedan itself, as a warehouse receipt system, need not be abolished.

Maintain market transparency and enforce free domestic transport of sugar. The transparent discovery and dissemination of mill site prices, thanks to industry associations and the SRA, should be maintained after sugar industry reform. Liberalized importation will vastly reduce the incentive to smuggle imported sugar, obviating the need for placing undue restrictions on the inter-island shipping of sugar.

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ANNEX

Details of Statistical Analysis

A. Relationship between export price and domestic price

The relative independence between domestic and world price is found by fitting a distributed lag model of the form:

$$\ln dp_t = \alpha + \beta_1 \ln bp_t + \beta_2 \ln bp_{t-1} + \varepsilon_t \quad (1)$$

to monthly domestic and border prices, in logs (with time subscript t). The model incorporates a one-month lag from world price to domestic price owing to shipping delays. Prior to estimation, we first test for stationarity using the Dickey-Fuller test; the test finds that the null of a random walk (or presence of unit root) is rejected (McKinnon approximate p-values are 0.30 and 0.51 respectively for dp_t and bp_t).

Table 11 reports the results of the regression analysis of Equation (1). The top part of the model fits least squares regression. The adjusted R^2 = 0.85 and the estimated coefficient of contemporaneous border price -0.0454 though the critical t-value is very low such that $\Pr(t > t_c)$ is 0.72 (meaning the coefficient is rejected at 5% level of significance). Meanwhile the lagged border price has a value of 0.2378; this implies that a one-percent increase in world price leads to a 0.24 percent increase in domestic price after one month. The coefficient is associated with a t-value of 0.06, which still fails the 5% threshold (though barely). However, the Breusch-Godfrey test, which exposes the presence of autocorrelation with χ^2 = 240.38, and $\Pr(\chi^2 > \chi^2_c)$ is vanishingly small. Hence the ideal properties of the coefficient estimates under least squares is invalidated.

Table 11. Coefficient estimation of the distributed-lag model

	Coefficient	t-value	$\Pr(t > t_c)$	95% Confidence interval	
Least squares:					
Lnbp	-0.0454	-0.36	0.72	-0.2923	0.2015
Lnbp(-1)	0.2378	1.89	0.06	-0.0103	0.4858
Period	0.0032	19.33	0.00	0.0029	0.0035
Constant	1.8565	28.54	0.00	1.7286	1.9845
Prais-Winsten:					
Lnbp	0.0251	0.36	0.72	-0.1109	0.1610
Lnbp(-1)	0.1900	2.74	0.01	0.0535	0.3265
Period	0.0031	8.51	0.00	0.0024	0.0038
Constant	1.8218	13.6	0.00	1.5584	2.0852

A correction of serial correlation is implemented with the Prais-Winsten regression, reported at the bottom part of the Table. The coefficient of contemporaneous border price still fails the t-value hurdle for significance; however, the coefficient lagged border price now passes the hurdle with $\Pr(\chi^2 > \chi^2_c)$ = 0.01.

B. Cointegration between Negros and other domestic prices

A more systematic analysis looks at the counterpart of equation (1) between pairwise comparisons of provincial prices. However, there are technical problems between a straightforward application of (1). First is the absence of a unit root in the time series data, which vitiates estimation of (1). However, under certain conditions, presence of a unit root does not vitiate estimation of a variant of (1) which is based off *cointegrating* relations.

Unit root tests. The unit root test (using the *dfuller* command of STATA) finds that time series monthly data of Batangas, Negros, Leyte, and Bukidnon, finds that unit root cannot be ruled out in monthly price (hence the time series are non-stationary), but can be ruled out for the first difference (i.e., the first difference is stationary).

Lag structure. The Akaike information criterion, Hannan-Quin information criterion, and Schwarz Bayesian information criterion, all agree that two lags is sufficient, except for Leyte-Negros for which three lags is appropriate.

Existence of cointegrating vector and VEC estimation. The Johansen cointegration test favors the existence of a cointegrating vector only for Leyte-Negros. The result of vector error correction (VEC) model estimation for this

pair is shown in **Table 12**. The cointegrating vector coefficient at the bottom of the page is at 0.82, suggesting that Negros affects Leyte price close to one-ton-one activity. However, the error correction component implies slow adjustment to changes, i.e., coefficient of the one-period lag of Negros price on Leyte is only about 0.18. In short, data is scarce, and only few provinces can demonstrably show a linkage with the Negros market. Geographic arbitrage does indeed dissipate price differences across mill districts but the adjustment process is slow and far from certain.

Table 12: Results of vector error correction estimation, Leyte and Negros monthly mill site prices, 1990 - 2018

Coefficient	Std. Err.	z	P>z
Leyte price (lagged)	0.292	0.059	-4.98
Leyte			
Difference lagged	0.072	0.081	0.88
Difference twice lagged	0.056	0.073	0.77
Difference thrice lagged	0.159	0.070	2.27
Negros			
Difference lagged	0.008	0.071	-0.11
Difference twice lagged	0.182	0.072	2.54
Difference thrice lagged	0.092	0.073	-1.26
Constant term	0.099	0.140	0.71
Negros			
L1.	0.211	0.074	2.85
Leyte			
Difference lagged	0.253	0.103	-2.46
Difference twice lagged	-0.095	0.092	-1.03
Difference thrice lagged	0.027	0.089	-0.31
Negros (cointegrating vector)			
Difference lagged	0.170	0.090	1.89
Difference twice lagged	0.170	0.091	1.87
Difference thrice lagged	0.097	0.092	1.06
Constant term	0.136	0.177	0.77
Leyte	1.00	0.00	..
Negros	0.82	-16.24	0

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