

Sugar: A Spoonful Too Much?

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About Food Market Series

Food Market is a series of articles published by researchers at Khazanah Research Institute (KRI) to analyse statistics related to some food items, intended to increase public knowledge and awareness on its production, trade and consumption. Other articles in this series are:

- [*Banana: The World's Most Popular Fruit*](#)
- [*Soy: The King of Beans*](#)

These articles are short, informative and accessible to the public. It utilises publicly available data (unless stated otherwise). They are **not** meant to study food-specific markets in-depth or make any policy recommendations.

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Articles are available online at www.KRIInstitute.org.

Views

*This article is part of the **Food Market** series of articles at KRI's website. It intends to provide a brief overview of the sugar supply and trade in Malaysia. Some insights are drawn for the benefit of the public; however, this article is **not** meant to offer an in-depth analysis or policy recommendations regarding the sugar market.*

Executive Summary

- Sugar production heavily relies on sugarcane as 80% of global sugar is produced from this crop, while the remaining is sourced from sugar beet. Some of the main producers of sugarcane are **Brazil, India and China**.
- In 2013, the total sugar supply available for consumption in Malaysia was **43.0 kilograms (kg) per person**, equivalent to **118 grams (g) of refined sugar per day** or **24 of 5g sugar packets** commonly found in fast food restaurants! This is nearly double the WHO's recommendation of 15kg to 20kg per person per year, or 41.1g to 54.8g per day.
- **Unused sugar is stored in our body as fat.** With increasingly sedentary lifestyles and the high levels of sugar consumed, obesity is a plausible outcome and might risk other cardiovascular and non-communicable diseases, such as type 2 diabetes. Currently, **Malaysia is the fattest country in Southeast Asia**.
- Malaysia's sugarcane production peaked in the 1970s, but has declined steadily. Sugar refining relies on imports of raw sugar, mainly from **Brazil and Australia**. Aside from supplying food-grade sugar to the domestic market, Malaysia also export this product.
- The sugar market is still protected by many countries. Major players such as **China and India**, impose more than 25% import tariffs of sugar products. Both developing and developed nations have some form of protectionism over their sugar industry.

Introduction

As Malaysians enjoyed the recent Hari Raya Aidilfitri celebrations, their happy smiles when they visited their family and friends were as sweet as the food served during these festivities. Sugary food is not uncommon in our daily diet. It is consumed directly as a sweetener, or added to other food items, whether we realise it or not. Recently, sugar has also been a discussion topic for many, as the Malaysian government announced a tax of 40 cent per litre on sweetened beverages in the 2019 Budget¹. The tax will be enforced in July 2019, postponed from its original enforcement date of 1 April 2019².

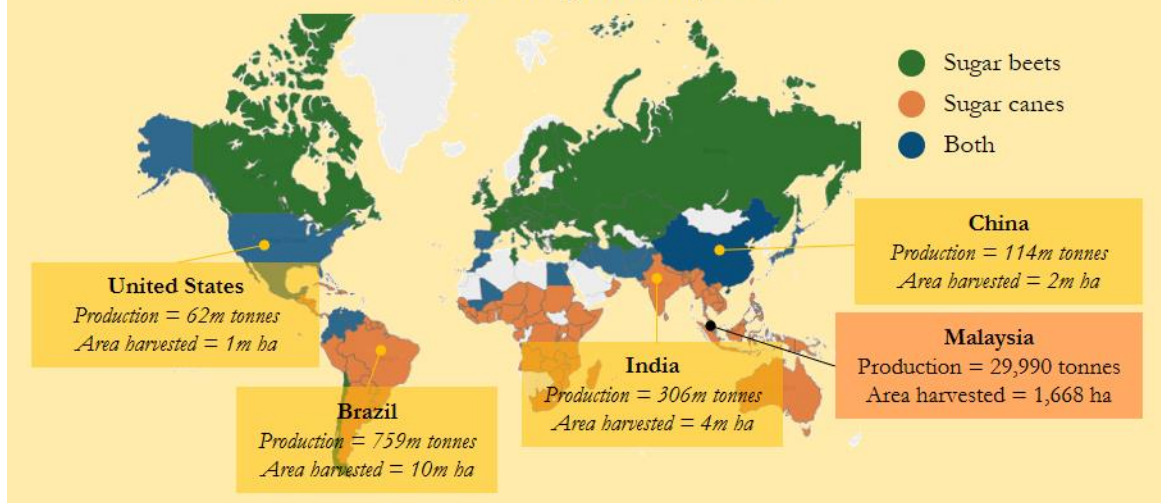
Granulated or table sugar that most households use as sweeteners consist of **sucrose** obtained from sugarcane or sugar beet. For nearly three millenia, sugarcane is the main source of sugar, but sugar beet replaced sugarcane's dominance by 1880 in continental **Europe**. Today, sugarcane produces 80% of **global** sugar³.



Did you know?

Sugarcane is a group of tall perennial grasses with **sucrose-rich stalks**. It has five broad species and is part of the *Saccharum* genus, commonly found in **tropical zones**. Meanwhile, sugar beet has **sucrose-rich roots**, and belongs to the *Beta vulgaris* species and typically found in **temperate zones**. Some countries cultivate both crops. In **2017**, the top sugarcane producers were **Brazil** (39% of global sugarcane production), **India** (16%) and **China** (5%), while the top sugar beet producers were the **Russian Federation** (17% of global sugar beet production), **France** (11%) and **Germany** (11%).

Sugarcane producers, 2017



Source: Based on 2017 figures for sugarcane and sugar beet production from FAO (n.d.-b).

¹ The Edge (2018)

² Azura Abas (2019)

³ FAO (2009)

Given the prevalence of sugar in our diets, the increase in demand and consumption of sugar is threatening the health of consumers, especially as it is affordable to the vast majority of the population, both in developed and developing nations. While certainly not the only factor, increased sugar intake may have contributed to the increasing incidence of overweight and obesity globally. In 2016, **52% of adults** (aged 18 and above) globally were overweight and obese, corresponding to 1.9 billion adults⁴. This epidemic affects developing nations hard, where both obesity and stunting rates are high, including in Malaysia.

Sugar Supply and Consumption in Malaysia

Figure 1 shows the supply⁵ per capita of sugar⁶ in Asia, Southeast Asia and Malaysia from 1961 to 2013⁷. Supply per capita has increased in these areas since 1961. In Malaysia, annual sugar supply per capita increased from **30.0 kilograms (kg)** per capita in **1961** to a peak of **53.4kg per capita** in **1997**, before falling to **30.3kg per capita** in **2005** and then increasing again to **43.0kg per capita** in **2013**, a **43%** increase since 1961. Across Asia, Malaysia has the second highest per capita sugar supply, superseded only by Jordan at 45.9kg per capita, and one of the highest globally (based on 2013 data).

To put these numbers into perspective, the sugar supply at 43.0kg per person in 2013 is equivalent to **118 grams (g)** of refined sugar per day, i.e. **24 of 5g sugar packets** commonly found in fast food restaurants! This is nearly double the World Health Organisation's (WHO) recommendation of 15kg to 20kg per person per year, or **41.1g to 54.8g per day**⁸. Additionally, other survey data suggests that Malaysians are consuming too much sugar. Taking into consideration high sugar content food items, Malaysians are estimated to have consumed about **153.9g** of sugar per day⁹ in 2003 (not just table sugar), way above the recommended levels. To be clear, having a large sugar supply per capita does not mean every individual consumes this much sugar. Some are used as input for the production of other food products which are sold domestically or exported. Moreover, the estimated amount is subject to errors, due to underestimation of population (if it excludes undocumented non-citizens) and memory recollection challenges during surveys.

As household incomes increase, the basket of food consumption increases in complexity, beyond consuming just staple carbohydrates such as rice and wheat. **Figure 2** shows the positive relationship between a country's gross domestic product (GDP) per capita and sugar supply per capita. This is not surprising, as previously poor households experiencing rising incomes and

⁴ WHO (2017).

⁵ Total food supply is calculated by adding food produced locally to imported food, and subtracting what is exported and wasted, taking into consideration changes in food stored. In short, total food supply is the food available in the country for consumption. While total food supply indicates the total amount of food available for consumption in the country, food supply per capita is the average available per person.

⁶ Sugar here is measured in raw sugar equivalent, i.e. the amount of sugar of any form converted back to its equivalent unprocessed amount.

⁷ 2013 is the last year for which comparable data are available.

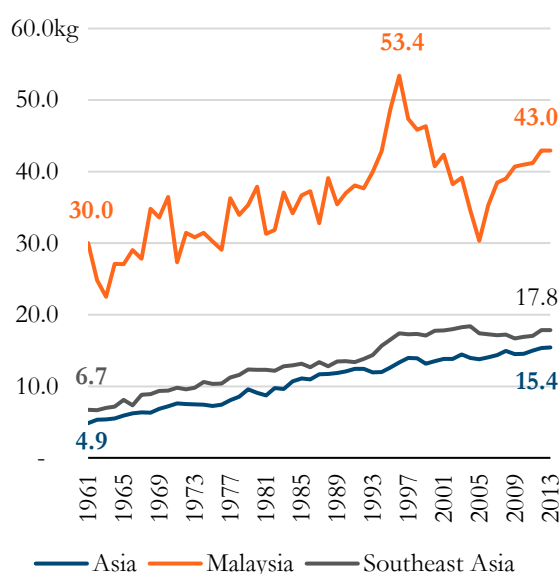
⁸ The recommended consumption of free sugars is less than 10% of total calorie intake per day, roughly 50g per day for a healthy adult WHO (2018a).

⁹ Amarra et al. (2016)

adjusting to times of stable food supply increase the variety and amounts of food consumed beyond just staple carbohydrates, including consuming more sugar¹⁰. Interestingly, Malaysians consume more sugar than is expected of a country with its level of GDP per capita.

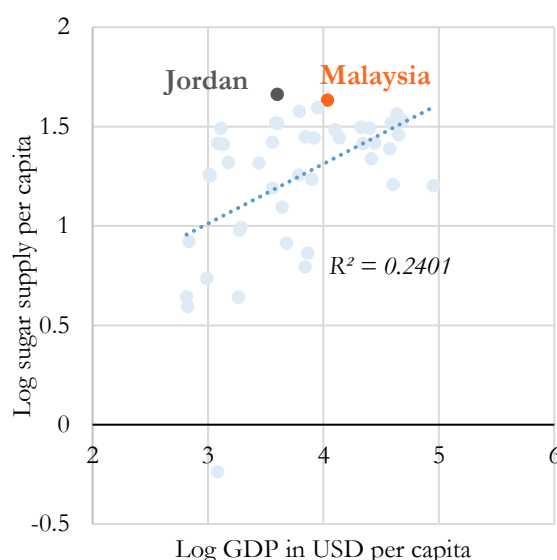
In some developing countries, high sugar consumption is due to the memory of food scarcity in the past. Households with access to more than enough food now may physically and mentally maintain the memory of previous food scarcity, so past experience of famine might affect present consumption¹¹. Even when food is plenty and stable, households are likely to feast and eat more to prepare for potential hardships, sub-consciously overeating food, including sugar¹². Adults whose mothers experience famine and starvation during pregnancy are also more prone to obesity due to genetic and physiological factors¹³.

Figure 1: Supply per capita (kg/person) per year of sugar, Malaysia selected regions, 1961 - 2013



Source: FAO (n.d.-b)

Figure 2: Supply per capita vs GDP in USD per capita, 2013



Source: FAO (n.d.-b) and Bank (n.d.-a, FAO (n.d.-a))

While sugar is not the only cause of nutrition-related health issues, Malaysia's higher than the recommended consumption of sugar is a cause for concern. Any excess sugar and carbohydrates consumed (broken down into simpler sugar by the body) over the dietary energy expenditure is converted into fats. Excessive amount of fats will interfere with the body's ability to control blood sugar and other important functions, leading to incidence of obesity and diabetes (**Box Article**). Sugar can also be as addictive as cocaine, examined in different experiments on test animals¹⁴.

¹⁰ WHO (2018b)

¹¹ Ibid.

¹² Ibid.

¹³ Ravelli (1976), Painter (2005)

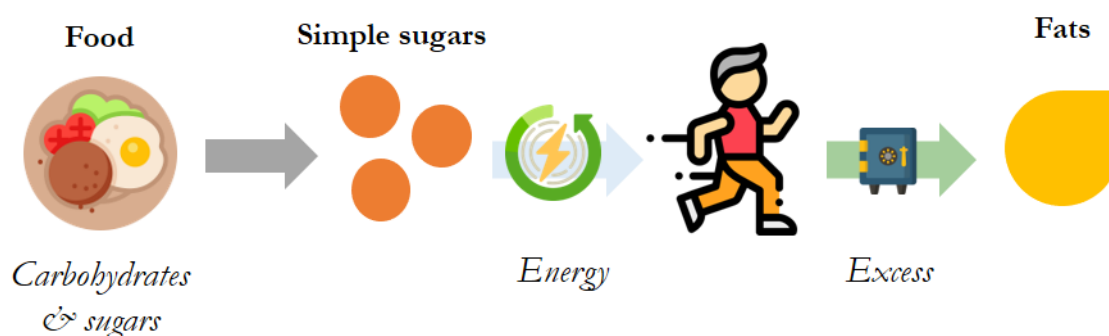
¹⁴ Hoebel et al. (2009)

Malaysia is currently the fattest country in Southeast Asia and the sixth among countries in the South Pacific and West Asia in the Asia Pacific region¹⁵. The prevalence of obesity in **adults** (above 18 years old) has increased from **4.5% in 1996** to **17% in 2015**¹⁶. Obesity among **children** also increased from **5.4% in 2006** to **11.9% in 2015**, doubled in the span of a decade. Diabetes has also increased from **11.6% in 2006** to **17.5% in 2015**¹⁷. The prevalence of overweight adults is also similar for households with different incomes, with between 25% to 35% of households are overweight in each income cohort.

Box Article: What is sugar?

Granulated or table sugar is a type of sucrose, which is a disaccharide of glucose and fructose. Sugar is part of a family of nutrients known as carbohydrates, which is the main energy provider of the body. Examples of carbohydrates include cereals and starchy food, such as rice, wheat and potato.

Figure 3. Conversion of carbohydrates to fat



When we eat carbohydrates, they will be processed into simpler forms of sugar and absorbed in the intestines. This process provide us energy to function as we work, walk and exercise.

If the amount of sugar in our body does not match the amount of energy we use, they will be stored as fats. This is why overweight and obesity are rising around the world as we live increasingly sedentary lives. High body fat is associated with obesity and many cardiovascular and non-communicable diseases, such as type 2 diabetes.

In 2016, a research paper analysed correspondence between the Sugar Research Foundation (now known as the Sugar Association), a sugar industry lobby group, and a group of researchers in the Harvard University School of Public Health. It revealed how the sugar industry influenced the scientific consensus on the causes of cardiovascular diseases, promoting fats, and not sugar, as the culprit. This later affected the United States

¹⁵ Verma (2013)

¹⁶ Institute of Public Health Malaysia (1996), Institute of Public Health Malaysia (2006), Institute of Public Health Malaysia (2011), Institute of Public Health Malaysia (2015)

¹⁷ MOH (2016)

(US) national dietary guidelines to emphasise lowering fat and lightly touching on sugar, which some suspected had triggered the obesity crisis in the US¹⁸. These guidelines later influenced the drafting of guidelines worldwide. The latest US National Dietary Guidelines have rectified this issue, with the removal of the food pyramid, and greater emphasis on reducing sugars.

It is hard to estimate how much sugar we actually consume daily. Much of the sugar we take could be hidden in the food we eat, due to the sugar used in processed and cooked food. This underestimates the real level of sugar we consume.

In fact, there are many types of local sugars and sweeteners that Malaysians consume, beyond granulated sugar. Palm sugar, processed from certain palm tree flowers, including *gula melaka* (from the coconut tree) and *gula apong* (from the nipah palm tree) are examples of local sugars. The extent of the use of palm sugar compared to white sugar is unknown, but it is known that many Malaysian traditional dishes across different cultures use *gula melaka* heavily, from Malay sweet pastries (such as *kuih bingka*, *onde-onde* and the like) to Chinese pork trotters in vinegar. There are also efforts to cultivate alternative sweeteners in Malaysia, such as stevia¹⁹, a natural sugar-free sweetener. The other hidden source of sugar is sweetened condensed milk, with large amount of sugar added to the milk. In 2003, Malaysians consumed on average 30g of sweetened condensed milk per day, equivalent to 16g of refined sugar²⁰.

Essentially, in addition to the high level of sugar supply per capita, we might also be concerned about the prevalence and amount of 'hidden' sugar in the food that we consume. It is also still unclear why Malaysia's sugar consumption is at high levels—it might be the result of higher income, increasing preferences, sugar addiction, widespread presence of added sugars in our food and more typically, a combination of two or more of these factors. Further research into this topic might be needed to explain this trend.

Sugarcane production, refined sugar manufacturing and international trade

As a tropical country, sugarcane grows in Malaysia. Official data show that sugarcane was harvested from **less than 2,000 hectares (ha)** of land in the 1960s, with average production of **43,600 metric tonnes (MT)**. In the next three decades, the area harvested and production dramatically rose, before declining in the 2000s. The 1970s recorded the highest sugarcane production averaging annual growth rates of **38%**, before dropping in the 1980s and 1990s at **8%** and **3%**, respectively. The highest recorded annual production was in **1995**, when Malaysia produced about **1.6 million (m) MT** of sugarcane. Starting year 2000, sugar production declined sharply—from more than 1.0 m MT in 1999 to about 30,000 MT in 2017 (**Figure 4**). Sugarcane production is now mainly in **Johor** (10,837 MT), **Sarawak** (3,863 MT) and **Selangor** (3,857 MT)²¹.

¹⁸ Kearns et al. (2016)

¹⁹ Gaspar (2017)

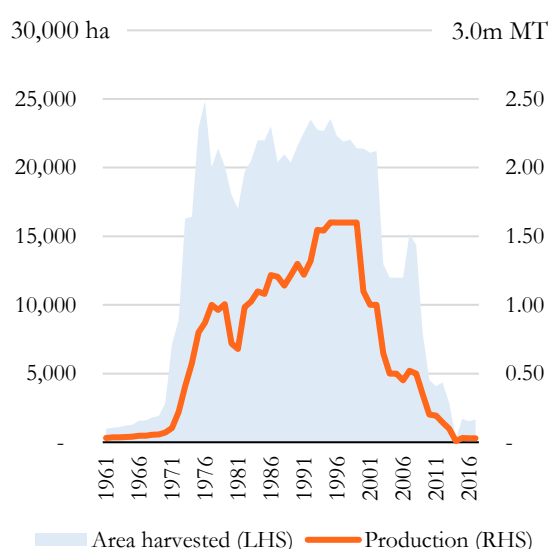
²⁰ Amarra et al. (2016)

²¹ DOA (2017). Based on 2017 data.

In earlier decades, domestic sugarcane was a key input for nation's sugar refining activities as the rise of sugarcane production coincided with the emergence of sugar refinery companies owning sugarcane plantations²². However, plantation activities dramatically declined in the 2000s. This could be associated with unfavourable weather conditions²³ and eventual conversion of sugarcane plantations to other crops, such as oil palm and rubber^{24 25}. The remaining sugarcane plantations likely serve the demand for sugarcane consumption, for example in the form of sugarcane juice.

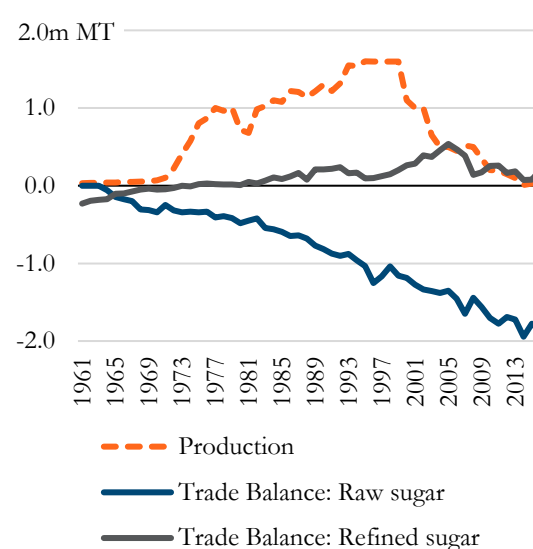
Malaysia has long been a net importer of raw sugar, processed by these refineries to make food-grade refined sugar. Over the years, Malaysia changed its status as net importer to a net exporter of refined sugar. Interestingly, the growth of its raw sugar deficit outpaced the growth of refined sugar surplus (Figure 5). This might indicate the growth of domestic demand for food-grade sugar, reflecting earlier observations on the increasing sugar supply per capita.

Figure 4. Area harvested (ha) and production (m MT) for sugarcane, Malaysia, 1961 - 2017



Source: FAO (n.d.-b)

Figure 5. Production of sugarcane, trade balance for raw sugar and refined sugar (m MT), 1961 – 2017



Sources: FAO (n.d.-b) and FAO (n.d.-c).

Note: Trade balance is the difference between export and import quantities. Raw sugar refers to Sugar Raw Centrifugal.

²² There are two sugar companies in Malaysia, namely MSM Malaysia Holding Berhad and Central Sugars Refinery (Muhd Asyraf Sawal (2018)). Two subsidiaries of MSM Malaysia Holdings Berhad, MSM Prai Berhad (based in Prai, Penang) and MSM Perlis Sendirian Berhad (based in Chuping, Perlis) were established in 1959 and 1971, respectively (Based on MSM (n.d.-b) and MSM (n.d.-a)). Meanwhile, Central Sugars Refinery, based in Shah Alam, have evolved from the mergers of different sugar refineries and stated that it was established in 1965.

²³ PPB Group Berhad (2005)

²⁴ MSM (2011)

²⁵ MSM (2012)

? Did you know?

Sugarcane has been cultivated in New Guinea and neighbouring islands since before 1000 BC. The Indians are said to be the first to develop techniques to extract sugar from sugarcane. From India, sugar expanded to the rest of the world. Sugarcane is processed and refined to be **granulated** or **table sugar**. It produces other by-products too.

By-products of sugarcane



Bagasse to be used as fuel; to produce paper, mulch and chemicals

Filtercake to be used as animal feed, fertiliser and wax

Ethanol to be used as biofuel alternative to gasoline

Molasses consumed as food or to produce feed, ethanol, rum and other products

Once sugarcane is harvested, its juice is **milled**, **strained**, **clarified** using certain chemicals, **evaporated** and then **crystallised**. From these processes, aside from **raw unrefined sugar**, bagasse, filtercake and molasses are produced. The sugar then goes through several steps—affination, carbonation, several layers of filtration, evaporation, crystallisation—before they go through curing, drying, cooling, screening and packing. More molasses are produced, aside from food-grade **granulated** and **confectionary sugars**. **Sugarcane juice** can also be consumed, rather than processed into refined sugar. It is a popular drink in Malaysia and other countries.

Source: Adapted from EPA (n.d.), MSM (n.d.-c) and FAO (2009)

The total import value of sugar-related products²⁶ was about **USD26m** (RM79m) in 1961 and increased to **USD912m** (RM3.8b) in 2016²⁷. Our imports appear to move with global sugar prices, except in some years (**Figure 6**)²⁸. In the past six decades, while the composition of sugar imports have been dominated by raw sugar, our exports are more diversified with food-grade sugar products such as refined sugar, confectionary sugar and other sugar products (**Figure 7**). **Brazil** and **Australia** are the major import sources for raw sugar, while **Singapore**, **Indonesia** and **China** are some of the main export destinations for our sugar products²⁹.

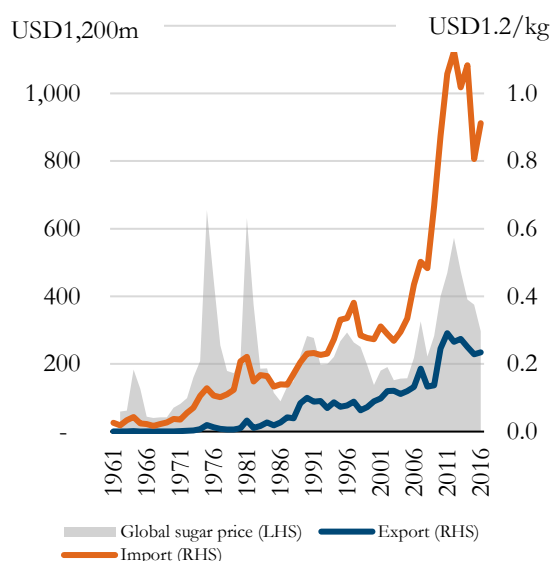
²⁶ Refer to raw sugar, refined sugar, confectionary sugar, maple sugar, beet sugar and other (nes) sugar.

²⁷ FAO (n.d.-c) and Bank (n.d.-b).

²⁸ Correlation between global sugar price and imports is 0.61.

²⁹ FAO (n.d.-d)

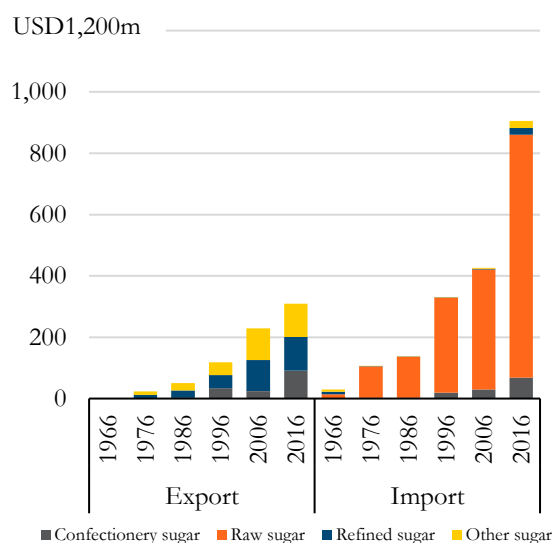
Figure 6. Total exports and imports of sugar-related products (USD m) and global sugar price (USD/kg), 1961 – 2017



Source: FAO (n.d.-c)

Notes: Total consist of raw sugar, refined sugar, confectionary sugar and other sugar (maple & syrups, beet and nes)

Figure 7. Composition of sugar-related exports and imports, various years (USD m)



The biggest player in the international sugar market is Brazil, accounting for **57%** of global exports of raw unrefined sugar and **16%** of refined sugar in 2016 (**Figure 8**). Other main players include India, China, the European Union (EU) and the US³⁰. Production and exports from Brazil peaked in the mid-1970s when the Brazilian government actively supported its sugar industry through PróAlcool, a range of policies that supported production of sugarcane for ethanol in response to the oil price shock of 1973 and the global sugar supply shortage. In the late 1980s, oil prices recovered and the government deregulated the sector. Since 2003, Brazil's sugar sector has been relatively market-driven³¹.

While sugar is produced in many countries, not all countries engage in the international trade of this commodity. In fact, the sugar market is among the least liberalised as many countries still impose barriers to trade such as **protective quotas** and **high tariffs**³². For example, India and China have average import tariffs **above 25%** for their sugar-related products (**Figure 9**). In fact, India recently doubled its import tariffs from 50% to 100% to stabilise domestic sugar prices, among other things³³. These measures protect domestic sugar producers from the international market, but might disadvantage consumers who eventually pay more for sugar³⁴. These policies are practiced by **both** developed and developing countries. The EU, for instance, has implemented

³⁰ FAO (n.d.-c)

³¹ Frawley (2016), Phillips (2018) and Giacomazzi (2012).

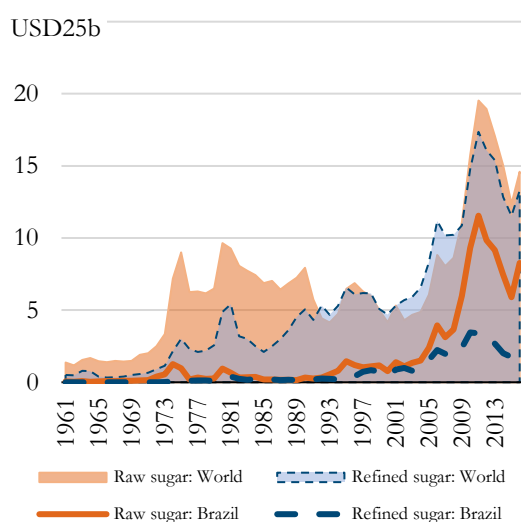
³² Canadian Sugar Institute (n.d.)

³³ USDA (2018)

³⁴ OXFAM (2004)

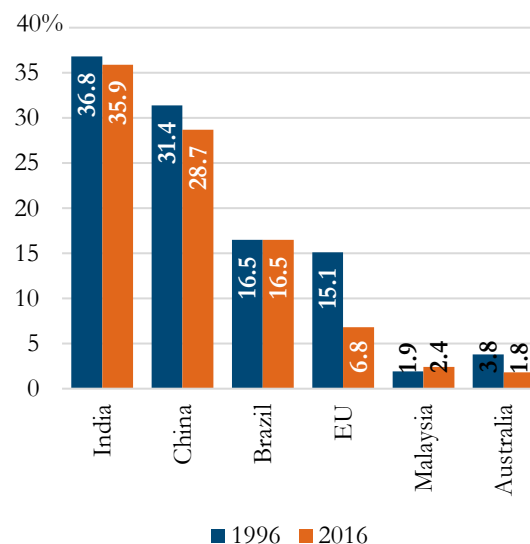
various domestic policies that encouraged sugar production, distorting the international sugar market with excess supply³⁵. The World Trade Organization (WTO) has ruled against the EU, resulting the end of its production quotas in 2017³⁶. Recently, India's subsidies for its sugar producers have been challenged by several countries including Australia, Thailand, the EU, Costa Rica and Guatemala, claiming that India's policies distort world production and prices³⁷.

Figure 8. Export of raw and refined sugar (USD bn), Brazil and world, 1961 – 2016



Source: FAO (n.d.-c)

Figure 9. Average tariff on sugars and sugar confectionary (%), selected countries and years



Source: WTO (n.d.)

Conclusion

In 2013, Malaysia's sugar supply available for consumption was as much as **43.0kg per person**, relatively more compared to other countries. However, the real amount of sugar consumed might be higher due to the prevalence of **added sugar** in our food. Excess sugar in our body is stored as fats, potentially leading to incidence of various diseases. To curb our love of sugary treats, Malaysia imposed a tax on sugary beverages; future studies on the outcome of this policy is especially significant, considering the linkages between higher sugar intake and negative health consequences. Sugar is also related to an important manufacturing activity (**sugar refining**), relying on **imports of raw unrefined sugar**—Malaysia is a **net importer of raw sugar**, although we are a **net exporter of food-grade refined sugar**. International sugar market is still among the most protected in the world. Some countries are attempting to liberalise, although not without facing significant challenges.

³⁵ Ibid.

³⁶ EC (2017)

³⁷ WTO (2019), Sen (2019)

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