

Factors Affecting the Demand and Import of Indonesian Sugar

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Abstract

Sugar is one of the most important staple foods after rice Indonesia. Currently, sugar production cannot fulfill the demand for sugar in the country, so the government absorbs the lack of sugar by import. The purpose of this research is to analyze factors which influence the sugar demand and import in the country. This research is used econometrics model through the simultaneous system of functions with time series data of 1982-2013. Estimated model was conducted by Two-Stage Least Squares method. The research result is, Indonesian sugar demand (Dg) is influenced by sugar price (Pg), income level (ini) and sugar demand in the previous year (Dg1). Import of Indonesian sugar (Mg) is influenced by the difference between demand and production of Indonesian sugar (Dg-Qg), time, and sugar imports in the previous year.

Keywords: Indonesia; Sugar; Demand; Import

Introduction

The condition of Indonesia's sugar economy tends to weaken for a long time. Indonesia's sugar glorious that had been achieved in 1930, with the number of sugar factories reached 179 units and the position as the world's second sugar exporter after Cuba has long ended, and since 1967 import began to do until now the world's largest sugar importer [1]. Fifty remaining sugar factories are still operating, unable to supply the domestic sugar needs for the people of Indonesia [2].

In Indonesia's statistical record, when it was 196,592 hectares of sugarcane area, cane production could penetrate 25.6 million tons while in 2010, the area of sugarcane reached 398.8 ha with sugarcane production reaching only 31.8 million tons. That is, with a larger amount of land, the production of sugarcane does not increase significantly [3]. Similarly, with the productivity of sugar cane, if it can reach 14.70 tons/ha, now with increasing land area, the productivity of sugarcane only reaches 5.74 tons/ha. That is, from the point of agricultural productivity, the productivity of sugarcane has a tragic decline [4].

To cover the shortage of production in an effort to meet the sugar needs of the people of Indonesia, sugar imports into a solution until now. Data Comtrade noted, in 2014 Indonesia imported 65.8 thousand tons of sugar about 35.7 million US dollars [5].

Looking at these trends, it is necessary to conduct research, what causes the sugar demand to be inadequate, and how the tendency of Indonesian sugar imports [6]. Therefore, it is important to know what factors play a role in Indonesia's sugar demand and Indonesian sugar imports [7].

Materials and Methods

The data types used in this study are secondary data as time series from 1982 to 2013. Data are sourced from institutions: Indonesian Central Bureau of Statistics (BPS), USDA, The World Bank, Indonesian Sugar Association (AGI). The procedure of data processing is utilized Econometrics, based on Economics theory through Economy models and run by SAS version 9 [8].

Result and Discussion

Cultures from her thigh and back grew *Rhizopus oryzae*, and sinus cultures grew *Mucor circinelloides*, both subspecies of Zygomycetes

[9-12]. Thigh cultures additionally grew *Alternaria sp*, an ascomycete fungi. She required extensive wound debridement of the back and leg lesions for two weeks, as well as two months of negative pressure wound therapy. She also underwent initial sinus debridement, with weekly sinus washouts and amphotericin foam gel placement for one month [13].

The Function of Sugar Demand and its Response:

$$Dg = \alpha + \beta Pg + \delta Pop + \gamma ini + \lambda Dg1$$

Where Dg=Demand of Indonesian sugar ('000 ton)

Pg=Domestic price of sugar (Rupiah/kg)

Pop=Population numbers

ini=Income (Indonesian Rupiah)

Dg1=Last year of Indonesian sugar demand ('000 ton)

$\alpha, \beta, \gamma, \delta, \lambda$ =parameters

The prediction of the domestic demand response function of sugar obtained is quite good with the value of F calculated: 16,9 which is relatively very real with an error rate less than 1 per cent. The value of determination coefficient obtained by 0.73 means the exogenous variables described in the model is 73 per cent explainable, while 27% is caused by other variables which are not in the function [14-19]. Table 1 below details these conditions.

Table 1 shows that influencing factors are sugar price (Pg), population number (Pop), income level (ini), and demand of sugar of previous year (Dg1) which is relatively very real [20]. The parameterized sign of a negative and the real sugar price with an estimated parameter of 199.8 means, an increase of one unit price, will respond with a decrease of 199.8 units of sugar demand. On the contrary, a decrease of

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Variable	Description	Estimated		
		Parameter	t Value	Pr> t
Pg	Price of sugar	-199.762	-2.06	0.0495
Pop	Population	0.010763	2.47	0.0208
ini	Income level	-0.01704	-2.17	0.0401
Dg1	Last year sugar demand	0.662398	5.88	<0.0001
F Value	=16.91; Pr>F ≤ 0,0001	R-Square	0.73019	

Table 1: The result on estimation of domestic sugar demand.

Variable	Description	Estimated		
		Parameter	t Value	Pr> t
(Dg-Qg)	The difference between Indonesian Sugar Demand and Indonesian Sugar Production	0,003244	2,49	0.0191
t	Time	102630,1	3,65	0.0011
Mg1	Last year Indonesian Sugar import	0.242573	1,16	0.2543
F Value	=103,31; Pr>F=0,0001	R-Square	0.95551	

Table 2: The result on estimation of Indonesian sugar import.

one unit price will be followed by an increase of sugar demand of 199.8 unit the estimated parameter result shows a minus sign (-0.199.762). From this result, it can be concluded that sugar is an elastic product in Indonesia, it can even be said to be very elastic, because a slight change of price, will respond to a relatively high sugar demand. This seems quite different from what Banse, Nowicki and Meijl say, the demand for agri-food products is rather inelastic as there are variabilities of agricultural supply. However, they say, within the last years the demand for agri-food products have been determined by the following driver of constant demand in Europe and Northern America with an increase in demand in Asian countries. And it does, there is a high demand increase of sugar in Indonesia [21,22].

The Population as one of the factors in sugar demand, also shows that with a population increase of one unit, will respond to the increase of sugar demand by 0.01unit. For Indonesia, which has the world's fourth-largest population, it should be noted that if there is an increasing population, it must worry about the increasing demand for sugar [23]. And if this cannot be anticipated with domestic production, then of course only imports are expected to cover the increasing demand for sugar. From the results of this study, the increase in the population of 1%, the Government had to estimate the increase in demand for sugar by 0.01 per cent. Although this figure seems small, if it is multiplied by an increasing number of people, the Government has a big responsibility in providing more sugar.

Unique conditions occur in the event of an increase in income level (ini), which in fact resulted in falling demand for sugar with a regression coefficient of -0.017. It means, when there is a decrease of one unit of income level, will respond with an increase in demand for sugar by 0.017 units. Conversely, if the level of income rises, the demand for sugar will fall. So, if there is an increase in income of one unit, will have a response to falling demand for sugar by 0.017 units. However, this condition has been expressed by Banse et al. there is a change in diet in emerging economies [24]. In 2015, Euro monitor International announced that Nigeria, Indonesia, Mexico, the Philliphines and Turkey are new emerging markets. Bloomberg also posted the top 2017 picks for Asia's emerging markets that Indonesia is one of the most popular picks for investors and strategists in 2017. However, there is a need to take a more in-depth study of why dietary changes are concerned in Indonesia, whether sugar is included.

Past data is very instrumental in doing research so it is the case in Econometrics; last year record is having value, as a factor should have been linked with today's number. Similarly, with this result, the

parameter of the previous year's demand is relatively straightforward with presently and can be interpreted that the current domestic demand of sugar depends on the amount of sugar demand in the previous year. With a relatively high level of significant (Pr <|t| <0.0001, the sugar demand variable in the previous year was considered substantial by the change of one unit of sugar demand last year, will bring changes to the current increase in sugar demand by 0.662398 units. In other words, with the result of this research, the Government can understand that the current demand for sugar is very dependent on the demand for sugar in the previous year. If the previous year sugar demand increased, it can be assumed that the current demand of sugar also tends to rise, with the increase rate of 0.663 units per unit change sugar demand of the previous year.

The Function of Sugar Import and its Response:

$$Mg = \alpha + \beta(Dg - Qg) + \delta t + \gamma Mg1$$

Where Mg=Import of Indonesian sugar ('000 ton)

Dg=Demand of Indonesian sugar ('000 ton)

Qg=Production of Indonesian sugar ('000 ton)

t=Time (year)

Mg1=Last year of Indonesian sugar Import ('000 ton)

α,β,δ,γ=parameters

The prediction of the Indonesian sugar import response function is quite good with the real value of F calculated of 103, 31 with an error rate of less than 1 per cent. The value of determination coefficient obtained is 0.96 means that the exogenous variable described in the model is 96 per cent explainable. While only 4% of other variables were not included in the model. Table 2 shows that the factors affecting Indonesian sugar imports are the difference between Indonesian Sugar Demand and Indonesian Sugar Production (Dg-Qg), time (t) and Indonesian Sugar Imports in the previous year (Mg1). Signs of the variable parameters of the (Dg-Qg), time, and last year Indonesian sugar import are positive with an error rate of less than 30 percent, indicating that the increasing of difference of sugar demand and sugar production, the time and the number of sugar imports of the previous year, will respond to increased imports by regression coefficient of 0,003 to (Dg-Qg) variable, 102,630 to time variable and 0,243 to sugar import of previous year. This is very important information for the Indonesian government, what OECD-FAO (2013) has predicted that Indonesia will be the largest sugar importer in 2020. From this result,

the parameter of (Dg-Qg), time, and sugar imports of previous years are real, it can be interpreted that Indonesian sugar imports will tend to increase from year to year and the number of imports will depend on increasing the difference in sugar demand and production and number count of imports the previous year.

Conclusion

Indonesian sugar demand (Dg) is influenced by sugar price (Pg), income level (ini) and sugar demand in the previous year (Dg1). Import of Indonesian sugar (Mg) is influenced by the difference between demand and production of Indonesian sugar (Dg-Qg), time, and sugar imports in the previous year. Indonesia should be cautious about the prolonged import of sugar and an increasing trend of sugar imports.

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