

Analysis of Factors Affecting Production and Import in Indonesia Corn Commodities using Two-Stage Least Squares (2SLS) Method

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Abstract: In addition to being one of the main commodities of concern to the government in this case, the Ministry of Agriculture has made efforts to increase production continuously for the past 2 (two) years accompanied by encouraging target achievement. In 2017 corn self-sufficiency is expected to be realized accompanied by efforts to increase exports and decrease imports. Based on 2016 data, Indonesia's corn production is around 23.58 million tons (ROOF, Directorate General of Food Crops) or an increase of 20.22% from 2015 production of 19.61 million tons. Estimated data for production in 2017 increased 10.39% to 26.03 million tons (Director General of Food Crops). Bidding in agriculture is a large number of agricultural commodities provided or offered by various producers in an area. The relationship that occurs between the price and the amount offered is positive, that is, the higher the price of a commodity (from OP1 to OP2), the more the number of commodities the producer offers (from OQ1 to OQ2).

Keywords: Imported Corn Production, 2SLS Method, Quantitative Method

I. INTRODUCTION

Corn as one of the main food commodities has a very important role in supporting food availability. Indonesia's country maize production is increasing from time to time due to increasing global demand. In addition to being one of the main commodities of concern to the government in this case, the Ministry of Agriculture has made efforts to increase production continuously for the past 2 (two) years accompanied by encouraging target achievement. In 2017 corn self-sufficiency is expected to be realized accompanied by efforts to increase exports and decrease imports. Based on 2016 data, Indonesia's corn production is around 23.58 million tons (ROOF, Directorate General of Food Crops) or an increase of 20.22% from 2015 production of 19.61 million tons. Estimated data for production in 2017 increased 10.39% to 26.03 million tons (Director General of Food Crops).

If seen by province for the last 5 (five) years in Table 1, East Java and Central Java are the main provinces producing corn with a share of national production of 46.12%. Together with 8 (eight) other provinces, the share of national production is 88.99%.

No	Provinsi	Produksi (Ton)					Rata-rata (Ton)	Share (%)	Share kumulatif (%)
		2012	2013	2014	2015	2016*)			
1	Jawa Timur	6,295,301	5,760,959	5,737,382	6,131,163	6,278,264	6,040,614	30.17	30.17
2	Jawa Tengah	3,041,630	2,930,911	3,051,516	3,212,391	3,574,331	3,162,156	15.80	45.97
3	Lampung	1,760,275	1,760,278	1,719,386	1,502,800	1,720,198	1,692,587	8.45	54.42
4	Sulawesi Selatan	1,515,329	1,250,202	1,490,991	1,528,414	2,065,125	1,570,012	7.84	62.27
5	Sumatera Utara	1,347,124	1,183,011	1,159,795	1,519,407	1,557,463	1,353,360	6.76	69.03
6	Jawa Barat	1,028,653	1,101,998	1,047,077	959,933	1,630,238	1,153,580	5.76	74.79
7	Nusa Tenggara Barat	642,674	633,773	785,864	959,973	1,278,271	860,111	4.30	79.08
8	Gorontalo	644,754	669,094	719,780	643,512	911,350	717,698	3.58	82.67
9	Nusa Tenggara Timur	629,386	707,642	647,108	685,081	688,432	671,530	3.35	86.02
10	Sumatera Barat	495,497	547,417	605,352	602,549	711,518	592,467	2.96	88.98
11	Lainnya	1,986,399	1,966,568	2,044,175	1,867,212	3,163,209	2,205,513	11.02	100.00
	Indonesia	19,387,022	18,511,853	19,008,426	19,612,435	23,578,399	20,019,627	100.00	

Like food crops in general, the trade performance of corn shows a deficit value. However, its performance in the January - May 2017 period shows a positive thing. Corn exports up to May increased both in terms of volume and value. The increase in corn export volume in January - May 2017 was 31.69% compared to the same month in 2016. The value of exports also increased by 26.47%, from 3.66 million USD to 4.62 million USD in 2017.

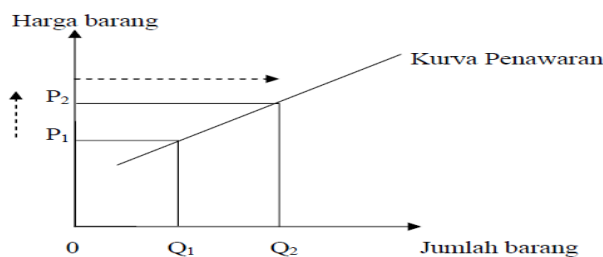
Based on the Regulation of the Minister of Trade Number 20 / M-DAG / PER / 3/2016 concerning provisions on the import of corn, Bulog was appointed as the party that imports corn for feed. Recommendations on the import of corn for feed are issued on recommendations from the Ministry of Agriculture. The limitation of corn imports for feed by the Ministry of Agriculture was taken by considering a program to increase national maize production. At present, corn imports are only carried out for certain situations. For example for the cow's milk industry where the dairy cows must be fed corn with very low levels of aflatoxin. This corn with very low requirements for aflatoxin levels cannot be met by the quality of local maize. Circulation of imported corn is also closely monitored, where companies cannot transfer imported corn.

The performance of corn trade based on import dependency ratio (IDR) and self-sufficiency (SSR) can be seen in BPS of 2016 and 2017. Center for Corn Production Center In the period of January - May 2017, the import dependence ratio of national maize is significantly lower compared the same period in 2016. The IDR value in 2017 was 2.06%, down from January-May 2016 which was 6.84%. Likewise, if specified according to the form of import export, IDR fresh corn in 2017 is 1.38% or decreases from the previous 6.10% in January-May 2016.

II. LITERATURE REVIEW

1. Theory of Demand, Supply and Price

Bidding in agriculture is a large number of agricultural commodities provided or offered by various producers in an area. The relationship that occurs between the price and the amount offered is positive, which is the higher the price of a commodity (from $0P_1$ to $0P_2$), the more number of commodities offered by producers (from $0Q_1$ to $0Q_2$).



The assumption used in this supply theory is *ceteris paribus*, which is a condition in which other factors are considered to be constant. For example, if the price of a commodity itself rises, it is assumed that *ceteris paribus* means that factors other than the price of the commodity themselves have not changed (Lipsey, 1995). The amount of production offered on the market comes from production at a certain time and inventory (inventory) from previous periods.

According to Iswardono (1994), the factors that influence the supply of a commodity mathematically can be written with the following functions:

$$QSK = f(PK, PS, PI, G, T, TX) \dots\dots\dots (2.1)$$

Where:

QSK = Commodity offer

PK = Price of the commodity itself

PS = Price of other commodities (substitution or complementary)

PI = Price of production factor

G = Company goal

T = Level of use of technology

TX = Taxes and subsidies

Prices are formed by markets that have two sides, namely supply and demand. Price is a signal of scarcity (scarcity) a resource that directs economic actors to allocate their resources (Sunaryo, 2001). The intersection of the supply curve with the demand curve of a commodity in a market determines the market price of the commodity, where the number of commodities demanded is equal to the quantity of commodity offered. In other words, the balance of market prices is the result of the interaction of the power of supply and demand in the market (Nicholson, 1995).

III. RESEARCH METHODOLOGY

1. Types and Data Sources

The data used in this study are secondary data in the form of time series data with a time period of 21 years, namely from 1996 to 2017, as well as the results of interviews with several parties related to research

problems. Secondary data was obtained from various government agencies or related institutions including the Ministry of Agriculture, Ministry of Trade, Ministry of Industry, Central Bureau of Statistics (BPS), Logistics Agency (BULOG), Association of Livestock Food Entrepreneurs (GPMT), Library and Agricultural Technology Deployment Center, Center for Economic Studies, Library of the Bogor Agricultural Institute, literature and internet studies. The types of data collected in this study were Indonesian corn production, corn crop area, corn crop productivity, volume or amount of Indonesian corn imports, local corn prices, corn prices at the producer level, urea fertilizer prices, corn import prices, world corn prices, corn import tariffs, rupiah exchange rate against the US dollar, deflation of Gross Domestic Product (2000 = 100), World Corn Trade Price Index (2000 = 100) and others.

2. Data Analysis and Processing Methods

This method of analysis is a descriptive method and quantitative method. The quantitative method is used to analyze the factors that influence the production and import of Indonesian corn. The data analysis model used is the Two-Stage Least Square (2SLS) method using the Eviews 5 program that previously used Microsoft Excel 2010.

IV. RESULT AND DISCUSSION

The condition of corn production in Indonesia during the period 1996 - 2017 increased fluctuatively because of the increase in the area and productivity of corn plants. The area in that period was concentrated in Java and experienced a shift in the use of land types from dry land to irrigated land during the dry season. The type of corn that is widely produced by domestic maize farmers is local maize which includes the type of pearl corn (*Zea mays indurata*). In terms of productivity, Indonesia's corn productivity is still relatively low despite increasing from year to year. This is because the farming system of corn farmers in Indonesia is not optimal, such as the limited use of high-yielding varieties, unbalanced fertilization is more dominant using urea fertilizer, and there is still a lack of use of pesticides for pest control.

Corn consumption also experienced an increase, especially consumption for industry. During the period of 1996 - 2017 there was no imbalance between the amount of corn production and consumption nationally. The feed industry as a support for the growth of the livestock industry is the main consumer of corn in Indonesia. This happens because there is an increase in public awareness to meet the needs of animal protein. However, the increase in the feed industry has not been matched by the production of domestic maize (*Zea mays indentata*) teeth used as feed ingredients.

Corn production increased but Indonesia's corn imports experienced a high increase to meet the needs of the feed industry. The type of corn imported is horse tooth corn (*Zea mays indentata*) as feed raw material. The countries of China, the United States, Argentina, Thailand, and India are countries of origin for Indonesian corn imports. The development of corn prices in the world market is relatively declining because there is always an excess supply of corn which is also a cause of an increase in Indonesia's corn imports. The government sets Indonesia's corn import tariffs to protect domestic corn farmers. However, the corn import tariff policy so far has favored the feed industry so that it can still produce at the lowest possible cost so there is no increase in the prices of livestock products.

Analysis of production factors at a real level of five percent based on the main variables that influence production, namely harvested area and corn productivity, provides information that for equal harvest area, the variable that has significant effect is the real price of corn at the producer level, the real prices of other crops, namely the real soybean prices that are corn competitors in land use, credit interest rates, and the previous year's harvested area; while for corn productivity only variables previous year's productivity that had a significant effect. The variable real price of corn at the producer level, inflation rate, and local real price of corn in the previous year have a significant effect on the real price of local corn. The variable real price of corn at producer level, inflation rate, and local real price of corn in the previous year have a significant effect on the real price of local corn.

Analysis of corn imports provides information that the variable price of Indonesian corn imports and the amount of Indonesian imports of corn in the previous year had a significant effect on the amount of Indonesian corn imports. Although Gross Domestic Product does not significantly affect the amount of Indonesian corn imports but has a sign that is in accordance with economic theory / hypothesis. The variable exchange rate of the rupiah against the US dollar, the amount of imported corn, the import tariff of corn, and the price of imported corn in the previous year had a significant effect on the price of Indonesian corn imports. There are several variables that have a significant effect but are not in accordance with economic theory / hypothesis, namely the interest rates on credit, the exchange rate of the rupiah against the US dollar and the import tariff on corn.

V. CONCLUSION

1. Conclusion

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2. Suggestions

Suggestions that can be recommended to relevant parties in an effort to realize an increase in corn production is the development of harvested area should be diverted outside Java and the land used should have a good irrigation system so that planting corn is no longer seasonal. Increased productivity of corn plants through improvement of farming systems is realized by the provision and use of superior hybrid and composite varieties, balanced use of fertilizers for urea, SP-36, KCl. and ZA, as well as the use of pesticides for pest control. Increasing corn productivity, especially horse tooth corn (*Zea mays indentata*) which is used as raw material for the feed industry will have a positive impact on the decline in Indonesian corn imports. Thus, the price of corn at the producer level will increase and encourage farmers to grow more corn. The government is expected to formulate policies in terms of the exchange rate of the rupiah against the US dollar and Indonesia's corn import tariff which is more in favor of domestic corn farmers without burdening entrepreneurs in the feed industry.

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