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THE IMPACT OF DEVELOPMENT POLICY ON SUPPLY AND DEMAND SOYBEAN IN INDONESIA

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ABSTRACT

This research discusses of developing soybeans on supply and demand in Indonesia. To answer these objectives, the goal of econometrics is to use system model of equations with estimation using the 2SLS method. The results show that amount of national soybean demand is strongly influenced by soybean prices at the wholesalers, population and per capita income. The amount of soybean demand is very responsive to changes in population. While the number of bids is influenced by soybean production, imports, and supplies. Policy simulation results 10 percent increase in soybean prices at the farmer will have an impact on increasing soybean production by around 9.58%. This increase caused by increasing in harvested area of 7.71%. Eliminating urea subsidies by 60% will have an impact on declining soybean productivity by 42.79%, then decreasing agricultural land of oybean which is 38.62% and productivity of 5.02%.

Keywords: Soybean Development, Policy, Supply, Demand

PROEM

In 2017, BPS stated that Indonesia must be able to meet food needs for 255.46 million people. This is a challenge for the government to reinvigorate the agricultural system in Indonesia. Agriculture is the activity of utilizing biological resources carried out by humans to produce food, industrial raw materials, or energy sources, as well as to manage their environment.

The agricultural sector to date, and in the future will continue to play an important role in the Indonesian economy. There are various fundamental reasons why the agricultural sector needs attention, among others, because the agricultural sector is the main primary products such as food, fiber, wood and others. The agricultural sector is also the dominant absorber of labor, especially in rural areas. In addition, the

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agricultural sector is often attached to the progress of a nation, because the agricultural sector is generally the dominant economic sector in developing countries (Kusnadi, 2005).

In the Indonesian market, the supply of imported soybeans, among others, was obtained from several countries such as the US, Argentina, Brazil, Malaysia and India. The supply of Indonesian soybeans is mostly dominated by soybeans from the US. The country controls more than half of the overall soybean trade in Indonesia with a share of 72%, followed by Argentina 11%, Brazil 6%, Malaysia 4%, India 1% and others 6%. (Aryaraja; 2000).

The main consumption of soybean products in Indonesia is tempeh and tofu as the main side of Indonesian society. The results of the 2015 SUSENAS show that the average tempeh consumption per person per year in Indonesia is 6.99 kg and knows 7.51 kg. Ironically, the fulfillment of the need for soybeans which is the main raw material for tempeh and tofu is only 67.28% or 1.96 million tons must be imported from abroad. This happened because domestic production was unable to meet the demand of domestic producers of tempeh and tofu.

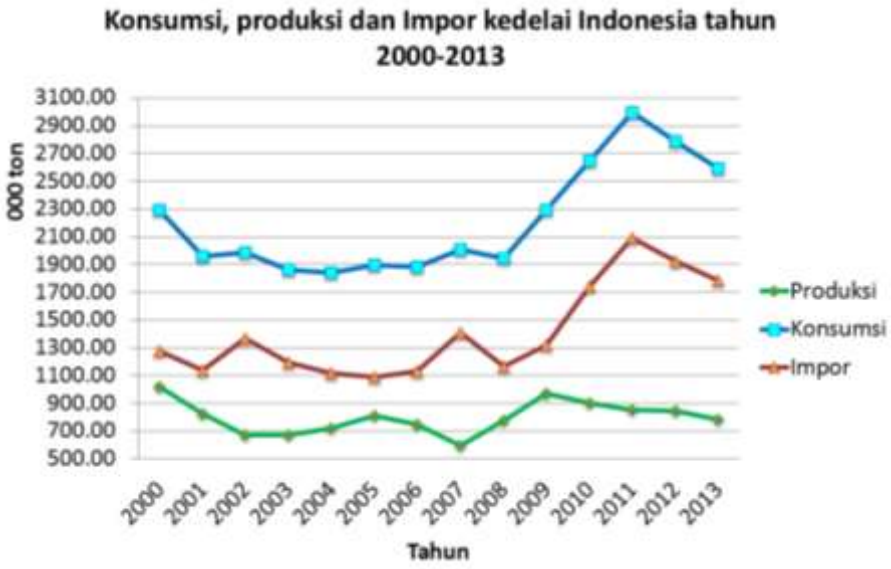

Figure 1. Soybean consumption, production and import, 2000-2013

The low Indonesian soybean production is influenced by many factors including the low production of tempe, the decreasing planting area, and the low use of cultivation technology. The government's efforts so far have not been maximized, only on paper.

THEORETIC

Government policy in order to increase soybean production is through (Kumenaung, 2002):

1. intensification, namely efforts to increase production through subsidizing inputs and using superior seed Technology;
2. extensification, namely efforts to increase production through expansion of planting areas, both in paddy fields and in dry land; and
3. Determination of basic prices, intended to create competitive base prices for farmers so that they are motivated to increase production.

The study of soybean economic policy has been carried out by several previous researchers, both those relating to aspects of production, consumption and trade with various policies. Among the research conducted by Budhi and Aminah (2010), states that in an effort to support soybean self-sufficiency, Indonesia has found a promising set of technologies in the form of soybean varieties that have high productivity, technology to increase the spectrum of development, extensification of land is still possible , efforts to provide quality seeds and the application of imported soybean import duties to the limit of 27 percent.

According to Setiabakti (2013) research results state that soybean production in Indonesia is strongly influenced by soybean prices at the farm level, prices of production facilities, especially urea and soybean seeds, labor costs and the amount of soybean imports. These factors influence through changes in increase in harvested area and soybean productivity. The area of soybean harvesting is very responsive to changes in prices or wages of agricultural labor in both the short and long term. While soybean productivity is less responsive to its forming factors. One of the results of the policy simulation is an increase in soybean prices at the farm level of 35%, this is very effective in increasing the welfare of soybean farmers.

METHOD

In analyzing the impact of trade policies on the performance of exports of primary wood processing industry products, the econometrics model was used as an analytical tool, and was built according to the framework of the previous chapter. The operational model is based on a model that has been developed by Labys (1973) and Sinaga (1989) with an emphasis on trade policy which is a policy variable (exogenous) on existing

structural equations. The type of data used in this study is secondary data with a time series from 1981 to 2010.

1. **Equation of Soybean Planting Area**

$$LAPK_t = a_0 + a_1 HKDP_{t-1} + a_2 (HRJG_t / HRJG_{t-1}) + a_3 HPUR_t + a_4 (UTKP_t / UTKP_{t-1}) + a_5 LAPK_{t-1} + U_1 \ldots\ldots\ldots\ldots\ldots\ldots(01)$$

Expected parameter value: $a_1 > 0$; $a_2, a_3, a_4 < 0$; $0 < a_5 < 1$

2. **Equation of Soybean Productivity**

$$YSKD_t = b_0 + b_1 LAPK_t + b_2 HBKD_t + b_3 YSKD_{t-1} + U_2 \ldots..(02)$$

Expected parameter value: b_1 , b_2, > 0 ; $0 < b_3 < 1$

3. **Equation of Indonesian Soybean Production**

$$PROK_t = LAPK_t * YSKD_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(03)$$

4. **Soybean Prices at Large Traders**

$$HKPB_t = c_0 + c_1 SNKD_t + c_2 HKDM_t + c_3 DKDN_t + c_4 HKPB_{t-1} + U_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(04)$$

Expected parameter value: c_1 , < 0 ; $c_2, c_3 > 0$; $0 < c_4 < 1$

5. **Soybean Prices at the Farmer**

$$HKDP_t = d_0 + d_1 HKPB_t + d_2 PROK_t + d_3 HKDM_t + d_4 DKDN_t + d_5 HKDP_{t-1} + U_4 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(05)$$

Expected parameter value: $d_2 < 0$; $d_1, d_3, d_4 > 0$; $0 < d_5 < 1$

6. **National Soybean Demand**

$$DKDN_t = e_0 + e_1 HKPB_t + e_2 JPUP_t + e_3 GPCI_t + U_5 \ldots\ldots\ldots\ldots(06)$$

Expected parameter value: $e_1 < 0$; $e_2, e_3 > 0$

7. **Soybean Inventory**

$$SKDI_t = f_0 + f_1 PROK_t + f_2 MKDI_t + f_3 DKDN_t + f_4 SKD_{t-1} + U_6 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(07)$$

Expected parameter value: $f_1, f_2, f_4 > 0$; $f_3 < 0$

8. National Soybean Supply

$SNKD_t = PROK_t + MKDI_t + SKDI_t$ ……..(08)

9. Impor Kedelai Indonesia

$MKDI_t = g_0 + g_1 PROK_t + g_2 DKDN_t + g_3 HKDM_t + g_4 NTRP + g_4 PKDA_t + U_7$…….(09)

Expected parameter value: $g_1, g_3 < 0$; $g_2, g_4 > 0$

10. Indonesian Import Soybean Prices

$HKDM_t = h_0 + h_1 HXKA_t + h_2 TMKD_t + h_3 CR4_t + U_8$……(10)

Expected parameter value: $h_1, h_2, h_3 > 0$

11. American Soybean Price Export

$HXKA_t = i_0 + i_1 IMWD_t + i_2 PKDA_t + i_3 HXKA_{t-1} + U_9$…..(11)

Expected parameter value: $i_1 > 0$; $i_2 < 0$; $0 < i_3 < 1$

Model identification is determined based on order requirements, ranking requirements and adequacy requirements. According to Koutsoyianis (1977), to discuss the structure equation model based on the terms of use of the formula (K - M)> (G - 1), where: K = Total endogenous variables and variables predetermined in the model, M = Number of endogenous and exogenous variables for one equation, G =. Under the condition:

1. (K - M)> (G - 1): Statistics are overidentified
2. (K - M) = (G - 1): identified equations (precisely identified)
3. (K - M) <(G - 1): equation not identified (unknown)

Policy simulations are conducted to evaluate the various effects of government policies represented by the value of independent variables or explanatory variables on endogenous variables. In accordance with the objectives of the study, the policy imulation for the period 1981-2010 or the historical simulation of the policy to be simulated is:

1. Increase in soybean prices at the farm level by 10%
2. Elimination of urea fertilizer subsidies by 60%

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RESULT

The results of the analysis obtained factors that influence the demand and supply of Indonesian soybeans are the area of soybean, soybean productivity, soybean prices in large traders, soybean prices at the farm level, national soybean demand, Indonesian soybean supply, imported Indonesian soybeans, imported soybean prices Indonesia and the price of American soybean exports. The following is a table of the general diversity of model predictions.

Table 1. General Diversity of Model Predictions

No	Nama Variabel	F Value	Prob>F	R-Square	DW-Stat	Dh-Stat
1	Luas Areal Tanam Kedelai	39,60	<,0001	0, 89593	2,32237	-0,26308
2	Produktivitas Kedelai	214,12	<,0001	0,96254	2,13942	2,64633
3	Harga Kedelai di Pedagang Besar	161,66	<,0001	0,96421	1,12978	-
4	Harga Kedelai di Tingkat Petani	436,39	<,0001	0,98957	2,12259	-0,04328
5	Permintaan Kedela Nasional	17,71	<,0001	0,67997	0,99139	
6	Persediaan Kedela Indonesia	19,83	<,0001	0,76772	2.17954	-
7	Impor Kedelai Indonesia	517,45	<,0001	0,99119	1,16253	
8	Harga Kedelai Impor Indonesia	299,09	<,0001	0,97293	1.32601	
9	Harga Ekspor Kedelai Amerika	42,62	<,0001	0,83645	1,98321	0,05901

Source: Research data, 2018

On the results of the analysis table ditas, economic criteria in this study All the parameters and magnitudes of the parameters in the model are in accordance with economic theory, in the Statistical Criteria obtained R ^ 2> 0.70 for 88.89% and F-test: Prob Value> F < 0.1 on the real level of 10 percent by 100%. While the t-test: at least one variable has an effect on the level of significant 10 percent. this finding confirms that, indicators of soybean planting area will have an impact on increasing domestic soybean productivity. besides, it will also reduce the level of imports and have an impact on increasing the selling price of soybean farmers, which in the end increases farmers' welfare.

A model is essentially a simplified representation of the real world, where a good model is a model that is able to explain the phenomenon. The model validation used in this study focused on the RMSPE and U-Theil coefficients and their decomposition. Validation results can be seen in the table below.

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Table 2. Validation Test

NO	Variabel	RMSPE	U-Theil
1	Luas Areal Tanam Kedelai	23,6516	0,0825
2	Produksi Kedelai Indonesia	25,2336	0,0849
3	Produktivitas Kedelai	3,4658	0,0152
4	Harga Kedelai di Pedagang Besar	30,7536	0.0898
5	Harga Kedelai di Tingkat Petani	18,7895	0,0491
6	Permintaan Kedela Nasional	18,4107	0,0064
7	Persediaan Kedela Indonesia	73,0329	0,0866
8	Penawaran Kedelai Indonesia	22,1137	0,0781
9	Impor kedelai Indonesia	53,4221	0,1131
10	Harga Kedelai Impor Indonesia	12,6310	0,0651
11	Harga Ekspor Kedelai Amerika	11,5494	0,0582

Source: Research data, 2018

The simulation can determine the direction and magnitude of changes in an endogenous variable in the soybean performance system in Indonesia, which is caused by government intervention or policy. Policy evaluation can be done by comparing the impact caused by the policy with several alternative policies. Alternative policies or historical simulation scenarios are carried out to evaluate the Impact of the Soybean Development Policy on the Supply and Demand of Soybean in Indonesia as follows:

Table 3. The Impact of Development Policy on Supply and Demand Soybeans In Indonesia

No	Variabel	Satuan	Nilai Dasar	Perubahan %	
				S1	S2
1	Luas Areal Tanam Kedelai (LAPK)	000 Ha	982,3	7,7166	-38,6236
2	Produksi Kedelai Indonesia (PROK)	000 Ton	11217,4	9,5842	-42,7916
3	Produktivitas Kedelai (YSKD)	Ku/Ha	11,5836	1,1283	-5,0200
4	Harga Kedelai di Pedagang Besar (HKPB)	Rp/Kg	2242,1	-9,3038	42,8081
5	Harga Kedelai di Tingkat Petani (HKDP)	Rp/Kg	1703,5	10,0000	36,8418
6	Permintaan Kedelai Nasional (DKDN)	000 Ton	1899,1	4,5495	-20,9257
7	Persediaan Kedelai Indonesia (SKDI)	000 Ton	122	1,1475	-5,8197
8	Penawaran Kedelai Nasional (SNKD)	000 Ton	12122,2	8,6478	-38,7141
9	Impor Kedelai Indonesia (MKDI)	000 Ton	779,5	-3,1944	15,0866
10	Harga Kedelai Impor Indonesia (HKDM)	US$/ Ton	279,6	0,0000	0,0000
11	Harga Ekspor Kedelai Amerika (HXKA)	US$/Ton	261,9	0,0000	0,0000

Source: Research data, 2018

Simulation 1: Increase in soybean prices at the farm level by 10%

Based on the results of the analysis above, it can be seen that the simulation results of increasing soybean prices at the farm level are 10 percent. This certainly will have an impact on increasing soybean production by around 9.58 percent. The increase in soybean production was a result of an increase in harvested area of 7.71 percent. The increase in soybean production is thought to be due to rising soybean prices at the farm level. Where this condition will increase the interest of farmers to grow soybeans, so that the area of harvest and soybean production increases and can reduce imports of soybeans. This increase in soybean production will cause an increase in the supply of national soybeans by 8.64 percent, this has an impact on increasing Indonesia's soybean inventory by 1.14 percent and the amount of demand also increasing by 4.54 percent. In addition, rising soybean production caused a decline in soybean imports by 3.19 percent. But it does not change the price of imported soybeans. An increase in farmer's soybean prices by 10 percent will cause an increase in soybean production and reduce soybean prices at the wholesaler level by 9.30 percent.

Simulation 2: Elimination of urea fertilizer subsidies by 60%

The results of the above analysis show that the 60 percent subsidy for urea fertilizer will cause a decrease in soybean production by 42.79 percent. The decline in soybean production is a result of a large decrease in the area of soybean, which is 38.62 percent and a decrease in productivity of 5.02 percent. This caused an increase in soybean prices at the farm level of 36.54 percent. As a result of the increase in soybean prices, the national soybean supply or supply has decreased by 38.71 percent. On the other hand there is also an increase in soybean prices at the level of wholesalers around 42.80 percent. In addition, the increase in soybean prices resulted in a decrease in the demand for Indonesian soybeans by 20.92 percent. The decline in soybean production resulted in an increase in soybean imports by 15.08 percent, but did not cause an increase in the price of imported soybeans.

Findings and Recommendation

1. The findings above confirm that the removal of subisdi fertilizers has an impact on the decline in soybean production, which has an impact on the decline in interest of farmers to massively grow soybeans, then has an impact on increasing soybean prices in the market, as well as increasing imported soybeans.

2. To increase domestic soybean production, the government must make policies that will benefit farmers as producers and consumers. Partially made policies will only benefit one party. To encourage farmers to want to increase their production, the government policy in addition to providing assistance in the form of subsidies for production facilities must also be accompanied by price guarantees when the harvest takes place, because at this time the bargaining position of farmers is very low. The price protection policy aims to stabilize output prices which will determine farm income which will ultimately change the welfare of farmers as soybean producers.

CONCLUSION

The results of the analysis and discussion above, can be concluded as follows:

1. The amount of national soybean demand is strongly influenced by soybean prices at the level of wholesalers, population and per capita income. The amount of soybean demand is very responsive to changes in population. While the number of bids is influenced by soybean production, soybean imports, and soybean supplies
2. The impact of soybean development policy on soybean supply and demand in Indonesia, namely:
    a. Increase in soybean prices at the farm level by 10%.
    b. Reducing soybean supply and demand, namely increasing the price of urea fertilizer by 60%.

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