ANALYSIS OF FACTORS AFFECTING COMPETITIVENESS AND IMPORT OF POWDERED MILK IN INDONESIA

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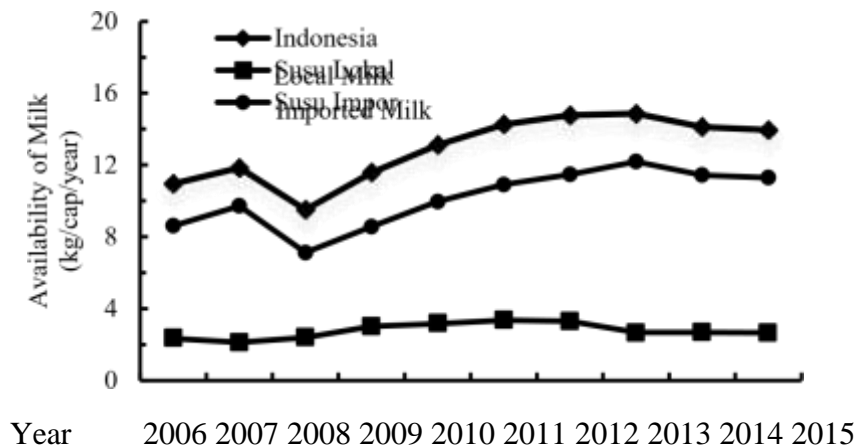[1]School of Business, Bogor Agricultural University, Indonesia.

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ABSTRACT: *The growth of domestic powdered milked consumption in Indonesia exceeds the growth of domestic powdered milk raw materials production, it is causes fulfillment of needs is provided through imports. The purpose of this study are 1) Analyze the factors that influence the competitiveness of the domestic powdered milk industry; 2) Analyze the factors that are determinants of the import of raw powdered milk, and 3) Formulate strategic recommendations that can improve the competitiveness of the domestic powdered milk industry. Based on the results, the factors that most play a role in the competitiveness of domestic powdered milk are government policies in trade, the Milk Processing Industry (IPS), and the company's strategy. Based on Engle-Granger Cointegration method, in the long run the volume of Indonesian powdered milk imports is significantly affected by the real price of imported powdered milk, the real exchange rate, real per capita income, and import tariffs. Meanwhile, based on short-term dynamic ECM equations, the volume of imported powdered milk is significantly affected by domestic powdered milk production, the real price of domestic powdered milk, real per capita income, and import tariffs.*

KEYWORDS: Competitiveness, Import, Powdered Milk, Engle-Granger Cointegration

INTRODUCTION

The availability of milk for consumption in Indonesia has been fluctuating growth. Food material balance data (NBM) shows the availability of milk for consumption in terms of its supply source consisting of two types, including local milk and imported milk. The availability of local milk and imported milk is 14.39 kg / capita / year with an average growth for local milk down 2.99% per year or 2.93 kg / capita / year while for imported milk it rises 2.70% per year or 11.46 kg / capita / year. The availability of domestic milk 80% is supplied from imported milk, while local milk only contributes 20%. This indicates that the Domestic Milk Processing Industry (IPS) prefers to use imported raw materials to produce powdered milk. Supplier of imported milk, including Australia, New Zealand and the United States. The Ministry of Agriculture study in 2015 shows that milk availability in Indonesia has increased by 1.34% per year (Figure 1).

Picture 1 Availability of Milk in Indonesia 2006-2015

Source: Ministry of Agriculture Republic of Indonesia (2015)

Herawati and Priyanto (2013) stated that Indonesian people still consider milk as a luxury item. Indonesian people's milk consumption is only around 11 liters / capita / year, lower than Malaysia and the Philippines, each of which reaches 22 liters / capita / year. Milk consumption in the community is generally in the form of pure milk, powdered milk and sweetened condensed milk. The average growth of consumption of pure milk in Indonesia according to data from National Socioeconomic Survey (Susenas) from 2006-2015 was decreased 2.44 liters / capita / year. Meanwhile, for the type of powdered milk and sweetened condensed milk in the same period tend to increase. The growth of consumption of powdered milk in Indonesia from 2006-2015 was 0.5% per year.

The average growth rate of domestic powdered milk consumption exceeds the production of domestic powdered milk raw materials, causing the fulfillment of needs is provided through imports. The dominance of imported milk raw materials indicates the dependence of domestic powdered milk industry on supplies from other countries. The realization of Indonesia's milk imports from 2006-2015 is still far above the realization of exports, causing a trade balance deficit. This can be seen from the ratio of exports to imports after 2010 tends to decline between 10.82% to 17.24% (Ministry of Agriculture 2016).

The ratio of Indonesia's milk import export ratio in 2015 was 10.82%, this indicates that national milk demand is more than 80% met by imported production. This is caused by domestic powder milk production unable to meet the needs of the milk processing industry. Based on data from the Central Statistics Agency (2018), in 2006-2015 powdered milk production did not had significant growth. Yusdja and Sayuti (2002) revealed that the lack of capacity of domestic milk production is due to the fact that the industrial structure at the farm level is dominated by small-scale dairy farmers. This condition is exacerbated by the inefficiency of the operational performance of farmer cooperative institutions. Therefore, it is important to conduct research related to the analysis of factors that affect the competitiveness and import of powdered milk in Indonesia.

Based on the explanation above, the research objectives of this study are 1) Analyze the factors that influence the competitiveness of the domestic powdered milk industry;

2) Analyze the factors that are determinants of the import of raw powdered milk, and 3) Formulate strategic recommendations that can improve the competitiveness of the domestic powdered milk industry.

LITERATURE

Amaliah and Fahmi (2007) conducted a study of Factors Affecting Indonesian Milk Imports using Error Correction Model (ECM). The study aims to analyze the factors that are determinants of Indonesian milk imports. The study uses time series data on production, consumption, exports and imports from 1996 to 2005. The results show that perceptions and preferences influence purchasing decisions.

Other research is conducted by Asmara (2012) regarding Competitiveness Analysis and Factors Affecting Milk Production in Indonesia using Porter's Diamond Analysis and Data Panel. Porter's Diamond's analysis shows that the fundamental weakness of domestic milk competitiveness lies in factor conditions. On the contrary, factors that are suspected to contribute greatly to the condition of competitiveness are the conditions of demand. The results of the analysis using panel data regression method shows that the variable number of dairy cows has a significant effect. For the variable price of domestic cow milk and the variable price of corn does not significantly influence milk production.

In addition, Herawati and Priyanto (2013) conducted a study on the Performance of the Milk Processing Industry in Supporting Milk Self-Sufficiency in Indonesia using Descriptive Analysis. The downstream segment of the dairy industry is still dominated by the milk processing industry, which is entirely located in Java by producing processed milk, most of which are imported. For the upstream segment, most are dominated by dairy farmers who are members of cooperatives or independent. There are 48 milk processing companies, 20 in West Java, 12 in East Java, 8 in DKI, 2 in DIY, 2 in Central Java and 1 company in North Sumatra, Lampung, East Kalimantan and South Sulawesi. In East Java, which is the highest level of processed milk, only 75.60% of the capacity of IPS is used to produce processed milk.

METHODOLOGY

Sampling Technique

The type of data used in answering the formulation of research problems are primary data and secondary data. Primary data is used to analyze the factors that affect the competitiveness of the domestic powdered milk industry using Diamond Porter. Primary data was obtained from questionnaires and direct interviews with respondents. Selection of respondents using judgmental sampling method, which is based on respondents expertise regarding the subject under study. The respondents including 9 (nine) persons, each representing the Government, Academics / Researchers, and Businessman.

The secondary data types is annual time series in 10 years (from 2006 to 2015). This data is to analyze the factors that are determinants of imported powdered milk in Indonesia. This annual

secondary data is then interpolated into quarterly data using a linear interpolation method developed by Insukindro (1999).

Research Variable

The volume of Indonesian powdered milk imports is used as a diagnostic variable to reflect the condition of domestic milk competitiveness in the framework of competition. The increase in the volume of imported powdered milk is reflect the low competitiveness of domestic milk.

Table 1. Research variables and data sources

Variable	Unit	Sources
Volume of imported powdered milk	Kg	
Volume of powdered milk production	Kg US$/kg	Directorate General of Livestock and Animal Health, Ministry of Agriculture
Real price of imported powdered milk		
Real price of domestic powdered milk	Rp/kg	
Real exchange rate Rupiah	Rp/US$	World Bank
Real GDP per capita	US$	World Bank

Data Analysis Descriptive Analysis

The Diamond Porter model is used as a tool to analyze the competitiveness of powdered milk in Indonesia. Analysis is run on each component in the Diamond Porter model which includes: 1) factor conditions, 2) conditions of demand, 3) related and supporting industries 4) strategy, structure and competition, 4) government, and 5) opportunity.

Determination of factors that have the greatest influence on the competitiveness of the powdered milk industry is run using a Likert scale based on the level of influence. Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena (Sugiyono 2009). The Likert scale used consists of 4 (four) levels which are gradations from not determining to very decisive.

Quantitative Analysis

The Engle-Granger cointegration estimation and error correction model (ECM) are used to determine the factors that affect the import of powdered milk as a problem that decreases the competitiveness of domestic milk. Estimates are made with EViews 6 software. The models used in this study are:

$QM_t = b_0 + b_1 QP_t + b_2 PM_t + b_3 PD_t + b_4 RER_t + b_5 GDP_t + b_6 D1_t + u_t,$ dimana:

QMt = Volume of Indonesian imported powdered milk in period t,

QPt = Volume of Indonesian powdered milk production in period t,

PMt = Real price of imported powdered milk in period t,

PDt	= Real price of domestic powdered milk in period t,
$RERt$	= Real exchange rate Rupiah to United States Dollar in period t,
$GDPt$	= Real GDP per capita in period t,
$D1_t$	= Dummy import tariff determination,
ut	= error distribunce in period t.

The estimation results on unit root and cointegration testing can be used to estimate the model using the error correction model (ECM) as follows:

$$DQM_t = \beta_1 DQP_t + \beta_2 DPM_t + \beta_3 DPD_t + \beta_4 DRER_t + \beta_5 DGDP_t + D1_t + \gamma u_{t-1} + e_t,$$

$-1 < \gamma < 0$ dimana :

D	= First difference,
QMt	= Volume of Indonesian imported powdered milk in period t,
QPt	= Volume of Indonesian powdered milk production in period t,
PMt	= Real price of imported powdered milk in period t,
PDt	= Real price of domestic powdered milk in period t,
$RERt$	= Real exchange rate Rupiah to United States Dollar in period t,
$GDPt$	= Real GDP per capita in period t,
$D1_t$	= Dummy import tariff determination,
γ	= *Error correction term*
ut	= $QMt - b0 - b1QPt - b2PMt - b3PDt - b4RERt - b5GDPt$
et	= *error distribunce* periode t.

Research Hypothesis

Based on a review of theories and literature studies from several previous studies, the hypothesis of factors that determine volume of Indonesian powdered milk imports are:

1. The volume of Indonesian powdered milk production has a negative effect on the volume of Indonesian imported powdered milk.

2. The real price of imported powdered milk has a negative effect on the volume of Indonesian imported powdered milk.

3. The real price of domestic powdered milk has a positive effect on the volume of Indonesian imported powdered milk.

4. The real exchange rate Rupiah to United States Dollar has a negative effect on the volume of Indonesian imported powdered milk.

5. The real GDP per capita has a positive effect on the volume of Indonesian imported powdered milk.

6. Dummy import tariff determination has a negative effect on the volume of Indonesian imported powdered milk.

RESULTS AND DISCUSSIONS

Domestic Powdered Milk Competitiveness Analysis (Porter's Diamond Approach)

This study analyzes the competitiveness of domestic powdered milk into the six components contained in the Porter's Diamond theory (Porter, 1990). Based on interviews with experts obtained results as Table 2.

Table 2. Factors that influence the competitiveness of domestic powdered milk based on the Diamond Porter model

No.	Factors	Responses				Respondents	Average Value
		1	2	3	4		
Factor Conditions							
1	Natural resources		2	5	2	9	3.00
2	Human resources			6	3	9	3.33
3	Capital resources		1	4	4	9	3.33
4	Science and Technology Resources			5	4	9	3.44
5	Infrastructure		2	3	4	9	3.22
Demand Conditions							
6	Domestic consumption of powdered milk		2	2	5	9	3.33
7	Per capita income growth		1	8		9	2.89
8	Consumer preferences		3	5	1	9	2.78
Related Industries and Supporting Industries							
9	Milk Processing Industry (IPS)			4	5	9	3.56
10	Supplier Industry		1	5	3	9	3.22
11	Cooperative		6	2	1	9	2.44
Strategy, Structure and Competition							
12	Company strategy			4	5	9	3.56
13	Domestic market structure			9		9	3.00
14	Competitor strategy		2	7		9	2.78
The Role of Government							
15	Government policy in trade			3	6	9	3.67
16	Government policy on investment		1	5	3	9	3.22

17	Government policy in taxation 2				4	3	9	2.78
18	Government policy in research 2 2 and technology				5		9	2.67
Opportunity								
19	Business climate	1	6	2			9	3.11
20	Market developments that allow opportunities		1	6	2		9	3.11
21	International Trade Agreement 1				4	4	9	2.67

From the results of this analysis it can be seen that the attributes that have the highest value are government policy in trade with an average value of 3.67, then followed by the Milk Processing Industry (IPS) and company strategies with an average value of

While the attribute that has the lowest value is a cooperative with a value of

Factor Conditions

1. Natural resources

    The condition of natural resources that support domestic powder milk production is inseparable from the conditions of domestic dairy farming. Based on Setiawati (2007), the genetics of dairy cows in Indonesia, namely Frisian Holstein (FH) cattle, Hissar and Sahiwal cattle and their crosses, have the highest superiority of milk production compared to other dairy cattle. However, the average people's dairy cow farmers pay little attention to the cattle lineage they have. Other natural resource factors that influence dairy farming are climate and environment. The tropical climate which tends to be hot causes the performance, production and reproduction of dairy cows to experience disturbances both directly and indirectly due to the declining quality of feed and the development of disease (McDowell, 1989). Domestic milk production centers are located on the island of Java, which on average has agroclimates that support the development of dairy cattle, namely cool temperatures, plateaus, availability of sufficient concentrates (quality and quantity), and abundant water (Luthan, 2011). The next factor is the land, where almost all of the people's dairy farms in Indonesia do not have a system that guarantees the provision of forage feed sources available throughout the year.

2. Human Resources

    Livestock sub-sector workforce in the 2012-2016 period is dominated by workers with a low level of education, including elementary school graduates and lower level others (graduating from elementary school, not / not completing primary school and not / never attending school) with a proportion of 75%. This shows that there is still a low level of quality education for workers in the livestock subsector. Meanwhile, when viewed from the status of its main job, the majority of workers in this sector are family / unpaid workers (35%). The dairy farming business that develops in Indonesia as a community farmer is characterized by small-scale family business units and maintenance that is still traditional. The dairy cattle business in Indonesia is still relatively small, namely 1-3 animals per

farmer. Most of the workforce comes from the farmer's own family, which consists of heads of families, wives and children of farmers. Workers who come from farmer families are family contributions to agricultural production or livestock which are never paid in money as a whole (Mubyarto, 1989).

3. Capital Resources

    Erwidodo (1993) and (Swastika et al., 2005) state that dairy farming in Indonesia is generally a family business in rural areas on a small scale, while large-scale businesses are still very limited and generally are newly growing dairy cattle businesses. The scale of the low dairy cattle business (3–4 tails) per farmer causes household income from dairy cows to not yet become a feasible source of income for farmers. In addition, based on the condition of dairy farming in Indonesia is currently run as a side business without paying too much attention to profit and loss, still far from technology, and supported by business management and capital that is still weak. Dairy farmers need large capital to run a livestock business. But most farmers still do not want to borrow capital from KUD loans or government programs due to the interest expense that must be borne by farmers, so that farmers use private capital more.

4. Science and Technology Resources

    Lack of capital and technology (Atmadilaga, 1989) causes farmers to be less able to develop their business and less able to produce at an optimum level. Even feeding according to the needs of livestock as a minimum maintanance is often forced to be passed by farmers, especially for livestock that do not yield cash income (Suryahadi et al., 2007). In addition, there is still a lack of awareness of farmers to implement Good Farming Practices (GFP) thereby reducing the quality of Domestic Fresh Milk (SSDN). In the downstream sector, technological advancements continue to grow, in addition to making dairy products more durable and long-lasting, technology is also able to change the form of liquid milk into powdered milk. Currently the milk preservation technology that is widely used by industry is using the technology of spray dryer dryers or roller dryers.

Demand Conditions

Delgado et al. (1999) predict that by 2020 average per capita milk consumption per year in Southeast Asia is 16 kg. Thus, there is a large market potential in Indonesia. The high potential demand for dairy products is the main strength of the Indonesian dairy industry. This power is predicted to increase continuously in the future along with the increasing per capita income of the Indonesian people. In addition, in terms of consumption, domestic milk production is still not sufficient to cover domestic consumption needs. Currently domestic production can only supply no more than 20% of national consumption, the remaining 80% comes from imports.

Related and Supporting Industries

According to experts from Diamond Porter analysis, IPS is included in the most important attributes of related industries and supporting industries that have an average value of 3.56. The search results of the Directorate General of Agro and Chemical Industry, Ministry of Industry in 2008, recorded 12 companies processing powdered milk in Indonesia. IPS collaboration with farmers in addition to accommodating fresh milk products from farmers, also compiles various programs to increase production, productivity and quality of milk

produced by farmer groups as raw material suppliers. The program is called the KUD (Village Unit Cooperative) service.

Strategy, Structure, and Competition

The company's strategy is also the most influential attribute with an average value of 3.56 in the Diamond Porter analysis. The strategy carried out by companies incorporated in the IPS is currently joining the Milk Processing Industry Association (AIPS). AIPS buys raw milk from the Indonesian Milk Cooperative Association (GKSI) and makes its own dairy farm. This is done to get good, consistent, and stable milk raw materials. In addition, oligopsonic competition in the powdered milk processing industry has led several companies to control the receipt of supply or become sole buyers of raw milk. Based on the share of powdered milk in Indonesia there are 9 (nine) companies that control the market (Marino, 2016).

The Role of Government

The role of the government in strengthening the domestic powdered milk market is very important, through policies that provide incentives for IPS to be able to produce domestic powdered milk. Based on the results of Diamond Porter's analysis, the attributes that most influence the role of government are government policies in trade with an average value of 3.67. Government policies that have been issued in order to increase domestic milk competitiveness include development of post-harvest facilities, fostering partnerships between IPS and farmers and / or cooperatives, provision of income tax facilities in investment of dairy industries and livestock, and provision of Business Credit schemes Cow breeding (KUPS). Regulation of the Minister of Agriculture 2017 requires businesses that produce processed milk (IPS) to have a processing unit within 3 years after this Regulation of the Minister of Agriculture applies. Whereas for businesses that do not produce processed milk (importers), it is required to form partnerships in the form of promotions. IPS business actors and importers are obliged to run partnership cooperation in the form of production facilities and capital for dairy farmers.

Opportunity

The powdered milk industry in Indonesia has a great opportunity in the effort to supply powdered milk products to 255 million Indonesians, whose current average consumption has only reached 0.018 kg / capita / year (Ministry of Agriculture 2016). In addition, AIPS projects that the processing industry based on cow's milk will grow between 6.8-7.0%, with the value of the sales of the cow's milk processing industry reaching Rp. 31 trillion. Furthermore, AIPS said that the people's purchasing power, availability of raw materials, and government regulations are the main pillars of the growth of milk production.

Analysis of Determinant Factors of Raw Powdered Milk Imported Long Term Analysis

Based on the estimation results of the Engle-Granger Cointegration method, in the long run the factors that affect milk imports in the long run are shown in Table 3, it can be seen that there are four of the six independent variables that have a probability value smaller than the real level of 5%, namely the real price imported powdered milk (PM), Rupiah real exchange rate (RER), Indonesian real per capita income (GDP) and import tariff dummy (D1). This means that these variables individually have a significant effect on the import of powdered milk (QM).

Meanwhile, domestic powder milk production (QP) and the real price of domestic powdered milk (PM) do not significantly affect milk import volume in the long run.

Table 3. Estimates of the factors that affect the import of powdered milk in long term

Variables	Coefficient	Probability
Constant	-7.021830	0.0000*
QP	0.039410	0.0551
PM	-0.192592	0.0020*
PD	0.042574	0.1150
RER	-0.364583	0.0274*
GDP	2.980736	0.0000*
D1	0.147147	0.0441*

Source: Results of data processing Eviews 6

Description: * Significant at 5% real level

Short Term Analysis

The results of the estimation of short-term dynamic ECM equations are shown in Table 4. It can be seen that there are four of the six independent variables that have a probability value smaller than the real level of 5%, namely the volume of domestic powder milk production (QP), the price of domestic powdered milk (PD) , Indonesian real per capita income (GDP) and import tariff dummy (D1). This means that these variables individually have a significant effect on the import of powdered milk (QM). Meanwhile, domestic powder milk production (QP) and the real price of domestic powdered milk (PM) do not significantly affect milk import volume in the short term.

Table 4 Estimates of the factors that affect the import of powdered milk in short term

Variables	Coefficient	Probability
Constant	-0.002117	0.3443
QP	0.054543	0.0000*
PM	-0.105264	0.0805
PD	0.036116	0.0000*
RER	-0.462709	0.1708
GDP	-15.25280	0.0000*
D1	0.034431	0.0000*
ET (-1)	-0.135894	0.0023*

Source: Results of data processing Eviews 6

Description: * Significant at 5% real level

Recommended Strategies for Increasing Domestic Powder Milk Competitiveness

Government policy on trade is the factor that determines the competitiveness of domestic powdered milk. So that in the future, the government needs to make policies especially in limiting trade in imported powdered milk and providing incentives in order to stimulate IPS to produce powdered milk. In addition, the Milk Processing Industry (IPS) is another factor that

also determines the need to increase cooperation with farmers. In addition to accommodating fresh milk products from farmers, IPS needs to develop various programs to increase production, productivity, and quality of milk produced by farmer groups as suppliers of raw materials. The strategy carried out by companies incorporated in the IPS is currently joining the Milk Processing Industry Association (AIPS). In order to get good, consistent, and stable milk raw materials, AIPS buys raw milk from the Indonesian Milk Cooperative Association (GKSI) and makes its own dairy farm. Milk obtained from the farm itself will certainly be more controlled both in terms of quality and price. In addition to procurement of raw materials, the powdered milk processing industry needs to start using the latest powdered milk processing machines that are able to produce more, efficient, and low-cost powdered milk to remain competitive.

The policy recommendation based on an analysis of the factors that affect milk imports in the long run is the government must be able to maintain the real exchange rate and reduce the real price of powdered milk by focusing on cost efficiency in the upstream sector. Furthermore, government should providing tax incentives to IPS who want to develop dairy farming domestically so that the resulting powdered milk products can compete with imported powdered milk products. Based on the results of short-term analysis, recommendations that can be submitted are encourage milk production through the mapping of livestock locations so that the supervision process of the ministry can be run thoroughly and on target. The government also needs to supervise the tariff policy for imported powdered milk by calculating the need for IPS raw materials in real terms so that the government can predict how many raw materials must be provided domestically.

IMPLICATION TO RESEARCH AND PRACTICE

For the government, it is necessary to limit the entry of imported milk by making superior policies and programs starting from the upstream sector, namely increasing the productivity of dairy farmers by providing superior seeds and feed subsidies to reduce production costs which have an impact on milk prices. In addition, it is important for the government to provide facilities in licensing and capital incentives for farmers. In the downstream sector, the government should make policies that are able to attract business people to want to develop industrial locations that are integrated with farmers, as well as provide tax incentives for businesses to use domestic raw materials.

For businesses, they must be able to develop domestic milk production in collaboration with local farmers. In addition, technology adoption is not only carried out in the downstream sector but also in the upstream sector so that the raw material produced is guaranteed both in quality and quantity.

For academics / researchers, further research needs to be developed to determine the efficiency of domestic powdered milk production when compared to using imported products. In addition, research is needed on how much technology productivity is currently used and the development of the latest technology. From the economic side, it is important to conduct research related to the impact of increasing domestic powdered milk production on the Indonesian economy.

CONCLUSION

Based on the results of the research, some conclusions are obtained as follows:

1. Factors considered to determine the competitiveness of the domestic powdered milk industry are: 1) Government policy in trade, 2) Milk Processing Industry (IPS), and 3) Corporate strategy.

2. Factors that are determinants of imports of raw powdered milk in Indonesia are:

    1) In the long run, it is significantly affected by the real price of imported powdered milk, the real exchange rate, the real per capita income, and the determination of import tariffs.

    2) In the short term, it is significantly affected by the domestic powdered milk production, the real price of domestic powdered milk, the real per capita income, and the determination of import tariffs.

3. Recommendation of strategies to increase the competitiveness of the domestic powdered milk industry is the government needs to make policies related to restrictions on the import of powdered milk by making policies that support farmers and the powdered milk processing industry. In addition, IPS needs to increase cooperation and develop various programs with farmers. Then in order to improve efficiency, can use powdered milk processing machines with the latest technology.

4. Recommendations based on long-term analysis are maintaining the real exchange rate and reducing the real price of powdered milk by focusing on cost efficiency in the upstream sector and providing tax incentives to IPS to develop dairy farming.

5. Recommendations based on short-term analysis, namely spurring milk production through the mapping of livestock locations so that the supervision process of the ministry can be carried out thoroughly and on target.

Future Research

Future research needs to be developed to determine the efficiency of domestic powdered milk production when compared to using imported products. In addition, research is needed on how much technology productivity is currently used and the development of the latest technology. From the economic side, it is important to conduct research related to the impact of increasing domestic powdered milk production on the Indonesian economy.

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