ANALYSIS OF FACTORS AFFECTING THE IMPORT OF DAIRY MILK (CASE STUDY: THE IMPORT OF DAIRY MILK IN INDONESIA)

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ABSTRAK

Pasokan susu segar dalam negeri (SSDN) belum dapat memenuhi kebutuhan konsumsi susu dalam negeri sehingga pemenuhan kebutuhan konsumsi susu dilakukan pula dengan impor susu. Penelitian ini bertujuan untuk analisis faktor-faktor yang mempengaruhi impor susu di Indonesia. Metode penelitian menggunakan teknik analisis kuantitatif yaitu regresi linier berganda. Penelitian ini dilakukan di Indonesia dengan menggunakan data sekunder tahun 2006-2016 yang diperoleh di Badan Pusat Statistik dan Kementerian Pertanian serta literatur-literatur lain terkait penelitian. Variabel penelitian meliputi kurs, PDB perkapita, ekspor susu, dan produksi susu. Variabel yang memiliki hubungan positif signifikan terhadap impor susu Indonesia adalah PDB perkapita, ekspor susu, dan produksi susu. Sedangkan, variabel kurs memiliki hubungan negatif terhadap impor susu.
Kata kunci: determinan, impor susu, regresi linear berganda

ABSTRACT

The supply of fresh dairy milk in the country (SSDN) has not been able to meet the needs of domestic dairy milk consumption so that the fulfillment of dairy milk consumption needs is also done by importing dairy milk. This study aims to analyze the factors that influence milk imports in Indonesia. The research method uses quantitative analysis techniques, namely multiple linear regression. This research was conducted in Indonesia using secondary data from 2006-2016 obtained at the Central Statistics Agency and the Ministry of Agriculture and other literature related to research. Research variables include exchange rates, GDP per capita, milk exports, and milk production. The results showed that variables GDP per capita, milk exports, and milk production have positive influence. Meanwhile, exchange rate has negative influence for milk imports.
Keywords: determinant, milk imports, multiple regression linear

INTRODUCTION

Import is one of the government policies and is aimed at international trade in Indonesia. The amount of domestic production that is unable to meet that of the domestic needs is the cause of the implementation of the import policy (Tri, 2011; Baohi Song et al., 2009). A negative relationship between imports and production is revealed by a study conducted by Syariah and Idqan (2007). If a country has a declining volume of imports for a commodity, it is assumed that the country has an increasing volume in production. Meanwhile, if the imports for a commodity increase, it is assumed that the production declines. Alternatively stated, the increase in the volume of imports is presumed to be caused by insufficient domestic production, making it is necessary to import. Foreign exchange rates have a negative relationship with imports (Andi dan Syamsul, 2009). Parveen (2012) showed that there is a negative and significant relationship between the US dollar exchange

rate and the rupiah toward the import volume of Indonesia.

Imports are also highly dependent on the gross domestic product (GDP) because GDP is a source of financing for imports. A study conducted by Imamudin (2008) showed a positive relationship between GDP and imports. An increase in national income will increase imports of consumer goods in Indonesia, assuming *cateris paribus*. Imports are applied to some goods/services whose quantity cannot yet be met in the country, including milk products. Up to 78.89 percent of the milk supply is fulfilled by imports while only 22.11 percent of it was fulfilled by domestic milk producers, which are smallholder dairy farmers.

Milk is an animal-based food material with high nutritional content. It is a good source of high plant protein with polyvalent that has a role in immune function and the transportation and absorption of nutrients as well as important vitamins and minerals for the human body (Pereira, 2014). It makes the demand for milk increasing together with the increasing human population and other factors affecting the import of Indonesian milk. Such import is carried out so that domestic milk needs can be fulfilled. The development of milk in 1996-2016 is shown in Table 1.

The role of the agricultural sector in economic development is crucial as most members of communities in poor countries rely on this sector. Rising public welfare in the agricultural sector becomes one of the attempts to eradicate poverty in the majority of people in the agricultural sector. Agricultural sector reform serves as an attempt to overcome the problem of the widening economic crisis, which is performed by increasing food security in the short term (Erwidodo, Wittwer, & Stringer, 2009).

As an agricultural sub-sector, livestock is essential to develop, aiming to stimulate the ability of local farmers to improve the domestic milk supply. To date, local breeders are only able to meet around 25 - 30 percent of the domestic supply (Directorate General of Animal Husbandry, 2017). The consumption presented in Table 1 also has not considered the use by industries outside of households. The shortage of milk supply is eventually fulfilled by the supply of imported milk. Until 2016, the supply of imported milk has raised to reach 412,176 tons (Table 1). The growth in milk imports in Indonesia year by year, in general, can lead to huge losses for Indonesia such as a reduction in national foreign exchange and the inability to manage potential resources efficiently and effectively.

Table 1. Development of Import, Availability and Consumption of Milk in 2006-2016 Period

Year	Imported Milk (Ton)	Availability of Local Milk (Kg/Cap/Year)	Milk Consumption (Kg/Cap/Year)
2006	188.128	2,34	1,48
2007	181.520	2,12	2,25
2008	180.933	2,39	2.13
2009	211.634	3,01	1,95
2010	231.396	3,16	2,07
2011	247.495	3,35	2,11
2012	386.116	3,30	1,69
2013	380.558	2,67	2,07
2014	363.531	2,68	2,20
2015	368.844	2,76	2,58
2016	412.176	2,97	2,67

Source: Ministry of Agriculture, 2017

This study aimed to analyze the factors affecting the import of dairy milk in Indonesia. The factors studied include exchange rates, GDP per capita, milk exports, and milk production.

RESEARCH METHODS

This study was conducted in Indonesia using secondary data from 2006-2016 obtained from the Statistics Indonesia and the Ministry of Agriculture as well as supporting literature listed in the bibliography. The dependent variable in this study is the import of milk in Indonesia (Y). The independent variables in this study are the exchange rates (X1), GDP per capita (X2), dairy milk exports (X3), and the amount of milk production (X4).

The data analysis technique used was quantitative analysis of multiple linear regression. Before being analyzed, the multiple linear regression model must pass the classical assumption test, including data normality, multicollinearity, heteroscedasticity, and autocorrelation. The multiple linear regression model for this study is shown by equation (Suyana Utama, 2009).
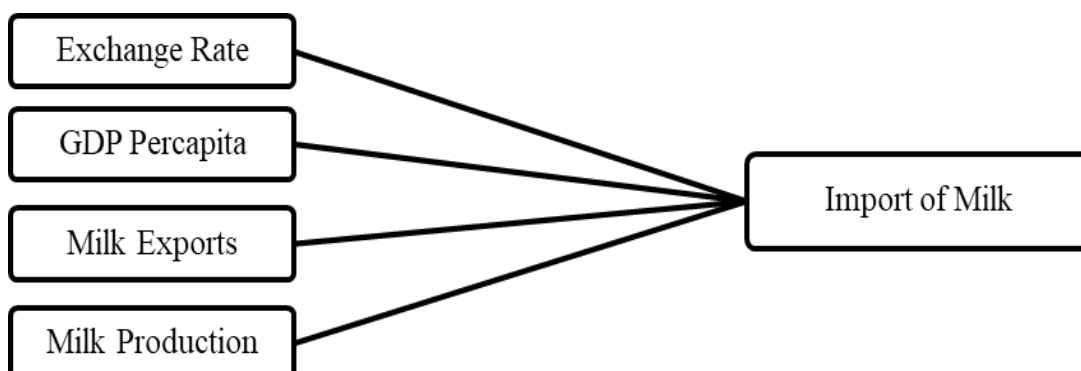
$$Y = \alpha + \beta 1 X1 + \beta 2 X2 + \beta 3 X3 + \beta 4 X4 + \mu 1$$

Information:
Y = Impor susu (ton)
α = Constant
β1...β3 = Regression coeficient

X1 = Exchange rates
X2 = GDP per capita (rupiah)
X3 = Milk exports (ton)
X4 = The amount of milk production
μ = Error

The data analysis technique used in this study was multiple regression equations, in which testings for the accuracy of the model was performed, which were the classical assumption test and statistical test. The classical assumption tests include normality, multicollinearity, heteroscedasticity, and autocorrelation test.

RESULTS AND DISCUSSION

Data on the import of dairy milk (Y), exchange rates (X1), GDP per capita (X2), dairy milk exports (X3), and the amount of dairy milk production in Indonesia processed in this research are shown in Table 2.

Table 2 shows that the values of the import of dairy milk and GDP per capita continue to increase annually. Unfortunately, this level of imports was not along with the production and export of dairy milk which had fluctuated during 2006-2016. The fluctuating production of dairy milk reflects the high demand for imports of dairy milk to meet the domestic consumption needs of dairy milk. Besides, since the rupiah exchange rate tends to weaken against the dollar, this results in a burden for the country import of dairy milk is continuously carried out.

Figure 1. Research Model
Source: Researcher, 2020

Table 2. Observation Data

Year	Import of Milk (Ton)	Exchange Rates (Rupiah/USD)	GDP Percapita (Rupiah)	Milk Exports (Ton)	Milk Production (Ton)
2006	188.128	8.980	14.816.401	35.241	570.952
2007	181.520	9.270	17.290.031	21.947	459.733
2008	180.933	11.244	21.364.534	55.774	474.439
2009	211.634	9.431	23.880.878	50.190	488.601
2010	231.396	9.009	28.800.000	47.818	909.533
2011	247.495	9.113	32.400.000	43.123	974.694
2012	386.116	9.610	35.100.000	52.174	959.732
2013	380.558	12.142	38.370.000	52.769	786.871
2014	365.186	12.612	41.900.000	55.183	800.751
2015	368.844	13.865	45.120.000	39.914	835.125
2016	412.176	13.518	47.960.000	40.516	912.735

Source: BPS and Ministry of Agriculture, 2017

The results of the classical assumption test of the research model show that the research model has met the classical assumption test.

The normality test shows that the residuals were normally distributed based on the Jarque-Bera value of 2.37461 with a *p-value* of 0.305042 where $p > 0.05$. The multicollinearity test shows that no multicollinearity issue was found in the research model as the centered VIF value of all variables were less than 10. The heteroscedasticity test shows that heteroscedasticity indications were not found in the research model as the *p-value* indicated by the value of Prob. chi-square (2) on Obs*R-Squared was 0.4874 and was greater than 0.05. The autocorrelation test shows that the regression model does not have autocorrelation indications as the *p-value* indicated by the value of Prob. chi-square (2) on Obs*R-Squared was 0.9093, which was greater than 0.05.

The results of the statistical tests in Table 4 shows that partially, the independent variables of exchange rates, income per capita, exports of dairy milk, and the amount of dairy milk production have a significant effect on the import of dairy milk because they have a probability value of $0.000 < 0.05$. Meanwhile, the independent variables simultaneously have a significant effect on the import of dairy milk because the significance is $0.000 < 0.05$.

The results of the statistical test show that $R^2 = 0.9426$, indicating that the independent variables can explain the dependent variable by 94.26%, and the remaining 5.74% is affected by other factors. Based on the results of the statistical test, the equation model of the import of dairy milk in this study is shown by the equation.

Table 3. The Result of Classical Assumption Test

Information	Critical Value	Result
Normality test	p value > 0,05	0,305042
Multicollinearity test	VIF < 10	< 10
Heteroscedasticity test	Prob. Chi Square > 0,05	0,4874
Autocorrelation test	Prob. Chi Square > 0,05	0,9093

Source: Primary Data Processed, 2019

Table 4. Results Test for Analysis of Factors that Affecting Milk Imports

Variable	Coeficient	T-statistic	Probability	Information
X1	-12.38425	-2.292669	0.0358	Significant
X2	0.002703	5.998209	0.0000	Significant
X3	1.385296	2.561361	0.0209	Significant
X4	128.8872	2.134859	0.0486	Significant
C	-3331.165	-0.078617	0.9383	-
$R^2 = 0.9426$				Prob. F = 0.000

Source: Primary Data Processed, 2019.

$$Y = -3331,165 - 12,38425X1 + 1,385296X2 + 0,002703X3 + 128,8872X4$$

The variable of the exchange rate has a negative and significant effect on the amount of import of dairy milk. The weakening of the rupiah currency can decrease people's purchasing power so that they will reduce milk consumption. A study by Amaliah and Fahmi (2007) also showed that the real exchange rate of IDR/USD affects the volume of the import of dairy milk significantly in the short and long terms. The import of dairy milk is also affected by the volume of production, the real price of imported milk, and the income per capita. The volume of imported dairy milk is significantly affected by per capita income, and the real exchange rate of IDR/USD, the real price of domestic dairy milk, and the real price of imported dairy milk in the long term.

The variable of GDP per capita has a positive and significant effect on the volume of imported dairy milk. A study by Hastuty Pratiwi (2013) showed that per capita income affects the import of dairy milk in the long run. The real prices of domestic dairy milk and prices of imported dairy milk also affect the import of dairy milk in the long run. Meanwhile, the population aged > 5 years old, the real price of domestic dairy milk, the real price of imported dairy milk, and the exchange rate affect the import of dairy milk in the short term. National production of dairy milk, exports of dairy milk, the population size of the population aged less than 5 years, and government policies regarding the elimination of imports of dairy milk do not affect imports of dairy milk in the short or long term.

The variable of export of dairy milk has a positive and significant effect on imports of dairy milk. The increase in imports of dairy milk is in line with the increase in exports of dairy milk in Indonesia due to the export of Indonesian milk in the form of raw materials such as milk, cream, and others. Meanwhile, imported dairy milk tends to be in the form of processed milk such as whey, butter, fresh cheese, casein, processed cheese, powdered cheese, buttermilk, yogurt, and others (Ministry of Industry, 2016). The number of exports and imports will change along with changes in the demand and supply of dairy milk. Shadbolt et al. (2016) described that New Zealand as a global trader of dairy products must consider changes in global supply and demand. Asian countries like Indonesia are milk sector-consuming countries with increasing demand for the milk sector at the international level although per capita consumption is still considered to be lower compared to countries in the European Union and North America (Chatellier, 2017). The consumption level of dairy milk in Indonesia is affected by a number of factors such as household expenditure. A study by Ahmad and Hermiyetti (2008) revealed that household expenditure has a positive and significant effect, particularly on the consumption of baby powder milk and sweetened condensed milk.

The variable of milk production has a positive and significant effect on the import of dairy milk. The growth in domestic production of dairy milk remains insufficient for domestic needs so that the import of dairy

milk is done to meet the domestic needs of dairy milk. Lack of equipment for local dairy farming affects the low efficiency and quality of domestically produced dairy milk (Global Business Guide Indonesia, 2015). Moreover, the drawback in transportation networks such as inadequate road and rail networks and lack of cold storage facilities become logistical challenges for land transportation for the distribution of perishable goods/products such as milk. As a result, the overall demand for dairy products has not been fulfilled although domestic production of fresh milk has increased (Moran & Morey, 2015). A study by Sharma et al (2005) showed that the high cost of transporting fresh milk for small-scale milk processing businesses in Senegal affects the tendency of businesses to use imported milk powder as a basic material for the manufacture of dairy products.

CONCLUSION

This study shows that partially, the independent variables of exchange rates, GDP per capita, exports of dairy milk, and milk production have a significant effect on the import of dairy milk because they have a probability value of $0.000 < 0.05$. The independent variables simultaneously have a significant effect on the amount of the import of dairy milk because the significance is $0.000 < 0.05$. The coefficient of determination is 94.26%, indicating that the independent variables can explain the dependent variable, and the remaining 5.74% is affected by other factors. Variables that can increase the import of dairy milk in Indonesia include GDP per capita, exports of dairy milk, and domestic production of dairy milk. Meanwhile, the exchange rate of rupiah can reduce the import of dairy milk.

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