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Impact of Import Restrictions Policy on Dairy Supply and Demand in Indonesia

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ABSTRACT

Dairy cows are one of the strategic livestock in Indonesia. However, increased dairy demand, which exceeds domestic dairy production, increases dairy import quantity. As dairy import increases, import tariff as an import restriction policy can be used to protect the sustainability of domestic dairy production. This study aimed to investigate the impact of import tariff policy on dairy supply and demand in Indonesia. This study used secondary data obtained from various official institutions. Factors determining dairy supply and demand were estimated using two-stage least squares (2SLS), and the impact of import tariff policy was estimated using a simultaneous equation system model. The empirical results indicate that the import tariff policy has a positive impact on dairy supply and a negative impact on dairy demand. Import tariffs were a factor determining the positive impact on dairy production, dairy cow population, and domestic dairy prices. The import tariff policy also had a negative impact on decreasing the quantity of dairy imports. It is concluded that import tariffs could be an important dairy import restriction policy to protect domestic dairy production and dairy producers in Indonesia.

Keywords: dairy product; dairy production; import tariff; protection; simultaneous equation model

INTRODUCTION

Dairy cows are one of Indonesia's strategic livestock. Based on existing conditions, most of the domestic fresh dairy supply (90%) is produced by smallholder farmers in partnership with dairy cooperatives. The dairy cooperative is one of the marketing channels for dairy farmers and dairy products, which have strategic roles in supporting dairy distribution (Priyono & Priyanti, 2015). The population of dairy cows in Indonesia for the period 1980–2019 grew by 3.01% per year, and fresh milk production grew by 4.34% per year (Priyono *et al.*, 2022). On the other hand, the growth of dairy demand outpaced the growth of the dairy cow population and dairy production. Dairy demand tends to increase with the rise in population, income, and public awareness of milk consumption (Irz & Kuosmanen, 2013).

The excess demand for dairy products has increased dairy imports. More than 70% of the national demand for dairy still depends on imports. Data from BPS-Statistics Indonesia showed that only 997.35 thousand tons of the total 4,385.73 thousand tons of milk required in 2020 were supplied from domestic dairy production (Pusdatin, 2020). Therefore, imports are still required to fulfill about 77.26 percent of dairy demand. Based on the World Trade Organization (WTO) agreement, Indonesian dairy producers have entered free trade since the non-tariff policy was abolished. There are three main pillars in the Agreement on Agriculture, including market access, domestic support, and export subsidies that can be used for agricultural development purposes in developing countries. However, dairy-exporting countries have received export subsidies and domestic support. In addition, in developing countries, there are difficulties with flexibility in tariff adjustments and market access to developed countries.

Import tariffs are import restrictions policies implemented to protect farmers by creating competitive and profitable agricultural commodity prices. Domestic dairy protection policies were regulated through Law No. 19 of 2013 concerning the protection and empowerment of farmers and Law No. 41 of 2014 concerning amendments to Law No. 18 of 2009 concerning husbandry and animal health. The dairy import tariff in Indonesia is set at 5% based on Minister of Finance Regulation No. 26 of 2022. Import tariffs on dairy products have become important since the non-tariff policy was abolished in Indonesia. Forty countries of the World Trade Organization (WTO) have implemented

agricultural tariff-rate quotas (Beckman *et al.*, 2021), and Mongolia also imposes import tariffs to encourage domestic industries (Shagdar & Nyamdaa, 2017). It is in accordance with Flaig *et al*. (2013) that one of the characteristics of the dairy industry in many developing countries is high protective tariffs. As one of the world's dairy producers, Canadian dairy producers have also been protected domestically and internationally through supply management and import-restrictive border controls (Beaulieu & Venkatachalam, 2018).

A rational dairy producer will maximize their profits. However, when the price of imported dairy products is lower than that of domestic dairy products, dairy producers cannot maximize their profits. Most of the dairy producers in Indonesia are small-scale farms (Atmakusuma *et al*., 2019), so their dairy products cannot compete with imported dairy products. Therefore, import tariff policy influences the supply and demand of dairy products in Indonesia. There are many studies on the factors determining dairy supply and demand (Uddin *et al*., 2011; Ortega *et al*., 2012; Irz & Kuosmanen, 2013; Cheng *et al*., 2014; Akaichi & Revoredo-Giha, 2014; Altarawneh, 2015; Kvasha *et al*., 2019; Biden *et al*., 2020). However, most previous studies still partially focused on the factors determining dairy supply and demand. Based on previous studies, import tariffs have not been considered important and are rarely included as factors determining supply and demand holistically.

Some studies on import tariff policy as a restriction on policy on dairy trade liberalization were conducted (Flaig *et al*., 2013; Gelan & Omore, 2014; Shagdar & Nyamdaa, 2017; Biden *et al*., 2020; Beckman *et al*., 2021). However, studies on the impact of import tariff policy on dairy supply and demand holistically are rarely conducted. This paper uses a simultaneous equation model to holistically determine the impact of an import tariff policy on dairy supply and demand. Therefore, this paper aims to analyze the impact of import tariff policies on dairy supply and demand in Indonesia. Other parameters are used to describe the behavior of factors determining dairy supply and demand in the model.

METHODS

Data used in the study were annual time-series data from 1990 to 2019. Data were obtained from the BPS-Statistics Indonesia, Ministry of Agriculture Republic of Indonesia, Ministry of Trade Republic of Indonesia, Bank Indonesia, and FAO statistics. The collected time-series data were analyzed using the two-stage least squares (2SLS) method on the dairy supply and demand model. The dairy supply and demand model was built using a simultaneous equation system. The model consists of 7 equations, namely 6 behavioral/structural equations and one identity equation. According to Sitepu & Sinaga (2018), the simultaneous equation system model can be estimated using the two-stage least squares (2SLS) method. The method was used to describe the behavior of factors determining dairy supply and demand and analyze the impact of import tariff policy on dairy supply and demand in Indonesia.

The equations of the dairy supply and demand model in detail are as follows:

$$QMP_t = a_0 + a_1QDC_t + a_2DMY_t + a_3MDP_t + a_4PDM_t + a_5MTM_t + a_6QMP_{t-1} + U_1 \quad \text{..... (1)}$$

$$QDC_t = b_0 + b_1PDM_t + b_2MDP_t + b_3XDP_t + b_4QDC_{t-1} + U_2 \quad \text{..... (2)}$$

$$MDP_t = c_0 + c_1QMP_t + c_2QDM_t + c_3PMM_t + c_4MDP_{t-1} + U_3 \quad \text{..... (3)}$$

$$QDM_t = d_0 + d_1PDM_t + d_2POP_t + d_3INC_t + d_4QDM_{t-1} + U_4 \quad \text{..... (4)}$$

$$PDM_t = e_0 + e_1QMP_t + e_2MDP_t + e_3QDM_t + e_4PMM_t + e_5EXR_t + e_6MTM + e_7PDM_{t-1} + U_5 \quad \text{..... (5)}$$

$$PMM_t = f_0 + f_1QWD_t + f_2QWP_t + f_3EXR_t + f_4PMM_{t-1} + U_6 \quad \text{..... (6)}$$

$$QMS_t = QMP_t + MDP_t - XDP_t \quad \text{..... (7)}$$

while QMP_t is dairy production (ton/year), QDC_t is dairy cow population (head/year), DMY_t is dairy productivity (liter/head/day), MDP_t is import of dairy products (ton/year), QDM_t is dairy demand (liter/capita/year), QMS_t is dairy supply (ton/year), PDM_t is domestic dairy prices (IDR/liter), PMM_t is import dairy prices (IDR/liter), XDP_t is export of dairy products (ton/year), MTM_t is import tariff (%), POP_t is population (million people/year), INC_t is income per capita (thousand/capita/year), EXR_t is exchange rate (IDR/1 USD), QWD_t is world dairy demand (thousand ton/year), QWP_t is world dairy production (thousand ton/year), QDC_{t-1} is lag of dairy cow population (head/year), QMP_{t-1} is lag of dairy production (ton/year), MDP_{t-1} is lag of dairy product imports (ton/year), PMM_{t-1} is lag of import dairy prices (IDR/liter), QDM_{t-1} is lag of dairy demand (liter/capita/year), PDM_{t-1} is lag of domestic dairy prices (IDR/liter), (a_1, a_2, a_4, a_5, $a_6 > 0$; $a_3 < 0$; b_1, b_3, $b_4 > 0$; $b_2 < 0$; c_2, $c_4 > 0$; c_1, $c_3 < 0$; d_2, d_3, $d_4 > 0$; $d_1 < 0$; e_3, e_4, e_5, e_6, $e_7 > 0$; e_1, $e_2 < 0$; f_1, $f_4 > 0$; f_2, $f_3 < 0$) are estimated coefficient, and U_1-U_6 is error term.

The model validation test assesses an error-testing tool for simulation results under actual conditions. Validation of the dairy supply and demand model was done using the statistical criteria Root Mean Square Percent Error (RMSPE) and Theil's inequality coefficient (Sitepu & Sinaga, 2018) as follows:

$$RMSPE = 100\,x\,\sqrt{\frac{1}{n}\,x\,\Sigma\,\left\{\left(\frac{(Pi-Ai)}{Ai}\right)^2\right\}} \quad \text{.....(8)}$$

$$U = \frac{\sqrt{\left(\frac{1}{n}\right)x\,\Sigma\,(Pi-Ai)^2}}{\sqrt{\left(\frac{1}{n}\right)x\,\Sigma\,(Pi)^2} + \sqrt{\left(\frac{1}{n}\right)x\,\Sigma\,(Ai)^2}} \quad \text{.....(9)}$$

while n is the number of observations, P_i is the predicted value in the model equation, and A_i is the actual estimated value of the sample observations.

The impact of the import tariff policy on dairy supply and demand in Indonesia was tested using a valid model. According to statistical criteria, the model was valid if the root means squared percent error was less than 30% and Theil's inequality coefficient was close to 0 (Sitepu & Sinaga, 2018). This study used the Statistical Analysis System (SAS) 9.4 to analyze the dairy supply and demand model.

RESULTS

Factors Determining Dairy Supply and Demand in Indonesia

Table 1 presents the estimated parameters of factors determining the behavior of the dairy supply in Indonesia. Dairy supply is the sum of domestic dairy production, dairy imports, and dairy stock minus dairy exports. The results showed that dairy production was significantly influenced by dairy cow population, dairy productivity, import tariff policy, and dairy production in the previous period. The coefficient of determination (R^2) of 0.998 indicated that 99.8% of the variation in dairy production could be predicted based on variations in the values of exogenous variables. The estimated parameters of exogenous variables that significantly affect dairy production had the theoretically expected signs.

The dairy cow population and productivity were the main factors determining the behavior of dairy production in Indonesia. Table 1 shows that the dairy cow population was significantly affected by the domestic dairy price. Furthermore, according to the estimated parameter results using the two-stage least squares method, the coefficient of determination (R^2) of the equations relating to the import of dairy products was 0.975. Endogenous variables appear to be well predicted by exogenous variables. The estimated results showed that the import of dairy products in the previous period significantly affected the import of dairy products.

Table 2 shows the factors determining the demand for dairy in Indonesia. The estimation results showed that dairy demand is significantly influenced by domestic dairy prices, population, and income per capita. Most of the parameter coefficients had the theoretically expected signs. The coefficient of determination (R^2) also indicated that endogenous variables could be well predicted based on the exogenous variables.

Other parameters were used to describe the behavior of factors determining the dairy price in Indonesia. Table 3 shows the factors that influence both domestic and imported dairy prices. The results showed that the domestic dairy price was significantly influenced by the import dairy price, exchange rate, import tariff policy, and domestic dairy price in the previous period. Meanwhile, world dairy demand and exchange rate significantly influenced import dairy prices. These two equations also showed a high coefficient of determination (R^2). Based on the results, it could be concluded that the import tariff policy was significantly influencing the behavior of dairy production and dairy prices. Therefore, the impact of an import tariff on dairy supply and demand was analyzed in a policy simulation scenario.

Impact of Import Tariff Policy on Dairy Supply and Demand in Indonesia

Table 4 provides the validation test results, which were analyzed using the Root Mean Square Percent

Table 1. Factors determining the behavior of dairy supply in Indonesia

Variables	Variable label	Parameter estimate	Probability (α)	Sig.
Dairy production (QMP): ton/year				
R squared: 0.99824 & Pr>F <0.0001				
Intercept	Intercept	-625675	<0.0001	
QDC	Dairy cow population (head/year)	2.496	<0.0001	***
DMY	Dairy productivity (liter/head/day)	68514.35	<0.0001	***
MDP	Import of dairy products (ton/year)	-0.079	0.308	ns
PDM	Domestic dairy price (IDR/liter)	1.181	0.851	ns
MTM	Import tariff policy (%)	86437	0.026	**
QMP_{t-1}	Lag of dairy production (ton/year)	0.102	0.064	*
Dairy cow population (QDC): head/year				
R squared: 0.92478 & Pr>F <0.0001				
Intercept	Intercept	95889.75	0.008	
PDM	Domestic dairy price (IDR/liter)	19.555	<0.0001	***
MDP	Import of dairy products (ton/year)	-0.118	0.288	ns
XDP	Export of dairy products (ton/year)	0.059	0.847	ns
QDC_{t-1}	Lag of dairy cow population (head/year)	0.128	0.464	ns
Import of dairy products (MDP): ton/year				
R squared: 0.97492 & Pr>F <0.0001				
Intercept	Intercept	-14259.1	0.584	
QMP	Domestic dairy price (IDR/liter)	0.064	0.354	ns
QDM	Population (million people/year)	2927.522	0.414	ns
PMM	Income per capita (thousand/capita/year)	-4.187	0.421	ns
MDP_{t-1}	Lag of dairy demand (liter/capita/year)	0.860	<0.0001	***

Note: ***= highly significant (p<0.01); **= significant (0.01<p<0.05); *= significant (0.05<p<0.10); ns=non-significant (p>0.10).

Error (RMSPE) and Theil's inequality coefficient. Except for the import dairy price (Table 4), all variables have an RMSPE of less than 30%. The majority of variables have Theil's inequality coefficient (U-Theil) close to 0, except import dairy price. Table 4 also shows that the proportions of bias (UM) and variance (US) were close to 0, while the proportions of covariance (UC) and proportion of distribution (UD) were close to 1. Therefore, it could be concluded that the dairy supply and demand model fulfilled the assumptions required to conduct policy simulations.

Table 5 presents the impact of the import tariff policy on dairy supply and demand simultaneously in Indonesia. The results showed that import tariffs by 5% increased dairy production by 5.252% and dairy cow population by 5.108%. The import tariff policy also decreased imports of dairy products by 1.962%. Furthermore, the study found that a 5% increase in import tariffs raises prices for both domestic and imported dairy products. Table 5 shows that the import tariff policy in Indonesia increased dairy supply by 3.703% and decreased dairy demand by 7.072%. Based

Table 2. Factors determining the behavior of dairy demand in Indonesia

Variables	Variable label	Parameter estimate	Probability (α)	Sig.
Dairy demand (QDM): liter/capita/year				
R squared: 0.94747 & Pr>F <0.0001				
Intercept	Intercept	-73.609	0.009	
PDM	Domestic dairy price (IDR/liter)	-0.001	0.048	**
POP	Population (million people/year)	0.409	0.009	***
INC	Income per capita (thousand/capita/year)	0.000	0.072	*
QDM_{t-1}	Lag of dairy demand (liter/capita/year)	0.332	0.280	ns

Note: ***= highly significant (p<0.01); **= significant (0.01<p<0.05); *= significant (0.05<p<0.10); ns=non-significant (p>0.10).

Table 3. Factors determining the behavior of dairy prices in Indonesia

Variables	Variable label	Parameter estimate	Probability (α)	Sig.
Domestic dairy price (PDM): IDR/liter				
R squared 0.98887 & Pr>F <0.0001				
Intercept	Intercept	-2127.12	0.004	
QMP	Dairy production (ton/year)	-0.003	0.212	ns
MDP	Import of dairy products (ton/year)	-0.002	0.387	ns
QDM	Dairy demand (liter/capita/year)	-28.683	0.705	ns
PMM	Import dairy price (IDR/liter)	0.326	0.005	***
EXR	Exchange rate (IDR/1 USD)	0.358	0.001	***
MTM	Import tariff policy (%)	5865.947	0.006	***
PDM_{t-1}	Lag of domestic dairy price (IDR/liter)	0.930	0.003	***
Import dairy price (PMM)				
R squared: 0.67875 & Pr>F <0.0001				
Intercept	Intercept	-1568.7	0.013	
QWD	World dairy demand (thousand ton/year)	0.280	0.094	*
QWP	World dairy production (thousand ton/year)	-0.004	0.777	ns
EXR	Exchange rate (IDR/1 USD)	-0.321	0.027	**
PMM_{t-1}	Lag of import dairy price (IDR/liter)	0.157	0.410	ns

Note: ***= highly significant (p<0.01); **= significant (0.01<p<0.05); *= significant (0.05<p<0.10); ns=non-significant (p>0.10).

Table 4. Model validation results using the root mean square percent error (RMSPE) and Theil's inequality coefficient

Variables	Variable label	RMSPE (%)	U-Theil	Bias (UM)	Reg. (UR)	Dist. (UD)	Var. (US)	Covar (UC)
QDC	Dairy cow population (head/year)	14.76	0.07	0.12	0.22	0.66	0.05	0.82
QMP	Dairy production (ton/year)	17.84	0.09	0.25	0.03	0.72	0.00	0.75
MDP	Import of dairy products (ton/year)	23.05	0.08	0.00	0.02	0.97	0.00	1.00
PMM	Import dairy price (IDR/liter)	52.14	0.23	0.00	0.47	0.53	0.07	0.93
PDM	Domestic dairy price (IDR/liter)	11.65	0.06	0.01	0.22	0.77	0.13	0.85
QMS	Dairy supply (ton/year)	16.32	0.08	0.20	0.03	0.77	0.00	0.80
QDM	Dairy demand (liter/capita/year)	18.63	0.06	0.23	0.00	0.77	0.01	0.75

Table 5. Impact of import tariff policy imposed by 5% on dairy supply and demand in Indonesia

Variables	Variable label	Initial average	Impact of import tariff policy imposed by 5%		Impact sign
			Unit	(%)	
QDC	Dairy cow population (head/year)	226,173	11,553	5.108	Positive (+)
QMP	Dairy production (ton/year)	565,915	29,724	5.252	Positive (+)
MDP	Import of dairy products (ton/year)	173,626	-3,407	-1.962	Negative (-)
PMM	Import dairy price (IDR/liter)	3,997	832.1	20.819	Positive (+)
PDM	Domestic dairy price (IDR/liter)	6,093	570.2	9.358	Positive (+)
QMS	Dairy supply (ton/year)	710,743	26,317	3.703	Positive (+)
QDM	Dairy demand (liter/capita/year)	8.870	-0.627	-7.072	Negative (-)

on simulation results, it could be concluded that the import tariff policy had a positive effect on dairy supply and a negative effect on dairy demand. The results also showed that most parameters had the theoretically expected signs.

DISCUSSION

In developing countries, international trade has an important role. The import restriction policy aims to protect domestic dairy production from the threat of imported dairy products. Import tariffs are one of the trade barriers that cause the price of imported products to be higher (Davis & Hahn, 2016). If the consumer's income is relatively fixed, the rise in price will cause the consumer's purchasing power to fall. Furthermore, the rise in the price of dairy products in the domestic market would cause a decrease in demand. Therefore, the variables used in the model are not only the impact of the import tariff but also variables determining dairy supply and demand in Indonesia.

Based on the empirical results, it is clear that the dairy cow population, dairy productivity, import tariff policy, and dairy production in the previous period all had a significant impact on dairy production. The results follow previous studies that dairy cow population and dairy productivity were determinant factors for dairy production (Svensson & Wagner, 2012; Mugambi *et al.,* 2015; Njuki *et al.,* 2020; Kosar *et al.,* 2022). Dairy productivity is determined by genetics (Vries & Marcondes, 2020), feed (Mugambi *et al.,* 2015), local resources, capital, and technology/farming management (Mukson *et al.,* 2017). According to the estimated coefficient, import tariffs also significantly affected dairy production. Imposing tariff rates on imports to WTO-bound rates, as in other developing countries such as Mongolia, protects domestic dairy production while supporting domestic industries (Shagdar & Nyamdaa, 2017).

Domestic dairy prices determine both dairy supply and demand. Empirical results showed that domestic dairy prices had a significant effect on increasing the dairy cow population. On the other hand, domestic dairy prices had a significant effect on decreasing dairy demand. In other words, domestic dairy prices indicate a positive impact for producers but a negative impact for consumers. The import tariff policy has an impact on increasing import prices due to import tax payments (Salvatore, 2013). Therefore, the price of dairy in the domestic market rises in response to the increase in the price of dairy imports due to the import tariff policy.

According to empirical findings (Table 3), world dairy demand and exchange rate influenced dairy import prices. When the world dairy demand increases, it creates a higher demand for dairy products in the global market (Salvatore, 2013). This increased demand can lead to higher import dairy prices. Furthermore, if the currency of the importing country strengthens relative to the currency of the exporting country, it can also influence import dairy prices. A stronger currency means that the importing country's currency can buy more units of the exporting country's currency. As a result, the cost of importing dairy products decreases, which can lead to lower import dairy prices. Based on empirical findings, import dairy prices positively influenced domestic dairy prices ($p<0.01$).

On the other hand, import tariff policy influenced domestic dairy prices positively ($p<0.01$). Domestic dairy prices are critical in determining dairy supply and demand in Indonesia. According to Kvasha *et al*. (2019), market prices for dairy products in Ukraine determine the volume of dairy supply and demand. As well as in Iran, domestic dairy prices also determine dairy supply and demand (Shokoohi *et al.,* 2019). Therefore, the import tariff policy impacts domestic dairy prices and dairy supply and demand.

Table 2 shows the factors determining dairy demand in Indonesia. Domestic dairy prices, population, and income per capita significantly influenced dairy demand. All parameter coefficients had the theoretically expected sign: the negative sign for domestic dairy price and the positive sign for population and income. According to Cheng *et al*. (2014), population growth has a significant effect on increasing milk consumption. Furthermore, Akaichi & Revoredo-Giha (2014) also stated that the consumption of fresh and powdered milk in Malawi increased along with household income. Flaig *et al*. (2013) also stated that milk consumption was also influenced by consumer household income and welfare.

The simulation results showed that the import tariff policy determined the dairy supply in Indonesia. According to the findings (Table 5), the import tariff policy increased the dairy supply. Dairy production and dairy cow populations are predicted to increase with the implementation of the import tariff policy. Therefore,

the import tariff policy had a positive impact on increasing dairy production and the dairy cow population. The empirical results also indicated that dairy production was positively affected by import tariffs. Furthermore, the import tariff policy had a negative impact on the import quantity of dairy products. The expected sign of the dairy product imports coefficient was to be negative. According to Salvatore (2013) and Shagdar & Nyamdaa (2017), in small countries, import tariffs have an impact on decreasing import quantity and protecting domestic production. Sun *et al*. (2014) also stated that import tariffs negatively affect import values.

The signs of predicted results for import and domestic dairy prices were positive (Table 5). According to empirical results, the estimated coefficient of import tariff on domestic dairy prices had the theoretically expected sign. Salvatore (2013) stated that import tariff policy causes importers to pay higher prices because tax payments are charged to importers. Newton (2016) also stated that empirically, domestic dairy commodity prices are influenced by international dairy commodity prices in both the long and short run. Therefore, both empirical and simulation results showed that import tariff policies determine increases in domestic dairy prices.

Dairy demand was predicted to decrease due to the implementation of the import tariff policy. Table 5 depicts the impact of the import tariff policy, as indicated by the fact that the predicted dairy demand was negative. The result justifies the study of Jones & Blayney (2014) and Biden *et al*. (2020), who stated that trade barriers in the dairy industry result in decreased dairy demand and vice versa if no trade barriers impact increased dairy demand. Salvatore (2013) also stated that small-country import tariff policies affected decreasing demand quantity.

Based on empirical results and simulation results, it is clear that import tariff policy could be an important factor in determining dairy supply and demand in Indonesia. Therefore, an import tariff policy is important to protect dairy producers in Indonesia. Through the import tariff policy, domestic dairy products will be able to compete with imported dairy products. To increase the dairy supply in the long term, the import tariff policy needs to be supported by increasing the dairy cow population in the long term. To increase the dairy cow population, productive female dairy cattle have to be retained and added. It is recommended for the government accelerate the increase in the dairy cow population, maintain high dairy prices, regulate and supervise milk distribution, and strengthen good dairy farming practices for dairy farmers.

CONCLUSION

Import restriction policy is a determining factor for both dairy supply and demand. As an import restriction policy, dairy import tariffs have a positive impact on dairy supply while having a negative impact on dairy demand. Import tariff policy in Indonesia was found to be a factor determining the increase in dairy production, dairy cow population, and domestic dairy prices. The impact of an import tariff policy indicates the importance of an import restriction policy to protect domestic dairy production and dairy producers.

CONFLICT OF INTEREST

The authors confirm that there is no conflict of interest with any personal, financial, or other organizations related to the material discussed in the manuscript.

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