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Economic Losses Estimation Due to Rejection of Indonesian Exported Food

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ABSTRACT

Export rejection has become an issue of concern for both exporting and importing countries. Rejection of food exports that occur directly or indirectly resulted in losses experienced by many parties. The purposes of this research were to identify the factors that play a role in the calculation of the estimated economic losses due to the rejection of export food and estimated the value of the economic losses. The commodities studied were tuna, shrimp, and nutmeg. While the export destination studied were the United States, the European Union, and Japan. The method used in this research was survey and descriptive analysis. The calculation of the estimated economic losses was done by using the equation obtained from the result of a literature study and data collection. Components that contribute to the calculation of estimated losses due to a rejection of Indonesian exports consist of the loss of sales and related activities on communication, testing and retesting, transportation and execution. The highest economic losses based on data from the three years (2014-2016) was on tuna that was estimated at US$3.01 million per year by the rejection from the United States. The transportation cost contributed to the highest loses as much as 59% or US$2.4 million per year.

Keywords: *economic losses; export; food safety; food rejection; Indonesia*

A. Introduction

Export activities are a major concern in Indonesia's economic growth. Through the Nawacita program, the government shows its seriousness in boosting exports while enhancing the competitiveness of domestic products in international markets. Indonesia's exports in 2018 reached 608,907.5 thousand tons with a value of US$180,012.7 million, consisting of US$17, 171.7 million of oil and gas exports and US$162,841 million of non-oil / gas commodity exports (BPS, 2019). The non-oil/gas export group consists of mining products, processing industries, and agricultural products, including fishery commodities. Tuna and shrimp are Indonesia's leading fishery export commodities which account for about 2% of total non-oil and gas exports (BPS, 2019; KKP 2019). According to FAO Stat (CEA, 2016), Indonesia is the largest exporter of tuna, shrimp and other fishery commodities in the United States (30%), Europe (23%) and Japan (13%).

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Rejection of exports has become a problem and concern of exporter and importer countries. United Nations Industrial Development Organization (UNIDO) in 2013 has reported the number of rejections of agricultural commodities and food exports from Indonesia in the United States as many as 375 cases, in the European Union as many as 40 cases, in Japan 38 cases, and 59 cases in Australia. The POM as National Contact Point (NCP) from Indonesia Rapid Alert System for Food and Feed (INRASFF) receives a notification on the rejection of Indonesian food exports because it does not meet food safety requirements in the destination country. The number of rejection notifications in 2012-2016 reached 212 cases. The notification was received from the EU, South Korea, Malaysia, and the US FDA website. Food exports from Indonesia are rejected due to microbiological contents, chemical and labeling problems (BPOM, 2017)

Export rejection can have economic impacts such as increasing transactions, lowering revenue, and affecting the credibility and reputation of exporters (Govindaraj et al, 2004). In addition, the export rejection may also due to the reduced export demand, either due to restricted exports (import restrictions) or importers do not want to risk re-occurrence.

B. Method Data Collection and Analysis of Rejection of Indonesian Food Export Year 2014-2016

Data collection and analysis were carried out by identifying the importing countries of the United States, the European Union, and Japan. An analysis was conducted to find problems related to the rejection of Indonesian food exports, including the average rejection rate per year, the reasons for export rejection and the export commodities.

The Formulation of the Model of Calculating Economic Losses Due to a Rejection of Food

A formula was based on the component of the study results of other country's literature and adjusted to the conditions and availability of data in Indonesian export rejection. The assumptions used in the estimation of the economic losses due to rejection of Indonesian food exports include (1) any exporter experiencing rejection need to re-export or withdraw the product back to home country; (2) each rejection case involves only one ton rejected commodity every container, and (3) then the commodities that are rejected are always be destroyed.

Primary and Secondary Data Collection

Primary data were collected using questionnaires and then continued interviews with Indonesian food exporters who had experienced export rejection, especially food commodities. Secondary data of export product data were collected from relevant agencies such as the Central Bureau of Statistics (BPS), Ministry of Trade, Ministry of Marine Affairs and Fisheries (KKP) in 2017. Survey method conducted through filling the questionnaire, then followed by an in-depth interview using interview questions that have been prepared before. Respondents in this study are 12 exporters who have experienced the rejection of Indonesian exports in five survey areas such as Surabaya, Medan, Manado, Lampung, and Pontianak.

Calculation of Economic Loss Estimate Due to Rejection of Food Exports

A calculation of economic loss due to rejection of food exports was based on estimating the nominal economic losses that can be experienced by Indonesian food exporter by destination countries on some commodities. The estimation was based on the cost of each component issued. The calculation conducted separately based on each type of commodity and export destination country. The formulation of the calculation model was based on the literature review of the components involved and

adapted to the conditions and availability of data in Indonesia.

Export Failure

Export failure can be interpreted as a cancellation of the export sale activity. The number of losses was determined by the price and volume of each food export commodity experiencing export rejection. Calculation of losses due to export failure can be calculated by the following equation:

TKP = XR x P x H x Q … (1)

TKP = total export failure
XR = percent of rejected export rejection
P = number of exports rejected per year
H = export prices
Q = rejected export volume per ton

Communication

Communication costs were licensing fees that must be made upon receipt of a rejection notice, such as a notice to the regulatory or the relevant agency for re-exportation, the maintenance of the re-transportation permit, and the scheduling of the report, etc. Calculation of loss due to communication can be calculated by the following equation:

TBK = P x K… (2)
TBK = total communication cost
P = number of export rejections per year
K = communication costs

Laboratory Testing

Laboratory testing conducted two times when delivering the first evidence and retesting after the reexport. The results of this test determine what execution should be done. Calculation of losses due to laboratory testing can be calculated by the following equation:

TPL = 2 x P x PL… (3)
TPL = total laboratory testing
P = number of export rejections per year
PL = cost of laboratory testing

Transportation

Transportation costs include shipping costs, port loading and unloading charges and various charges at the time the commodities traded were temporarily stored. This cost depends on the distance the country was making a rejection. The farther the costs incurred the greater. Rejected food exports were stored in the port containers, including ports handling and stacking. Rejected food export containers were stacked in the port until the arrival of the vessel. Consequently, it takes longer to hire containers as temporary food export storage. The longer the execution procedure the longer the product was stored and the greater the cost incurred. Calculation of losses due to transportation can be calculated by the following equation:

TBT = P (PK + BM + PM) (4)
TBT = total transportation cost
P = number of export rejections per year
PK = shipping cost
BM = loading and unloading costs
PM = temporary storage cost

Execution

The estimated execution costs required to handle the rejection of food exports. Each rejected food export has an execution that varies according to the conditions experienced. Calculation of loss due to product execution can be calculated by the following equation:

$TTL = X_O \times P \times Q \times TL$ (5)

TTL = total execution costs percentage of execution taken by exporter

X_O = percentage of execution taken by exporter
P = number of export rejections per year
Q = export volume of food per ton
TL = execution cost

Indirect Cost (Loss of Consumer Image and Belief)

The rejection of food exports was affecting a decrease in income, credibility, and the reputation of exporters (Govindaraj et al, 2004). In addition, export rejection may also result in reduced export demand, either due to restricted exports (e.g. import restrictions) or importers do not want to risk

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re-occurrence. The impacts can eliminate good image and affect consumer confidence in the export commodities. Loss of trust from consumers can be overcome by promoting (advertising) that can convince consumers to restore their confidence in the product concerned. Calculation of losses indirect costs can be calculated by the following equation:

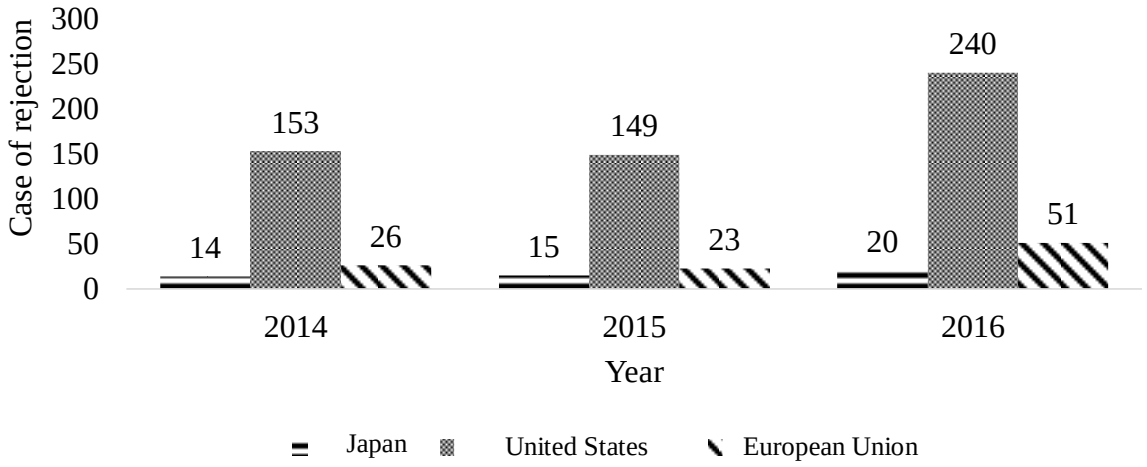
TBI = P x I … (6)

TBI= total promotional / advertising costs
P = number of export rejections per year
I = promotion / advertising costs

The 3 types of commodities related to the count are tuna, shrimp, and nutmeg and three countries are the United States, the European Union, and Japan. These countries are the main export destination countries of Indonesia and countries that are key to world trade.

C. Result and Discussion

From 2014 to 2016, Indonesia has secured 691 rejections of food export commodities from international trade destinations: The United States, the European Union, and Japan. The number of food rejection cases during 2014-2016 can be seen in Figure 1. The average rejection of Indonesian food export commodities in the three countries was 230 cases per year.



Source: US OASIS (2017), EURASFF (2017), and MHLW (2017)
Figure 1 Number of cases of food export rejection from Indonesia by The United States, European Union, and Japan in 2014-2016

Based on Figure 1, United States was known as the country with the highest rejection activities of Indonesian food exports with the average rejection of 181 cases per year, followed by EU 33 cases, and Japan 16 cases. The high number of rejection cases was influenced by the quality of export commodities before delivery and the tightening of import safeguards in trade protection by export destination countries. A history of past rejection may also be a factor in the high case of rejection of an export commodity from a country.

The result was similar to Baylis et al (2009) that exporters are less concerned with export rejection cases and export inspection is not random but was targeted to exporters who have experienced previous rejections or identified as unsafe. The case of the rejection of food exports involves several food commodities.

Based on the grouping of commodities, tuna had the highest rejection cases that mainly happened in the United States. The frequency of rejection of tuna, shrimp, and nutmeg during 2014-2016 in the United States, European Union, and Japan can be seen in Table 1.

Table 1 The frequency of rejection of tuna, shrimp and nutmeg exports from Indonesia during 2014-2016 in the United States, European Union, and Japan

Country	Tuna		Shrimp		Nutmeg	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
United State	340	94	35	74	1	2
European	15	4	2	4	45	83
Japan	6	2	10	21	8	15
Total	361	100	47	100	54	100

Source: US OASIS (2017), EURASFF (2017), and MHLW (2017)

The export of Indonesian fishery commodities was growing rapidly. Indonesia was one of the world's largest producer and exporter of tuna commodities, at least 16% of the world's tuna comes from Indonesia (CEA, 2016). Tuna was exported in a fresh, frozen or canned form (Nurani, 2013). The dominant market and high demand, cause tuna commodities to have a high potential for rejection. The high number of rejections also occurred in 2003-2008 when the average rejection reached more than 100 cases per year (Rinto, 2011).

Other food export commodities from Indonesia that many rejected in 2014-2016 were shrimp as many as 47 cases. The results show 20% of total Indonesian food export commodities rejected in Japan were shrimp. Shrimp was the mainstay commodity export commodities besides tuna. The volume of shrimp exports from Indonesia was 69,766 tons with a value of US$ 562 million (BPS, 2017). The main markets of Indonesian shrimp exports were Japan (52%), United States (18%), and Europe (15%) (Putro, 2008).

On the other side of agricultural commodities, nutmeg from Indonesia also had a high frequency of rejection of food exports. Indonesia is one of the largest nutmeg exporters in the world, even Indonesia controls 75% of world nutmeg supply. The volume of Indonesian nutmeg export was 9,724 tons with a value of US$ 52 million (BPS, 2017). The biggest importers of Indonesian nutmeg also come from the EU, USA, and Japan. The export volume of nutmeg commodities from Indonesia in 2016 to the European Union amounted to 1,536 tons, the United States of 690 tons, and Japan 112 tons (BPS, 2017). The number of cases of rejection caused by Indonesian nutmeg commodities was mostly produced by smallholder plantations by traditional handling with minimal equipment and done with less hygiene. Therefore, post-harvest handling of nutmeg export commodities in Indonesia still needs to be refined.

In general, the reasons for the rejection received vary according to the rules that have been applied by each export destination country. Reasons for rejection of Indonesian tuna, shrimp and export nutmeg from 2014-2016 in the United States, European Union, and Japan can be seen in Table 2.

Table 2 Reasons for rejection of Indonesian tuna, shrimp and nutmeg export from 2014-2016 in the United States, European Union, and Japan.

Reason for rejection	Type of commodities			Total
	Tuna	Shrimp	Nutmeg	
Hygiene (*filthy*)	309	8	1	318
Microbial contaminations	29	26	0	55
Mycotoxins	0	0	40	40
Mislabeling	5	3	0	8
Additive	4	4	0	8

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Antibiotic residues	0	6	0	6
Heavy metal	8	0	0	8
Absence of document	0	0	13	13
Poor temperature control	6	0	0	6
Total	361	47	54	462

Source: US OASIS (2017), EURASFF (2017) and MHLW (2017)

Grouping was based on the rejection reasons for 2014-2016 shown the main reason for refusing Indonesian food exports on tuna, shrimp, and nutmeg commodities were filthy, microbial contamination and mycotoxin. The reason for filthy was used when a food contains something that's not right there in the food. The reason for the rejection of Indonesian food exports due to filthy in the United States was found in many fishery products such as tuna.

The United States was the main export destination of fishery commodities from Indonesia. The export volume of tuna commodities from Indonesia to the United States increased from 8,504 tons in 2015 to 10,788 tons in 2016 and up to May 2017 Indonesian tuna exports have been recorded as many as 65,875 tons with a value of US$ 226 million (BPS, 2017). The increase in the export volume of fishery commodities was expected to potentially increase the number of rejected products. The number of cases of rejection because the filthy shows a lack of supervision of the implementation of GMP during the production process so that there are foreign objects that stick like plastic, hair, and other materials that are undesired in the product.

The main reasons for rejection in nutmeg commodities were the mycotoxins content and the incomplete document. The European Union was the main destination country for the export of spices from Indonesia. Many commodities reexport to the country of origin was estimated to occur due to post-harvest processing and poor shipping system. The duration of loading or unloading, resulting in aflatoxin developing and spreading (Kemendag, 2017).

Microbial contamination was the main reason for shrimp commodities rejection. *Salmonella, E. coli,* and *V. cholerae* were the most widely reported microbes that contributed to the cases. According to Rahmawaty et al (2014), The obstacle faced by exporters from Indonesia is the existence of differences in the way of taking samples and testing microbes between Indonesian laboratories and destination countries. The difference lies in the testing technology and laboratory infrastructure (methods, tools, and HR) to produce a different level of precision.

Economic Losses Due to Rejection of Food Exports

Based on the results of the literature study, identification of cost components involved in the calculation of estimated economic losses due to a rejection of food exports, as can be seen in Table 3.

Table 3 Component of the calculation of estimated economic losses due to the rejection of food exports in the United State and Brazil

Main component	**Part component**	
	United States[a]	**Brazil[b]**
Direct cost	Export failure	Export failure
	Communications	Communications
	Testing and retesting	Testing
	Storage	Storage
	Destruction	Destruction
	Transportation	Transportation
	Litigation	

Indirect Costs	Brand protection	Loss of consumer confidence Decrease in demand Decrease in holdings

Source: [a]GMA (2011); [b] Resende-Filho and Buhr (2010)

The calculation of estimated losses in both countries uses two main components, direct and indirect costs. The scope of this study has not been possible to calculate by the same method. Therefore, not all components contained in the two countries are used to calculate the estimated economic losses due to a rejection of food exports from Indonesia. The calculating component selected for use in calculating the estimated economic loss due to food export rejection from Indonesia can be seen in Table 4. In this study, the estimated economic loss due to a rejection of Indonesian food exports was calculated only from the direct cost component. The damaging reputation cost (such as loss of sales and the cost of repaying the reputation and confidence) of an exporter was difficult to quantify and was a major challenge to be financially restored.

Table 4 Component of the calculation of options for the calculation of losses due to the rejection of food exports from Indonesia

Main component	**Part component**
A. Direct	
Export failure	-Product price[b] -Volume of products[b]
Communication[a,b]	-
Laboratory testing[a,b]	-
Transportation	-Shipping cost[c] -Temporary storage cost[c] -Port cost[c]
Execution	-Destruction[a] -Reprocessed[a]

Source: [a]GMA (2011); [b] Resende-Filho and Buhr (2010); [c]Sanchez (2003)

Export Failure

The volume of rejection of food exports was not reported on the rejection notices in each country so the volume of export commodities rejected in the calculation of estimated economic losses due to a rejection of Indonesian exported food assumed that each case of rejection involving a 1 ton of commodity volume. Prices of tuna, shrimp, and export nutmeg from Indonesia can be seen in Table 5.

Table 5 Prices of tuna, shrimp, and export nutmeg from Indonesia

Commodity Type	Price per ton (US$)
Tuna	7,443
Shrimp	9,178
Nutmeg	9,817

Source: BPS 2017

Communication

Based on the result of the survey and interviews that have been done with an exporter whoever experienced the rejection of food export, the minimum cost to be paid for this component was US$185 and the maximum cost was US$738. The export of food which experience rejection of food

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export result food safety issues tends to have greater communication costs compared to rejected commodities due to reasons of quality or specification requested accordance with the demand of importers. Based on the survey results obtained the average estimate of communication costs was US$474.

Laboratory Testing

The first step that an exporter may experience if the export rejection was to submit laboratory test results. Exporters conducted sampling and analysis. The results of this sampling and analysis can be used to refute the reason for the rejection. But if the result was unacceptable then food exports must be re-exported. Products that have been re-exported were re-tested to decide on the execution. Based on the survey results and interviews, the minimum cost US$37 and a maximum of US$738. The average cost US$406.

Transportation

Transportation costs include shipping costs from export ports to import ports. According to Sanchez (2003), transportation costs include shipping costs, port loading, and unloading costs, insurance premiums and various charges at the time of traded commodities temporarily stored. Other variables that affect the number of transportation costs include distance, commodity prices, and export volume. Estimated transportation costs due to food export rejection can be seen in Table 6.

Table 6 Estimated transportation costs due to rejection of Indonesian food exports based on export destination countries

Variables		Estimated cost (US$ / container)		
		United State	European	Asia
Shipping costs	minimum	11,076	7,384	738
	maximum	14,768	12,922	4,430
	average	12,830	10,153	3,231
Cost of loading and unloading ports	minimum	1,477	923	222
	maximum	3,692	1,846	369
	average	2,677	1,385	295
Temporary storage costs	minimum	738	738	55
	maximum	1,255	1,108	1,108
	average	1,015	923	414

Execution

Based on the results of the survey and interview there were three actions conducted by exporters experiencing export rejection, which were reprocessed, used as animal feed or destroyed. The execution was different, depending on the circumstances of each case. The type of product, volume, the reason for rejection, the country to reject, and the time may affect the execution performed and costs incurred. If rejected food exports still eligible for sale and still in compliance with domestic market regulations, the products may be resold in the domestic market or made into animal feed. If not, rejected food exports must be destroyed. This result same as UNIDO (2011) that the product experiencing rejection from the export destination country can be destroyed or processed into animal feed. The estimated cost of execution loss due to the rejection of Indonesian food exports can be seen in Table 7.

Estimation of Economic Losses Due to Rejection of Food Exports

Based on the component and unit cost data released by food exporters, the calculation of the estimated economic losses due to a rejection of food exports can be calculated. The result of estimated economic loss due to food export rejection can be seen in Table 8.

Table 1 The result of the estimated economic loss due to Indonesian exported food rejection

Commodity	Variable	Country (US$)		
		United State	European Union	Japan
Tuna	Export failure	841,103	37,217	14,887
	Communication	66,753	2,308	738
	Laboratory testing	83,441	5,538	1,181
	Transportation	1,866,993	62,304	7,879
	Execution	152,975	6,769	2,708
	Total	3,011,265	114,135	27,393
Shrimp	Export failure	110,131	9,178	27,533
	Communication	7,089	462	1,108
	Laboratory testing	8,861	1,108	1,772
	Transportation	198,265	12,461	11,818
	Execution	1,6245	1,354	4,061
	Total	340,590	24,561	46,292
Nutmeg	Export failure	9,817	176,702	29,450
	Communication	591	8,307	1,108
	Laboratory testing	738	19,937	1,772
	Transportation	16,522	224,294	11,818
	Execution	1,354	24,368	4,061
	Total	29,022	453,608	48,210

Based on the calculation of economic losses that have been estimated, the highest economic loss of food exports from Indonesia during the last three years (2014-2016) was tuna from the United States with an estimated loss of US$3.01 million per year. The second position with the highest loss was the commodity of nutmeg from the European Union of US$0.45 million per year and shrimp from the United States with an estimated loss of US$0.34 million per year. Total economic losses due to the rejection of Indonesian food exports during 2014-2016 in the United States, European Union and Japan on tuna, shrimp and nutmeg commodities can be seen in Figure 2.

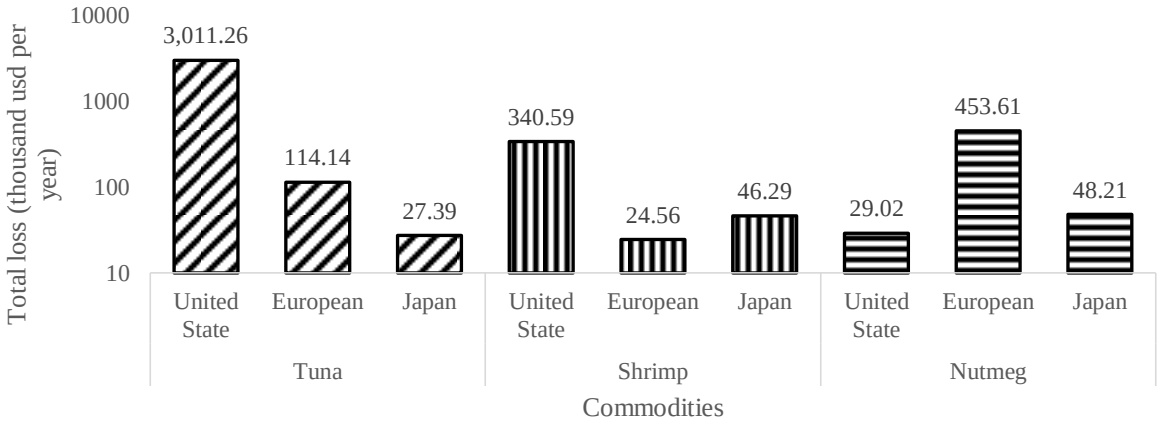

Figure 2 Total economic losses due to the rejection of Indonesian food exports during 2014-2016 in the United States, European Union, and Japan on tuna, shrimp and nutmeg commodities.

Tuna fish in 2014-2016 has been rejected mainly by the United States. The number of tuna rejected by the United States reaches 113 cases per year, nutmeg in the EU and shrimp in the United States was 18 and 12 cases per year.

The highest economic loss due to the rejection of food exports of the three types of

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commodities when viewed from the export destination country was the United States of US$3.38 million per year, then followed by the EU by US$ 0.59 million per year. While Japan relatively contributed lower loss by US$ 0.12 million per year. Besides due to the number of cases of rejection, another factor that can affect was distance. Japan located in Asia be closer to Indonesia compared to the EU or the United States. This obviously affects the expenditure costs incurred. The amount of this loss depends on the amount of each unit cost on each component cost incurred and the number of cases of rejection that occurred. The more cases of food export rejection, the greater the economic losses.

As a comparison, UNIDO in 2006 and 2010 also estimated the economic losses in four bigger sectors fisheries, fruits and vegetables, spices and nuts and from all countries which indicated the total economic loss due export rejection in the United States was US$ 80 million per year, US$ 77 million per year in the EU and US$ 14 million per year in Japan (UNIDO, 2013). A similar conclusion was found in both studies that the United States being the export destination country with the highest loss.

In general, the biggest contributing component was transportation, 59% of total loss and export failure contributes 31% of the total loss. Transportation becomes the largest cost caused by this cost include three components of the parts were shipping costs, port maintenance fees, and temporary storage costs. Meanwhile, other costs that contributed were communications of 2%, laboratory testing 3% and execution issued by 5%. The economic losses based on the cost components can be seen in Table 9.

Table 9 Economic losses are based on the component costs incurred

Cost component	Average loss (US$)	Percentage (%)
Export failure	1,256,018	31%
Communication	88,464	2%
Laboratory testing	124,348	3%
Transportation	2,412,354	59%
Execution	213,895	5%
Total	4,095,079	100%

The calculation of the estimated economic loss was indicated that the rejection of food exports may cause economic losses for exporters. Though small in value compared to export earnings, however, many cases of export rejection may result in reduced export demand, either due to restricted exports (e.g. import restrictions) or because importers were unwilling to risk re-occurrence. The more rejection of exports that resulted in greater economic losses. This can certainly hinder the achievement of national export targets, the export performance was very important for Indonesia to support economic growth, moreover, to offset the high rate of imports from other countries.

The government's efforts to reduce food export rejection are carried out through food export certificates. In the rules that are valid in 2020, analysis certificates from accredited laboratories are required, with a maximum validity period of 12 months. These certificates include, among others, the Certificate of Analysis of Chemical Pollution and Microbiological Pollution, the Certificate of Analysis of 3 MCPD, and the GMO Certificate for several products (BPOM, 2020).

D. Conclusion

The components that play a role in calculating the estimated loss are the cost of export failure, communication costs, laboratory testing costs, transportation costs, and execution costs. Based on the calculation of estimated economic losses due to the rejection of Indonesia's food exports during 2014-2016 the biggest economic losses experienced by tuna commodities (US$3.01

million per year). When viewed from the export destination countries the United States contributes the greatest losses. The overall loses mostly come from transportation cost (59% or US$2.4 million per year). It is necessary to increase awareness and action for all parties involved in understanding the differences in regulations, technical requirements, and characteristics of quality management and food safety that are required by the destination country so that cases of rejection of Indonesian food exports are not re-occurring and causing greater losses.

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