

Factors affecting imported price of shrimp products in Japan market: Evidences from Thailand and Vietnam

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ABSTRACT— This study aims to identify the factors affecting import price of frozen shrimp from Thailand and Vietnam to Japan market by time-series monthly data from 2008 to June, 2019. The dataset of this study includes the monthly data covering from 2008 to June, 2019 about the imported price of shrimp products of Thailand and Vietnam in Japan market with total 138 observations. Error correction models was explored to estimate the factors influencing to the imported price of shrimp products of Thailand and Vietnam in Japan market. The explanatory variables includes in the models were determined based on the theory of demand and supply. Found results showed that, both in short and long run, the imported price of frozen shrimp from other countries such as Vietnam, China and India was indicated as the factors effect on the imported price of Thailand shrimp products ($P < 0.01$). Similar results were found for the case of Vietnam shrimp products imported to Japan ($P < 0.01$), suggesting Thailand, China, India and Vietnam were directly competitors for shrimp products in Japan market. Exchange rate between USD and JPY played an important role in the changes of import price for both Thailand and Vietnam frozen shrimp. In long run, the results of this research indicated that the implementation of quality assurance regulation caused of increasing in imported price of Vietnam frozen shrimp. Meanwhile, the application of new technology in shrimp cultured could improve the competition advantages of Thailand frozen shrimp.

KEYWORDS: Japan, Thailand, Vietnam, Shrimp, Imported price, Error correction models.

1. INTRODUCTION

Trade has proved its important role in economic growth of many countries. Number of jobs and improved living standard in many developing countries [35], [16]. Shrimp is the major product as the daily food material in the world, and global shrimp production is performed in 60 countries. Thailand and Vietnam are the largest suppliers of shrimp products in global market. Shrimp production, which is mainly export-oriented, play as an emerged role for rural develop-ment, income increasing and improvement of livelihood in those countries [22], [37], [28], [8]. Among those, more than 40% of shrimp products from these suppliers are exported to the US, EU and Japan [7].

The COVID-19 pandemic in the end of 2019 created a worth opportunity for the shrimp exported coun-tries due to the demand quantity of Chinese shrimp products in the global markets has been reduced. However, it is fact that shrimp producers in the exporting countries, such as Vietnam and Thailand, have been recently reflected by the stringent consideration of traceability, quality, and safety requirements from the global markets, especially the high living standards countries (i.e. the US, EU, and Japan markets). Those have resulted of the decreasing of Vietnamese shrimp quantity exported to those markets [13]. This was because all of shrimp producers in the exporting countries may not enable to respond the requirements in the short term [14].

Regarding Japan market, Vietnam and Thailand were the highest suppliers for shrimp products from 2008 to 2019, which are averagely accounting more than 30% total value of shrimp products imported to Japan. It should be noticed that, the price of shrimp products exported to the high living standards countries (i.e. Japan) is approximate 20% higher than the price exported to the other markets (calculated from the statistical data of [7]). This, then, is expected to call for the efforts to export of shrimp suppliers from other countries. Thus, shrimp exporting countries such as Vietnam, Thailand, China, and India have to improve their competitive advantages to compete to each other [8]. Consequently, those exporting countries become the direct competitors of shrimp products in the global markets. Any disruption in shrimp production of those exporting countries was estimated to have severe and important effects on the demand quantity and price of the other exporting countries.

Product price is reflected of the result of the various economics relationships, including price interaction between different stages along the supply chain, and the co-integrated effects between the prices of the observed products and its substitution in the markets [17], [26], [20]. Regarding the shrimp products, the production activities in the largest suppliers of the shrimp products in the world, such as Vietnam, Thailand, India, and other Southeast Asia countries is small-scale [5]. Therefore, the shrimp producers along upstream flows of supply chain in the local side, especially shrimp farmers in those countries might not have enough market power to determine the price of the products in the global side. Conversely, the changes in price of the downstream agents along supply chain in the global side might have significant effects on the selling price of the upstream agents in the local side [24].

From scientific perspectives, there was diversified works on agricultural product price fluctuation and factors affecting the prices of agricultural products have been considered, including cultivated activities, shrimp trade and marketing, food safety standards implemented along shrimp supply chain, value chain analysis, and price forecasting [37], [13], [25], [31], [39], [21], [30]. Cointegration theory and Error Correction Models have been explored to examine the effects of the price fluctuations of the agricultural products prices between each stages along supply chain, and/or between the different markets in both short and long run [6], [27]. However, there have been no attempts particularly to compare the price and emerging challenges practiced in the factors affecting the price of shrimp exports to Japan of both Vietnam and Thailand. On the other hand, the database related to the market price of the largest exporting shrimp, such as Vietnam, Thailand, India, and other Southeast Asia countries are limited [19]. There was no public data about the export price or the selling price at the wholesale and retail markets are officially published for the scientific research purpose [23].

This study aims to renew the relevant research on determinants influencing to the price of shrimp products analysis in the global market but make up for the inadequacy of related studies focusing on identifying the factors influencing the price of shrimp products imported to Japan market based on the evidences from the Vietnam and Thailand frozen shrimp products. The results of this study are expected to be a useful scientific platform which stakeholders of shrimp industry and policymakers in both Vietnam and Thailand to figure out the exporting strategies in the global markets and maintain the sustained growth of shrimp production in particular, and in the agriculture sectors in general.

2. Material and Methods

2.1 Data collection

The monthly data of the imported price of Vietnam and Thailand frozen shrimp products and that of the other importers in Japan market (e.g. China, India) from 2008 to June, 2019 was collected from statistics of Japan's Customs. The other factors affecting to the imported price of Vietnam and Thailand shrimp products in Japan

market were obtained from Food and Agriculture Organization (FAO), World Trade Organization (WTO), and International Monetary Foundation (IMF). The description of all variables of dataset is shown in Table 1.

2.2 Research model

The factors influencing of the imported price of Vietnam and Thailand shrimp products in Japan markets are determined by its shifters of demand and supply [14]. Regarding the supply side, the frozen shrimp products imported to Japan market is the total supplied quantity of frozen shrimp products from Vietnam (country code is VN), Thailand (country code is TL), and rest of the world (country code is ROW). Regarding the demand side, Japan (country code is JP) is one of the largest importers of frozen shrimp products. Any changes in the demand from Japan probably effect to the quantity and the price of shrimp products in the global market.

The demand (Japan market) side:

The total demand for Vietnam and Thailand shrimp products Japan market is depended on the consumer price and the other shifters of demand for shrimp products in Japan and the world [17], as presented in the follows:

$$I_{JP} = I(P_{JP}, Z_{JP}) \quad (1)$$

where, I_{JP} is the amount of imported of shrimp products to Japan, P_{JP} and Z_{JP} are consumer price (in USD) and demand shifters of the imported shrimp products in Japan, respectively. Let define E_i ($i = VN, TL, ROW$) as the exchange rate of JPY and USD. If law of one price is assumed, then, there are no transaction costs and transportation costs of shrimp products in global markets [11]. Then, $P_{JP} = E_i P_i$. The total quantity demanded for shrimp products in Japan is described as:

$$M = I(P_{JP}, Z_{JP}) = f(E_i, P_i, Z_{JP}) \quad (2)$$

The supply (export) side:

Total amount of shrimp products exported to Japan market are shown as below:

$$X_{JP} = X_{VN} + X_{TL} + X_{ROW} \quad (3)$$

where, X_{VN} and X_{TL} are the amount of Vietnam shrimp products exported to Japan and X_{ROW} is the quantity of shrimp products exported from rest of the world (ROW) to Japan. X_{VN} , X_{TL} , and X_{ROW} are defined as follows:

$$X_{VN} = f(P_{VN}, Z_{VN}) \quad (4)$$

$$X_{TL} = f(P_{TL}, Z_{TL}) \quad (5)$$

$$X_{ROW} = f(P_{ROW}, Z_{ROW}) \quad (6)$$

P_i and Z_i ($i = VN, TL, ROW$) are the price (in USD) and demand shifters of the shrimp products exported from Vietnam, Thailand and ROW to Japan, respectively.

$$\text{Hence, } X_{JP} = f(P_{VN}, Z_{VN}, P_{TL}, Z_{TL}, P_{ROW}, Z_{ROW}) \quad (7)$$

The equilibrium market is at total demand (imported side) equals to total supply (exported side),

$$\text{where: } X = M \quad (8)$$

Thus, the imported price of Vietnam shrimp to Japan was presented as:

$$P_{VN} = f(E, P_{JP}, Z_{VN}, P_{TL}, Z_{TL}, P_{ROW}, Z_{ROW}) \quad (9)$$

$$P_{TL} = f(E, P_{JP}, Z_{TL}, P_{VN}, Z_{VN}, P_{ROW}, Z_{ROW}) \quad (10)$$

2.3 Data analysis

The Error Correction Models (ECMs) were explored to estimate the factors effect to the imported price of Vietnam and Thailand shrimp products to Japan market. ECMs, which are useful in estimating the short run effects of x on y or long run effects of x on y in the case of multiplier when the speed at which of y returns to equilibrium after a deviations occurred, are a category of multiple time series models that directly estimate the speed at which a dependent variable. Of which, the ECM model in long run is derived from the ECM in

the short run [32].

The basic structure of an ECM is:

$$\Delta P_t^k = \beta_0^k + \sum_{i=1}^n \beta_i^k \Delta X_{ti}^k + \sum_{j=1}^n \beta_j^k \Delta Z_{tj}^k + \beta_\gamma^k \varepsilon_{t-1}^k + e_t \quad (11)$$

where,

P_t is the imported price of frozen shrimp from Thailand (or Vietnam) in Japan market at the t th month.

$k = 1$ indicates for Vietnam frozen shrimp; $k = 2$ indicates for Thailand frozen shrimp

X_{ti} is the imported price of frozen shrimp from the i th ($i = 1, n$) countries, which are the competitors of Vietnam (or Thailand) at the t th month.

Z_{tj} is the j th ($j = 1, n$) demand shifters for frozen shrimp in Japan market at the t th month

β_0 : is the intercept; β_i ($i = 1, n$) and β_j ($j = 1, n$) are the coefficients of X_{ti} and Z_{tj} in the model, respectively.

e_t : white noise

ε_{t-1} is the error correction component of the models.

Augmented Dickey-Fuller (ADF) test (unit root test) was employed to check the stationary of the variables included in the ECMs model. Durbin Watson statistic $DW \cong 2(1 - \rho)$ was explored to test the autocorrelation.

The test for residual's constant variance is the autoregressive condition heteroskedastic model: $\varepsilon_t^2 = \beta_0 + \beta_1 \varepsilon_{t-1}^2 + e_t$ (*) with null hypothesis ($\beta_1 = 0$), indicating there is no heteroskedastic residual ($P < 0.1$).

Regarding the imported price of frozen shrimp from the direct competitors of Vietnam and Thailand in Japan market, the price of frozen shrimp imported from Thailand is included in the model as a factor influencing to the imported price of Vietnam shrimp, and vice versa. Since Vietnam and Thailand are the direct competitors of shrimp products imported to Japan market [37], [9]. Therefore, any changes in the quantity and prices of Vietnam shrimp imported to Japan market are expected to effect to the quantity and price of shrimp products of Thailand imported to Japan market, and vice versa. In details, the imported quantity and price of Vietnam shrimp products in Japan market are decreased if the quantity of shrimp products imported from Thailand increases, but the price decreases [36]. Similarly, the imported quantity and prices of Thailand shrimp in Japan market are expected to decrease if the quantity of shrimp products imported from Vietnam and ROW increase and the prices decrease. Besides that, in the present study, the prices of shrimp products imported from other countries, included China (country code is CN) and India (country code is In), which are the direct competitors of Vietnam and Thailand shrimp imported to Japan, were included in the model to examine their effects on the price of Vietnam and Thailand shrimp products imported to Japan [13].

The increases of unsafety food incidents has led to the recent attention in the food safety and quality issues in the global markets, especially in the high standards markets such as Japan, the US, EU, Australia, etc. In order to meet the food safety requirements, the exporting countries have to apply the quality assurance certification to producing process. Those requirements are estimated to reduce the price of food products imported to the imported market in the short run [14], [18]. However, the export countries, who are able to adjust their producing process to satisfy those requirements from the importing countries, enable to improve the price and comparative advantages in global market [1], [4]. In the long run, the labels attached to the certified products play as the commitment of producers for the safety, quality and traceability of the products [12]. Therefore, the certified products are estimated to increase the consumer's confidences about the products have been purchased. Hence, the price of certified products are estimated to be higher than that of non-certified

products. The application for safety and quality assurance certification for Vietnam shrimp products not only plays as a passport to be accepted by the global markets but also is able to gain the higher price (Su-zuki and Nam, 2018).

Regarding the shifters of demand and supply for Vietnam shrimp products imported to Japan, the factor in relation to the requirements of safety and quality assurance issues specified for shrimp products imported to Japan and other countries in the world. The Enfloxacin antibiotics residue is one of the most important issues to evaluate the quality and safety of shrimp products in global markets. In January 2011, the first case of this kind of antibiotic residue was confirmed on shrimp products in Japan. Japanese Government, then, imposed a strict inspection regulation for the imported shrimp products [33], [34]. This has resulted of the decreases in both quantity and price of shrimp products to Japan market. Therefore, this accident is added to the model as one of the shifter demands for Thailand shrimp products imported to Japan. From Vietnam side, after this accident, Vietnam Directorate of Fisheries, then, has immediately issued the national traceability regulation, namely Circular No.03/2011/BNN-PTNT (Cir.03) in March, 2011 in an attempt to enhance the implementing traceability and managing quality and safety of shrimp products from farms to distribution and processing. Thus, the regulation is supposed to be the meaningful responses from Vietnam Government to enable the eligibility of certified shrimp products into Japan and global markets requirements, suggesting a positive effect to the price of Vietnam shrimp products imported to the global markets, including Japan. Therefore, the implementation of the Cir.03 was included in the model as a response of Vietnamese Government to the discovery of enfloxacin antibiotic accident.

The safety and quality issues aside, the implementation of Vietnam-Japan Economic Pacific Agreement has been vaild in October, 2009. This was expected to enhance the trade value between Vietnam and Japan, including shrimp products. Therefore, this factor was also added to the model to test its impacts to the imported price of Vietnam shrimp products in Japan.

In Thailand, the application of the automachine technology in shrimp production and fish feeders to reduce labor problems and increase production efficiency from January 2009 was estimated to increase the quantity production and enhance a better control quality of shrimp farming input in Thailand. The first case of Early Mortality Syndrome (EMS) diseases in September, 2011 has decreased the quantity of shrimp farming inputs. Those, then, influenced to the price of shrimp farming inputs in local side of Thailand, and to the price of Thailand shrimp products in global markets.

Besides that, Japanese earthquake in 2011 had a major effects on demand quantity and price for seafood products in Japan [38]. In this study, this was included to test the effects of this accident on the imported price of shrimp products. On the other hand, monthly income per capita of Japanese were included as the factors influencing to both Vietnam and Thailand shrimp products imported to Japan. Furthermore, the seasonal influencing is even supposed as the shifters of demand and supply of Vietnam and Thailand shrimp products in the model.

Here, all variables were standardized to make them have same scale. The procedure of standardization mainly based on the mean and standard deviations of independent variables and this process makes sense in term of scaling the difference between the “spread” of the independent variable and the dependent variable. The detail of variables is described in Table 1.

Table 1. Description of variables included in the ECM model, presented the factors influencing to the imported price of shrimp products of Vietnam and Thailand to Japan market

Name		Vietnam	Thailand	Min.	Max.	Mean (N=138)	SD
<i>Dependent variable</i>							
P_t^1	Import price of Vietnam's frozen shrimp in Japan market	x	Not included in the model	0.78	1.64	1.15	0.24
P_t^2	Import price of Thailand's frozen shrimp in Japan market	Not included in the model	x	0.66	1.42	0.91	0.20
<i>Explanatory variables</i>							
P_t^1	Import price of Vietnam's frozen shrimp in Japan market	Not included in the model	x	0.78	1.64	1.15	0.24
P_t^2	Import price of Thailand's frozen shrimp in Japan market	x	Not included in the model	0.66	1.42	0.91	0.20
X_{CN}	Import price of China's frozen shrimp in Japan market	x	x	0.46	1.53	0.87	0.22
X_{India}	Import price of India's frozen shrimp in Japan market	x	x	0.64	1.42	0.92	0.02
Z_1	Exchange rate USD/JPY	x	x	76.60	123.83	100.44	13.32
Z_2	Japanese income per capita per month	x	x	284.86	399.07	342.70	20.50
Z_3	Earthquake	x	x	Dummy variable, EQ = 1 from January 1 st 2011 and after since the Earthquake occurred in Japan; EQ = 0 before January, 2011.			
Z_4	Implement of seafood safety regulation in Vietnam	x	Not included in the model	Dummy variable, Cir. = 1 from March, 2011 and afterward since Vietnamese Government issued the national regulation about quality assurance and traceability for seafood products, Cir. = 0 from June, 2009 and before.			
Z_5	First quarter	x	x	Dummy variable, $Q_1 = 1$ for the first quarter of year, $Q_1 = 0$ for other quarter.			
Z_6	Second quarter	x	x	Dummy variable, $Q_2 = 1$ for the second quarter of year, $Q_2 = 0$ for other quarter.			
Z_7	Third quarter	x	x	Dummy variable, $Q_3 = 1$ for the second quarter of year, $Q_3 = 0$ for other quarter.			
Z_8	Implement of Vietnam-Japan Economic Partnership Agreement	x	Not included in the model	Dummy variable, Agree. = 1 from October, 2009 and afterward since the Vietnam-Japan Partnership Agreement has been effective. , Agree. = 0 from September 2009 and before.			
Z_9	Discovery of Enflloxacin	Not included in the model	x	Dummy variable, EQ = 1 from January, 2011 since the first case of			

Name		Vietnam	Thailand	Min.	Max.	Mean (N=138)	SD
				the enrofloxacin antibiotic residue on shrimp products imported to Japan was discovered.			
Z ₁₀	Early Mortality Syndrome (EMS)	Not included in the model	x	Dummy variable, EMS = 1 from September, 2011 and after since the first case of EMS in Thailand occurred, EMS = 0 from August, 2011 and before.			
Z ₁₁	Automachine and technology started to apply for shrimp production and fish feeders	Not included in the model	x	Dummy variable, Automa. = 1 from January, 2009 and afterward, Automa. = 0 from December, 2008 and before.			

Source: summarized from the theoretical framework and literature review.

3. Results and Discussion

The results of ECM models to estimate the factors influencing the price of frozen shrimp of Vietnam and Thailand imported to Japan market were presented in Table 2. In whole, the explanatory variables included in the models have significantly effected to the price of frozen shrimp imported from Vietnam and Thailand to Japan market ($P < 0.01$). In both short and long run, the price of frozen shrimp from Vietnam and Thailand to the Japan market was significantly affected by the imported price of shrimp products from Thailand, China, and India. Besides that, found results of the ECM model also indicated the significant effects of exchange rate on the imported price of frozen shrimp products of Vietnam and Thailand to Japan market. Other factors, including the seasonal effects, implementation of seafood regulation, and improvement in production technology, also significantly influenced to the imported price of shrimp products of Vietnam and Thailand in Japan market.

Table 2. The results of ECMs model illustrated the factors affecting to the price of frozen shrimp of Vietnam and Thailand imported to Japan market

Variables	Short term		Long term	
	Vietnam	Thailand	Vietnam	Thailand
	Coefficient	Coefficient	Coefficient	Coefficient
Intercept	0.012	0.005	n/a	-0.854***
Import price of Thailand's frozen shrimp in Japan market	0.169*	Not included in the model	0.247***	Not included in the model
Import price of Vietnam's frozen shrimp in Japan market	Not included in the model	0.296***	Not included in the model	0.041***
Import price of China's frozen shrimp in Japan market	0.043*	0.079***	0.002**	-0.022***
Import price of India's frozen shrimp in Japan market	0.209***	0.140***	-0.035***	n/a
Exchange rate USD/JPY	0.498***	0.507***	-0.585**	-0.402***
Earthquake	0.001	0.011	n/a	0.044***
Japanese income	-0.112	0.153	n/a	n/a
Implement of seafood safety regulation in Vietnam	-0.004	Not included in the model	0.005***	Not included in the model
First quarter	0.0003	-0.005	0.034***	n/a

Second quarter	-0.019**	-0.012	0.019***	n/a
Third quarter	-0.01	-0.003	0.023***	n/a
Implement of Vietnam-Japan Economic Pacific Agreement	0.001	Not included in the model	n/a	Not included in the model
Discovery of Enfloxacin	Not included in the model	-0.028	Not included in the model	n/a
Early Mortality Syndrome (EMS)	Not included in the model	0.017	Not included in the model	n/a
Implement of automachine in Thailand	Not included in the model	0.002	Not included in the model	-0.022***
Error correction term	-0.611***	-0.484***		
Lag of dependent variable			0.389***	0.516***
R square	0.58	0.59		
P-value	0.000	0.000		
Durbin Watson	2.036	2.025		

Note. All continuous variables in logarithm first differenced form ECMs in short run according to the results of unit root test for the stationary of dataset ($P < 0.01$). The Durbin Watson test value is approximate 2, indicated that there has no autocorrelation in ECM models; All continuous variables in logarithm forms in ECMs long term; *, **, *** present the significant level at 1%, 5%, 10% respectively; n/a represented there is no significant effects of the explanatory on the dependent variable in the long term.

Source: author's computation based on the collected data.

In short term, the imported price of the Thailand, China and India frozen shrimp has positively affected to the price of Vietnam frozen shrimp imported to Japan market, *certius paribus* ($P < 0.01$). Among those, an 1% increased in the price of Thailand frozen shrimp imported to Japan in the short run has resulted of an 0.169% increase in the imported price of the Vietnam frozen shrimp products to Japan market. Similarly, an 1% increased in the price of China and India frozen shrimp imported to Japan has resulted of an 0.043% and 0.209% increases in the imported price of the Vietnam frozen shrimp products to Japan market, respectively. Similar results were found from the ECM models to estimate the factors influencing to the imported price of Thailand frozen shrimp products in Japan market. In short term, the increases in the imported price of frozen shrimp products from Vietnam, China, and India to Japan market have resulted of the increase in the price of Thailand frozen shrimp products imported to Japan market ($P < 0.01$).

In long term, it should be noticed that the increases in the imported price of India frozen shrimp had the negative effects on the price of Vietnam frozen shrimp imported to Japan market ($P < 0.01$). Similarly, found results indicated a negative effect of the imported price of China frozen shrimp on the imported price of Thailand frozen shrimp products in Japan market ($P < 0.01$). This results suggested that the frozen shrimp products imported from those countries are the substitute products of each others [37], [15]. In the short term, since the increases in the imported price of frozen shrimp products addressed the increases in demand for those products in Japan market. However, the price of the imported frozen shrimp continuously increased in the long term might lead to the changes in Japanese consumers consumption to the other products. The demand for the imported frozen shrimp in Japan market, therefore, might be decreased. This, then, was causes of the decreases in its imported price.

In addition, it was also found that an increase by 1% in the price of Vietnam (or Thailand) frozen shrimp

products imported to Japan market in the previous year has resulted of an increase by 0.39% in its imported price in the current year. This intended that the Vietnam shrimp exporters should consider the fluctuation of the market price to take the chance of gaining a higher price in global market, *certius paribus*.

On the other hand, the estimated results of ECM models also indicated that the exchange rate between USD and JPY had a positive effect on the imported price of Vietnam and Thailand frozen shrimp to Japan in short term. If other factors are unchanged, an increase by 1% in the exchange rate led to increase 0.498% and 0.507% in the imported price of Vietnam and Thailand frozen shrimp in Japan market, respectively ($P < 0.01$). The result is reasonable since imported price added to the ECM model was in Japanese Yen. An appreciation of USD means the depreciation of JPY. Then, the Japanese consumers have to buy the frozen shrimp products imported from Vietnam and other countries in the higher price [26], [11], [29]. In contrast, an increase by 1% in exchange rate in long term is causes of the decreases by 0.585% and 0.402% in the imported price of Vietnam and Thailand frozen shrimp products in Japan market, respectively. It was because the increases in exchange rate in the long run have resulted of the increases in the price of the imported shrimp products. Japanese consumers, therefore, have to pay a higher price for Vietnam frozen shrimp. Consequences, they might change their consumption to other products, which might be the substitute products of imported frozen shrimp, and/or the domestic shrimp products [14].

Regarding the case of Vietnam frozen shrimp, found results of the ECM model also indicated seasonal effects to the price of Vietnam frozen shrimp imported to Japan market. The ECM model in short term indicated that the imported price of Vietnam frozen shrimp in Japan market during the second quarter was lower than that of the other quarters of the year by 0.019% ($P < 0.05$). This might be explained because the second quarter is the spring season in Japan. Japanese consumers tend to consume the traditional and domestic products during the new year, rather than the imported products. However, in the long run, the estimated results of ECM model indicated a positive effect on the price of Vietnam frozen shrimp imported to Japan market ($P < 0.05$), suggested that the Vietnam shrimp exporters might consider to improve the product's attributes, which might be reasonable to consume in the new year. This, then, might increase the premium of the Vietnam shrimp products in Japan market.

The implementation of the seafood safety regulation to response the identification of enfloracin antibiotic residues accident of Vietnamese Government did not found as a significant factor affecting to the imported price of Vietnam frozen shrimp in Japan market in the short term ($P < 0.1$). However, this was significantly addressed a positive effects on the price of Vietnam frozen shrimp products imported to Japan market ($P < 0.01$). This results suggested that the implementation of quality assurance regulations might play as an alternative to enhance the economics incentives for Vietnamese shrimp stakeholders by the improvement of product's quality towards to response the requirements of global market [13], [2], [10].

Regarding the case of Thailand, it was found that the application for the automachine to improve the production technology and fish feeders might have no significant in the short term ($P < 0.1$). However, this might be useful to reduce the production costs of Thailand shrimp farming. Therefore, it might decrease the price of Thailand shrimp in the long term. This, then, might improve the competitive advantages of Thailand shrimp products in the global market [3].

4. Conclusion

This study figured out the factors affecting the price of frozen shrimp products of both Thailand and Vietnam imported to Japan market. It was concluded that the price of shrimp products imported to Japan markets of both countries was reflected to each others. Besides that, the imported price of frozen shrimp products of

China and India also indicated as the factors influencing to that of Thailand and Vietnam in both and long term. Those results suggested that shrimp exporting countries should consider to contribute the database of production, trade quantity and price and the global market information to support the shrimp stakeholders in the forecasting and carrying the strategy in the long run. However, a limitation of this study is that it only considers the evidences from the Vietnam and Thailand frozen shrimp imported to Japan market in explaining factor influencing to the changes of imported price. Therefore, the scientific platform, which is figured out in this study might be expanded to the other relevant products, and other countries in the global markets.

On the other hand, the implementation of seafood safety was found as the significant role since this might increase the imported price of shrimp products in Japan market in the long run, suggesting the shrimp stakeholders should consider to apply the international food safety standards to improve the product's quality, and response the requirement of imported markets. In addition, the application of the new technology might improve the competitive advantages of shrimp exporters by reduction of the production cost in the long term. Those suggested that calling for integration and collaborations between the exporting countries in order to share the experiences, technology, and solved the international commercial trade problems should be considered to enhance the economic gains of the shrimp exporting countries. Therefore, the studies on the linkage contribution mechanism between stakeholders along the supply chain of agriculture products may be the meaningful future research towards the agricultural development and sustainability over the world.

5. Acknowledgement

This work was conducted under the collaborations of Provincial Department of Fisheries in Ca Mau and other provinces in Mekong Delta, Vietnam to provide information and recommendations.

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