The Important Factors for Thai Frozen Shrimp Exporting to the United States of America and Japan

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Abstract

The aim of the research was to study the important factors affecting the volume of Thai frozen shrimp exports to the United States of America (U.S.A.) and Japan, focusing on : Manufacturing Production Index classified by frozen seafood category, Domestic Wholesale Shrimp Price, Gross Domestic Product: GDP of U.S.A. (Japan), Per capita GNP of U.S.A (Japan), Personal Consumption Expenditure: PCE of U.S.A. (Japan). The study used secondary data, collecting on a monthly basis from January 2018 to December 2022, for a total of 60 months, using the Multiple Regression Analysis by the Least Squares Estimation method.The results of the study found that the important factors affecting the volume of Thai frozen shrimp exports to the U.S.A. in the same direction, statistically significant were Manufacturing Production Index classified by frozen seafood category: MPI. As for the Domestic Wholesale Shrimp Price: PRI, Gross Domestic Product: GDP of U.S.A. Per capita GNP of U.S.A: PCI, and Personal Consumption Expenditure: PCE of U.S.A. were not affected on the volume of Thai frozen shrimp exports to the U.S.A., statistically significant. For the important factors affecting the volume of frozen shrimp exports from Thailand to Japan in the same direction, statistically significant was Manufacturing Production Index classified by frozen seafood category: MPI while the Domestic Wholesale Shrimp Price: PRI was affected in the opposite direction. For Gross Domestic Product: GDP of Japan, Per capita GNP of Japan: PCI, and Personal Consumption Expenditure: PCE of Japan were not affected on the volume of Thai frozen shrimp exports to Japan statistically significant.

KEYWORDS: Frozen shrimp, Thai exporting, Frozen seafood

Introduction

When considering Thai shrimp exports in 2022, from Table 1 from International Fishery Trade Analysis Group Fisheries Development Policy and Planning Division, The Fisheries Department processes it from the Customs Department (www.thai-frozen.or.th), it can be seen that exports to the U.S.A.s, Thailand's main shrimp export market, were likely to decrease, which result in a proportion only 28.21. The volume decreased by 18.76 percent and the value decreased by 6.42 percent compared to 2021. The export volume was only 35,172.66 tons, valued at 14,837.17 Millon Baht, which was the lowest amount of Thai shrimp exports to the U.S.A.s in the history. In the meanwhile, exports to Japan tend to increase, with a volume of 38,600.36 tons worth 14,303.23 Millon Baht, making the proportion increase

to 27.19 percent. Shrimp exports to the U.S.A., which was Thailand's main market, have a decreased trend import. Because there were a lot of shrimp products left in inventory. The U.S.A. economy was in a state of inflation. Products were also more expensive. However, Thailand's important export markets for frozen processed shrimp were the U.S.A.s and Japan. which includes the order value of the two countries each year was worth more than half of the value of Thai frozen shrimp exports. In the past period, the expansion of Thailand's processed shrimp industry has continued. This was a result of having the advantage of raw materials that were diverse and sufficient for the needs of both domestic and international markets. Including having low labor costs readiness to accept changes in the production process was able to compete especially producing to the standards that trading partners want including the government's policy to promote the food industry from farm level development to processing plants and marketing. As a result, Thailand's processed shrimp industry has expanded. However, problems, obstacles and limitations in trade were increasing every time. From these reasons, the researcher was interested in studying the important factors affecting the volume of frozen shrimp exports from Thailand to the U.S.A. and Japan

Table 1 Thai Frozen Exporting Year 2021 - 2022 Quantity: Ton Value: Millon Baht

Country / Gorup	2021		2022		Change Rate		Value Proportion	
	Quantity	Value	Quantity	Value	Quantity	Value	2021	2022
USA	43,296.50	15,854.72	35,172.66	14,837.17	-18.76	-6.42	31.79	28.21
Japan	35,132.16	12,044.26	38,600.36	14,303.23	9.87	18.76	24.15	27.19
China	23,831.01	7,975.72	24,188.31	9,252.48	1.50	16.01	15.99	17.59
South Korea	8,850.25	3,162.23	7,199.10	2,919.81	-18.66	-7.67	6.34	5.55
Taiwan	6,708.34	2,041.51	8,895.26	2,644.90	32.60	29.56	4.09	5.03
ASEAN10	20,893.53	2,212.87	15,513.16	2,045.24	-25.75	-7.58	4.44	3.89
Canada	4,829.73	1,619.12	4,503.13	1,752.93	-6.76	8.26	3.25	3.33
Australia	4,369.90	1,553.73	4,366.91	1,699.63	-0.07	9.39	3.12	3.23
Hong Kong	3,987.91	1,129.87	4,323.38	1,183.72	8.41	4.77	2.27	2.25
EU27	1,759.11	592.46	1,498.99	599.77	-14.79	1.23	1.19	1.14
United Kingdom	2,450.95	906.26	1,373.84	542.00	-43.95	-40.19	1.82	1.03
New Zealand	830.37	278.04	869.53	301.60	4.72	8.47	0.56	0.57
Mexico	528.76	191.91	456.10	216.87	-13.74	13.01	0.38	0.41
Other	952.49	310.16	744.22	304.00	-21.87	-1.99	0.62	0.58
Total	**158,420.99**	**49,872.86**	**147,704.93**	**52,603.36**	**-6.76**	**5.47**	**100.00**	**100.00**

Source: International Fishery Trade Analysis Group Fisheries Development Policy and Planning Division, The Fisheries Department processes it from the Customs Department

Literature Review

1. Information of Thai shrimp industry and main Thai shrimp frozen export markets

In the past, shrimp farming in Thailand used a farming style that was similar to nature. Most of the farming involves tiger shrimp. There was only the construction of a seawall in their own coastal area Then wait for time for the natural shrimp larvae to grow. In 1986, Thailand began to enter the developed farming system. It was initiated by a private business company with large-scale farming. As for the trade side of the Thai shrimp industry, emphasis was placed on exports rather than domestic consumption with an export share of 90 percent, only 10 percent was consumed domestically, making Thailand a leading shrimp exporter in the world. It was exported to main markets including the U.S.A., Europe, and Japan before Thailand faced the problem of Emergency Shrimp Death Syndrome (EMS) in white Vannamei shrimp in late 2012. As a result, Thai shrimp production decreased rapidly. In the years 2014-2015, there were problems with human trafficking and illegal fishing in the Thai fishing industry, which was ranked by the United States as a country with problems. Serious human trafficking (Tier 3) Eiamsomarng, W. (2017)

From the analytical report of the International Fishery Trade Analysis Group Fisheries Development Policy and Planning Division, Department of Fisheries (2022) has discussed the market situation of Thailand's shrimp trade in important main markets as follows.

- The United States Market

Thai shrimp exports have not yet increased as targeted. because shrimp was exported to the United States market, which was Thailand's main market, has a trend of decreasing imports. Because there were a lot of shrimp products left in inventory. The United States economy was in a state of inflation. Products were more expensive Purchasing power decreases. In addition, competition in export prices was high. Because a large producer like India which was exported to the United States as its main market. The slowdown in imports has forced India to find a market to distribute its shrimp products. However, Indian shrimp still has residue problems regularly detected in the US market. This causes the trend of shrimp prices to remain low because there was more shrimp production than demand.

- The Japan Market

Japan was considered an important trading partner in ASEAN. After various countries in ASEAN received special import tax privileges from the FTA trade agreement, therefore import tax rates were no different. But it would compete at more export prices. In order to gain more market share, during 2022, Thai shrimp exports to the Japanese market were likely to increase more than in 2021 (Kasikorn Research Center, 2023).

2. Researches reviews

Shuquan, H. and Bu-iad, M. (2020). studied the economic factors affecting the volume of Thai frozen shrimp exports to the United States and Japan. In this research used Manufacturing Production Index: MPI, and Personal Consumption Expenditure: PCE as the part of independent variables of the study. The result found that the economic factors affecting the volume of frozen shrimp exports from Thailand to the United States (Japan) in the same direction significantly was Manufacturing Production Index: MPI classified by production activity Frozen seafood category. For the price of wholesale shrimp in the country, Gross Domestic Product of the United States (Japan), Per capita Income of the United States (Japan), the changes rate of private consumption

expenditures in the United States (Japan): none effects on the volume of frozen shrimp exports from Thailand to the United States (Japan) statistically significant.

Ya, Z and Pei, K. (2022) studied the factors affecting agricultural trade between China and Africa. The results indicated that China's GDP, African countries' GDP, the years of education of the African population, the average arable land per capita of African countries and the renewable water resources per capita in Africa had positive effected on the trade flow of agricultural products between China and Africa. Geographical distance and China's exchange rate had a negative impacted on trade flow.

Dudziskia, J. and Knapa, R. (2022) studied the Price, volume and level of economic development as determinants of export value in countries and regions. Its results found that the level of economic development of countries and regions, measured with NI per capita, has been found an important factor determining the growth rates and the levels of export prices. Variation of this indicator reflects the differences in economic power of individual countries and regions. The study points to a correlation between the level of economic development and the growth rate in export prices.

The Terminology Definitions

- **The volume of Thai frozen shrimp exports to the United States and Japan** means the amount of export volume of fresh frozen shrimp calculated in tones exported to the United States and Japan.
- **Manufacturing Production Index classified by production activity seafood category frozen** means an index that reflects industrial production classified by activities; production of frozen seafood category.
- **The average domestic wholesale shrimp prices** mean the average domestic wholesale shrimp prices from prices of shrimp of all 6 sizes at the central shrimp market of Samut Sakhon Province (Prices for 6 sizes of shrimp include: size 40 pieces, 50 pieces, 60 pieces, 70 pieces, 80 pieces, 90 pieces per kilogram).
- **Gross Domestic Product of the United States and Japan** means the value of the products of that nation. No matter what country it is produced. This number indicates the country's growing economic status at that time.
- **Per capita income of the United States and Japan** means the Income is the value of goods and services at market prices divided by the total population of the United States and Japan.
- **The change rate of private consumption expenditures in the United States and Japan** means Consumption expenses the household sector indicates the purchasing ability of the household sector by a high PCE number. It indicates the growing economic situation of the United States and Japan.

Benefits of research

1. Thai frozen shrimp exporters can use the research results to plan marketing for future exports.

2. The government can use the results of this research as a guideline in formulating policies to promote Thai frozen shrimp exporters in the future.

Conceptual Framework

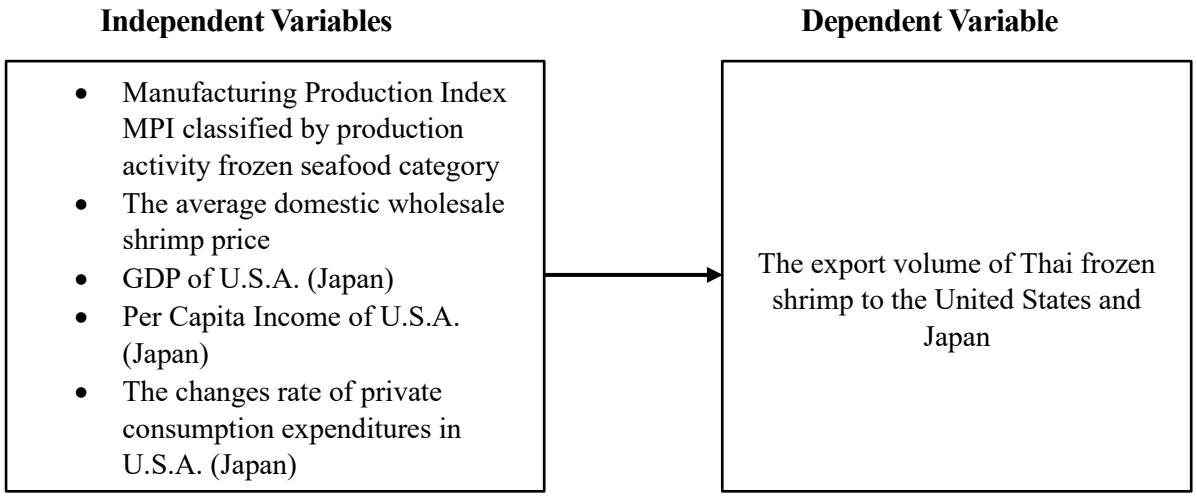

Figure 1: Conceptual Framework

Hypotheses

The Manufacturing Production Index classified by production activity; frozen seafood category (MPI), the average domestic wholesale shrimp price (PRI), GDP of U.S.A. (Japan) (GDP), Per Capita Income of U.S.A. (Japan) (PCI), and the changes rate of private consumption expenditures in U.S.A. (Japan) (PCE) had relationship to the export volume of Thai Frozen shrimp to the United States and Japan (QEP)

Research Methodology

This study used the secondary data, which was quantitative data. The population used for the study was the volume of Thai frozen shrimp exports to the United States. The important factors were Manufacturing Production Index: MPI classified by food production activities. Frozen seafood, wholesale shrimp prices in the country, Gross National Product of U.S.A. (Japan) , Per capita income of the United States (Japan), the change rate of consumption expenditures Private sector of the United States (Japan). The sample was monthly data from January 2018 to December 2022, a total of 60 data sets.

Data and statistical analysis

The models used in this research was the Multiple Linear Regressions) by the Ordinary Least Squares method: OLS

Variables

- **Independent Variables**

• Manufacturing Production Index classified by production activity; frozen seafood Category **(MPI)**
• The average domestic wholesale shrimp price **(PRI)**
• GDP of U.S.A. (Japan) **(GDP)**
• Per Capita Income of U.S.A. (Japan) **(PCI)**
• The changes rate of private consumption expenditures in U.S.A. (Japan) **(PCE)**

- **Dependent Variable**

the export volume of Thai Frozen shrimp to the United States and Japan **(QEP)**

Research results

The results from the multiple regression analysis are as follow; -

$$QEP_{U.S.A.} = -120420.283 + 76.97337MPI - 68.43218PRI + 732.51613GDP_{U.S.A.}$$
$$(4.507537)^{**} \quad (-1.372483) \quad (1.085454)$$

$$+ 0.754933PCI_{U.S.A.} - 188.45763\ PCE_{U.S.A.}$$
$$(1.010311) \quad (-0.206931)$$

Whereas, F-statistic = 46.55775 (Sig = 0.0000)**
R-Squared = 0.851413 Adjust R-Squared = 0.832466
* = Significance level at 0.05
** = Significance level at 0.01

From checking the reliability of the equation, the results the calculation would result in a value of F = 46.55775 and a statistical significance value = 0.0000, which was a statistical significance value. The calculated statistic was less than 0.01. Therefore, it results in rejecting the main hypothesis H_0: There was no independent variable. that affected the volume of Thai frozen shrimp exports to the United States, but accepted the alternative hypothesis H_1: There was at least one independent variable that had an effect. significantly affecting the volume of Thai frozen shrimp exports to the United States at 99 percent of the confidence level. After that, t-Stat would be used to test the relationship of the dependent variable with the independent variables, one pair at a time, with the dependent variable being the volume of Thai frozen shrimp exports to the United States and the independent variables were various factors from various data that could be calculated and summarized. Variables in the equation can describe factors that affect the amount of Thai frozen shrimp can be exported to the United States: 85.14 13 percent, while the other 1 4.8587 percent. came from other factors, with one significant variable Including the Manufacturing Production Index classified by production activity; frozen seafood category (MPI). As for the 4 variables that were not any significant effect on the volume of Thai frozen shrimp exports to the United States. included:

The average domestic wholesale shrimp price (PRI), GDP of U.S.A. (GDP), Per Capita Income of U.S.A.(PCI), and the changes rate of private consumption expenditures in U.S.A. (PCE).

The coefficients value of the Manufacturing Production Index classified by production activity; frozen seafood category (MPI). was 76.9733. It could be explained If the Manufacturing Production Index classified by production activity; frozen seafood category (MPI) increases of 1 point, the volume of Thai frozen shrimp exports to the United States.will increase to 7 6 .9 7 3 3 tons which are related in the same direction.

The dependent variable was the volume of Thai frozen shrimp exports to Japan (QEP_{JAPAN}).

The independent variables were the Manufacturing Production Index classified by production activity; frozen seafood category (MPI), the average domestic wholesale shrimp price (PRI), GDP of Japan (GDP), Per Capita Income of Japan) (PCI), and the changes rate of private consumption expenditures in Japan (PCE)

$$QEP_{JAPAN} = 2132.189 + 25.32162MPI - 19.08377PRI - 179.7738GDP_{JAPAN}$$
$$(4.285223)^{**} \quad (-3.625450)^{**} \quad (-1.768166)$$

$$- 0.000342PCI_{JAPAN} - 5.953302PCE_{JAPAN}$$
$$(-1.464142) \quad (-0.094485)$$

Whereas, F-statistic = 28.66498 (Sig = 0.0000)**
R-Squared = 0.770232 Adjust R-Squared = 0.752061
* = Significance level at 0.05
** = Significance level at 0.01

From checking the reliability of the equation, the results the calculation would result in a value of F = 28.66498 and a statistical significance value = 0.0000, which was a statistical significance value. The calculated statistic was less than 0.01. Therefore, it results in rejecting the main hypothesis H_0: There was no independent variable. that affected the volume of Thai frozen shrimp exports to the United States, but accepted the alternative hypothesis H_1: There was at least one independent variable that had an effect. significantly affecting the volume of Thai frozen shrimp exports to Japan at 99 percent of the confidence level. After that, t-Stat would be used to test the relationship of the dependent variable with the independent variables, one pair at a time, with the dependent variable being the volume of Thai frozen shrimp exports to Japan and the independent variables were various factors from various data that could be calculated and summarized. Variables in the equation can describe factors that affect the amount of Thai frozen shrimp can be exported to Japan: 77.0232 percent, while the other 22.9768 percent. came from other factors. Two significant variables were the Manufacturing Production Index classified by production activity; frozen seafood category (MPI).and the average domestic wholesale shrimp price (PRI). As for the 3 variables that were not any significant effect on the volume of Thai frozen shrimp exports to Japan included: GDP of Japan. (GDP), Per Capita Income of Japan (PCI), and the changes rate of private consumption expenditures in Japan. (PCE).

The coefficients value of the Manufacturing Production Index classified by production activity; frozen seafood category (MPI). was 25.32162. It could be explained If the Manufacturing Production Index classified by production activity; frozen seafood category (MPI) increases of 1 point, the volume of Thai frozen shrimp exports to Japan will increase to 25.32162 tons which are related in the same direction.

The coefficients value of the average domestic wholesale shrimp price (PRI) was -19.08377 could explain that if the average domestic wholesale shrimp price (PRI) increases 1 Baht, the volume of Thai frozen shrimp exports to Japan will decrease 19.08377 tons by opposite direction relationship.

Conclusion

From the study of the important factors affecting the volume of Thai frozen shrimp exports to the United Staes and Japan found that

1. Manufacturing Production Index classified by production activity seafood category frozen, it had a relationship in the

same direction with the volume of Thai frozen shrimp exports to the United States and Japan statistically significant. According to the theory of analyzing basic factors that indicated consumption behavior, which these conditions were reflected in the Manufacturing Production Index classified by production activity seafood category frozen. If Manufacturing Production Index classified by production activity seafood category frozen has increased proportion, this will inevitably affect the volume of Thai frozen shrimp exports to the United States and Japan (Shuquan, H. and Bu-iad, M., 2020.) which was consistent with supply theory (Chintrakulchai, S., 2019) by making the export volume of Thai frozen shrimp going to the United States and Japan has increased also.

2. The average domestic wholesale shrimp price. There was a relationship in the opposite direction with the volume of Thai frozen shrimp exports to Japan statistically significant which related the research of Saweda O, L. and others (2021) that studied Demand for Imported versus Domestic Fish in Nigeria. Their research results found that the fish plays an important role in food and nutrition security in Nigeria. This could be further supported with investment and interventions to increase supplies of fish and reduce the cost of fish to the consumer. This was of particular concern in the North where food security was low and still only about 50% of households consume fish. The higher cost of imported products since 2015 and the 2019 devaluation of the naira had created a greater opportunity for domestic fish production to compete with imported fish. For the average domestic wholesale shrimp price had not relationship with the volume of Thai frozen shrimp exports to the United States statistical significance. This could be said that Thailand was involved in the dominates the market in the United States. Moreover, the nature of trade between export merchants in Thailand and the U.S. import merchants would have a relatively stable contract in order to maintain the quantity of shrimp was sufficient to meet demand even if the price changed.

3. GDP of U.S.A. and Japan could not explain the relationship with Thai volume of frozen shrimp exports to the United States and Japan Statistically significant. Because of shrimp was one kind of food product that was the fourth most important factor for humans. Even though the economy was in decline, it was still necessary.to consume for human.

4. Per Capita Income of U.S.A. and Japan. It could not explain the consumers in the United States and Japan. Due to the fact that the consumers in the United States and Japan often preferred convenient to consume and reduced the consumption of frozen shrimp from Thailand as income increased which was consistent with the research of Issifu, I. and others (2022) that studied the Drivers of Seafood Consumption at Different Geographical Scales and had the same result as Bogachev, A.I. and Dorofeeva, L N. (2021) that studied about Fisheries as a factor of strengthening food security in Russia.

5. The changes rate of private consumption expenditures in U.S.A. and Japan. It was unable to explain relationship with Thai volume of frozen shrimp exports to the United States and Japan which could be explained similar to the case of GDP and Per Capita Income. Even though the changes rate of private consumption expenditures in U.S.A. and Japan will increase but it does not mean that Thai frozen shrimp will be consumed more. In contrast, the population of the United States and Japan may consume high-priced seafood products Or, on the other hand, if the consumption expenditures of the population the United States and Japan

decreased It may be due to the bad economy and low income. It may cause them to turn to consuming more frozen shrimp from Thailand because they are more convenient to inexpensive consumption.

Recommendation

Base on this research result, the author would suggest as following

1. To stimulate the Manufacturing Production Index classified by production activity; frozen seafood category (MPI) will be able to increase the volume of Thai frozen shrimp exports to the United States and Japan.

2. To decrease the average domestic wholesale shrimp price (PRI) will be able to increase the volume of Thai frozen shrimp exports to Japan.

3. The average domestic wholesale shrimp price (PRI) will not be used as criteria in determining the marketing promotion strategies for exporting Thai frozen shrimp to the United States.

Recommendation for future research

The author would suggest as following

1. To study Thai frozen shrimp export market beside of the United States and Japan.

2. More independent variables in related studies should be added to the model used in Multiple Regression Analysis studies, such as exchange rates, the average shrimp selling price of major competitors, etc.

3. Might divide the study period into 2 periods: studying before and after the COVID crisis, which will help the study results to reach more reliable conclusions.

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