

Factors Affecting Thai Fresh, Chilled, Frozen, and Dried Fruits Export to China

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Abstract

This study investigates the economics factors which affecting Thai fruits export to China by study with economics factors are GDP of Thailand, GDP of China, transportation cost of Thailand, exchange rate baht per yuan, and population of China by the information times series data during the period 1989-2018 equal 30 years. The paper extends the standard gravity model to the factors that affect Thai fruits export to China. The result can be summarized as three main finding: GDP of Thailand, exchange rate baht per yuan, and population of China are significant positive effect on value of Thai fruits export and 2 main found that GDP of China, transportation cost are significant negative effect on value of Thai fruits export. We explain these results and suggest policy.

Keywords: Thai Fruit Exports; China Market; Trade Factors

1. Introduction

Export is the main sector that very important to driving economic of Thailand and export is one of the important mechanisms driving the country's economy to have a high growth rate. It is considered another area of business that is important to entrepreneurs and the country. Because it is a business that can bring a lot of foreign currency into Thailand in each year and these income is part of the money that can be used to develop and solve the economic problems that occur is important for the expansion of investment and creating demand for labor, helping to import foreign currencies, creating effective use of resources, helping to advance technology, and help reduce the dependence on foreign products. More

over export with agricultural product is the most products that Thailand can export with very high value equal 43,735.46 in 2018 it is the value that higher more than other product and it is the value that higher than other countries which Thai export (Bank of Thailand, 2019). The Thai government and other department that concerned have the objective to stimulate Thai fruit exports, therefore, there are policies or activities to encourage Thai exporters to enter the international fruit export market by government has a policy that is a long-term agricultural and cooperative strategy in the future from year 2017-2036 (Prime minister delivery unit, 2017) by the National Economic and Social Development Plan No.15 (2032-2036), the project has 13 main policies as follows: 1) Agri-Map policy 2) Large agricultural policy 3) Center establishment policy Nationwide Agricultural Development 882 Centers Nationwide 4) Organic Agriculture Policy 5) Quality Policy for Agricultural Product Standards Farm Inspection 6) Agricultural Bank Policy 7) New Agricultural Policy 8) Delivery System Policy Irrigation area and water distribution, amount of water storage, 9) Area development policy for 10) Agricultural policy reform The strength of the cooperatives 11) Farmers market policy 12) Smart Farmer policy 13) Smart officer policy that all 13 policy have relate to Thai agricultural export (Ministry of Agriculture and Cooperatives, 2016).

More over the Department of Export promotion has a policy for the development and support Thai fresh, chilled, frozen, and dried fruits export to be able to entry in the world market by having a policy to preserve the old and new markets and implementing policies including organizing various activities to push Thai fruit exports (Department of Export Promotion, 2018). By that policy is large-scale agricultural extension system policy have the principles is increase the efficiency of production such as reduce production cost and the production has quality as the standard that market need and then Thai government have new policy is government policy pushes Thailand to be the fruit metropolis of the world. Supporting the product processing industry for community enterprises and SMEs by support marketing and consumption have to promote the quality of product and have to connect the business partners with other countries in online and offline channels supporting the distribution of production outside the production sources, development the transportation sector for consumers receive the product faster, and development the potential of productivity for upgrade and improve productivity potential especially in the cultivation that need to use techniques and technology to help increase the quality and quantity of production accordance with the market demand and funding sources for entrepreneurs to push Thailand to become a fruit metropolis in the world (Sentangsedtee, 2018). So all the policy can be help the export ability of Thailand can export to China.

Thai fruit is an economic crop that can make high income for Thailand especially the Chinese people who love the deliciousness and believe in the good quality of Thai fruits causing Thailand can be export to China most at the high value and the top 3 of fruits that Thailand can exports is durian, longan, and mangosteen (Thaemarket, 2017). So, we can see

in the Table 1 Thailand can export the fresh, chilled, frozen, and dried fruits to China at high value in many year. If we talk about fruits the first market that our think about is China is the country that highest export value of Thai fresh, chilled, frozen, and dried fruits export in Table 1 when compare with other countries.

	Value : Million baht					
	2013	2014	2015	2016	2017	2018
China	13,553.54	12,592.08	16,086.01	18,129.99	22,396.91	32,395.74
Vietnam	5,058.49	9,246.81	10,309.95	17,670.08	34,867.58	31,789.59
Hong kong	5,204.99	8,781.56	7,437.72	6,960.37	6,129.45	7,639.99
Indonesia	1,503.47	2,345.39	1,920.36	2,084.55	2,948.63	2,124.87
USA	1,424.88	1,720.37	1,703.02	2,185.49	2,154.17	2,571.91

Table 1 The fresh, chilled, frozen, and dried fruits export market

Source: Thailand Trading Report, 2019

In Table 1 the value of Thai fresh, chilled, frozen, and dried fruits export to China is increasing value every year but in 2014 the value of Thai export is decreasing from 2013 and can see in the Table 1 have the competition between China and Vietnam some year Thai can export to Vietnam more than China at a great value in year 2018 equal 32,395.74 million baht (Thailand Trading Report, 2019).

More over Thai fruit is one of the important products that benefit from the Free Trade Agreement between ASEAN and China (ACFTA) which has caused China to cancel the import duty of every Thai vegetable and fruit since 2003 is an important tool to help create advantages and expand trade opportunities for farmers and Thai fruit exporters since this agreement came into force. Thai fruit exports to China grew by 1,312 percent (Economynews, 2019) in 2018, Thai fruit exports to China totaled 1,927.31 million US dollars, while in the first 5 months (January-May) of 2019 Thai fruits went the Chinese market is still expanding continuously with an export value of 1,199.69 million US dollars. Thai fruits export has expanded by 31% of export over the same period of the year 2018 (Economy news, 2019). Not only that the growth rate of Thai fresh, chilled, frozen, and dried fruit exports has increased in some year at a very high value even though some year decrease from the Figure 1

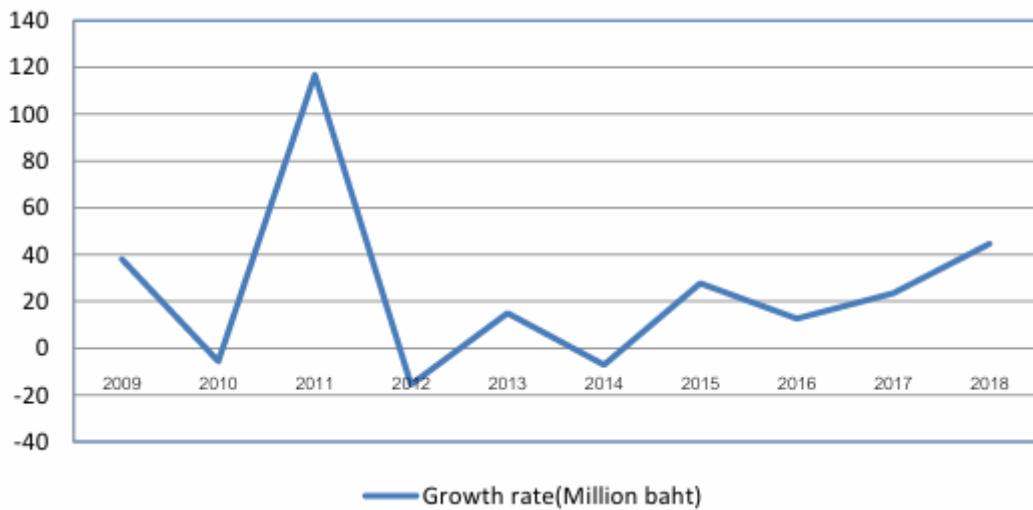


Figure 1 Growth rate of Thai fresh, chilled, frozen, and dried fruits export to China

Source: Thailand Trading Report, 2019

Although in some years the growth rate will be negative but can be observed that in the last 3 years. Thailand has the ability to export to China at a high growth rate every year in last 3 years between 2016-2018.

From past research Anucha Phuriphanpinyo (2017) studied the factors affecting the export of agricultural product as the researcher he studied the impact of agricultural product exports by overall of agricultural products its means have not subdivide the product type. He has suggestions for the future research by studying product for provide detailed information.

To studying by the subdivide the product type in agricultural product by means of choosing to study specific product types in agricultural for example Rice, Rubber, Cassava, Cane, fruits, Corn, and etc. To be used as a guideline to study, Researcher are interested to studying about fruits type with the export of fresh, chilled, frozen, and dried fruits of Thailand to China. Use economics factors that affecting the export sector. Then have the objective is to study about the factors affecting Thai fresh, chilled, frozen, and dried fruits export to China. Why Thai can still export to China with high value where study product classification by the product that interesting is fruits. The detail as fresh, chilled, frozen, and dried fruits and study with China by times series data in 1989-2018 equal 30 years.

2. Research Objectives

This study investigates the economics factors which affecting Thai fruits export to China by study with economics factors are GDP of Thailand, GDP of China

3. Research Methodology

As previously stated the aim of this study is to studying the factors that affecting Thai fresh, chilled, frozen, and dried fruits export to China by use times series data with yearly in year 1989-2018 around 30 years.

3.1 Data

In this table shows the variable information that use to study for finding the factors affecting Thai fruits export to China.

Variable proxy	Indicator name	Unit	Data source
Ex_{tc}	Value of Thai fresh, chilled, frozen, and dried fruit exports to China	Million Baht	Bank of Thailand
GDP_t	GDP of Thailand	Billion US Dollar	World bank
GDP_c	GDP of China	Trillion US Dollar	World bank
TC_t	Transportation cost	Baht per liter	Macrotrends
EXR_{tc}	Exchange rate baht per yuan	Baht per Yuan	Bank of Thailand
P_c	Population of China	Billion person	World bank

Table 2 Information used

3.2 Theoretical Model

World bank Gravity model is the model that start by Tinbergen (1962) he applied from Newton's Law "Universal Law of Gravity" applied to measure the trade by the point of Newton's Law is assume that have two materials there are whose mass equal (M_1) and (M_2), material have spaced equal (d), and the attraction energy between the two materials is (F_g) (Thatchawan Kanitphong, 2013) as follows:

$$F_g = G \frac{M_1 M_2}{d^2}$$

(1) From equation (1) the attraction energy (F_g) increasing with the increase in the mass of both materials (M_1) and (M_2) but inverse variation to the distance between the materials (d) meaning that both materials have a higher mass and nearby the attraction energy between materials (F_g) will increase (Partner students, 2013).

Tinbergen applied Newton's law of attraction to research on the international trade between Countries Somprasong Phromuj (2013) can make equation (1) be a new equation:

$$F_{ij} = \beta \frac{Y_i Y_j}{D_{ij}}$$

(2) The major in point of this model is the model that used the variable from economy to study the international trade with two countries or more than by other variable is X_{ij} (Thatchawan Kanitphong, 2013). Equation can be transformed in to:

$$F_{ij} = \beta_0 Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} X_{ij}^{\beta_4}$$

(3) Where, F_{ij} is the export value from country i to country j; β_0 is the constant; Y_i is the usually the nominal gross domestic product (GDP) in country i; Y_j is the market size of trading country j; D_{ij} is the geographic distance between country i and country j; X_{ij} is denotes any other additional factors that can either aid or impede trade between country i and country j.

3.3 Empirical Model

So, The gravity model is model that specific to study with factors affecting Thai fresh, chilled, frozen, and dried fruits export to China because this model is suitable to study and popular to apply for International trade and this model can use many variables explain effect to export sector. So, Gravity model is appropriate for study.

$$Ex_{tc} = \beta_0 (GDP_t^{\beta_1}) (GDP_c^{\beta_2}) (TC_t^{\beta_3}) (EX_{tc}^{\beta_4}) (P_c^{\beta_5})$$

(1) Where, Ex_{tc} is Thai fresh ,chilled ,frozen ,and dried fruits export value of Thailand to China; β_0 is a constant; $(GDP_t$ is Gross Domestic Product of Thailand; GDP_c is Gross Domestic Product of China; TC_t is Transportation cost of Thailand; EX_{tc} is exchange rate of Thai baht per Yuan; P_c is population of China.

Then, modify to Semilog (lnx) in equation (5).

$$Ex_{tc} = \beta_0 \beta_1 \ln(GDP_t) + \beta_2 \ln(GDP_c) + \beta_3 \ln(TC_t) + \beta_4 \ln(EX_{tc}) + \beta_5 \ln(P_c) + \varepsilon_{tc}$$

(2) After, the equation can be transformed in to log from the equation (6) is below:

$$(Ex_{tc}) = \beta_0 + \beta_1 (GDP_t) + \beta_2 \ln(GDP_c) + \beta_3 (TC_t) + \beta_4 (EX_{tc}) + \beta_5 (P_c) + \varepsilon_{tc}$$

(3) In this equation have ε_{tc} is error term and have to be take log just $\beta_2 \ln(GDP_c)$ because Gross Domestic Product of China have the skewness by in some year GDP of Chin growth very high but some year increase not much means in 30 years GDP of China have swing growth not flow causing the data skewness. So should have to modify by take log will can reduce the skewness of data cause to make the data close to the normal distribution means reduce the complexity (Bussiness analyticsnnida, 2019).

From the equation (6) will help to fine the answer to the objective which factors affecting the export of Thai fresh, chilled, frozen, and dried fruit to China and which factors can make Thailand can export at the high value.

The proxy	Variable	Hypothesis
GDP_t	GDP of Thailand	+
GDP_c	GDP of China	+
TC_t	Transportation cost	-
EXR_{tc}	Exchange rate	+
P_c	Population of China	+

Table 3 Hypothesis statements

This table is a table showing the assumptions of each factor variable. In which direction it should be expected, in theory it should be as follows

GDP of Thailand or Gross domestic product in Thailand will be positive relationship with value of export which have the same direction. Zheng, et al. (2017) said “The market size in country that is exporter such as GDP, is generally considered a main determinant of international trade flows and is included in standard gravity model specifications, because the development level of a national economy is a common proxy for trade demand or supply”.

GDP of China or Gross domestic product in China will be positive relationship with value of export which will have the same direction found that the factors affecting the demand for Thai fruit exports to China statistically significant is the price of Thai fruit exports to China, embroidered with the consumer price index of China and the value of Gross domestic product per capita in China adjusted by China's consumer price index and GDP of China can tell about the economic situation of trade partner country (NattachadaDetpong, 2018). But there is a conflict with research of Prasert Chaitip, Chukiat Chaiboonsri, and Apiraphol Dewitt (2015) that said the mostly of export has a negative relationship with variables Gross domestic product of trade partner country in long-run and short-run equilibrium.

Transportation cost will be negative relationship. Zheng, et al. (2017) said Distance is basic factors required in the gravity model specification according to conventional international trade theory and can shows the cost of export. Distance or transportation cost as a proxy for trading cost, tends to be a negative factor for exports.

Exchange rate will be positive relationship. It is found that the currency of the exporting country or importer affects the price of the product. If at any time the Thai baht depreciates, the price of the goods calculated in the currency of the exporter will increase the demand for delivery. If the Thai baht depreciates, the product price is calculated in the currency of the exporter. Significant exports have increased demand for exports will be higher (Nattachada Detpong, 2018). Many studies have discussed the impact of the bilateral exchange rate on bilateral trade (Oskooee, 1986). Those studies were usually based on the pass-through

effect of the exchange rate (Goldberg and Knetter, 1997). The exchange rate of trade partners is expected to have a positive effect on exports.

Population of China will be positive relationship. The mostly of export has a positive relationship with variables population in long-run and short-run equilibrium, means canned pineapple in syrup is possibly substitution goods for those countries. If the population of the partner country increases the exporting countries will be able to export more as the population of country increases which will be related to demand in economics (Prasert Chaitip, ChukiatChaiboonsri, and Apiraphol Dewitt, 2015).

4. Result and discussion

The finding in table 4 show the factors are affecting Thai fresh, chilled, frozen, and dried fruits export to China by researcher have studied all 5 variable for find the factor that effect value of export which factors affect export. The results are as follows.

	Coefficient	Std. Error
C	-207330.0000***	57072.2800
GDP_t	128.8162***	16.6434
$\ln(GDP_c)$	-15759.2100***	4532.4140
TC_t	-67.9019***	23.2960
EXR_{tc}	3281.7870***	641.4335
P_c	143018.8000***	42703.2900
R^2	0.9530	
Adj. R^2	0.9432	
DW	2.0282	
F:	97.3401	

Note: 1) C is Value of Thai fresh, chilled, frozen, and dried fruit exports to China 2) GDP_t is Gross Domestic Product of Thailand 3) $\ln(GDP_c)$ is Gross Domestic Product of China 4) TC_t is Transportation cost of Thailand 5) EXR_{tc} is exchange rate Thai baht per yuan 6) P_c is population of China 7) *, **, *** stands for significance at the 1% level, 5% level, and 10% level respectively.

Table 4 Regression Results for export value of Thailand

The findings in table 4 show that First, the result of Gross Domestic Product of Thailand ,exchange rate Thai baht per yuan ,and population of China is positive relationship with value of Thai fresh ,chilled ,frozen ,and dried fruit exports to China. Gross Domestic Product of China and transportation cost of Thailand is negative relationship value of Thai fresh, chilled, frozen, and dried fruit exports to China.

Gross Domestic Product of Thailand and value of Thai fresh ,chilled ,frozen ,and dried fruit exports to China is the same direction as the amount of value of export is an Thai fresh ,chilled ,frozen ,and dried fruit exports to China with a statistical significance of 1 percent when the GDP of Thailand increasing 1 billion US dollar will increase the amount of value of Thai fresh ,chilled ,frozen ,and dried fruit exports to China 128.8162 million Baht means if GDP of Thailand has high value or increasing it will make Thai can export more because GDP of Thailand can explain the economic situation for analysis about export sector and GDP of Thailand can tell the ability of Thai that is exporter to other countries which is consistent with Zheng, et al. (2017) that study about the determinants of Chinese nonferrous metals imports and export which empirical result of the export the GDP in country is same direction as significant with exports value.

Exchange rate of baht per yuan and value of Thai exports is the same direction as the amount of value of export is an Thai fresh, chilled, frozen, and dried fruit exports to China with a statistical significance of 1 percent when the exchange rate of baht per yuan increasing 1 baht per yuan will increase the amount of value of Thai fresh, chilled, frozen, and dried fruit exports to China 3281.7870 million Baht. Exchange rate of Thai baht per yuan as this research finding that same direct with value of Thai export consistent with Oskooee (1986) and Goldberg and Knetter (1997) from in the hypothesis have the same effect that is expected to be positive.

When the Thai baht depreciates effecting in the country having an advantage in price competition or effecting in increased export revenue converted into Thai Baht and follow with Nattachada Detpong (2018) if at any time the Thai baht depreciates, the price of the goods calculated in the currency of the exporter will increase the demand for delivery. If the Thai baht depreciates, the product price is calculated in the currency of the exporter. Significant exports have increased demand for exports will be higher. Another one the result same as direction is an positive the reason is exchange rate of Thai baht is depreciate it will export if compare with baht per yuan (Jakravint Piamworakaroon, 2017).

Population of China and value of Thai exports is the same direction as the amount of value of Thai fresh, chilled, frozen, and dried fruit exports to China with a statistical significance of 1 percent when the population of increasing 1 billion person. It will increase the amount of value of Thai export is an Thai fresh, chilled, frozen, and dried fruit exports to China 143018.8000 million Baht. Population of China is the same direct with value of Thai export which is consistent with Gamkan luangwirutkol (2010) that she study about factors affecting exports of fresh, chilled, frozen shrimp of Thailand to the United States, Japan and South Korea have to talk about the population variable in the same direction as significant with exports value if population increase cause to Thai can export more with increasing value.

Gross Domestic Product of China and value of Thai exports is not same direction as the amount of value of Thai fresh, chilled, frozen, and dried fruit exports to China with a statistical significance of 1 percent when GDP of China increasing 1 percent will decrease the

value of Thai fresh, chilled, frozen, and dried fruit exports to China 15759.2100 percent which the result is not according to the theory of gravity model and inconsistent with Nattachada Detpong (2018) and Zheng, et al. (2017) that they result are positive effect to export value and Gross Domestic Product of China is the variable that same direct with export value means when the GDP of trading country have high value of GDP it will make exporter country can export more (Zheng, et al., 2017). In the result of this variable is consistent with Prasert Chaitip, Chukiat Chaiboonsri, and Apiraphol Dewitt (2015) the result is negative effect to export value wherewith GDP of China is the proxy of market size that imported country. The market size of the partner country is negative may be caused by economic problems in that country or the economic slowdown which is the reason (Prasert Chaitip, Chukiat Chaiboonsri, and Apiraphol Dewitt, 2015).

In this case show the results not according to the theory of gravity model in the hypothesis. Market size of China has the large economy then if GDP of China has the negative way its means the country's overall economy and domestic cash flow are slowing (Finnomena, 2018). More over last 8-9 years ago (2010 2019) China GDP has the growth rate decrease (World development indicators, 2019). So, that is the reason which affect Thailand can export less of fruits when GDP increase or decrease will directly affect all of country whether it is about investment sector, export and import sector which the result show by that reason (Finnomena, 2018).

Transportation cost of Thailand and value of Thai fresh, chilled, frozen, and dried fruit exports to China is the not same direction in hypothesis with a statistical significance of 1 percent when transportation cost of Thailand increasing 1 million per liter will decrease the value of Thai fresh, chilled, frozen, and dried fruit exports to China 67.9019 million Baht. Transportation cost of Thailand is consistent with Zheng, et al. (2017) that study about the determinants of Chinese nonferrous metals imports. Usually, the direction of this variable is will follow with the theory of gravity model (Thatchawan Kanitphong, 2013). When the transportation cost decrease will effect to export more its means reduce the cost of export cause to country can be get benefit from the lower transportation costs.

The last is constant or C in table 4 it's means value of Thai fresh, chilled, frozen, and dried fruit exports to China is equal-207330.0000 million baht by does not depend on other factors (GDP of Thailand, GDP of China, transportation cost of Thailand, exchange rate of Thai baht per yuan, and population of China) means Thailand can export to China decrease 207330.0000 million baht. If not studying the above mentioned factors the value of Thai export maybe not have. Therefore should be study with other factors. Then able to point out the importance of all factors why all factors should be study together and traced to why all factors is significance at 1%. R squared is equal 0.9530 means can explain 95.3% and another 4.7% is can't explain, Adjusted R squared is 94.32%, Durbin Watson equal 2.0282 is appropriate, and F statistic is the highest at 97.340.

5. Conclusion

This research is study about the five factors of economy that are affecting Thai fresh, chilled, frozen, and dried fruits export to China by study with five factors in economics sectors to analysis for finding the factors that affect Thailand can still export to China with high value. Five factors they are GDP of Thailand, GDP of China, transportation cost of Thailand, exchange rate of Thai baht per yuan, and population of China by use times series data with yearly in year 1989-2018 around 30 years.

Variable	Hypothesis	Result	Conclusion
GDP of Thailand	+	+	accept
GDP of China	+	-	reject
Transportation cost of Thailand	-	-	accept
Exchange rate baht per yuan	+	+	accept
Population of China	+	+	accept

Table 5 The conclusion of result

The result illustrated that has the accept are 4 variables and reject 1 variable from the study of 5 variables as the GDP of Thailand, transportation cost of Thailand, exchange rate of Thai baht per yuan, and population of China are accept hypothesis. But GDP of China is reject hypothesis.

From the results of regression analysis can be used to recommendation to government for supporting export sector by findings the result of each variable there are GDP of Thailand, GDP of China, Transportation cost, exchange rate Thai baht per yuan, and population of China which is the variable that is important to economy. By from the result shows the value of population can increase export value therefore the government can planning for export strategy by use analysis from the result. It's means the countries that have high population maybe can export more than the countries that have less population and also talk about the demand of country. If countries high population the demand also high. So government will try to plan how Thailand fruits export will be entry to the target group (high population) including the other negotiation for support export. So can develop the ability of export by strategic planning for stimulate Thai fruits export entry to the world market and support export sector of Thailand to compete in the world due to export is the one important sector that can measure for define strategies that help driving the economy not only in Thailand but this is worldwide our attach importance to exports, so that is the policy recommendation from this result how to bring Thai export.

For future research, researcher recommends studying by focus on specific factors of fruits for example production information, fruits price inside and outside country, climate

change and should more factors that different. Finally, those interested would benefit from future research by take an interest more about export sectors because export is the main sectors that very important for Thai economic.

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