FACTORS THAT IMPACT INDUSTRIAL AND AGRICULTURAL EXPORT VALUE OF THAILAND WITH MAJOR TRADING PARTNERS

ONNICHA SINGPHAKDEE

MASTER OF ECONOMICS IN APPLIED ECONOMICS

MAEJO UNIVERSITY

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT

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ชื่อเรื่อง ปัจจัยที่ส่งผลกระทบมูลค่าการส่งออกสินค้าอุตสาหกรรมและมูลค่าการ
ส่งออกสินค้าเกษตรของประเทศไทยกับประเทศคู่ค้าหลัก
ชื่อผู้เขียน นางสาวอรนิชา สิงห์ภักดี
ชื่อปริญญา เศรษฐศาสตรมหาบัณฑิต สาขาวิชาเศรษฐศาสตร์ประยุกต์
อาจารย์ที่ปรึกษาหลัก Assistant Professor Dr.Jorge Fidel Barahona Caceres

บทคัดย่อ

การศึกษานี้ตรวจสอบถึงปัจจัยที่ส่งผลกระทบต่อการส่งออกของสินค้าอุตสาหกรรมและสินค้าเกษตรจากประเทศไทยไปยังคู่ค้าหลัก ซึ่งเราพัฒนาแบบจำลองแรงโน้มถ่วงโดยใช้แบบจำลอง Autoregressive เพื่อแก้ไขขอนุกรมเวลาและใช้ข้อมูลจากปี 2545 ถึง 2562 เราพบว่าการส่งออกของทั้งสองภาคได้รับผลกระทบจากจำนวนประชากร ราคาน้ำมัน และอัตราแลกเปลี่ยนที่คล้ายคลึงกันทั้งสองภาค อย่างไรก็ตามผลกระทบของผลิตภัณฑ์มวลรวมภายในประเทศที่แท้จริงของประเทศคู่ค้าและปริมาณการผลิตทั้งหมดทั้งสองภาคมีความแตกต่างกัน เนื่องจากคู่ค้าของการส่งออกอุตสาหกรรมและคู่ค้าของการส่งออกสินค้าเกษตรแตกต่างกัน มูลค่าการส่งออกสินค้าเกษตรของไทยโดยผลิตภัณฑ์มวลรวมภายในประเทศที่แท้จริงของจีนมากกว่าประเทศอื่นๆที่เป็นประเทศคู่ค้าหลักในส่งออกของไทยและปริมาณสินค้าอุตสาหกรรมของไทยมีทั้งสหรัฐอเมริกา ญี่ปุ่น และจีน ที่ส่งผลต่อการส่งออกอุตสาหกรรมของไทย รัฐบาลและผู้กำหนดนโยบายสามารถนำผลที่ได้จากการศึกษาเหล่านี้นำไปใช้พิจารณาในการกำหนดนโยบายเพื่อกระตุ้นการผลิตของทั้งสองภาคส่วนให้เพิ่มขึ้นเพื่อเพิ่มโอกาสในการส่งออกไปยังต่างประเทศ

คำสำคัญ : การส่งออกอุตสาหกรรม, การส่งออกเกษตร, แบบจำลองแรงโน้มถ่วง

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Author	Miss Onnicha Singphakdee
Degree	Master of Economics in Applied Economics
Advisory Committee Chairperson	Assistant Professor Dr. Jorge Fidel Barahona Caceres

ABSTRACT

This study investigates the factors that impact exports of industrial and agricultural goods from Thailand to major partners. We developed a gravity model by fix time series with an Autoregressive model and using data from 2002 to 2019. We find that export of both two-sectors is impacted in a similar magnitude by population, oil prices and exchange rate. However, the magnitude of the effect of real GDP of partner country and quantity production in the sector are different. Because trade partners of industrial export and trade partners of the agricultural products are different. The export value of agriculture in Thailand by real GDP of China is more than other countries in major countries export of Thailand. And the quantity products of Thai industries has US, Japan and China that effect to the industries export of Thailand. The government and policymakers can use these results to consider determining the policy to stimulate more production of both sectors to increase the opportunity for export to another country.
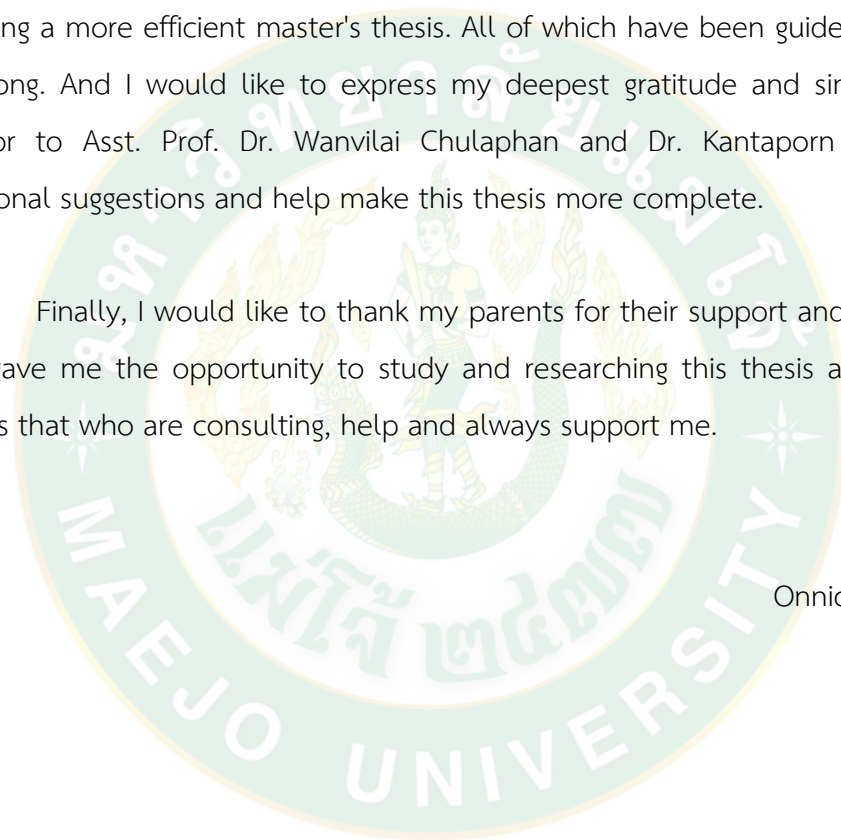
Keywords :   Export industry, Export agriculture, Gravity Model

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CHAPTER 1

INTRODUCTION

Over the last four decades, Thailand has remarkable progress social and economic development, moving from a low-income to an upper-middle-income country in less than a generation. Which in this develop from a low-income to an upper-middle-income country it is not smooth as other countries. By Thailand's economy in 1960 to 1996 is the boom years which grew at an average annual rate of 7.5 percent and 5% during 1999-2005 following the Asian Financial Crisis. This growth created millions of jobs that helped pull millions of people out of poverty. Gains along multiple dimensions of welfare have been impressive: more children are getting more years of education, and virtually everyone is now covered by health insurance while other forms of social security have expanded (The World Bank, 2021).

The facing various situations that arise whether it's just the impact on the domestic or the impact on the world, Thailand must have to develop the country to be able to become a high-income country. It is not only Thailand that wants to be a high-income country, but there are many other countries. So, each country has to develop its own country to be equal with other countries all the time, resulting occur in the national economic and social development plan of Thailand until now have twelve issues (National Economics and Social Development Council, 2022).

The Twelfth National Economic and Social Development Plan in 2017 to 2021 of Thailand has objective to developing by attempt to develop country to reach higher levels of development for example, a larger economy, outstanding and robust production and service bases, and a greater level of bilateral and multilateral international cooperation. Deepening collaboration within sub-regional and ASEAN frameworks has provided Thailand with significant opportunities in both trade and investment. Moreover, the infrastructure network has been developed to cover a much larger area of the country. Social services coverage has become comprehensive. These advancements have contributed to economic opportunities, poverty reduction, a higher income per capita, as well as an improvement in living standards (National Economics and Social Development Council, 2022).

Which the Twelfth Plan have twenty key integrated development issues by have both national and international level including with development about technology and innovation, preparation of people for the workforce and capacity Enhancement in all ages, reducing inequality, production restructuring and economic opportunities at each stage of the value chain by including agricultural production system and manufacturing sector (National Economics and Social Development Council, 2022). And the important is development economic in domestic and to compete with foreign countries.

Especially, Enhancement of International Cooperation to Deliver Favorable Development Benefits in key seventeen which this strategy focuses on defining and streamlining institutional linkages and regulations at the operational and implementation levels, particularly in border zones; reducing non-tariff barriers on trade and investment; advancing infrastructure development within the country and with neighboring countries; highlighting Thailand's creative role within global forums; and supporting the country's efforts to achieve its Sustainable Development Goals (SDGs) (National Economics and Social Development Council, 2022).

And keys eighteen is Expanding Thai Outward Investment this strategy emphasizes the enhancement of Thai entrepreneurs' business skills in order to increase business cooperation with neighboring countries, investment in human resources, technology, and innovation, improving the business environment, and supporting the work of business councils under various cooperation frameworks, as well as providing Thai entrepreneurs with access to financial capital and in-depth knowledge regarding overseas production bases for Thai entrepreneurs (National Economics and Social Development Council, 2022). Both of two keys is the plan to development for international.

However, Thailand is the country in the world that focus on export because Thailand is export country that the economy depended on export to trade partner countries. To exchange goods and services that have advantage for produce in the domestic. And the income that their receive will generate to develop infrastructure, standard of living and develop all the thing to developed country. As you can see in Figure 1 will show the most exporters in the world (World Integrated Trade Solution, 2022).
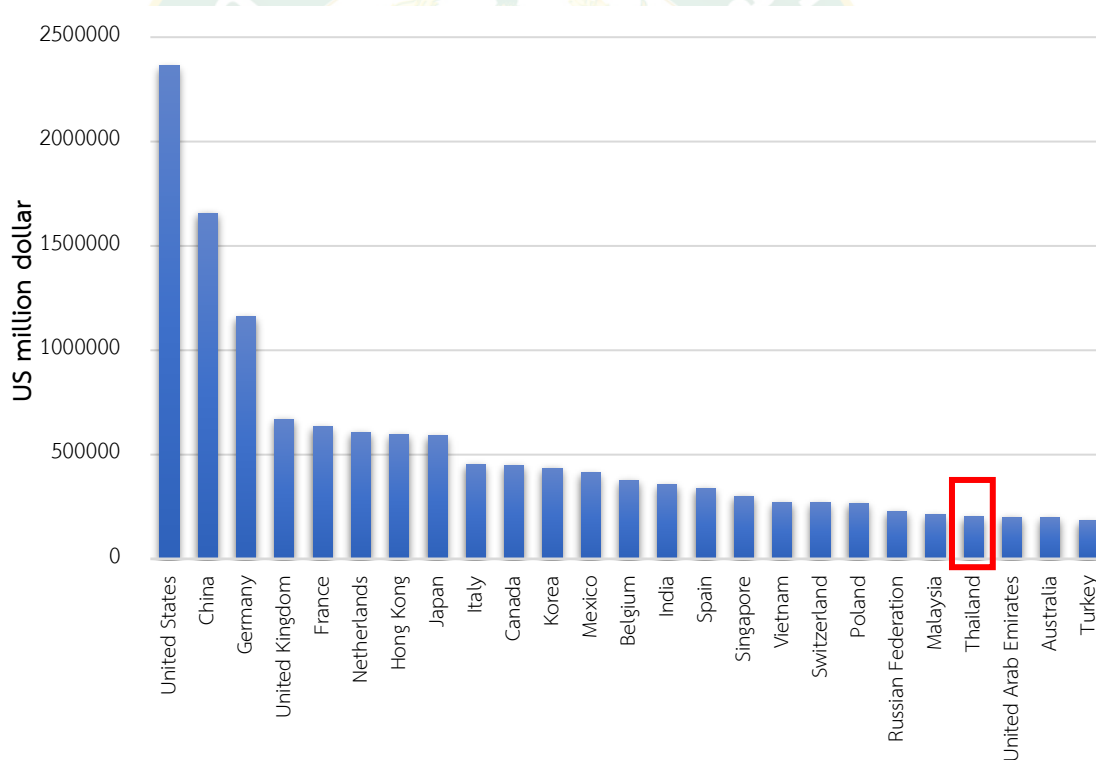
Figure 1 *Top Exporters by country 2019*

Source: World Integrated Trade Solution, 2022

From Figure 1 as you can see Thailand is one in top 25 countries that exporter in the world. The value that Thailand export to trade partner countries around 201,954.859 US million dollar from total value export of the world 18,258,830.515 US million dollar (World Integrated Trade Solution, 2022). According with the Twelfth Plan that develop Thailand reach to larger economy, outstanding and robust production and service bases, and a greater level of bilateral and multilateral international cooperation. Making export is an important part driving the economy of Thailand to large economy follow in Twelfth Plan.

Because Thailand export and service sectors in Thailand hold the value around 59.77 percent of GDP in 2019 (Trade Economics, 2021). It means export GDP have affect to Thai economy due to having export value is more than haft of total GDP in domestic. It is interesting to look into the export sector which are industry product export and agriculture product export because these products hold the big proportion of export of Thailand since 2002 to 2019 which can equal around 95 percent of total export of Thailand, by 77.41 percent of industry export value and 17.43 percent of agriculture export value (Ministry of commerce, 2020) as will show you in the figure below.
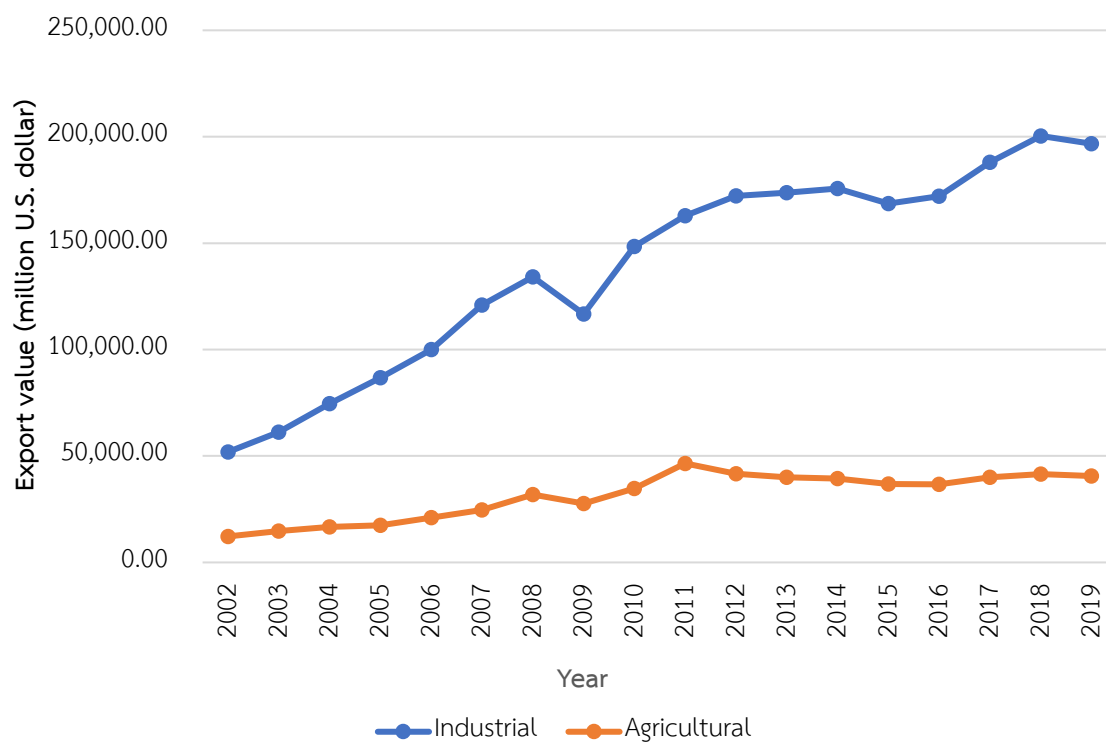
Figure 2 *The value export of industry and agriculture from 2002 to 2019.*

Source: Ministry of commerce, 2020

Figure 2 show the value export of industry and agriculture from 2002 to 2019. The value export between industry export and agriculture export is more different between two sectors you can see that the value export of industry has growing fast from 2002 to 2019 while the value export of agriculture has growing slow since 2002 to 2011 but from 2011 to 2019 trend quite stable.

When we analyze the major trading partners in each sector, we can several differences that can explain the growth of export. As represent on Figure 3 and Figure 4.
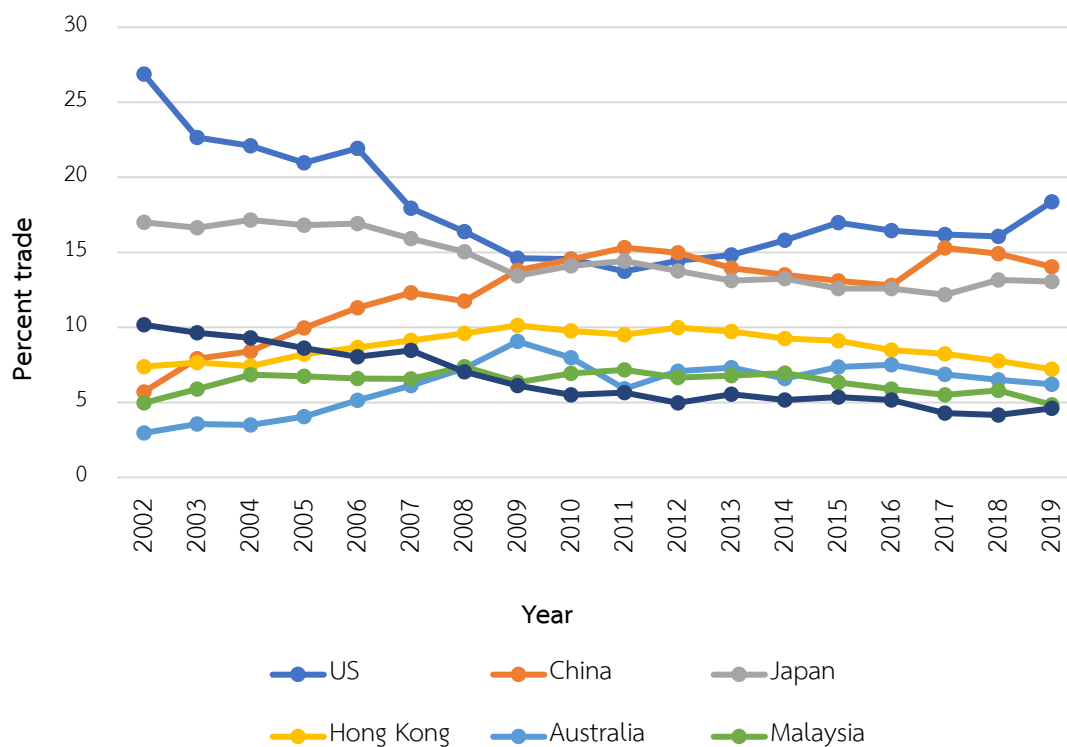
Figure 3 *The percent trade industrial from Thailand to partners 2002 to 2019.*
Source: Ministry of commerce, 2020

As you can see in Figure 3 in during period 2002 to 2008 have only US and
Japan who have the highest industrial percent trade which mean they are the
country that import industrial products the most from Thailand. But you will see
from 2009 to 2019 China is one country that imports more industrial products from
Thailand and then China has industrial percent trade similar to US and Japan. For
other countries, percent of export of Thailand's industrial products it drops out
continuously. Therefore, Figure 3 show the export value of Thailand's industry is
main driven by the US, Japan and China (Ministry of commerce, 2020)

This is the countries import industrial products from Thailand the most. Which four countries are US, Japan, China and Hong Kong have export value 38.74 percent or around 96 billion US dollar from 249 billion US dollar of total export (The Observatory of Economic Complexity, 2019).
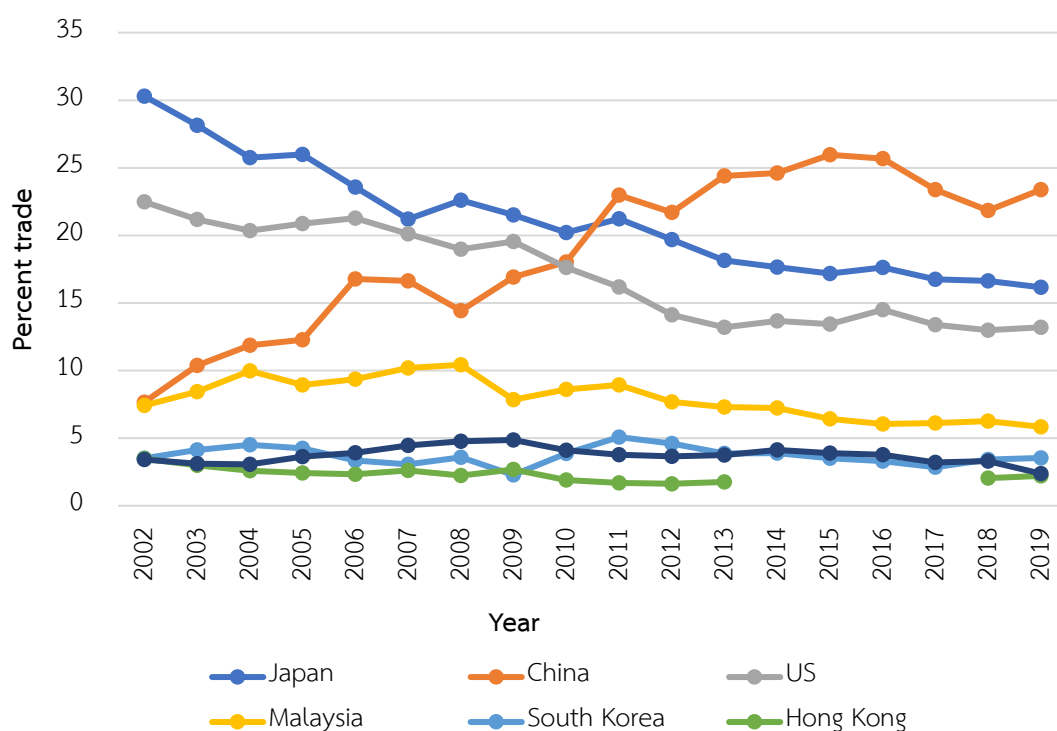
Figure 4 *The percent trade agricultural from Thailand to partners 2002 to 2019*
Source: Ministry of commerce, 2020

Figure 4 shows the percent trade of agriculture export from Thailand to partners in 2002 to 2019. As you can see, the major importer countries from Thailand's agricultural product are Japan, US, China, and Malaysia. China is a country that import Thailand agricultural products increase continuously. In contrast way for Japan, US, and Malaysia and other trade partners as we can see from these countries

have percent trade of Thailand agricultural product decrease continuously. So, it means China is a main driver export of agricultural product of Thailand (Ministry of commerce, 2020).

As we said before, the percent trade of Thailand export industrial products main driven by US, Japan and China. And China is the main driver of Thailand export agricultural products (Ministry of commerce, 2020). So, you will see that the value export of Thailand main driven by only five countries and all these five countries have to driven Thai exports growth. This is not positive for the exports and the economy of Thailand. Because if in the future, China, US, Japan, Hong Kong and Malaysia do not import products from Thailand or decrease importing from Thailand, it will make Thailand lose the large income from exporting products due to five countries import the in industrial sector and agricultural sector, while other trading partners also important for Thai export but in each country has a little value thus, a little effect to Thai export.

The problem of this study is, because Thailand exports have the highest proportion on industry and agriculture and the main importers are only 5 countries which are US, China, Japan, Hong Kong and Malaysia (Ministry of commerce, 2020). So, it is the risk to lose of huge income for Thailand in case that those countries don't want to import from Thailand anymore. If Thailand know the factor that affect to the industrial and agricultural export, Thailand can decrease the risk for loss of

income in terms of rely the exports on more countries. However, we don't know the factors that affect exporting from Thailand to trading partner countries.

For this reason, it is important for Thailand to know what determinants that affect to industry and agriculture export and how these determinants have different effect on industry and agriculture export because Thailand is export country. The government and policymakers need to know the factor affect to Thailand export with trading partner countries for using determine the policy. In term of trade to increase trade partners importing products from Thailand for avoid risk that depended on a few importer countries.

However, In previous studies have focused on the factors that affect trade in sector individually Chen (2015); Sichei et al. (2008) and overall trade (Basarac Sertic et al., 2015; Yazici, 2015). And there is no study that compares how the different of factors affect trade in industrial and agricultural goods from Thailand (Basarac Sertic et al., 2015; Chen, 2015; Sichei et al., 2008; Yazici, 2015). So, the question is what ways do the impacts of determinants of agricultural exports differ to those of industries. This question led us to find the difference between impacts of determinant of agricultural exports differ to industry export.

1.1 IMPORTANT OF THE STUDY

In this situation the export sector is important to economy. So, when we know the determinant of industry and agriculture export can help to determine policy to support and increase trade partner countries. Which this study finds the determinant affect industrial export and agricultural export of Thailand to China US Japan Malaysia and Hong Kong.

1.2 ADVANTAGE OF THE STUDY

The results will help to know determinants that affect to industry and agriculture export and how these determinants have different effect on industry and agriculture export.

1.3 OBJECTIVE OF THE STUDY

The aims of this study are (1) investigate the factors that affect industrial export with main trade partner countries of Thailand, (2) investigate the factors that affect agricultural export with main trade partner countries, and (3) compare what are factors affect different between industrial export and agriculture of Thailand

CHAPTER 2

LITERATURE REVIEW

2.1 TRADING PARTNER COUNTRIES FOR THAILAND EXPORT

Thailand is the country that exporting to partner countries in many countries in 2019 as you can see on Table 1 below the over thirty countries which in each countries they import different product different value. By The most common destination for the exports of Thailand are United States 32.2 billion US dollar, China 29.1 billion US dollar, Japan 23.8 billion US dollar, Vietnam 11.8 billion US dollar and Hong Kong 11.1 billion US dollar (The Observatory of Economic Complexity, 2022).

Table 1 *Destination export of Thailand in 2019.*

No	Country	Value (Billion US dollar)	% Share
1	United States	32.2	13
2	China	29.1	11.7
3	Japan	23.8	9.59
4	Vietnam	11.8	4.73
5	Hong Kong	11.1	4.45
6	Malaysia	10.1	4.07
7	Australia	10	4.03
8	Indonesia	8.75	3.52
9	Singapore	8.39	3.38
10	India	7.06	2.84
11	Cambodia	6.96	2.80
12	Philippines	6.68	2.69

Table 1 (Continues) Destination export of Thailand in 2019.

No	Country	Value (Billion US dollar)	% Share
13	Switzerland	5.59	2.25
14	Germany	5.16	2.08
15	South Korea	4.96	1.99
16	Netherlands	4.35	1.75
17	Mexico	4.34	1.75
18	Myanmar	4.24	1.71
19	Chinese Taipei	3.97	1.60
20	Laos	3.80	1.53
21	United Kingdom	3.77	1.52
22	United Arab Emirates	2.61	1.05
23	France	2.48	1.00
24	Canada	2.25	0.90
25	Saudi Arabia	2.07	0.83
26	South Africa	1.94	0.78
27	Italy	1.73	0.69
28	Belgium	1.65	0.66
29	Brazil	1.51	0.61
30	Pakistan	1.23	0.49
31	Spain	1.14	0.46
32	Russia	1.13	0.45

Source: The Observatory of Economic Complexity, 2022
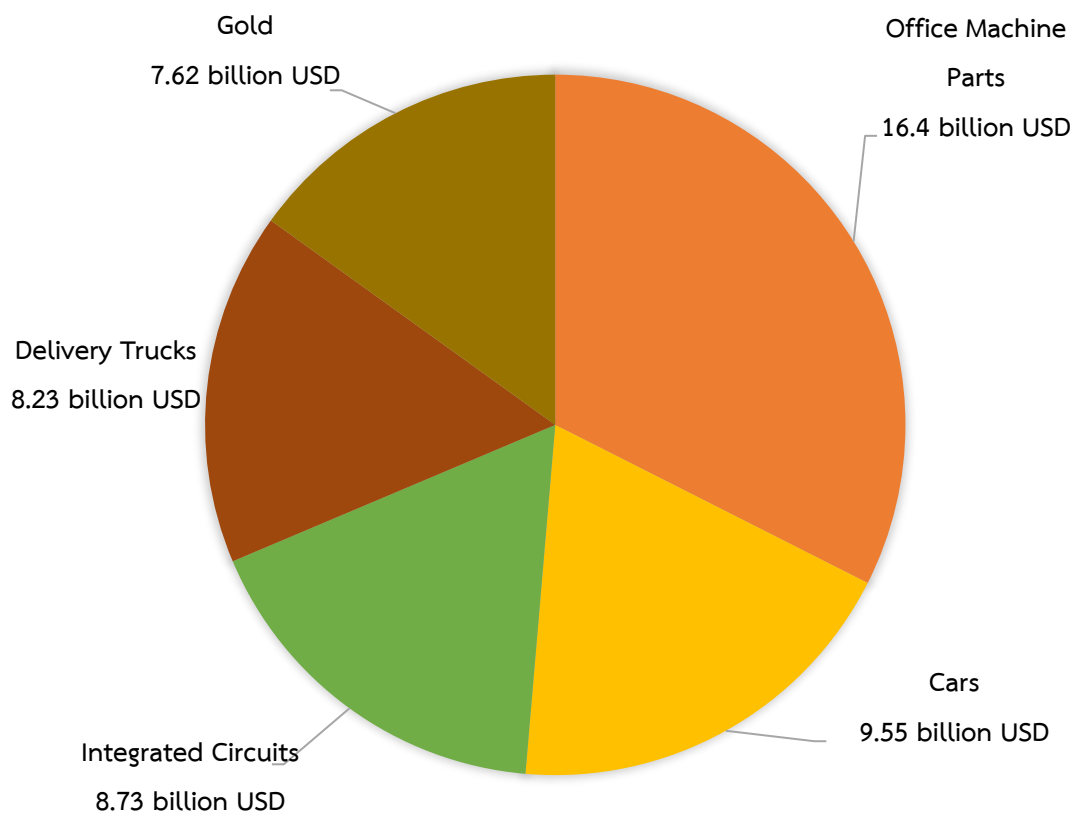
Figure 5 *The most products export to destination of Thailand in 2019*
Source: The Observatory of Economic Complexity, 2022

The most that exports are led by Office Machine Parts 16.4 billion US dollar, Cars 9.55 billion US dollar, Integrated Circuits 8.73 billion US dollar, Delivery Trucks 8.23 billion US dollar, and Gold 7.62 billion US dollar mostly is industrial products that Thai export. (The Observatory of Economic Complexity, 2022).

2.1.1 United States

The United States has economy is the largest in the world. By GDP as figure below has increasing trend from 2002 to 2019 which are over twenty trillion US dollar (World Bank Database, 2022a). So, it's big economy make United States also has purchasing power for another countries, including Thailand that US is the important importer product from Thailand.
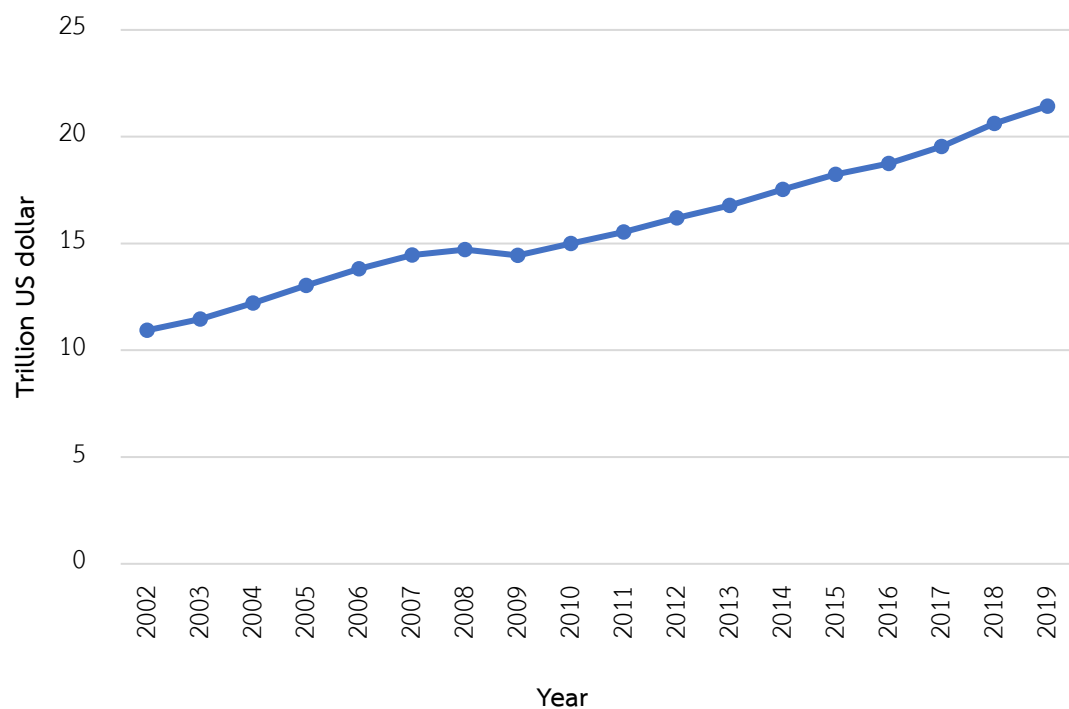
Figure 6 *GDP of United States from 2002 – 2019.*

Source: World Bank Database, 2022

And the top ten product that Thailand export to United States can show you as Table 2 By the value export the most is industrial products (Trading Economics, 2022c).

Table 2 *Top ten product that Thailand export to United States in 2020.*

Thailand Exports to United States	Value
Machinery, nuclear reactors, boilers	8.46 billion US dollar
Electrical, electronic equipment	7.54 billion US dollar
Rubbers	4.20 billion US dollar
Vehicles other than railway, tramway	2.32 billion US dollar
Meat, fish and seafood preparations	1.14 billion US dollar
Pearls, precious stones, metals, coins	1.04 billion US dollar
Articles of iron or steel	998.82 million US dollar
Plastics	798.96 million US dollar
Optical, photo, technical, medical apparatus	730.60 million US dollar
Vegetable, fruit, nut food preparations	729.99 million US dollar

Source: Trading Economics, 2022

2.1.2 China

China is the country has development economic growth rapidly the pace of institutional development, and there are important institutional and reform gaps that China needs to address to ensure a high-quality and sustainable growth path (World Bank Database, 2022b). As you can see in Figure 7 the GDP of China in 2002 around 1.471 trillion US dollar and in 2019 the GDP growth rapidly to 14.280 trillion US dollar (World Bank Database, 2022a). And in the present make China is big economy second from United State and maybe the largest economy in the future.
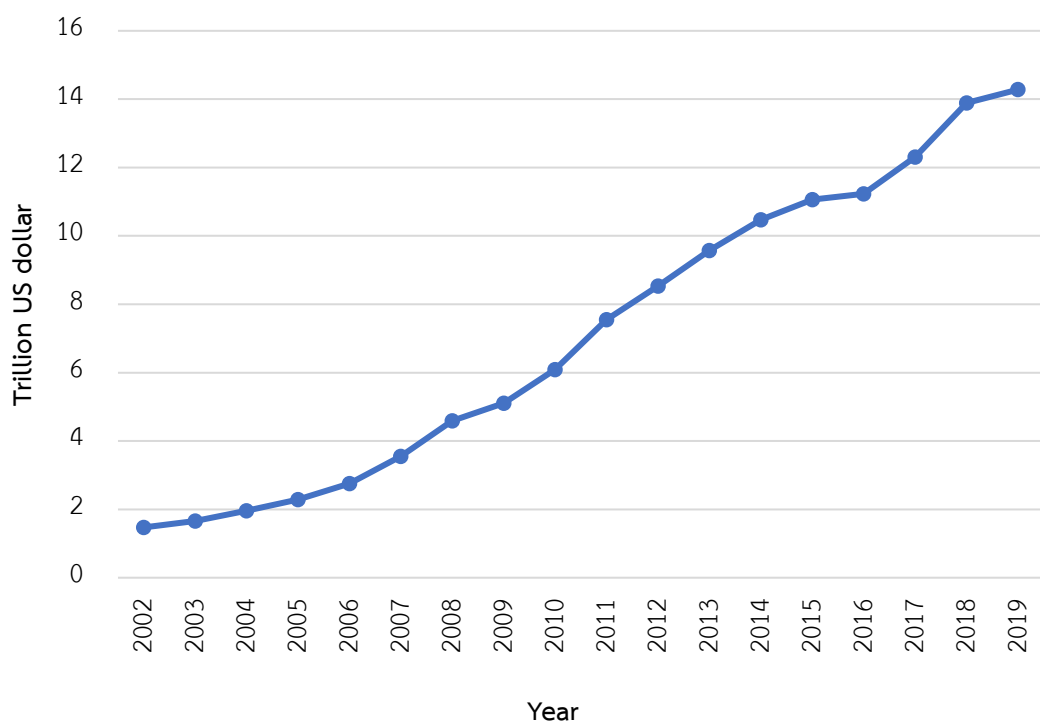
Figure 7 *GDP of China from 2002 – 2019.*

Source: World Bank Database, 2022

The most value product China import from Thailand is rubbers 4.10 billion US dollar. Next is machinery, nuclear reactors, boilers has value 3.5 billion US dollar, there are industrial products and have other products both agricultural products and industrial products (Trade Economics, 2022a). As you can see in Table 3.

Table 3 *Top ten product that Thailand export to China in 2020.*

Thailand Exports to China	Value
Rubbers	4.10 billion US dollar
Machinery, nuclear reactors, boilers	3.50 billion US dollar
Plastics	3.24 billion US dollar
Electrical, electronic equipment	3.13 billion US dollar
Edible fruits, nuts, peel of citrus fruit, melons	2.91 billion US dollar
Vehicles other than railway, tramway	1.75 billion US dollar
Organic chemicals	1.31 billion US dollar
Optical, photo, technical, medical apparatus	1.14 billion US dollar
Wood and articles of wood, wood charcoal	1.06 billion US dollar
Milling products, malt, starches, inulin, wheat gluten	744.90 million US dollar

Source: Trade Economics, 2022

2.1.3 Japan

Japan is the country in southeast Asia has development in several develop to reach Japan is developed country. The economy has fluctuation following the situation in domestic as you can see in Figure 8 show the GDP have increase and decrease causing the economy to be stimulated all the time. Which from 2002 GDP is 4.183 trillion US dollar and 2019 GDP only 5.149 trillion US dollar. It different from United States and China that have increase continuously (World Bank Database, 2022a).
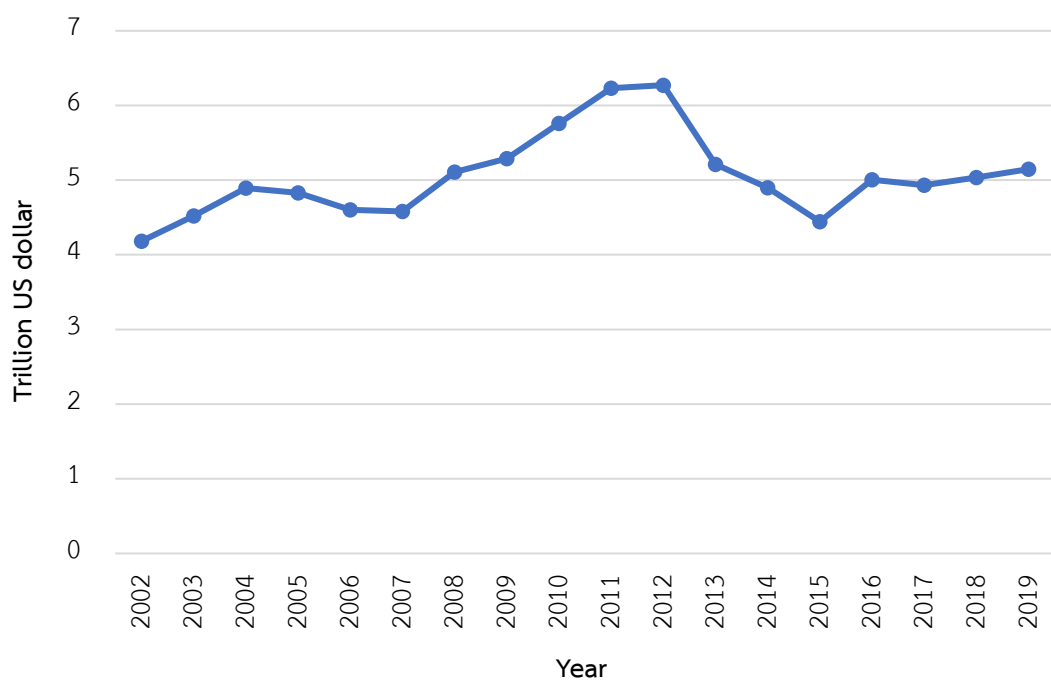
Figure 8 *GDP of Japan from 2002 – 2019.*

Source: World Bank Database, 2022

So, the Thai's products import by Japan are industrial products such as electrical or machinery etc. and import Thai food products in part of agricultural products to increase purchasing power of population in domestic (Trade Economics, 2022b). Table 4 show top ten products that Thailand export to Japan and the value in each product.

Table 4 *Top ten products Thailand export to Japan in 2020.*

Thailand Exports to Japan	Value
Electrical, electronic equipment	5.26 billion US dollar
Machinery, nuclear reactors, boilers	3.10 billion US dollar
Meat, fish and seafood preparations	2.22 billion US dollar
Vehicles other than railway, tramway	2.21 billion US dollar
Plastics	1.38 billion US dollar
Rubbers	787.94 million US dollar
Optical, photo, technical, medical apparatus	699.61 million US dollar
Articles of iron or steel	530.63 million US dollar
Aluminum	429.16 million US dollar
Miscellaneous chemical products	405.53 million US dollar

Source: Trade Economics, 2022

2.1.4 Malaysia

Malaysia is border country with Thailand by successful for diversified economy from the country that initially agriculture to the host in robust manufacturing and service sectors make Malaysia leading export of electrical appliances, parts and component (World Bank Database, 2022c). In the Figure 9 as you see GDP in 2002 only 100.846 billion US dollar but in 2019 the GDP 365.276 billion US dollar which is increase continuously of GDP (World Bank Database, 2022a).
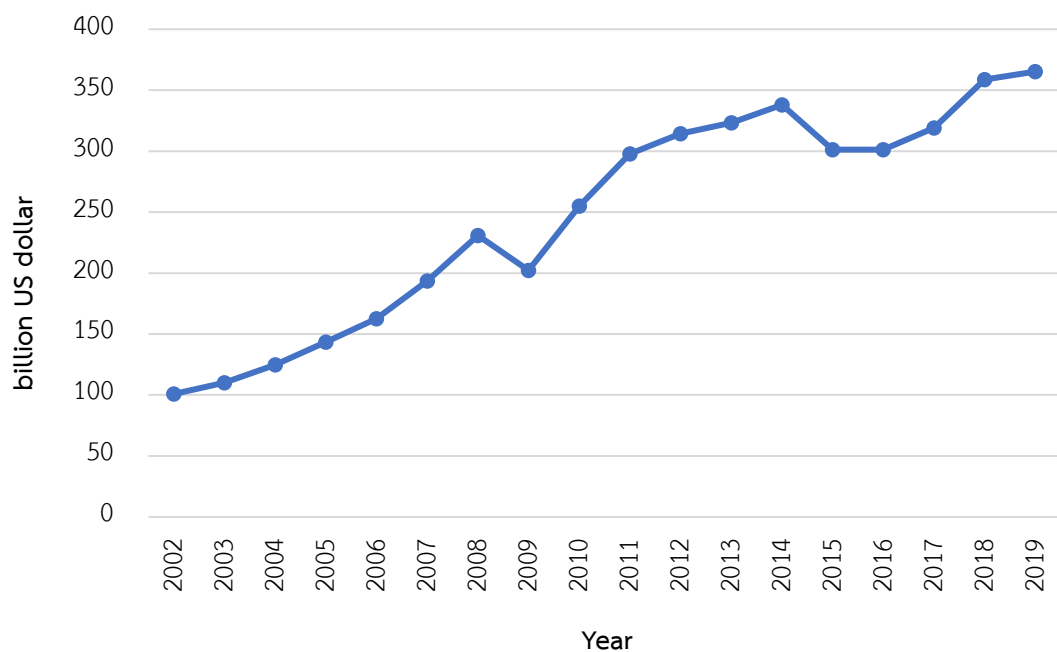
Figure 9 *GDP of Malaysia from 2002 – 2019.*

Source: World Bank Database, 2022

Malaysia imports products from Thailand both industrial and agriculture products. By you can see Table 5 that show important product Thailand export to Malaysia in top ten and have other products an important too (Trading Economics, 2022b).

Table 5 *Top ten product that Thailand export to Malaysia in 2020.*

Thailand Exports to Malaysia	Value
Electrical, electronic equipment	1.52 billion UD dollar
Machinery, nuclear reactors, boilers	1.25 billion UD dollar
Rubbers	1.01 billion UD dollar
Vehicles other than railway, tramway	823.89 million US dollar
Mineral fuels, oils, distillation products	783.72 million US dollar
Plastics	444.98 million US dollar
Ships, boats, and other floating structures	261.29 million US dollar
Cereal, flour, starch, milk preparations and products	186.49 million US dollar
Articles of iron or steel	154.70 million US dollar
Residues, wastes of food industry, animal fodder	127.00 million US dollar

Source: Trade Economics, 2022

2.1.5 Hong Kong

Hong Kong is Special Administrative Region of China by ideal location in fast-growing Asia and riding on the opportunities brought by the mainland economy, the Hong Kong Special Administrative Region has developed into an international business, trade and financial hub, as well as a renowned tourist city, providing high value-added and knowledge-intensive services to the globalized world. Hong Kong also serves as the gateway to the mainland for overseas investors as well as a platform for Mainland enterprises to go global (The Government of the Hong Kong Special Administrative Region, 2020). So, the GDP of Hong Kong is continuous and rapid growth by as you can see in Figure 10 that show the GDP in 2002 around 166.349 billion US dollar increase to 363.016 billion US dollar in 2019 (World Bank Database, 2022a).
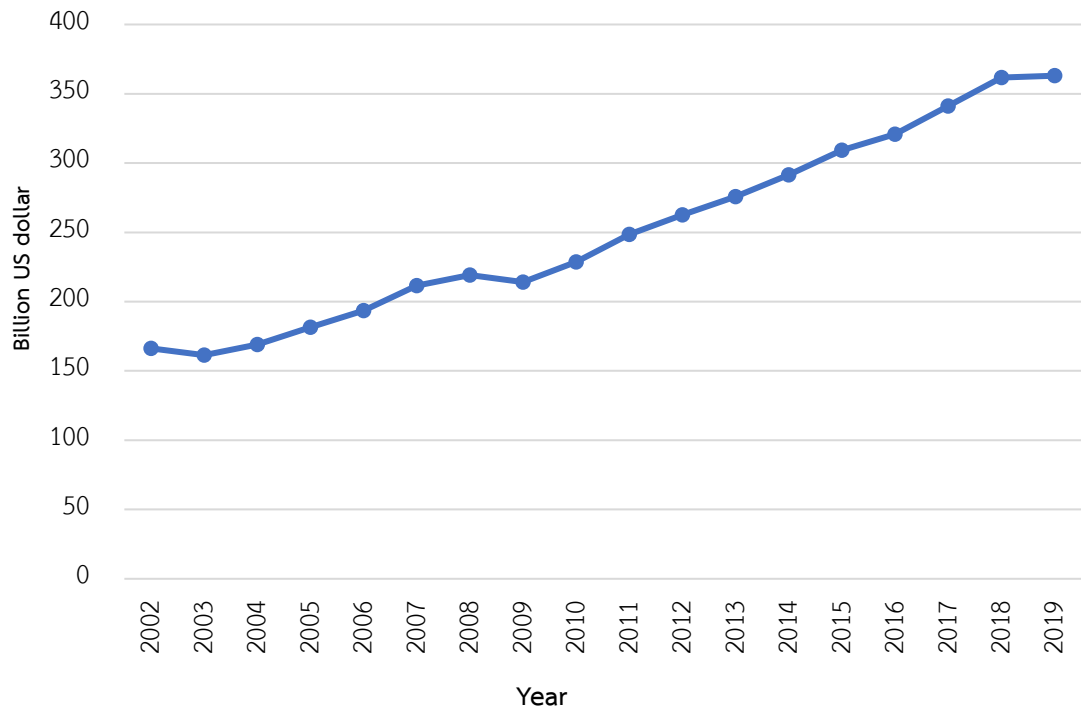
Figure 10 *GDP of Hong Kong from 2002 – 2019.*

Source: World Bank Database, 2022

The Hong Kong Special Administrative Region have limited area but have several economic activities make improvement and development until making it an economic zone that can attract investors tourist or even foreign workers (Sik-hung, 2020). Which importing products of Hong Kong from Thailand mostly is industrial products as you can see in Table 6 show top ten product that Thailand export to Hong Kong (Trading Economics, 2022a).

Table 6 *Top ten product that Thailand export to Hong Kong in 2020.*

Thailand Exports to Hong Kong	Value
Electrical, electronic equipment	3.59 billion US dollar
Machinery, nuclear reactors, boilers	3.06 billion US dollar
Pearls, precious stones, metals, coins	1.79 billion US dollar
Aircraft, spacecraft	436.25 million US dollar
Edible fruits, nuts, peel of citrus fruit, melons	361.60 million US dollar
Optical, photo, technical, medical apparatus	224.37 million US dollar
Cereals	191.28 million US dollar
Clocks and watches	174.56 million US dollar
Essential oils, perfumes, cosmetics, toiletries	153.75 million US dollar
Meat and edible meat offal	148.79 million US dollar

Source: Trade Economics, 2022

2.2 STUDY ABOUT EXPORTS INDUSTRIAL SECTOR

There are many studies related with factor that affect to industrial products export such as textile industry, textile and clothes, nonferrous metals, software, chemical products. For instance, Tharakan et al. (2005a) found the effects of size, distance, linguistic connections, and trade-facilitating networks are determinants of Indian software export. A study investigating determinants of nonferrous metal exports in Chinese country found that market size, ore resource scarcity, a high degree of economic openness affect to nonferrous metals exports and a high level of political risk, exchange rate, has a significant positive effect on export (Zheng et al., 2017).

The study of Lee et al. (2014) focus on three factors which are supply of apparel export, potential apparel demand and existence of fashion capital. And found that supply of apparel export and potential apparel demand are strong determinants of apparel export in developed countries. In addition, there are studies the determinant of textile and clothes Chan and Au (2007); Rahman et al. (2019a); Wu et al. (2012) they found that GDP, GDP per capita of importers, and real exchange rate are significant on export of exporters.

Other study Chan and Au (2007) found common membership of free trade agreement for bilateral trading partners and population growth rate of the importers have significant effect on China's textile export. But Wu et al. (2012) found that geographic distance, FDI outflows and inflows, openness to trade, and bilateral investment treaties are important for China's FDI outflows and stimulate growth in midstream textile product exports of China. The study found the results of import tariff on exports has negative and significant impact while the positive impact of devaluation has been observed of chemical products' exports of Pakistan (Atif et al., 2019).

In addition, the study in overall of industrial product such as Babubudjnauth (2020); Bahmani-Oskooee et al. (2014) they found real home currency depreciation has expansionary effect on manufacturing output growth in the short-run while it drops manufacturing output in the long-run and correspond with Buturac et al. (2019). Chew et al. (2018) who stated price of exports, price of imports, unit business costs, and net operating surplus over manufacturing output have significant on export competitiveness in the unique case of Singapore.

2.3 STUDY ABOUT EXPORTS AGRICULTURAL SECTOR

The study of factors affects to agriculture export they examine in term of specific product for example forest product, meat, shrimp, rice, fruit, pork, sea food, wine, and broiler product. Which are the study of Chen (2015) found the biggest impacts on Vietnam rice export are gross domestic product (GDP), price, population, and exchange rate. For study of forest product trade finding GDP and GDPC have a positive impact on trade whereas distance has an inverse impact on trade and similarly, APEC and OECD have significant impact on China bilateral trade of forest products (Nasrullaha et al., 2020).

The study of trade policies and subsidies used by exporting and importing countries, livestock production capacity in countries and distances play an important role in determining trade follows of meat (Koo et al., 1994). Natale et al. (2015) found seafood trade is attracted either by countries with well-established seafood preferences or by countries with low labour costs for further processing and important thing is the growth of aquaculture production and the other is the trade for re-processing effect seafood trade. More ever, Castillo et al. (2016) higher incomes, lower prices, cultural and geographical affinities, and trade agreements promote wine exports; the expansion of bottled wine trade, especially within the EU, is particularly highlighted.

And Davis et al. (2014) found long-run exchange rate volatility has a negative and significant effect on broiler trade. And when compared to the effects of population, regionalization, and sharing a common border; the short-run effect of exchange rate volatility was insignificant. So, exchange rate volatility has little or no effect on bilateral broiler trade. But conversely study with Shahriar et al. (2019) found exchange rate significant factors affecting the Chinese pork exports.

Cardamone (2011) found that fruit effect of EU preferential policies is found to vary by commodity for example the Generalised System of Preferences (GSP) seems to increase exports to the EU of fresh grapes only, while exports to the EU of oranges are favored by the Cotonou Agreement. Regional trade agreements appear effective in expanding EU-bound exports from eligible countries for all fruits except oranges and similar with Atif et al. (2016) found preferential trading agreements impact to agriculture export. More ever, Fiankor et al. (2019) found results to suggest that increased government effectiveness enhances trade of high-value products, whereas better voice and accountability scores decrease trade of coconut products with both levels of value addition.

In addition, other study shows the effect of governance distance on exports of fruits and vegetables, in particular apples, bananas, and grapes. Which increasing governance distance hinders bilateral trade, the interaction of standards and the governance distance is positively associated with exports, hence partially offsetting

the direct trade-inhibiting effects of the latter (Fiankor et al., 2019). Koo and Karemera (1991) found production capacities, income, import and export unit value indexes, and trade policies used in wheat trade play an important role in determining trade flows of wheat.

Dlamini et al. (2016) found that Swaziland's GDP, importer's GDP, importer's land area and official common language had significant positive effects on Swaziland's sugar exports. The study further revealed that the creation of COMESA and EU trading blocs had significant positive effects on the Swaziland's sugar exports. This implies that the above-mentioned factors have contributed to the sugar trade flows increase during the time period under study. On the other hand, importer's population, Swaziland openness and distance between Swaziland and her trading partner's capital cities had a significant negative effect on Swaziland's sugar export flows.

So, from the study before of individual products and overall product in both sectors. It makes we don't don know real GDP, population, political stability, manufacturing output. Agricultural output, exchange rate, crude oil price and ASEAN to compare the factor that affect between agricultural export and industrial export.

2.4 STUDY ABOUT THE GRAVITY MODEL

The gravity model has been successfully applied to flows of the most varying types, such as migration, flows of buyers to shopping centers, recreational traffic, commuting, patient flows to hospitals and interregional as well as international trade more than twenty years (Bikker, 1987). Baier and Standaert (2020) use the gravity model is a model of international trade states that the volume of trade between two countries is proportional to their economic mass and a measure of their relative trade frictions. Perhaps because of its intuitive appeal, the gravity model has been the workhorse model of international trade for more than 50 years.

Have many studies use this model to measure international trade of trade partner countries Song and Lee (2022) study about The relationship between international trade and logistics performance: A focus on the South Korean industrial sector, which use logistics performance index (LPI) in gravity equation model, the basic models for analyzing trade flows. The study of analysis of the impact of bilateral and transit quotas on Turkey's international trade by road transport also using an approach that integrates the max-flow and gravity models, making this model can suggest a loss in Turkish exports by road transport because of the quotas imposed by other countries (Çekyay et al., 2017).

In addition, use the gravity equation to finding relationship between international tourism promotes international trade between countries (Santana-

Gallego et al., 2016). Okubo (2004) study about the border effect in the Japanese

market: A Gravity Model analysis by use gravity model to analyze the border effect in

the Japanese market, which indicates how biased interregional trade is compared

with international trade and will can found that the border effect or not effect to

Japan market.

D.W.Alexander and R.Merkert (2021) applications the gravity model to s to

evaluate and forecast US international air freight markets post-GFC by have the aims

is evaluate whether gravity models are robust enough to forecast and accurately

account for substantial economic shocks such as the Global Financial Crisis (GFC) and

making get the results that US demand for air freight is highly sensitive to transport

costs, competition from sea freight and consumer spending patterns of perishable

etc. Similar results found cost and distance that effect to on airfare (Yamaguchi,

2008).

The standard gravity model to investigate the determinants of international

trade, employing a dataset of bilateral trade and economics characteristics in the

ASEAN+3 countries and provide some important insights into the determinants of

bilateral trade and offer policy implications regarding the promotion of international

trade for governments worldwide, In particular we find that output asymmetry

between countries positively explains bilateral trade. (Nguyen and Vo, 2017). And use

the gravity model to examine patterns of international trade about regionalization or geographical bias affect the levels of bilateral trade (POON, 1997).

This study develop the gravity model analyzes Hungary's export linkages of the interwar and Cold War periods by gravity model shows the dramatic cleavage of the "Iron Curtain," the effect of the NEM, and particularly strong and weak linkages for Hungarian trade that may result from historical legacies, complementarity, or specific political contacts (Buckwalter, 2004). The study of Differing trade elasticities for intra- and international distances: A gravity approach use the gravity model of trade estimate the impact that within-country transportation distance has on international trade levels making find that internal distance reduction in the distance a good travels within the exporting country increases trade (Query, 2020).

And applying the gravity model for measure export to partner countries by Prentice et al. (2005) use an empirical gravity model of interregional trade is specified for Canadian pork exports to the United States and the results show that, among other things, demand for transport is highly elastic, suggesting that pork producers and truckers have a mutual interest in exploring means to lower freight costs. Pelletiere and Reinert (2006) estimate a gravity model of Japanese and US exports of used automobiles that incorporates an original, ordered measure of protection in global, used automobile markets by the results confirm protection by our measure is suppressive and often statistically significant and that what we term 'Grubel income

effects' are present. However, Japanese export behavior appears to differ in some important respects from that of the USA.

This paper investigates the claim that public export credit guarantees mitigate this friction to trade flows and hence promote exports by use empirical trade gravity model found the effect of public export guarantees on exports which indicates that export promotion is indeed effective. Furthermore, political risk turns out to be an important obstacle for exports and hence should be taken into account in any empirical model of trade (Moser et al., 2008a).
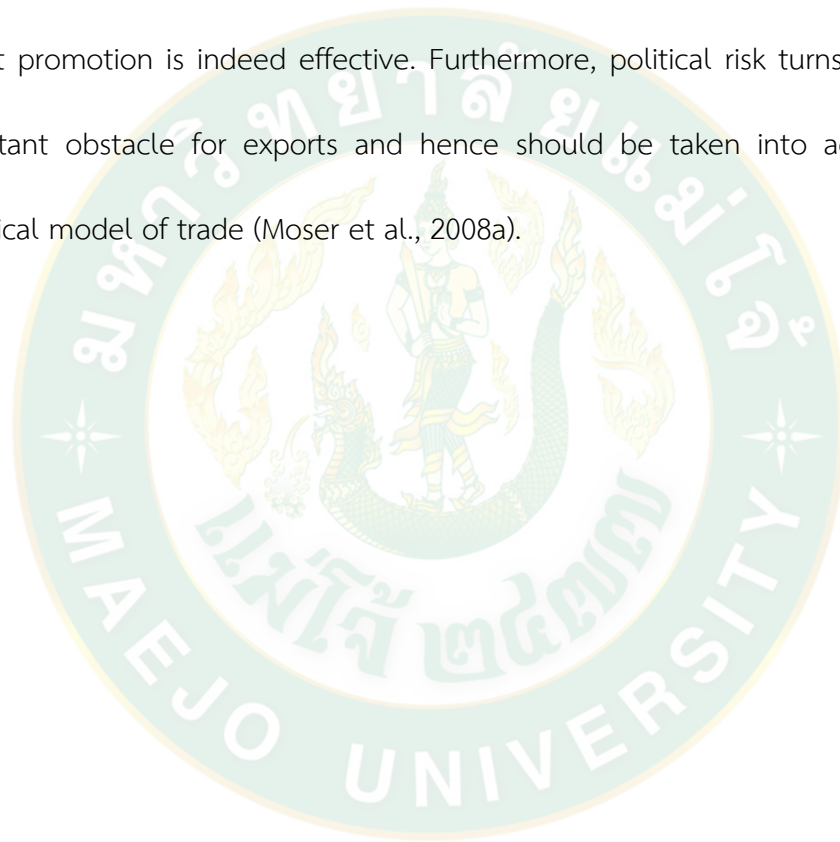
Table 7 *Literature review of export industrial sector.*

Author (Year)	Title	Variable	Methodology	Main finding
P. K. M. Tharakan, Ilke Van Beveren and Tom Van Ourti (2005)	Determinants of India's Software Exports and Goods Exports	Size, distance, linguistic connections, and trade-facilitating networks	The Gravity model	Effects of size, distance, linguistic connections, and trade-facilitating networks impact to India's Software export.
Juyoung Lee, Elena Karpova and Minjung Lee (2014)	Determinants of Apparel Exports in Developed Economies: Application of the Gravity Model and Economic Geography Theory	Supply of apparel export and potential apparel demand	The Gravity model and economic geography theory	Apparel domestic supply and potential apparel demand are strong determinants of apparel export in developed countries.

Table 7 *(Continue) Literature review of export industrial sector.*

Author (Year)	Title	Variable	Methodology	Main finding
Yafei Zheng, Yanmin Shao and Shouyang Wang (2017)	The determinants of Chinese nonferrous metals imports and exports	Market size, ore resource scarcity, a high degree of economic openness, a high level of political risk and exchange rate	The Gravity model	1.Importing affect by - market size, geographic proximity, ore resource endowment, a high degree of economic openness, a high level of political risk, and a well-developed seaport transportation system of trade partners 2.Exporting affect by - market size, ore resource scarcity, a high degree of economic openness, and a high level of political risk 3.Exchange rate is positive effect on export flow but non affect to imports flow.

Table 7 *(Continues) Literature review of export industrial sector.*

Author (Year)	Title	Variable	Methodology	Main finding
Eve M. H. Chan and K. F. Au (2007)	Determinants of China's textile exports: An analysis by gravity model	GDP, real exchange rate, common membership of free trade agreement for bilateral trading partners, per capita GDP and population growth rate of the importers,	The Gravity model	GDP, real exchange rate, common membership of free trade agreement for bilateral trading partners, per capita GDP and population growth rate of the importers, all these factors, have significance on the China's textile exports. But geographical distance has no significant effect on textile trading.
Hsiu-Ling Wu, Chien-Hsun Chen and Li-Ting Chen (2012)	Determinants of Foreign Trade in China's Textile Industry	GDP, per capita GDP, geographic distance, FDI outflows and inflows, openness to trade, and bilateral investment treaties.	The Gravity model	GDP, per capita GDP, geographic distance, FDI outflows and inflows, openness to trade, and bilateral investment treaties affect to the textile industry export.

Table 7 (Continues) Literature review of export industrial sector.

Author (Year)	Title	Variable	Methodology	Main finding
Redwanur Rahman, Saleh Shahriar and Sokvibol Kea (2019)	Determinants of Exports: A Gravity Model Analysis of the Bangladeshi Textile and Clothing Industries	GDP, real exchange rate, per capita GDP, World Trade Organization membership, European Union and North American Free Trade Agreement	The Gravity model	GDP, real exchange rate and per capita GDP of the importers have affect toexports. Also, Bangladesh and WTO membership have a strong positive significant impact on T&C exports. And the geographical distance has no effect on textile trading. Moreover, EU, NAFTA are the two important export destinations for the garments of Bangladesh.

Table 7 *(Continues) Literature review of export industrial sector.*

Author (Year)	Title	Variable	Methodology	Main finding
Rao Muhammad Atif, Haider MahmoodID, Liu Haiyun and Haiou Mao (2019)	Determinants and efficiency of Pakistan's chemical products' exports: An application of stochastic frontier gravity model	Import tariff on exports, devaluation, Preferential Trade Agreements (PTA), colonial links, common language, political disputes and contiguity by incorporating dummy variable.	Stochastic frontier gravity model	Import tariff is negative on exports of chemical products. Devaluation has been observed is positive on exports of chemical products.
Mohsen Bahmani-Oskooee Scott W. Hegerty and Ruixin Zhang (2014)	The Effects of Exchange-Rate Volatility on Korean Trade Flows: Industry-Level Estimates	Exchange-rate risk	The Autoregressive Distributed Lag (ARDL) approach	In the long run, majority of industries are unaffected from exchange-rate risk. But small Korean exporters are particularly vulnerable to exchange-rate risk.

Table 7 *(Continues) Literature review of export industrial sector.*

Author (Year)	Title	Variable	Methodology	Main finding
Ashok Babubudj nauth (2020)	An empirical analysis of the impacts of real exchange rate on GDP, manufacturing output and services sector in Mauritius	Real home currency depreciation	The empirical growth model by Vector Autoregressive approach	Real currency depreciation is observed to be contractionary in the short-run while it is expansionary in the long-run. real home currency depreciation has expansionary effect in short-run and drops in long-run. Real domestic currency depreciation has positive long term effect on services sector performance in Mauritius.
Goran Buturac, Davor Mikulić and Petra Palić (2019)	Sources of export growth and development of manufacturing industry: empirical evidence from *Croatia*	Performanc e of the Croatian manufacturi ng industry	The constant market share method (C.M.S.)	competitiveness in the Croatian manufacturing industry was the most important factor which determined the increasing share of national companies in a period from 2013 to 2015.

Table 7 *(Continues) Literature review of export industrial sector.*

Author (Year)	Title	Variable	Methodology	Main finding
Soon-Beng Chew, Jia Hong Chen, Ming Chou Hung and Teresa Wan Ying Lek (2018)	Factors Affecting Export Competitiveness of Singapore's Manufacturing Sector: A Regression Analysis	Price of exports, price of imports, unit business costs, and net operating surplus over manufacturing output	Mundell–Fleming model	exports are not adversely affected by an appreciation of SGD. This is attributed to the direct causal relationship between import prices and export prices that helps to minimize the effects of a higher cost of export production brought about by appreciation, with lower import costs.

Table 8 *Literature review of export agricultural sector.*

Author (Year)	Title	Variable	Methodology	Main finding
Thi Hong Hanh Bui, Qiting Chen (2015)	An Analysis of Factors Influencing Rice Export in Vietnam Based on Gravity Model	GDP, price, population and exchange rate	The Gravity model	The most impact of rice export in Vietnam are GDP, price, population, and exchange rate.
Muhammad Nasrullah, Liu Chang, Khalid Khan, Muhammad Rizwanullah, Farah Zulfiqar and Muhammad Ishfaq (2020)	Determinants of forest product group trade by gravity model approach: A case study of China	GDP, GDPC, distance, APEC and OECD	The Gravity model	Better to promote exports and import to countries having large economies or short distance countries.

Table 8 (Continues) Literature review of export agricultural sector.

Author (Year)	Title	Variable	Methodology	Main finding
Won W. Koo David Karemera Richard Taylor (1994)	A gravity model analysis of meat trade policies	Trade policies, subsidies exporting and importing countries, livestock production capacity, and distances	The Gravity model	trade policies and subsidies used by exporting and importing countries, livestock production capacity in countries, and distances play an important role in determining trade flows of meat.
Fabrizio Natale, Alessandra Borrello and Arina Motova (2015)	Analysis of the determinants of international seafood trade using a gravity model	Low labour costs, growth of aquaculture production and re-processing	The Gravity model	Seafood trade is expanding under the influence of two key forces: one is the growth of aquaculture production and the other is the trade for re-processing.

Table 8 *(Continues) Literature review of export agricultural sector.*

Author (Year)	Title	Variable	Methodology	Main finding
J. Sebastian Castillo, Emiliano C. Villanueva and M. Carmen García-Cortijo (2016)	The International Wine Trade and Its New Export Dynamics (1988–2012): A Gravity Model Approach	Higher incomes, lower prices, cultural, geographical affinities, and trade agreements	The Gravity model	higher incomes, lower prices, cultural and geographical affinities, and trade agreements promote wine exports; the expansion of bottled wine trade, especially within the EU.
Christopher G. Davis, Andrew Muhammad, David Karemera and David Harvey (2014)	The Impact of Exchange Rate Volatility on World Broiler Trade	Long-run exchange rate volatility, population, regionalization	The Gravity model	long-run exchange rate volatility has a negative and significant effect on broiler trade, albeit small when compared to the effects of population, regionalization, and sharing a common border; the short-run effect of exchange rate volatility was insignificant. Overall, results suggest that exchange rate volatility has little or no effect on bilateral broiler trade.

Table 8 *(Continues) Literature review of export agricultural sector.*

Author (Year)	Title	Variable	Methodology	Main finding
Redwanur Rahman, Saleh Shahriar and Sokvibol Kea (2019)	Determinants of Exports: A Gravity Model Analysis of the Bangladeshi Textile and Clothing Industries	GDP, real exchange rate and per capita GDP of the importers	The Gravity model	GDP, real exchange rate and per capita GDP of the importers have appeared to be major determinants of Bangladesh's textile exports trade. Bangladesh and WTO membership have a strong positive significant impact on T&C exports. The geographical distance has no effect on textile trading. It is found that and NAFTA countries are the two important export destinations for the garments of Bangladesh.

Table 8 (Continues) Literature review of export agricultural sector.

Author (Year)	Title	Variable	Methodology	Main finding
Paola Cardamone (2011)	The effect of preferential trade agreements on monthly fruit exports to the European Union	Preferential trade agreements (Generalised System of Preferences (GSP) increase exports to the EU of fresh grapes and the Cotonou Agreement increase export orange to EU.)	The Gravity model	The effect of EU preferential policies is found to vary by commodity. GSP can increase exports to the EU of fresh grapes only, while exports to the EU of oranges are favoured by the Cotonou Agreement. Regional trade agreements appear effective in expanding EU-bound exports from eligible countries for all fruits except oranges.
Rao Muhammad Atif, Liu Haiyun and Haider Mahmood (2016)	Pakistan's agricultural exports, determinants and its potential: an application of stochastic frontier gravity model	Bilateral exchange, tariff rates, common border, common culture, colonial history and preferential trading agreements	Stochastic frontier gravity model	bilateral exchange, tariff rates, common border, common culture, colonial history and preferential trading agreements by including their respective dummies also effect agriculture exports. And common language no effect agriculture exports.

Table 8 (Continues) Literature review of export agricultural sector.

Author (Year)	Title	Variable	Methodology	Main finding
Dela-Dem Doe Fiankora, Inmaculada Martínez-Zarzoso and Bernhard Brümmer (2019)	Exports and governance: the role of private voluntary agrifood standards	Government effectiveness	Structural gravity framework.	increasing governance distance hinders bilateral trade, the interaction of standards and the governance distance is positively associated with exports.
Won W. Koo and David Karemera (1991)	Determinants of World Wheat Trade Flows and Policy Analysis	Production capacities, income, import and export unit value indexes, and trade policies	The Gravity model	production capacities, income, import and export unit value indexes, and trade policies important role in determining trade flows of wheat.

Table 8 (Continues) Literature review of export agricultural sector.

Author (Year)	Title	Variable	Methodology	Main finding
Sotja G. Dlamini, Abdi-Khalil Edriss, Alexander R. Phiri and Micah B. Masuku (2016)	Determinants of Swaziland's Sugar Export: A Gravity Model Approach	Swaziland's GDP, importer's GDP, importer's land area, official common language and the creation of COMESA and EU trading, importer's population, Swaziland openness and distance	The Gravity model	Swaziland's GDP, importer's GDP, importer's land area and official common language, the creation of COMESA and EU trading blocs had significant positive effects on the Swaziland's sugar exports. and importer's population, Swaziland openness and distance between Swaziland and her trading partner's capital cities had a significant negative effect on Swaziland's sugar export flows.

2.5 CONCEPTUAL FRAMEWORK

What determinants that affect to industry and agriculture export and how these determinants have different effect on industry and agriculture export.

The aims of this study are (1) investigate the factors that affect industrial export with main trade partner countries of Thailand, (2) investigate the factors that affect agricultural export with main trade partner countries, and (3) compare what are factors affect different between industrial export and agriculture of Thailand.

Gravity model

Empirical model modified from Frede and Yetkiner (2017) to study export value of industry and agriculture between bilateral trade.

Export value of industry (Y)

Export value of agriculture (Y)

Real GDP of importers countries $(RGDP)$
Population of importers (Pop)
Political stability of exporter $(Poli)$
Manufacturing value added of exporter $(Manuf)$
Exchange rate bilateral exchange rate (X)
Crude oil price (Oil)
Trade agreement $(ASEAN)$

Real GDP of importers countries $(RGDP)$
Population of importers (Pop)
Political stability of exporter $(Poli)$
Agriculture value added of exporter $(Agri)$
Exchange rate bilateral exchange rate (X)
Crude oil price (Oil)
Trade agreement $(ASEAN)$

The government and policymakers need to know the factor affect to Thailand export with trading partner countries for using determine the policy. In term of trade to increase trade partners importing products from Thailand for avoid risk that depended on a few importer countries.

Figure 11 *Conceptual framework*

This conceptual framework study about factors that impact industrial and agricultural export value of Thailand with major trading partners. Because the research problem is Thailand's export sector has a high percentage of GDP. But Thai exports are only exported to a few countries and the export value is very high. Therefore, Thai exports are at risk from exporting products with few important trading partners because if Thailand's export destination do not import products from Thailand, it will cause Thailand to huge loss of export value. And will affect to Thai's economy a lot too.

So, investigating what determinants that affect to industry and agriculture export and how these determinants have different effect on industry and agriculture export. By have the objective of this study are three objective which are first, to investigate the factors that affect industrial export with main trade partner countries of Thailand. Second, to investigate the factors that affect agricultural export with main trade partner countries and third, to compare what are factors affect different between industrial export and agriculture of Thailand.

The methodology that using is Gravity model to measure value of trade between two countries and modified the model from trade Frede and Yetkiner (2017) to export because this study is export value of industry and export value of agriculture between bilateral trade in each sector. Which in this study have partner

countries for industrial export sector including US, Japan, China and Hong Kong and partner countries of agricultural export sector including China, US, Japan and Malaysia.

And define the variable for export industry which are Real GDP of importers countries (RGDP) and Population of importers (Pop) because large economic activity mass will effect to more export, Political stability of exporter (Poli) can promote export to importers, Manufacturing value added of exporter (Manuf) have relationship export to have more product can export more to partners, Exchange rate bilateral exchange rate (X) Crude oil price (Oil) is total cost for export, Trade agreement (ASEAN) is group that have agreement together which can help easy for trading, and the variable for export agriculture similar with variable of industry accept agriculture value added of exporter (Agri) is also have more product can export mare. And finally, the results from this study the government and policymakers need to know the factor affect to Thailand export for using determine the policy. In term of trade to increase trade partners importing products from Thailand for avoid risk that depended on a few importer countries.

CHAPTER 3

METHODOLOGY

3.1 DATA

This study uses annual data from 2002 to 2019. The industry export value data of Thailand to trade partner countries in U.S. dollar (China, United States, Japan, Hong Kong) and the agriculture export value data of Thailand to trade partner countries in U.S. dollar (China, United States, Japan, Malaysia) was obtained from the Ministry of commerce of Thailand. Exchange rate Thailand to bilateral trade obtained from Bank of Thailand. Real Gross Domestic Product of trade partner countries in U.S. dollar obtained from the United States Department of Agriculture. Crude oil price from Thailand to partners in U.S. dollar/barrel obtained from the Federal Reserve Bank of st. Louis. And the manufacturing value added of Thailand, agriculture value added of Thailand in percentage, the amount of population, and Thailand political stability in percentile rank obtained from the Statistics and Demography Programme.

3.2 THEORETICAL MODEL

The analysis of flows of trade are usually based on a gravity model as show in Equation 1 (Frede and Yetkiner, 2017).

$$T_{ij} = G \frac{M_i^{\beta_1} M_j^{\beta_2}}{TC_{ij}} \qquad (1)$$

Where T_{ij} is total trade of product from country i to country j, M is economic activity mass of country i and j, TC_{ij} is transportation cost or transaction and G is constant (Matteis et al., 2018).

From Equation 1 is the study of total trade which including export and import, but in this study, we want to study export so we changed total trade to be export value in given sector (Atif et al., 2016). M_i was not included because we focus effect of export to trade partners and market size can be divided to income and population (Zheng et al., 2017). We can modify by take logarithm as Equation 1 in linear form to corresponding estimable equation (Batra, 2007) and can show in Equation 2.

$$lnEX_{ij,t} = \beta_0 + \beta_1 lnG + \beta_2 lnM_{j,t} + \beta_3 lnPop_{j,t} + \beta_4 lnTC_{ij,t} \qquad (2)$$

where $EX_{ij,t}$ is the export of product between countries i and j at time t. $M_{j,t}$ is economic activity mass of country j at time t, $Pop_{j,t}$ is population of country j at time t, $TC_{ij,t}$ is transport cost at time t and G is the constant. So, we will use the gravity model to measure export value that relate with the research problem by separate the analysis for export of industrial products and export agricultural products.

3.2.1 The factors that affect industrial export value of Thailand

Extending the analysis of the gravity model to the export industrial products. An important variable to include political stability it can affect exports. Due to political stability is important motivation to international trade activity (Moser et al., 2008b). Another study found the governance quality (political stability) significant in aiding favorable trade regulations that promote export (Munemo, 2021). Another factor affecting industrial trade is quantity product of manufacturing. An increase in quantity product of manufacturing will cause a change in industrial export. Which Matteis et al. (2018) found that since DDGS is a coproduct of ethanol production can increase product for export US DDGS.

In term of exchange rate cost variable has effect to manufacturing export. Bahmani-Oskooee et al. (2014) shows the exchange-rate risk affect Japanese exports of manufactures and certain machinery and transport equipment. And have another factor affect to industry export is crude oil price cost because Nanovsky (2018) found exchange rate negative effect due to it is shipping cost of trade. Finally, variable is trade partner countries is dummy variable for export is the benefit to industrial export for member group. Nguyen et al. (2016) found that the logistics-related costs in ASEAN and current level of logistics-related costs could be a burden or an advantage for ASEAN countries.

Based on this analysis we added variables representing the other factors that influence industrial exports of Thailand to major trading partners into Equation 2 thus, obtaining Equation 3.

$$\begin{aligned} lnEXI_{ij,t} = \ & \beta_0 + \beta_1 lnM_{j,t} + \beta_2 lnPop_{j,t} + \beta_3 lnPoli_{i,t} + \beta_4 lnProI_{i,t} \\ & + \beta_5 lnX_{ij,t} + \beta_6 lnOil_{i,t} + \beta_7 PartI \end{aligned} \tag{3}$$

Where $EXI_{ij,t}$ is value export of industry between country i and country j, $M_{j,t}$ is economic activity mass, $Pop_{j,t}$ is population, $Poli_{i,t}$ is political stability, $ProI_{i,t}$ is quantity product of manufacturing, $X_{i,j}$ is exchange rate cost, $Oil_{i,t}$ is oil price cost, $PartI$ is dummy variable show trade partner countries

So, we expect. in economic activity mass, population, political stability, quantity product of manufacturing and trade partner countries are positive effect on industrial exports. However, exchange rate cost and oil price cost we expect these factors negative effect to industrial exports.

3.2.2 The factors that affect agriculture export value of Thailand

The gravity model extending to the agricultural exports by the analysis of adding more other variables. First, political stability expects positive effect because trade policy give the benefit on export (Nowak-Lehmann et al., 2007). Next, quantity product of agriculture variable impact on agricultural exports. Matteis et al. (2018) found that increasing production of US DDGS to generate more exports of this feedstuff to international markets. In term of exchange rate cost also impact on agriculture exports because it's cost of export. Which according with study of Davis et al. (2014) found exchange rate volatility (short- and long-run) affect cross-partner broiler trade. Another factor that impacts on agriculture exports is oil price cost effect due to its cost of export similar with exchange rate cost. And another factor affecting industrial export is trade partner countries because it's facilitate of trade in group. Sarker and Jayasinghe (2007) found that the developments in the EU since the mid-1980s have served to boost agri-food trade significantly among the members.

We will be based on this analysis we added variables representing the other factors that influence industrial exports of Thailand to major trading partners into Equation 2 thus obtaining Equation 4.

$$lnEXA_{ij,t} = \beta_0 + \beta_1 lnM_{j,t} + \beta_2 lnPop_{j,t} + \beta_3 lnPoli_{i,t} + \beta_4 lnProA_{i,t} \qquad (4)$$
$$+\beta_5 lnX_{ij.t} + \beta_6 lnOil_{i,t} + \beta_7 PartA$$

Where $EXA_{ij,t}$ is value export of agriculture between country i and country j, $M_{j,t}$ is economic activity mass, $Pop_{j.t}$ is population, $Poli_{i,t}$ is political stability, $ProA_{i,t}$ is quantity product of agriculture, $X_{i,j}$ is exchange rate cost, $Oil_{i,t}$ is oil price cost, and $PartA$ is dummy variable show trade partner countries.

Thus, we expect the variable that we added more as Equation 4, which are economic activity mass, population, political stability, quantity product of agriculture and trade partner countries have positive effect on agricultural export which are economic activity mass, population, political stability, quantity product of agriculture and trade partner countries. And conversely, exchange rate cost and oil price cost expect negative effect.

3.3. EMPIRICAL MODEL

3.3.1 Determinant of industrial exports

Base on the theoretical from Equation 3 we added variables representing the other factors that influence industrial exports of Thailand to major trading partners which are US, Japan, China and Hong Kong as Equation 5.

$$lnEXI_{ij,t} = \beta_0 + \beta_1 lnRGDP_{j,t} + \beta_2 lnPop_{j,t} + \beta_3 lnPoli_{i,t} + \beta_4 lnManuf_{i,t} \quad (5)$$
$$+ \beta_5 lnX_{ij,t} + \beta_6 lnOil_{i,t} + \beta_7 ASEAN + \varepsilon$$

Where $lnRGDP$ is logarithm of real GDP of importers countries (US, Japan, China, Hong Kong), $lnPop$ is logarithm of population of importers, $lnPoli$ is logarithm of political stability of exporter (Thailand), $lnManuf$ is logarithm manufacturing value added of exporter, lnX is logarithm of exchange rate bilateral exchange rate, $lnOil$ is logarithm of crude oil price , $ASEAN$ is dummy variable of trade agreement with export industry of Thailand and ε is error term.

In this study we are not able to run cointegration because we do not have enough data which are 17 years and only 4 countries. So, we fix time series problem with the Autoregressive model as Equation 6.

$$lnEXI_{ij,t} = \beta_0 + \beta_1 lnRGDP_{j,t} + \beta_2 lnPop_{j,t} + \beta_3 lnPoli_{i,t} + \beta_4 lnManuf_{i,t} \quad (6)$$
$$+ \beta_5 lnX_{ij,t} + \beta_6 lnOil_{i,t} + \beta_7 ASEAN + \beta_8 lnEXI_{ij,t-1} + \varepsilon$$

From Equation 5, we used real GDP of importer countries ($RGDP$) proxy for economic activity mass and population in Equation 3 if country is large, it is more likely to achieve economies of scale so increase export and simultaneously possess the capacity to absorb imports according with (Nanovsky, 2018; Tharakan et al., 2005a). So, we expect positive effect of real GDP and population of importers on Thailand's export which is alternative hypothesis, while if coefficient of real GDP and population of importers is not positive, it will be null hypothesis.

For political stability ($Poli$) of exporter. By high political stability can promote export to importer countries (Munemo, 2021). Then we expect positive effect of Thai political stability to export, which is alternative hypothesis, while null hypothesis of political stability not positive. Next, manufacturing value added ($Manuf$) we use proxy for quantity product of manufacturing. Which if richer ore resource endowment will be more likely to export so expect positive effect (Zheng et al., 2017) it is alternative hypothesis, but null hypothesis of output of manufacturing not positive.

Exchange rate (X) and Oil price (Oil) we proxy for exchange rate cost and oil price cost relatively. There are is total cost for export so we expect negative effect to export (Kumar et al., 2010) is alternative hypothesis, while null hypothesis of total cost not positive. And ASEAN member is dummy variable which is trade agreement in ASEAN group where 1 is member of ASEAN, 0 is otherwise. So, we use to proxy for trade partner countries because. If trading partners of industrial export is member

trade agreement in ASEAN be 1 is alternative hypothesis, while null hypothesis is trading partners of industrial export not be member trade agreement in ASEAN will be 0 (Nguyen et al., 2016).

3.3.2 Determinant of agricultural exports

Base on the theoretical from Equation 4 we added variables that representing the other factors that influence agricultural exports of Thailand to major trading partners which are Japan, China, US and Malaysia as Equation 7.

$$lnEXA_{ij,t} = \beta_0 + \beta_1 lnRGDP_{j,t} + \beta_2 lnPop_{j,t} + \beta_3 lnPoli_{i,t} + \beta_4 lnAgri_{i,t} \qquad (7)$$
$$+ \beta_5 lnX_{ij,t} + \beta_6 l + \beta_7 ASEAN + \varepsilon$$

Where $lnRGDP$ is logarithm of real GDP of importers countries (US, China, Japan, Malaysia), $lnPop$ is logarithm of population of importers, $lnPoli$ is logarithm of political stability of exporter (Thailand), $lnAgri$ is logarithm agriculture value added of exporter, lnX is logarithm of exchange rate bilateral exchange rate, $lnOil$ is logarithm of crude oil price, $ASEAN$ is dummy variable of trade agreement with export agriculture of Thailand and ε is error term.

But in this study, we are not able to run cointegration because we do not have enough data. So, we fix time series problem with Autoregressive model followed as equation 8.

$$lnEXA_{ij,t} = \beta_0 + \beta_1 lnRGDP_{j,t} + \beta_2 lnPop_{j,t} + \beta_3 lnPoli_{i,t} + \beta_4 lnAgri_{i,t} \qquad (8)$$
$$+ \beta_5 lnX_{ij,t} + \beta_6 lnOil_{i,t} + \beta_7 ASEAN + \beta_8 lnEXA_{ij,t-1} + \varepsilon$$

From Equation 7 we proxy real GDP ($RGDP$) and population (Pop) of importers for economic activity mass and population in Equation 7 responding with Chen (2015) found that increases, supply of goods and services increases with more export opportunities. So, we expect positive effect of real GDP and population of importers on Thailand's export which is alternative hypothesis, while coefficient of real GDP and population of importers is not positive, it will be null hypothesis. Political stability ($Poli$) of exporter proxy for trade policy which follow with Munemo (2021) found that political stability promote export to importer countries. And expect positive effect to export so is alternative hypothesis, but political stability not positive is null hypothesis.

Agriculture value added ($Agri$) of exporter we proxy for quantity product of agriculture. In this variable we expect positive effect is alternative hypothesis, but agriculture value added not positive is null hypothesis. Due to increase agriculture value added is net products can increase agriculture export (Ghazalian, 2019). Next, Exchange rate (X) and crude oil price (Oil) of exporter country proxy for exchange rate cost and oil price cost. By we expect negative effect on agriculture export its alternative hypothesis, but total cost not positive is null hypothesis. Accord with Bougheas et al. (1999) found the cost for export goods can reduce export. And ASEAN member ($ASEAN$) is dummy variable where 1 is member of ASEAN, 0 is otherwise. We use to proxy for trade partner countries due to trade agreement of

ASEAN is facilitate for member in group (Nguyen et al., 2016). If trading partners of agriculture export is not member trade agreement in ASEAN will be 0 is null hypothesis, while trading partners of agricultural export is member trade agreement in ASEAN be 1 it is alternative hypothesis.

CHAPTER 4

RESULTS AND DISCUSSION

This study uses gravity model to measure value export between two countries which separate measure export of industrial and agricultural sectors of Thailand estimate by Autoregressive model. It's the export industrial and agricultural from Thailand to trading partner countries in period during 2002 to 2019. And the results will show the Table 9 and Table 10.

Table 9 *Results of the factors impact on value export of industry.*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$lnRGDP$	0.317141	0.087718	3.615462	0.0006***
$lnPop$	-0.291859	0.164267	-1.776728	0.0808*
$lnPoli$	0.041306	0.031334	1.318250	0.1925
$lnManuf$	0.645857	0.075357	8.570632	0.0000***
lnX	0.257977	0.130880	1.971087	0.0534*
$lnOil$	0.131508	0.030772	4.273685	0.0001***
$ASEAN$	1.157673	0.542701	2.133169	0.0371**

Table 9 *(Continue) Results of the factors impact on value export of industry.*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$InEXI_{t-1}$	0.656391	0.063465	10.34259	0.0000***
Durbin Watson	1.647335			
R^2	0.988451			
Adjusted R^2	0.986885			
Number of observations	68			

Notes: All variables are in log. (***), (**) and (*) denote significance at the 1%, 5%

and 10% levels, respectively.

Table 10 *Results of the factors impact on value export of agriculture.*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$lnRGDP$	0.601256	0.115401	5.210155	0.0000***
$lnPop$	-0.265045	0.086720	-3.056340	0.0034***
$lnPoli$	0.034232	0.037233	0.919411	0.3616
$lnAgri$	0.406289	0.070393	5.771733	0.0000***
lnX	0.206967	0.066511	3.111753	0.0029***
$lnOil$	0.137433	0.042097	3.264688	0.0018***
$ASEAN$	1.218950	0.343867	3.544828	0.0008***
$InEXA_{t-1}$	0.552227	0.079620	6.935806	0.0000***
Durbin Watson	1.750337			
R^2	0.984722			
Adjusted R^2	0.982650			
Number of observations	68			

Notes: All variables are in log. (***), (**) and (*) denote significance at the 1%, 5% and 10% levels, respectively.

Table 11 *Comparison the results between the factors impact on value export of*

industry and agriculture.

Variable	Export industry	Export agriculture
$lnRGDP$	0.317*** (0.088)	0.601*** (0.115)
$lnPop$	-0.292* (0.164)	-0.265*** (0.087)
$lnPoli$	0.041 (0.031)	0.034 (0.037)
$lnManuf$	0.646*** (0.075)	-
$lnAgri$	-	0.406*** (0.070)
lnX	0.258* (0.131)	0.207*** (0.067)
$lnOil$	0.131*** (0.031)	0.137*** (0.042)
$ASEAN$	1.158** (0.543)	1.219*** (0.344)
$InEXI_{t-1}$	0.656*** (0.063)	-
$InEXA_{t-1}$	-	0.552*** (0.080)

Table 11 *(Continue) Comparison the results between the factors impact on value export of industry and agriculture.*

Variable	Export industry	Export agriculture
Durbin Watson	1.647	1.750
R^2	0.988	0.985
Adjusted R^2	0.987	0.983
Number of observations	68	68

Notes: the number outside parenthesis is coefficient while number inside parenthesis is standard error. All variables are in log. (***), (**) and (*) denote significance at the 1%, 5% and 10% levels, respectively.

The results from Table 11 the real GDP of importer countries in industrial exports and agricultural exports has significant positive effect on export of exporter country. Which our result from study found that real GDP of importers effect on agricultural export of Thailand more than industrial export of Thailand. Because in Thailand agricultural product for export is final goods consume by consumers of partner countries. But exporting industrial products is the intermediate goods consume by factories or entrepreneur (Bank of Thailand, 2021). As you can see that we said before, China is importer who drive agricultural product in Thailand. Especially, China is large country that have the most consumers in the world,

(Statista, 2021) So, with those reasons, it correspond with our result that real GDP of importers impact on agricultural export of Thailand because US, China and Japan are large purchasing power in The world.

Population of trading partners has significant negative effect to both export sectors. Because population size cannot be predicted a priori since its coefficient can reflect economies of scale in production or specialization through a greater division of labor (Gould, 1994; Tharakan et al., 2005b) so, population size maybe affect or not depend on type of export. For Thai's political stability of our finding not significant on both export sectors. By similar with Potelwa et al. (2016) also found political stability of our finding not significant to South Africa's Agricultural Exports to World Markets.

The result manufacturing output of industrial sector and agricultural output of agricultural sector in Thailand significant positive effect. We found that manufacturing output of Thailand affect exporting in domestic more than in term of agricultural in Thailand. Because mostly of agricultural sector is produce for consume in domestic. However, agricultural sector of Thailand still low development for agricultural technology. So, it make agricultural of Thailand are replaced by the world's major agricultural producers or even slower than neighboring Asian countries (The Bank of Thailand, 2021). However, manufacturing output of industrial sector of Thailand has more impact than agriculture sector. Accord with the information of FDI inflow of

industrial goods in Thailand hold 97.53 percent from total FDI inflow in Thailand (Board of Investment, 2020).

Moreover, our finding shows exchange rate has significant positive effect on industry export. It found that exports increase as real effective exchange rate rises. Although seemingly contrast at first sight, but the observation actually makes sense for Taiwan's electronics industry (Chen et al., 2020) because high exchange rate can promote the high economy. Next, variable is crude oil price of exporter has significant positive effect but not affect a lot for industry and agriculture export which accord with Nguyen et al. (2016)

Another variable is ASEAN trade agreement, in Thailand this variable also similar in industry and agriculture export. According to Rahman et al. (2019b) who state ASEAN has effect on export less than other trade group so not significant on export Bangladeshi Textile and Clothing Industries. However, ASEAN trade agreement with Thailand have impact on export of Thailand because trade partners in ASEAN trade agreement with Thailand are China Japan and Malaysia. However, without ASEAN, trade agreement with Thailand are only two countries which are US and Hong Kong. So, our result show that the more of trade member can increase export.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

The objective of this study is to know the determinants that affect to industry and agriculture export and how these determinants have different effect on industry and agriculture export. In this study we study from trade partner countries with industrial export and agricultural export from 2002 to 2019. So, the result of industrial export and agricultural export have differed in those industries. For instant, the structure of production about industrial export mechanical use. And agricultural product have depend on natural resources etc.

The results represent the factors that effect on export industry including are real GDP of importer, amount of population in the importer, manufacturing value added of exporter, crude oil price, exchange rate and member of ASEAN. And the factors that effect on export agriculture including are real GDP of importer, amount of population the importer, agricultural value added of exporter, crude oil price, exchange rate and ASEAN. From our study we found that two determinants impact both sectors differently.

These is the determinants that different between industry and agriculture export are real GDP of importer countries and industrial products and agricultural products of Thailand. So, the determinants of agricultural exports differ to those of industries is manufacturing output impact Thailand industrial export with partners. while real GDP of importers are impact on Thailand agricultural export with partners. However, other factors also effect on industrial export and agricultural export which are population, exchange rate, crude oil price and ASEAN trade agreement with Thailand with the similar effect.

The situation of COVID-19 pandemic impacts on the global economy as well as international trade. Because COVID-19 pandemic affects to supply chain in the world (Bank of Thailand, 2020). The pandemic situation can make exports of regional countries and Thailand contracted sharply in the second quarter of 2020. In May, Thai exports shrank by 23 percent compared to the fourth quarter of 2019. While Thai exports had already recovered by around 50 percent from the bottom and registered a 12 percent contraction in July compared to the fourth quarter of 2020. Moreover, they remained much lower than the pre-pandemic level compared to most countries in the region (Bank of Thailand, 2020).

Thai exports were still the recovery of slower than that of regional countries due to the structure of Thai exports was concentrated in the product segments and the markets that were slow to recover such as automotive, machineries and equipment compared to other countries in the region. As they were high-value

products, their demand declined in line with a collapse in global demand because of the COVID-19 pandemic make people who don't have enough purchasing power. Resulting in the exporting of automotive contracted by 21 percent compared to the fourth quarter of 2019 – worse than other product categories and regional countries. Which Thailand is the exporter country get affect from declining supply chain(Bank of Thailand, 2020).

For agriculture exports also affect from this pandemic because many countries in the world have Lock Down country, even Thailand has close the restaurant and lower demand for food because of the fall in tourism have impacts on domestic producers, as will lower wages and salaries due to unemployment and shorter working hours (UNICEF, 2020). And other countries be similar with Thailand. Therefore, Thailand has value exports decrease because demand of Thai's food products of also decrease.

So, boosting the competitiveness of Thai exports was therefore of critical importance especially the multilateral agreements, improving necessary infrastructure, and ensuring technology adoption particularly for SMEs. Moreover, both business models and products should be adjusted to suit the post-COVID environment, in order to increase participation in the global supply chain and enhance competitiveness of Thai exports sector in the future (Bank of Thailand, 2020).

5.2 POLICY RECOMMENDATIONS

From this study, studying the factors affecting the exports of both agricultural and industrial products in Thailand. Which this study gets two results that different between export industry and agriculture. So, the government or policy makers can use these results to apply for set the policy maybe improve policy or amending existing policies to increase value export of Thailand to other partners.

The first result is real GDP of importer countries affect to agriculture export this mean, if importer countries have big economy, it can make large purchasing power products of Thailand. Thus, the policy makers can look the next big economy country apart from China or US because these countries are major trade partners of Thailand already. To set the policy that according with the next big economy, Thailand can consider the successful policy that Thailand has used in 1999 to 2003 which is exports to new market policy. The results of using this policy can increased trade value from China, Middle East Countries, Neighboring Countries, South Africa Countries, South Asian Countries and European countries etc.(Department of International Trade Promotion, 2002). The policy makers can consider this policy and adjust it to match with the situation of economy in each country.

And the second result is quantity products of industrial affect to industry export of Thailand. This is the fact, because if in Thailand can more produce the products also can more exports. Which in term of more investment or more FDI in Thailand can make it possible to increase exports to other countries because investment is come into production in various products and then export to other countries. Moreover, we have ever had the policy to stimulate investment which is policy that promote investment to develop the country's competitiveness by promoting research and development, creating innovation, creating added value for the agricultural and industrial sector, service sector, and small and medium enterprises promotion as well as promoting fair competition and reducing socio-economic inequality (Thailand Board of Investment, 2014). Due to this policy, Thailand can improve it to get higher investment and production, then lead to higher quantity of industrial products of Thailand.

5.3 LIMITATION

In this study use annual data in each variable from 2002 to 2019 which is before the pandemic of COVID-19. The limitation of this study including are two limitations first, for export industrial sector and export agricultural sector which trade partners of industry sector which are US, Japan, China and Hong Kong choose to study because these countries have the highest value export of industrial export from 2002 to 2019. And similar to export agricultural sector that choose study China, Japan, US and Malaysia because the highest value export of agricultural export from 2002 to 2019 too. And second, this study uses the gravity model to measure value export between two countries and run by autoregressive model because do not have enough data in each sector which have only four countries and seventeen years, it can't run cointegration.

5.4 FUTURE STUDY

This study found real GDP of importer countries affect to agricultural export and quantity of industrial products are affect to value export of Thai's industrial products. Causing between industrial export and agricultural export are different factors determinant in export sectors of Thailand. So, in future study can find other factors besides real GDP of importer and quantity product to determinant of Thailand export for industrial export and agricultural export.

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CURRICULUM VITAE

NAME   Onnicha Singphakdee

DATE OF BIRTH   19 November 1998

EDUCATION   Master degree in applied economics