The Nexus of Logistics Performance and Trade Flows between China and Thailand

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Abstract

This study primarily aims to test how logistics performance could influence the trade flows between Thailand and China from 2007 to 2018. An insight into bilateral trade between the two countries shall be examined, but this study also provided a bird's-eye view of the trade pattern. Time series multiple regression analysis is employed to estimate the relationship between logistics performance and trades during the timeframe. The findings suggest that logistics performance is statically significant to the trade flows between Thailand and China. In contrast, other variables such as the GDP per capita, FDI outflows, Stocks traded, and Market capitalization of Thai listed companies revealed a positive correlation of trade patterns for both sides. This implied that the trade flows between Thailand and China are fundamentally dominated by logistics performance effectiveness, respectively supplemented by other external forces. Therefore, to maintain trade momentum with China, the Thai government is advised to improve the logistics performance in various conditions such as physical infrastructure, shipment process, and customs procedures to accommodate the increasing demand for the international trade, specifically from the Chinese firms. To this end, the Thai government is advised to allocate a particular budget to improve port facilities, customs clearance, real-time tracking systems, and reliability of the related service delivery. These executions would boost future trade flows and expand the one-belt-one-road economic policy from China to Asia more productively.

Keywords: Logistics Performance, Bilateral Trade, Trade Flows, Thailand and China

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Introduction

It has been evident that trade flows across the countries are primarily dominated by socio-economic factors, such as GDP growth rate, income per capita, unemployment rate, and national savings. This might be why a vast number of economists tend to emphasize these factors, particularly when it comes to examining trade flows and related commercial exchange.

In the borderless world, considering merely socioeconomic factors is inadequate as the cross-border trade in modern society is critically motivated by external and institutional forces. Integrating additional variables into the analysis is pivotal to better understanding the dynamic trade pattern across the countries. For this reason, considering the Logistic Performance Index (LPI) in the analytical equation to comprehend real-world international trade is thought-provoking. The empirical studies of (Wang, Qiu, & Choi, 2019; Su 2017; Marti, Puertas, & Garcia, 2014) contended that effective logistic performance and joint-policy implementation for logistics development alongside the trade liberalization are necessary to promote trade flows and pave the way to the realization of ASEAN economic integration (Banomyong, 2008). ASEAN countries were then recommended to remove barriers to logistics performance like an improvement of customs clearance and inspection, licensing requirements in each ASEAN country, and regulation of internal point-to-point maritime transport services in a bid to increase regional logistics arrangement and achieve the goal of ASEAN Single Shipping Market (ASSM) more visibly (Tongzon & Lee, 2016).

Nevertheless, relatively few scholarly works employ the LPI as an indicator to estimate its relationship with the trade flows at the country level in the ASEAN region. This missing link emerged in this empirical study with the primary objective of filling the literature gap by examining the relationship between LPI and trade flows in the case of Thailand and China. The researcher employs LPI as the primary variable testing its correlation with the trade flows during 2007-2018, which is set before the hit of COVID-19, to see the business as usual scenario of the bilateral trade pattern. This timing is proper and suitable to predict the future direction, especially toward the AEC 2025. The results of this work could be used as policy guidance to improve economic relations between China and Thailand for the private sector.

Objectives

- To investigate whether the enhancement of logistics performance of Thailand would result in a positive effect on the trade flows with China from 2007 to 2018.
- To propose policy guidance to further develop trade relations between Thailand and China amid the intensification of the trade war between the United States and China.

What is the Logistics Performance Index?

The Logistics Performance Index (LPI) is a benchmarking tool created by the World Bank aiming to identify challenges and opportunities concerning the logistics performance of an economy (The World Bank, 2022). This interactive tool is widely used across the business industries and is represented in the form of ranking. The data used in this ranking tool comes from a survey of logistics professionals who are asked questions about the foreign countries in which they operate. The calculation is based on the weighted average of the total scores of 5 concerning the performance of the followings six sub-components

1. **Customs:** the efficiency of customs and border management clearance.
2. **Infrastructure:** quality of trade and transport infrastructure.
3. **Ease of arranging shipments:** ease of arranging competitively priced shipments.
4. **Quality of logistics services:** competence and quality of logistics services – trucking, forwarding, and customs brokerage.
5. **Tracking and tracing:** the ability to track and trace consignments.
6. **Timeliness:** the frequency with which shipments reach consignees within scheduled or expected delivery times.

According to the World Bank, these components reflect the country's performance regarding the multi-layers of trade facilitation offered to foreign investors and business people. The capacity of logistics performance is assumed to cause the confidence and long-term prospects of business operation and international investment.

Logistic performance is significantly crucial for regional commerce in many Asia-Pacific countries, where the emergence of production networks has been most pronounced (Saslavsky & Shepherd, 2014)This involves the global logistics cities regarding infrastructure capacity and service responsiveness to develop a cluster-led strategy under China's Belt and Road Initiative (Chhetri et al., 2018). Moreover, good logistic performance could contribute to economic prosperity and development under the Silk Road Economic Belt. It was also an influential factor for a Chinese development in the future (Li Mengjie Jin & Ng, 2018). Thus, the contemplation of a strategic policy framework to foster logistics and related infrastructure is pivotal for both China and most Asia-Pacific countries.

It is widely hypothesized that a higher degree of LPI would lead to a more significant trade in goods and trade in services as a whole. Diagram 1 exhibited details of the multi-dimensional nexus among LPI sub-components that link to policy regulation and service delivery.

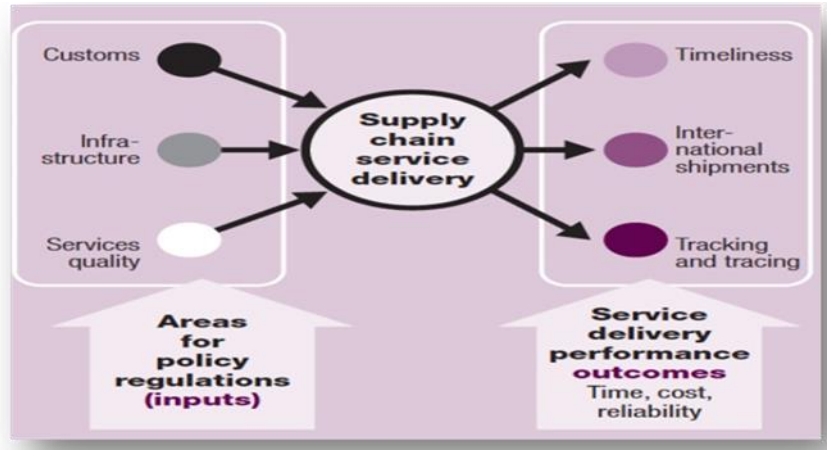

Figure 1 Inputs and Outcomes Indicators of Logistics Performance Index

Source: Logistics Performance Index, World Bank (2018)

The highlighted sub-indicators are extensively used to evaluate logistics performance across the countries. Logistic performance is posited as a positive correlation to the trade flows of an economy. This is because it helps an economy ease trading difficulties by providing

facilitation, accommodation, and physical support to various economic activities, not only the cross-border trade but also international investment and movements of the service sector.

Macro View of ASEAN-Chinese Trades

Amid intensified trading relations between the United States and China, Chinese trade policy tends to be re-directed to the ASEAN market. For instance, it critically plays a broad spectrum of economic activities, specifically trade in goods with the 6 ASEAN countries *(Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand.)* It has ranked the largest ASEAN 6 trading partner since 2010, surpassing Japan, the EU, and the United States. Trade volume between China and ASEAN rose to $327,456 million in 2017 compared to 2012 at around $271,340 million. In comparison, the trade volume with Japan, EU-28, and the United States appears to remain constant during the same period (ASEAN Secretariat, 2018). All implied the strong growth of trade between ASEAN 6 countries and China.

Table 1 Logistics Performance in Key ASEAN Countries and China (2007-2018)

Unit: the total score is 5

Year	**2007**	**2010**	**2012**	**2014**	**2016**	**2018**	**Ranking** (Based only on 2018)
China	3.32	3.49	3.52	3.53	3.66	3.61	2
Thailand	3.31	3.29	3.18	3.43	3.26	3.41	3
Singapore	4.19	4.09	4.13	4.00	4.14	4.00	1
Malaysia	3.48	3.44	3.49	3.59	3.43	3.22	5
Indonesia	3.01	2.76	2.94	3.08	2.98	3.15	6
Philippines	2.69	3.14	3.02	3.00	2.86	2.90	7
Vietnam	2.89	2.96	3.00	3.15	2.98	3.27	4

Source: World Bank, international logistics performance index (2007-2018)

According to Table 1, it is interesting to note that Singapore comes first with the highest score of 4.0, leaving behind other ASEAN economies like Thailand, Vietnam, and Malaysia for more than 0.5 average points. The figure implies the divert logistics performance across the ASEAN members, which might potentially deter the realization of ASEAN market integration in 2025.

Source: ASEAN Secretariat, ASEAN Statistical Yearbook (2018)

The trade volume between ASEAN 6 countries and China has a typical pattern with the remaining 4 ASEAN countries known as CLMV *(Cambodia, Laos, Myanmar, and Vietnam.)* More interestingly, as one of the most prominent investors in these countries, China has ranked the major trading partner since 2008, followed by the EU and Japan. The trade amount had skyrocketed from 22,301 million USD to 113,552 million USD in 2017, or around a 500% increase from the base year 2008. According to this figure, it is expected that the trade between these economies is likely to soar due to a greater ASEAN market integration and Chinese outward economic policies.

A Macro View of ASEAN-Chinese Trades

Amid intensified negative trading relations between the United States and China, Chinese trade policy tends to be re-directed to the ASEAN market. For instance, it critically exhibits a broad spectrum of economic activities, specifically trade in goods with the 6 ASEAN countries *(Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand)*. It has ranked the largest ASEAN 6 trading partner since 2010, surpassing Japan, the EU, and the United States. Trade volume between China and ASEAN rose to $327,456 million in 2017 compared to 2012 at around $271,340 million. In comparison, the trade volume with Japan, EU-28, and the United States appears to remain constant during the same period (ASEAN Secretariat, 2018). All implied the strong growth of trade between ASEAN 6 countries and China. See full details in Table 2 below:

Table 2 ASEAN 6 Trade in Goods by Trading Partners (2008-2017)

Unit: Million USD

TRADING PARTNER	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ASEAN	432,748	345,019	465,301	534,506	553,429	560,700	547,707	472,471	455,843	517,267
TRADING PARTNER	1,305,045	1,044,815	1,354,853	1,629,233	1,665,204	1,662,902	1,643,035	1,417,253	1,374,014	1,565,384
Australia	52,943	43,760	52,881	62,248	64,977	63,222	67,411	52,462	47,383	52,355
Canada	10,430	8,826	9,294	10,958	10,296	11,089	10,311	9,168	8,813	9,489
China	174,406	154,410	205,341	254,811	271,340	290,721	293,743	280,252	279,024	327,456
EU-28	153,192	155,205	184,698	213,538	211,029	209,217	207,671	184,830	182,767	203,255
India	48,323	37,961	52,786	68,988	65,808	61,555	60,805	53,442	50,833	63,993
Japan	197,436	146,521	201,462	234,032	238,017	212,769	200,298	171,221	169,366	182,245
Korea, Republic of	78,001	65,249	88,491	105,771	109,289	105,394	101,558	82,698	79,598	90,591
New Zealand	7,811	5,365	7,117	8,488	8,701	9,048	9,888	8,018	7,152	8,561
Russian Federation	9,755	6,713	10,828	14,767	15,622	17,083	19,950	11,711	9,120	13,121
USA	168,419	132,643	161,142	174,165	173,409	173,829	173,760	166,713	161,912	179,845
Rest of the World	404,329	288,163	380,813	481,467	496,718	508,975	497,641	396,737	378,046	434,474
TOTAL	1,737,793	1,389,834	1,820,155	2,163,739	2,218,634	2,223,602	2,190,742	1,889,724	1,829,857	2,082,651

Table 3 CLMV Trade in Goods by Trading Partners (2008-2017)

Unit: Million USD

TRADING PARTNER	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
ASEAN	39,079	31,960	35,573	45,808	48,928	53,706	57,129	62,910	60,733	72,960
TRADING PARTNER	124,100	116,002	137,114	177,560	200,233	240,883	270,930	320,229	348,011	418,678
Australia	120	218	4,518	5,195	5,402	5,753	5,878	5,030	5,496	6,785
Canada	296	202	1,161	1,321	1,636	1,975	2,498	3,487	3,819	4,328
China	22,301	23,639	28,955	38,291	45,644	57,603	68,901	83,245	89,670	113,552
EU-28	17,435	16,112	18,103	24,864	29,679	34,679	37,605	45,825	50,798	58,147
India	981	1,211	3,879	5,157	5,324	6,614	7,031	6,723	7,765	9,637
Japan	17,289	14,436	17,238	21,966	26,018	27,173	28,188	31,579	33,042	37,014
Korea, Republic of	312	9,473	13,253	18,632	21,686	29,006	29,367	37,869	44,857	63,089
New Zealand	17	7	488	551	582	736	811	735	747	963
Russian Federation	29	43	1,839	2,036	2,470	2,842	2,575	2,258	2,836	3,670
USA	16,784	16,025	18,077	21,713	24,678	29,298	35,531	43,870	49,895	54,424
Rest of the World	48,536	34,638	29,604	37,833	37,114	45,203	52,544	59,608	59,087	67,069
TOTAL	163,179	147,962	172,687	223,368	249,161	294,589	328,058	383,138	408,743	491,638

Source: ASEAN Secretariat, ASEAN Statistical Yearbook (2018)

The trade volume between ASEAN 6 countries and China have shared a typical pattern with the remaining 4 ASEAN countries known as CLMV *(Cambodia, Laos, Myanmar, and Vietnam)* as shown in Table 3. More interestingly, as one of the most prominent investors in these countries, China has ranked the major trading partner since 2008, followed by the EU and Japan. The trade amount had skyrocketed from 22,301 million USD to 113,552 million USD in 2017, or around a 500% increase from the base year 2008. According to this figure, it is expected that the trade between these economies is likely to soar due to a greater ASEAN market integration and Chinese outward economic policies.

A Comparative Analysis: Thai-Chinese, Thai-USA, and Thai-Japanese Trade Patterns

At the country level, apart from the long-standing political and economic relations, trade volume between Thailand and China, in comparison with Japan and the United States, disclosed the same pattern similar to the overall ASEAN-Chinese trade. The trade volume between Thailand and China has been progressively higher in recent years. To be more precise, China became the largest trading partner with Thailand in 2014, with the trading amount going up to 63,582 million USD surpassing Japan at 57,205 million USD. The trade volume between the two rose from 64,798 million USD in 2015 to $80,220 million in 2018 (Thai Ministry of Commerce, 2019). The evidence suggests that Chinese trade is essential for the Thai economy to maintain growth and competitiveness. See full details below:

Table 4: Thai-Chinese Trade (2007-2018)

Unit: Million USD

Year	2007	2010	2012	2014	2016	2018
Thai-Chinese Trade	31,072	45,711	63,990	**63,582**	**65,830**	**80,220**
Thai-Japanese Trade	46,501	58,164	72,183	57,205	51,154	60,193
Thai-United States Trade	28,910	30,878	35,306	38,470	36,541	43,010

Source: Ministry of Commerce, Thailand, and Foreign Trade Statistics of Thailand (2018)

The overall trend indicates a robust trading relationship between Thailand and China with the potential to grow further. The growing amount of trade can be assumed to be caused by China's more significant trading policy toward Asia, with an intensification of the trade war with the United States forcing China to shift the focus to the ASEAN market.

Conceptual Framework and Research Methodology

Concerning the justifications in the previous sections, the conceptual framework consists of 7 variables for the hypothesis testing; 2 factors are categorized as controlled variables: the GDP growth rate and GDP per capita, as they correspond to socio-economic factors. While the dependent variable is only one, that is the trade volume between Thailand and China. The below shows the conceptual framework for data analysis:

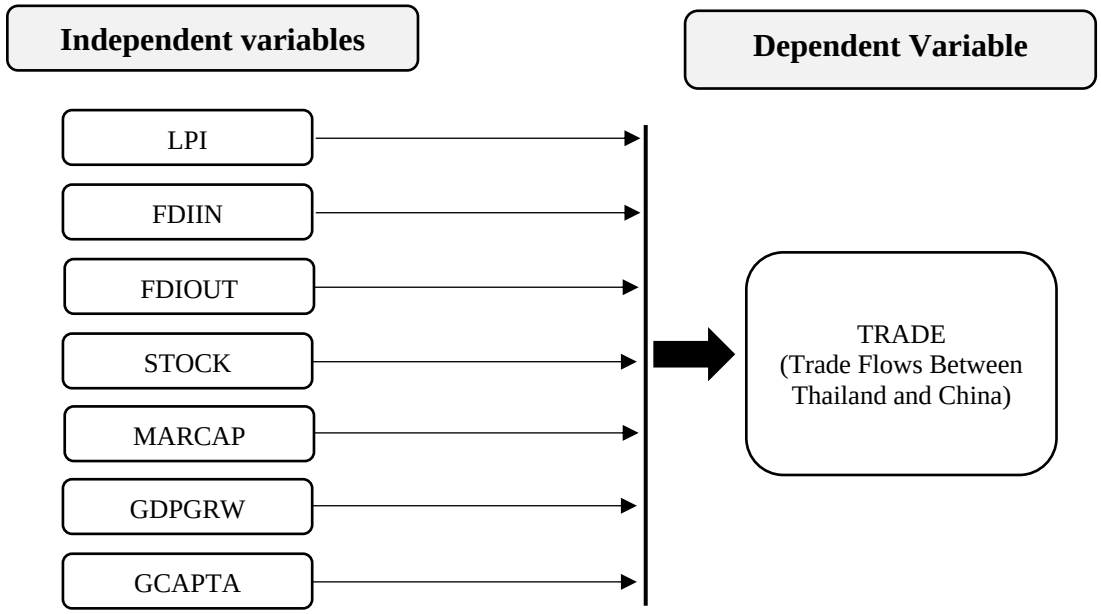

Figure 2 Conceptual Framework

This study employed the Multiple Regression Technique to estimate the relationship between a dependent variable (trade volume between Thai and China) and a set of independent variables, which are hypothesized to affect the trade flows between the two countries. See Appendix for full details on the measurement of variables and data sources.

Model specification: Multiple Regression Equation

$$Y = a + b1X1 + b2X2 + b3X3 \ldots + bnXn$$

Table 5 Signs, Details, and Symbols for Multiple Regression Analysis

Sign	Details	Symbol
Y	Trade Volume Between Thailand and China (Million USD)	TRADE
X1	Overall Logistics Performance Index (LPI) Ran	LPI
X2	FDI inflows of Thailand, Net Inflows (% of GDP)	FDIIN
X3	FDI Outflows of Thailand, Net Outflows (% of GDP)	FDIOUT
X4	Stocks Traded, Total Value (% of GDP)	STOCK
X5	The Market Capitalization of Listed Domestic Companies (%	MARCAP
X6	GDP Growth of Thailand (Annual %)	GDPGRW
X7	GDP Pcapita of Thailand (Current US$)	GCAPTA

Table 6 Empirical Results of The Regression

Independent Variable	**Dependent Variable:** Trade Flows Between Thai-China		
	Coefficients (*b*)	**T**	**Sig.**
(Constant)	-	3.626	.022
LPI	-.185	-5.364	.006**
FDIIN	.060	1.236	.284
FDIOUT	-.182	-4.198	.014*
STOCK	-.232	-3.466	.026*
MARCAP	.162	2.865	.046*
GDPGRW	-.085	-1.964	.121
GCAPTA	1.275	17.284	.000**
R Square = .999; adjusted R Square = .996; F = 427.508; p = .000; Durbin Watson = 1.469			
*statistically Significant at 0.05 level.			
**statistically Significant at 0.01 level.			

Results and Discussion

The findings revealed that the logistics performance index (LPI) is statistically significant to Thai-Chinese trade flows at the confident level of 0.01. The FDI outflows (FDIOUT,) Stocks traded (STOCK,) and Market capitalization of listed domestic companies (MARCAP) also revealed a strong association at a significant level of 0.05.

This implies the LPI is a crucial factor in bolstering the trade flows between Thailand and China during the past decades, which means effective logistics performance of a country, especially in the case of Thailand, would result in the positive effect of an increase in international trade. This is because the well-functioning of customs procedure, coverage infrastructure, speedy shipment arrangement, excellence of logistics services, and efficient tracking system in a timely manner can encourage cross-border trade and provide more confidence to investors. At the same time, other external factors such as strong FDI outflows, a high volume of stock traded, and the size of the market capitalization of listed domestic

companies are still playing a pivotal role in causing the productive impact on international trade. The government policy support to the domestic investors, promotion of domestic stock traded, and empowerment of the listed companies in the home country are considered to indirectly promote trade flows among countries. A friendlier business environment accommodated by effective logistics performance might lead to other economic activities such as trade-in services, business relocation, and capital mobility. The study of Xu et al. (2021) consolidated this finding and suggested that policymakers should consider enhancing their support to the logistics and transportation sector in China to mitigate the undesirable impact of the novel COVID-19 that vastly causes a negative effect on the logistics operations, especially in the areas of air and land freights.

Conclusion and Policy Recommendations

This present study is a country-based analysis aiming to examine the trade flows between Thailand and China from 2007 to 2018. The logistics performance index (LPI) is chosen as a primary factor to test the hypothesis of the relationship between effective logistics performance and trade flows in the case of Thailand and China. The findings suggested that the productive logistics performance and other external forces like strong FDI outflows, a high volume of stock traded, and the size of the market capitalization of listed domestic companies would positively affect trade flows between Thailand and China. To this end, the gradual improvement of logistics procedures ranging from customs clearance to promoting investment in the stock market could promote the trade volume constructively.

The government expenditure and budget allocation to develop the domestic infrastructures such as road, rail, shipment process, and relevant customs procedures are vital to stimulate international trade, especially in Thailand. The government investment in port facilities, electronic customs clearance, and real-time tracking systems is considered necessary as it could supplement the one-belt-one-road policy of China toward Asia in the future. In conclusion, Thailand is a geographical gateway to the broader ASEAN market and can serve the needs of Chinese investment in the coming years. Thus, a good foundation of logistics in all forms would be a pre-condition to promote more outstanding trade relations with China, bringing Thailand to a higher plane of competitiveness in the ASEAN market.

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