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REVISITING THE IMPACT OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH IN THAILAND

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Abstract – *Past studies have researched how foreign direct investment has played a pivotal role in stimulating Thailand's economic growth. However, Thailand's foreign direct investment inflows have exhibited huge fluctuations from 1979 until now. Empirical studies have revealed that foreign direct investment worsens and weakens current accounts, raising foreign debt. In addition, foreign firms with large influence on market shares might crowd out domestic investment. Hence, this study aimed to re-examine the impact of foreign direct investment on Thailand's economic growth in both the short and long run by employing yearly data from 1980 to 2019 using the Vector Error Correction Model and Granger Causality test. Besides, this study also investigated the impact of other determinants of economic growth, namely real effective exchange rate and trade. The empirical results revealed that foreign direct investment has positively impacted Thailand's economy in the long run. In addition, foreign direct investment emerged as the most influential variable on economic growth. Given the importance of foreign direct investment for Thailand, The Board of Investment of Thailand should implement effective policies and provide incentives that benefit foreign investors to invest in the country. In addition, the government should implement further intervention measures to improve the positive spillover effects from foreign direct investment.*

Keywords: economic growth, foreign direct investment, Granger Sausality test, Thailand, Vector Error Correction Model.

I. INTRODUCTION

Thailand is one of the founding members of ASEAN, alongside its neighboring nations Malaysia, Singapore, Indonesia and the Philippines. Based on the study conducted by Robinson et al. [1], as shown in Appendix 1, Thailand's economic growth has been impressive since the 1950s. Its GDP increased an average of 5.2% in the 1950s, and by adopting a comprehensive industrialization strategy in the early 1960s, GDP growth surged to an average of 7.2%.

In the 1960s and 1970s, Thailand was among the fastest developing non-industrial nations in the world. This situation was noteworthy because of the country's rapid development, the incredible enhancements, and programs alleviating neediness, especially during the 1970s. However, during the 1980s, Thailand's economic growth slowed, partly attributable to the worldwide recession. Referring to Appendix 2, the GDP growth rate of Thailand started to drop in 1979. It dropped significantly from 10.296% in 1978 to 5.372% in 1979. The decreasing trend continued until 1985 with a rate of 4.647%.

On the other hand, according to the World Bank [2], from 1986 to 1989, foreign currency inflows to Thailand increased by 400%. The pace of investment picked up as foreign investors discovered the potential markets of Southeast Asia. As the Thai Baht was pegged to the US dollar, offering opportunities for higher rates of return, foreign investors figured out that Thailand was an attractive investment destination. Therefore, the government of Thailand opened up an international banking facility in Bangkok to attract more foreign investors and make it easier for them to invest in the country. As illustrated in Appendix 3, Thailand had the highest foreign direct investment (FDI) inflows of 15.936 billion US dollars in 2013 but dropped to 4.817 billion US dollars in 2019. This situation was due to South-East

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Asia's ongoing supply chain and manufacturing disruptions. Greenfield investments and the divestment of Tesco (a major UK-owned retailer) in the country to a local Thai investor are also key reasons affecting the decline of FDI net inflows in Thailand.

The government introduced Thailand's Board of Investment (BOI) to administer packages of investment incentives. It was designed to promote import-substituting industries, and the role of the public sector was limited and narrowed down to providing infrastructure. This strategy was backed by traditional financial policies, which had been introduced decades before, and the government deficit had an average of less than 2% of GDP, while monetary growth was narrowed to between 10% and 15% every year. Although there were some changes in the par value, the Thai baht exchange rate was linked with the US dollar starting from 1963. It limited and restricted foreign ownership in resource-based projects, services and manufacturing in domestic markets. Conversely, the BOI has lessened restrictions over the past few years. It is currently undertaking policies and measures to help expand projects from investors, develop new greenfield projects and encourage foreign direct investment in the country.

However, some studies have indicated a negative relationship between FDI and economic growth. Mencinger [3] stated that several conditions may induce FDI to slow down or hinder economic growth. For example, FDI tends to worsen and weaken current accounts, and rising foreign debt jeopardizes a country's economic growth, especially when there is an escalation in foreign investment that is politically motivated. Omran et al. [4] found that FDI could adversely affect economic growth if foreign firms have a large influence on market shares which may result in the crowding out of domestic investment.

In contrast with these negative views of FDI, there have also been positive views of FDI and economic growth. According to Shaari et al. [5], FDI is a method by which companies and corporations can obtain a strong occupancy in foreign markets through asset-receiving activities from other nations. In other words, FDI is an international investment activity conducted by overseas investors to increase returns, have larger markets, and enjoy economies of scale. Although the pattern of FDI has changed over time, it has persisted and continues to be a crucial tool to develop economic growth.

Likewise, Sarbapriya [6] revealed that an increase in FDI would lead to economic growth, which was proxied by the GDP. However, only a few empirical studies have found strong evidence to support this theory. Besides, Blomstrom et al. [7] argued that the relationship between FDI and the GDP had not been completely confirmed, with some disagreeing that the relationship would differ based on each country's development level. Moreover, a study from Maheswari [8] also found that countries with higher economic growth tended to capture more foreign investments from overseas investors. This situation was because the economies of developing nations have optimum utilization of resources compared to less developed countries, which benefits investors and the country itself.

On the other hand, Borensztein et al. [9] signified that FDI was a pivotal factor in moving innovation, as FDI had caused more foreign investment to increase economic growth in contrast with domestic investment. For the most part, as expressed by Marwah et al. [10], the relationship between economic growth and FDI depends on the size of a country's economy and the volume of investments collected from overseas investors and organizations, leading to a conclusion that the GDP has a positive relationship with FDI inflows. As a result of the conflicting views on the relationship between FDI and economic growth, it is necessary to revisit the impact of FDI on economic growth in Thailand using the latest data, as the economic landscape has changed over time.

II. LITERATURE REVIEW

The relationship between economic growth and FDI has been a popular topic debated by many researchers for decades. Some researchers have argued that there is a positive relationship between the two variables. According to Haller [11], a nation can create rapid economic growth when businesses and individuals have the power

and vision to arrange their activities for the long run, which needs political and monetary stability. The results and outcome of economic activities rely on efficient use of resources in the industries, on efficient labour and others; investments are not easily deducted due to high consumption. When current incomes can be reused for other purposes, the productive capital increases, thus the real incomes will also increase; the degree of education and civilization rises and generates good results; and any opinion that takes the protection and conservation of eco-system in consideration.

When a country's FDI increases, it will provide more advanced technology for domestic companies and therefore creating more employment opportunities. Thus, it can be conlcuded that the increase of FDI reduces the poverty rate via technology transfer. Besides, , it also create more positive effect on a nation's exchange rate and improve its trade performance. This arguments are supported by past studies. For instances, Sumner [12] emphasised the importance of FDI on investment capital through the net effect of the capital account and concluded that net positive transfers on the financial account could increase investment opportunities, resulting in greater economic growth. Nevertheless, Aghion et al. [13] noted that it is vital to examine the relationship between exchange rate volatility and the level of financial development, as well as the nature of economic shock. They found that exchange rate volatility consistently affects the economic growth in countries with thin capital. Miles [14] also stated in his research that the exchange rate, as the financial variable, could positively affect long-term economic growth. Moreover, according to research by Seyoum [15], trade is the exchange of goods and services from one nation to another. It has been proven that exports and imports can enhance the economic growth of many countries, especially developing countries.

Borensztein et al. [9] completed a study involving 69 developing countries to demonstrate whether there was a positive association between FDI and the country's economic growth. They utilised a seemingly unrelated regression technique (SUR) for this postulation. After running the tests with the SUR method, they discovered that FDI had undoubtedly influenced the countries' economic development. In any case, it relies upon the countries' human resources. FDI had a high productivity effect on a country's economic growth when a country had a minimum threshold stock of human capital. FDI led to economic growth with the support of productive human capital.

Besides FDI, Abu Dalu et al. [16] examined the relationship between macroeconomic components and real output growth among the ASEAN-5 economies. The Autoregressive Distributed Lag (ARDL) approach and the cointegration test was used to measure the impact of the Real Effective Exchange Rate (REER), the domestic interest rate, the inflation rate, money supply and other factors concerning economic growth. After their examination with the ARDL approach and the cointegration method, they found that the domestic money supply was the principle variable influencing the real GDP, joined by the REER, which affected the sampled nations' real GDP. Levy-Yeyati et al. [17] examined the relationship of exchange rate regimes with the economic growth of 183 countries using yearly data that consisted of 26 observation samples. They applied a de facto classification of regimes based on the actual behaviour of the relevant macroeconomic variables. The regression results implied that less flexible exchange rate regimes were strongly associated with slower economic growth and had greater output volatility among developing countries. On the contrary, exchange rate regimes did not significantly impact the economic growth of industrial countries.

Lastly, Bouoiyour indicated [18] a positive relationship between trade and economic growth in Morocco from 1960 to 2000. He applied cointegration and the Granger Causality test to determine the nexus between the variables. The results showed that imports and exports Granger caused GDP while imports Granger caused exports. On the other hand, Sarkar [19] examined whether there is a positive relationship between trade and economic growth in India and Korea by applying the ARDL approach and cointegration. The results showed no relationship between trade and economic growth in India and Korea.

III. RESEARCH METHODS

Theoretical framework

According to Romer [20], the new growth model theory revealed that economic growth was affected by two important points: human capital and technological changes. The growth hypotheses and the FDI and economic growth hypothesis reveal that FDI is the main factor contributing to high economic growth through immediate and indirect effects. The formula below shows the function of the endogenous growth model [21]:

$$\Delta A = F(KA, HA, A)$$

where:
ΔA: The increase in technology
F: The production function of technology
KA: Capital investment on technology
HA: Human capital
A: Current technology

In addition to the endogenous growth model, this study also adopted the exogenous growth model because it contains the FDI variable. Solow [22] introduced this model and believed that economic growth was achieved by compiling exogenous production components, for example, capital and labour. The formula below shows the function of the neo-classical growth model [23]:

$$Y = AF(K, L)^4$$

where:
Y: Gross Domestic Product
K: Capital
L: Number of unskilled labour in an economy
A: Determinant level of Technology

Empirical model

The main aim of this study was to revisit the impact of FDI on economic growth in Thailand. This study's dependent variable was economic growth proxied by the Real GDP. Meanwhile, three economic variables: FDI, REER and TRADE, acted as the independent variables, which were selected based on the theoretical framework and past studies. This study applied annual time series data from 1980 to 2019. This result is shown via the time series model in the equation as follows:

$$RGDP = f(FDI, REER, TRADE) \qquad (1)$$

where:
RGDP: Economic growth of Thailand
FDI: Foreign direct investment inflow of Thailand
REER: Real effective exchange rate of Thailand
TRADE: Total trade of Thailand

In addition, the model above was modified as a log-linear form equation to reduce the standard deviation value. As a result, the empirical model is as follows:

$$lnRGDP_t = \beta_0 + \beta_1 lnFDI_t + \beta_2 lnREER_t + \beta_3 lnTRADE_t + \varepsilon_t \qquad (2)$$

where:
$RGDP_t$ = Real Gross Domestic Product
FDI_t = Foreign Direct Investment
$REER_t$ = Real Effective Exchange Rate
$TRADE_t$ = Trade
ε_t = Random Error Term
$\beta_0, \beta_1, \beta_2, \beta_3$ = Coefficient
t = Time Period from 1980 to 2019
ln = Natural Logarithm

Source of data

Thailand's real GDP and Trade data were derived from the World Bank database. Thailand's Foreign Direct Investment inflow was extracted from the United Nations Conference on Trade and Development (UNCTAD) database. The Real Effective Exchange Rate (REER) was extracted from Bruegel, the European Economic Think Tank. All the data collected were annual, with 40 observations from 1980 to 2019.

Test and procedures

Unit root test

The two most frequently orders of integration were integrated at level I(0) and integrated as the first difference, I(1). If, after unit root testing, the outputs show that all of the series are I(0) and stationary, the OLS model can be used to regress the output. However, the non-stationary variables can be altered and converted into stationary data by differencing d times. However, the flow of the series will become constant.

$$y_t - y_(t-1) = (1-L)_{yt} = e_t \qquad (3)$$

As a result, the model will obtain a misspecification error if the long-run effect is critical and can be seen in the model. The most popular unit root tests researchers use are the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests.

Augmented Dickey-Fuller (ADF) test

Dickey and Fuller introduced the ADF test as a successor to the original Dickey-Fuller (DF) test. To overcome the serial correlation problem, it includes a lagged differenced dependent variable and ΔY_t. These augmentations were created as the DF test has a serial correlation problem due to the assumption regarding the error terms being correlated with each other. Thus, the DF test was unsuitable for determining the present model's data stationarity.

$$\Delta Y_t = \beta_1 + \alpha t + \delta Y_{t-1} + \sum_{i=1}^{m} \theta_i \Delta Y_{t-i} + \varepsilon_t \qquad (4)$$

Phillips-Perron (PP) test

The PP test conducts the error term and analyzes the serial correlation using a non-parametric statistical method. The PP test also addresses some models' autocorrelation and heteroscedasticity problems. Moreover, the PP test will perform better than the ADF test if the sample size applied in the model is too small. The equation of the PP test is as follows:

$$\Delta Y_t = \alpha_0 + \beta Y_{t-1} + \varepsilon_t \qquad (5)$$

Johansen Juselius (JJ) test

The short-run effect must always integrate into equilibrium in the long run. Removing the trend from the variable tests the short-run dynamics. However, the long-run relationship, which has important information related to economic theory, was withdrawn to adopt this procedure. Thus, the cointegration test was essential to focus on the issue of the short-run dynamic with the long-run equilibria. The advantage of cointegration testing is that it decreases the chances of obtaining a spurious regression in the econometric model.

Vector Error Correction Model (VECM)

The VEC model is a restricted VAR requiring non-stationary variables to find its cointegration. It allows for short-run adjustment by not allowing the endogenous variables to have a long-run relationship with its co-integrating relationship. If the variables are co-integrated, this will cause an error, and this cointegration term is called the Error Correction Term (ECT). Thus, the model will have a short-run disequilibrium but make a self-adjustment back to the long-run equilibrium.

Granger Causality test

Granger Causality testing is widely used to discover whether there are relationships between endogenous and exogenous variables. The variables used must be integrated at I(1). In the present study, the test determined the Granger causal relationship between the dependent variable (RGDP) and the independent variables (FDI, REER and TO). The equation of the Granger Causality model to test the relationship between the variables can be written as:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \ldots + \alpha_i Y_{t-i} + \beta_1 X_{t-1} + \ldots + \beta_i X_{t-i} + \varepsilon_t \qquad (6)$$

$$X_t = \alpha_0 + \alpha_1 X_{t-1} + \ldots + \alpha_i X_{t-i} + \beta_1 Y_{t-1} + \ldots + \beta_i Y_{t-i} + \varepsilon_t \qquad (7)$$

IV. RESULTS AND DISCUSSION

Unit root test results

The results generated in Table 1 suggest that all data in the series were not stationary at level, as the table shows that the intercept and trend & intercept were not significant at level. However, after transforming to first order differencing, the series data was stationary and integrated at order I(1) as all variables were significant at the 1% significance level with intercept and trend & intercept. As a result, the Johansen Juselius cointegration test was implemented as the next step to verify the long-run relationship of the series.

Unit root test results

The trace and maximum eigenvalue test results for the model are shown in Table 2. The results imply that only one cointegration vector was significant at the 5% significance level for both tests. Thus, there was a long-run relationship in this model. As a result, VECM test was conducted to discover the elasticity of the independent variables.

Table 1: Unit root test results

ADF Unit Root Test				
	Levels		First Difference	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept
LRGDP	-0.5413 (0)	-2.4492 (1)	-4.4038 (0)***	-4.3419 (0)***
LFDI	-1.8441 (0)	-1.2657 (0)	-6.4627 (0)***	-6.9169 (0)***
LREER	-1.6159 (0)	-0.7145 (0)	-4.3487 (0)***	-4.8842 (0)***
LTRADE	-1.2849 (1)	-2.0417 (0)	-7.9751 (0)***	-8.0177 (0)***
	PP Unit Root Test			
	Levels		First Difference	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept
LRGDP	-0.6790 (2)	-2.1008 (3)	-4.4375 (1)***	-4.3768 (1)***
LFDI	-2.0677 (2)	-1.1817 (1)	-6.4685 (2)***	-6.9847 (2)***
LREER	-1.7314 (2)	-0.8807 (1)	-4.3505 (1)***	-4.7686 (4)***
LTRADE	-1.2063 (0)	-2.0153 (3)	-7.9696 (2)***	-8.0406 (1)***

Note: Figure in () are the lag lengths. Asterisks (*), (**) and (***) denote significant at 10%, 5% and 1% levels, respectively.

Table 2: Johansen and Juselius cointegration tests results

Trace Test: LRGDP, LFDI, LREER, LTRADE (k = 2, r = 1)			
H_0	H_1	λ-trace	95% CV
r = 0	r ≤ 1	61.6686**	47.8561
r ≤ 1	r ≤ 2	29.1945	29.7974
r ≤ 2	r ≤ 3	14.1061	15.4947
r ≤ 3	r ≤ 4	1.7086	3.8415
Maximum Eigenvalue Test: LRGDP, LFDI, LREER, LTRADE (k = 2, r = 1)			
H_0	H_1	λ-max	95% CV
r = 0	r ≤ 1	32.4741*	27.5843
r ≤ 1	r ≤ 2	15.0884	21.1316
r ≤ 2	r ≤ 3	12.3976	14.2646
r ≤ 3	r ≤ 4	1.7085	3.8415

Note: Asterisks (**) denotes significant at 5% level, k is the number of lag and r is the number of cointegration Vector.

Vector Error Correction Model (VECM) results

Based on the computed results above, foreign direct investment, real effective exchange rate and trade were all statistically significant at the 1% significance level in affecting the real GDP in Thailand. Based on the equation above, LFDI was positive and significantly impacted the LRGDP. The result shows that if foreign direct investment rose by 1%, the real Gross Domestic Product rose by 1.662%. In addition, FDI was Thailand's most influential variable for economic growth, with a coefficient of 1.662. Besides that, the table above shows that Thailand's LREER was positive and significant at the 1% significance level. This outcome indicated that when the REER rose by 1%, real Gross Domestic Product would increase by 0.0184

On the other hand, LTRADE in Thailand had a negative and significant long-run relationship with the LRGDP of the country. When trade increased by 1%, the real Gross Domestic Product decreased by 1.7101%. This result implies that trade and the GDP were negatively related. In other words, the motive of FDI in Thailand was likely to be market- rather than efficiency-seeking.

Table 3: Implied long run elacticities of normalised cointegration vector

Parameter Estimated	Constant	LRGDP	LFDI	LREER	LTRADE	ECT
Elasticities	46.2713	1.000	1.6620	0.0184	-1.7101	-0.1341
[t-statistics]			[4.7780]***	[4.2751]***	[-3.5266]***	[-3.2863]***

Note: Asterisks (***) denotes significant at 1% level.

$$LRGDP = 46.2713 + 1.662\ LFDI + 0.0184LREER - 1.7101LTRADE$$
$$(4.7780) \qquad (4.2751) \qquad (-3.5266)$$

The Error Correction Term value for this model was -0.1341. The ECT value reveals that the long-run equilibrium was adjusted by 13.41% in a year. In other words, the process for all variables to achieve equilibrium would require approximately 7.5 years.

Granger Causality test results

In the Granger Causality test, the null hypothesis can be rejected when the p-value is smaller than the 1% and 5% significance levels. The results in Table 4 indicate that the real effective exchange rate had a unilateral relationship with the real Gross Domestic Product in the short run, as the p-value was 0.0172. This situation implies that the null hypothesis of no causality between the real Gross Domestic Product and the real effective exchange rate could be rejected at the 5% significance level. The real gross domestic product and trade had a unilateral relationship with foreign direct investment as the p-values were 0.0335 and 0.0060, respectively. This situation indicates that the null hypothesis of no causality between real gross domestic product and trade with foreign direct investment was rejected at the 5% significance level and 1% significance level, respectively. On the other hand, the real Gross Domestic Product and the real effective exchange rate had a unilateral relationship with trade as the p-values were 0.0000 and 0.0009, respectively. Therefore, the null hypothesis of no causality between the real gross domestic product and the real effective exchange rate with trade could be rejected at the 1% significance level.

Dianogstic test results

The Jarque-Bera, LM, ARCH, and RAMSEY RESET test results show that the model was well structured, fitted, and had no heteroscedasticity and misspecification errors. The CUSUM and CUSUM squares tests infer that the parameters adopted in the model were stable. The results of CUSUM and CUSUM of squares for this model are illustrated in Figures 1 and 2. As a result, the estimated results were robust and reliable.

V. CONCLUSION AND RECOMMENDATIONS

The empirical results suggest that foreign direct investment, real effective exchange rate and trade significantly affected Thailand's economy in the long run. Each of the variables impacted economic growth in its way. Foreign direct investment was the most important factor affecting the country's growth. This outcome aligns with the study by Nguyen et al. [24], who concluded that foreign direct investment was important, especially for emerging and developing countries.

Considering the result mentioned above, The Board of Investment (BOI) of Thailand should implement effective policies and provide incentives that benefit foreign investors to engage in investing activities in the country. One policy should introduce and provide investment promotions to non-BOI companies seeking additional foreign equity to boost their capital. Such a policy would allow companies to produce more goods and services and engage in trade activities with foreign countries to increase Thailand's trade volume and economic growth.

At the same time, the government should pursue selective intervention measures by improving the positive spillover effects from foreign direct investment. It would be an important platform to encourage competitiveness and revamp industry. Besides, support from the government in innovative programs for foreign investors could be very effective in guiding foreign investors' financial and technical resources. Thus, the government should also focus on these activities as they are associated with positive externalities.

Table 4: Granger Causality test results

Dependent Variable	x^2-statistics				ECT	
	ΔLRGDP	ΔLFDI	ΔLREER	ΔLTRADE	coefficient	t-statistics
ΔLRGDP	-	3.9018 (0.1421)	8.1203 (0.0172)**	3.0231 (0.2206)	-0.1341	-3.2863
ΔLFDI	6.7952 (0.0335)**	-	1.4802 (0.4771)	10.2260 (0.0060)***	-0.0937	-1.092
ΔLREER	1.1782 (0.5548)	1.0320 (0.5969)	-	2.2253 (0.3287)	-5.3846	-1.5118
ΔLTRADE	41.7432 (0.0000)***	3.9451 (0.1391)	14.0337 (0.0009)***	-	0.2294	2.9938

Note: Asterisks (***) and (**) denote the significance at the 1% and 5% levels, respectively. Δ is the first different operator.

Table 5: Diagnostic and stability test

Diagnostic Test	F-statistics (p-value)
JB	1.8078 (0.4050)
AR [2]	0.3192 (0.7298)
ARCH [1]	1.1514 (0.2908)
RESET [2]	0.4511 (0.5080)
CUSUM	Stable
CUSUM^2	Stable

Note: Asterisk (**) denotes the significance at the 5% significance level. JB is the Jarque-Bera statistics for testing normality. AR [13] and ARCH [16] are the Lagrange Multiplier test of 2^{nd} order serial correlation and 1^{st} order ARCH effects. RESET [16] refers to the 1^{st} order RAMSEY RESET specification test. CUSUM is the cumulative sum of the recursive residual stability test, and the CUSUM square test is the cumulative sum of the squares of the recursive residual stability test.

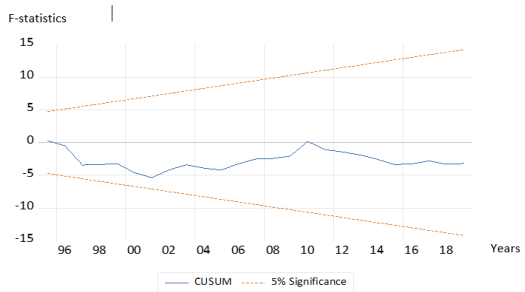

Fig. 1: CUSUM result

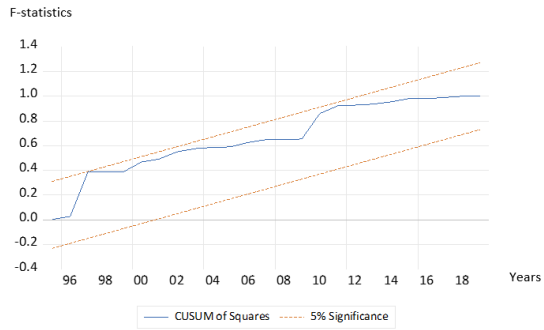

Fig. 2: CUSUM^2 result

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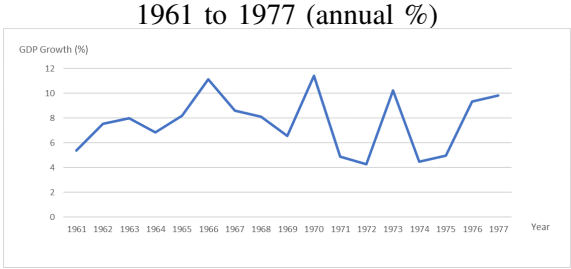
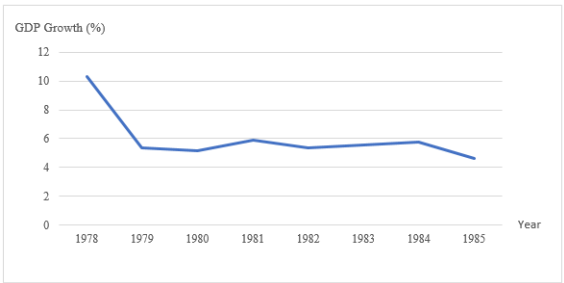
APPENDIX

Appendix 1: GDP growth of Thailand from 1961 to 1977 (annual %)



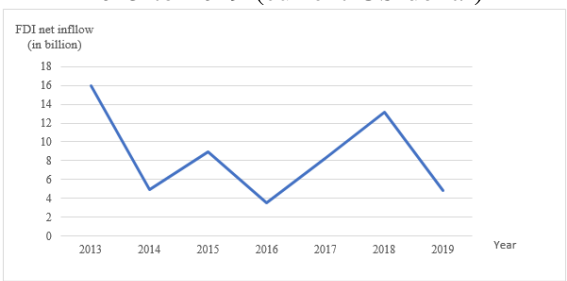
Source: World Bank database

Appendix 2: GDP growth of Thailand from 1978 to 1985 (annual %)



Source: World Bank database

Appendix 3: FDI net inflows of Thailand from 2013 to 2019 (current US dollar)



Source: World Bank database