

DOES OIL PRICE AND TRADE OPENNESS NEXUS ALONG WITH FOREIGN DIRECT INVESTMENT HAVE INFLUENCE ON ECONOMIC GROWTH IN THAILAND

ZIA UR RAHMAN^{1*}, AABERA ATTA², UMER SUFFIAN AHMAD³ AND AQEELA RAZA⁴

<https://orcid.org/0000-0002-3985-2679>

zia4939@gmail.com

Department of Economics, Ghazi University
Dera Ghazi Khan, Pakistan

ABSTRACT

The objective of this research is to analyze the conceivable cointegration and direction of causality among the oil price, trade openness, foreign direct investment and the growth rate in Thailand, using the time series data from 1974 to 2018. In addition to these variables' fiscal development and inflation are also employed to observe the influence of financial openness on economic growth. Johansen cointegration test is utilized to detect long-run relationship incorporated with the vector error correction for the short-term association. Further, granger causality is utilized to determine the direction of causality among the contending variables. The outcomes of Johansen and vector error confirms the short and long-term affiliation among variables in Thailand. The coefficient of VECM (Wald test) detect the cumulative influence on the growth rate. The estimations of granger causality affirmed that oil price, inflation, fiscal development via trade, granger cause the growth rate and the fiscal development and foreign direct investment granger causes the growth rate in bi-direction and uni-direction, respectively. The study suggests, based on the impulse response function (under the consideration of the behavior of variables) government should liberalize trade openness as it fortifies the position of Thailand in the neighbored.

Key Words: Oil Price, Trade Openness, Economic Growth, Diagnostic tests and Granger Causality.

JEL codas: F13, F21, F36.

INTRODUCTION

The emerging economies possessive less stable macroeconomic policy, unembellished financial fluctuations along with the weak/lower institutional capacity, so lowering down the restriction on the boundaries for the global financial market, should assist the economy in the production and growing faster (Kim, Lin, & Suen, 2012; Rani and Kumar, 2018). The globalization assists to develop an efficient distribution of capital, enhance the risk allocation, lead to macroeconomic policy and smooth the way for the institutional restructuring, these compensations are the great blessing for

the developing economies (Rani and Kumar, 2018). The association among the trade, oil price fluctuation and foreign direct investment have acknowledged significant consideration recently, in the hypothetical and experimental literature. The traces of the groundwork have been seen in the work of the Shaw, 1973; Galbis, 1977; Kapur, 1976 and Mathieson, 1980.

Financial segment plays a key role in smoothing the economic growth by rallying saving, easing payments and trading of goods and services across the boundary. Whereas, the liberalization and the globalization totally change

the viewpoint of the manufactures and producers drastically. Moreover, both introduces the new prospect of investments and enhance the provision of capital in the international market. Consequently, this extension increases the small business and produce the job opportunity and the income. Further, many works determined that trade openness smooth the way to prosperity (Anderson & Babula. 2008; Tahir & Norulazidah., 2014).

The international trade significantly influences the trading economies because of the specialization in different goods and each country has a different factor endowment. So, both countries flourish with the international trade in a term of output and residential welfare (Murthy, Patra, & Samantaraya, 2014) along with different pathways like factor price equalization, capital accrual and more employment. The discussion and find out the association about the influence of trade openness on economic growth is the prosperous idea (Baltagi, Demetriades, & Law, 2009; Kim et al., 2010a, 2010b, 2011; Menyah, Nazlioglu, & Ruufael, 2014; Sehrawat & Giri, 2016b).

The countries with high exports having the better financial system while classical are in the favor of the free trade which indirectly enhance the productivity and the employment in the trading economies (Beck, 2002). However, Edwards (1998, Awojobi & Katircioglu 2011) say that the countries having less restrictions on trade are more benefitted from the mobilization of the latest technologies. While Chuku et al. 2011 also determines that structural adjustment policies are designed for the efficient utilization of the resources, decline the ratio of the inefficient uses and lemmatized the external economic activities and to retain the economic growth. Many researchers conduct their work in their respective countries and found that trade influence the economic growth (Chaudhry et al. 2010; Ersoy & Deniz, 2011; Sakyi, 2011).

Olayungbo, (2019) in the era of globalization, the influence of the macroeconomic and political instability spread one edge to the other. In case of price rise, oil-exporting countries are benefitted with the

appreciation of the exchange rate. trade balance and foreign reserves and vice versa in the decline in the oil price which ultimately slower the economic growth.

OBJECTIVE OF THE STUDY

This study is conducted to 1) explore the nexus among the oil price, trade openness, foreign direct investment and the economic growth; 2) to determine the associated among the variables either they are affiliated with each other both in short and in the long run scenario; 3) to determines the direction of the causality; 4) to examine the trend of the variables in the coming time frame. However, rest of the paper is comprising on theoretical framework, result and discussion and the conclusion and the suggestions, respectively.

DATA AND METHODS

The theories of the absolute and comparative cost advantage elaborate that every country has a different factor's endowment, so every country specialized in different goods and services which based the international trade. While international trade on the other side, assist to greater extent to increase the welfare and prosperity of both nations (Murthy, Patra, & Samantaraya, 2014). On the contrary, Beck (2002) says that the country having the better financial system has a greater share in the export and trade credit. However, the classical were in the favor of the free trade and in the support of free trade between the trading countries subject to attain the maximum production and the employment (Salvatore, 2010).

This work follows the model design by the Adedayo Emmanuel Longe et al, (2019), which is based on the Babatunde (2015), incorporated with the variables such as GDP per capita (GDPPC), trade openness (Trade), oil price (OP), inflation (Inf), financial development (FD), foreign direct investment (FDI) and the gross fixed capital formation (GFCF). The model is expressed such as



GDPPC = Trade + OP + Inf + FD + FDI + GFCF (1)

Time series data is collected from the World Development Indicator, which is comprises on the time frame of 1974 to 2019. The first study used the augmented Dickey Fuller (ADF), 1979 and Philip-Perron test (PP), 1988-unit root test. The beauty of Philip test is its strength to capture the heteroscedasticity in the model and ability to detect the level of auto-correlation. The test Dickey–Fuller comprises on the suitable regression model.

$$\Delta y_t = \rho y_{t-1} + \mu_t \tag{2}$$

However serial co relation creates a problem. To address this issue augmented Dickey–Fuller method contains the past values of the first differences of y_t .

$$y_t = \pi y_{t-1} + (\text{constant, time trend}) + \mu_t \tag{3}$$

This test not only detects the heteroscedastic in the data, but it also resolves the problem of serial correlation of any level. The Phillip – Perron test involves fitting the regression in the AR (I) procedure ...

$$\Delta y_{t-1} = \alpha_0 + \lambda y_{t-1} + \mu_t \tag{4}$$

Although ADF technique resolve the issue of any level's auto- correlation while considering the lagged value on the independent side. The Philip test makes a correction to the t-value. Although, if the factors are connected each other by one order, then the Johansen (1991) co-integration technique is employed, to distinguish the presence of long-run affiliation between the gross domestic product and the resource inflows. In the equation the number of cointegration explains the long-term association. The Johansen test of co-integration is comprising on Trace-value and Max-Eigen value, which express equationally such as...

$$Y_t = \lambda_0 + \lambda_1 Z_t + \mu_t \sim I(1) \tag{5}$$

$$X_t = \sigma_0 + \sigma_1 Z_t + \varepsilon_t \sim I(1) \tag{6}$$

While, $Z_t \sim I(1) \dots \dots \mu_t, \varepsilon_t \sim I(0)$

At 1st difference both equation (i) and (ii) have zero mean and constant variance, while ε_t & μ_t are stationary at I(0) (level) and auto-correlation exists there. That's the pre-requisite for the next technique which is utilized to capture the long-run association between the factors of the research known as the Johansen Co-integration methodology. Under the consideration of the number of independent linear combinations 'k' for a 'm' time series can be measured by co-integration, which the next step of stationary method.

$$X_{1,t} = \alpha_1 + \gamma_1 Z_{1,t} + \gamma_2 Z_{2,t} + \dots + \gamma_p Z_{p,t} + \varepsilon_{1,t} \tag{7}$$

$$X_{2,t} = \alpha_2 + \phi_1 Z_{1,t} + \phi_2 Z_{2,t} + \dots + \phi_p Z_{p,t} + \varepsilon_{2,t} \tag{8}$$

$$X_{m,t} = \alpha_m + \varphi_1 Z_{1,t} + \varphi_2 Z_{2,t} + \dots + \varphi_p Z_{p,t} + \varepsilon_{m,t} \tag{9}$$

The Johansen co-integration comprises on the two tests like the trace test

$\lambda \text{trace}(r) = -T \sum_{i=r+1}^n \ln(1 - \lambda_{r+1})$ And the second is maximum eigenvalue test $\lambda \text{max}(r, r+1) = -T \ln(1 - \lambda_{r+1})$. Both contain alike hypothesis i.e. presence of co-integration. The hypothesis of trace test is given below:

$$\begin{aligned} H_0 : N = N_0 \\ H_A : N > N_0 \end{aligned}$$

It explains the number of linear arrangements i.e. T is equal to the T0. While HA elaborates the number of linear arrangement T is greater to the T0. Maximum eigenvalue test hypothesis is presented below:

$$\begin{aligned} H_0 : A = A_0 \\ H_A : A = A_0 + 1 \end{aligned}$$



However, the null hypothesis of Max-eigen value is alike to the trace, but difference is in the alternative hypothesis which states more than one combination. We know that if $\mu_t \sim I(0)$ in two series like Y_t and X_t then the relationship can be expressed in the VECM framework...

$\Delta y_t = a_0 + b_1 \Delta X_t + \pi \mu_{t-1} + Y_t$ Whom contain the information about long-run and short-run, here b_1 is the short-term effect that capture the direct influence of X_t will have on a change in Y_t . While π explains the summary of the adjustments of disequilibrium which were present.

The fascinating point of ECM to be noted if two elements are (X, Y) interlinked this test express long-term as well as short-term fluctuations. The reason is $Y_{t-1} - \beta_0 - \beta_1 X_{t-1}$, which capture the long as well as short-run equilibrium seized by the differenced term. It is known that if all term in VECM is stationery, then OLS will be effective, because if Y, X are co-integrated of order 1 then the Δ of (X,Y) both factors will be 0 [I(0)]. It is stated earlier that if X and Y are associated then the linear arrangement $Y_{t-1} - \beta_0 - \beta_1 X_{t-1} \sim 1(0)$. Moreover, $\pi = 1 - \alpha_1$ articulates the statistics of the variable towards equilibrium. Because when long-run scenario exists then $Y_{t-1} - \beta_0 - \beta_1 X_{t-1} = 0$.

Now, we move to our prediction technique, on which bases the study can predict the future behavior of the variables, which is widely known as the Vector Auto regressive technique (VAR). It's the beauty of the VAR technique that it deals all the variables on the same line there is no endogenous and exogenous variable in the model. Before estimation of such models, it is necessary to make the system identified. This can be achieved by setting all the variables in an equation. Sims (1980) claims that in a set of variables if simultaneity exists then all the variable in the set should be treated on the same ground, no difference should be there among the variables. Because some variables are

endogenous and exogenous in a model to resolve this problem Sims developed the VAR technique. So that every variable should be treated on the same line. The term auto regressive is because of the appearance of the lags on the right side of the equation. However, based on some underlying theory, it is thought that random term is independent and also explains the structural change in the model. The 1 show the previous value which starts from $\sum_{l=1}^{\infty}$. The system of simultaneous equations in VAR model is given below.

$$\text{GDPPC} = a_{10} - \beta_{12}\text{Trade} - \beta_{13}\text{OP} - \beta_{13}\text{Inf} - \beta_{13}\text{FD} - \beta_{13}\text{FDI} - \beta_{13}\text{GF} - a_{11}\text{GDPPC}_{it} - a_{12}\text{Trade}_{it} - a_{13}\text{OP}_{it} - a_{14}\text{Inf}_{it} - a_{15}\text{FD}_{it} - a_{16}\text{FDI}_{it} - a_{17}\text{GF}_{it} - \mu_{it}$$

Likewise, with all the other variables, we can develop a system of equations. Where μ are the error term, called shocks or the impulse in term of VAR. however, VAR is appropriate model for forecasting future. It presents the realistic picture as compare to other models. It is better than other model because of its empirical fitness and simplicity. Further, it ignores the problem of endogeneity. In VAR all the variables are treated indifferently, and it deals with simultaneity in variables. Since, the estimation obtained by VAR are difficult to interpret so, some researchers often take the help of the varying technique known as the Impulse response function (IRF) because it finds out the shock which is generated by the variable and then the shock pass through the whole system of equation.

This method or technique elaborates the response of a variable when it creates a wave in the stabilized economy. Then all the other variable attains the shock created by a specific variable and try to remain equilibrium point or move towards the equilibrium. According to the Han (2011) the impulse response is important as it is considered a specific technique to analyze the dynamic time series and most important part of it, is that dynamicity/change of the variables also explains the future behavior of the variable in the system.



Let suppose, X_t be the K dimensional vector series.

$$X_t = A_1 X_{t-1} + \dots + A_p X_{t-p} + U_t \quad (a)$$

$$\Phi(\beta)\mu_t = \sum_{i=0}^{\infty} \Phi U_{t-1} \quad (b)$$

$$I = (I - A_1 B - A_2 B \dots - A_n B_n) \varphi(B) \quad (c)$$

To measure the impulse response of an equation like $Cov(\mu) = \sum \varphi X_{t-1}$ which is present in a dynamic model. Due to change in the K variable in the lth time period Φ_j is the reaction of the coefficient of the j. Impulse response also explains the trend of the all the other variable in the model who's change its path of developing. In the results of impulse response, it is clear that current value as well as lag value play an important role in policy making and prediction of the performance of the variable. The impulse response shows, the shock which is created by the dependent variable to the independent variable then how explained variable behavior and move towards equilibrium or away from equilibrium.

The standard equation is...

$$X_t = \mu + \sum_{i=1}^p \varphi X_{t-1} + \mu_t \quad (d)$$

$$\mu_t = \epsilon_t Z \dots \dots \dots \quad (e)$$

Putting the value of μ into eq (f)

$$X_t = \mu + \sum_{i=1}^p \varphi X_{t-1} + \epsilon_t Z \quad (g)$$

Where, ϵ_t has a variance equal to σ^2 . Impulse response explores that in a system of equation if some external change hit then it passes through the whole system. The impulse response explains the shock wave generated by the variable in the past and the present value in the system and how it destabilizes the variable to its standard position. Impulse response function is utilized, for the forecasting of the behavior of the variables.

RESULTS AND DISCUSSION

1. Descriptive Estimations

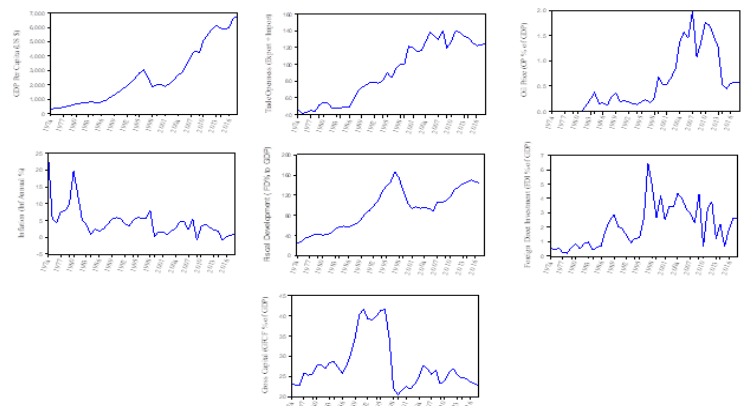
To take the insight overview, the study first apply the descriptive analysis which

elaborates that the average value of the gross domestic product per capita, trade openness, oil price, inflation, financial development, direct investment, and gross fix capital formation have the 2504.77, 90.51, 0.54, 4.67, 93.02, 2.06 and 28.03 respectively. Which lies between the maximum value (6595.0, 140.43, 1.98, 24.31, 166.50, 6.43 and 41.65) and the minimum value (332.11, 41.33, 0.02, -0.90, 24.20, 0.20 and 20.41), are resented in the Table 01. While figure 01 plotted the trend of all the variables.

Table 1
Descriptive Analysis

Variables	GDPPC	Trade	OP	INF	FD	FDI	GFCF
Mean	2504.77	90.51	0.54	4.67	93.02	2.06	28.03
Median	2020.27	87.01	0.27	3.83	94.63	1.84	25.88
Maxi	6595.00	140.43	1.98	24.31	166.50	6.43	41.65
Mini	332.11	41.33	0.02	-0.90	24.20	0.20	20.41
Std. Dev	1918.50	35.22	0.57	4.74	40.63	1.48	6.20
Skewn	0.77	-0.01	1.05	2.39	-0.20	0.76	1.17
Kurtos	2.34	1.43	2.80	9.84	1.79	3.00	3.08
Jarq- Ber	5.22	4.52	8.28	127.91	2.67	4.25	10.09

Source: Author(s) calculation



Source: Author(s) calculation

Fig.1 Trend of Variables



The results of the Augmented Dicky Fuller (ADF) and the Philip Perron (PP) test are presented in the Table 02 and 03. Both denotes that inflation and foreign direct investment have stationery at the level, while all the other factors like gross domestic product, fiscal development, gross fixed capital formation, oil prices and trade openness are stationery at the first difference I(1).

Table 2
ADF Result

Variables	Level & Intercept		1 st Difference & Intercept		Conclusion
	T-stat Prob.		T- stat Prob.		
Ln GDPPC	-1.42	0.56	4.06	0.00	1(1)
Ln Trad	-1.09	-0.70	-6.55	0.00	1(1)
Ln OP	-2.32	-0.16	-6.64	0.00	1(1)
Ln Inf	-4.43	0.00	-8.30	0.00	1(0)
Ln FD	-2.00	0.28	-1.50	0.01	1(1)
Ln FDI	-2.70	0.08	-9.38	0.00	1(0)
LN GFCF	-2.54	0.11	-4.24	0.01	1(1)

Source: Author(s) calculation

Table 3
PP Results

Variables	Level & Intercept		1 st Difference & Intercept		Conclusion
	T- stat Prob.		T- stat Prob.		
Ln GDPPC	-1.35	0.59	-4.11	0.00	1(1)
Ln Trad	-1.09	0.70	-6.55	0.00	1(1)
Ln OP	-2.98	0.04	-6.47	0.00	1(1)
Ln Inf	-4.43	0.00	-8.51	0.00	1(0)
Ln FD	-2.38	0.15	-3.49	0.01	1(1)
Ln FDI	-2.49	0.12	-11.43	0.00	1(0)
Ln GFCF	1.84	0.35	-4.02	0.00	1(1)

Source: Author(s) calculation

However, the Zivot Andre (2002) test was also employed to determines the structural break in the data, the results are mentioned in the Table 04.

Table 4
ZA Results

Variables	A. Intercept		B. Trend		C. Both (A&B)	
Ln GDPPC	-4.41	1997	-3.09	1992	-4.78	1997
Ln Trad	-2.93	2009	-3.84	2006	-3.82	2000
Ln OP	-5.28	1982	-3.41	1984	-4.75	1984
Ln Inf	-4.91	1999	4.52	1985	-5.05	1982
Ln FD	-5.28	2010	15.47	2001	-5.71	1997
Ln FDI	-5.28	2010	-5.44	2001	-5.69	1997
LN GFCF	-4.92	1997	-3.49	1991	-6.40	1997

Source: Author(s) calculation A-Intercept -5.34, -4.93, 4.58 (at 1%, 5% & 10%) ... B-Trend -4.80, -4.42 & -4.11(1%, 5% & 10%) A&B -5.57, -5.08 and -4.82 (1%, 5% & 10%) respectively.

The estimation describes that all the factors have the structural break in the data in different years except the gross domestic product and the trade openness.

After a thorough investigation of the stationery, the Johansen test of cointegration for multiple equation was employed to analyze the long-term cointegration. Moreover, to capture the cumulative progress of all factors which are a presence in the model, numerous equilibrium equations are required. Because this study employs the more than two variables. For example, if a model is comprising on “n” factors then it may be “n-1” numbers of cointegration factors. The results of the trace value (Johansen cointegration) are mentioned in the Table 05. The null hypotheses are as following: $N_0: f = 0$, $N_0: f \leq 1$, $N_0: f \leq 2$, $N_0: f \leq 3$, $N_0: f \leq 4$, and $N_0: f \leq 5$, and $N_0: f \leq 6$ against the alternative hypotheses $N_1: f = 1$, $N_1: f = 2$, $N_1: f = 3$, $N_1: f = 4$, $N_1: f = 5$, $N_1: f = 6$ and $N_1: f = 7$. The outcomes of the Johansen cointegration (Trace) shows that there are four vectors equation which are at 5% critical value. The results of the Johansen cointegration (Maxi-Eigen value) are presented in the Table 06 which also shows that there four co-integrating vectors which are at 5% critical



value. This test confirms the long run association among the variables.

Menyah et al, (2014) findings are in the line, that financial development and trade openness do not affect the economic growth in different economies from South African. Ulasan (2014) conducted a study in multi countries and come to know that trade liberalization (openness) has no association with the economics growth. While Rahman, Shahbaz and Farooq (2015), declare in their study that capital, international trade and the financial development are the growth-oriented factors.

Bal, Dash and Subhasish (2016) in their study investigate that the capital formation and trade openness have significant influence on the economic growth in the Indian economy. And Sehrawat and Giri (2016b) also found the cointegration between the trade openness and economic growth in the SAARC economies. In their paper (Sehrawat and Giri, 2016a) it is also noted that trade openness reduces the inequality in the SAARC nations.

Table 5
Trace Values

Null Hypothesis	Alternative Hypothesis	Eigen value	Trace Statistics	5 % Critical value	Prob .	Hypothesized No. of CE (s)
$N_0: f = 0$	$N_1: f \leq 1$	0.77	167.86	125.61	0.00	None*
$N_0: f = 1$	$N_2: f \leq 2$	0.70	114.67	95.75	0.00	At most 1*
$N_0: f = 2$	$N_3: f \leq 3$	0.60	70.81	69.81	0.04	At most 2*
$N_0: f = 3$	$N_4: f \leq 4$	0.38	37.64	47.85	0.31	At most 3*
$N_0: f = 4$	$N_5: f \leq 5$	0.23	20.34	29.79	0.39	At most 4*
$N_0: f = 5$	$N_6: f \leq 6$	0.15	10.79	15.49	0.22	At most 5*
$N_0: f = 6$	$N_7: f \leq 7$	0.12	4.67	3.84	0.03	At most 6*

Source: Author(s) calculations variables.

Table 6
Max-Eigen Values

Null Hypothesis	Alternative Hypothesis	Eigenvalue	Max-Eigen Statistics	5 % Critical value	Prob.	Hypothesized No. of CE (s)
$N_0: f = 0$	$N_1: f \leq 1$	0.77	53.194	46.231	0.00	None*
$N_0: f = 1$	$N_2: f \leq 2$	0.70	43.859	40.077	0.01	At most 1*
$N_0: f = 2$	$N_3: f \leq 3$	0.60	33.174	33.876	0.06	At most 2*
$N_0: f = 3$	$N_4: f \leq 4$	0.38	17.296	27.584	0.55	At most 3*
$N_0: f = 4$	$N_5: f \leq 5$	0.23	9.544	21.131	0.78	At most 4*
$N_0: f = 5$	$N_6: f \leq 6$	0.15	6.124	14.264	0.59	At most 5*
$N_0: f = 6$	$N_7: f \leq 7$	0.12	4.675	3.841	0.03	At most 6*

Source: Author(s) calculations

The study employed the Vector Error Correction Model (VECM), to investigate the short run affiliation among the gross domestic product per capita, Trade openness, oil prices, inflation, fiscal development, foreign direct investment and gross capital formation. Because this is the driven technique, which is employed to analyze the influence of one time series on the other. This approach also elaborates the speed of adjustment towards the equilibrium with the passage of every period.

Table 7
VECM Results

Error Correction	D (ln GDPPC)	D (ln TRAD)	D (ln OP)	D (ln INF)	D (ln FD)	D (ln FDI)	D (ln GFCF)
$N_0: f = 0$	$N_1: f \leq 1$	0.77	167.86	125.61	0.00	None*	
$N_0: f = 1$	$N_2: f \leq 2$	0.70	114.67	95.75	0.00	At most 1*	
$N_0: f = 2$	$N_3: f \leq 3$	0.60	70.81	69.81	0.04	At most 2*	
$N_0: f = 3$	$N_4: f \leq 4$	0.38	37.64	47.85	0.31	At most 3*	
$N_0: f = 4$	$N_5: f \leq 5$	0.23	20.34	29.79	0.39	At most 4*	
$N_0: f = 5$	$N_6: f \leq 6$	0.15	10.79	15.49	0.22	At most 5*	
$N_0: f = 6$	$N_7: f \leq 7$	0.12	4.67	3.84	0.03	At most 6*	
CointEg1							
	0.921	-0.006	0.069	0.170	-0.116	-0.026	0.280
	(0.091)	(0.06)	(0.663)	(0.062)	(0.500)	(0.093)	(0.656)
	[9.642]	[-0.072]	[0.105]	[2.723]	[-0.231]	[-0.292]	[0.426]

Source: Author(s) calculations

The result shows that the speed of convergence of GDPPC, Trade, OP, INF, FD, FDI and GFCF towards equilibrium, with every passing period each variable adjusted towards equilibrium.

The work of John C Anyawu (2012) in African countries elaborate that the foreign direct investment has strong influence on the trade through openness. While, (Dent, 2008) says that influence of the increase in the level of oil price



may have positive or the negative influence only depends on the nature of the economy. The results denote that rise in oil price negatively affect some developing economies, and this influence can be seen via inflation, decline in the balance of payment and the fiscal imbalances. Dent (2008) also finds out that a rise in the oil price indirectly reduces production because the production cost increases which declines the

economic growth. Some researchers agreed with the findings of the Dent (2008). Moreover, to identified the cumulative influence of the variables on the GDP per capita the Wald test was utilized, whom result shows that all the variables cumulatively affect the gross domestic product per capita. The results of the Wald test are presented in the Table 08.

Table 8
Wald Estimations

Test Statistics	Value	df	Prob.
F-stat	28.892	(2,34)	0.00
Chi-Squar	57.785	2	0.00

Source: Author(s) calculations

Now the study is interested to determine the granger causality, which variable granger cause the factors and in what direction. For this purpose, the granger causality test was employed.

The results of the granger causality explain that fiscal development and the growth rate both have two-way causality, oil price has one-way causality from oil to the trade openness and fiscal development has one-way granger causality from fiscal development to the trade openness. The trade openness has one-way granger causality from trade openness to the foreign direct investment. Inflation has one-way granger causality from inflation to the trade openness and oil prices have one-way granger causality from oil prices to the foreign direct investment. The fiscal development has one-way granger causality from fiscal development to the foreign direct investment and gross fix capital formation has two-way granger causality with the fiscal development. While inflation has one-way causality with the foreign direct investment in the direction of inflation to the foreign direct investment. Simply, we can say that all the factors are granger cause each other in a different direction.

The results of the Prebish and Miyrdal are in the line which states the trade openness improves the developing economy if it is trading with the developed nation. Odhiambo's (2009) work examines the fluctuating and affiliation

among the rent of money modifications, financial development, economic growth and also determined the causal relation among financial depth and economic growth. While Abdullahi. (2010) find out in five sub- Saharan economies bidirectional causality along with reverse causality from. economic growth to financial development in two country.

Although Hsu and Wu (2009) examine the countries having healthier financial markets; they have no need to attains the benefits from the foreign direct investment to improve the economic growth. While Uddin et al. (2013) states that in the Kenya's economy, the expansion of the financial market positively influenced the growth. Anyanwu (2012) find out in his paper that FDI granger cause the trade, FDI is attracted via oil and FDI is also attracted the trade via trade openness which indirectly leads the scenario for the correlation between oil price and economic growth.

Adedayo et al, (2019) determines that consumer price index, trade openness, oil price and current account are positively correlated with the exchange rate and about 91% adjustment is made from moving short run to the long term. And a fluctuation in oil price and current account balances have a robust effect on exchange rate of Nigerian in the long run. Whereas, Sadiku et al. (2015) investigates the trade openness, fiscal balance, financial development, terms of trade and trade deficit significantly related to the



current account in the Former Yugoslav Republic of Macedonia. Similarly, the energy import, growth rate, real effective exchange rate, trade openness and foreign capital investment play a significant role in the determination of the current account in the Turkish economy (Yurdakul and Cevher, 2015).

Similarly, Mbithi and Mutuku (2017), while studying the economy of Kenya, the trade openness, oil prices, fiscal deficit, business fluctuations, trade competitiveness, fiscal balance, reliance level and phase of economic growth are the key element of the current account deficit. Ibhagui (2018) noted that if the boundaries are open for the trade (trade openness) this will lead to the current account deficit because he concluded that trade openness had a negative associated with the current account balance.

We performed numerous reliability and diagnostic test to check our designed model which are presented in the Table 10. The autoregressive conditional heteroscedasticity (ARCH) and Breusch- Gogfrey serial correlation LM (Breusch 1978; Gogfrey 1978) tests conclude that there is no problem of heteroskedasticity and serial correlation, because the probability value is greater than 0.05%. The Ramsey RESET test (Ramsey, 1969) confirmed that model was correctly specified as the probability value is greater than 0.05%. The Jarque and Bera (1987) test was also applied to determine the normal distribution of the residual term. The null hypothesis of normal distribution was accepted as the probability value is greater than 0.05%.

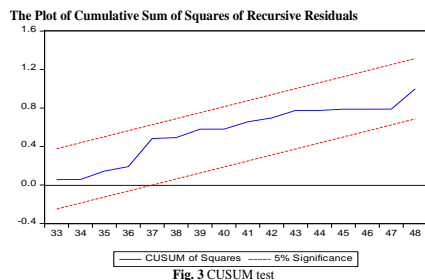
Table 10
Diagnostic Tests

Heteroskedastic: Breusch- Pagan- Godfrey		
X ² - Statistics	Degree of Freedom	Prob.
	1	0.12
Breusch- Godfrey Serial Correlation LM Test		
X ² - Statistics	Degree of Freedom	Prob.
	1	0.23
Jarque - Bera Test		
F- Statistics	Degree of Freedom	Prob.
1.24	(2,34)	0.77
Ramsey RESET Test		
F- Statistics	Degree of Freedom	Prob.
16.2	(1,35)	0.31

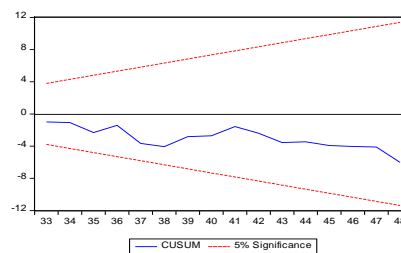
Source: Author(s) calculations

Moreover, CUSUM and CUSUMQ test were conducted to find out the stability of the parameters, respectively. The straight line represents the critical bound at 5% significance level. The null hypothesis of stable parameters is

accepted against the alternative hypothesis of unstable as the parameters, as CUSUM and CUSUMQ both plotted within the 5% significance level, which is turn confirms the short run as well as long-run parameters are stable and reliable.



Source: Author(s) calculation



Source: Author(s) calculation



The study finally employs the vector autoregressive model (VAR). This approach is utilized as a policy experiment because many information is hidden in the data. Sims (1980) introduced this technique however, to elaborate

the outcome, we need the impulse response function because all variables are connected with each other through a system of equations. That's why shock wave, which is generated by one variable, it is effect pass through the whole system of equation.

Table 9
VAR Results

Variables	Ln GDPPC	Ln TRAD	Ln OIL	Ln INF	Ln FD	Ln FDI	Ln GFCF
Ln GDPPC	0.922 (0.09) [9.64]	-0.005 (0.006) [-0.079]	0.069 (0.663) [0.105]	0.280 (0.656) [0.426]	0.170 (0.062) [2.723]	-0.116 (0.500) [-0.231]	-0.027 (0.093) [-0.292]

Source: Author(s) calculations

As it is stated earlier that VAR's result are not directly explained so study explore these results in the direction of impulse response

function (hereafter IRF). The results of IRF are presented in the figure 05.

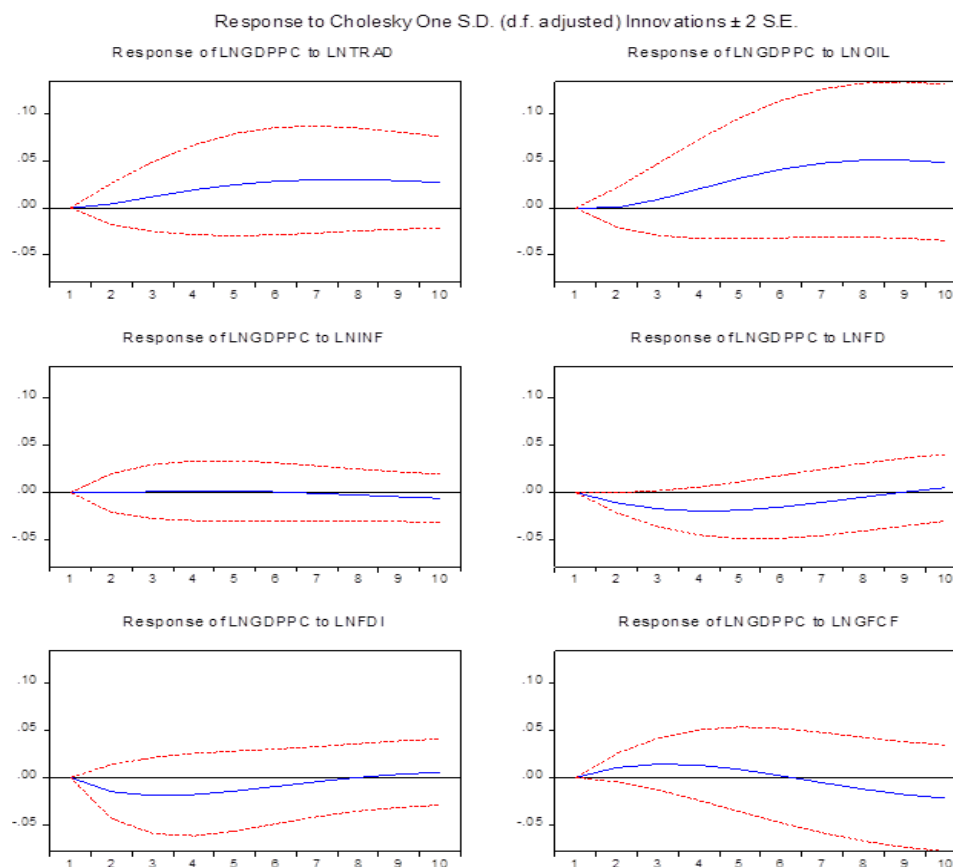


Fig.5 Impulse Response Function

The outcomes of the IRF states that if the shock of standard deviation of trade openness is

given to the GDP per capita, the response of the GDP per capita would be positive. Simply we can

say that if trade openness level increases in the economy the per capita income would rise, which in turn uplifts the standard of living of the masses. While in the case of the oil prices, the figure 5 defines that if the shock wave generated by the oil prices hits the economy, then the GDP per capita initially remain at equilibrium position till second period and then starts to increase with an increasing rate. And if a shock wave generated by the inflation hits the economy initially and 6th period economy will remain at equilibrium position and moves very closely to the equilibrium line but negatively.

While a standard deviation shock of the fiscal development is given to the GDP per capita, then the response of the GDP per capita would be negative and moves along the equilibrium position in such a way that with every passing year it moves away and after 6th year starts to moves towards the equilibrium position. And attains the equilibrium in the 9th period and then respond positively. Approximately, same behavior is adopted by the foreign direct investment the difference is at the 8th period where foreign direct investment becomes positive and then remain and respond positively.

While in the response of the gross fix capital formation's shock, the GDP per capita initially positively and starts to increase with an increasing rate and then attain the equilibrium position in the 6th period and then moves negatively. Simply say that due to fluctuation in the gross fix capital formation initially the GDP per capita increases till 6th period.

CONCLUSION

In this study, an effort was made to analyze the association among the gross domestic product per capita, trade openness, oil prices, fiscal development, foreign direct investment and gross fixed capital formation in the scenario of Thailand. For this purpose, time series data was used which covers the time 1974 to 2018 collected from the World development indicator (WDI). This work utilized the Johansen co-integration, vector error correction and impulse response function to determine the long-

term affiliation between the variables. To investigate the cointegration study initially apply the ADF, PP and ZA test to check the stationarity. The result of ADF and PP propose that all the factors are co-integrated with the order of one and zero i.e. $I(1)$ and $I(0)$. While ZA test explains that all the variables have a structural break in the data with different time frame.

The Vector error model and Johansen confirm the short and the long-term affiliation between GDP per capita and its independent variables. Additionally, Wald test explored that all the coefficient collectively influencing the GDP per capita. Therefore, this work approves that all the self-governing variables positively but significantly participate to increase the GDP per capita in Thailand.

This study also finds out the granger causality among the variables, the result shows that all the variables granger cause each other in different directions. Moreover, a series of diagnostic test determines that all coefficients lies between the significant range, residual term is normally distributed, model is correctly specified and no problem of heteroscedasticity and serial correlation. Moreover, the impulse response function elaborates that trade openness, oil price, fiscal development and the foreign direct investment fluctuation would increase the GDP per capita, whereas inflation remains on the equilibrium position in the changing scenario.

RECOMMENDATION

The study suggest that trade openness should be promoted to attract the foreign direct investment, which assist to develop the gross fix capital formation in the home country. Further, the changing oil price would be very harmful for the economy so, country should adopt measures to avoid the price shock wave.

REFERENCES

- Abdullahi, D. A. (2010). Financial liberalization, financial development and growth linkage in Sub-Saharan African countries: An empirical investigation. *Studies in Economics and Finance*, 27(4), 314–339



- An application of ARDL bounds test. *Journal of Economics and International Finance*, 3(3), 146–156
- Anderson, L., & Babula, R. (2008, July). The link between openness and long-run economic growth. *Journal of International Commerce and Economics*, 1–20
- Anyanwu, J.C., 2012. Why does foreign direct investment go where it goes? New evidence from African Countries. *Annals of Economics & Finance*, 13(2), 425–462
- Awojobi, O. and Katircioglu, S., 2011. Financial development, trade openness and economic
- Babatunde, M., (2015). Oil price shocks and exchange rate in Nigeria. *International Journal of Energy Sector Management*, 9(1), 2–19
- Baltagi, B. H., Demetriades, P., & Law, S. H. (2009). Financial development and openness: Evidence from panel data. *Journal of Development Economics*, 89(2), 285–296
- Beck, T. (2002). Financial development and international trade: Is there a link? *Journal of International Economics*, 57(1), 107–131
- Blackburn, K., & Huang, V. (1998). A theory of growth, financial development and trade. *Economica*, 65(257), 107–124
- Chaudhry, I.S., Malik, A. and Faridi, M.Z., 2010. Exploring the causality relationship between trade liberalization, human capital and economic growth: Empirical evidence from Pakistan. *Journal of Economics and International Finance*, 2(9), 175–182
- Chuku, C.A., Akpan, U.F., Sam, N.R. and Effiong, E.L., 2011. Oil price shocks and the dynamics of current account balances in Nigeria. *OPEC Energy Review*, 35(2), 119–139
- Dent, C.M., 2008. The Asian development bank and developmental regionalism in East Asia. *Third World Quarterly*, 29(4), 767–786
- Ersoy, I. and Deniz, P., 2011. Financial and Trade openness: Evidence on emerging market regional groups. *European Journal of Economics, Finance and Administrative Sciences*, 39- 71
- Faras, R. Y., & Ghali, K. H. (2009). Foreign direct investment and economic growth: the case of the GCC countries. *International Research Journal of finance and economics*, 29(1), 134-145
- Frimpong, J. M., & Oteng-Abayie, E. F. (2010). When is inflation harmful? Estimating the threshold effect for Ghana. *American Journal of Economics and Business Administration*, 2(3), 232
- Galbis, V. (1977). Financial intermediation and economic growth in less-developed countries: A theoretical approach. *Journal of Development Studies*, 13(6), 58–72
- growth in Nigeria: time series evidence
- Hsu, C. C., & Wu, J. Y. (2009). FDI and economic growth: Revisiting the role of financial market development. Taipei, Taiwan: Department of Economics, National Central University
- Jarque, C. M., & Bera, A. K. (1987). A test for normality of observations and regression residuals. *International Statistical Review/Revue Internationale de Statistique*, 163-172
- Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: Journal of the Econometric Society*
- Kapur, B. K. (1976). Alternative stabilization policies for less developed countries. *Journal of Political Economy*, 84(4, Part 1), 777–795
- Karimi, M. S., & Yusop, Z. (2009). FDI and economic growth in Malaysia. <https://mpra.ub.uni-muenchen.de/14999/>
- Kim, D. H., Lin, S. C., & Suen, Y. B. (2010a). Dynamic effects of trade openness on financial development. *Economic Modelling*, 27(1), 254–261
- Kim, D. H., Lin, S. C., & Suen, Y. B. (2010b). Are financial development and trade openness complements or substitutes? *Southern Economic Journal*, 76(3), 827–845
- Kim, D. H., Lin, S. C., & Suen, Y. B. (2011). Interactions between financial development and trade openness. *Scottish Journal of Political Economy*, 58(4), 567–588
- Longe et al. (2018) Observed for the economy of Nigeria that oil price fluctuations had a positive insignificant impact on current account balances in the short run. In the long run, the impact was negative and significant
- Longe, A. E., Muhammad, S., Ajayi, P. I., & Omitogun, O. (2019). Oil price, trade openness, current account balances and official exchange rate in Nigeria. *OPEC Energy Review*
- Longe, A., Adelokun, O. and Omitogun, O., 2018. The current account and oil price fluctuations nexus in Nigeria. *Journal of Competitiveness*, 10(2), 118–131
- Mathieson, D. J., (1980). Financial reform and stabilization policy in a developing economy. *Journal of Development Economics*, 7(3), 359–395
- Mbithi, S.B. and Mutuku, C., 2017. Current account deficit dynamics in Kenya: evidence from time-series data (1980–2014). *Journal of Economics, Management and Trade*, 19(2), 1–11
- Mckinnon, R. I. (1973). Money and capital in economic development. Washington, DC: Brookings Institution
- Menyah, K., Nazlioglu, S., & Rufoael, Y. W. (2014). Financial development, trade openness and economic growth in African countries: New insights from panel causality approach. *Economic Modelling*, 37(C), 386–394
- Tahir, M., Haji, D. H. N. B. P., & Ali, O. (2014). Trade openness and economic growth: a review of the literature. *Asian Social Science*, 10(9), 137
- Odhiambo, N. M. (2009). Finance-growth-poverty nexus in South Africa: A dynamic causality linkage. *The Journal of Socio-Economic*, 38(2), 320–325
- Rahman, M. M., Shahbaz, M., & Farooq, A. (2015). Financial development, international trade, and economic growth in

Australia: new evidence from multivariate framework analysis. *Journal of Asia-Pacific Business*, 16(1), 21-43.

Rani, R., & Kumar, N. (2018). Panel data analysis of financial development, trade openness, and economic growth: Evidence from BRICS countries. *Emerging Economy Studies*, 4(1), 1-18.

Ramsey, J. B. (1969). Tests for specification errors in classical linear least-squares regression analysis. *Journal of the Royal Statistical Society: Series B (Methodological)*, 31(2), 350-371.

Romelli et al. (2018) submitted that trade openness positively and negatively influences current account and real exchange rate, respectively, in developed and emerging economy. https://www.researchgate.net/publication/324125803_Current_Account_and_Real_Exchange_Rate_changes_the_Impact_of_Trade_Openness

Romelli, D., Terra, C. and Vasconcelos, E., 2018. Current account and real exchange rate changes: the impact of trade openness. *European Economic Review*, 105, 1–32.

Sadiku, L., Fetahi-Vehapi, M., Sadiku, M. and Berisha, N., 2015. The persistence and determinants of current account deficit of FYROM: an empirical analysis. *Procedia Economics and Finance* 33, 90–102.

Sakyi, D., 2011. Trade openness, foreign aid and economic growth in post-liberalisation Ghana: https://www.researchgate.net/publication/228421786_Trade_openness_foreign_aid_and_economic_growth_in_post-liberalisation_Ghana_An_application_of_ARDL_bounds_test

Schumpeter, J. A. (1911). *The theory of economic development*. Cambridge, MA: Harvard University Press.

Shrawat, M., & Giri, A. K. (2016a). Panel data analysis of financial development, economic growth and rural-urban income inequality: Evidence from SAARC countries. *International Journal of Social Economics*, 43(10), 998–1015.

Shaw, E. S. (1973). *Financial deepening in economic development*. New York, NY: Oxford University Press.

Sims, C. A. (1980). Macroeconomics and reality. *Econometrica: Journal of the Econometric Society*, 1-48.

Tahir, M., & Norulazidah, P. (2014). Trade openness and economic growth: A review of the literature. *Asian Social Science*, 10(9), 137–142.

Uddin, S. G., Sjo, B., & Shahbaz, M. (2013). The casual nexus between financial development and economic growth in Kenya. *Economic Modelling*, 35(1), 701– 707.

Udemba, E. N. (2019). The triangular nexus causality among economic growth, TRADE, FDI and Oil Price: a time series analyses of Nigeria. *OPEC Energy Review*, 1-22.

Yurdakul, F. and Cevher, E., (2015). Determinants of current account deficit in Turkey: the conditional and partial Granger causality approach. *Procedia Economics and Finance* 26, 92–100.

Zivot, E., & Andrews, D. W. K. (2002). Further evidence on the great crash, the oil-price shock, and the unit-root hypothesis. *Journal of Business and Economics Statistics*, 20(1), 25-44.

AUTHOR'S PROFILE:

Zia Ur Rahman, currently working at Ghazi University in Economics department as a lecturer which is positioned in Dera Ghazi Khan, Punjab, Pakistan. In 2018, obtain degree in Macroeconomics (M. Phil) from NUML University, Islamabad. The author is very much interested in the research work, because of Associate. Prof. Dr. Arif-Ullah who is his mentor and motivated him to plan research work, without his kind and generous consideration it is impossible to flourish this research skills.



COPYRIGHTS

Copyright of this article is retained by the author/s, with first publication rights granted to IIMRJ. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution – Noncommercial 4.0 International License (<http://creativecommons.org/licenses/by/4>).