



The Impact of the US-China Economy on the Economic Growth of OIC Member Countries

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Abstract: As countries having sizeable economic scale, the US and China have significant contributions as well as influence on the world economy. Hence, the economic activities performed by both countries have a higher possibility to affect other countries' economic conditions due to the presence of economic integration among the countries. The study aims to investigate the US-China economy impact which is proxied by a balance of trade (BOT), net foreign direct investment (FDI), and exchange rate (ER) on the economic growth of OIC member countries (EG). The study utilizes data from 1979-2018 and adopts Autoregressive Distributed Lag (ARDL) then applies a bounds testing approach to measure the short and long-run relationship between independent and dependent variables. The finding of the study shows that there is a long-run cointegration between the US-China economy impact on the economic growth of OIC member countries. The short-run ARDL model also indicates that all the independent variables have a significant relationship with the economic growth of OIC member countries across the regions.

Originality/Value: The study comprehends as well as provides a new insight on the influence of the US and China's economic activities on OIC member countries' economies.

Introduction

In the last two decades, the United States (US) and China have had a pivotal role in the global economy by implementing free market policies and privatization, increasing sales, and gaining a foothold in international economic trade (Ferguson, 2008). The US and China also have complementary and beneficial relations with each other in bilateral trade. As a new economic power, China has primarily restructured its economy in many sectors that successfully increase foreign investment and fulfill global demand for goods and services. All of these economic activities are carried out by China to attain its objective called "Made in China 2025", with the manufacturing and technology sectors as its foundation (Yong, 2018). In addition, "Made in China 2025" may take the first position in the next few years in manufacturing and technology development.

On the other hand, for the current situation, US economic policy focuses more on domestic reforms ranging from increasing economic growth, raising interest rates to the Fed, and improving the balance of trade in the US, which continued to experience a deficit in the year 2018. The trade policies performed by US government reflect the political philosophy of "America First" and struggle to address unjust trading activities from other countries which are the source of US trade deficit.

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In the integrated economic activities, the economy of the US and China affects the world economy due to the fact that they have significant economic activities (Blagrove & Vesperoni, 2018; Cheong & Tongzon, 2018; Cali, 2018). Moreover, Jiang et al. (2018) also stress that the economic policies of the US and China influence other countries, particularly their trading partners. Since the trade war between the two countries exists by imposing a trade barrier, the US-China economy has experienced a slowdown in international trade, which affects their trading partners, including Organization of Islamic Cooperation (OIC) member countries (Cheong & Tongzon, 2018). OIC member countries have intense trading activities with the US and China, especially in the oil sector in the Middle East (Sharma, 2019). The current economic development of OIC member countries can also increase the potential economic activities with the US and China many years later (Organization of Islamic Cooperation Statistical Commission, 2017).

Empirically, the previous study explains that the economic activities of the US and China affect the increase and decline in the economic conditions of other countries, especially those that become their trading partners. However, the previous studies, such as conducted by Lin (2013) and Lin and Wang (2018) only focus on the impact of the trade deficit between the US and China as single countries, while Blagrove and Vesperoni (2018) only examine the export, GDP and economic growth of the trading partners but they do not have a sufficient discussion of the impact of trade balance of US and China to other countries. Moreover, Cheong and Tongzon (2018) and Cali (2018) focus on examining the impact of tariff barriers between the US and China on their trading partners, while Kerry (2018) and Zhang et al. (2019) put more attention to the impact to the global market. Therefore, the question of how the influence of the US and China's economic activities on OIC member countries' economies needs more investigation to find the precise answer to comprehend and provide new insight. Regarding prior empirical studies, the study aims to assess the influence of the US-China economy on the economic growth of OIC member countries. In addition, to deepen the analysis, this study also separates OIC member countries based on the regional approach.

In terms of the organization of the study, after the introduction, a literature review is explained in the next section, and is followed by the result and discussion. Finally, it ends with a conclusion and recommendation.

Literature Review

Theoretically, Balassa (1994) defines economic integration as abolishing all factors that may discriminate certain countries from having international relationships with others. Economic integration can also mean that in international relationships among countries, all barriers must be removed. Moreover, Balassa (1994) also mentions that economic integration can lead to cooperation among countries that will benefit each other such as in international trade, defined as the activities of export-import transactions.

According to Krugman and Obstfeld (2000), when countries trade with one another, they will obtain trade advantages (gains from trade). International trade also provides countries with an opportunity to maximize their trade through the resources they have and maximize their position to generate economic benefit. In addition, with this international trade, it is easier for each country to increase efficiency in their production through specialization for each good. In the end, it creates an advantage in producing goods and services for other countries (Krugman & Obstfeld, 2012). The existence of international trade will also provide opportunities for each country to increase sales and remove tariff barriers through economic integration. Countries that are more open to their economy find it easier to benefit from international trade. Mankiw (2007) explains that the existence of specialization in international trade provides welfare for the entire community. However, the existence of economic integration, such as in international trade activities, also has consequences in which countries may influence each other, which does not only receive advantages but also disadvantages, especially during unstable economic conditions.

In the globalization era, the economic circumstances and policies of a country have a considerable impact on other countries. Moreover, the impact will be more substantial if it is related to countries with significant economies of scale, such as the US and China. This is in line with the study from Lin (2013) and Lin and Wang (2018) who find that the reduction in the US trade deficit creates instability in the US and China export-import activities. Furthermore, Kerry (2018) and Zhang et al. (2019) claim that

the policy actions of the two countries have a positive and significant connection with the global market in which the US gains greater profits in the financial and commodity markets. In the long run, the policies of the Chinese government to have "Made in China 2025" have succeeded in inviting many investors in the manufacturing sector. Meanwhile, [Itakura \(2019\)](#) discusses the trade war between the US and China, which results in a short and long-run internal impact on Wall Street's welfare, trade volume, business, and share decline. The trade war also decreases the US and China's GDP by 41.4% and 31.3% respectively.

US-China economy through economic integration also affects the economic conditions of many countries. For example, [Rosyadi and Widodo \(2018\)](#) assert that trade barriers imposed by the US and China have a significant and negative relationship with the GDP of the US and China and a significant and positive effect on the GDP of their trading partners such as Mexico, New Zealand, Canada and Rest of World (ROW). [Hoa \(2005\)](#) also finds that the impact of China in integrated economy and trade with Australia, the European Union, ASEAN, Japan, and the United States directly causes a positive and significant relationship with China's GDP and economic growth.

On the other hand, a study by [Koo and Zhuang \(2007\)](#) has a similar finding to the study by [Hoa \(2005\)](#) that the appreciation of the dollar or yuan in the future has a significant relationship with an increase in export and economic condition of Asia and ROW countries. [Gabriela et al. \(2014\)](#) and [Didier \(2017\)](#) add that China has a positive relationship with South Africa, Brazil, India, and Russia regarding investment and international trade. The significant influence of China's economy on the world economy may be stronger if the One Belt One Road (OBOR) initiative is applied ([Yu, 2018](#); [Jiang et al., 2018](#)). [Dong and Whalley \(2012\)](#) have different findings that US-China economic conditions negatively and significantly affect other countries that become their trading partners. They reveal that when US-China international trade and currency value increase, their trading partners' economic growth, such as Japan, EU countries, and ROW experience a downward movement.

From the perspective of the US-China economic impact on developing countries, [Foo et al. \(2019\)](#) state that trade flows from Southeast Asian countries to China have a positive and significant relationship with both countries' economic conditions. In other countries, [Chemingui and Bchir \(2010\)](#) explain that liberalization schemes and trade openness in Africa increase China's GDP due to its easiness of international trade. This condition is also possible to improve the African economy. The same circumstance was found in the Middle East due to trade openness and liberalization with China ([Ghani, 2011](#)). In addition, [Ghani \(2011\)](#) also mentions that most Middle Eastern countries peg their currency to the US dollar, resulting in the same movement as the US dollar, thus impacting the economic growth of the Middle Eastern countries through increased trade. China's economy and its exports can also increase Pakistan's economy through economic integration between the two countries ([Uzair & Nawaz, 2018](#)). The finding also discloses that trading barriers such as tariffs tend to lessen international trade between the two countries, impacting their economic growth. [Blagrave and Vesperoni \(2018\)](#) add that China's economy influences ASEAN economic growth by 0.01% to 0.04%.

The effect of the US economy on developing countries can also be seen from the findings of [Malik \(2015\)](#), [Moeller \(2018\)](#), and [Ali and Hussain \(2017\)](#), who find that FDI from the US to Pakistan has a positive and significant impact on GDP. [Ailan and Tang \(2017\)](#) also state that capital inflow from the US to Africa in the short run has a positive and significant effect on African GDP. Then [Cheong and Tongzon \(2018\)](#) and [Carvalho et al. \(2019\)](#) conclude that an increase in import tariffs imposed by the US improves emerging economies through an increase in GDP and international trade. In the ASEAN regions, trade competition between the US and China positively impacts ASEAN exports ([Cali, 2018](#)). The competition also benefits India in the short-run perspective ([Mahato, 2019](#)). India has more opportunities to engage in international trade while the US and China are "too busy" to have a trade war. [Blagrave and Vesperoni \(2018\)](#) even added that trade war makes China lose its GDP.

From the perspective of the US-China economic impact on developed countries, research from [Ju-Xiang et al. \(2009\)](#) finds that capital inflow and FDI from the US and China significantly and negatively affect the Japanese economy. It can be seen from an increase in capital inflow and FDI from the US and China which create an economic downturn in Japan. In addition, the short-run import policy imposed by the US government has no significant impact on EU member countries' GDP; however, it has a significant and negative influence in the long run. It confirms that EU member countries must be aware of US economic policy because the policy becomes one of the determinants of EU member countries' GDP.

Methodology

To examine the impact of the US-China economic condition on the economic growth of the OIC member countries, this study utilizes time series data consisting of 40 observation periods from 1979 to 2018. The dependent variable in this study is the average economic growth of the OIC member countries, and the independent variables are the US trade balance, US exchange rate, US FDI, Chinese trade balance, Chinese exchange rate, and Chinese FDI. To deepen the discussion, the OIC member countries are then territorially divided. The observation period used in this analysis remains unchanged, except for Central Asia, which is only 31 observations from 1988-2018 due to the issue of the availability of the data. All the data are retrieved from the World Bank and the United Nations Conference on Trade and Development (UNCTAD) Database.

The study adopts the model proposed by [Pesaran et al. \(2001\)](#) to examine the short-run and long-run impact of the US-China economic condition on OIC member countries' economic growth. In general, the model used in this study is as follows:

$$EG_{OICt} = \beta_0 + \beta_1 BOT_{US,t} + \beta_2 ER_{US,t} + \beta_3 FDI_{US,t} + \beta_4 BOT_{CH,t} + \beta_5 ER_{CH,t} + \beta_6 FDI_{CH,t} + e_t \quad (1)$$

Table 1. Variable Definition

Variables	Variable Definition	References
EG _{OIC}	The average economic growth in the OIC countries	(Ali & Hussain, 2017)
BOT _{US}	US export minus import trade value in the UK pounds	(Li et al., 2018)
ER _{US}	The value of the US dollar exchange rate to the UK pounds	(Rasoulinezhad, 2017)
FDI _{US}	The value of US FDI in the UK pounds	(Mahato, 2019)
BOT _{CH}	Chinese export minus import trade balance in the UK pounds	(Li et al., 2018)
ER _{CH}	The value of the China Renminbi exchange rate to the UK pounds	(Rasoulinezhad, 2017)
FDI _{CH}	The value of Chinese FDI in the UK pounds	(Mahato, 2019)

In terms of the method, Autoregressive Distributed Lag (ARDL) is adopted in this model. To apply the method of analysis, there are several steps. The first is determining the data stationary level by conducting a unit root test through the Augmented Dickey-Fuller Test (ADF) ([Dickey & Fuller, 1981](#)). [Pesaran and Shin \(1999\)](#) state that the main requirement for the ARDL test is the variable must be different at each level of stationarity. This is due to the fact that the ARDL test explains the autoregressive level and slowness distribution in the data, so the observation data will be better if the data is abundant ([Pesaran & Shin, 1999](#)). The ARDL equation model can be written with the addition of the lag variable coefficient as shown below:

$$y_t = \delta + \theta_1 y_{t-1} + 1 \dots + \theta_p y_{t-p} + \delta_0 x_t + \delta_1 x_{t-1} + \delta_2 x_{t-2} + \dots + \delta_q x_{t-q} + v_t \quad (2)$$

X_t and Y_t lags represent the lag model. In general, lag y is symbolized by p, and x lag is q, so lags (p, q) become the basic concept in the ARDL equation model. The equation explains that the ARDL model has a lag. Then to deepen the understanding, the equation becomes as follows:

$$Y_t = Y_{0i} + \sum_{i=1}^p \delta_i Y_{t-i} + \sum_{i=0}^q \beta'_i X_{t-i} + e_{it} \quad (3)$$

The second step is to determine cointegration using bound testing, as explained in equation 3. For the explanation, Y_t describes the vector of the equation as the dependent variable, and the variable of X_t represents bounds testing cointegration at level I (0) or lower bound and I (1) or upper bound in the equation. Variables β and δ indicate a coefficient in the equation model, while variable y is a constant. Lags (p, q) show a lag in the research model in which p lag is the endogenous variable and q lag is the exogenous variable in the equation model ([Hill & Griffiths, 2011](#)).

Furthermore, as the next step, ARDL is performed. From the above-mentioned basic equation, the ARDL model for this study is formulated as follows:

$$\begin{aligned} \Delta EG_{OICt} = & \sum_{i=1}^n a_{1i} \Delta EG_{OICt-1} + \sum_{i=1}^n a_{2i} \Delta BOT_{US,t-1} + \sum_{i=1}^n a_{3i} \Delta ER_{US,t-1} + \\ & \sum_{i=1}^n a_{4i} \Delta FDI_{US,t-1} + \sum_{i=1}^n a_{5i} \Delta BOT_{CH,t-1} + \sum_{i=1}^n a_{6i} \Delta ER_{CH,t-1} + \sum_{i=1}^n a_{7i} \Delta FDI_{CH,t-1} + \\ & \theta_1 EG_{OIC,t-1} + \theta_2 BOT_{US,t-1} + \theta_3 ER_{US,t-1} + \theta_4 FDI_{US,t-1} + \theta_5 BOT_{CH,t-1} + \theta_6 ER_{CH,t-1} + \\ & \theta_7 FDI_{CH,t-1} + e_t \end{aligned} \quad (4)$$

Symbol Δ indicates the lag length for economic growth in the OIC member countries as the endogenous and exogenous variables. Coefficient $a_{1i} - a_{7i}$ reflects the relationship between the dynamic model in the short run and $\Theta_1 - \Theta_7$ for the long run relationship. Furthermore, following the model from Pesaran et al. (2001), namely the bounds testing, aims to examine the long-run relationship among the variables. If cointegration exists, the ARDL-ECM model is applied by using an equation as follows:

$$\Delta EG_{OICt} = a_0 \sum_{i=1}^n a_{1i} \Delta EG_{OICt-1} + \sum_{i=1}^n a_{2i} \Delta BOT_{UST-1} + \sum_{i=1}^n a_{3i} \Delta ER_{UST-1} + \sum_{i=1}^n a_{4i} \Delta FDI_{UST-1} + \sum_{i=1}^n a_{5i} \Delta BOT_{CHt-1} + \sum_{i=1}^n a_{6i} \Delta ER_{CHt-1} + \sum_{i=1}^n a_{7i} \Delta FDI_{CHt-1} + \lambda ECT_{t-1} + e_t \quad (5)$$

However, if there is no cointegration relationship, only the ARDL equation model is allowed to be applied as explained below:

$$\Delta EG_{OICt} = a_0 \sum_{i=1}^n a_{1i} \Delta EG_{OICt-1} + \sum_{i=1}^n a_{2i} \Delta BOT_{UST-1} + \sum_{i=1}^n a_{3i} \Delta ER_{UST-1} + \sum_{i=1}^n a_{4i} \Delta FDI_{UST-1} + \sum_{i=1}^n a_{5i} \Delta BOT_{CHt-1} + \sum_{i=1}^n a_{6i} \Delta ER_{CHt-1} + \sum_{i=1}^n a_{7i} \Delta FDI_{CHt-1} + e_t \quad (6)$$

If cointegration occurs, there are additional variables in the form of λECT_{t-1} . Symbol λ means that $1 - \sum_{i=1}^p \delta_i$ describes the degree of the adjustment speed of the variable so the sign becomes negative. ECT variable explains $Y_{t-1} - \Theta X_t$ or as a correction if an error occurs in the previous period. The F-statistic value becomes a reference to determine whether the model has a cointegration relationship (Hill & Griffiths, 2011). When the F-statistic is lower than the alpha of the lower bound, it fails to reject H_0 . Then, from the result, it can be concluded that the cointegration relationship does not exist, and the ARDL model must be applied. However, if the F-statistic value is higher than the alpha of the upper bound, H_0 will not be accepted, and it can be concluded that ARDL-ECM can be applied (Pesaran et al., 2001).

Results and Discussion

Table 2 shows the maximum and minimum economic growth of 6.9% and -1%. For the Balance of Trade of the US (BOT_{US}), the higher number is GBP£ -7.68 bn, indicating that the US has never had an export value higher than its import in the last four decades. For the Exchange Rate of USD to GBP (ER_{US}), the lowest level is GBP£ 0.43 per 1 USD, and the average value of Foreign Direct Investment US (FDI_{US}) is GBP£ 101.25 bn, indicating the average FDI inflow to the US from foreign countries. On the other hand, the Balance of Trade in China (BOT_{CH}) average has a positive value of GBP£ 7.91 bn. This value is better than BOT_{US} which usually has a negative value. It implies that China tends to export more than import from other countries. In addition, China Renminbi's value reaches the peak point of GBP£ 0.33 for 1 China Renminbi in the last four decades. The average value of Chinese Foreign Direct Investment (FDI_{CH}) is GBP£ 7.47 bn, reflecting a lower value than FDI_{US} .

In the ADF analysis (shown in Table 3), the results exhibit that ER_{US} , FDI_{US} , and ER_{CH} are stationary at level, but other variables are on the 1st difference level of the unit-roots test. From the unit root test, it can be examined that a different level of stationary among the variables exists. Therefore, according to the unit roots test, the ARDL model is chosen as an analysis tool.

Table 2. Descriptive Statistics Result

Variable	Obs.	Mean	Std Dev.	Min.	Max.
EG_{OIC}	40	3.27%	1.81%	-1%	6.9%
BOT_{US}	40	GBP£ -188.7 bn	GBP£ 148.6 bn	GBP£ -464.48 bn	GBP£ -7.68 bn
ER_{US}	40	GBP£ 0.61	GBP£ 0.07	GBP£ 0.43	GBP£ 0.77
FDI_{US}	40	GBP£ 101.25 bn	GBP£ 92.91 bn	GBP£ 5.02 bn	GBP£ 365.88 bn
BOT_{CH}	40	GBP£ 7.91 bn	GBP£ 10.34 bn	GBP£ -3.27 bn	GBP£ 35.78 bn
ER_{CH}	40	GBP£ 0.12	GBP£ 0.08	GBP£ 0.06	GBP£ 0.33
FDI_{CH}	40	GBP£ 7.47 bn	GBP£ 9.17 bn	GBP£ 0.01 bn	GBP£ 29.09 bn

Table 4 explains the F-value obtained from the bounds testing cointegration test, 194.02. It can be explained that the calculated F-value is higher than the upper bound value (I_1) at a 5% level of

significance of 3.61. The calculated F-value is also higher than the upper bound value (I_1) at 1% significance level of 3.23, at an alpha significance of 0.25 of 3.99, and greater at an alpha significance of 10, which is 4.43. Based on the result mentioned above, it can be concluded that both variables have a long-run cointegration relationship. Then ARDL-ECM can be applied to analyze the research model.

Table 3. Augmented Dickey-Fuller (ADF) Test

Variables	At Level			First Difference			Inferences
	No Intercept and Trend	Intercept	Intercept and Trend	No Intercept and Trend	Intercept	Intercept and Trend	
EG _{OIC}	-0.521	-1.995	-2.366	-5.460**	-5.429**	-5.419**	I(1) :Stationer
BOT _{US}	1.224	-0.239	-1.850	-2.988*	-3.373*	-3.366*	I(1) :Stationer
ER _{US}	0.283	-4.521**	-4.454**	-4.464**	-4.452**	-4.386**	I(0) : Stationer
FDI _{US}	-0.746	-1.810	-4.190**	-4.880**	-4.932**	-4.816**	I(0) : Stationer
BOT _{CH}	-0.745	-1.346	-2.304	-3.930**	-3.890**	-3.738**	I(1) :Stationer
ER _{CH}	-1.740*	-1.911	-1.318	-3.637**	-3.807**	-4.481**	I(0) : Stationer
FDI _{CH}	0.739	-0.185	-1.772	-3.197*	-3.435*	-3.469*	I(1) :Stationer

Note: ***, **, * explain the stationary for $\alpha = 1\%$, 5% , and 10% respectively

Table 4. Bounds Testing Cointegration

Lower Bound (I_0)		Upper Bound (I_1)	
L_1	2.12	L_1	3.23
L_05	2.45	L_05	3.61
L_025	2.75	L_025	3.99
L_01	3.15	L_01	4.43

F = 194.02

t = -18.75

Short-Run ARDL Estimation

As shown in Table 5, the influence of BOT_{US}, FDI_{US}, and ER_{US} is positive for economic growth in the short run. Regarding the impact on China's economy, BOT_{CH}, ER_{CH}, and FDI_{CH}, it has a significant effect on economic growth. This result confirms that in the short run, the US-China economy becomes the determinant of the OIC member countries' economy.

Long-Run ARDL Estimation

In the long run (shown in Table 6), the influences of the independent variables on economic growth are different. The variables of BOT_{US}, ER_{US}, BOT_{CH}, and ER_{CH} have a negative and significant impact on economic growth. According to the coefficient, an appreciation of 1% in the US dollar decreases 13.09% of the economic growth. This influence is greater than other variables, including China's economic condition variables. Furthermore, the FDI of the US and China has a positive and significant influence on the economic growth of the OIC member countries in the long run. It can be interpreted that when the FDI value of the US and China increases, the economic growth of the OIC member countries rises.

Further Findings Based on OIC Member Countries Regions

To deepen the understanding of the US-China economic influence on the economic growth of the OIC member countries, the study divides the OIC member countries based on seven regions based on the United Nations classification. The short-run ARDL estimation (shown in Table 7) explains that six of seven OIC regional countries have negative and significant ADJ scores. Only the OIC member countries from Southeast Asia have positive and significant ADJ scores, which means that only ARDL can be applied (Pesaran, Shin, and Smith, 2001). From the short-run estimation result, it can be seen that the balance of trade in the US had a significant and positive influence on the economic growth of all regions.

It indicates that, in the short run, an increase in the US balance of trade benefits other countries' economic growth (Moeller, 2018).

Table 5. Short-run ARDL Estimation

Variables	Coefficient	S.E	t-statistic
ADJ. EGOIC			
L1.	-4.80	0.25	18.75
BOT _{US}			
L1.	0.01	0.01	2.56**
L2.	0.03	0.02	17.44**
L3.	0.08	0.01	19.65**
L4.	0.08	0.01	18.62**
ER _{US}			
L1.	9.96	3.93	2.53**
L2.	64.63	5.49	11.77**
L3.	45.59	4.49	10.14**
L4.	34.71	2.57	13.47**
FDI _{US}			
L1.	-0.02	0.01	12.93**
L2.	0.01	0.01	0.39
L3.	0.03	0.01	12.06**
L4.	0.03	0.01	21.17**
BOT _{CH}			
L1.	1.16	0.07	16.36**
L2.	1.34	0.10	13.38**
L3.	1.22	0.08	14.98**
L4.	0.80	0.07	11.51**
ER _{CH}			
L1.	25.52	2.68	9.51**
L2.	-78.21	7.05	11.09**
L3.	1.74	5.20	0.33
L4.	-89.59	6.7	13.23**
FDI _{CH}			
L1.	-0.87	0.07	11.36**
L2.	-0.68	0.07	9.58**
L3.	0.77	0.05	13.12**
L4.	0.96	0.05	17.98**
_cons	46.22	2.79	16.53
R-square	0.99		
Observation	36		

Note: ***, **, * explain the level of significance for 1%, 5%, and 10% in each specific symbol.

Table 6. Long Run ARDL Estimation

Variable	Coefficient	S.E	t-statistic
LR			
BOT _{US}	-0.01	0.01	27.75**
ER _{US}	-13.09	1.19	10.97**
FDI _{US}	0.01	0.01	6.35**
BOT _{CH}	-0.32	0.01	19.58**
ER _{CH}	-6.94	0.23	29.19**
FDI _{CH}	0.15	0.01	15.20**
R-square	0.99		
Observation	36		

Note: ***, **, * explain the level of significance for 1%, 5%, and 10% in each specific symbol.

Table 7. Short-Run ARDL Estimation for OIC Member Countries in All Regions

Variables	EGoICMID		EGoICEUROPE		EGoICAFRICA	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
ADJ.						
L1.	-2.02	6.61**	-1.01	6.43**	-5.25	18.66**
Region OIC (L1.)			-0.27	1.18		
L2.	0.25	1.70			0.49	6.58
L3.						
L4.						
BOT _{US} (L.0)						
L1.	0.04	2.42**	0.08	4.02**	-0.01	2.22**
L2.			0.07	3.40**	0.01	2.91**
L3.			0.04	2.48**	0.05	5.01**
L4.					0.06	6.64**
ER _{US} (L.0)						
L1.	27.81	1.20	66.16	2.56**	-92.37	13.07**
L2.	16.29	0.87	29.12	1.45	-26.08	9.16**
L3.	68.58	3.27**	105.42	4.64**	-35.55	4.35**
L4.						
FD _{US} (L.0)						
L1.	0.11	5.57**	0.08	4.63**	0.01	4.29**
L2.	0.05	3.51**	0.06	3.68**	0.02	6.10**
L3.	0.05	3.62**	0.05	3.19**	0.03	5.60**
L4.					0.04	7.79**
BOT _{CH} (L.0)						
L1.	-0.51	3.50**	0.26	1.23	0.91	6.40**
L2.					1.01	5.61**
L3.					1.16	6.76**
L4.					0.70	5.24**
ER _{CH} (L.0)						
L1.	7.46	0.19	4.58	0.10	116.28	11.30**
L2.	100.54	2.41**	55.22	1.23	9.65	1.60
L3.	-90.94	2.37**	-150.19	3.50**	112.92	16.53**
L4.					37.98	5.06**
FD _{CH} (L.0)						
L1.	-0.20	0.72				
L2.	-0.15	0.49	-1.06	3.58**	-0.47	2.79**
L3.	0.70	1.62	-1.10	3.41**	-0.33	2.42**
L4.	-0.43	1.33			0.36	4.39**
_cons	33.40	11.54	22.21	1.82	-7.52	5.38**
R-squared	0.89		0.91		0.99	4.95

Note: ***, **, * explain the level of significance for 1%, 5%, and 10% in each specific symbol .

Table 7. Continued

Variables	EGoICSOUTHASIA		EGoICSEA		EGoICSOUTHAM		EGoICCENTASIA	
	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
ADJ.								
L1.	-2.79	8.05**	1.64	28.56***	-1.73	7.72**	-0.54	2.84**
L2.							0.29	1.32
L3.	0.53	8.51	-0.66	26.60	0.38	2.74		
L4.								
BOT _{US} (L.0)								
L1.	0.01	0.83	0.19	62.29**	0.02	1.93*	0.08	2.94**
L2.	0.03	6.53**	0.09	60.91**			0.07	2.83**
L3.	0.02	3.37**	-0.37	95.97**				
L4.			-0.39	93.04**				
ER _{US} (L.0)								
L1.	-38.59	5.19**	373.24	83.95**	0.03	0.00	31.46	1.12
L2.	19.86	2.23**	18.50	10.60**				
L3.	-42.80	5.38**	-327.67	67.75**				
L4.			-28.45	16.74**				
FDI _{US} (L.0)								
L1.	0.05	9.60**	-0.38	69.31**	0.03	3.39**	0.01	0.03
L2.	0.02	4.12**	-0.31	72.02**	0.02	2.00*	0.03	1.76*
L3.	0.03	7.91**	-0.39	106.2**				
L4.	0.04	9.11**	-0.31	87.06**	-0.01	0.05		
BOT _{CH} (L.0)								
L1.	-0.67	11.78**	-1.79	25.76**			0.74	3.69**
L2.	-0.33	3.98**	-4.26	59.35**				
L3.	-0.23	1.96*	-5.68	104.5**				
L4.	-0.26	2.41**	-5.03	114.2**				
ER _{CH} (L.0)								
L1.	-21.87	1.74*	-399.24	64.63**			-17.26	0.19
L2.	-48.98	3.18**	-101.30	42.02**				
L3.	17.64	1.37	13.02	2.42**				
L4.	27.89	2.81**	316.27	54.11**				
FDI _{CH} (L.0)								
L1.	0.28	2.21**	7.12	99.68**	3.12	1.59	0.36	1.92*
L2.	0.68	5.90**	5.83	81.07**				
L3.	0.58	6.44**	-4.01	111.4**				
L4.			-8.57	103.7**				
_cons	2.56	0.72	40.68	37.22				
R-squared	0.99		1.00		0.81		0.70	

Note: ***, **, * explain the level of significance for 1%, 5%, and 10% in each specific symbol.

Table 8. Long Run ARDL Estimation for OIC Member Countries in All Regions

Variables	EG _{OICMID}		EG _{OICEUROPE}		EG _{OICAFRICA}		EG _{OIC SOUTHASIA}	
	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t
BOT _{US}	-0.01	4.74**	-0.07	5.32**	-0.01	9.78**	-0.01	8.99**
ER _{US}	-12.45	1.44	-33.29	1.50	7.98	13.83**	-2.49	1.03
FDI _{US}	-0.039	3.32**	-0.03	1.40	-0.01	8.85**	-0.01	5.65**
BOT _{CH}	-0.074	0.83	-1.47	4.95**	-0.15	5.74**	0.25	7.68**
ER _{CH}	-34.15	8.05**	-26.17	2.43**	-3.38	7.14**	26.16	30.36**
FDI _{CH}	-0.02	0.39	0.86	4.10**	0.09	5.36**	-0.20	5.90**

Note: ***, **, * explain the level of significance for 1%, 5%, and 10% in each specific symbol.

Table. 8 Continued

Variables	EG _{OICSEA}		EG _{OIC SOUTHAM}		EG _{OICCENTASIA}	
	Coeff.	t	Coeff.	t	Coeff.	t
BOT _{US}	-0.13	29.62**	-0.01	2.72**	-0.08	2.10**
ER _{US}	67.94	27.82**	13.49	2.34**	28.13	0.52
FDI _{US}	-0.34	42.32**	-0.03	3.57**	0.09	1.79*
BOT _{CH}	-1.45	15.54**	0.01	0.26	-2.28	2.54**
ER _{CH}	-83.02	32.61**	-33.29	7.59**	154.70	1.16
FDI _{CH}	0.69	13.28**	0.09	1.82*	0.71	1.97*

Note: ***, **, * explain the level of significance for 1%, 5%, and 10% in each specific symbol.

In terms of the influence of the US exchange rate, it significantly influences the economic growth in all regions except in South America and Central Asia Region. Moreover, the direction of the significant relationship is primarily positive in all the regions but negative in the EU regions. It can be interpreted that if the US dollar appreciates, the economic growth in almost all the regions rises. Regarding US FDI, it has a positive and significant impact on economic growth in all regions except Southeast Asia. China's balance of trade also significantly affects the OIC member countries in almost all the regions except the EU and South America.

The positive and significant relationship between the economic growth in Africa and Central Asia indicates that when China's balance of trade increases, the economic growth in such regions also increases. For the long-run analysis (shown in Table 8), the influence of the US and China's trade balance on most OIC member countries is negative and significant. It delineates that when the US and China balance of trade increases, the majority of the OIC member countries in all the regions experience a decline in their economic growth. Regarding US and China currency impact, the effect varies in these regions. For example, the influence of the US dollar on the OIC member countries in Africa is positive and significant. It can be interpreted that the OIC member countries in Africa gained an advantage through improved economic growth during the US dollar appreciation. In terms of the US and China's FDI in the long run, the effect also varies in each region. US FDI has a negative and significant effect on most OIC member countries in all the regions. On the other hand, in the long run, China's FDI has a positive and significant impact on most OIC member countries in all the regions.

According to the results, in the short-run relationship between the US and China's economic activities to the economic growth of OIC member countries, a positive and significant relationship between independent to dependent variables is in line with Moeller (2018) who concludes that it occurs due to the existence of a reciprocal relationship in international trade between the US and several OIC member countries. Moreover, Koo and Zhuang (2007) add that when the US dollar experiences currency appreciation, US trading partners increase their exports to the US because the trading partners have more competitive products in terms of price. The positive influence of the US economy on economic growth is also caused by FDI performed by US investors to other countries (Smialek, 2019; Malik, 2015; Ali & Hussain, 2017). The FDI inflow to the US possibly occurs due to an improved US economy which can be identified from the improved balance of trade conditions and the US dollar exchange rate. A good economic condition in the US, including FDI, attracts US investors to invest in other countries, such as the OIC member countries, to expand business activities.

In addition, BOT_{CH} , ER_{CH} , and FDI_{CH} have a significant effect on economic growth, which is similar to Hoa (2005), Uzair and Nawaz (2018), and Jiang et al. (2018) who explain that when China is engaged in international trade with other countries, it influences on increasing the economic growth of its trading partners. Jiang et al. (2018) add that the Silk Road proposed by the Chinese government to expand international trade with its trading partners increases China and its trading partners' trade balance. Unlike BOT_{CH} and FDI_{CH} , ER_{CH} has a negative and significant effect, implying that the appreciation of China's Renminbi will make China more likely to accept imports than exports (Mahato, 2019). On the other hand, this condition is possibly desirable for its trading partners. Rasoulinezhad (2017) delineates that when Chinese renminbi appreciates, it benefits the OIC member countries in the Organization of Petroleum Exporting Countries (OPEC) group because they have a surplus of international trading activity with China.

For the long-run relationship, according to the findings, the US economy has a strong influence on the economic growth of other countries, including the OIC member countries (Cheong & Tongzon, 2018; Li et al., 2018; Cui et al., 2019). This finding also confirms that the effect of the US economy is stronger than China's economy in the long run. In terms of the relationship between the US and China's FDI to the economic growth of OIC member countries, it is in line with Smialek (2019), Malik (2015), and Ali and Hussain (2017), who conclude that the improvement of the economic condition of US will benefit other countries. In the long run, a high value of FDI in the US and China is possibly caused by improved economic indicators such as balance of trade and exchange rate. As a result, the OIC member countries can benefit from an increase in FDI in US and China to have higher economic growth.

When the analysis is deepened into a regional basis, several regions have a significant relationship to the US exchange rate in the short run. This condition becomes an opportunity for US trading partners to export their goods and services to the US in an effort to increase their economic growth (Koo & Zhuang, 2007). However, for the OIC member countries in the EU, US currency appreciation creates negative economic growth. In the impact of the US FDI on the economic growth of OIC member countries in several regions, the finding is aligned with Smialek (2019), Malik (2015), and Ali and Hussain (2017), who conclude that the improvement of the US economy tends to benefit other countries. However, for the OIC member countries in Southeast Asia, an increase in US FDI reduced their economic growth. This finding may be caused by the fact that there is no good reciprocal relationship between the OIC member countries in Southeast Asia and FDI in US.

In terms of the relationship of China's economy in the short-run, Foo et al. (2019) and Jiang et al., (2018) explain that the positive and significant relationship with China's trading partners is caused by the existing economic cointegration with all countries. In other words, there is a reciprocal relationship between China and its trading partners, including the OIC member countries in such regions. However, the negative and significant relationship with Middle East, South Asia and Southeast Asia regions imply that the imported goods and services from China do not benefit the economic growth of the OIC member countries of such regions because these possibly result in a deficit of balance of trade in China's trading partners (Liu, 2016).

For the long-run relationship, the majority of the OIC member countries may have a deficit balance of trade with the US and China in the long run, which lessens their economic growth, as mentioned by Liu (2016). This finding contrasts with Hoa (2005), Uzair and Nawaz (2018), and Jiang et al. (2018) who explain that China's international trade will benefit China's trading partners. It is only the OIC member countries from South Asia that have a significant and positive relationship in terms of economic growth with China's balance of trade. Regarding the US and China currency impact, as mentioned by Koo and Zhuang (2007), other countries in international trade will be more competitive in price with the US to export goods and services. However, in the long run, China's Renminbi has a negative and also significant effect on the economic growth in Africa. Yong (2019), Dong and Whalley (2012), and Mahato (2019) claim that China's trading partners may have a deficit balance of trade due to an increase in their imports when China's Renminbi has a lower value.

The result from the relationship between US-China's FDI in the long run to the economic growth of OIC member countries in several regions is similar to Ju-Xiang et al. (2009), who explain that capital inflow and investment relations of US will have a positive effect on the economic downturn of other countries. Moreover, Doku et al. (2017) explain that when capital inflows are allocated to China, the vertical capital flow chain entering other countries will also increase because the Chinese supply chain

causes an increase in capital inflow to other countries. This finding confirms that economic growth tends to rise when China's FDI increases.

The long-run analysis for all regions also delineates that when the US and China balance of trade increases or is positive, the majority of the OIC member countries in all the regions experience a decline in their economic growth. Regarding US and China currency impact, the effect varies in these regions. For example, the influence of the US dollar on the OIC member countries in Africa is positive and significant. It can be interpreted that the OIC member countries in Africa gain an advantage by improving economic growth during the US dollar appreciation. In terms of US-China's FDI in the long run, the effect also varies in these regions. The US FDI negatively and significantly affects most OIC member countries in all the regions. On the other hand, in the long run, China's FDI has a positive and significant impact on most OIC member countries in all the regions.

Conclusion

This study aims to analyze the impact of the economy of the US and China on the economic growth of the OIC member countries. The findings reveal that there are short-run and long-run relationships among the variables. In the short-run, the US-China economy, represented by the balance of trade and FDI, has a positive and significant relationship with the economic growth of the OIC member countries. Regarding the exchange rate, the US dollar has a positive and significant effect on the economic growth of the OIC member countries, while China's Renminbi has a negative and significant effect. In the long run, the influences of the US and China have the same results. The US and China's balance of trade and exchange rate have a negative and significant influence, while the US and China's FDI have a positive and significant influence on the economic growth of the OIC member countries. In addition, most of the US and China's economic influences on the OIC member countries in all regions are significant. However, the directions of the effects are different, depending on the US and China's economic relationship in each region.

According to the findings, from the perspective of economic authority, the OIC member countries in all regions, either regulators, people in business, or practitioners, must be aware of and formulate the appropriate economic and business strategy to respond to the development of the US-China economy. Furthermore, the strength of US and China influences may differ in each region depending on the US-China economic relationship. For the following researchers, this study still has much room to improve. We suggest that specific variables at the regional or country level are needed to be more objective to examine the impact of the US-China economy on each OIC member country. Moreover, another econometric method may be needed to examine the possibility of the asymmetric impact of the US-China economic condition on OIC member countries' economic growth.

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