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The Impact of the US-China Trade Balance on the Economic Growth of Organisation of Islamic Cooperation Member Countries

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ABSTRACT

This paper aims to examine the impact of the US-China trade balance on the economic growth of Organisation of Islamic Cooperation (OIC) member countries. The data were obtained from the World Bank covering a total of 40 observation periods between 1979 and 2018. The data comprise the OIC member countries' economic growth as the dependent variable and the US-China trade balance and exchange rate as the independent variables. Adopting the Non-linear Autoregressive Distributed Lag (NARDL) model as the method of the study, the findings reveal that the US-China trade balance has a symmetric relationship with the economic growth of OIC member countries. To deepen the study, regional-level analysis was also conducted to examine the unique impact in eight different regions that include OIC member countries. The study found that only the South East Asia region has an asymmetric short- and long-run relationship between the US-China trade balance and economic growth, while the other regions have a symmetric relationship. Based on the findings, the paper suggests that each OIC member country region should adopt its own policy based on either the symmetric or asymmetric relationship, in order to respond to the dynamics of the US-China trade balance. This approach is expected to generate higher economic growth for the OIC member countries.

ملخص

تهدف هذه الورقة البحثية إلى دراسة تأثير الميزان التجاري بين الولايات المتحدة والصين على النمو الاقتصادي للدول الأعضاء في منظمة التعاون الإسلامي (OIC). وتم الحصول على البيانات من البنك الدولي، وهي تغطي ما مجموعه 40 فترة مراقبة بين عامي 1979 و 2018. وتشمل البيانات النمو الاقتصادي للدول الأعضاء في منظمة التعاون الإسلامي باعتباره المتغير التابع والميزان التجاري بين

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الولايات المتحدة والصين وسعر الصرف كمتغيرات مستقلة.وباعتماد نموذج الانحدار الذاتي ذو الإبطاء الموزع غير الخطي (NARDL) كطريقة للدراسة، وتكشف النتائج أن الميزان التجاري بين الولايات المتحدة والصين له علاقة متماثلة مع النمو الاقتصادي للدول الأعضاء في منظمة التعاون الإسلامي. ولتعميق الدراسة، تم إجراء تحليل على المستوى الإقليمي أيضا لفحص التأثير الفريد في ثماني مناطق مختلفة تشمل البلدان الأعضاء في منظمة التعاون الإسلامي. وتوصلت الدراسة إلى أن منطقة جنوب شرق آسيا وحدها تتميز بعلاقة غير متكافئة قصيرة وطويلة المدى بين الميزان التجاري بين الولايات المتحدة والصين والنمو الاقتصادي، في حين أن المناطق الأخرى لديها علاقة متماثلة. وبناء على النتائج، تشير الورقة البحثية إلى أنه يتعين على كل منطقة من منظمة التعاون الإسلامي أن تتبنى سياستها الخاصة استنادا إلى العلاقة المتماثلة أو غير المتكافئة، من أجل الاستجابة لديناميكيات الميزان التجاري بين الولايات المتحدة والصين. ومن المتوقع أن يؤدي هذا النهج إلى نمو اقتصادي أعلى للبلدان الأعضاء في منظمة التعاون الإسلامي.

ABSTRAITE

This paper aims to examine the impact of the US-China trade balance on the economic growth of Organisation of Islamic Cooperation (OIC) member countries. The data were obtained from the World Bank covering a total of 40 observation periods between 1979 and 2018. The data comprise the OIC member countries' economic growth as the dependent variable and the US-China trade balance and exchange rate as the independent variables. Adopting the Non-linear Autoregressive Distributed Lag (NARDL) model as the method of the study, the findings reveal that the US-China trade balance has a symmetric relationship with the economic growth of OIC member countries. To deepen the study, regional-level analysis was also conducted to examine the unique impact in eight different regions that include OIC member countries. The study found that only the South East Asia region has an asymmetric short- and long-run relationship between the US-China trade balance and economic growth, while the other regions have a symmetric relationship. Based on the findings, the paper suggests that each OIC member country region should adopt its own policy based on either the symmetric or asymmetric relationship, in order to respond to the dynamics of the US-China trade balance. This approach is expected to generate higher economic growth for the OIC member countries.

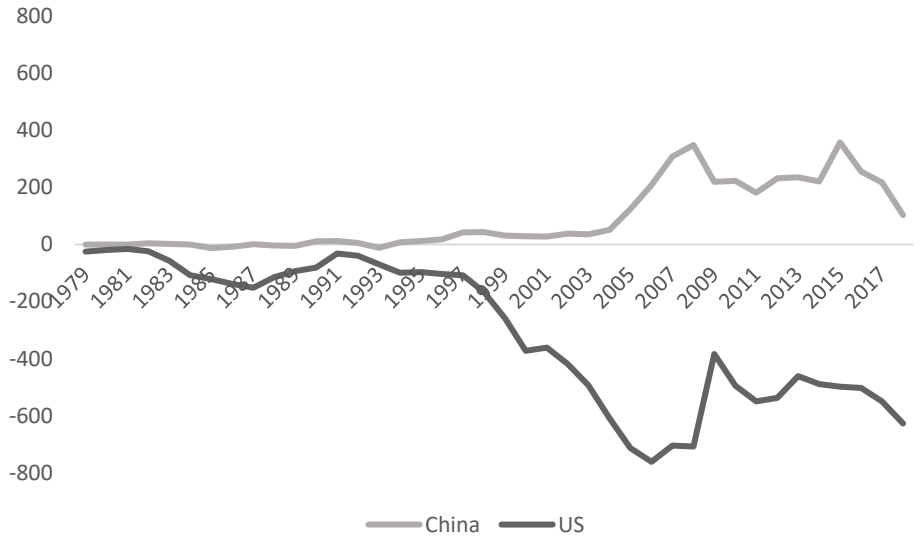
***Keywords**: US-China trade balance, NARDL, OIC member countries' economic growth*

JEL : F40, F4, F62

1. Introduction

Economic integration is essential for economic activity among countries (Bilgin et al., 2011). Such integration has been prominent in both the financial and real sectors, including in international trade. An integrated economy can yield benefits for all countries due to its openness and the ease of conducting international trading activities (Xing, 2007). There is also the implication that an integrated economy can lead to spillover impacts at times of economic crisis, which will in turn influence other countries as part of the overall process.

Figure 1: The US and China Balance Trade, 1979–2018 (in USD billion)



Source: World Bank (2020)

In the current era of integrated economic dominance, the world's two largest economies, namely the US and China, play a pivotal role in global economic activities. According to data from the World Bank (2020), China's GDP equates to a roughly 17% share of the global economy, while the US and China have a combined GDP of more than USD 34.1 trillion. This leading contribution to global GDP is supported by a high level of international trading activity through the US and China's trading partnerships, which cover both import and export activities. Data from the World Bank (2020) shows that, during the period 1979–2018, the US and China experienced a trade balance fluctuation. However, since 1990,

China's trade balance has tended to be positive, while that of the US has consistently trended negative. There is no doubt that the impact of this trade imbalance between the two countries will directly affect their economic growth (Sun and Heshmati, 2010).

Bilgin et al. (2011), Chiu and Ren (2018), Xing (2007), Carvalho, Azevedo and Massuquetti (2019), and Ianchovichina and Martin (2020) explained that the international trading activity of the US and China, whether for exports or imports, affects the state of the global economy. Hence, the international trade of these two countries is one of the factors that influence world economic growth, including that of the Organisation of Islamic Cooperation (OIC) member countries. According to the OIC database (SESRIC, 2020), a total of 52 countries makes up the OIC, located across several regions including Africa, Europe, Asia and South America. SESRIC (2019) reported that the OIC share of global GDP reached 15.2% in 2018. This represented a rise of 0.4 percentage points compared to 2010, when the OIC's share stood at 14.8%.

Previous trade balance studies have mainly discussed the impact of currency exchange on the trade balance in terms of identifying the J-Curve effect for developed and developing countries. These studies include Baak (2008), Halicioglu (2008), Wang, Lin and Yang (2012), Bahmani-Oskooee and Harvey (2012), and Nusair (2016). In terms of related studies on the trade balance and the impact of US-China international trade on the economic growth of other countries, Sun and Heshmati (2010) noted that an increase in international trade participation will have a positive impact on a country's economic growth, especially for exporting countries. Furthermore, other researchers have attempted to examine the relationship between the trade balance and the contribution to economic growth. These include Zhang (1999), Were (2015), Chan and Tze-Haw (2014) and (Chiu and Ren, 2018).

To enrich the research perspective, this paper aims to examine the impact of the US-China trade balance on the OIC member countries' economic growth from the perspective of an asymmetric approach. The paper is divided into several sections. A literature review and explanation of the study's methodology are presented after this introductory section, followed by the results and discussion. Lastly, the conclusion will be discussed, which will shed light on the findings and provide suggestions for future research.

2. Literature Review

2.1 Trade balance and economic growth

The global trading system has created a boom in the global economy at the same time as opening the door for individual countries to increase the size of their economy (Steinbock, 2018). Based on economic theory, trade leads to economic growth (Andersen and Babula, 2009). The growth model refers to tangible growth, which depends on a foundation of export growth to imports in the context of the income elasticity ratio; hence, the balance of payments (BOP) must be in equilibrium (Thirlwall, 1979). Idiosyncratically, international trading is the only sustainable way to invest in increasing imports, where an expansion in domestic production activities leads to a rise in the amount of foreign exchange revenue earned via exports (Blavasciunaite, Garsviene and Matuzeviciute, 2020). Accordingly, capital flows lead to economic growth in the exporting country (Kvedaras, Garcimartín and Astudillo, 2020).

Prior studies have examined the diverse effects of the trade balance as well as economic growth in terms of geographical locations, as implied through a deeper trade balance or measurement of the deficit. Such studies include Blavasciunaite, Garsviene and Matuzeviciute (2020), Bakari, Fakraoui and Tiba (2019), Bakari (2018) and Bakari and Saaidia (2016). Prior to this, Abbas and Raza (2013), Fetahi-Vehapi, Sadiku and Petkovski (2015), Were (2015) and Altaee, Al-Jafari and Khalid (2016) failed to depict the effect of the trade balance (exports and imports) on economic growth. Hence, this study argues that the trade balance plays a significant role in global economic growth.

2.2 US-China trade relationship

Globalisation has become an essential and persistent phenomenon in response to which the world's economic and political forums have made some acute deviations (Cui et al., 2019; Munir and Ameer, 2018; Panigrahi, Bahinipati and Jain, 2019). Trade liberalisation linked to the phenomenon has potentially benefitted China, which has recorded GDP growth of 9% since 2000 (Cui et al., 2019). Nevertheless, the USA continues to be considered the world's largest economy (Kapustina et al., 2020), with China in second position (Cui et al., 2019; Kapustina et al., 2020). However, while many factors connected to globalisation have affected the growing US-China trade balance, the central element has been the modification of the global industrial structure and the

consequences of a large number of multinational firms transferring their manufacturing bases from the developed regions to China (He et al., 2009). More recently, China has developed into a strategic competitor and heterodox power. This has been highlighted by the US National Security Strategy and US National Defense Strategy (2018) and has definitely become a prime concern for the US (Guo, Sheng and Yu, 2018; Jisi et al., 2018), thereby giving rise to US-China trade friction (He, Gong and Wang, 2009).

US-China trade friction is mainly founded on the trade imbalance, different market systems and exchange rates (Hughes, 2005; Jisi et al., 2018; Yang, 2012). Yet, while US imports from China have not had any significant impact on the US trade deficit (Kim, 2014), the prospect of trade friction has arisen due to the US market's over-dependence on Chinese exports (Glaser and Viers, 2016); as such, trade friction has been influenced by trade protectionism, which in turn has been triggered by economic slumps (Kapustina et al., 2020; Kim, 2014; Steinbock, 2018; Stiglitz, 2018). Consequently, the two countries have reached certain arrangements to balance their trade relationship with the aim of growing their respective economies and in turn the global economy (Steinbock, 2018). Ultimately, the US is attempting to reduce both its joint trade and federal budget deficit and also lessen China's rapid economic growth (Kapustina et al., 2020; Steinbock, 2018). Hence, a trade deficit reduces economic growth, leading to a higher budget deficit (Butkus and Seputiene, 2018). Despite this, however, any friction within the US-China trade balance will also generate a spillover effect and thus encourage other countries as part of the global trading system.

2.3 Impact on OIC countries

China's rapid growth has been predicated on the significant development of its export-led trade relationships with other countries and organisations such as the OECD and emerging countries, while simultaneously shifting from labour to technology and capital exports (Caporale, Sova and Sova, 2015). As the USA has sought to reduce its exports from China, other countries have entered the US domestic market with which it may achieve a trade balance (Steinbock, 2018). Hence, US-China trade friction is both significant and likely to result in several economic displacements for both countries (Ajami, 2020; Fajgelbaum and Khandelwal, 2021). As a consequence, there is the potential for manufacturing and electronics supply chains to shift to other emerging countries (Steinbock, 2018). In

this way, both countries may find that least-developed and emerging countries enhance their trade balance and lead to the creation of new trading partnerships. Henceforth, this trade friction has a spillover effect, namely a ripple effect in the Asian economies, predominantly for Japan, India and the Asian Tigers (Ajami, 2020).

Furthermore, Keho (2017) evidenced the positive effects of international trade on economic growth in the Ivory Coast. India's international trade has also had a spillover effect on the economic growth of neighbouring countries such as Bangladesh, Nepal, Bhutan and Sri Lanka (Kumar, 2020). Sub-Saharan countries have similarly benefitted in diverse ways, from enhanced human capital, economic growth and institutions to the diversification of exports (Osakwe, Santos-Paulino and Dogan, 2018). New realignments in trade relations between countries have also begun to emerge (Ajami, 2020; Fajgelbaum and Khandelwal, 2021). In this context, OIC countries have advanced the potential for negotiating a bilateral trade relationship with China, while India and China do not have a well-established bilateral negotiating relation (Ajami, 2020).

Several past empirical studies examined the link between economic growth and the trade balance in OIC countries. For example, Sahin and Mucuk (2014) noted the negative influence of a current account deficit on Turkey's economic growth (supported by Aydın and Esen, 2016), while the international trade balance is an important driver of Indonesian economic growth (Pratikto, 2012). A long-term association between economic growth, international trade and financial growth has also been noted in Pakistan (Gokmenoglu, Amin and Taspinar, 2015). Trade cooperation has helped in driving economic growth for both Malaysia and Turkey (Kayadibi, 2015), while trade in services has boosted economic growth in Jordan faster than the trade in goods (Serena, Nooh and Abdullah, 2016). Finally, in Malaysia, the trade balance was found to significantly affect the exchange rate, domestic income and rate of inflation, while the trade deficit has a negative effect (Manual and San, 2019). OIC countries experienced growth in exports in the global market during the period 2017–2018 despite previously recording a continuous fall since 2008, reaching a low point in 2016. Hence, the OIC countries have latterly recorded a better economic performance than other country groups (OIC, 2019). Farooq et al. (2020) examined the negative influence of globalisation on the economic growth of OIC countries from 1991 to 2017. There is a definite need for OIC countries to enhance their exports

to the world through an improvement to their competitive economic segments in the form of robust diversification and greater technological concentration (OIC, 2019). Hassan, Sanchez and Hussain (2010) suggested a drive to enhance trade relations among member countries as a means of increasing economic growth. However, the US-China trade balance and friction between the two countries also have the potential to impact the recent economic growth derived from international trade among OIC countries. This study argues that the OIC countries, Bangladesh, Pakistan, Malaysia, Indonesia and Middle Eastern countries can develop and benefit from US-China trade friction.

3. Methodology

This study uses time-series data with an observation period of approximately 40 years, from 1979 to 2018, to measure the impact of the US-China trade balance on the economic growth of OIC member countries. The data were obtained from the World Bank and the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC). The dependent variable used in this study is OIC member countries' economic growth (EG), which is calculated as an average of the economic growth of the OIC member countries.

Furthermore, the independent variables consist of the US trade balance (BOT_{US}) and China's trade balance (BOT_{CH}), defined as the total amount of exports minus imports in USD for the US and China respectively. The rationale for using the trade balance as an independent variable is due to the spillover effect that impacts other countries. We also add the US exchange rate (ER_{US}) and China's exchange rate (ER_{CH}), which are considered to be complementary variables. ER is measured by the exchange rate of the US and China respectively at the end of the year and is denoted in United Kingdom pounds sterling to equalise the currency unit for both countries.

Table 1: Data Description

Variable	Obs	Mean	Std. Dev	Min	Max
EG_{OIC}	40	3.27%	1.82%	-1%	6.9%
BOT_{US}	40	USD -304.1 bn	USD 244.5 bn	USD -761.72 bn	USD -15.68 bn
BOT_{CH}	40	USD 89.18 bn	USD 114.47 bn	USD -12.6 bn	USD 357.87 bn
ER_{US}	40	£ 0.62	£ 0.079	£ 0.43	£ 0.77
ER_{CH}	40	£ 0.13	£ 0.084	£ 0.06	£ 0.33

From the data given in Table 1, the highest rate of economic growth in the OIC countries is 6.9% and the lowest is -1%. Furthermore, BOT_{US} is usually a deficit amount, which means that US imports exceed US exports. In contrast, BOT_{CH} shows a maximum of USD 357.87 bn, thus representing a positive value in its trade balance. Additionally, Table 1 shows that, based on the exchange rate to UK pounds sterling, the USD is stronger than the Chinese renminbi.

3.1 Research model

To examine the potential existence of an asymmetric relationship between the US-China trade balance and the economic growth of OIC member countries, this study adopts the Non-linear Autoregressive Distributed Lag (NARDL) model as suggested by Shin, Yu and Greenwood-Nimmo (2014). The NARDL results will identify whether an asymmetric relationship exists among the variables or not. In applying NARDL, several statistical tests must be conducted. Firstly, a unit root test as suggested by Dickey and Fuller (1981) is conducted to measure the level of stationarity.

Secondly, based on Shin, Yu and Greenwood-Nimmo (2014), the short-run and long-run relationship will be measured using the following equation:

$$\Delta \mathrm{EG}_{OICt} = a_0 + a_1\, \Delta \mathrm{EG}_{OICt-1} + a_2\, \Delta POSBOT_{USt-1} + a_3\, \Delta NEGBOT_{USt-1} + a_4\, \Delta \mathrm{ER}_{USt-1} + a_5\, \Delta POSBOT_{CHt-1} + a_6\, NEGBOT_{CHt-1} + a_7\, \Delta \mathrm{ER}_{CHt-1} + \sum_{i=1}^{n} \Theta_{1i}\, \Delta \mathrm{EG}_{OICt-1} + \sum_{i=1}^{n} \Theta_{2i}\, \Delta POSBOT_{USt-1} + \Theta_{3i}\, \Delta NEGBOT_{USt-1} + \sum_{i=1}^{n} \Theta_{4i}\, \Delta \mathrm{ER}_{USt-1} + \sum_{i=1}^{n} \Theta_{5i}\, \Delta POSBOT_{CHt-1} + \sum_{i=1}^{n} \Theta_{6i}\, \Delta NEGBOT_{CHt-1} + \sum_{i=1}^{n} \Theta_{7i}\, \Delta \mathrm{ER}_{CHt-1} \quad (1)$$

where the POS and NEG of the US-China trade balance value are generated from,

$$POSBOT_{USt} = \sum_{i=1}^{n} \Delta\, BOT_{USt}^{+} = \max(\mathrm{BOT}_{USt}, 0) \quad (2)$$

$$NEGBOT_{USt} = \sum_{i=1}^{n} \Delta\, BOT_{USt}^{-} = \min(\mathrm{BOT}_{USt}, 0) \quad (3)$$

$$POSBOT_{CHt} = \sum_{i=1}^{n} \Delta\, BOT_{CHt}^{+} = \max(\mathrm{BOT}_{CHt}, 0) \quad (4)$$

$$NEGBOT_{CHt} = \sum_{i=1}^{n} \Delta\, BOT_{CHt}^{-} = \min(\mathrm{BOT}_{CHt}, 0) \quad (5)$$

Sriyana and Ge (2019) explained that the Wald test can be used to examine the existence of an asymmetric relationship. If the value of the F-statistic is significant, H_0 is rejected, which means the relationship among the variables is asymmetric.

The NARDL model can also be used in the form of the ARDL model as well as with bounds testing, as suggested by Pesaran, Shin and Smith (2001), provided that the POS and NEG values from the observed variables have already been calculated based on the Shin, Yu and Greenwood-Nimmo (2014) model (Cheah et al., 2017). Bahmani-Oskooee (2001) added that the bounds testing cointegration is inadequate if the result falls between the lower and upper bounds. In this case, an additional test must be conducted through the value of error correction; this must be negative and significant to conclude the presence of cointegration among the observed variables. As a robustness check, cumulative sum (CUSUM) was performed to examine whether the model was stable at the 5% significance level.

4. Result and Discussion

4.1 Unit root test

Table 2: Augmented Dickey–Fuller (ADF) Test

Variable	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): Stationary
BOT_{US}	0.399	-0.896	-1.926	-5/460***	-5.429***	-5.419***	I(1): Stationary
ER_{US}	0.283	-4.521**	-4.454**	-4.464**	-4.452**	-4.386**	I(0): Stationary
BOT_{CH}	-1.010	-1.519	-2.188	-3.080***	-3.010**	-2.916*	I(1): Stationary
ER_{CH}	-1.740*	-1.911	-1.318	-3.637**	-3.807**	-4.481**	I(0): Stationary

Note: ***, ** and * denote the level of stationarity at *a* = 1%, 5% and 10% respectively.

As the opening stage of the NARDL analysis, the results from the Augmented Dickey–Fuller (ADF) test (Table 2) show that EG_{OIC} and BOT_{US} are stationary at the first difference. This level of stationarity is also observed for BOT_{CH}. Furthermore, the results for ER_{US} and ER_{CH} differ from those of the previously mentioned variables. Both variables are stationary at level. According to Shin, Yu and Greenwood-Nimmo (2014), this condition meets the requirement for the NARDL model to test the relationship between the independent and dependent variables.

4.2 NARDL result

Table 3. NARDL Result

Variables	OIC	South East Asia	South Asia	Middle East	Central Asia	Europe	South America	Africa
EG (-1)	-1.051***	-1.279***	-1.324***	-1.182***	-0.506**	-1.108***	-1.581***	-1.546***
	(0.316)	(0.304)	(0.282)	(0.303)	(0.229)	(0.309)	(0.333)	(0.397)
$POSBOT_{US}$(-1)	-0.00930	0.0193	-0.0104	0.00880	-0.0199	0.000124	0.00600	-0.0131
	(0.00594)	(0.0145)	(0.0138)	(0.0197)	(0.0228)	(0.0234)	(0.0171)	(0.00897)
$NEGBOT_{US}$(-1)	-0.00713**	-0.0156	-0.0131	-0.00343	-0.00705	-0.0114	-0.00681	-0.0135**
	(0.00340)	(0.00921)	(0.00806)	(0.0122)	(0.0144)	(0.0131)	(0.0104)	(0.00511)
$POSBOT_{CH}$(-1)	-0.00525	-0.0582**	-0.0107	-0.00311	0.00139	-0.00451	-0.00616	-0.0189
	(0.00946)	(0.0265)	(0.0240)	(0.0341)	(0.0347)	(0.0371)	(0.0292)	(0.0140)
$NEGBOT_{CH}$(-1)	-0.00840	0.000553	-0.00810	0.0496	-0.0324	0.0283	0.0225	-0.0229
	(0.0122)	(0.0323)	(0.0308)	(0.0467)	(0.0471)	(0.0541)	(0.0407)	(0.0208)
ΔEG_{OIC}(-1)	0.113	0.445*	0.267	0.113	0.0659	0.175	0.314	0.101
	(0.199)	(0.234)	(0.194)	(0.200)	(0.226)	(0.229)	(0.210)	(0.224)
$\Delta POSBOT_{US}$	-0.00303	-0.0119	-0.000951	-0.0253	0.0127	-0.0259	-0.000317	0.00494
	(0.00706)	(0.0190)	(0.0180)	(0.0263)	(0.0268)	(0.0306)	(0.0230)	(0.0116)
$\Delta POSBOT_{US}$(-1)	0.00630	-0.00498	0.00980	-0.00768	0.00893	-0.0185	0.00375	0.000616
	(0.00734)	(0.0192)	(0.0181)	(0.0274)	(0.0281)	(0.0304)	(0.0234)	(0.0122)
$\Delta NEGBOT_{US}$	-0.00364	0.0363	-0.0104	-0.0189	-0.0278	-0.0334	0.0332	0.00922
	(0.00725)	(0.0229)	(0.0182)	(0.0269)	(0.0278)	(0.0294)	(0.0235)	(0.0121)
$\Delta NEGBOT_{US}$(-1)	0.00146	0.0320	0.0136	0.0135	-0.0383	0.0215	-0.0172	0.0113
	(0.00898)	(0.0265)	(0.0223)	(0.0340)	(0.0355)	(0.0371)	(0.0293)	(0.0139)

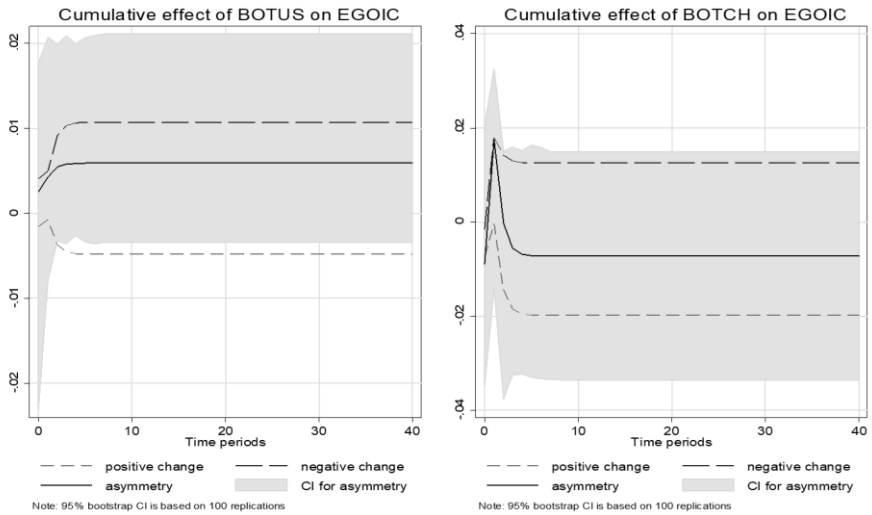
$\Delta POSBOT_{CH}$	-0.00582	0.00323	0.00260	0.00505	-0.0172	-0.00826	-0.0164	-0.0220
	(0.00845)	(0.0226)	(0.0213)	(0.0316)	(0.0327)	(0.0343)	(0.0269)	(0.0134)
Δ $POSBOT_{CH}(-1)$	0.00731	0.0162	0.0216	0.00107	0.0139	0.00108	-0.0133	0.00632
	(0.0125)	(0.0320)	(0.0317)	(0.0452)	(0.0464)	(0.0507)	(0.0394)	(0.0196)
$\Delta NEGBOT_{CH}$	0.00680	-0.0711*	0.00232	-0.0448	0.0458	0.0108	-0.00366	0.0193
	(0.0139)	(0.0399)	(0.0343)	(0.0507)	(0.0538)	(0.0610)	(0.0436)	(0.0224)
$\Delta NEGBOT_{CH}(-1)$	0.000186	-0.0793*	-0.000155	-0.0258	0.0208	-0.0252	-0.0227	-0.0198
	(0.0172)	(0.0456)	(0.0419)	(0.0634)	(0.0658)	(0.0697)	(0.0532)	(0.0310)
ER_{US}	-0.219	-15.93	-1.877	-2.280	0.0352	7.723	-4.305	8.030
	(4.371)	(10.21)	(9.329)	(14.07)	(14.30)	(15.32)	(11.97)	(5.912)
ER_{CH}	-7.513*	7.389	29.76***	-24.53	7.287	5.001	-32.96**	-12.60*
	(4.303)	(9.070)	(9.399)	(14.26)	(14.22)	(13.83)	(13.42)	(6.234)
Constant	3.136	14.78**	0.0882	9.785	-3.332	-3.152	8.832	0.327
	(3.224)	(6.858)	(5.833)	(9.151)	(8.793)	(9.338)	(7.680)	(4.063)
Observations	38	38	38	38	38	38	38	38
R-squared	0.606	0.580	0.636	0.592	0.367	0.594	0.672	0.799
Bounds test	5.366***	2.777*	8.614***	4.692***	1.849	4.506***	4.924***	10.721***

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3 shows the results of the NARDL test as advocated by Shin, Yu and Greenwood-Nimmo (2014) to measure the existence of an asymmetric effect of BOT_{US} and BOT_{CH} on the OIC member countries' economic growth. From the result, we can observe that $NEGBOT_{US(-1)}$ has a negative and significant impact on the economic growth of the OIC member countries at the 5% level of significance. To deepen the finding, regional analysis is used to identify the specific influence of the US and China's trade balance on the OIC member countries' economic growth. From the findings, only the South East Asian and African regions are identified as having a significant relationship between $POSBOT_{CH(-1)}$ and $NEGBOT_{US(-1)}$ respectively and the economic growth of each region. The results of the bounds testing cointegration in all regions show that all regions are statistically significant, which means that cointegration exists among the variables except in Central Asia.

Moreover, the NARDL Bootstrap Analysis (Figure 2) reveals the existence of a temporary asymmetric relationship at the beginning of the observational period. However, in the long run, the relationship appears symmetric. In terms of the influence of BOT_{CH} on the OIC member countries' economic growth, an increase in the positive change tended to generate a temporary rise in economic growth at the beginning of the period. Virtually the same pattern is seen when the negative change increases, albeit with a different degree of influence.

Figure 2: NARDL Bootstrap Analysis



4.3 Short-run and long-run symmetric test

The Wald test is applied to measure the existence of an asymmetric short-run (W_{SR}) and long-run (W_{LR}) relationship among the variables. The H_0 hypothesis reflects a symmetric relationship while H_1 gives a value for rejecting H_0 if the F-statistic is significant at either the 1%, 5% or 10% level. If H_0 is rejected, an asymmetric relationship exists among the variables observed in this study.

Table 4: Short-run and Long-run Symmetric Test

Variables	OIC	South East Asia	South Asia	Middle East
Symmetry Test				
W_{LR} for $POSBOT_{US}$=$NEGBOT_{US}$	0.09564	3.662*	0.02366	0.2205
W_{SR} for $POSBOT_{US}$=$NEGBOT_{US}$	0.08318	2.202	0.01419	0.1519
W_{LR} for $POSBOT_{CH}$=$NEGBOT_{CH}$	0.0503	2.502	0.005746	0.9778
W_{SR} for $POSBOT_{CH}$=$NEGBOT_{CH}$	0.03236	4.239*	0.09021	0.5
Long-run Effects:				

$POSBOT_{US}$	-0.009	0.015	-0.008	0.007
	2.972*	1.907	0 .6092	0.1993
$NEBOT_{US}$	0.007	0.012	0.010	0.003
	4.452**	3.366*	2.533	0.07716
$POSBOT_{CH}$	-0.005	-0.045	-0.008	-0.003
	0.2758	5.759**	0 .1874	0.008236
$NEGBOT_{CH}$	0.008	-0.000	0.006	-0.042
	0.438	0.000293	0 .06762	1.169

Table 4: Short-run and Long-run Symmetric Test (continue)

Variables	**Europe**	**Central Asia**	**South America**	**Africa**
Symmetry Test				
W_{LR} for $POSBOT_{US}=NEGBOT_{US}$	0.1384	0.2307	0.3407	0.001559
W_{SR} for $POSBOT_{US}=NEGBOT_{US}$	0.1654	1.479	0.04123	0.2391
W_{LR} for $POSBOT_{CH}=NEGBOT_{CH}$	0.2496	0.3728	0.4128	0.03019
W_{SR} for $POSBOT_{CH}=NEGBOT_{CH}$	0.003633	0.3526	0.001398	0.07907
Long-run Effects:				
$POSBOT_{US}$	0.000	-0.039	0.004	-0.008
	0.0000281	0.9488	0.1258	2.548
$NEBOT_{US}$	0.010	0.014	0.004	0.009
	0.6996	0.2935	0.4298	6.384**
$POSBOT_{CH}$	0.1384	0.003	-0.004	-0.012
	0.1654	0.001594	0.04416	1.57
$NEGBOT_{CH}$	0.2496	0.064	-0.014	0.015
	0.003633	0.510	0.3253	0.261

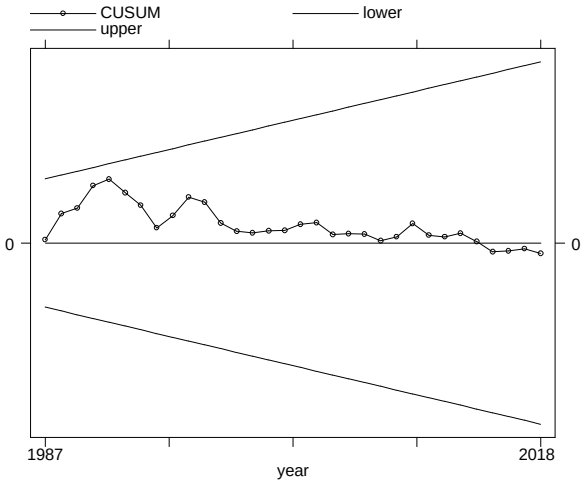
Note: *** p<0.01, ** p<0.05, * p<0.1

According to Table 4, no short-run or long-run asymmetric relationship exists among the trade balance of the US and China and the OIC member countries' economic growth. This is shown by the fact that W_{LR} for $POSBOT_{US}$=$NEGBOT_{US}$, W_{SR} for $POSBOT_{US}$=$NEGBOT_{US}$, W_{LR} for $POSBOT_{US}$=$NEGBOT_{US}$ and W_{SR} for $POSBOT_{US}$=$NEGBOT_{US}$ are not significant at any level; H_0 is thus accepted. The finding also confirms that the relationship among the trade balance of the US and China and the economic growth of OIC member countries is symmetric, indicating that an increase/decrease in the negative/positive trade balance of the US and China has a symmetrical impact on the economic growth of the OIC member countries.

Based on the value of the F-statistic, the same finding appears for most of the OIC member countries in all but one of the regions, namely South Asia, Middle East, Europe, Central Asia, South America and Africa. The finding thus reveals that the trade balance of the US and China has a symmetric effect on the economic growth of the OIC countries in those regions in either the short run or the long run. The fact that there is no asymmetric relationship among the variables shows that an increase/decrease in the negative/positive trade balance of the US and China has the same impact on the economic growth of the OIC member countries.

In contrast to the other regions, South East Asia has a significant long-run asymmetric relationship between BOT_{US} and the economic growth of the OIC member countries in that region. This is demonstrated by the F-statistic value of W_{LR} for $POSBOT_{US}$=$NEGBOT_{US}$, which is significant at the 10% level. Specifically, an asymmetric relationship is found between $NEGBOT_{US}$ and the economic growth of the OIC member countries in South East Asia. The coefficient indicates that a USD 1 increase in the US trade balance deficit will increase the economic growth of OIC member countries in South East Asia by 0.012%. This finding explains that the OIC member countries in South East Asia will asymmetrically benefit when the US experiences a deeper deficit in its trade balance. As mentioned by Xing (2007), a lower volume of exported goods and services by a certain country, such as the US, may be explained by the superior competitiveness of other countries, such as OIC member countries, in the international market. This would lead to an upsurge in the economic growth of OIC member countries, especially in South East Asia.

Figure 3. Stability Test



In addition, the value of W_{SR} for $POSBOT_{CH}$=$NEGBOT_{CH}$ is significant at the 10% level. This finding confirms the existence of an asymmetric relationship in the short run. Chan and Tze-Haw (2014) explained that an increase in China's positive trade balance will have a negative effect on the economic growth of South East Asian countries. This is because, as part of their role in global economic activity, China and South East Asian countries also compete in the international markets for certain goods and services. However, the goods and services exported by countries in South East Asia may be uncompetitive in the international market when compared with those of China, thereby resulting in a higher positive trade balance for China.

Lastly, to examine the robustness of the research finding, according to Figure 3, the test result indicates that the plot of the CUSUM statistics does not exceed the critical bounds of the 5% level of significance. The result also indicates that the model is constant, which reflects the stability of the estimated parameters in the model.

5. Conclusion

The relationship between the US-China trade balance and the OIC member countries' economic growth varies across the different regions examined. When all OIC countries are included in the same sample, the finding reveals a symmetric relationship among the observed variables.

This condition also occurs for the majority of the regions, except for South East Asia, which has an asymmetric relationship. In addition, a long-run asymmetric relationship was found between BOT_{US} and the economic growth of the OIC member countries in South East Asia, along with a short-run relationship between BOT_{CH} and the OIC member countries' economic growth in South East Asia.

The study's findings provide an insight into the effect of the US-China trade balance on the OIC member countries' economic growth, which varies across the regions. These findings will be of benefit to the OIC regional authorities as they formulate their response to the dynamics within the US-China economic relationship, wherein they must consider the sensitivity of the regional economy to the state of the US-China trade balance. OIC policymakers may also find that the study's findings help in enhancing their collaboration with member countries as well as in their attempts to build new trade relationships with other countries in terms of both goods and services. Furthermore, the findings may help international traders to enhance their trading relationships among OIC countries in order to strengthen the mutual economic condition. Lastly, the study's findings will enrich the body of knowledge available for the literature reviews of future researchers.

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