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Trade Liberalization and Economic Growth: The Scenario of the MINT Economies

Innocent. U. Duru

Department of Economics, Renaissance University Ugbawka, Enugu State, Nigeria.
Email: iud3x@yahoo.com Tel: +234-8154827934

Abstract

This study investigated the impact of trade liberalization on economic growth for Mexico, Indonesia, Nigeria and Turkey from 1986 to 2020. The Autoregressive Distributed Lag Bounds approach to cointegration and Toda and Yamamoto causality test were utilized for this study. The long-run results revealed that there is no relationship between trade liberalization and real gross domestic product per capita except for Mexico and in this situation, the significance level was at 10%. The results of the causality test showed that no causality was detected between real gross domestic product per capita and trade liberalization for Mexico and Indonesia. A bidirectional causality between real gross domestic product per capita and trade liberalization was found for Nigeria whereas a unidirectional causality from trade liberalization to real gross domestic product per capita was revealed for Turkey. The no causality results for Mexico and Indonesia means that the policy objectives of trade liberalization and economic growth can be pursued independently in both economies. In addition, the bidirectional causality detected for Nigeria suggests that the policy objectives of trade liberalization and economic growth can be pursued together in Nigeria. Furthermore, the unidirectional causality from trade liberalization to real gross domestic product per capita found for Turkey implies that she employs trade liberalization policies effectively for objectives of economic growth, thus trade liberalization causes economic growth.

Keywords: Trade liberalization, Economic growth, Cointegration, ARDL, Toda and Yamamoto Multivariate Causality, Nigeria.
JEL Classification: C22; F19; O50.

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Contents

Contribution of this paper to the literature
This study contributes to existing literature by investigating the impact of trade liberalization on economic growth for Mexico, Indonesia, Nigeria and Turkey from 1986 to 2020.

1. Introduction

The link between trade liberalization and economic growth has attracted extensive research in the parlance of international economics. Trade liberalization is believed to be the engine of economic growth and development in economies of the world, especially the developing ones. Chile and Talukder (2014) and FAO (2005) maintained that liberalized international trade affects long-run economic growth. No wonder, the unrelenting and general divergences in the performance of the economy among economies, particularly developing economies has heightened the attention given to trade liberalization-economic growth nexus in recent times (Lall, 2004).

Dollar and Kraay (2001) declared that economies such as China, India, Malaysia and Mexico considered post-1980 globalizers realized quicker rates of growth than the affluent economies. However, in a similar vein, economies that pursued a protectionist regime of trade suffered a declining rate of growth. Evidence from numerous literature infers that barriers to trade decreases growth (see, for instance, (Dollar, 1992; Dollar & Kraay, 2003; Edwards, 1992; Frankel & Romer, 1999; Sachs & Warner, 1995)). However, as a result of the narrow openness measure utilized and other methodological deficiencies, Rodriguez and Rodrik (2000) were doubtful about the findings. Food and Agriculture Organization (2003) argued that many economies have embarked on trade policy reforms to further open their economies and broaden their access to the international market and increase the competitiveness of export.

Trade liberalization campaigners are of the view that it will increase the small domestic market; accelerate the transfer of technology; encourage foreign direct investment; generate greater competition; create marketing networks; supply technical and managerial skills; increase the flow of knowledge, resources, goods and services causing higher growth of the economy (Annabi, 2006; Corbett & Winebrake, 2008; Henry, Kneller, & Milner, 2009; McCulloch, Winters, & Cirera, 2003; Stone & Shepherd, 2011; Zhang, 2008). Thus, it is not surprising that Corbett and Winebrake (2008) argued that many economies have witnessed shocking economic growth in the recent past as a result of their readiness to open their borders and markets to foreign investment and trade. Again, Krueger (1997) maintained that the swift industrialization and development in Hong Kong, Singapore, South Korea and Taiwan considered as the four East Asian "tigers", is a model of beneficiaries of thriving policies of trade liberalization since the beginning of the 1960s.

Among the prominent features of the world economy in the last thirty-six years was that developing economies went through fast trade liberalization either individually or as a component of multilateral proposals with the World Bank (WB), World Trade Organization (WTO) and the International Monetary Fund (IMF). Hence, in the early 1980s, most developing economies were encouraged to effect trade reforms besides the Structural Adjustment Programmes (SAPs), imposed by the IMF, the WB and other international organizations, as a necessary step for a free-market economy. Thus, in the mid-1980s and early 1990s, trade reforms were effected and trade liberalization was entrenched in nearly all the developing economies.

The view on whether trade liberalization is a prerequisite for fast and sustained economic growth or not remained mixed. While some authors believe that trade liberalization is a must for fast and sustained economic growth (Berg & Krueger, 2003; Edwards, 1993; Edwards, 1997; Edwards, 1998; Krueger, 1990; Krueger, 1998; Winters, McCulloch, & McKay, 2004), others contest this assertion claiming that there is small evidence indicating that trade liberalization is meaningfully related to economic growth (Harrison & Hanson, 1999; Rodriguez & Rodrik, 2001). Regardless of the programmes applied to boost openness to trade in the four developing market economies of Mexico, Indonesia, Nigeria and Turkey, regarded as MINT economies, trade barriers still exist. Irrespective of important trade reforms in MINT economies, some disagreements concerning the role of trade liberalization in them persist.

In light of the above, this study seeks to examine the impact of trade liberalization from the perspective of the MINT economies. This research question was addressed in this study: What is the causal link between trade liberalization and economic growth in MINT countries? The general objective of this study is to investigate the causal link between trade liberalization and economic growth in the MINT countries. The rest of the paper is structured as follows. Section 2 focuses on the literature review and theoretical framework. Section 3 discusses the methodology. Section 4 dwells on data presentation, analysis and discussion of results while the conclusion and policy implications are presented in section 5.

2. Literature Review and Theoretical Framework

2.1. Empirical Literature

An extensive body of theoretical and empirical literature has investigated the relationship between trade liberalization and economic growth with mixed results. For instance, Nduka (2013) employed the Ordinary Least Square (OLS) methodology from 1970-2008 to examine empirically the nexus between trade openness and economic growth in Nigeria. The findings of the test of cointegration indicated the presence of a long-run equilibrium link between the variables. The findings indicated that trade openness had a positive and significant relationship with economic growth in Nigeria. In a similar vein, Mercan, Gocer, Bulut, and Dam (2013) applied the panel data technique to investigate the impact of openness on economic growth for the fast-emerging economies of Brazil, Russia, India, China and Turkey considered as BRIC-T countries from 1989-2010. The results revealed a positive and statistically significant relationship between openness and economic growth according to apriori expectations.

In addition, Dao (2014) applied the panel data techniques and pooled OLS regression to examine the link between trade openness and economic growth for a panel of 71 countries over the globe from 1980 to 2010. The results revealed a positive and significant link between trade openness and economic growth. Hamad, Burhan, and Stabua (2014) used the OLS methodology to investigate the impact of trade liberalization on economic growth in

Tanzania using annual time series data from 1970 to 2010. This period was decomposed into an era of the closed economy (1970-1985) and an era of the open economy (1986-2010). The results showed that openness to trade had a positive and significant impact on economic growth in Tanzania. However, this impact was comparatively greater in the closed economy era than the era of the open economy.

Equally, Manwa (2015) applied the Autoregressive Distributed Lag (ARDL) methodology and fixed effects panel data estimations from 1980 to 2011 to empirically examine the nexus between trade liberalization and economic growth in Southern African Customs Union (SACU) economies of Namibia, Swaziland, Botswana, South Africa and Lesotho. The findings revealed that trade liberalization measured through adjusted trade ratios, tariffs, the real effective exchange rate and trade ratios exerted an insignificant effect on economic growth in Swaziland. Botswana, Namibia and Lesotho. However, in the case of South Africa, the results unearthed that trade liberalization exerted an impact on economic growth consistently.

In another similar study, Qazi (2015) employed the ARDL methodology on data from 1971-2013 to examine the effect of financial and trade liberalization on economic growth in Pakistan through the conduits of private saving and investment. The determinants of capital account liberalization were investigated in the study as well. The findings based on the equation of economic growth revealed that the index of financial liberalization, capital stock and labour force had a positive relationship with economic growth. However, the index of financial openness and openness to trade had a negative relationship with economic growth. In addition, the results showed that real deposit rate, per capita real private income, public saving and index of financial liberalization had a positive relationship with private saving in the long run. On the other hand, capital account liberalization, openness to trade and index of financial openness had a negative relationship with private saving in the long run.

Furthermore, the findings revealed that per capita real private income, index of financial liberalization and public investment had a positive relationship with private investment in the long run. However, real interest rates and openness to trade had a negative relationship with private investment in the long run. Finally, the findings of the effect of trade liberalization/openness on capital account liberalization/openness highlighted a positive relationship between trade openness and capital account liberalization. Additionally, the findings further revealed that trade liberalization and openness to trade have a positive association with financial openness. Summing up, the general results revealed that the index of financial liberalization had a positive relationship with economic growth, investment and private saving.

Kalu, Nwude, and Nnenna (2016) as well utilized the Classical Linear Regression Model (CLRM) from 1991-2013 to analyze the effect of trade openness on economic growth in Nigeria. The findings showed that export and net export both had positive and significant links with economic growth. On the other hand, imports exerted a positive and significant impact on economic growth. In another similar study, (Hozouri, 2016) employed the dynamic panel data methodology and data from 2000 to 2013 to examine the effect of trade liberalization on economic growth in 17 Middle East and North Africa (MENA) countries of Iran, Yemen, Algeria, United Arab Emirates (UAE), Bahrain, Tunisia, Djibouti, Syria, Egypt, Saudi Arabia, Jordan, Qatar, Kuwait, Oman, Lebanon, Morocco and Libya. The findings revealed that the sensitivity of economic growth has a significant and negative link with tariff changes, however, its link with the volume of trade was positive. Keho (2017) used the ARDL methodology and the Granger causality test proposed by Toda and Yamamoto in another related study to investigate the effect of openness to trade on economic growth in Cote d'Ivoire from 1965-2014. The results revealed that openness to trade had a positive impact on economic growth in the short-run and long-run respectively. Furthermore, the findings suggest a positive and strong balancing link between trade openness and capital formation in stimulating economic growth.

Employing the Error Correction Model (ECM) methodology and time-series data from 1980-2016, Bekele (2017) investigated the link between trade liberalization and economic growth in Ethiopia. The findings showed that trade openness exerted a positive and significant impact on economic growth. In addition, Moyo and Khobai (2018) employed the ARDL approach to cointegration and the Pooled Mean Group (PMG) model in a similar study to investigate the link between trade openness and economic growth in Southern African Development Cooperation (SADC) economies of Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania and Zambia using data from 1990-2016. The results showed that trade openness had a negative effect on economic growth in the long run.

In addition, using the ECM and data from 1980 to 2016, Elijah and Musa (2019) explored the dynamic impact of trade openness on economic growth in Nigeria. The findings of the short-run and long-run indicated that openness to trade is harmful to economic growth in Nigeria. Additionally, Ajayi and Araoye (2019) employed the Vector Error Correction Model (VECM) to analyze the effect of openness to trade on economic growth in Nigeria from 1970 to 2016. The findings of the test of cointegration indicated the presence of a long-run link between the variables. The results showed that openness to trade exerted a negative impact on Nigeria's economic growth. Furthermore, using the ARDL methodology, Duru, Okafor, Adikwu, and Njoku (2020) examined empirically the causal relationship between trade liberalization and economic growth in Nigeria from 1981 to 2018. The results showed a unidirectional causality running from trade liberalization to economic growth (trade-led growth) during the study period.

Evidence from the past works reviewed revealed that irrespective of many works that tried to shed light on the impact of trade liberalization on economic growth, the argument, among economists, researchers, policymakers, academics within the realm of policymaking and academia on the relationship between trade liberalization and growth is still open. Based on the results of empirical studies, economies that are more outward-oriented record better performance in terms of economic growth in the long run ((Dollar & Kraay, 2004; Edwards, 1998; Frankel & Romer, 1999; Lee, Ricci, & Rigobon, 2004; Sachs, Warner, Åslund, & Fischer, 1995), among others). However, Rodriguez and Rodrik (2001) argued that these results had been questioned continuously based on at least two limitations: The first flaw is associated with the measurement technique of countries' openness to trade. On the other hand, the second flaw has to do with the methodology of estimation.

Furthermore, evidence shows that there is no macroeconomic study that had separated the MINT countries and explored the impact of trade liberalization on their economies from the context of general equilibrium. Past

researches merely confronted this debate from a cross-country context. This part of the investigation is novel. Thus, the nexus between trade liberalization and economic growth to the best of my knowledge has been generally unnoticed and unstudied for the MINT countries. This study fills this gap in knowledge by investigating the impact of trade liberalization on economic growth for the MINT economies. The dependence of MINT countries on trade, the dearth of research on the issue in the context of MINT economies and the methodological flaws previously spotted provide the rationalizations for embarking on this study. In addition, the study made a methodological contribution through the use of the Autoregressive Distributed Lag methodology that makes it possible for the short-run and long-run effects of trade liberalization on economic growth to be ascertained.

2.2. Theoretical Framework

In the contention of Thindwa and Seshamani (2014), three theories account for the gains of trade liberalization to countries. These are the comparative advantage theory proposed by David Ricardo, Heckscher-Olin (H-O) neoclassical factor endowment theory of trade and the endogenous growth theory. The endogenous growth theory would form the theoretical foundation for this study. This is based on the premise that the new growth theory or the endogenous growth theory proposed by Romer (1986); Lucas (1988); Romer (1990); Grosman and Helpman (1991) and Barro and Sala-i-Martin (1997) is the main theoretical platform employed by academics for analyzing the link between trade liberalization and economic growth.

The comparative advantage theory proposed that there would be the realization of benefits from trade if every country concentrates on the production of the goods in which it has a comparative advantage (Salvatore, 2007). The benefits from trade are decomposed into static and dynamic gains. In the opinion of Thindwa and Seshamani (2014), "static gains from trade stem from the fact that countries have different factor endowments and therefore, the opportunity cost of production varies between countries" (p.964). However, dynamic gains from trade stem from the increased output of resources. Labour is the only input of production in the Ricardian comparative advantage theory. The right of entry to export markets is increased through international trade, and economies would benefit if increasing returns are presumed to hold. These benefits from trade could accrue to the MINT economies under the platform of trade liberalization through the enhanced right of entry to international markets. The foreign reserves of the MINT countries and by implication its import cover could be improved through the foreign exchange gotten from trade. Improved output of labour, attainment of ground-breaking knowledge and technology could spur dynamic gains. The main limitation of this classical model is that it is a static model based on one input of production. Thus, it is subjected to restrictions on how the economy operates today.

The H-O model builds upon the Ricardian model of comparative advantage. However, it added extra input of production. The land was incorporated as a second input of production to reflect the endowment of resources. It believes that economies can embark on international trade by exporting products in which they have a comparative advantage. In the contention of this model, comparative advantage is expressed in terms of factor abundance and intensity in a given country. Thindwa and Seshamani (2014) maintained that "a country has a comparative advantage if it has a particular resource in abundance and if the ratio of that resource to others is high in production (factor intensity)" (p.965). Hence, Salvatore (2007) claimed that a state has a comparative advantage in manufacturing a product that employs the resource that shows these features. Trade between economies and resources concentration in the manufacturing of comparatively few products breeds a high standard of living for the economies concerned. The MINT economies are labour-abundant countries as most emerging economies with an endowment of natural resources. Based on these resources, the MINT countries have engaged formal and informal labours together to work on these resources in developing their economies.

The endogenous growth theory postulates that growth results from domestic factors in an economy such as innovation, knowledge and investment in human capital. Investment in these internal factors would be of great benefit to economies of the world. This is partly based on the premise that economies of scale in production can stem from such decisions. Reduction in the alterations of prices paves way for effective distribution of internal resources to different sectors of the economy. However, Howitt (1998) maintained that externalities resulting from the engagement of advanced technology in manufacturing in economies of the globe are responsible for economic development.

The MINT economies employ resources internal to their economies for the promotion of economic growth. Hence, on the ground of theory, the MINT countries are expected to realize gains from trade in particular and attain economic growth and development in general as a result of trade liberalization and openness. However, the condition in these MINT countries may not be in line with theoretical expectations. This is based on the premise that there are other determinants of economic growth like trade liberalization. Thus, from the standpoint of macroeconomics, trade liberalization may not be the significant element influencing economic growth. However, a principal limitation of the endogenous growth theory is that it has continued to rely on some long-established neoclassical assumptions that are repeatedly unsuitable for emerging economies (Todaro & Smith, 2015). Despite this limitation, it had continued to be the main model of choice among academics in the analysis of the link between trade liberalization and economic growth.

3. Methodology and Model Specification

This study used annual data from 1986-2020 to examine the nexus between trade liberalization and economic growth in MINT countries. The data were obtained from World Bank World Development Indicators (WDI) database. The datasets are depicted in Table 1, Table 2, Table 3, and Table 4 respectively in the appendix. The dependent variable is the real Gross Domestic Product (GDP) per capita in constant 2015 US$. The time series characteristics of the variables were checked for unit root using the Augmented Dickey-Fuller (ADF) test. The goodness of fit and model adequacy of our specification was checked through diagnostic and stability tests. The Autoregressive Distributed Lag (ARDL) Bounds test to cointegration suggested first by Pesaran and Shin (1999) and advocated by Pesaran, Shin, and Smith (2001) was utilized to estimate the economic growth equation. Following Hozouri (2016) with modifications, the economic growth equation that would be estimated to establish the association between trade liberalization and economic growth in MINT economies is stated in Equation 1 as:

$$RGDPPCAP = \beta_0 + \beta_1 GFCF_t + \beta_2 OPEN_t + \beta_3 GGOVFCE_t + \epsilon_t \quad (1)$$

$$Where:$$

$$\beta_0, \beta_1 \text{ and } \beta_2 = Coefficients\ in\ the\ model$$

$$RGDPPCAP_t = Real\ GDP\ per\ capita\ at\ time\ t$$

$$GFCF_t = Gross\ Fixed\ Capital\ Formation\ at\ time\ t$$

$$OPEN_t = Openness\ to\ trade\ computed\ as\ (X + \frac{M}{GDP})\ at\ time\ t$$

$$GGOVFCE_t = General\ Government\ Final\ Consumption\ Expenditure\ at\ time\ t$$

$$\epsilon_t = Error\ term$$

Based on economic theory, gross fixed capital formation and openness to trade are expected to be positive. However, general government final consumption expenditure is expected to be negative. Iterating Equation 1 into the ARDL framework yields:

$$\Delta RGDPPCAP_t = \propto_0 + \sum_{i=1}^{\rho} \emptyset_{1,i} \Delta RGDPPCAP_{t-i} + \sum_{i=1}^{\rho} \emptyset_{2,i} \Delta GFCF_{t-i} + \sum_{i=1}^{\rho} \emptyset_{3,i} OPEN_{t-i} + \sum_{i=1}^{p} \emptyset_{4,i} \Delta GGOVFCE_{t-i} + \varphi_4 GGOVFCE_{t-i} + \varphi_1 RGDPPCAP_{t-i} + \varphi_2 GFCF_{t-i} + \varphi_3 OPEN_{t-i} + \epsilon_t \quad (2)$$

Where p denotes the lag length, Δ represents the difference operator, α_0 is the drift, ε_t is the error term, $\emptyset_1$, $\emptyset_2$, $\emptyset_3$ and $\emptyset_4$ are coefficients of short-run dynamics while φ_1, φ_2, φ_3 and φ_4 are coefficients of the long-run relationship. Thus, Equation 2 is the base equation for measuring the short-run and long-run links among the variables. The technique of the bounds test requires employing the F-test to ascertain the existence of a long-run link in levels between RGDPPCAP and its determining factor. The specification of this test is as follows:

$$H_0: \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = 0$$

(absence of long-run relationship among the variables) against the parameters:

$$H_1: \varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq 0$$

(presence of long-run relationship among the variables)

The hypothesis stated above is judged through asymptotic critical value bounds of the F-statistic proposed by Pesaran et al. (2001). For instance, if the calculated F–statistic is lower than the I(0) critical values bound, the null hypothesis of the absence of a long-run link between RGDPPCAP and its determinants cannot be rejected. On the other hand, If the calculated F–statistic is greater than the I(1) critical values bound, the alternative hypothesis of the presence of a long-run link in levels between the dependent variable and the independent variables will be accepted. Additionally, if the F–statistic falls between the I(0) and I(1) critical values bounds, the test is inconclusive.

If the presence of a long-run relationship in levels between the dependent variable and independent variables was not established, the process terminates. However, if the presence of a long-run relationship was established between the variables in the model, the short-run and long-run estimates of the economic growth model would be measured. Based on Equation 3, the long-run elasticities can be calculated using OLS.

$$RGDPPCAP_t = \propto_0 + \sum_{i=1}^{\rho} \emptyset_{1,i} \Delta RGDPPCAP_{t-i} + \sum_{i=1}^{\rho} \emptyset_{2,i} \Delta GFCF_{t-i} + \sum_{i=1}^{\rho} \emptyset_3 \Delta OPEN_{t-i} + \sum_{i=1}^{\rho} \emptyset_4 \Delta GGOVFCE_{t-i} + \epsilon_t \quad (3)$$

The last step would be the estimation of short-run elasticities. The estimates of the short-run were obtained through an ECM.

$$\Delta RGDPPCAP_t = \propto_0 + \sum_{i=1}^{\rho} \emptyset_{1,i} \Delta RGDPPCAP_{t-i} + \sum_{i=1}^{\rho} \emptyset_{2,i} \Delta GFCF_{t-i} + \sum_{i=1}^{\rho} \emptyset_3 \Delta OPEN_{t-i} + \sum_{i=1}^{\rho} \emptyset_4 \Delta GGOVFCE_{t-i} + \pi ecm_{t-i} + \epsilon_t \quad (4)$$

Where $\emptyset_1$, $\emptyset_2$, $\emptyset_3$ and $\emptyset_4$ in Equation 4 are the parameters of the short-run dynamics, π is the speed of adjustment and ecm_{t-1} is the error correction term. The parameter π is expected to be negative and significant to corroborate the long-run link between the dependent variable and the independent variables.

Table-1. ADF Test Results.

Country	Variable	Augmented Dickey-Fuller (ADF)		
		Level	First Difference	I(d)
Mexico	RGDPPCAP	-5.0764***	-	I (0)
	GFCF	-2.4626	-6.2528***	I (1)
	OPEN	-0.6965	-4.9125***	I (1)
	GGOVFCE	-0.5261	-5.0627***	I (1)
Indonesia	RGDPPCAP	-3.9512***	-	I (0)
	GFCF	-1.7972	-3.4376**	I (1)
	OPEN	-2.6699	-8.7883***	I (1)
	GGOVFCE	-2.5230	-6.1109***	I (1)
Nigeria	RGDPPCAP	-3.7055***	-	I (0)
	GFCF	-1.5707	-4.6706***	I (1)
	OPEN	-3.5378***	-	I (0)
	GGOVFCE	-0.7973	-4.9806***	I (1)
Turkey	RGDPPCAP	-6.1037***	-	I (0)
	GFCF	-1.7972	-3.4376**	I (1)
	OPEN	-2.6699	-8.7883***	I (1)
	GGOVFCE	-2.2298	-6.1676***	I (1)

Note: ** and *** indicate statistical significance at 1% and 5% levels.

4. Data Presentation, Analysis and Discussion of Results

4.1. Results of Augmented Dickey-Fuller (ADF) Test.

The ADF unit root results are depicted in Table 1. The results revealed that most of the series were stationary in first differences. On the other hand, some series such as RGDPPCAP for all MINT economies and OPEN for Nigeria were stationary at levels. Evidence from Table 1 shows that the application of the ARDL methodology is justified since the variables of interest were integrated at different orders.

Table-2. Diagnostic Results

Country	Test	Type of Statistic	Test Statistic	P-value
Mexico	Breusch-Godfrey Serial Correlation LM Test	χ^2	0.4763	0.7881
	Ramsey RESET test	F	16.1527	0.0007
	Jarque-Bera normality test	χ^2	7.1447	0.0281
	Heteroskedasticity Test: ARCH	χ^2	9.7094	0.6414
Indonesia	Breusch-Godfrey Serial Correlation LM Test	χ^2	7.8331	0.0199
	Ramsey RESET test	F	33.5222	0.0000
	Jarque-Bera normality test	χ^2	2.5720	0.2764
	Heteroskedasticity Test: ARCH	χ^2	13.7343	0.3180
Nigeria	Breusch-Godfrey Serial Correlation LM Test	χ^2	0.6018	0.7402
	Ramsey RESET test	F	0.2083	0.6533
	Jarque-Bera normality test	χ^2	4.3560	0.1133
	Heteroskedasticity Test: ARCH	χ^2	9.8542	0.6287
Turkey	Breusch-Godfrey Serial Correlation LM Test	χ^2	10.4453	0.0054
	Ramsey RESET test	F	0.8033	0.3813
	Jarque-Bera normality test	χ^2	0.8882	0.6414
	Heteroskedasticity Test: ARCH	χ^2	15.8064	0.2003

4.2. Results of Diagnostic Tests

Even though there was no cointegration among the variables for Nigeria and Turkey, diagnostic tests were executed based on the estimated short-run models. However, for Mexico and Indonesia that we considered both long run and short run models based on the results of the bounds tests, diagnostic tests were also executed. All the results were reported in Table 2. Based on the results, none of the models had problems of heteroscedasticity. Except for Mexico's economic growth model, the Jarque-Bera normality test revealed that the residuals were normally distributed for the growth models of Indonesia, Nigeria and Turkey. The Histogram for the normality of residuals for the MINT economies are depicted in Figure 1a, Figure 1b, Figure 1c, and Figure 1d respectively in the appendix. In addition, the results revealed that the growth models for Mexico and Nigeria had no problems of serial correlation. However, the economic growth models for Indonesia and Turkey had problems of serial correlation. Furthermore, the results of the Ramsey Reset test shows the possibility of the growth models not being correctly specified for Mexico and Indonesia. This is because the probability values of 0.0007 and 0.0000 against the Ramsey Regression Equation Specification Error Test (RESET) test for Mexico and Indonesia respectively were less than the suggested 5 per cent level of significance. Hence, the null hypothesis that the model was correctly specified was rejected. However, the economic growth models for Nigeria and Turkey were correctly specified.

Table-3. Bound Test Results.

Country	F-statistics	Significance Level	Lower Critical Value Bound I(0)	Upper Critical Value Bound I(1)
Mexico	3.9648	1%	5.17	6.36
		5%	4.01	5.07
		10%	3.47	4.45
Indonesia	4.4956	1%	5.17	6.36
		5%	4.01	5.07
		10%	3.47	4.45
Nigeria	1.3850	1%	5.17	6.36
		5%	4.01	5.07
		10%	3.47	4.45
Turkey	2.2671	1%	5.17	6.36
		5%	4.01	5.07
		10%	3.47	4.45

Note: Critical value bounds for the F-statistic from Pesaran et al. (2001).

4.3. Results of Bound Test

Table 3 depicts the results of the bounds F-test. For Mexico and Indonesia, the F-values falls between the lower critical value bound I(0) and the upper critical value bound I(1). Thus, the test was considered inconclusive. However, considering the empirical illustration as depicted in Table 2, the F-statistic obtained for Mexico (3.9648) and Indonesia (4.4956) falls between the lower critical value bound I(0) and the upper critical value bound I(1). Hence, we considered both long-run and short-run models for Mexico and Turkey. On the other hand, the calculated F statistics for Nigeria and Turkey falls below the lower critical value bound I(0). This implies the absence of a long-run relationship or cointegration among variables. Hence, there was no estimation of the ARDL-ECM for Nigeria and Turkey as a result of the absence of cointegration among the variables. However, the short-run model was estimated for Nigeria and Turkey due to no cointegration among variables.

Table-4. Results of short-run estimates for the short-run model.

Country: Nigeria				
Dependent Variable: RGDPPCAP				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
RGDPPCAP(-1)	0.2539	0.2085	1.2177	0.2375
RGDPPCAP(-2)	0.2117	0.2192	0.9661	0.3455
GFCF	-0.3211	0.2129	-1.5080	0.1472
GFCF(-1)	0.2466	0.3262	0.7560	0.4585
GFCF(-2)	-0.3519	0.2883	-1.2208	0.2364
OPEN	0.0349	0.0914	0.3812	0.7071
OPEN(-1)	0.1498	0.1030	1.4542	0.1614
OPEN(-2)	-0.1546	0.0897	-1.7246	0.1000
GGOVFCE	-0.4772	0.6641	-0.7185	0.4807
GGOVFCE(-1)	0.5943	0.8779	0.6769	0.5062
GGOVFCE(-2)	-0.4240	0.6371	-0.6655	0.5133
C	22.2635	14.7968	1.5046	0.1481
R-squared 0.4962			Adjusted R-squared 0.1940	
Schwarz Criterion 6.2160			F-statistic 1.6418	
Durbin-Watson Stat 1.8389			Prob (F-statistic) 0.1579	
Country: Turkey				
RGDPPCAP(-1)	0.0057	0.2270	0.0251	0.9802
RGDPPCAP(-2)	-0.0165	0.2103	-0.0785	0.9382
GFCF	-0.5234	0.8925	-0.5865	0.5641
GFCF(-1)	1.7294	1.2253	1.4115	0.1735
GFCF(-2)	-1.0741	0.6625	-1.6213	0.1206
OPEN	-0.0660	0.1237	-0.5335	0.5996
OPEN(-1)	-0.0643	0.2269	-0.2833	0.7798
OPEN(-2)	0.1848	0.1704	1.0849	0.2909
GGOVFCE	-2.5242	1.7138	-1.4728	0.1564
GGOVFCE(-1)	1.7028	2.2886	0.7441	0.4655
GGOVFCE(-2)	-0.1501	1.4973	-0.1002	0.9212
C	6.7454	20.7135	0.3257	0.7481
R-squared 0.3017			Adjusted R-squared -0.1173	
Schwarz Criterion 6.7699			F-statistic 0.7200	
Durbin-Watson Stat 2.1620			Prob (F-statistic) 0.7167	

Note: ***, ** and * denote significance at 1%, 5% and 10% respectively.

4.4. Results of the Short-Run Model

Because there was no cointegration among the variables for Nigeria and Turkey, the short-run model was estimated for both countries. The estimated coefficients for real GDP per capita at first lag were positive and statistically insignificant for both Nigeria and Turkey. The insignificance of this estimate means that the real GDP of the previous year does not impact on real GDP of the current year in the short run. In addition, the estimates of gross fixed capital formation and general government final consumption expenditure for Nigeria and Turkey were negative and statistically insignificant. The insignificance nature of these estimates suggests that both gross fixed capital formation and general government final consumption expenditure do not impact economic growth in the short run. Based on the results of the short-run model reported in Table 4, openness to trade utilized as a proxy for trade liberalization had a positive and insignificant impact on economic growth for Nigeria in the short run. The insignificant estimate implies that it does not have an impact on Nigeria's economic growth in the short run. However, in the case of Turkey, openness to trade exerted a negative and insignificant relationship with economic growth in the short run.

Table-5. Long-run estimates for economic growth model.

Country	**GFCF**	**OPEN**	**GGOVFCE**	**C**
Mexico	0.4828 [0.8912] (0.3833)	0.2771 [1.7578*] (0.0941)	0.5150 [0.5168] (0.6109)	-19.1853 [-1.1727] (0.2547)
Indonesia	0.0076 [0.0375] (0.9705)	0.0374 [0.3002] (0.7672)	1.1617 [1.2604] (0.2220)	-7.5152 [-0.5173] (0.6106)

Note: Probability Values are in bracket - ( ).
t-statistics are in [ ]
* denote significance at 10% level.

4.5. Results of Estimated Long-Run Coefficients

The estimated long-run coefficients for gross fixed capital formation was positive and statistically insignificant for both Mexico and Indonesia. This results contravenes the findings of Duru and Ezenwe (2020); Duru et al. (2020) and Duru et al. (2021). The coefficient for trade openness used as a proxy for trade liberalization had a positive and significant relationship with economic growth for Mexico. This implies that trade liberalization contributes to economic growth in Mexico in the long run. This result is in line with the submissions of Nduka (2013); Mercan et al. (2013); Dao (2014); Hamad et al. (2014) and Bekele (2017). However, it is contrary to the submissions of Duru et al. (2020). However, trade liberalization had a positive and insignificant impact on economic growth in Indonesia. The insignificance of this estimate implies that it does not impact economic growth in the long run. This result is contrary to the submissions of Duru et al. (2021). Furthermore, the coefficients of general

government final consumption expenditure for both Mexico and Indonesia was positive and insignificant as reported in Table 5. This result finds an advocate in Duru et al. (2020).

Table 6: Results of estimated short-run error correction model.

Country: Mexico				
Dependent Variable: RGDPPCAP				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Δ(RGDPPCAP(-1))	-0.0037	0.1597	-0.0235	0.9815
Δ(GFCF)	1.8696	0.3566	5.2433***	0.0000
Δ(GFCF(-1))	0.0847	0.5704	0.1486	0.8834
Δ(OPEN)	0.1223	0.1361	0.8989	0.3794
Δ(OPEN(-1))	-0.1443	0.1567	-0.9206	0.3682
Δ(GGOVFCE)	-2.2661	1.0936	-2.0721**	0.0514
Δ(GGOVFCE(-1))	-0.0969	1.1515	-0.0841	0.9338
ECM_{t-1}	-1.1413	0.2958	-3.8578***	0.0010
ECM = RGDPPCAP + 0.4828*GFCF + 02771*OPEN + 0.5150*GGOVFCE – 19.1853*C – 0.5417*D				
Country: Indonesia				
Δ(RGDPPCAP(-1))	0.4643	0.2201	2.1096**	0.0477
Δ(GFCF)	0.5511	0.4227	1.3037	0.2072
Δ(GFCF(-1))	0.2538	0.3800	0.6680	0.5117
Δ(OPEN)	-0.3020	0.0626	-4.8237***	0.0001
Δ(OPEN(-1))	0.0162	0.1016	0.1598	0.8746
Δ(GGOVFCE)	-2.0284	1.1360	-1.7856*	0.0893
Δ(GGOVFCE(-1))	0.2400	1.1596	0.2069	0.8382
ECM_{t-1}	-0.9966	0.2461	-4.0494***	0.0006
ECM = RGDPPCAP + 0.0076*GFCF + 0.0374*OPEN + 1.1617*GGOVFCE – 7.5152*C – 0.0823*D				

Note: ***, ** and * denote significance at 1%, 5% and 10% respectively.

The results of the short-run dynamic model are illustrated in Table 6. For Mexico, change in gross fixed capital formation and change in general government final consumption expenditure was merely the variables that had a statistically significant effect on the change in real GDP per capita in the short run. Thus, the change in the gross fixed capital formation of the previous year exerted a positive and significant effect on economic growth. In addition, change in general government final consumption expenditure had a negative and significant effect on economic growth. Furthermore, change in trade openness used as a proxy for trade liberalization had a positive and insignificant impact on economic growth. However, in the case of Indonesia, the first lag of the dependent variable, change in trade openness and change in general government final consumption expenditure were merely the variables that had a statistically significant effect on the change in real GDP per capita in the short run. Hence, the change in the real GDP per capita of the previous year exerted a positive and significant impact on economic growth.

Also, changes in trade liberalization exerted a negative and significant impact on economic growth. This means that trade liberalization does not contribute to economic growth in the short run. Furthermore, change in general government final consumption expenditure had a negative and significant effect on economic growth. The findings showed that all the Error Correction Terms (ECT) were negative and statistically significant. The ECT measures the speed of adjustment back to long-run equilibrium as a result of a shock. For instance, for Mexico, the coefficient of the lagged ECT in the growth equation model was -1.1413. It is negative and statistically significant. Its coefficient of -1.1413 means that 114% of the previous shock to equilibrium in the long-run economic growth was corrected by it within one year. However, in the case of Indonesia, the ECT coefficient of -0.9966 means that 100% of the previous shock to equilibrium in the long-run economic growth was corrected by it within one year. The ECT coefficient was also negative and statistically significant.

Table-7. Results of the Granger Causality Test (TY Augmented Lags Methods).

	Sources of Causation	
Country/Dependent Variable	**RGDPPCAP** χ^2	**OPEN** χ^2
Mexico		
RGDPPCAP	-	3.4141
OPEN	2.7046	-
Indonesia		
RGDPPCAP	-	4.9858
OPEN	2.3573	-
Nigeria		
RGDPPCAP	-	9.2840***
OPEN	10.9709***	-
Turkey		
RGDPPCAP	-	7.9540**
OPEN	1.9548	-

Note: *** and ** Indicate significance at the 1 per cent and 5 per cent levels respectively.

4.6. The Results of Toda and Yamamoto Multivariate Causality Test

The Toda and Yamamoto causality test was employed to find the causality between real Gross Domestic Product (GDP) per capita and trade openness. The results of the causality test are illustrated in Table 7. In the case of Mexico, the findings revealed that there was no causal relationship between real GDP per capita and openness to

trade. Thus, the findings implied that there is no causal link between trade liberalization and real GDP per capita in Mexico. Just like Mexico, there was no causal relationship between trade liberalization and real GDP per capita for Indonesia. Unlike Indonesia and Mexico, a bi-directional causal relationship between real GDP per capita and trade openness was detected for Nigeria. For Turkey, a unidirectional causal relationship from trade openness to real GDP per capita was identified. This shows that trade liberalization promotes economic growth in Turkey. Our causality results for Nigeria is in line with the submissions of Nwinee and Olulu-Briggs (2016) and Nduka, Chukwu, Ugbor, and Nwakaire (2013). However, it contradicts the findings of Yakubu and Akanegbu (2018) and Tyopev (2019).

5. Conclusion and Policy Implications

This study investigated the link between trade liberalization and economic growth in the MINT economies using time series data from 1986-2020. The ARDL methodology and the Toda and Yamamoto Multivariate Causality test were utilized in this study. The long-run results revealed that trade openness had no impact on real GDP per capita except for Mexico. Even in this situation, trade openness became significant at the 10% level of significance. The results of the causality test showed that no causality was detected between real gross domestic product per capita and trade liberalization for Mexico and Indonesia. A bidirectional causality between real gross domestic product per capita and trade liberalization was found for Nigeria whereas a unidirectional causality from trade liberalization to real gross domestic product per capita was revealed for Turkey.

The no causality results for Mexico and Indonesia means that the policy objectives of trade liberalization and economic growth can be pursued independently in both countries. In addition, the bidirectional causality detected for Nigeria suggests that the policy objectives of trade liberalization and economic growth can be pursued together in Nigeria. Furthermore, the unidirectional causality from trade liberalization to real gross domestic product per capita found for Turkey implies that she employs trade liberalization policies effectively for objectives of economic growth, thus trade liberalization causes economic growth.

References

Ajayi, E., & Araoye, F. (2019). Trade openness and economic growth in Nigeria. *International Journal of Economics and Financial Management*, *4*(2), 50-63.

Annabi, N. (2006). Implications of WTO agreements and uniteral trade policy reforms for poverty in Bangladesh: Short versus long-run impacts. World Bank Policy Research Working Paper No. 3976, Washington DC: The World Bank.

Barro, R. J., & Sala-i-Martin, X. (1997). *Economic growth.* New Delhi: McGraw-Hill.

Bekele, Y. E. (2017). Exploring the relationship between trade liberalization and Ethiopian economic growth. MPRA Paper No. 83584.

Berg, A., & Krueger, A. (2003). Trade, growth and poverty: A selective survey. IMF Working Paper 03/30, International Monetary Fund.

Chile, L. M., & Talukder, D. (2014). The paradox of agricultural trade liberalization in Bangladesh and Tanzania. *American Journal of Trade and Policy*, *1*(1), 23-31.

Corbett, J. J., & Winebrake, J. (2008). *The impacts of globalization on international maritime transport activity: Past trends and future perspectives.* Guadalajara, Mexico: Global Forum on Transport and Environment in a Globalizing World.

Dao, A. (2014). Trade openness and economic growth. Mark A. Israel '91 endowed summer research fund in economics. Retrieved from: http://digitalcommons.iwu.edu/israel_economics/2.

Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976-1985. *Economic Development and Cultural Change*, *40*(3), 523-544. Available at: https://doi.org/10.1086/451959.

Dollar, D., & Kraay, A. (2001). Trade, growth, and poverty. *The Economic Journal, Royal Economic Society*, *114*(493), 22-49.

Dollar, D., & Kraay, A. (2003). Institutions, trade and growth: Revisiting the evidence. Policy Research Working Paper No. 3004. The World Bank.

Dollar, D., & Kraay, A. (2004). Trade, growth, and poverty. *The Economic Journal*, *114*(493), 22-49.

Duru, I. U., Okafor, B. O., Adikwu, F. O., & Njoku, F. C. (2020). Trade liberalization and economic growth: An assessment of Nigerian experience. *Asian Development Policy Review*, *8*(3), 194-213. Available at: https://doi.org/10.18488/journal.107.2020.83.194.213.

Duru, I. U., & Ezenwe, U. (2020). Empirical investigation of the impact of exports on economic growth: Evidence from Nigeria, 1980-2016. *International Journal of Publication and Social Studies*, *5*(1), 18-43. Available at: https://doi.org/10.18488/journal.135.2020.51.18.43.

Duru, I. U., Eze, M. A., Okafor, B. O., Yusuf, A., Ede, L. O., & Saleh, A. S. (2021). Military outlay and economic growth: The scenarios of Lake Chad Basin Countries of the Republic of Chad and Nigeria. *Growth*, *8*(1), 12-26. Available at: https://doi.org/10.20448/journal.511.2021.81.12.26.

Edwards, S. (1992). Trade orientation, distortions and growth in developing countries. *Journal of Development Economics*, *39*(1), 31-57. Available at: https://doi.org/10.1016/0304-3878(92)90056-f.

Edwards, S. (1993). Openness, trade liberalization, and growth in developing countries. *Journal of Economic Literature*, *31*(3), 1358-1393.

Edwards, S. (1997). Openness, productivity and growth: What do we really know? NBER Working Paper Number No. 5978.

Edwards, S. (1998). Openness, productivity and growth: What do we really know? *The Economic Journal*, *108*(447), 383-398. Available at: https://doi.org/10.1111/1468-0297.00293.

Elijah, S., & Musa, A. B. (2019). Dynamic impact of trade openness on the economic growth in Nigeria. *International Journal of Engineering and Advanced Technology*, *8*(5), 609-616. Available at: https://doi.org/10.35940/ijeat.e1087.0585c19.

FAO. (2005). *The state of food and agriculture, agricultural trade and poverty: Can trade work for the poor?* Rome: Food and Agriculture Organization of the United Nations.

Food and Agriculture Organization. (2003). *Trade reforms and food security: Conceptualizing the linkages.* Rome: Food and Agriculture Organization of the United Nations.

Frankel, J., & Romer, D. (1999). Does trade cause growth? *American Economic Review*, *89*(3), 379-399.

Grosman, G., & Helpman, E. (1991). *Innovation and growth in the global economy.* Cambridge: MIT Press.

Hamad, M. M., Burhan, A. M., & Stabua, A. B. (2014). The impact of trade liberalization on economic growth in Tanzania. *International Journal of Academic Research in Business and Social Sciences*, *4*(5), 514-532. Available at: http://dx.doi.org/10.6007/IJARBSS/v4-i5/879.

Harrison, A., & Hanson, G. (1999). Who gains from trade reform? Some remaining puzzles. *Journal of Development Economics*, *59*(1), 125-154. Available at: https://doi.org/10.1016/s0304-3878(99)00008-5.

Henry, M., Kneller, R., & Milner, C. (2009). Trade, technology transfer and national efficiency in developing countries. *European Economic Review*, *53*(2), 237-254. Available at: https://doi.org/10.14217/9781485598447-4-en.

Howitt, P. (1998). Endogenous growth. Retrieved from: www.econ.brown.edu. [Accessed May 15, 2021].

Hozouri, N. (2016). The effect of trade liberalization on economic growth: Selected MENA countries. *International Journal of Economics and Finance*, *9*(1), 88-95.

Kalu, E. U., Nwude, C. E., & Nnenna, N. (2016). Does trade openness engineer economic growth in Nigeria? (Empirical evidence covering 1991 to 2013). *Global Journal of Management and Business Research*, *16*(4), 1-8.

Keho, Y. (2017). The impact of trade openness on economic growth: The case of Cote d'Ivoire. *Cogent Economics & Finance*, *5*(1), 1-14. Available at: http://dx.doi.org/10.1080/23322039.2017.1332820.

Krueger, A. O. (1990). Asian trade and growth lessons. *The American Economic Review, 80*(2), 108-112.
Krueger, A. O. (1997). Trade policy and economic development: How we learn. *American Economic Review, 87*(1), 1-22.
Krueger, A. O. (1998). Why trade liberalisation is good for growth. *The Economic Journal, 108*(450), 1513-1522.
Lall, S. (2004). *Reinventing industrial strategy: The role of government policy in building industrial competitiveness.* Paper presented at the G-24 Discussion Papers 28, United Nations Conference on Trade and Development.
Lee, H. Y., Ricci, L. A., & Rigobon, R. (2004). *Once again, is openness good for growth? NBER Working Papers.* Cambridge: NBER.
Lucas, R. E. J. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3-42.
Manwa, F. (2015). *Impact of trade liberalization on economic growth: The case of the Southern African Customs Union (SACU) Countries.* PhD Thesis, Southern Cross University, Lismore, NSW.
McCulloch, N., Winters, L. A., & Cirera, X. (2003). *Trade liberalization and poverty: A handbook.* London: Centre for Economic Policy Research.
Mercan, M., Gocer, I., Bulut, S., & Dam, M. (2013). The effect of openness on economic growth for BRIC-T countries: Panel data analysis. *Eurasian Journal of business and economics, 6*(11), 1-14.
Moyo, C., & Khobai, H. (2018). Trade openness and economic growth in SADC countries. MPRA Paper No. 84254.
Nduka, E. K. (2013). Openness and economic growth in Nigeria. *Journal of Education and Practice, 4*(1), 68-73.
Nduka, E. K., Chukwu, J. O., Ugbor, K. I., & Nwakaire, O. N. (2013). Trade openness and economic growth: A comparative analysis of the pre and post structural adjustment programme (SAP) periods in Nigeria. *Asian Journal of Business and Economics, 3*(3.4), 1-12.
Nwinee, B. F., & Olulu-Briggs, O. V. (2016). Trade openness, financial development, and the Nigerian economy. *American International Journal of Contemporary Research, 6*(3), 170-183. Available at: https://doi.org/10.1111/j.1467-9485.2011.00559.x.
Pesaran, M. H., & Shin, Y. (1999). *An autoregressive distributed lag modelling approach to cointegration analysis. Econometrics and Economic Theory in the 20th Century: the Ragnar Frisch Centennial Symposium.* Cambridge: Cambridge University Press.
Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289-326.
Qazi, M. A. H. (2015). *Impact of economic liberalization on economic growth in the case of Pakistan.* An Unpublished Doctor of Philosophy Degree of the Faculty of Economics and Administration, University of Malaya, Kuala Lumpur, Malaysia.
Rodriguez, F., & Rodrik, D. (2000). Trade policy and economic growth: A skeptic's guide to the cross-national evidence. In B. Bernanke & K. Rogoff, (Eds.), Macroeconomics Annual 2000 (pp. 261-338). Cambridge, MA: MIT Press for NBER.
Rodriguez, F., & Rodrik, D. (2001). Trade policy and economic growth: A sceptic's guide to the cross-national evidence. NBER Macroeconomics Annual 2000 (pp. 261–324). Cambridge, MA: MIT Press.
Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy, 94*(5), 1002-1037. Available at: https://doi.org/10.1086/261420.
Romer, P. R. (1990). Are non-convexities important for understanding growth? *American Economic Review, 80*(2), 97-103.
Sachs, J. D., & Warner, A. M. (1995). Natural resource abundance and economic growth. NBER Working Papers, No. 5398. New York: National Bureau of Economic Research.
Sachs, J. D., Warner, A., Åslund, A., & Fischer, S. (1995). Economic reform and the process of global integration. *Brookings Papers on Economic Activity, 1*(1), 1-118. Available at: https://doi.org/10.2307/2534573.
Salvatore, D. (2007). *International economics* (9th ed.). USA: John Wiley and Sons Inc.
Stone, S. F., & Shepherd, B. (2011). Dynamic gains from trade: The role of intermediate inputs and equipment imports. OECD Trade Policy Working Paper No. 110.
Thindwa, M. O., & Seshamani, V. (2014). Trade liberalization and the performance of the tobacco sector in Malawi. *Journal of Emerging Issues in Economics, Finance and Banking, 3*(1), 962-975.
Todaro, M. P., & Smith, S. C. (2015). *Economic development* (12th ed.). New Jersey: Pearson Education, Inc.
Tyopev, I. (2019). *Trade openness and economic growth in selected West African countries.* An Unpublished PhD Economics thesis of Benue State University, Makurdi, Benue State, Nigeria.
Winters, L. A., McCulloch, N., & McKay, A. (2004). Trade liberalization and poverty: The evidence so far. *Journal of economic Literature, 42*(1), 72-115. Available at: https://doi.org/10.1257/002205104773558056.
Yakubu, M. M., & Akanegbu, B. N. (2018). Trade openness and economic growth: Evidence from Nigeria. *European journal of Business, Economics and Accountancy, 6*(4), 30-44.
Zhang, W. B. (2008). *International trade theory: Capital, knowledge, economic structure, money & prices over time.* Berlin Heidelberg: Springer-Verlag.

Appendices

Appendix 1: Data set on real gross domestic product per capita of MINT economies.

Table-1. Data on RGDPPCAP of MINT Economies.

Year	Mexico	Indonesia	Nigeria	Turkey
1986	-5.0968586	3.7422332	-2.5099486	4.888763818
1987	-0.3338109	2.891931495	0.52584855	7.402176226
1988	-0.7083912	3.80170995	4.5469365	0.447775659
1989	2.10829938	5.507034964	-0.7088532	-1.486309099
1990	3.20338291	5.3479457	8.93068727	7.383071281
1991	2.30201264	5.07105896	-2.164465	-0.967257707
1992	1.68311479	4.711831054	2.02582456	3.324226368
1993	0.15792316	4.760224439	-4.4570781	5.931883178
1994	3.15906427	5.839520704	-4.2328183	-6.175858761
1995	-7.8317514	6.562205374	-2.5300523	6.17718775
1996	5.07244944	6.217928008	1.63459401	5.686793303
1997	5.193558	3.189871378	0.40682595	5.886121916
1998	3.58158308	14.35055602	0.05719452	0.806059059
1999	1.24783802	0.605436819	-1.8957202	-4.750586281
2000	3.44097633	3.482210606	2.4191326	5.32213582
2001	-1.7929026	2.235179698	3.29057075	-7.147845597
2002	-1.4029391	3.090635928	12.4574682	4.890330717
2003	0.07226822	3.376532827	4.65778629	4.252446053
2004	2.49483102	3.630908791	6.48960368	8.28603301
2005	0.86952153	4.289591484	3.72162394	7.559697386
2006	2.98443254	4.107514355	3.32621788	5.620645339
2007	0.78256904	4.946468138	3.8220723	3.797987497
2008	-0.357633	4.620033675	3.97251049	-0.382922616
2009	-6.6741654	3.247328238	5.19795441	-6.027912669
2010	3.61719033	4.812273068	5.15854535	6.919606567

2011	2.22716348	4.748318533	2.52532223	9.509983157
2012	2.24713983	4.606485522	1.47285123	3.093101823
2013	0.0294528	4.151428229	3.85372268	6.664883623
2014	1.54403511	3.639072303	3.51397656	3.168090824
2015	2.01903688	3.555062495	-0.0292823	4.328127771
2016	1.40302067	3.758837332	-4.1683884	1.642463409
2017	0.93145654	3.841197264	-1.7888176	5.794264413
2018	1.05031157	3.987824861	-0.6797247	1.428914877
2019	-1.1393691	3.871444142	-0.3797524	-0.40134604
2020	-9.2054	-3.10714219	-4.2601131	0.659370381

Source: World Bank, World Development Indicators Database.

Appendix 2. Data Set on Gross Fixed Capital Formation of MINT Economies.

Table-2. Data on GFCF of MINT Economies.

Year	Mexico	Indonesia	Nigeria	Turkey
1986	18.72587	25.551	54.94827	25.551
1987	17.54044	25.17103	50.04989	25.17103
1988	18.67873	26.99156	43.75477	26.99156
1989	17.37131	28.53473	52.48744	28.53473
1990	17.97946	30.55156	53.12219	30.55156
1991	18.73103	29.67142	48.40018	29.67142
1992	19.6226	28.00259	43.77439	28.00259
1993	20.84942	26.28067	44.47636	26.28067
1994	21.67319	27.57069	42.06784	27.57069
1995	16.35404	28.42981	37.20593	28.42981
1996	18.41382	29.60236	36.58167	29.60236
1997	19.84665	28.30768	38.42226	28.30768
1998	21.08837	25.42951	40.5534	25.42951
1999	21.11672	20.13876	38.278	20.13876
2000	21.48889	19.85085	34.04928	19.85085
2001	19.9337	19.67266	30.03794	19.67266
2002	19.26942	19.42916	26.76866	19.42916
2003	19.7779	19.50606	28.3709	19.50606
2004	20.47646	22.44862	26.06325	22.44862
2005	20.70371	23.64051	24.96612	23.64051
2006	21.54334	24.13099	26.1665	24.13099
2007	21.94191	24.94694	20.18004	24.94694
2008	23.16439	27.69859	18.85977	27.69859
2009	22.12647	31.11477	21.11545	31.11477
2010	21.5827	30.99941	16.81501	30.99941
2011	22.27391	31.30745	15.67631	31.30745
2012	22.84044	32.71963	14.21112	32.71963
2013	21.25247	31.96578	14.16873	31.96578
2014	20.99786	32.51674	15.08353	32.51674
2015	22.43071	32.81193	14.82718	32.81193
2016	22.80226	32.57773	14.72496	32.57773
2017	22.09217	32.16064	14.71562	32.16064
2018	22.0425	32.2885	19.01838	32.2885
2019	20.66706	32.34713	24.62523	32.34713
2020	18.78994	31.73343	28.64594	31.73343

Source: World Bank, World Development Indicators Database

Appendix 3. Data Set on Trade Openness of MINT Economies

Table-3. Data on OPEN of MINT Economies.

Year	Mexico	Indonesia	Nigeria	Turkey
1986	29.60622	41.00954	9.135846	41.00954
1987	31.26232	46.97425	19.49534	46.97425
1988	38.79034	47.25456	16.94061	47.25456
1989	38.32965	49.08188	34.18262	49.08188
1990	38.5197	52.89186	30.92474	52.89186
1991	35.78654	54.83956	37.0216	54.83956
1992	35.5535	57.42743	38.22739	57.42743
1993	27.82791	50.52339	33.71975	50.52339
1994	30.70997	51.8771	23.05924	51.8771
1995	46.32102	53.95859	39.52838	53.95859
1996	50.4192	52.26474	40.25773	52.26474
1997	48.77736	55.99386	51.46101	55.99386
1998	50.99612	96.18619	39.27861	96.18619
1999	50.61797	62.94391	34.45783	62.94391
2000	52.43268	71.43688	48.9956	71.43688
2001	47.16607	69.79321	49.6805	69.79321
2002	46.69791	59.07946	40.03517	59.07946
2003	50.20569	53.61649	49.33496	53.61649

2004	53.48615	59.76129	31.89587	59.76129
2005	53.93813	63.98794	33.05946	63.98794
2006	56.09272	56.65713	42.56657	56.65713
2007	56.79528	54.82925	39.33693	54.82925
2008	57.77703	58.5614	40.79684	58.5614
2009	55.96777	45.51212	36.05871	45.51212
2010	60.76032	46.70127	43.32076	46.70127
2011	63.46968	50.18001	53.27796	50.18001
2012	65.76725	49.5829	44.53237	49.5829
2013	63.76488	48.63737	31.04886	48.63737
2014	64.92536	48.08018	30.88519	48.08018
2015	71.08909	41.93764	21.33265	41.93764
2016	76.06221	37.42134	20.72252	37.42134
2017	77.11574	39.3555	26.3476	39.3555
2018	80.5633	43.07431	33.00783	43.07431
2019	77.91529	37.44878	34.02388	37.44878
2020	77.98212	33.19059	25.39979	33.19059

Source: World Bank, World Development Indicators Database.

Appendix 4. Data Set on General Government Final Consumption Expenditure of MINT Economies

Table-4. Data on GGOVFCE of MINT Economies.

Year	Mexico	Indonesia	Nigeria	Turkey
1986	8.756565	11.24248	1.929236	7.588005
1987	8.358128	9.424605	1.632709	7.822874
1988	8.484909	8.976333	1.552698	7.612643
1989	8.327433	9.389376	1.315222	9.343364
1990	8.430745	9.534441	1.220141	10.96102
1991	9.115903	9.138088	1.220982	12.41925
1992	9.942875	9.516266	2.047629	12.92502
1993	9.114783	9.023312	2.148452	12.89387
1994	9.466826	8.114181	1.769021	11.65737
1995	8.55116	7.829064	1.166196	10.7858
1996	8.119714	7.566959	0.911235	11.57077
1997	8.261602	6.842805	0.912571	12.25939
1998	8.543129	5.693508	1.375668	10.61322
1999	9.178512	6.604457	1.383378	12.66856
2000	9.515219	6.531995	2.123442	11.92866
2001	9.881126	6.889059	1.990621	12.64592
2002	10.37772	7.257458	1.340488	12.83567
2003	11.03379	8.129486	0.951747	12.59042
2004	10.48729	8.321868	4.787637	12.3152
2005	10.52171	8.109508	4.544547	12.18597
2006	10.34442	8.627169	5.125842	12.90753
2007	10.40538	8.34647	9.44834	13.38969
2008	10.72952	8.423781	9.428957	13.59629
2009	11.91696	9.589178	8.649948	15.65786
2010	11.77136	9.005915	8.8481	14.87456
2011	11.77708	9.058677	8.572152	13.60036
2012	11.94673	9.248788	8.228178	14.12612
2013	12.19139	9.51772	7.155219	14.01838
2014	12.19496	9.425026	6.464486	14.01998
2015	12.3172	9.749414	5.935159	13.80517
2016	12.01041	9.52781	5.384282	14.73321
2017	11.6166	9.120571	4.403315	14.38026
2018	11.57089	9.021232	5.604329	14.68642
2019	11.35833	8.809677	5.572002	15.52729
2020	12.75341	9.289052	8.707691	15.24316

Source: World Bank, World Development Indicators Database

Appendix 5a: Graph of Diagnostic Test for Mexico

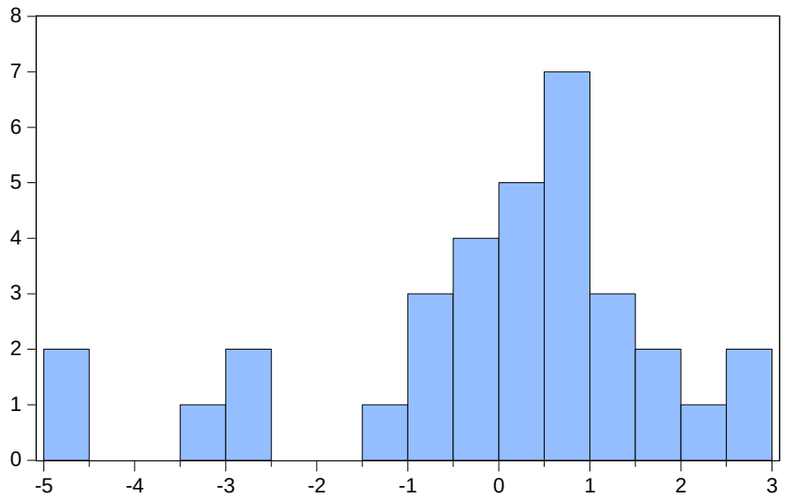

Figure-1a. Histogram for normality of residuals for Mexico.

Source: Extract from E-views econometric software.

Appendix-5b. Graph of Diagnostic Test for Indonesia.

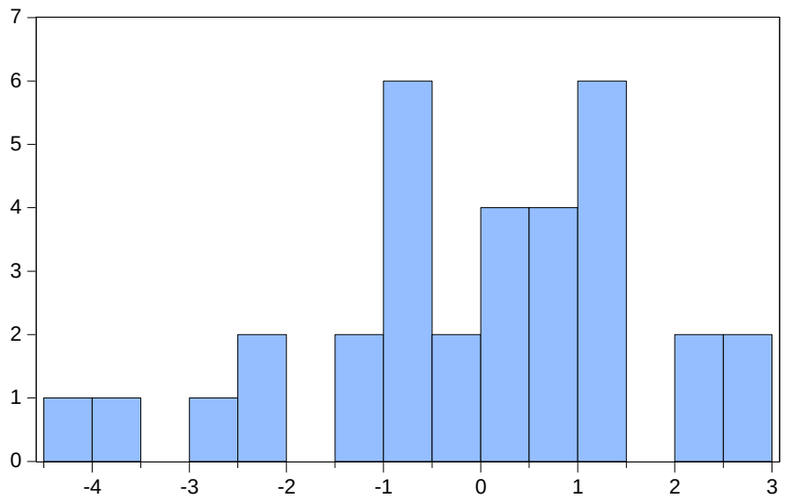

Figure-1b. Histogram for normality of residuals for Indonesia.

Source: Extract from E-views econometric software.

Appendix-5c. Graph of Diagnostic Test for Nigeria.

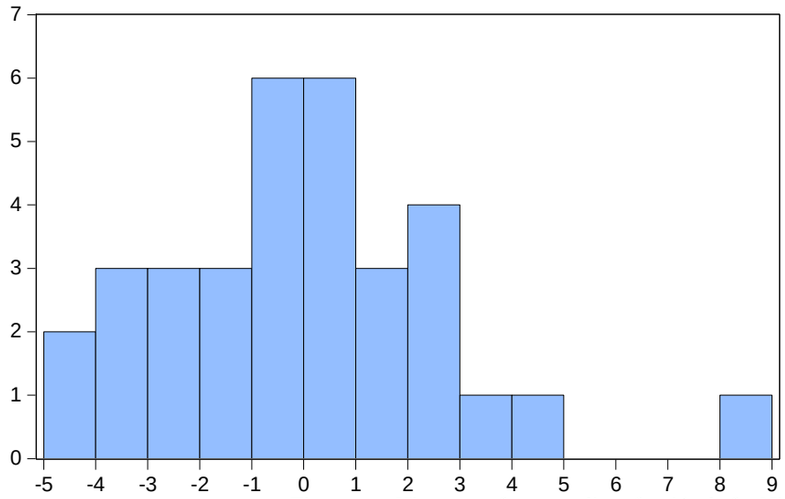

Figure-1c. Histogram for normality of residuals for Nigeria.

Source: Extract from E-views econometric software

Appendix-5d. Graph of Diagnostic Test for Turkey.

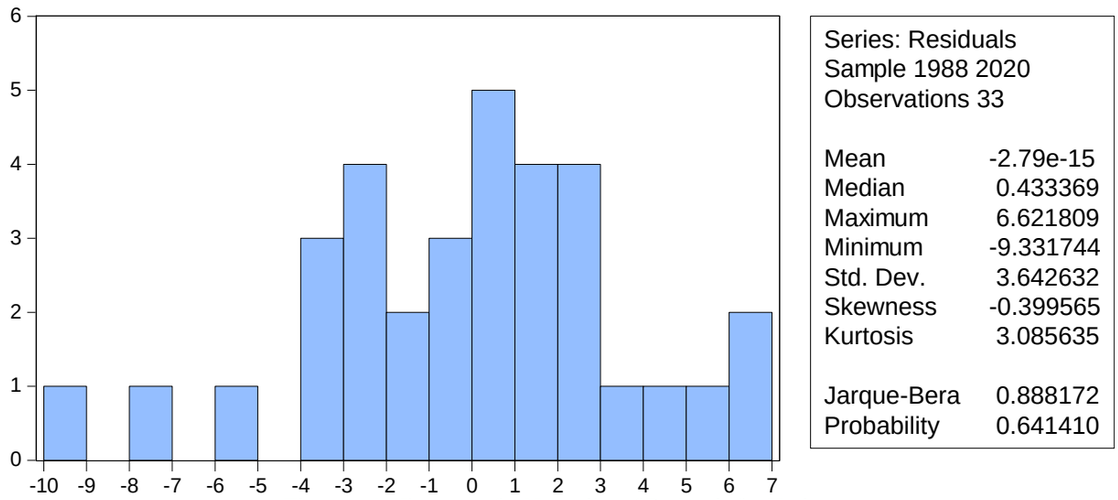

Figure-1d. Histogram for Normality of Residuals for Turkey.

Source: Extract from E-views econometrics software.