



TRADE INTEGRATION AND ECONOMIC WELL-BEING: EVIDENCE FROM GENERALISED METHODS OF MOMENTS (GMM) IN THE D-8 COUNTRIES

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ABSTRACT: *This paper contributes to the trade–development nexus by investigating the link between trade integration and economic well-being in the developing eight (D-8) countries comprising Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan, and Turkiye. Essentially, this paper examined how trade openness, financial openness, and the exchange rate contributed to gross national income (GNI) per capita (a proxy for economic well-being). The panel data obtained from the United Nations Conference on Trade and Development (UNCTAD), the World Bank’s World Development Indicator (WDI), and the Chinn-Ito index between 2005 and 2021 were analysed using the two-step generalized method of moments (GMM), panel unit root, and Rao cointegration, among others. Evidence of a long-run relationship among the variables was established from the Kao cointegration test results at the 5 per cent significance level. This suggests that trade integration has a forecasting ability for economic well-being in the D-8 countries. The results of the two-step GMM revealed that trade openness significantly enhanced the economic well-being of the D-8 countries. This finding explains that cross-border trade among the members of the D-8 countries plays a substantial role in improving the standard of living of the population. Similarly, the results showed that as the degree of financial openness grew, economic well-being improved significantly. However, the results further revealed that exchange rate depreciation had an insignificant negative effect on economic well-being. Given the findings, this paper recommends that policymakers in the D-8 countries should synergise to implement a non-restrictive trade policy, gradually collapse the barriers to financial openness, and promote exchange rate stability to create more opportunities for economic development.*

KEYWORDS: Trade integration, economic well-being, financial openness, exchange rate and D-8 countries.



INTRODUCTION

The literature on the development implications of trade integration has remained largely inconclusive. This is rooted in the theoretical controversies that surround the discourse of globalization. The classical economists' position on trade favoured the increased integration of countries in global trade, arguing that countries should produce and export commodities in which they have either an absolute or comparative advantage while importing those commodities in which they have a comparative disadvantage. This is based on the understanding that trade integration will increase access to goods and services at a cheaper rate, which will increase global economic well-being. While the classical economists supported the dismantling of trade barriers, the argument of the neoclassical school of thought is that trade policies such as increased openness may not foster economic growth; rather, economic growth is driven by technological changes, which are endogenous (Zahonogo, 2016). However, the gravity theory highlights that the benefits of trade integration could be constrained by income and distance, especially when countries closer to each other may not be technologically advanced (Hozouri, 2017).

In recent times, there has been renewed interest in the benefits and costs associated with trade integration. Some later studies (Zahonogo, 2016; Grossman & Helpman, 1991) have been quick to outline the positive implications of trade integration to include economic growth, increased market access, human capital development, access to wide sources of capital, and employment opportunities, among others. While Grossman and Helpman (1991) contend that countries opening up ensure faster economic growth in relation to countries that are less integrated, Zahonogo (2016) offers some insights into the asymmetric effect of trade openness on economic growth, contending that total trade and openness above certain thresholds could cause a decline in economic growth. In addition, Bunje, Abendin, and Wang (2022) argue that imports stifle economic growth, whereas exports of goods and services enhance economic growth. However, Esaku (2021) posits that the growth benefits of trade openness differ in the short- and long-run and among trade openness indicators.

Although the benefits of trade integration as documented in the existing literature are interesting, the costs or associated negative implications have increased the susceptibility of the trading countries and their financial markets to external shocks, and the effects of some of these shocks could have long-lasting effects in an environment where the local economy is not resilient. Ulaşan (2015) argues that trade openness may not guarantee economic growth. This is equally supported by some recent studies (Omoke & Opuala-Charles, 2021; Ramirez-Rondán, Terrones, & Vilchez, 2020; Duodu & Baidoo, 2020), which recognize the increasing role of financial openness, exchange rate policy, and technological advancement in ICT in driving economic growth in developing economies. As outlined by Nguyen and Bui (2021), increased financial integration creates opportunities for firms to access more credits for expansion at a cheaper rate, with positive implications for economic prosperity.

Despite the focus of most of the previous studies on trade policy, they tend to limit their concentration on economic growth implications, thereby ignoring the economic well-being or standard of living of the population. Additionally, some of these studies failed to consider the role of financial openness. Therefore, this paper makes an improvement to the previous studies by analyzing how trade integration has affected the economic well-being of the members of the D-8 countries. As an economic group within the member states of the Organization of Islamic Countries (OIC), the D-8 countries formed an economic development alliance to



improve member countries' positions in the global economy, diversify and create new opportunities in trade relations, and enhance participation in decision-making at the international level, among others. The extent to which their trade relations have translated to intended and desired economic development has remained controversial, as Jafari, Ismail and Kouhestani (2011) posit that the D-8 countries tend to trade more with industrialized or other developing countries than their own member countries. In this light, the thrust of this paper is to ascertain how trade integration contributed to economic well-being in the D-8 countries. The rest of this paper is organized as follows: Section 2 focuses on the review of theoretical and empirical links between trade integration and economic development. Section 3 presents the methodology whereas results and discussions are contained in Section 4. Section 5 summarises the paper and offers recommendations.

REVIEW OF THE RELATED LITERATURE

Theoretical Underpinning

In the literature, there are several theories that try to link trade and economic growth. According to Ijirshar (2019), the absolute advantage theory contends that countries should specialize in producing goods in which they have an absolute advantage, arguing that through such a process, production will become more efficient, improving the standard of living of the citizenry. For Ricardo (1817), a country could have an absolute advantage in more than one good, recommending that trade could be beneficial and improve the economic well-being of society if countries produced and exported commodities in which they had a comparative advantage. According to Opong-Baah, Bo, Twi-Brempong, Amoah, Prempeh, and Addai (2022), both theories advocate for greater trade integration and non-regulation of trade through government policy or intervention. Solomon and Tukur (2019) noted that while the absolute and comparative advantage theories failed to highlight the product that could bestow an advantage on countries, the Heckscher-Ohlin theory suggests that comparative advantage can be gained and economic wellbeing improved when countries employ production factors that were in abundance in producing goods and services. This, they argue, would give such countries a price and cost advantage, increasing the gains from trade.

Empirical Literature

Evidently, a plethora of empirical literature offered some insights into the benefits and costs of trade integration from both country-case and cross-country perspectives. While some of the studies found evidence to justify the benefits of trade integration, others failed to validate the trade-development nexus. Kong, Peng, Ni, Jiang and Wang (2021) paper relates to the relationship between China's opening up and its influence on economic growth quality under exchange rate fluctuation between 1994 and 2018. An autoregressive distributed lag (ARDL) method and a threshold model were applied to analyse this relationship. The study made certain fundamental findings. They showed that a stable cointegration relationship exists between trade openness and quality of economic growth in China. It was also revealed that trade openness significantly improved the quality of economic growth in China. Notably, opening up the economy when trade openness is high diminishes economic growth quality in China.

Yameogo and Omojolaibi (2021) employed the panel vector auto-regression, autoregressive distributed lag (ARDL) and system generalized method of moments to x-ray if trade



liberalization and economic growth affect the poverty level in sub-Saharan Africa from 1990 to 2017. Data of forty (40) sub-Saharan African countries was used for the study, with the panel ARDL method used for sensitivity analysis. Within the period considered, their analysis informed that trade liberalization, population growth and institutional quality ensured reduction in poverty levels in the long run. They found that poverty was unresponsive to shocks, to trade and economic growth in the short run.

Udeagha and Ngepah (2021) followed a non-linear approach in examining how trade openness related with economic growth in South Africa within the period from 1960 to 2016. Aided by the non-linear autoregressive distributed lag (NARDL) method, they showed that trade openness had asymmetric effects on the South African economy, and this was observed both in the short and long run. In the long run, opening up of the South African economy led to a decline in economic growth, measured using gross domestic product per capita. When the economy of South Africa was less opened, they noted that there was increased economic growth in the long run.

Omoke and Opuala-Charles (2021) examined the moderating role of institutional quality in the nexus between trade openness and economic growth in Nigeria. By employing three trade openness indicators (total trade, export trade and import trade), they questioned if the quality of institutions in Nigeria affects how these proxies of trade openness contribute to the Nigerian economy. To do this, they set up a multiplicative model where the indices of trade openness was interacted with institutional quality indicator (quality of governance), estimated within the autoregressive distributed lag (ARDL) framework. While result revealed that import trade had a negative effect on economic growth, they showed that the negative effect reduces as the quality of institution improves. Their result hinted that the export significantly promoted economic growth and institutional quality played no role in actualizing this.

The work of Xu, Han, Dossou and Bekun (2021) looked at the relationship between trade openness, foreign direct investment and income inequality in 38 sub-Saharan African (SSA) countries from 2000 to 2015. By using the system generalized method of moments (GMM) to estimate these relationships, the increased trade openness worsens the income inequality level in the SSA countries. Other variables exacerbating income inequality were corruption, education, rule of law and political instability. An increase in foreign direct investment was found to induce a reduction in income inequality.

Abeka, Andoh, Gatsi and Kawor (2021) employed the system generalized method of moments (GMM) to assess if telecommunication infrastructure enhances the effect of financial development on the economy of 44 sub-Saharan African countries from 1996 to 2017. Specifically, the study examined the moderating role of cellular telephones and fixed telephones in the financial development and economic growth nexus. The system GMM results revealed that conditional effect of telecommunication infrastructures is positive, indicating that telecommunication infrastructure boosts the direct effect of financial development on economic growth.

Alam and Sumon (2020) followed a panel approach as they studied 15 Asian countries from 1990 to 2017. The panel vector error correction model was used to examine the causal link between trade openness and economic growth. The panel fully modified ordinary least square and dynamic ordinary least square methods were used to examine the long-run responsiveness of real gross domestic product to changes in trade openness, capital formation and foreign



direct investment. Their causality result revealed bidirectional causality between trade openness and economic growth. They noted that economic growth responded positively and significantly to changes in trade openness in 14 countries, except in India wherein the positive coefficient was insignificant.

The tripartite analysis of the relationship between trade openness, human capital and economic growth in 19 Asian countries from 1985 to 2017 was investigated by Amna Intisar, Yaseen, Kousar, Usman and Makhdum (2020). The 19 Asian countries were grouped into two panels on the basis of differences in gross domestic product per capita. The Southern Asia comprised seven (7) countries and the Western Asia countries numbered eleven (11) countries. The panel unit root and cointegration approaches were adopted and the panel long run model was estimated using the fully modified OLS and dynamic OLS methods. They also analysed the causal relationship among the variables using the Dumitrescu and Hurlin causality test. Regardless of the panel cointegrating method, both trade openness and human capital significantly enhanced economic growth in Southern and Western Asia. The impact of labour force and foreign direct investment differed across the two regions. In Southern Asia, the effect of labour force was negative, but FDI contributed positively to economic growth in the region. In Western Asia, FDI and labour force had negative and positive impact respectively.

Paun, Musetescu, Topan and Danuletiu (2019) was concerned with the drivers of sustainable economic growth in 45 low-, middle- and high-income countries from 2006 to 2015. Using the panel OLS, fixed effect and random effect methods, they considered the impact of financial development and sophistication on the economy of the 45 countries. Their panel results revealed that credit and domestic monetary expansion were negatively related with economic growth. Financial sophistication of the financial system and financial inclusion stimulated economic growth and development and so did the quality of financial systems.

DATA AND METHODOLOGY

MODEL SPECIFICATION

The model for examining the impact of trade integration on economic well-being in the D-8 countries closely followed the work of Kong, Peng, Ni, Jiang and Wang (2021), but in this case, certain adjustments were made given that this study focused on economic well-being and not the traditional growth implication of trade.

The model employed was specified in a functional form below:

$$GNI_{i,t} = f(GNI_{i,t-1}, TOP_{i,t}, \vartheta'_{i,t}) \quad (1)$$

where

$GNI_{i,t}$ = Gross national income per capita (a proxy for economic well-being);

$GNI_{i,t-1}$ = initial level of economic wellbeing of the D-8 countries and denote the catch-up effect;



$TOP_{i,t}$ = is trade openness, used to measured trade integration. Trade openness was arrived at by summing total exports and imports of goods and services and expressed as percentage of gross domestic product.

$\vartheta'_{i,t} = (k \times 1)$ vector of control variables, which within the period of the investigation may have affected economic well-being in the countries of interest. These control variables include financial openness (measured using the Chinn-Ito index) and official exchange rate.

In econometric specification, equation (1) becomes:

$$\ln gni_{i,t} = \ln gni_{i,t-1}\beta_1 + top_{i,t}\beta_2 + fop_{i,t}\beta_3 + lnexc_{i,t}\beta_4 + \varepsilon_{i,t} \quad (2)$$

$\beta_2 - \beta_4$ defines coefficients of the explanatory variables

$\varepsilon_{i,t}$ denotes the disturbance term.

The GMM simultaneously estimates the following two models:

First, the level equation using the first difference as instruments

$$\ln GNI_{it} = \delta \ln GNI_{it-1} + \gamma_1 TOP_{it} + \gamma_2 FOP_{it} + \gamma_3 \ln EXC_{it} + \omega_i + \varepsilon_{it} \quad (3)$$

The first difference equation using the level variables as instruments

$$\Delta \ln GNI_{it} = \Delta \ln GNI_{it-1} + \Delta TOP_{it} + \Delta FOP_{it} + \Delta \ln EXC_{it} + \varepsilon_{it} \quad (4)$$

DATA DESCRIPTION

The datasets used for this study are panel data obtained from different sources including the United Nation Conference on Trade and Development (UNCTAD), World Bank's World Development Indicator (WDI), and the Chinn and Ito (2010). The measure for economic well-being was gross national income per capita (GNI) and was sourced from the United Nation Conference on Trade and Development (UNCTAD). Trade openness was measured using the sum of total exports and imports of goods and services as a percentage of GDP and the official exchange rate of the D-8 countries to the US dollar was used as a measure of exchange rate. Both trade openness and exchange rate were sourced from the World Bank's World Development Indicator (WDI).

DATA ANALYSIS TECHNIQUES

The model was estimated using the Blundell and Bond (1998) generalized method of moments (GMM) method. The choice of this method over the Pooled Mean Group (PMG) of Pesaran, Shin and Smith (1999) and the Arellano and Bond (1991) difference generalized method of moments (GMM) method is that it minimizes data losses and estimates both the level and first difference equations as a system. Descriptive statistics were applied to obtain the basic statistics on the interest variables such as mean, maximum and minimum values, and normality condition of the series. To determine the stability properties of the four interest variables, the datasets were subjected to unit root testing within the framework of the Levin, Lin and Chu (LLC)



(2002). This approach to unit root testing entails estimating the regression model to obtain the test statistics on which decision of unit root test is based.

$$\Delta Y_{it} = \omega Y_{i,t-1} + d' \gamma_i + \sum_{j=1}^p \theta_{ij} \Delta Y_{i,t-j} + \mu_{it} \quad (5)$$

where

Δ = first difference operator

X_{it} = interest variable for the panel at time t

p = lag length selected using either the Akaike information criterion (AIC), Schwarz information criterion (SIC) or Hannan-Quinn information criterion to address the issue of possible serial correlation of the residuals.

μ_{it} = disturbance which is assumed to be have a zero mean and constant variance.

ω = parameter to be estimated

$Y_{i,t-1}$ = predetermined interest variable.

In validating if there is long-run relationship among trade openness, financial openness, exchange rate and economic wellbeing, the study employed the residual-based method of Kao (1999) to examine the existence of cointegrating relationship among the interest variables.

RESULTS AND DISCUSSION

Descriptive Statistics

The results of the descriptive statistics are reported in Table 1.

Table 1: Descriptive Statistics

	<i>GNI</i>	<i>TOP</i>	<i>FOP</i>	<i>EXC</i>
Mean	4511.128	55.8625	-0.4949	4308.711
Median	3067.157	44.4439	-0.6577	81.7877
Maximum	12402.82	203.8546	2.3106	42000.00
Minimum	435.6480	16.3521	-1.9270	1.3015
Std. Dev.	3565.790	38.8677	0.9036	9218.239
Skewness	0.7431	2.2421	1.2387	2.6794
Kurtosis	2.0500	7.2801	4.7052	10.1126
Jarque-Bera	17.6313	217.7623	50.1277	449.4044
Prob.	0.0001	0.0000	0.0000	0.0000
Observation	136	136	133	136

Source: Author's Computation (2023) from STATA 17



The summary statistics for the interest variables are reported in Table 1. Within the period of the study, the economic well-being in the D-8 countries averaged US \$4,511.128; trade integration of the D-8 countries averaged 55.8625 percent of the gross domestic product; financial openness averaged -0.4949; and the exchange rate had a mean value of 4,308.711. Economic well-being i , measured using gross national income per capita, fluctuated during the period, rising from US \$435.6480 to US \$12,402.82. The D-8 countries appeared to be more integrated into international trade as total trade peaked at 2 percent of gross domestic product, dropping to a low of 16.3521 percent. In Table 1, the study documents an improvement in the level of financial openness of the D-8 countries as the Chinn-Ito index improved from -1.9270 to 2.3106. Devaluation of the domestic currencies of the D-8 countries was observed as the domestic currencies appreciated only to 1.3015 per US dollar, as a staggering 42,000.00 was exchanged for one US dollar in the bloc. From the computation presented in Table 1, there were wild fluctuations in gross national income per capita and exchange rate, which informed the study by introducing the distributions in the model in their logarithmic form. Equally, the skewness statistic showed the impressive distribution of all four interest variables, and the skewness statistics indicated increases in each series over the course of the study.

Panel Unit Root Test

The results of the panel unit root test are presented in Table 2.

Table 2: LLC Panel Unit Root Result

Panel Unit Root Test			
LLC			
Variables	Levels	1 st Diff.	Remark
$lngni_{it}$	-3.5080***	-	I(0)
top_{it}	-2.8115***	-	I(0)
fop_{it}	-0.9505	-2.6060***	I(1)
$lnexc_{it}$	1.4410	-5.8590***	I(1)

Note: *, ** and *** denote significance at 10%, 5% and 1%, correspondingly; LLC = Levin, Lin and Chu.

Source: Authors' computation (2023)

The unit root tests were conducted using the Levin, Lin, and Chu (LLC) (2002) method. The null hypothesis that this approach tests is the non-stationarity of the series, which is examined against the alternative hypothesis of a stationary series. Table 2, which conveys the unit root result, highlights that at the level unit root test, only gross national income per capita (GNI) and trade openness (TOP) were stable at the 5 percent significance level. The study found that financial openness (FOP) and exchange rate (EXC) had unit root problems in their level forms. The financial openness (FOP) and exchange rate (EXC) series were further separated by first differencing, and this process resulted in the stationarity of both series. The unit root test showed that financial openness (FOP) and exchange rate (EXC) are integrated in order one, I(1), while gross national income per capita (GNI) and trade openness (TOP) are integrated in order zero, I(0).



Cointegration Test

Table 3: Kao Cointegration Result

H_0: No level relationship		
ADF	t-Stat.	Prob.
	-2.6432***	0.0041

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

Source: *Authors' computation (2023)*

Information on the long-run relationship between trade openness, financial openness, exchange rate, and economic well-being is documented in Table 3. The Kao (1999) model was estimated to determine if the interest variables have a common long-run trend. The Kao (1999) method is a residual-based method, wherein the errors from the linear combination of the series are tested for stationarity. The results documented the cointegrating relationship between trade openness, financial openness, exchange rate, and gross national income per capita. This was informed by the probability value of the Kao test statistics, which is less than the 5 percent level of significance.

Model Estimation

As previously noted, the GMM was applied to estimate the model. The results are summarized in Table 4.

Table 4: Summary of the Two-step System GMM Results

Variable	Coefficient	Robust Std. Error	z	Prob.
$lngni_{it-1}$	0.8824***	0.0364	24.18	0.000
top_{it}	0.0013**	0.0006	2.12	0.034
fop_{it}	0.0205***	0.0069	2.98	0.003
$lnexc_{it}$	-0.0022	0.0099	-0.23	0.821
C_{it}	0.9447***	0.2644	3.57	0.000
Diagnostics				
Observation	125			
F-Statistics	22547.47[0.000]			
Instruments/Group	8/8			
AR (1)	-2.05[0.040]			
AR (2)	-1.51[0.131]			
Hansen Statistics	1.38[0.711]			

Note: *, ** and *** denote significance at 10%, 5% and 1%, correspondingly; probability value in parentheses

Source: *Authors' computation (2023)*



The study examined how economic well-being responded to changes in trade openness, financial openness, and exchange rate in a dynamic setting. Table 4 showed that trade openness had a significant positive impact on economic well-being. This implies that the standard of living improved by 0.0013 percent as the D-8 countries opened up their economies. This result is consistent with the findings of Kong, Peng, Ni, Jiang, and Wang (2021), Yameogo and Omojolaibi (2021), and Alam and Sumon (2020), but contradicts the results of Udeagha and Ngepah (2021) and Xu, Han, Dossou, and Bekun (2021), who noted that trade openness does not translate into improved economic performance. The implication of the significant positive effect of trade openness on economic well-being is that the members of the D-8 countries can leverage trade relations to advance the level of economic development for improved living conditions for the population. At the same time, the results revealed that an increase in financial openness significantly stimulated economic well-being in the D-8 countries. Specifically, as financial openness improved by 1 percent, the gross national income per capita rose by 0.0205 percent. This finding highlights that an improvement in financial openness through the globalization of the financial landscape has the potential to promote economic well-being and an improved standard of living.

In contrast, exchange rate depreciation reduces the economic well-being of the D-8 countries by approximately 0.0022 percent, but this negative relationship is not statistically significant. This finding is not surprising because it reflects the prevalence of an inconsistent exchange rate policy in the D-8 countries that has been identified in the existing literature to undermine the benefits of trade integration. In sum, the results are valid based on the diagnostic tests carried out. The study rejected the null hypothesis of first-order autocorrelation of the errors while failing to reject second-order autocorrelation. More so, the instruments used are valid as suggested by the Hansen (1982) J-test, given the corresponding probability of the test statistic is greater than 0.05. On balance, the outcomes of these post-estimation diagnostic tests provided enough evidence for the reliability of the estimated dynamic GMM model for policy formulation and long-term forecast.

CONCLUSION AND RECOMMENDATIONS

Understanding the benefits and costs of trade integration has remained an interesting area of research in the past two decades, considering the increasing levels of trade relations and economic cooperation among countries worldwide, especially in developing and emerging economies. This paper followed the two-step GMM to explore the dynamic effects of trade integration on economic well-being in the D-8 countries. The findings showed that trade openness significantly improved the economic well-being of the D-8 countries during the study period. This suggests that trade relations among the countries offer some opportunities for economic development. Second, as financial openness grew, the economic well-being of the D-8 countries was enhanced. This attests to the effectiveness of *de facto* and *de jure* in driving the process of economic development in the D-8 countries. However, exchange rate depreciation was found to cause economic well-being to decline, indicating that the exchange rate policy has not offered the intended and desired opportunity for economic development in the D-8 countries. Based on the findings, this paper concludes that trade relations provide a roadmap for improving the standard of living of the population in the D-8 countries. Hence, this paper recommends that policymakers in the D-8 countries should work together to



implement a non-restrictive trade policy, gradually collapse the barriers to financial openness, and promote exchange rate stability to create more opportunities for economic development.

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