

The Impact of Trade Openness and Export Expansion Grants in Nigerian Economy (1986-2019): New Evidence from Quantile Regression.

Behiye Cavusoglu (✉ behiye.cavusoglu@neu.edu.tr)

Near East University: Yakin Dogu Universitesi <https://orcid.org/0000-0003-0561-4514>

Mohammed A. M Usman

Near East University: Yakin Dogu Universitesi

Research

Keywords: Trade openness, Export expansion grants, Economic growth, Nigeria

Posted Date: January 18th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-145322/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

The Impact of Trade Openness and Export Expansion Grants in Nigerian Economy (1986-2019): New Evidence from Quantile Regression.

Abstract

Trade openness and export promotion policies such as export expansion grants are the furthestmost competent yardstick for measuring growth and development, approved by various countries since 1970s. Looking at the Nigeria economy whose depends almost largely on external trade is inclusive. Therefore, this analysis explores the effects of trade openness and export expansion grants on Nigerian economy using annual data from 1986-2019. This analysis makes use of coefficient covariance metrics, stability leverage plots and pairwise granger causality and quantile regression to portray the impact of trade openness and export expansion grants on Nigerian economic growth. The outcomes confirm that, there was a positive relationship between trade openness (TOPN) and economic growth (GDPR) in the first and last quantiles (seventh) quantile while the remaining quantiles has negative effect on GDP growth rate of Nigeria and were statistically insignificant during the study era. While the coefficients of export expansion grants (EEXG) have positive effect on GDP growth rate of Nigeria in all quantiles but statistically significant only in sixth as well seventh quantile. Also, the result of pairwise granger causality showed strong bi-directional causality between trade openness and GDPR at 5% level of significance as well as uni-directional causality running from GDPR to export expansion grants. Therefore, it recommended that, Nigerian government should adjust the structure of its trade through concentrating on high value-added products instead of exporting semi-finished goods as well by given more support to domestic industries (such as subsidies, tax holiday, more export expansion grants) to compete internationally. Also, government should maintain stable exchange rate as well policies through effective monetary policies that would reduce inflation rate in the economy in order to attain Nigeria's Economic Recovery and Growth Plan which is in line with SDGs goal of 2023 in Nigeria.

Keywords: Trade openness. Export expansion grants, Economic growth, Nigeria.

1. Introduction

The importance of external trade in promoting growth and development have been inspired by different literatures. Here the problem is that, does external trade acts serves as mechanism for growth and development, which assumed by trade-led growth hypothesis. Romer (1990) & Young (1991): Helpman and Grossman (1990).

In the long term, trade openness has been shown to potentially improve economic growth through having easy contact with products and services, as well efficiency allocation of resources which affects the overall output via technological advancement and knowledge accumulation. (Barro & Sala-i-Martin, 1997; Rivera-Batiz & Romer, 1991). Although both theoretically and empirically, the connection between the openness and capacity of a nation to produce and export products or services and improvement on its GDP growth rate is generally a topic of discussed. Trade openness

has thus succeeded in promoting economic development through exports and imports. Vamvakidis (1998). Trade openness represents the incorporation of countries into the global economy. Small countries are usually considered to be more integrated (due to their size in the domestic market) than large countries (Kovarova, 2017).

The beginning of export-oriented trade policy reforms in West Africa dates back to the early 1980s, when import-substitution policies were superseded by West African countries. World imports of goods and services to Western Africa accounted for 19.9% of total GDP in 1990 and 30.3% in 2008, respectively. Similarly, in 1990 and 30.8 percent in 2008, exports accounted for 19.8 percent of the overall GDP (Kovarova, 2017). Furthermore, the analysis by the International Monetary Fund (IMF, 2016) indicated that an average West African country is more than 30 percent more open to international trade today than in 1960, for example it is calculated by quantifying the ratio of exports plus imports over GDP. As members of the Economic Community of West African States (ECOWAS), Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo have made considerable progress in terms of integration and cooperation since the 1990s.

Similarly, a research by Fadehunsi (1986), Udah (2012) and Usman (2010), showed an evidence that promoting export sector is what determines development as a result of its trickle-down effects to the rest of the sectors of the economy. Continuous inflow of foreign export earnings was also considered by Usman and Salami (2008) to be a sure way to improve the status of the economic balance of payments. They also emphasized that the Asian Tigers' growth-inspiring export expansion program was made possible not because of demand and supply forces only, rather because of sensibly planned government interference which displayed different inducements that stimulated growth in export.

Despite the openness of the Nigerian economy, since the dominant commodity of foreign trade consists mainly of non-renewable capital, international trade conditions have yet to improve (Udah, 2012). Therefore, it has become important that economic diversification should be a prerequisite for accelerating and sustaining Nigeria's economic growth.

Most of the studies carried out in this field were carried out separately to examine the impact of trade openness or export expansion grants on economic growth in Nigeria, none or few have attempted to see the combined impact of trade openness and export expansion grants on the Nigerian economy. This study therefore seeks to fill this void because the need for transparency and export promotion policies by promoting and supporting Nigerian domestic industries has been recognized as well as put forward in key universally recognized development goals such as the Developing Nations Decade 2011-2020 (Istanbul Program of Action) and the 2030 Sustainable Development Agenda.

Our main contribution to the literature is to examine the impact of trade openness and export expansion grants on economic growth in Nigeria and to respond to how growth in Nigeria is influenced by the level of export expansion grants, real exchange rate, interest rate, inflation rate, and trade openness. Our contribution to this study is in this direction and the best of the expertise of researchers can help build jobs, promote structural change and achieve sustainable economic growth in Nigeria. The article is arranged as follows; section one deals with the introduction, relevant literature is covered in second section, the subsequent section (3) deals with methodology, and analysis and discussion in section four. Finally, the conclusion and implications are discussed in section five.

2. Literature Review and Theoretical Framework

Several trade openness initiatives are available, such as population densities, GDP trade shares, barriers to trade, dual imbursement and exchange rate deals, such as contraband premiums as well indexes of trade policies and orientation as showed by (Yanikkaya, 2003). However, none of these measures are excluded from methodological issues (Harrison, 1996 & Yanikkaya, 2003). Trade percentage (share) over GDP or to be more precisely, country's exports adding it to its imports divisible by GDP is the common measure applicable to the most of existing literatures. Typically, in the long run this measure is accessible for many nations. Nevertheless, since it depends on natural resources, nation's structure, and more various commercial factors but it has some disadvantages. A nation may have a large export rate or have resources that are desirable because of their small size, instead not so even though some nations have limited import tariffs (Lloyd, 1999). However, numerous observational studies also used similar tests as well have recorded a strong positive effect on the growth of the economy as suggested by modern growth and recent international trade models, using such technique is indeed a major significant path to explaining the relation regarding international exchange (trade) and economic growth. (Yanikkaya, 2003).

The literature offers current existing literatures concerning the effects of trade openness and export expansion grants on GDP growth rate (economic growth). The following related studies are discussed in this paper in two segments: (a) The relationship between GDP growth rate and openness to trade; (b) GDP growth rate proxy to economic growth and export expansion grants. These are covered below.

2.1 Trade openness and Economic growth

Openness to trade and its impacts on nations economy is a core component of significant policies related to international trade. Preceding research adopted several theories to explain the relationship among openness to trade and the rate at which the country's economic activities grow. The relationship among trade openness and Morocco's growth rate was discussed by Bouoiyour (2003). The results indicated that there is no long-run causality between them. Higher imports and exports have contributed to an increase in GDP in the short term. Calderon et al. (2004) also discovered that trade openness had a positive influence on richer countries growth rate, inversely no effects in poor countries as a result of openness. Freund and Bolaky (2008) discovered a strong per capita income impression on openness to trade evidence from 126 countries data using cross sectional analysis. Their studies have also shown that in more elastic economies, but have no effect on does stagnant economies, an increase in trade has improved living standards. In comparison, Sarkar (2008) discovered openness to trade would have a detrimental impact on the growth. As proxy of transparency, this study used the trade-GDP ratio. Chang et al. (2009) found that if a significant policy is adopted, the positive relation among growth and transparency could be significantly improved.

Using 1960-2000 sample period, Ulasan (2012) examined the correlation among openness to trade and long-run sustainable growth rate. The findings showed how some variables of trade openness associated strongly as well as favorably to long-term economic development. Bidirectional ties among openness to trade and growth rate have been evidently shown in the analysis in major developed as well as developing countries, Rahman et al (2017) Rahman and Mamun (2016), the same findings were also found for Australia in (2016). In the long run, no evidence was found in

Eris and Ulasan (2013) of a straight and strong link among openness to trade and economic development. The effect of openness to trade on South-East European countries' economic growth was explored by Fetahi-Vehapi et al. (2015). Their results found that trade openness had a positive impact on economic growth, depending on both the initial per capita income and other parameters; however, there was no substantial evidence among the two parameters. Tahir et al. (2014) investigated existence of relationship among openness to trade and GDP growth rate, their findings showed openness to trade had a positive effect on growth rate.

In addition, Musila & Yiheyis (2015) explored the effect of openness to trade on Kenya's level of investment and the rate of economic development. Their findings showed that through relationship among real capital growth, a shift in trade openness affected the pace of economic growth in the long run. In a research undertaken by Wizarat, Hye, and Lau (2016) demonstrate openness to trade are closely correlated with growth in GDP of china in the short run and long run. Ahmed, Asaleye, Lawal, and Nwanji, (2016). Used autoregressive distributed lag technique in respect to Nigerian economy they found openness to trade had negative influence on economic growth in long run but a positive effect in the short-term. Additionally, Tyopev, I (2019), using secondary data in a panel data analysis from 1970-2016, he investigated whether openness to trade has correlation with economic growth and development. His results indicated the existence of long run relationship between openness to trade and economic growth of Nigeria, Ghana and Cote d'Ivoire, and that this relationship is negative but marginal for Nigeria and Cote d'Ivoire, but positive and important for Ghana.

2.2 Export Expansion Grants and Economic growth

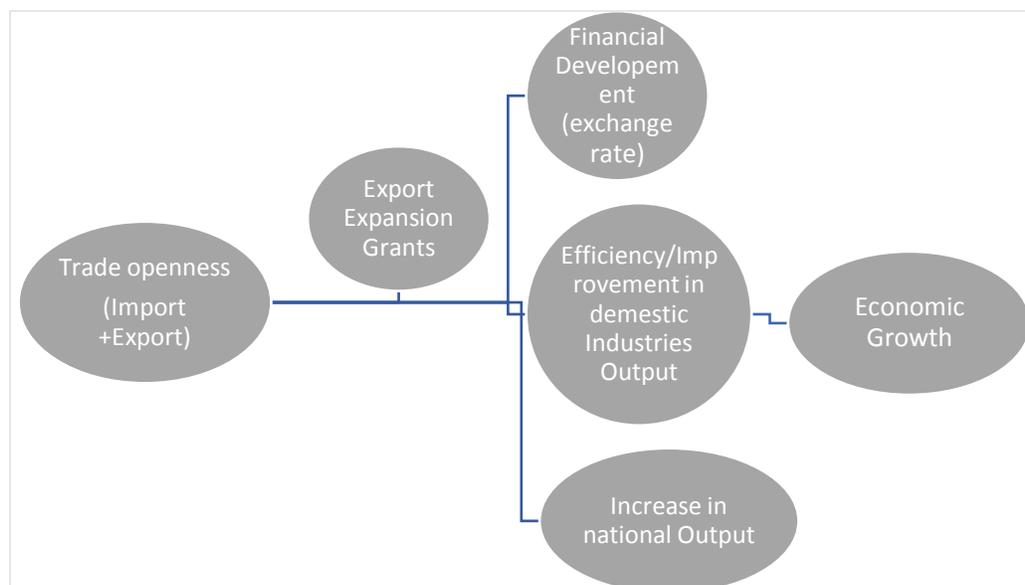
Export elevation has been an activity that attracts increasing significance in developing as well as developed nations. More countries today are rapidly realizing that in an increasingly dynamic and foreign economic climate, exportation promotion proposals many paths for development as well as way of survival. In general, export promotion strategy is taken into account by nations hopeful to quick economic development, Feeder (1983), it is clear that export promotion is necessary to solve the deficit in the balance of payments. Nyong (2005) indicates that in view of this shortage in country's payment equilibrium may be adjusted by a given strategy that promotes exports.

Export promotion will allow developing countries to correct their external sector imbalances, UNTACD (1989) and World Bank (1984), thus ensuring a complete upgrading and improvement in their domestic economies. Similarly, Krugman and Helpman (1985), Sarbapriya (2011) Smith and Todaro (2003), postulated that flourishing exports provide important basis of external exchange income would be redirect to creation and invention to the highly improved and efficient domestic industries. Also, Ali and Madueme (2019) explore the effect of export expansion grants on Nigerian non-oil export growth using Nigerian annual data from 1986-2015. Using ARDL technique, the result indicated that export expansion grants have insignificant effect on growth rate of Nigeria.

Finally, Akeem (2011) on analysis to investigate whether export efficiency on foreign trade in Nigerian growth rate (1970-2005). He discovered that a 91 percent increase in exports would decrease growth rate by 19 percent.

The mechanisms and channels of trade openness and export expansion grants will have significant effect on economic growth as depicted in Figure 1.

Figure 1: Schematic Framework for Trade Openness, Export expansion Grants, and Economic Growth Relationship.



Source: Author

From the schematic Figure 1, trade openness is commonly considered to be the number of traded sectors of a country in relation to total production. It measures the international competitiveness of a country in the global market as well. Increased openness facilitates will provide greater integration into global markets. These can be achieved through proper export expansion grants that will help domestic industries to compete globally, this would help financial development and regulation particularly exchange rate regulation stability. This situation will improve domestic industries towards increasing national output as well as country's Economic growth.

2.3 Theoretical Framework

Export-led growth model is used as a framework in this analysis. In several of the studies, as stated in the theoretical analysis, export-led growth is used. This theory looks at growth in which exports rise faster than other national expenditure components. This can occur when domestic goods, through reduced costs, increased variety or quality changes, which makes the product more competitive in world markets. This theory is important to the study because Nigeria's current policies prioritize export expansion grants and export promotion policies, in particular those of Nigerian manufactured goods Opara (2010).

3. Methodology

Sources and description of data

The research is carried out on data from two sources spanning the period 1986-2019. Which includes World Bank World Development Indicator (WDI) database containing information on most world economies' manufacturing, micro and microeconomic development indicators over the

century, as well as data from the Nigerian export expansion grants commission. We also include variables such as (GDPR) GDP growth rate as dependent variable, Export expansion grants (EEXG), INFL (Inflation rate), INTR (Interest rate), REXR (real exchange rate) and Trade openness (TOPN) as independent variables.

3.1 Model Specification

The model is characterized by different functional relationships (the impact of trade openness and export expansion grants on economic growth in Nigeria). This research therefore varies from similar models since it takes into account the variables described above of export expansion grants, inflation, interest rate, real exchange rate, and trade openness. The model is defined as follows:

$$GDPR = f(EEXG, INFL, INTR, REXR, TPN) \dots \dots \dots \text{eqn (1)}$$

The relationship is depicted as:

$$GDPR = \alpha_0 + \alpha_1 EEXG + \alpha_2 INFL + \alpha_3 INTR + \alpha_4 REXR + \alpha_5 TOPN \dots \dots \dots \text{eqn (2)}$$

Econometric Relationship is as follows:

$$GDPR_t = \alpha_0 + \alpha_1 EEXG_t + \alpha_2 INFL_t + \alpha_3 INTR_t + \alpha_4 REXR_t + \alpha_5 TOPN_t + \mu_t \dots \text{eqn (3)}$$

Where:

$GDPR_t$ = gross domestic product growth rate (annual% in current US dollars)

$EEXG_t$ = Export expansion Grants given to Domestic industries.

$INTR_t$ = Lending rate as percentage of bank rate that usually meets short and medium term.

$INFL_t$ = Consumer price index (annual %)

$REXR_t$ = Real effective exchange rate index (annual %).

$TOPN_t$ = Export plus import divided by GDP. (% of GDP).

μ_t = Stochastic Error Term

t = Time period

α_0 = the intercept of the model

α_1, α_2 and α_3 = Coefficients of the independent variables.

The research applied Augmented Dickey-Fuller (ADF) stationarity tests and the variables has been found to exhibit different differenced order (i.e I(0) and I(1)) after which we applied quantile regression since from the diagnostic checks, the series is not free from heteroscedasticity and serial correlation problem.

Quantile regression is a non-parametric regression technique developed by Koenker and Basset (1978) that assumes no statistical distribution and can flexibly express a complex relationship. It is presumed the exogeneous parameter is independently dispersed and homoscedastic. Benefit of quantile regression over OLS is that quantile regression is more robust than OLS regression to outliers and non-normality.

Quantiles, shown by π , point to the direction where an observation for λ falls within an ordered sequence. For a random variable λ with cumulative distribution $F(\lambda)$, the π -th quantile, $Q(\pi)$ is given as:

$$Q(\pi) = \inf \lambda : F(\lambda) \geq \pi \dots \dots \dots \text{eqn (4)}$$

Where inf corresponds to infimum, which is the smallest value of λ satisfying the inequality, or the highest lower bound. The conditional distribution of λ based on the explanatory variables is given in the Quantile regression model. Not only the distribution location and size of λ , but also the distribution structure was examined for effect of the independent parameters on explained parameters. It is possible to measure how the explanatory variables affect the fifth, median, or ninetieth percentiles of the distribution.

In finding the mean value, quantile regression minimizes the sum of the residuals' absolute values. The absolute value function is symmetrical such that, the median consistently has a similar amount of data points above it as shown below.

The minimization problem of a quantile regression parameter $\hat{\beta}_\pi$ is given as:

$$\hat{\beta}_\pi = \mathit{argmin}_\beta (\sum_{i:\lambda_i > \beta x_i} \pi |\lambda_i - \beta x_i| + \sum_{i:\lambda_i < \beta x_i} (1 - \pi) |\lambda_i - \beta x_i|) \dots\dots\dots \text{eqn (5)}$$

Where each element is $k \times 1$ vector.

3.2 Granger causality test

A variable Z is said to granger cause another variable Q if it previous values can be assume to predict the current values of Q in a given period of time. The granger causality test functional relationship in relation to this research work is given as follows:

$$\begin{aligned} GDPR = & \sum \beta_1 GDPR_{t-1} + \sum \beta_2 EEXG_{t-1} + \sum \beta_3 INFL_{t-1} + \sum \beta_4 INTR_{t-1} + \sum \beta_5 REXR_{t-1} \\ & + \sum \beta_6 TOPN + U_t \dots\dots\dots \text{eqn (6)} \end{aligned}$$

$$\begin{aligned} EEXG = & \sum \alpha_1 EEXG_{t-1} + \sum \alpha_2 GDPR_{t-1} + \sum \alpha_3 INFL_{t-1} + \sum \alpha_4 INTR_{t-1} + \sum \alpha_5 REXR_{t-1} \\ & + \sum \alpha_6 TOPN + U_t \dots\dots\dots \text{eqn (7)} \end{aligned}$$

$$\begin{aligned} INFL = & \sum \lambda_1 INFL_{t-1} + \sum \lambda_2 EEXG_{t-1} + \sum \lambda_3 GDPR_{t-1} + \sum \lambda_4 INTR_{t-1} + \sum \lambda_5 REXR_{t-1} \\ & + \sum \lambda_6 TOPN + U_t \dots\dots\dots \text{eqn (8)} \end{aligned}$$

$$\begin{aligned} INTR = & \sum \pi_1 INTR_{t-1} + \sum \pi_2 EEXG_{t-1} + \sum \pi_3 INFL_{t-1} + \sum \pi_4 GDPR_{t-1} + \sum \pi_5 REXR_{t-1} \\ & + \sum \pi_6 TOPN + U_t \dots\dots\dots \text{eqn (9)} \end{aligned}$$

$$\begin{aligned} REXR = & \sum \psi_1 REXR_{t-1} + \sum \psi_2 EEXG_{t-1} + \sum \psi_3 INFL_{t-1} + \sum \psi_4 INTR_{t-1} + \sum \psi_5 GDPR_{t-1} \\ & + \sum \psi_6 TOPN + U_t \dots\dots\dots \text{eqn (10)} \end{aligned}$$

$$\begin{aligned} TOPN = & \sum \theta_1 TOPN_{t-1} + \sum \theta_2 EEXG_{t-1} + \sum \theta_3 INFL_{t-1} + \sum \theta_4 INTR_{t-1} + \sum \theta_5 REXR_{t-1} \\ & + \sum \theta_6 GDPR + U_t \dots\dots\dots \text{eqn(11)} \end{aligned}$$

Decision Rule:

The decision rule for the granger causality is on the basis that, the coefficients of the series under study does not granger cause each other on 5 percent significance level.

4. Results and Discussion

The results indicate that all variables are stationary from Table 1, which indicates the stationarity result using (ADF), taking into account their ADF statistics as well as their probability values, since the t-statistics values are greater than the critical values at 5 percent significance levels.

Table 1. Augmented Dickey Fuller Result

Variables Prob	ADF statistics	Critical Values (5%)
LGDP 0.0001	-5.4313	-2.9571
LEEXG 0.0001	-5.5461	-2.9571
LINTR 0.0000	-5.6358	-2.9540
INFL 0.0001	-5.4674	-2.9571
LREXR 0.0000	-5.8907	-2.9571
LTOPN 0.0294	-3.2321	-2.9810

Coefficient covariance Metrics

Covariance is similar to correlation, but the data is not considered to be standardized in the coefficient covariance matrix. Covariance is therefore expressed as a unit which varies with the data and is not translated to a standard scale of -1 to +1. The coefficients are positive if both variables tend to rise or decrease together, while if one variable tends to increase as the other decreases, the coefficient is negative.

Table 2. Coefficient Covariance Metrics Test

Variables LREXR	LEEXG LTOPN	INFL	LINTR
LEEXG 1.7355	1.8992	2.4309	5.3317 1.9252
INFL 1.2912	-2.4309	2.7980	1.4692 1.6943

LINTR 3.5735	5.3317	1.4692	0.0014	3.6603
LREXR 7.2235	1.9252	1.6943	3.6603	1.0879
LTOPN 4.2997	-0.0001	-6.3093	-0.0002	-2.5943

From the Table 2 the covariance between export expansion grants, INFL, LINTR, LREXR and LTOPN is approximately 2.43, 5.33, 1.92 and 1.73 respectively which indicates that, they have positive relationship. Also, interest rate and real exchange rate maintains positive relationship with the rest of the variables of the study. The variance coefficients of between inflation rate and export expansion grants is -2.43 which indicates negative relationship between them, while the covariance coefficient between INFL, LINTR, LREXR and LTOPN indicates positive relationship. Finally, the covariance coefficients between trade openness, export expansion grants, inflation rate, interest rate, and real exchange rate indicates negative relationship between the variables.

Quantile Regression

From the quantile regression estimation result presented in Table 3. The coefficients of export expansion grants exert positive impact on GDP growth rate throughout the seven quantiles, but the probability values are insignificant within the study period except in the sixth and seventh quarter this is as a result of insufficiency of the amount devoted to export promotion to domestic industries which is in line with analysis outcome of Ali and Madueme (2019). From the first two quantiles, inflation rate has positive impact on growth rate of Nigeria. This may be consequences in increase of aggregate demand caused by single digit inflation in the economy. While the remaining five quantiles, inflation rate maintain negative impact on growth rate of Nigeria.

Table 3. Quantile Regression Estimation

Variables		Quantiles						
		0.1	0.2	0.3	0.4	0.5	0.6	0.7
LEEXG	Coefficient	0.0028	0.0031	0.0159	0.0174	0.0223	0.0355	0.0486
	P-Value	0.9113	0.6435	0.7248	0.8138	0.4223	0.0384	0.0143
INFL	Coefficient	8.1023	2.1946	3.9462	-	-	-6.5823	-
	P-Value	0.6473	0.9077	0.8437	0.9808	0.7529	0.7090	0.3476
LINTR	Coefficient	-	-	-	-	-	-0.0916	-
	P-Value	0.1635	0.1240	0.1342	0.1155	0.0953	0.0308	0.4192
LREXR	Coefficient	0.0052	0.0085	0.0057	0.0041	0.0042	0.0065	0.0144
	P-Value	0.2329	0.1266	0.2338	0.4288	0.4453	0.2762	0.1023
LTOPN	Coefficient	0.0408	-	-	-	-	-	0.0363

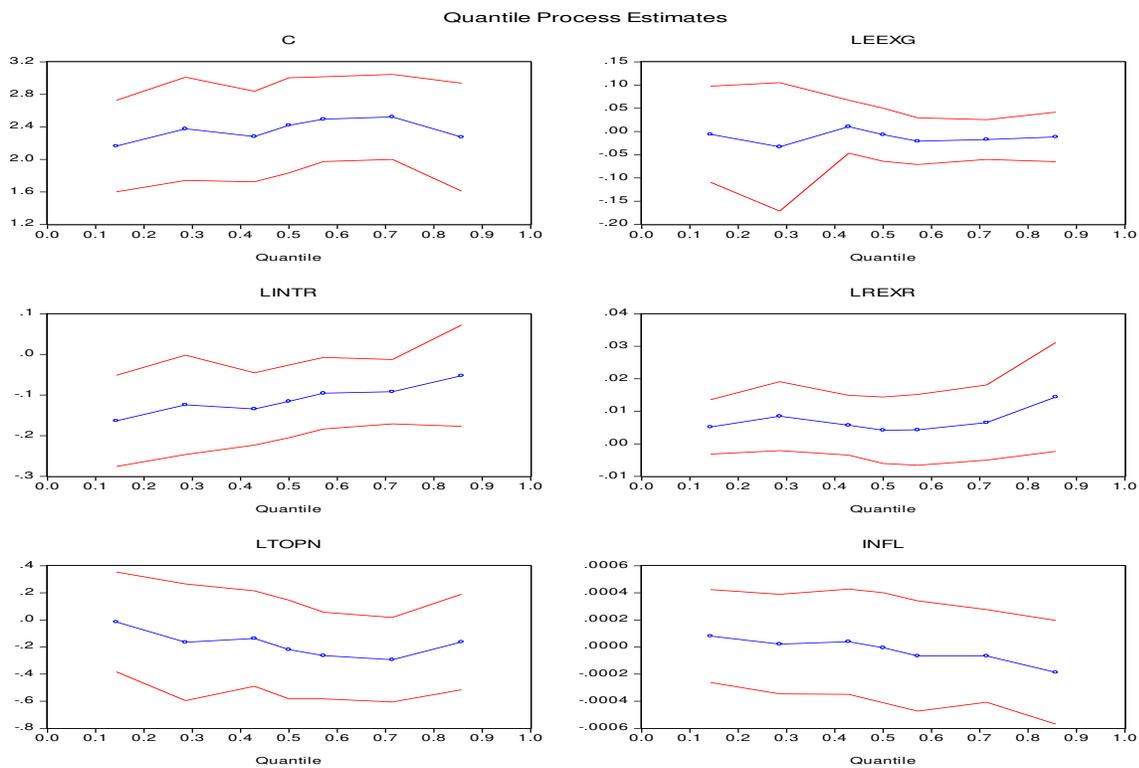
	P-Value	0.9368	0.4591	0.4517	0.2498	0.1181	0.0756	0.3737
--	---------	--------	--------	--------	--------	--------	--------	--------

Source: Author's computation

Considering interest rate, its coefficients has negative impact on growth rate One percent increase in rate of interest can decrease growth rate of GDP by 0.16, 0.14, 0.13, 0.11, 0.009 and 0.05 with substantial probability values, except for the fifth, sixth and seventh quantiles, respectively. Also, real exchange rate has positive influence on growth rate throughout the quantiles.

Finally, trade openness also had positive impact on Nigerian GDP growth rate at first as well seventh quantile while negative impact in the third, fourth, fifth, and sixth quantile and statistically insignificant as a result of dominants product of international trade components which mainly includes non-renewable resources as well as lack of competitiveness of the Nigerian domestic industries with the rest of the world as equally shown in analysis by Udah (2012).

Figure 2 Quantile Process Estimation Graph



Quantile Process Estimation Graph

Figure 2 which shows quantile regression process estimation graph. Export expansion grants exhibits decline in the first quantile up to third quantile where it starts increasing until half of fourth quantile where it continues to decline up to the tenth quantile. Interest rate increase in the in the first quarter until half of the second quarter where it starts declining up to the fourth quarter where

it continues to increase up the tenth quarter. Also, real exchange rate increase in the first quarter up to the third quarter where it starts to decline until seventh quarter and continue to increase up to tenth quarter. Trade openness exhibits decline pattern in the first quarter up to the third quarter where it starts increasing up to half of the fourth quarter where it continues to decline until half of the seventh quarter where it starts increasing up to the tenth quarter. Finally, inflation rate exhibits decline throughout the quantiles.

Diagnostic Checks

The outcome of Bruch-Godfrey serial correlation LM test demonstrates that, given the observed R^2 and the probability value of 17.07 and 0.0002, there is a serial correlation problem (see Table 4). There is also proof of a heteroscedasticity problem from the heteroscedasticity result, given the observed R^2 and the probability value of 20.37 and 0.0011, respectively. Therefore, it becomes valid to use quantile regression analysis because there is problem of serial correlation and heteroscedasticity in the sequence.

Table 4 Residual Diagnostic Checks

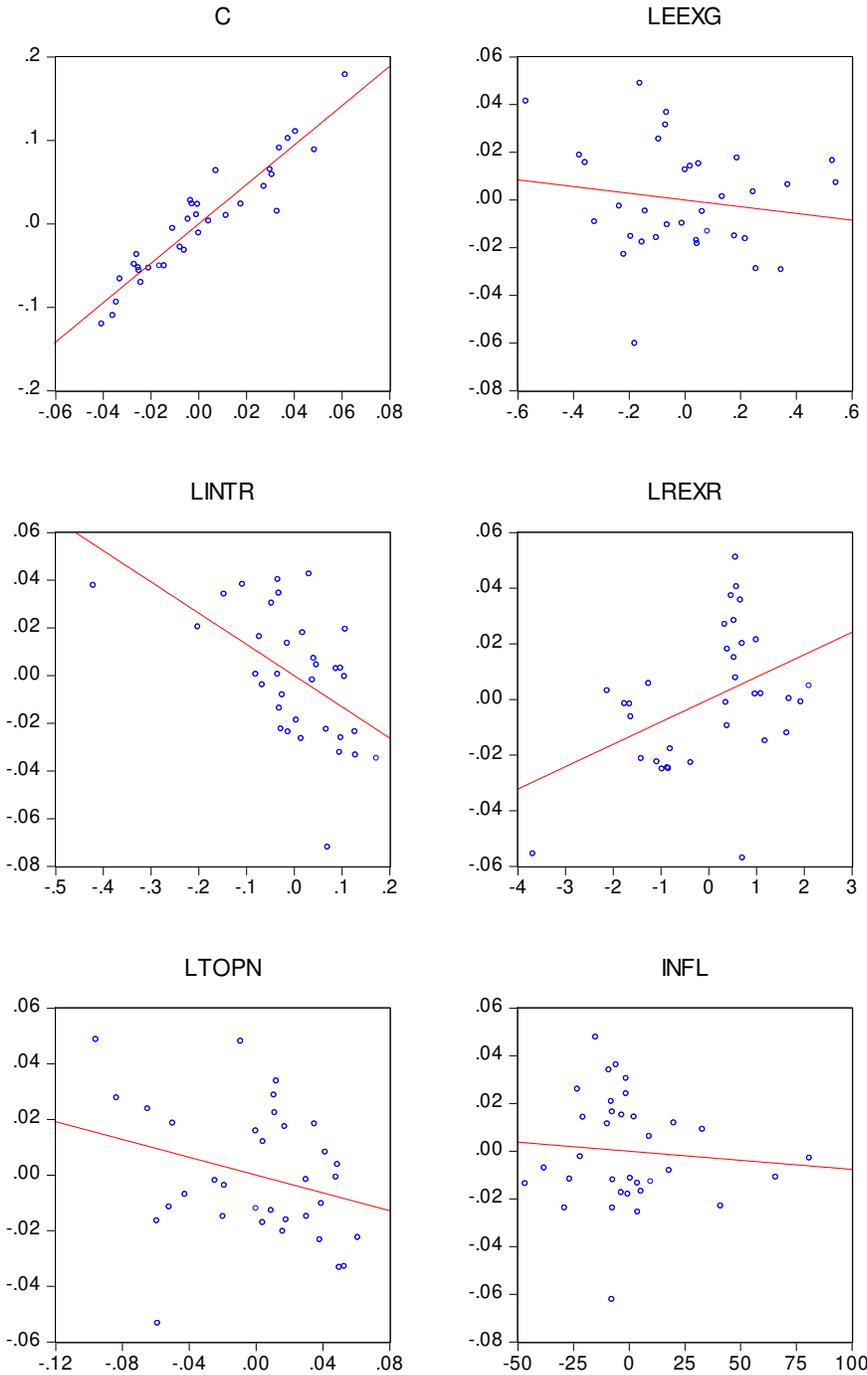
Statistical Tests		Probability	
Bruch-Godfrey			
Serial Corr.			
LM Test	13.12159	Prob. F(2,26)	0.0001
F-statistics			
Obs* R^2	17.07913	Prob. Chi-square (2)	0.0002
Heteroskedasticity			
Test (Harvey)			
F-statistics	8.376201	Prob. F(5,28)	0.0001
Obs* R-square	20.37684	Prob. Chi-Square (5)	0.0011
Scaled explained SS	14.57115	Prob. Chi-Square (5)	0.0124

Stability leverage Plots

In order to include the effect in the model, leverage plots are used to visualize the impact of points on the measure. A position horizontally far from the plot's center has more impact on the effect test than a point near to the center.

Figure 3 Stability Leverage Plots

LGDPGR vs Variables (Partialled on Regressors)



From Figure 3 which portrays leverage plots between real gross domestic product (dependent variable) and export expansion grants, interest rate, inflation rate, real exchange rate and trade openness (independent variables). From the plots it is clearly indicated that, most of the leverage plots points of the variables under study were distant from the horizontal line except in the case on interest rate where the plot points are closer to the Centre which implies that, they render less influence on growth rate of Nigeria which is proxied to GDPGR in the study.

Table 5. Pairwise Granger Causality Test

Variable/ Hypothesis (Variables Does not Granger cause Each other)	F-stat.	Probability
LEEXG Vs LGDPR	6.80779	0.0040
LGDPR Vs LEEXG	1.45949	0.2501
INFL Vs LGDPR	0.01474	0.9854
LGDPRVs INFL	0.64198	0.5341
LINTR Vs LGDP	0.17315	0.8419
LGDPR Vs LINTR	4.79931	0.0165
LREXR Vs LGDPR	0.22997	0.7961
LGDPR Vs LREXR	0.50551	0.6088
LTOPN Vs LGDPR	9.08011	0.0010
LGDPR Vs LTOPN	5.93115	0.0073
INFL Vs LEEXG	2.74476	0.0822
LEEXG Vs INFL	0.57439	0.5698
LINTR Vs LEEXG	17.2567	1.2354
LEEXG Vs LINTR	1.04385	0.3659
LREXR Vs LEEXG	0.25506	0.7767
LEEXG Vs LREXR	0.02438	0.9759
LTOPN Vs LEEXG	0.94499	0.4012
LEEXG Vs LTOPN	3.01397	0.0658
LINTR Vs INFL	4.27505	0.0244
INFL Vs LINTR	0.19781	0.8217
LREXR Vs INFL	1.42270	0.2586
INFL Vs LREXR	4.29443	0.0240
LTOPN Vs INFL	0.69255	0.5090
INFL Vs LTOPN	0.19916	0.8206
LREXR Vs LINTR	1.44335	0.2538
LINTR Vs LREXR	0.55298	0.5816
LTOPN Vs LINTR	2.78180	0.0797
LINTR Vs LTOPN	5.49811	0.0099
LTOPN Vs LREXR	0.16800	0.8462
LREXR Vs LTOPN	0.38424	0.6846

From the pairwise granger causality result (see Table 5), it shows that, a uni-directional causality running from GDP growth rate to export expansion grants taking into consideration their probability values at 5 percent significance level. Also, no causality between GDP growth rate as well inflation rate. Also, unidirectional causality exists between interest rate and GDP growth rate. So also, no proof of causality between real exchange rate and GDP growth rate. A strong bi directional causality between trade openness and GDP growth rate at 5 percent significance level. Also, no causality between export expansion grants, INFL, LINTR, LREXR, and LTOPN. But there is unidirectional causality running from inflation rate and interest rate. Finally, there is uni-directional causality between trade openness and interest rate.

5. Conclusion and Policy Recommendations

Influence of openness to trade and export expansion grants on economic growth is a subject of discussion in current literature. Therefore, the analysis explores the impact of trade openness and export expansion grants on economic growth in Nigeria within the period of 1986-2019. The research used a quantile regression method with export expansion grants, inflation rate, interest rate, real exchange rate and trade openness as control variables. Quantile regression has been applied to investigate the effects of trade openness and export expansion grants on economic growth in Nigeria. Further, coefficients covariance metrics, stability leverage plots and pairwise Granger causality approach were used to unravel the direction of causality between variables under study.

The findings indicate the presence of a positive relationship in the first and last quantile (seventh quantile) among openness to trade and economic growth, while remaining quantiles had negative effect on Nigeria's economic growth during the study period. Although export expansion grant coefficients have positive impact on Nigeria's economic growth in all quantiles, but only in sixth as well seven quantiles are statistically significant this may be as a result of dominants product of international trade components which mainly includes non-renewable resources as well as lack of competitiveness of the Nigerian domestic industries with the rest of the world. Also, the result of pairwise granger causality exhibited strong bi-directional causality between openness to trade and GDP growth rate at 5% significance level as well as unidirectional causality running from GDP growth rate to export expansion grants. The research findings therefore authenticate trade-led growth hypothesis in Nigerian context. It means a large share of Nigeria's economic growth is connected to grants to domestic industries for export expansion and to some degree, the openness of the Nigerian economy. Though the coefficients are not statistically significant within the study period. This may be as a result of lack of international competitiveness of Nigerian domestic industries. Therefore, Nigeria require to decrease trade bottlenecks and further foster global trade. However, under the Prebisch-Singer Trade Decline Statute, heavy reliance on external trade can be harmful to financial stabilization as well as growth and development.

Nigeria primarily exports crude oil and primary products, the prices of which are unpredictable and globally market-determined. The country should shift its trade composition by changing it exports of raw materials (crude oil) and semi-manufactured products to high value-added goods in order for an outward-oriented policy to have a much greater effect on economic growth. As well by given more support to domestic industries (such as subsidies, tax holiday, more export expansion grants) to compete internationally. In addition, Nigerian trade policies should encourage investment in capital-intensive industries and grow human capital capable of integrating innovations from advanced countries as well the country should reduce the level of interest rate in order to make borrowing easier as evidence showed in the research as it negatively affects growth rate. Also, government should maintain stable exchange rate as well policies that would reduce inflation rate in the economy in order to attain Nigeria's Economic Recovery and Growth Plan which is in line with SDGs goal of 2023 in Nigeria.

Declarations:

Availability of data and materials

Data and materials used in this article are available from the author upon request.

Competing interests

The authors declare no conflict of interest regarding the publication of this paper.

Funding

Not applicable.

Authors' contributions

All authors contributed equally to the conception and design of the study. Both authors read and approved the final manuscript.

Acknowledgements

We would like to commend the editors and two anonymous reviewers for providing insightful and constructive comments on an earlier version of this paper.

References

- Akeem, U. O. (2011). Non-oil Exports Determinant and Economic Growth in Nigeria. *European Journal of Business and Management* 3(3): 1- 23.
- Ali, M., & Madueme, S. I. (2019). Effect of Export Expansion Grant on the Growth of Nigeria's Non-Oil Export.
- Barro, R. J., & Sala-i-Martin, X. (1997). Technological diffusion, convergence, and growth. *Journal of Economic Growth*, 2(1), 1–26. <https://doi.org/10.1023/A:1009746629269>.
- Bouoiyour, J., 2003. Trade and GDP growth in Morocco: short-run or long-run causality? *Braz. J. Bus. Econ.* 3 (2), 14–21.
- Calderon, C., Loayaza, N., Schmidt Hebbel, K., 2004. External Conditions and Growth Performance, Working Papers Central Bank of Chile 292.
- CBN (2000). The Structure of Nigerian Economy and Implications of Development. Lagos: Ream Communications Ltd. Pp 198 – 199.
- Chang, R., Kaltani, L., Loayza, N., 2009. Openness can be good for growth: the role of policy complementarities. *J. Dev. Econ.* 90 (1), 33–49.
- Eris, M.N., Ulasan, B., (2013). Trade openness and economic growth: Bayesian model averaging estimate of cross-country growth regressions. *Econ. Modell.* 33, 867–883.
- Fadehunsu, A. (1986). Export Promotion as a Strategy for Industrialization. Being a paper presented at a workshop on Export Promotion, Kano.
- Feeder, G. (1983). On Export and Economic Growth. *Journal of Development Economics* 12: 59 – 74.
- Fetahi-Vehapi, M., Sadiku, L., Petkovski, M., (2015). Empirical analysis of the effects of trade openness on economic growth: an evidence for South East European countries. *Procedia Economic. Fin.* 19, 17–26.
- Freund, C., Bolaky, B., 2008. Trade, regulations, and income. *J. Dev. Econ.* 87, 309–321.

- Grossman, G. M., & Helpman, E. (1990). Comparative advantage and long-run growth. *American Economic Review*, 80, 796–815.
- Grossman, G. M., & Helpman, E. (1991a). *Innovation and economic growth in the global economy*. Cambridge, MA: MIT Press.
- Grossman, G. M., & Helpman, E. (1991b). Trade, knowledge spillovers, and growth. *European Economic Review*, 35, 517–526. [https://doi.org/10.1016/0014-2921\(91\)90153-A](https://doi.org/10.1016/0014-2921(91)90153-A).
- Harrison, A., (1996). Openness and growth: A time-series, cross-country analysis for developing countries. *Journal of Development Economic*, 48, 419-449.
- Helpman, E. & Krugman, P. R. (1985). *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and International Economy*. Cambridge: MA MII Press.
- Hye, Q. M., Wizarat, S., & Lau, W.-Y. (2016). The impact of trade openness on economic growth in China: An empirical analysis. *The Journal of Asian Finance, Economics and Business*, 3, 27–37. <https://doi.org/10.13106/jafeb>.
- International Monetary Fund (2016). *Sub-Saharan Africa: time for a policy reset*. World Economic and Financial Surveys, Washington, D.C.
- Kovarova, K. (2017). Economic globalization effects and openness to trade of the ECOWAS member states. *Ekonomia* 10(314), 7-17.
- Udah, E. B. (2012). Export-Growth Hypothesis: An Econometric Analysis of the Nigerian Case. *Interdisciplinary Journal of Research in Business* 2(4): 39 – 49.
- Usman, D. (2010). Non – Oil Export Determinants and Economic Growth in Nigeria 1985 – 2008. *European Journal of Business and Management Sciences* 3(3): 124 – 132.
- Vohra, R. (2001). Export and Economic Growth: Further Time Series Evidence from Less Developed Countries. *International Advances in Economic Research* 7 (3): 345 – 350.
- Usman, D. & Salami, A. (2008). The Contribution of Nigerian Export-Import (NEXIM). Bank Towards Export – Export of Non-oil Growth in Nigeria. *International Business Management Review* 2(3), 85 – 90.
- Lawal, A. I., Nwanji, T. I., Asaleye, A., & Ahmed, V. (2016). Economic growth, financial development and trade openness in Nigeria: An application of the ARDL bound testing approach. *Cogent Economics and Finance*, 4, 1–15.
- Lloyd, P.J. (1999). *The Global Economy in PJ. Lloyd (d.), International Trade Opening and the Formation of the Global Economy*, Cheltenham, the United Kingdom: Edward Elgar.
- Musila, J.W., Yiheyis, Z., (2015). The impact of trade openness on growth: the case of Kenya. *J. Pol. Model.* 37 (2), 342–354.
- Nyong, M.O. (2005). Globalization, poverty and growth, chapter 14. In M. O. Nyong (2005), *International economics: Theory, policy and application*. Cross Rivers State: Wusen Publishers.
- Opara, B. C. (2010), “Export Marketing: Catalyst for Nigeria Economic Paradigm Shift” *Research Journal for International Studies*, 13(79).
- Rahman, M.M., Saidi, K., Mbarek, M.B., (2017). The effects of population growth, Environmental quality and trade openness on economic growth: a panel data application. *J. Econ. Stud.* 44 (3).

- Rahman, M.M., Mamun, S.A.K., (2016). Energy use, international trade and economic growth nexus in Australia: new evidence from an extended growth model. *Renew. Sustain. Energy Rev.* 64, 806–816. October (available online 14 July).
- Rivera-Batiz, L. A., & Romer, P. M. (1991). International trade with endogenous technological change. *European Economic Review*, 35, 971–1001. [https://doi.org/10.1016/0014-2921\(91\)90048 N](https://doi.org/10.1016/0014-2921(91)90048 N).
- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98, S71–S102. <https://doi.org/10.1086/261725>.
- Sarapriya, R. (2011). A Causality Analysis on the Empirical Nexus between Export and Economic Growth: Evidence from India. *International Affairs and Global Strategy* 1: 24 – 39 retrieved on 9/11/2014 from www.iiste.org.
- Sarkar, S., 2008. Trade openness and growth: is there any link? *J. Econ. Issues* 42 (3).
- Tahir, M., Haji, D.H.N.B.P., Ali, O., (2014). Trade openness and economic growth: a review of the literature. *Asian Soc. Sci.* 10 (9).
- Tyopev, I. (2019). Trade openness and economic growth in selected West African countries (Doctoral dissertation).
- Todaro, P. & Smith, S. C. (2003). *Economic Development* 8th ed. Singapore: Addison Wesley.
- Udah, E. B. (2012). Export-Growth Hypothesis: An Econometric Analysis of the Nigerian Case. *Interdisciplinary Journal of Research in Business* 2(4): 39 – 49.
- UNCTAD (1989). Trade Policy Reform and Export Performance in Developing Countries in the 1980s in Trade and Development Report 1989, Geneva.
- Ulasan, B., 2012. Openness to International Trade and Economic Growth: a Cross-Country Empirical Investigation. In: *Economics Discussion Paper*, (2012-25).
- Vamvakidis, A., (1998). Regional integration and economic growth. *The World Bank Economic Review*, 12(2), 251-270.
- World Bank (1984). *Towards Sustained Development in Sub-Saharan Africa*. Washington DC. The World Bank.
- Yanikkaya, H., (2003). Trade openness and economic growth: A cross country empirical investigation. *Journal of Development Economics*, 72(1), 57-89.
- Young, A. (1991). Learning by doing and the dynamic effects of international trade. *The Quarterly Journal of Economics*, 106, 369–406. <https://doi.org/10.2307/2937942>.

Figures

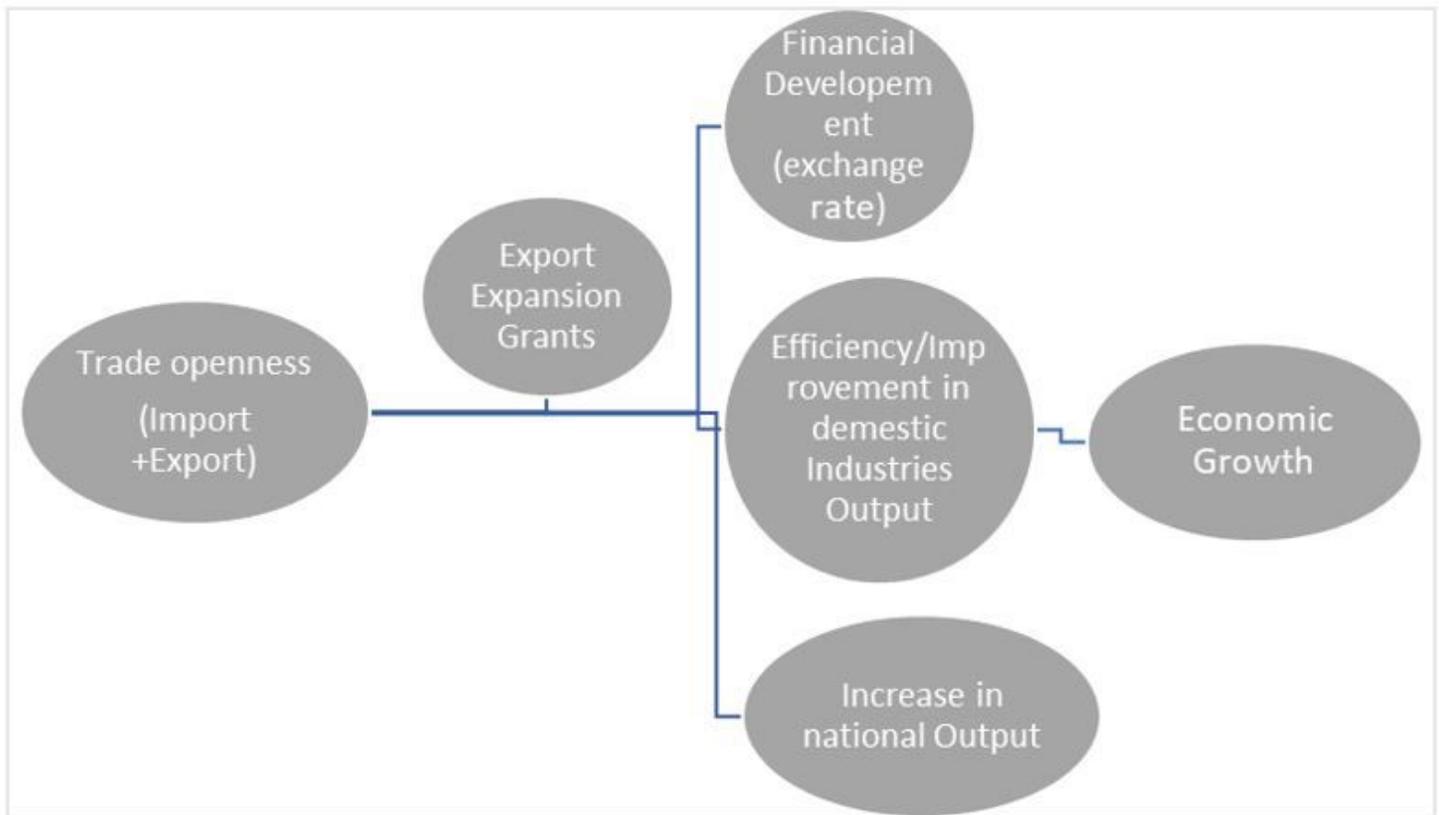


Figure 1

Schematic Framework for Trade Openness, Export expansion Grants, and Economic Growth Relationship.
Source: Author

Quantile Process Estimates

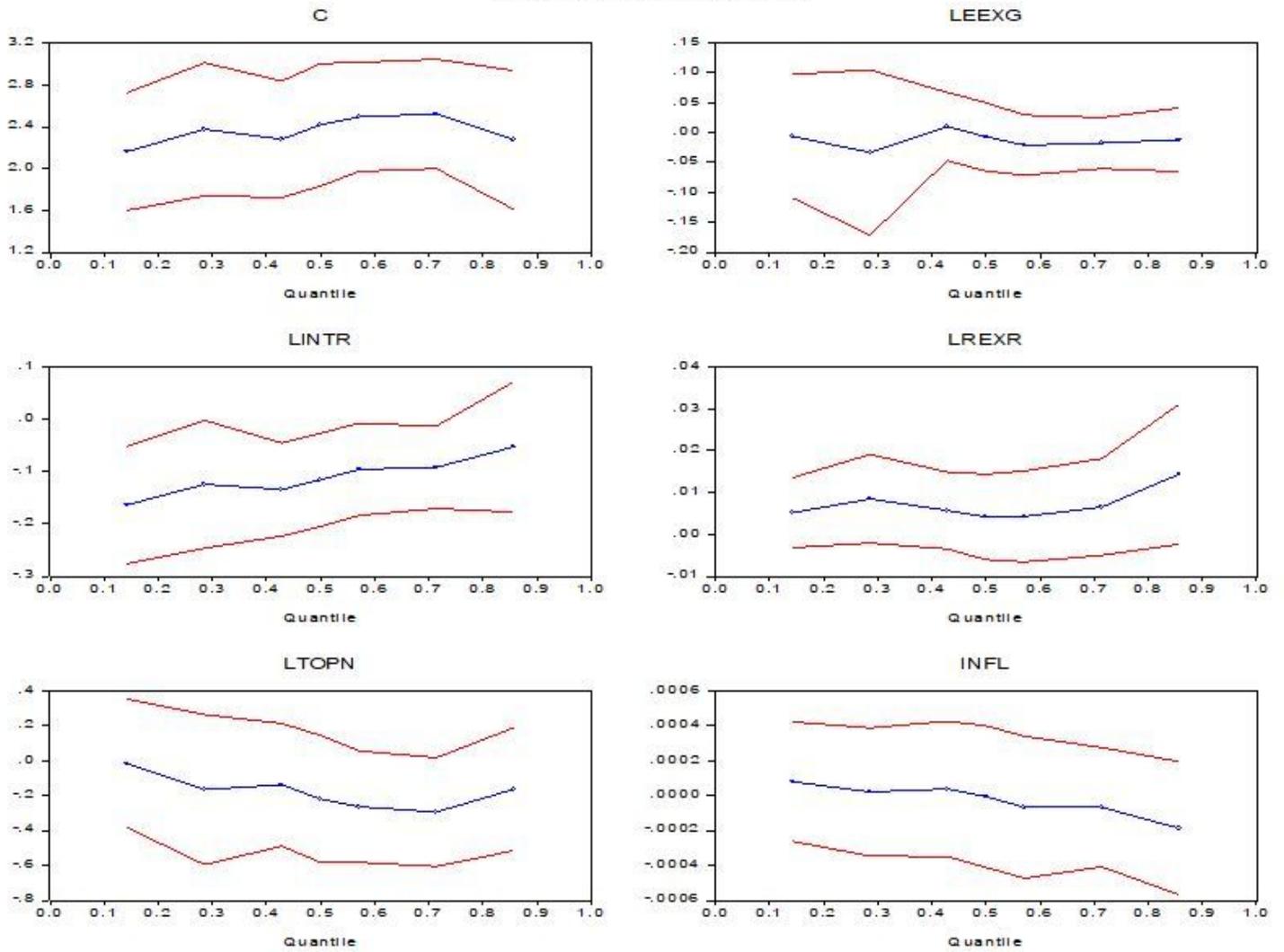


Figure 2

Quantile Process Estimation Graph

LGDPGR vs Variables (Partialled on Regressors)

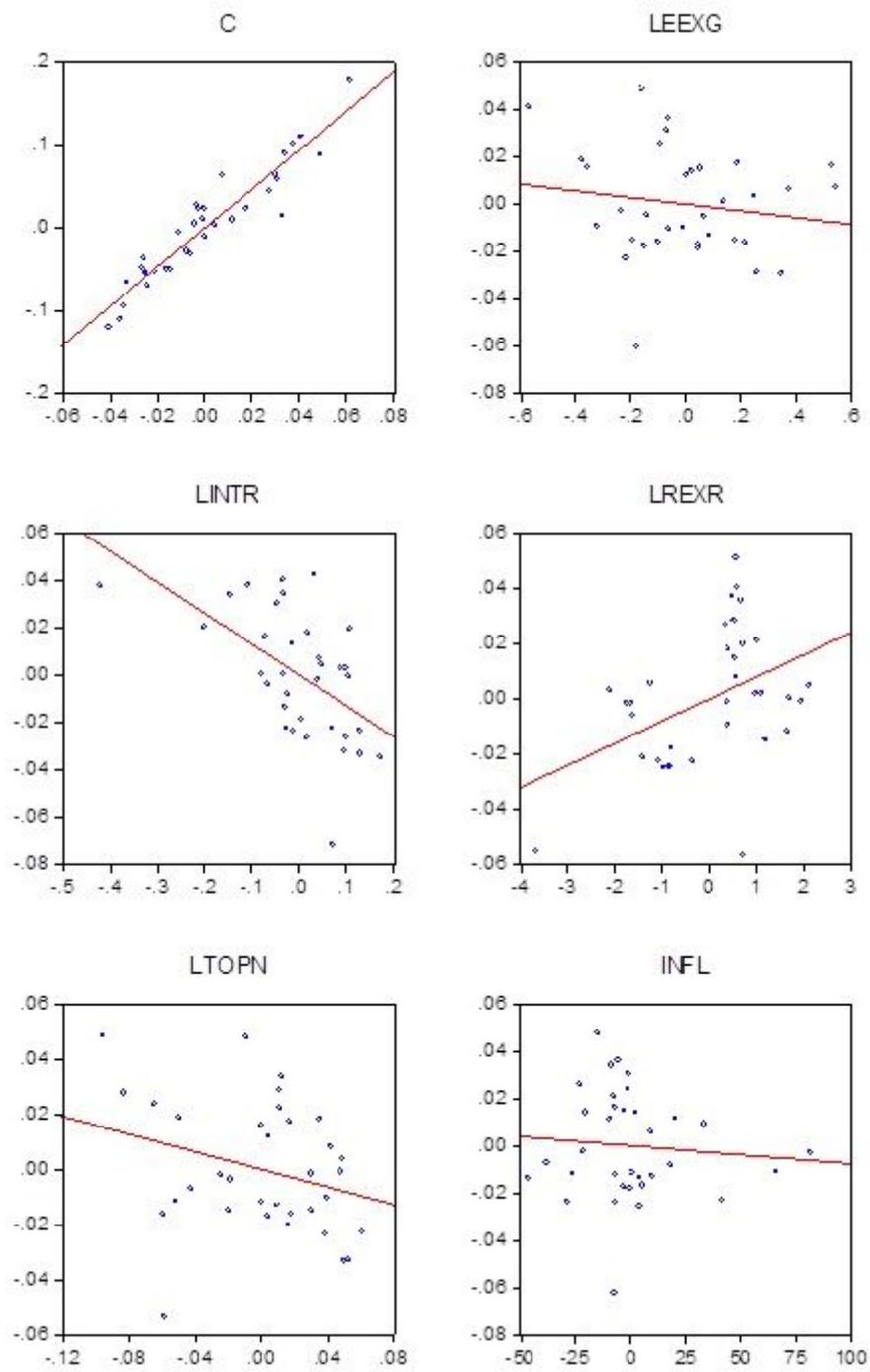


Figure 3

Stability Leverage Plots