The Relationship between Institutional Framework and International Trade: An Application of the Gravity Model

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ABSTRACT

This study empirical investigated the relationship between institutional framework and Nigerian Trade spanning from 1998 to 2023 through the application of gravity model. The study considered rule of law (RoL), government effectiveness (GE), control of corruption (CoC), regulatory quality (RQ) and political and operational stability (POS) as tenets of institutional framework. The gravity regression model was used to determine the direction and magnitude of the independent variables on the dependent variable. The matrix correlation was used to check for multicollinearity among the independent variables, while the descriptive statistics was used to test for the normality of the variables. The results revealed that Nigeria has weak institutional framework. Also, the result revealed that POS, RoL and CoC had significant impact on Nigerian trade while RQ and GE had insignificant impact on Nigerian trade. The researcher recommended that Nigeria government should improve on its current institutional framework statue in-order to improve its trade.

Keywords: Government Effectiveness, Gravity Model, Institutional Framework, Regulatory Quality, Rule of Law, Trade.

INTRODUCTION

International trade is one of the most important elements influencing nations' economic progress across the world. It provides opportunities for consumers to have access to commodities and services that are not available in their own domestic economies. Also, trade increases competition and lowers global costs, which helps consumers by increasing their purchasing power, which results in an increase in consumer surplus (Obasanmi & Imahe, 2020). Furthermore, it addresses the issues of domestic monopoly by allowing foreign enterprises to compete with domestic firms. However, trade between countries does not work in isolation. It needs the energy of the institutions to function effectively and efficiently. Institutions can be seen as the software determinants of trade. Institutional frameworks are pivotal to smooth functioning of trade. However, it was in 1990s that the role of institutions came into the discuss of economic researchers as to how different institutions of an economy can alter the course of different components of an economy.

The role of institutions on the international trade has also been under discuss, as international trade is a major software driving factor of economic growth (Najaf & Ye, 2018). Domestic formal institution affects security and enforcement of property rights and other aspects of quality governance. They influence the uncertainty that surrounds transactions in both domestic and foreign trades. Also, institutional framework affects informal norms of behaviours and interpersonal trusts, which influence the values and conventions of

doing businesses. This may in turn impact on the risk perceptions and preferences in international transactions. Qualitative institutional framework reduces uncertainty about contract enforcement and general trade transactions. This reduces trade transaction cost directly, by increasing the level of trust in the process of trade transactions. Lower trade cost that result from quality institutional framework increases trade volume from within and outside the country of origin. Better institutions involve stronger consumer rights, rule of law and property rights in addition to control of corruption, government effectiveness, political stability and others. This in turn will improve product quality, inducing decreasing trade costs and the reputation of a country's exports (Levchenko in Krenz, 2016; Obasanmi, 2018). For an importer country, quality institution influences trade costs via tariffs.

Therefore, studying the relationship between institutions and trade is particularly interesting due to the two-sided effects that might exist. Research findings about the unidirectional relationship between institutions and trade remain rather inconclusive, however. Francois and Manchin (2013) argued that institutional quality may also be driven by trade, however, institutions are more likely to have a more direct and immediate effect on the probability of trading and the amount traded than the other way around, hence this study tends to empirically investigate unidirectional effect of institutional framework on Nigeria's volume of international trade from 1998 to 2021. This period was chosen because some deliberate institutional frameworks were put in place with the emergence of a civilian regime.

Objectives of the Study

The main objective of the study is to determine the relationship between institutional framework and Nigerian trade (openness). Institutional framework were conceptualized to include and limited to regulatory framework, rule of law, government effectiveness, political and operational stability and control of corruption.

Specifically, the objectives are:

1. To determine if regulatory quality affects Nigeria's trade (openness).

2. To determine if rule of law affects Nigeria's trade (openness).

3. To determine if government effectiveness affects Nigeria's trade (openness).

4. To determine if political and operational stability affects Nigeria's trade (openness).

5. To determine if control of corruption affects Nigeria's trade (openness).

Hypotheses of the Study

The following hypotheses guided the study at 5% significant level

1. Regulatory quality does not significantly affect Nigeria's trade (openness).

2. Rule of Law does not significantly affect Nigeria's trade (openness).

3. Government effectiveness does not significantly affect Nigeria's trade (openness).

4. Political and operational stability does not significantly affect Nigeria's trade (openness).

5. Control of corruption does not significantly affect Nigeria's trade (openness).

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CONCEPTUAL ISSUES

This study conceptualized institutional framework as those core principles such as regulatory quality, the rule of law, government effectiveness, political and operational stability, and control of corruption that guide the operation of public and other institutions to optimize prosperity for the economy and its citizens.

Table 1: Definition of World Bank governance indicators (WGI).

Indicator	Definition
Regulatory Quality	The government's ability to provide strong policies and regulations that enable and promote the development of the private sector
Rule of Law	The extent to which agents trust and accept the rules of society, including the quality of contract enforcement and property rights, the police, and the courts, as well as the probability of crime and violence
Government effectiveness	The quality of public services, the capacity of the public function and its independence from political pressures; and the quality of policy formulation
Political and operational Stability	The probability that the government will be damaged by unconstitutional or violent affairs, including terrorism
Control of corruption	The extent to which public power is used for private gain, counting on small and large forms of corruption, as well as the management of the State by elites and private interests

Sources: Kaufmann et al. (2011) and Abreo, C., Bustillo, R. & Rodriguez, C. (2021).

Applying these principles / indicators as described in Table 1 improves the investment ecosystem that stimulates economic growth, development and the well-being of citizens through domestic and foreign investment. According to North in Abubakar (2020), the pioneer of institutional economics theory, defined institutions as a set of rules, compliance procedures, and moral and ethical norms of behaviour aimed at restraining the behaviour of individuals in the interest of maximizing the wealth or the utility of principals.

Relationship between Institutional Framework and Trade

International trade has promoted bilateral and multilateral cooperation and relations between and among exporters and importers (Lynn, 2015). Institutional framework is among the many factors affecting the bilateral and multilateral trade performance and economic development of most developed economies. According to literature, inadequate institutional framework cause trade barriers and have negative effects on per capita income and trade promotions. Low governance effectiveness raises transaction costs, but proper institutional framework has beneficial influence on trade flows (Thu, 2021). Also, institutional variation is a key driver of informal trade barriers, and it can limit trade on its own. Literature has it that cultural differences have no significant effect on total trade, while some researchers believe that institutions play an important role in international trade as the international business environment involves many governance structures and systems. Anderson and Marcouiller (2002) in their study found that corruption and imperfect contract enforcement negatively affect international trade and inefficient governance structures causes trade barriers just like tariffs. They concluded that for the smooth flow of trade, adequate institutional structure/framework is very important for a country. Also, Saputra (2019) found that low levels of internal corruption have positive influence on trade. He believed that low degree of corruption in underdeveloped nations has more significantly positive effect than developed countries.

The researcher analysis also showed that market size and competitiveness influence trade activities. He

assumed that developing countries have a higher corruption rate than developed countries due to the improper institutional structures and systems and this is real of Nigeria. Furthermore, De Groot, Linder, and Subramanian (2004) highlighted the roles of institutional quality on bilateral trade performance. The researchers disclosed that low governance quality raises transaction costs and institutional quality has a substantial influence on trade flows. Also, they found that institutional dissimilarity has impact on bilateral and multilateral trade performance, particularly in the best-performing nations.

THEORETICAL FRAMEWORK

This study is built around the gravity model. The gravity model of trade is applied to analyze the relationship between institutional quality and Nigerian trade openness. Many researchers (Ali & Mdhillat 2015; Abban, 2020; Thu, 2021 and Oshota and Wahab, 2022) have applied the gravity model in international trade, to examine the puzzling concept of bilateral trade flows. **Jan Tinbergen**, a Dutch economist, applied the gravity model to the analysis of foreign trade flows for the first time. It is notable that the name, *gravity model*, is derived from the gravitational force concept. The gravity model's major competitive advantage is its ability to utilize real data to analyze the sensitivity of trade flows for the policy issues we care about.

In general, the gravitational force between two bodies is equal to each of their masses and inversely proportional to the square of their distance (Baier & Standaert, 2020). As a result, bilateral trade flows between two nations are influenced by their economic masses and are inversely proportional to trade costs. The proxies for trade costs are distance, adjacency, common language, colonial links, common currency, island or landlocked, institutions, infrastructures, migration flows, bilateral tariff barriers and so on. The gravity model explains why larger nations trade more than smaller countries, and why trade expenses between trading partners limit trade. In Timbergen's model, trade flow between country A and B, GDP and geographical distance are the variables. According to the literature review (Miniesy, 2004; Nedozi, Obasanmi & Uwagboe, 2010), GDP/GNP and distance are the common factors explaining bilateral trade flows using the gravity equation.

Therefore, the basic equation for the gravity model can be generated as follow:

$$X_{ij} = C\frac{Y_i Y_j}{t_{ij}^2}$$

Where

X_{ij} = Trade from *i* to *j*

C = Constant

Y = Economic mass (~ GDP, PGDP)

t = Trade costs between two countries (~ distance, adjacency… policy factors)

EMPIRICAL LITERATURE

Some extant literature in support of this study are discussed below

Oshota and Wahab (2022) empirically analyzed the extent to which national institutional quality affects bilateral trade flows in ECOWAS based on a gravity model for the period from 2000 to 2018. Specifically, the study employed the negative binomial pseudo-maximum likelihood estimator (NBPML). The results

reveal that institutional variables with both aggregated and disaggregated measures of the quality of institutions have a significant and positive impact on trade flows in ECOWAS and on its sub-samples, WAEMU and WAMZ. The results further indicated that for both importing and exporting countries, reduced corruption, effective rule of law and effective government coincide with more trade among member countries. The degree of regional integration is an important determinant of intra-ECOWAS trade, as are GDP, GDP per capita, common language, and land lockedness.

Thu (2021) examined the impact of institutional quality on bilateral trade between Myanmar and the selected trading partners between 2000 and 2020. The random effects model was used to conduct regression analysis and the required secondary data was collected from the World Development Indicators and World Governance Indicators. Bilateral trade was considered as the dependent variable and GDP per capita, distance, sanction and governance indicators such as government effectiveness, rule of law, control of corruption, political stability, regulatory quality and voice and accountability were included as independent variables. The regression results showed that the institutional quality has statistically significant positive effects on bilateral trade between 2000 and 2020. However, the results revealed that the institutional quality of Myanmar during the military rule (2000-2010) has statistically significant negative effects on bilateral trade.

Abreo, Bustillo and Rodriguez (2021) examined the role of institutional quality in the international trade of a Latin American country: evidence from Colombian export performance. The study used a panel data set for 2005–2018, through which the export flows from Colombia to 136 of its trading partners are considered. The findings indicated that Colombian institutional quality and the institutional distance between the country and its partners are statistically significant and affect its foreign sales. Similarly, there is a prominent influence of regulatory quality and the rule of law variables in the performance of Colombian exports in relation to other variables included in the model. The researchers concluded that, the Colombian government must improve its institutional quality considerably as a fundamental step towards boosting its overseas sales, not least because the country's institutional distance from the world average is notable, which also affects its exports.

Saputra (2019) examined the impact of corruption on bilateral trade flows in developed and developing countries by using an extension of the gravity panel model. The model reviewed 30 countries among which 19 were developed countries and 11 were developing ones, during the period of 1995-2016. For the impact of corruption on export activities, it appeared that domestic level of corruption has insignificant effect upon bilateral export in both developed and developing countries, but the asymmetric effect of the partner country's corruption level is significantly apparent in the case of export. Positive effect from low level of partner countries' corruption in raising bilateral export was found to be greater for developing countries than for developed ones. The effect of corruption on bilateral imports tend to be similar to bilateral exports, however, it was found that low domestic corruption level in the reporting countries will positively affect import activities and that fact becomes more apparent for developing countries.

Abasimi, Li and Khan (2018) empirically investigated the impacts of institutions on international trade in Ghana's economic perspective. The econometric tool employed in the study was the Ordinary Least Squares (OLS) technique. The results revealed that business freedom and freedom from corruption has no significant effects on Ghana's trade, however, property rights, monetary freedom, trade freedom and exchange rate exhibit great robust influence on trade in Ghana's economic perspective.

The effects of different institutions of Pakistan like business freedom, freedom from corruption, trade freedom, property rights, and monetary freedom on the international trade of Pakistan was the focus of Najaf, A & Ye (2018) study. Multiple Linear Regression Model was used. The study concluded that all the institutions have significant impact on the global trade of Pakistan.

Earlier, Krenz (2016) examined if political institutions influence international trade? measurement of institutions and the long-run effects. The study investigated the relationship between institutions and trade constructing a measure of institutions from the information given by the International Country Risk Guide and using a methodology that can control for omitted variables bias, endogeneity in the regressors, as well as cross-country heterogeneity. The researchers examined the long-run effects of the political institutional framework on trade for a panel of 87 countries for the period from 1990 to 2007. The study employed recent panel econometric methods for testing and estimating in the presence of non-stationarity, investigate panel causality and use methods that are robust to slope heterogeneity. The results implied that an improved political institutional framework is a cause of increased trading activity.

Ali and Mdhillat (2015) examined if corruption impede international trade? New evidence from The EU and the MENA Countries. The study used the gravity trade model to examine the effect of corruption on bilateral trade for a sample of 37 countries representing two regions: the Middle East and North Africa and the European Union during the period from 2002 to 2012. The study provided evidence that corruption negatively influences trade flows and that control of corruption improves trade potentialities. Also, subsamples estimations report robust support for this result but with more negative impact of corruption on regional trade for MENA countries.

MODEL SPECIFICATION

In accordance with theoretical framework on the variables that impact bilateral trade flows, the gravity model was used to investigate the relationship institutional quality and Nigerian trade openness from 1998 to 2021. The basic form of this model accepted that trade between countries is proportional to their size and inversely proportional to their distance. The bilateral trade from country i to country j $BILAT_{ijt}$ are explained by GDP, geographical distance, and some dummies bilateral trade agreements, and sanction period.

The basic form of model for a year is specified as follows:

$$X_{ij} = \beta_o + \beta_1 GDP_i + \beta_2 GDP_j + \beta_3 DIST_{ij} + \beta_4 A_{ij} + \mu_{ij} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (i)$$

Where GDP_i is the GDP of exporter and GDP_j as importer, $DIST_{ij}$ is the distance of the two capitals. A_{ij} represents any other factors that prevent or create trade between the two countries and μij is the error term.

In line with this concept and scope of this study, equation (1) is re-modeled to incorporate the institutional framework indicators considered in this study, thus,

$$TT_{Nig} = a_0 + a_1 RQ + a_2 RoL + a_3 GE + a_4 POS + a_5 CoC + a_t \quad \ldots\ldots\ldots\ldots \quad (ii)$$

Where TT is Total Trade of Nigeria (import plus export), Regulatory Quality (RQ), Rule of Law (RoL), Government Effectiveness (GE), Political and Operational Stability (POS) and Control of (CoC) Corruption.

Where $a_1 - a_5 > 0$

Result Presentation, Analysis and Discussion of Findings

Table 2: Descriptive Statistics

	CoC	GE	POS	RoL	RQ	TT
Mean	-1.175417	-0.996250	-1.722083	-1.095000	-0.890833	17390560

Median	-1.100000	-1.020000	-1.905000	-1.050000	-0.885000	17148426
Maximum	-0.890000	-0.150000	-0.630000	-0.810000	-0.620000	41598669
Minimum	-1.910000	-1.210000	-2.200000	-1.430000	-1.380000	1589275.
Jarque-Bera	27.38346	207.4230	6.345245	2.084538	3.548635	1.278051
Probability	0.000001	0.000000	0.051894	0.352654	0.169599	0.527806
Observations	24	24	24	24	24	24

Source: Researcher's Computation 2023

According to global rating, the tenets of institutional framework are ranked from + 2.5 to – 2.5, with +2.5 indicating strong and -2.5 indicating weak. From the result of table 2, it was revealed that all the meant tenants of institutional framework are negative from -0.890833 to -1.722083 which meant that institutional framework is very weak in Nigeria within the period of the study. CoC has a mean of -1.175417, GE has a mean -0.996250, POS has -1.722083, RoL has -1.095000 and RQ has -0.890833. For TT (total trade), the mean was #17390560 million per annual. The maximum (best) rating for CoC is -0.890000, GE is -0.150000, TT was #41598669 million, POS is -0.630000, RoL is -0.810000 and RQ is -0.620000. The minimum (worst) rating CoC is -1.910000, GE is -1.210000, TT is #1589275 million, POS is -2.200000,RoL is -1.430000 and RQ is -1.380000. The result of the Jarque-Bera probability revealed that, all the variables were normal distributed except CoC and GE which were not normally distributed because the probability value is less than 0.05.

Table 3: Multicollineraity Test (Matrix Correlation)

	RQ	RoL	GE	POS	CoC
RQ	1				
RoL	.450*	1			
GE	-.090	-.072	1		
POS	-.407*	-.373	-.032	1	
CoC	.047	.488*	.162	-.221	1

Source: Researcher's Computation 2023

The result of table 3 revealed that the independent variables were not highly correlated with one another because the coefficients of the correlation of the independent variables were less than 50%. This has removed the overfitting problem usually caused by presence of multicollineraity, thus making any of the independent variable not able to predict the other, hence not biasing the outcome of the regression model.

Table 4: Regression Output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9460759.	15734234	0.601285	0.5551
RQ	-10875969	8260239.	-1.316665	0.2045
RoL	46571576	9076677.	5.130906	0.0001
GE	-3851162.	6889946.	-0.558954	0.5831

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POS	-14049955	3259757.	-4.310124	0.0004
CoC	-18040487	7474597.	-2.413573	0.0267
R^2 0.788319, Adjusted R^2 0.729518 F stat 13.40671, F (Prob) 0.000015 DW Stat 1.504108				

The result of table 4 indicated that approximately 78.83% of the systematic variation in the dependent variable (TT) was explained or accounted for by the independent variables (tenets of institutional framework). This was endorsed by the R-bar square which is approximately 72.95%. The result also showed that at least or all the independent variables are significant with the probability of the f-statistic (0.000) lesser than 0.05. The result of the DW statistic (1.504) approximately "2" indicates the absence of serial autocorrelation in the model. The result also revealed that out of all the tenents of institutional framework considered in this study, POS, RoL and CoC have significant impact on trade but only RoL and CoC conformed to apriori expectation. RQ and GE have insignificant impact on trade and did not conform to apriori expectation.

DISCUSSION OF FINDINGS

This study has been able to reveal that out of the five tenets of institutional framework considered in this study, RoL (Rule of Law), POS (Political and Operational Stability) and CoC (Control of Corruption) proved to have significant impact on Nigerian trade while RQ (Regulatory Quality) and GE (Governance Effectiveness) proved otherwise. Also, only RoL and CoC agreed to apriori expectation. On the result of CoC, this study is in line with the study of Ali and Mdhillat (2015) who found that corruption negatively influences trade flows and that Control of Corruption significantly influences trade. Also, this study disagreed with Krenz (2016) who found that political institutional framework is a cause of increased trading activity while the current study found a negative and significant impact on trade.

In same vein, this study disagreed with Najaf, A & Ye (2018) who concluded that all the institutions have significant impact on the global trade of Pakistan unlike this study who found only RoL, POS and CoC as having significant impact on Nigeria's trade and Abasimi, Li and Khan (2018) who revealed that business freedom and freedom from corruption has no significant effects on Ghana's trade, unlike this study who found that CoC has significant impact on Nigerian trade.

CONCLUSION AND RECOMMENDATIONS

Qualitative institutional framework is essential software determine of economic growth and development through investment and trade. It is imperative that every economy desirous of growth and development should improve on its institutional framework quality. It could be found in this study that, Nigeria has a very weak institutional framework whether in regulatory quality, rule of law, governance effectiveness, political operational stability or control of corruption. Maybe, this is why the economy is still struggling to find a path in economic growth and development. This study has proved that institutional framework is pivotal to Nigerian trade, however, only rule of law and control of corruption agreed to apriori expectation. Also, rule of law, control of corruption and political operational stability are significant to Nigerian trade, while regulatory quality and governance effectiveness did otherwise. Based on the findings, the researcher basically recommends that Nigeria should as a matter of urgency improve on the weak statues of its current

institutional framework in-order to improve and increase growth and development desires through investment and trade.

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