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**The impact of institutions and
infrastructure on intra-regional trade:
The Economic Community of West
African States**

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INTRODUCTION

The Economic Community of West African States (ECOWAS) comprises eight Francophone, five Anglophone, and two Lusophone countries. The total population was about 387 million people, with a combined Gross Domestic Product (GDP) of \$689,197million and an average GDP per capita of \$ 1301.6 (World Bank, 2019). These countries were categorized into two zones namely the West African Economic and Monetary Union (WAEMU) and the West Africa Monetary Zone (WAMZ). Over the years, the ECOWAS has built a commendable institutional architecture even though implementation was the heightened challenge (United Nations Economic Commission for Africa, 2015). Comparatively, the ECOWAS performed better in macroeconomic convergence, free movement of persons, and financial integration than other Regional Economic Communities (RECs) in Africa (Africa Regional Integration Index, 2016). The World Bank's Doing Business (2016) ranked Ghana, Cabo Verde, Cote d'Ivoire, Burkina Faso, and Mali as the most favourable business environment among the ECOWAS member-states. However, indigenous producers were faced with a small market size in country-specific, limited credit facility, and competition from the international markets among others. This has led the ECOWAS to pursue rigorous infrastructural projects and initiate a policy framework for greater integration to reduce trade costs. In this background, Cabo Verde, Ghana, and the Gambia ranked highest in regional infrastructure, and also Nigeria and Ghana ranked highest in trade integration (Africa Regional Integration Index, 2016).

International trade is demonstrated by evidence as a predominant factor in stimulating economic growth and development by raising the level of income. In this background, Infrastructure reduces trade costs and ensures efficiency in transactions (Celbis, 2013; Martincus et al, 2014). In line with this, studies have shown weak institutions and substandard trade and transport infrastructure adversely affect trade by compounding to the trade costs (Deen-Swarraj et al, 2012; Akpan, 2014; Engel & Jouanjean, 2015; Hanson & Owusu, 2015; Poelhekke & Bonfatti, 2017; Onyekwena & Oloko, 2016; Bah & Jackson, 2017; Yushi & Borojo, 2019). Additionally, the difference in the infrastructure of trading partners causes trade imbalance (Lopez & Thia, 2020). Furthermore, Sustainable Development Goals 9 and 16 emphasize the need to increase industry, innovation and infrastructure, and guarantee peace, justice and strong institutions respectively. As a result, the role of institutions and infrastructure in the facilitation of trade has been given much attention in developing countries therefore the exigency for appropriate institutions and infrastructure to attenuate trade costs, facilitate trade activities, and consolidate the gains from trade. Empirically, Ndulu et al. (2008) showed that the poor growth recorded in Africa during the 1980s was attributed to weak institutions and the growth resurgence was due to improvement in the existing institutions in the 1990s.

The ECOWAS aimed to promote corporation and integration to reduce the level of poverty in the bloc. As a result, the role of the ECOWAS evolved overtime by resolving conflicts, initiating policies to attenuate corruption, ensured the implementation of Rule of law, assisted in the fight, and disparaging extreme armed groups. The 1991 Political Declaration of the ECOWAS aligned policies on Peace and Security, the Rule of Law, Government Effectiveness, Elimination of unconstitutional change of Government and Human Rights. The parlous events not captured under the Law of ECOWAS and the recommendations by the African Economic Community and the African Charter on Human and People's Rights led to the revised treaty in 1993 (ECOWAS Commission, 2015). In this background, Article 6 of the Revised Treaty, spelled out the establishment, composition, and functions of institutions of the ECOWAS. In 1999, the ECOWAS Summit then agreed on a Protocol for the Establishment of a Mechanism for Conflict Prevention, Management and Resolution, Peace and Security to be exercised in line with the 2001 Supplementary Protocol on Democracy and Good Governance by the Directorate of Political Affairs, Peace and Security (PAPS). The Protocol on the Fight against Corruption stipulated in Articles 48 and 49 mandated the ECOWAS member-states stamp out corruption in 2001. These policies were strengthened with the 2001 Declaration on the Fight against Trafficking in Persons, the ECOWAS Gender Policy in line with the establishment of the Gender Development Center in 2003, the 2010 Regional Action Plan incorporated the United Nations Security Council Resolutions, the 2011 Kampala Declaration. In 2006, the ECOWAS Summit further devised institutional reforms to empower the community by instituting formal structures and institutional arrangements (Bossuyt, 2016). In 2013, the ECOWAS also agreed on the Political Declaration on a Common Position against Terrorism as an anti-terrorism strategy to curb the menace.

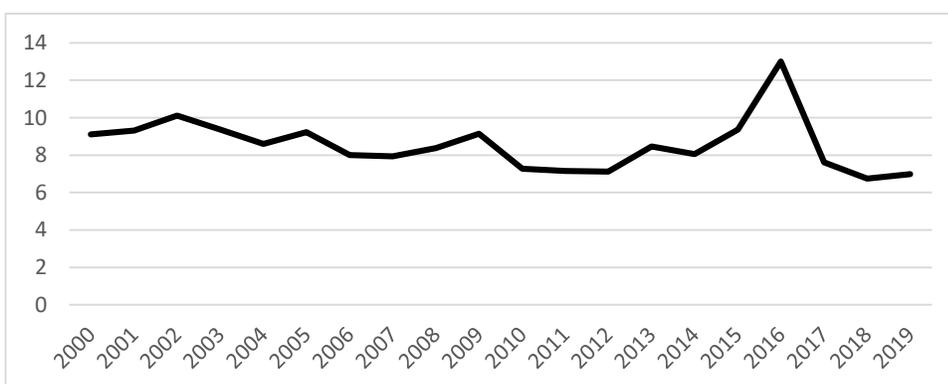
Since its inception, the ECOWAS had laid down regional infrastructural projects to facilitate trade notable in multimodal Transport, Energy, and telecommunication. In this background, the ECOWAS infrastructure Projects and Preparation and Development Unit (PPDU), the ECOWAS Regional Road Transport and Transit Facilitation Programme, The Transport Facilitation Project, the INTELCOM II programme under the Telecommunication and Air Transport Project under the ECOWAS Air Transport Action Plan 209-2015 and the Yamoussoukro Decision were committed to reducing the infrastructure deficit. In 2018, the ECOWAS Commission also set out the legal basis for sustainable quality infrastructure within the framework of the West Africa Quality System Programme (WAQSP).

The Partnership between the New Partnership for Africa’s Development Infrastructure Project Preparation Facility (NEPAD-IPPF) and the ECOWAS infrastructure Project Preparation and Development Unit (PPDU) to improve upon rail transport, shipping, air transport, and maritime transport. Also, the Global Infrastructure Forum, the ECOWAS Sahel Strategy, the Vision 2020, the Vision 2050, the programme for Tran-West Coastal Highway, and the Commonwealth Trade Hot Topics of which some ECOWAS members hold membership, were introduced to bridge the infrastructure gap. Additionally, the Programme for Infrastructure Development in Africa (PIDA) outlined several projects in West Africa which included the Abidjan-Lagos Highway Development Project, Praia-Dakar-Abidjan Corridor Development Programme, Dakar-Niamey Multimodal Corridor, the Abidjan-Ouagadougou/Bamako, West Africa Hub Port and Rail Programme, and West Africa Air Transport. In this background, Twenty out of fifty one projects were coordinated by the ECOWAS Commission for the West Africa sub-region (ECOWAS, 2016).

Infrastructural projects among the member-states were heavily financed through several sources. In this background, the ECOWAS Bank for Investment and Development (EBID) was the indigenous financier for infrastructural projects, Special programs, and other development projects embarked on by the community. The ECOWAS further launched the development of FODETE, a fund to support infrastructure projects in the energy and transport sectors. Other financiers include the European Union, the African Development Bank, the World Bank, and the United States Agency for International Development (USAID). Countries such as Canada, China, Japan, Spain, Germany, Denmark, United Kingdom (UK), and Norway facilitated some projects in the community.

In terms of integration, the ECOWAS moved from a Free Trade Area (FTA) to a Customs Union in 2015 towards a proposed Common Currency in 2020, to stimulate trade flows, serve as a bridge to rectify the problems likely to surface in the formation of a common market and curb the reluctance of member-states to open up to trade. However, the policy on common currency was derailed by the inability to attain the macroeconomic convergence and the contemporaneous lethal effect of the Corona Virus Disease pandemic (Abban, 2020a). Despite the effort, intra-regional trade is consistently below 12% of total trade.

Figure 1. A trend analysis of intra-regional trade in the Economic Community of West African States (2000-2019)



Source: UNCTAD Database

The unsatisfactory trade flows among member-states were attributed to relatively poor diversification of the economies, similar climatic conditions, strong trade ties with colonizers, relatively large informal sector, non-tariff barriers, trade and transport infrastructure, inadequate power infrastructure, the use of sovereign currencies, substandard market integration, policy divergence between regional and country-specific due to politicians targets of short term infrastructure to woo votes, non-implementation of regional policies to facilitate integration, among others (Akpan, 2014; Bossuyt, 2016; Toress & Seters, 2016; Abban & Abebrese, 2019; Abban, 2020a). According to the World Bank (2015), nearly every country in West Africa fails to respect the equivalence of the national certificate of the exporting country, therefore, institutions on trade have come under scrutiny. In this light, the exigency to investigate the impact of institutions and infrastructure on intra-regional trade in the ECOWAS.

Currently, there exists one empirical study that focused on the historical reflection of institutions on trade in the ECOWAS hitherto limited studies on West Africa country-specific (Bah et al, 2017; Abasimi et al, 2018). In this context, Bah et al (2017) threw light on the historical reflection of trade institutions in West Africa. This study seeks to investigate the impact of institutions on trade in the ECOWAS for policy purposes. Additionally, there exist no empirical studies on the role of aggregate trade and transport infrastructure in the ECOWAS. In this background, there exist limited studies undertaken on multimodal transport, its effect on growth and development, and the related barriers in the ECOWAS (Ranganathan & Foster, 2011, Akpan, 2014; Peprah et al, 2016; Toress & Seters, 2016; Ali & Kramer, 2016; Iheonu et al, 2017).

Objectives of the study

1. To investigate the impact of institutions on trade among members of the ECOWAS
2. To investigate the impact of trade and transport infrastructure on trade among ECOWAS member-states.

Research Questions

To achieve the above objectives, the study seeks to address the following questions:

- (i) Are the existing institutions contributing significantly to trade?
- (ii) Are the existing trade and transport infrastructure having a significant effect on trade in ECOWAS?

LITERATURE REVIEW

According to Coase (1992, p.718), it makes little sense for economists to discuss the process of exchange without specifying the institutional setting within which trading takes place. Given this, Rodrik (2009) showed that virtually every major development strategy of the past five decades has fallen short of becoming a panacea. Additionally, Easterly (2001) showed the failed policy-oriented panacea that has failed which includes conditional aid, debt forgiveness, foreign aid, education, family planning, big infrastructure projects, foreign investment, and so on. In his argument, none of these activities will have any impact on development unless countries meet the basic institutional requirements: rule of law, corruption-free government, and protection of property rights, efficient bureaucracy, and political constraint on the Executive. In this background, the current paradigm influencing recent reforms emphasizes the importance of improved institutions as one of the key factors enhancing trade hence economic growth. In this context, formal institutions have proven to reduce uncertainty which creates transaction costs, especially currency risk, thereby reduces the cost of doing business. In this context, institutions have proven to facilitate trade and ensure transparency (Peng, 2009; Iwanow, 2012; Beyer & Fening, 2012; Ogundipe et al., 2014; Krenz, 2016; Yushi & Bogojo, 2018; Álvarez et al, 2018). In West Africa, the level of underdevelopment was attributed in part to weak pre-colonial and extractive colonial institutions (Rodney, 1981; Acemoglu et al, 2001; Richards & Nwanna, 2010). Therefore the need to design a policy framework to tackle the challenges of enhancing trade, economic growth, and alleviating poverty.

An important notion highlighted by the literature on contract enforcement and its impact on trade is that firms might adapt their organizational structures to cope with imperfect enforcement of contracts (Antras & Helpman, 2004). In particular, firms often respond to poor contract enforcement by vertically integrating their production processes. According to Nunn (2007), countries with good contract enforcement specialize in the production (and export) of goods for which relationship-specific investments are most important. The author also found that differences in contract enforcement abilities of nations affect the global trade pattern to a greater extent than differences in physical and human capital. The key assumption is that the impact of contract enforcement regulations on the comparative advantage of complex goods is reduced when firms are better able to integrate vertically. Given that production processes vary between industries, different sectors will have different inherent capacities for vertical integration. This implies that the institutional environment can have an impact on organizational structure, which in turn affects the structure of economic exchanges, productivity, and other factors. Ranjan & Lee (2007) undertake an empirical analysis of the impact of contract enforcement on trade, demonstrating that trade volumes are more affected by contract enforcement quality in sectors that are more institutionally-intensive. The authors find a positive correlation between the quality of contract enforcement and the volume of international trade, with this impact becoming more pronounced for more differentiated goods.

Kaufmann & Wei (1999) tested the 'efficient grease' hypothesis which stipulates that firms may find bribes helpful to minimize the effective red tape it faces. However, they find that corruption does not improve exchanges, instead, if corruption is widespread, time spent with bureaucrats and the regulatory burden is high. Additionally, Winters (2004) highlighted that "the less restrictive is trade policy, the lower are the incentives for corruption while simpler more transparent and non-discretionary policies reduce the scope for corruption." Empirically, Ades & Di Tella (1999) argued that there is a correlation between economic rents resulting from trade restrictions, active industrial policy measures, and higher corruption rates. Corruption, as demonstrated by Mauro (1995), lowers investment and economic growth. Moreover, Wei (2000) examines another potential reason for the relationship between corruption and trade openness: "open countries face greater losses from corruption than less open ones because corruption impinges disproportionately on foreign transactions. As a result, they have greater incentives to develop better institutions." Wei (2000) supports this hypothesis through a cross-country panel analysis. The author shows that corruption is associated with what he terms "natural openness" (the share of trade that can be attributed to clear exogenous variables such as distance, population, and land area), but not with "residual openness." The latter term Wei defines as the difference between actual and natural openness which can be related to the economic policies implemented by a country.

Chor (2010) provides theoretical foundations to the notion that institutions might impact trade by affecting countries' comparative advantage. Chor analyses different sub-components of institutional quality and develops a model that measures the effects of factor endowments, Ricardian productivity, and institutions. The results confirm the role of factor endowments and various types of institutions as a source of comparative advantage. Levchenko (2004), whose model of international trade examines differences in institutional quality based on an incomplete contract as the source of comparative advantage. In his study, the model indicates that poor countries with weak institutions may fail to benefit from trade, as trade pushes factor prices to diverge. Nunn (2007) also examines the effect of contracting institutions on trade but his initial assumptions somewhat differ from Levchenko. The author finds that countries with good contracting institutions tend to specialize in exports for which relation-specific investments are most important. His estimates show that the quality of contract enforcement explains a larger share of global trade patterns than countries' factor endowments. Analysis by Costinot (2009) proposes a theoretical model seeking to explain how contract enforcement institutions affect comparative advantage. Under free trade, the country where teams are larger – in efficiency units of labour – specializes in the more complex goods. In our set-up, it is the country where the product of institutional quality and workers' human capital is larger. Hence, better institutions and higher levels of education are complementary sources of comparative advantage in the more complex industries. The government enforced trade barriers, such as tariffs and non-tariff barriers, also contribute to trade transaction costs (Baeten & den Butter, 2006).

The argument of Shirley (2005) highlighted that, in environments where obtaining information on the forthcoming transaction is expensive and where private property is less than perfectly protected, contracts are more difficult to specify and enforce for all possible eventualities. As a result, transaction costs increase, with negative consequences for productive activity. Shirley (2005) notes that "societies with persistently higher transaction costs have less trade, fewer firms, less specialization, less investment, and lower productivity. Institutions determine whether transaction costs are low or high.

Moreover, Berkowitz et al. (2006) assess how the quality of national institutions, in particular those related to complex products whose distinctive features are hard to fully specify in a contract, affect international exchange. The authors show that well-designed institutions in an exporting country increase international trade. Institutions in both the importing and the exporting countries are assumed to influence transaction costs in simple and complex products. But “while international transaction costs affect the costs of trade, domestic transaction costs affect complex and simple products differently, thereby changing comparative advantage. McLaren (2000) examines how trade openness influences the organization of production in industry equilibrium. The author argues that opening to trade has the effect of “thickening” the market, giving each firm a greater selection of procurement options from “downstream” suppliers. Also, Antràs & Helpman (2004) proceed from similar assumptions regarding firms’ choices on final good production. They show that when trade costs decline, final-good producers tend to rely more on foreign outsourcing than on the creation of multinational firms. The ECOWAS is ambivalent about whether institutions are playing a key role in trade or an exigency for a newly designed policy framework to expose the large informal, address policy shortfalls and maximize the gains from the touted policy on the common currency.

Empirical studies on trade and transport infrastructure show that trade and transport infrastructure played a significant role in trade facilitation. Francois and Manchin (2013) examine the impact of infrastructure and institutional quality on bilateral trade flows. The study adopted a multilateral resistance in the estimation of the gravity model of international trade. The study lagged the values of time-varying explanatory variables to control for endogeneity of infrastructure and institutional quality. The result showed that institutional quality was an indispensable determinant of bilateral trade flow among countries. Akpan (2014) evaluated the gains from improving road infrastructure on trade in the ECOWAS. The study focused on the 11 coastal countries along the Lagos- Dakar road with exception of Niger, Mali, Cape Verde, and Burkina Faso. The methodology used in the study is the gravity model of international trade. The results show that improving road infrastructure will increase intra-regional trade by 5.27% as compared to 2012 trade statistics. The study also showed that improvement in road infrastructure will facilitate free movement of people hence intra-regional trade. The study concludes by emphasizing the need for soft infrastructure to achieve the laid down goals of the ECOWAS. Ismail and Mahyideen (2015) investigated the effects of several indicators of physical and soft infrastructure on the trade flows of Asian countries. The study quantified the impacts of both hard and soft infrastructure on trade flows for exporters and importers and economic growth indicators. The result showed that improvements in each transport infrastructure such as the roads, ports, railways, air transport, and logistics facilitated trade. Bankole et al (2015) examine the impact of information and communications technology infrastructure on intra-Africa trade using archival data obtained for 28 African countries. The result showed that information and communication infrastructure and institutional quality have a positive effect on intra-Africa trade. Their results suggest that institutional quality and telecommunication infrastructure inures efficiency in intra-African trade flows. Peprah et al (2016) evaluated the prospect for freight and logistics companies in the operationalization of the ECOWAS Protocol on Free Movement of Goods and Persons using primary data. The methodology used in the study was qualitative in nature. The result showed that the introduction of the protocol facilitated trade and organizational growth within the West African countries. Seck (2017) analyzed the impact of infrastructure and institutional quality on the trade flow of different countries in sub-Saharan Africa. The study examined the degree to which various elements of trade cost Africa may have contributed to shaping intra-and extra-trade by adopting several trade facilitation measures such as information and communication technology, regulatory environment, trade finance, physical infrastructure, border efficiency, and logistics performance for 2007 and 2012. The result shows African firms adjust to changes in the environment. Munim & Schramm (2018) investigated the impact of port infrastructure and logistics performance on economic growth using 91 countries. The study constructed latent variables estimated as a Structural Equation Modelling (SEM) for the analysis. The study showed that development in port infrastructure and logistics inures greater gains to the economy of a country hitherto the logistics performance. Yushi & Begoro (2019) investigated institutional quality and infrastructure on intra-regional trade in Africa using forty-four countries with a data span from 2000 to 2014. The study used the two-step Heckman in the estimation of the gravity model of international trade. The study showed that the level of trade is influenced by the quality of institutions and infrastructure. To the best of my knowledge, there is no empirical study on institutions on trade in the ECOWAS hitherto limited studies conducted a comprehensive analysis on the aggregate impact of trade and transport infrastructure, with much focus on multimodal transports.

METHODOLOGY

The study used a dataset with 3780 bilateral trade observations spanning from 2000 to 2017 (some observations are missing for the dependent variable). Data for bilateral trade were sourced from IMF Direction of Trade Statistics (DOTs) and UN Comtrade, real GDP was sourced from World Bank’s World Development Indicators (WDI), distance from CEPII and Institutional quality data were sourced from World Governance Indicators, data on Logistics Perception Index from World Bank, data on Tariff was obtained from World Bank’s ESCAP.

To investigate the impact of institutions on trade in the ECOWAS, the augmented gravity model of international trade was used. Several empirical studies have adopted the augmented model to estimate the effect of institutions on trade. This study followed the works of Kunčič (2013), de Groot et al. (2005), Francois & Manchin (2013), Ogundipe et al. (2014), Álvarez et al (2018), Yushi & Begoro (2019) and many others.

The augmented model is stated as follows; The Impact of institutions on trade

$$X_{ijt} = \beta_0 + \beta_1 \ln(Y_i Y_j)_t + \beta_2 \ln(Y_i Y_j / Pop_i Pop_j) + \beta_3 \ln D_{ij} + \beta_4 Cont_{ij} + \beta_5 Lang_{ij} + \beta_6 Comcol_{ij} + \gamma RL + \gamma Crpctrl + \delta GE + \phi GF + \sigma VA + \pi PS + \varepsilon \dots\dots\dots 3.1$$

Where $RL + Crpctrl + GE + GF + VA + PS$ are institutional quality indicators

$$X_{ijt} = \beta_0 + \beta_1 \ln(Y_i Y_j)_t + \beta_2 \ln(Y_i Y_j / Pop_i Pop_j) + \beta_3 \ln D_{ij} + \beta_4 Cont_{ij} + \beta_5 Lang_{ij} + \beta_6 Comcol_{ij} + \pi PS + \phi Tinf + \delta Tariff + \varepsilon \dots\dots\dots 3.2$$

Where i and j denotes countries, t denotes time, and the variables are defined as: X_{ij} denotes the value of bilateral trade (exports) between i and j , Y is real GDP, Pop is population, D_{ij} is the distance between i and j , $Inst$ is the institutional quality variable represented with six indicators, $Cont_{ij}$ is a binary variable which is unity if i and j share a land border, $Lang_{ij}$ is a binary variable which is unity if i and j have a common official language, $ComCol_{ij}$ is a binary variable which is unity if i and j were colonized by the same colonial master, RL_{ij} denotes the product of rule of law in the country-pairs, VA_{ij} denotes the product of voice and accountability between country-pairs, PS_{ij} represent the product of political stability and absence of voice between country-pairs, GE_{ij} represents the product of Government effectiveness between country-pairs, RF_{ij} represent the product of regulatory framework of country pairs, ε is a vector of nuisance coefficients, and represents the myriad other influences on bilateral exports, assumed to be well behaved. Where $I = 1, 2 \dots N$ is the number of countries where $N = 15$, t is the time-series dimension of the data ($T = 18$ years). The coefficient of interest is β_6 .

3.1 Definition of Variables and Expected Signs

The export of goods was used as a proxy for bilateral trade between the reporting country and the partner in line with each country's attempts to balance its trade with the other. The data on exports were reported at the levels to suit the non-linear estimation technique procedure. The variable was adopted in the model to represent trade flows between countries since the level of imports is usually underestimated. GDP was used to proxy for the economic mass of the country in the model. The study expected GDP to have a positive relationship with trade. It was measured as the log product of the GDP of country-pairs. Distance is the transportation cost involved in trading between the two countries. The coefficient of distance is expected to have a negative relationship with trade. The higher the transportation cost, the higher the price of the goods to be traded and vice versa.

This is because, as distance increases the cost of trading among countries ostensibly increases thereby reducing the volume of trade. Border is defined as the geographic boundaries of political entities such as countries, provinces, states amongst others.

The coefficient of sharing a land border is expected to have a positive relationship with trade. Spatial theory of trade depicts that countries sharing border tends to cooperate to enhance trade. The dummy was represented with 1 if the country-pairs share the same border and 0 otherwise. The coefficient of Language is expected to have a positive relationship with trade. Adam Smith argued in 'Wealth of Nations' that common language enhances trade and exchange through effectively communicating the task in hand to the trading partners and easily convincing parties to know it is in their best interest. The dummy was represented 1 if the country-pair shared a common official language and 0 otherwise. Institutions are defined as 'sets of formal and informal rules governing the actions of individuals and organizations, as well as the interaction of participants in the development process according to the World Bank. The coefficient of institutions is expected to have a positive relationship with trade. This paper employs six different key indicators of institutional quality as provided by the World Governance Indicators, WGI (2019) database namely; rule of law, regulatory quality, control of corruption, and government effectiveness. Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Moreover, Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Also, the control of corruption was captured as the perception of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the capture of the state by elites and private interests. Furthermore, Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Government Effectiveness and Regulatory Quality are related to the capacity of the government to effectively formulate and initiate sound policies, which is quite similar to business regulations, measured by the Doing Business indicators. Voice and Accountability as defined by WGI, Voice and Accountability captures perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and free media. Finally, Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. The coefficient is expected to have a positive impact on trade. The various indicators of institutions were measured as the log product of the country-pairs. According to the World Bank ESCAP, Tariff answers the question, 'Evaluate the effect of tariffs on agricultural goods.' The coefficient of tariff is expected to be negative hence harm trade. It was measured as the log of the value for the country-pairs. Also, the World Bank Logistics Perception's Quality of Trade and Transport infrastructure focuses on roads, railroads, ports, and information technology.

3.2 Estimation Technique

Although authors recommend estimating the gravity model using a log linearized approach, it is now standard to estimate the AvW model with a fixed effect Poisson Pseudo Maximum Likelihood (PPML) since it controls for heteroscedasticity, zero trade, and model misspecification (Gourieroux et al, 1984; Silva Santos and Tenreyro, 2011). Thus, the PPML includes observations with zero trade values of which linear estimation techniques will drop because the logarithm of zero is undefined which leads to sampling selection bias. As a result, the omission of relevant observations poses serious problems, and information is loosed (Eichengreen and Irwin, 1996). Furthermore, the robust standard errors do away with problems associated with panel data estimation. Also, PPML fits the data better by controlling for heteroscedasticity than a log-linear model since the error term has a variance occurring at a higher moment which can be influenced by one or more explanatory variables (Santos Silva and Tenreyro, 2006). Thus, the second and highest moment conditions are absent from the estimation procedure.

Therefore, the coefficients of log linearized models can be highly misleading due to the presence of heteroscedasticity. Moreover, the PPML, unlike the log-linear estimator estimates the effect of policy variables on trade whereas the log-linear estimator estimates the policy variable on the log of trade which can be misleading. Additionally, the PPML is consistent with a small sample size as well as a large sample size. To buttress, the Monte Carlo simulation test on the best estimator for the gravity model of international trade stipulates the gravity model is best estimated as a non-linear model (Silva-Santo and Tenreyro, 2006; 2011). Further studies on the best estimator for the coefficients of the gravity model is the PPML (Bobková, 2012; Vavrek, 2018). Given this, the PPML estimation technique becomes the best option to estimate the parameters.

PRESENTATION OF RESULTS

4.1: Results for the impact of institutions on trade

The study estimates the effect of the impact of institutions on trade in the ECOWAS.

Table 4.3 Poisson Pseudo Maximum Likelihood (PPML) Estimates

Variables	Coefficients
GDP	. 1.663 *** (.2764823)
Distance	-.001 *** (.0004167)
Border	-.284 (.3069309)
Language	.686 (1.073511)
Colonizer	.477 (1.028392)
Rule of Law	1.397 *** (.5138701)
Corruption Control	-.293 (.2038834)
Government Effectiveness	-.920 (.9229386)
Regulatory Framework	-2.165 *** (.6788759)
Voice and Accountability	.496 (.3640187)
Political Stability and Absence of Violence	.432* (.253727)
_cons	-15.681 *** (5.665889)

Note: *, ** and *** represent rejection of null hypothesis at 10%, 5% and 1%. Robust Standard Errors are in the parenthesis. Author's Estimates

Rule of Law is found to have a positive and significant relationship with trade as the estimated coefficient is 1.397 at 1%. The existing institutional framework for the protection of rights and properties has attenuated the level of violence and crime to a substantial degree in the ECOWAS ([Ibrahim Index of African Governance, 2020](#)). However, the minor challenges were terrorism, conflicts, and disputes ([AfDB, 2018](#)). Given this, the existing framework can accommodate the level of trade of the ECOWAS. Therefore, improvement of the rule of law by providing improved logistics would significantly enhance trade flows with one another and reduce trade disputes when further integration is pursued.

Corruption Control is found to have a negative and insignificant effect on trade in sub-region. The estimated coefficient of the corruption control variable is -.293. The result shows that corruption controls are not playing their expected role to ensure relatively greater transparency but rather compounds trade costs in the sub-region. The result is not startling because corruption is widespread in social, cultural and administrative architecture in West Africa ([Transparency International report, 2017; 2018; 2019](#)). This chunk of corruption in the ECOWAS promotes state fragility and violent conflict, therefore, it makes the sub-region unattractive to trade ([Jones, 2008; Yeh, 2011; Transparency International report, 2017; 2018; 2019](#)). According to [Ikenson \(2008\)](#), countries with lower corruption perceptions are likely to perform better on logistics perceptions whereas countries with intense corruption appear to have greater frictions in their logistics environments. However, the ECOWAS reduced the rate of corruption in recent unfolding events comparative to the 1990s and early 2000s due to the practice of democracy ([Escresa & Picci, 2015b](#)).

Government Effectiveness is found to have a negative but insignificant effect on trade with an estimated coefficient is -.920. This is not startling because the mechanisms to serve as a check for the formulation and implementation of favourable policies have not been fruitful in the ECOWAS. This is evident in the conflicting policy direction of regional and national policies in the ECOWAS ([Atuobi, 2007; Toress & Seters, 2016](#)). In this background, ECOWAS member-states were found in the lower half or even lower third of the ranking of 146 countries with the least government efficiency ([Busse et al, 2007; AfDB, 2018](#)).

Regulatory Framework is found to have a negative and significant effect on trade with an estimated coefficient is -2.165 at 1%. The result shows that the existing regulatory framework provided an additional incentive to increase trade costs in the ECOWAS. The result is not startling because the weak regulatory framework is evidential in the increased adjustment costs of trade liberalization and reduced welfare gains from trade due to greater average trade costs ([Isukul & Chizea, 2016; Ajide & Raheem, 2016](#)). The prevalence of more regulations makes indigenous producers less competitive to foreign competitors. Moreover, excessive regulatory framework leads to lower quality institutions signaling countries with weak regulatory frameworks gain less from integration ([Djankov et al., 2002; Busse et al, 2007](#)). This partly accounts for the low level of trade among member states in the sub-region.

Voice and Accountability are found to have a positive and insignificant relationship with trade as the estimated coefficient is .496. The result is startling because indigenes lack information, competence to hold those in power accountable, and people in power are not held accountable through institutional processes and mechanisms in ECOWAS ([Subrahmanyam et al., 2014; AfDB, 2018](#)). In this background, the estimate shows there has been an improvement from time to time.

Political Stability and Absence of Violence is found to have a positive relationship with trade as the estimated coefficient is .432 and statistically significant at 10%. The result is not startling because ECOWAS efforts toward political stability and absence of violence have improved security even though not fully-fledged. In this context, the efforts of the ECOWAS towards political, social, cultural, and economic events have enhanced co-operation and unification among the member-states ([Bamfo, 2013; Van Wyk, 2020](#)). More so, political stability has been strengthened over the last decade through the practice of democratic rule notable in elections held in Togo, Cape Verde, Benin, Burkina Faso, Nigeria, Cote d'Ivoire, Niger, Guinea, and Gambia ([Iizuka et al. 2018](#))

4.2: Results for the impact of trade and transport Infrastructure on trade

The study estimates the effect of trade and transport infrastructure on trade in the sub-region.

Table 4.3 Poisson Pseudo Maximum Likelihood (PPML) Estimates

Variables	Coefficients
GDP	.132 (.2698181)
GDP per capita	2.832*** (.6553791)
Distance	-.000 (0004302)
Border	.333 (.3105188)
Language	.635 (.4991359)
Colonizer	-.234 (.471893)
Volatility	-.486* (.2791526)
Political Stability and Absence of Violence	.605*** (.2057449)
Infrastructure (qytTinf)	-.304 (1.273924)
Tariff	.289 (.3433896)
_cons	-1.111195 (3.052715)

Note: *, ** and *** represent rejection of null hypothesis at 10%, 5% and 1%.

Author's Estimates

Robust Standard Errors are in the parenthesis.

The coefficient of the quality of trade and transport infrastructure (qytTinf) is -.304 but statistically insignificant. The results show that the deplorable state of trade and transport infrastructure has undergone some changes. This is not startling because according to Torres & Seters (2016), intra-regional trade was hampered by the high costs of transporting goods by road or rail within the ECOWAS member-states noticeably the producers in rural areas. Transport prices per ton kilometer from farm gate to primary collection markets tend to be three to five times higher than those from secondary (often rural wholesale) markets to wholesale markets located in the countries capitals (FAO, 2015). Also, railway facilities generally were in a deplorable state and unable to fully function (Japan International Corporation Agency, 2012).

Moreover, road density in the ECOWAS member-states remains low compared to other developing regions and rural communities continue to have by far the lowest accessibility to all-season roads in the developing world. This differs among countries, with more developed countries such as Ghana and Nigeria doing well compared to others (FAO, 2015).

Tariff is estimated to have a coefficient of .289 but statistically insignificant. The result is not startling because the countries heavily depend on tariffs as a source of revenue even though the charge has been reduced among member-states due to trade liberalization policies (ODI, 2013; World Bank 2015; de Roquefeuil, 2014; Toress & Seters, 2016).

POLICY RECOMMENDATION AND CONCLUSION

The study investigated the impact of institutions on trade in the ECOWAS using six institutional quality datasets. The study further investigated the impact of trade and transport infrastructure on trade. Using the Poisson Pseudo Maximum Likelihood (PPML) to estimate the augmented gravity model of trade. The study showed that two out of six indicators of institutional quality had a positive and significant effect on trade. Given this, the existing institutions do not have a significant impact on trade. Given this, the substandard institutions have culminated in the low level of trade and the inadequate Foreign Direct Investment (FDI) inflow among the members of the ECOWAS. Additionally, the study showed that the existing trade and transport infrastructure has adversely contributed to the low level of trade even though there has been an improvement over time.

Rule of law had a positive and significant effect on trade among members of the ECOWAS. In this background, the implemented laws of the land are held in high esteem by the indigenes. As a result of population growth, there is the need to intensify the vigilance and transparency of state institutions such as the court and law enforcement agencies through the provision of logistics to facilitate the implementation of laws and surveillance through car patrolling by security agencies in communities. *Political stability and Absence of violence* had a positive and significant relationship with trade among members of the ECOWAS. In this context, the result shows that there are minimal reported cases of unconstitutional change of government and politically incentivized violence and terrorism. This incinerates that there has been a smooth changeover of governments over the period hence countries have practiced staunch democratic governance. As a recommendation, there are existing loopholes in relation to governance by presidents. As a result, the ECOWAS should initiate a policy of two-term of governance of the presidents to reduce political scuffle and hullabaloo that breeds conflicts. *Regulatory Quality* had a significant adverse effect on trade among member states. In this background, the nonexistence of an appropriate channel for both indigenous and foreign investors has risen the cost of doing business therefore an institution for investors has to be established. Additionally, the prevalence of usurious taxes dwindles the gains from investment therefore the need to initiate policies of a common transparent tax system coupled with tax reliefs for relatively performing private companies. *Corruption control* had a negative but insignificant effect on trade among the ECOWAS member states. Given this, efforts channeled to attenuate corruption has compounded the cost of corruption. This could be attributed to the measures implemented at vantage points where corruption-related cases are minimal. Given this, the level of corruption depends on the incumbent government. As a result, laws should be formulated on how the funds are to be disbursed to the governments. Additionally, delicate institutions such as the Central Bank and the Auditor General Office should be devoid of political swing. Given this, an independent ECOWAS Central Bank that oversees the activities of all Central Banks is essential for the monitoring and disbursement of funds. Finally, a new policy variable on contract execution should be developed to reduce contacts between the governments and investors. *Government Effectiveness* had a negative but insignificant effect on trade. In this context, the government's effort to curtail the ills has not effectively materialized due to the indifference by the leaders even though affects the level of trade. Policies are to be channeled to ensure greater transparency in the economy by exposing the informal sector through initiating policies that improve trade statistics, reduces smuggling, and research into the motives and gains of smugglers corollary to corruption and bribery with stringent supervision. Also, public services should be channeled to key sectors of the economy and avoid relatively large social transfers. Additionally, a policy variable should be developed for Emergency responses such as disease outbreaks among members. *Voice and Accountability* had a positive but insignificant effect on trade. In this background, some countries have the rights of the populace compromised such as freedom of expression and press freedom. As a result, the study recommends that the ECOWAS should initiate a policy to enhance press freedom and freedom of speech at all times whiles regulating activities that adversely affect the political serene. More so, stringent punishment is to be meted on people who abuse and victimize journalists in line with the introduction of standardized apparel for journalists on the field.

Trade and transport infrastructure had a negative but insignificant effect on trade. The result shows that trade and transport infrastructure also compounds to the low level of trade by raising the trade cost among members. Given this, there is a need to complete the construction of regional roads, railway, ports, and improve upon the service delivery to open the trade corridors and facilitate relatively greater trade flows across member states. The ECOWAS should prioritize reducing the time taken to clear goods at ports, facilitate the completion of the regional railway line, complete all outlined road infrastructure projects under a Public-Private Partnership (PPP) or Build Own Transfer (BOT) Agreement to make available in the shortest possible time. Also, there should be a regional market for the pricing of goods. To attenuate the smuggling, there should be specified vehicles with a recognizable identity to transport goods across borders. Additionally, there is a need for a technological device for the detection of extractive minerals at the various points of exit of member countries. Also, the establishment of regional storage facilities and research centres. Finally, the ECOWAS should devise a new institutional framework to facilitate transparency, security, and growth by curtailing the ills of the community.

Table 4.2 Descriptive statistics of data

Number of parameters: 12

Number of observations: 1430

Number of observations dropped: 0

Pseudo log-likelihood: -5.099e+10

R-squared: .49402915

(Std. Err. adjusted for 144 clusters in pairings)

trade	Robust		z	P> z	[95% Conf. Interval]	
	Coef.	Std. Err.				
lnGDP	1.66264	.2764823	6.01	0.000	1.120744	2.204535
lndistance	-.0013124	.0004167	-3.15	0.002	-.0021291	-.0004956
border	-.284417	.3069309	-0.93	0.354	-.8859906	.3171565
lang	.6857831	1.073511	0.64	0.523	-1.41826	2.789826
colonizer	.4774998	1.028392	0.46	0.642	-1.538112	2.493112
RL	1.397212	.5138701	2.72	0.007	.390045	2.404379
CC	-.2930149	.2038834	-1.44	0.151	-.6926189	.1065892
GE	-.9195335	.9229386	-1.00	0.319	-2.72846	.8893929
RF	-2.165115	.6788759	-3.19	0.001	-3.495687	-.8345424
VA	.4961672	.3640187	1.36	0.173	-.2172964	1.209631
PS	.4316699	.253727	1.70	0.089	-.0656258	.9289656
_cons	-15.6807	5.665889	-2.77	0.006	-26.78564	-4.575765

Number of parameters: 11

Number of observations: 502

Number of observations dropped: 0

Pseudo log-likelihood: -3.512e+10

R-squared: .42626044

(Std. Err. adjusted for 96 clusters in pairings)

trade	Robust					
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lnGDP	.1322428	.2698181	0.49	0.624	-.396591	.6610766
lnpercapita	2.83205	.6553791	4.32	0.000	1.547531	4.11657
lndistance	-.0004481	.0004302	-1.04	0.298	-.0012914	.0003951
border	.3332679	.3105188	1.07	0.283	-.2753378	.9418735
lang	.63547	.4991359	1.27	0.203	-.3428184	1.613758
colonizer	-.2342866	.471893	-0.50	0.620	-1.15918	.6906066
volatlity	-.4860844	.2791526	-1.74	0.082	-1.033213	.0610447
PS	.6047855	.2057449	2.94	0.003	.2015329	1.008038
infrastructure	-.3042893	1.375182	-0.22	0.825	-2.999596	2.391018
Tariff	.2889088	.3433896	0.84	0.400	-.3841224	.96194
_cons	-1.111195	3.052715	-0.36	0.716	-7.094408	4.872017

Variable	Obs	Mean	Std. Dev.	Min	Max
ctry1	0				
ctry2	0				
dum_ctry1	3,780	1118.267	4.611708	1111	1125
dum_ctry2	3,780	1213.581	970.8086	1111	11113
pairings	3,780	106.0333	61.06078	1	211
years	3,780	2008.5	5.188814	2000	2017
trade	3,780	3.74e+07	1.67e+08	0	4.59e+09
lnGDP	3,780	19.56702	.9223271	17.6356	22.38172
lnpercapita	3,780	5.745322	.3757	4.946437	6.936348
lndistance	3,780	1314.568	777.4092	105.1806	5294.028
border	3,780	.2410053	.4277501	0	1
lang	3,780	.3761905	.4844928	0	1
colonizer	3,780	.3224868	.46749	0	1
cu	3,780	.2661376	.4419955	0	1
volatlity	3,774	.1931224	.2098588	.0001341	1.915696
peakness	3,780	.0018519	.042999	0	1
RL	2,706	-.3885552	.5384461	-4.884381	.444818
Tariff	1,503	2.416208	.3861922	.0345629	3.12503
CC	2,955	-.4861001	.7056482	-6.320305	.292497
GE	3,258	-.2699306	.4407506	-3.219399	.3937729
RF	3,330	-.5411694	.4882643	-2.972461	.3999772
VA	2,018	-.656782	.5459141	-2.923602	.244751
PS	2,134	-.7371403	.8604508	-4.356556	.6837254
infrastruc~e	1,992	.577607	.2156454	0	.8382685