Impact of Import and Export on The Ghanaian Economy

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ABSTRACT

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International trade is a cross-border exchange of goods and services. Ghana, a developing country, is no different from countries that rely heavily on international trade. The study seeks to analyze data obtained from the secondary annual time series for the period 1990 to 2020. Through multiple regression analysis between the trade and the economic growth, Augmented Dickey fuller test, Johansen co-integration test, Vector auto regression test, and Co-variance analysis Vector error cointegration test were used to verify the main hypothesis. The emphasis reveals positive effect of trade on the GDP of Ghana thereby having significant impact on the Ghanaian economy.

Keywords : Economic growth, Export, Import, Ghana.

I. INTRODUCTION

The revolution of maritime trade right from the 1950s has brought about a remarkable transformation in the trade sector. All areas of international trade had undergone such great transformation. Transportation as a critical role in international trade has been the most vital engine in this regard. Intermodal transportation has been made possible and easy since the innovation of several transport modes and means [1] [2] [3] . This is to point out that the subject of international trade cannot be dealt with without including the part or role played by the transportation sector. The continuous transportation of cargo between importers and exporters across borders plays a key role in managing supply chains in international trade [4].

It's actually unquestionable that the role of transport logistics in the area of trade expedition has revolutionized over the years and has in turn attracted several researchers from areas of fields to dive deeper into this sector [3] [4] [5] [6] in particularly as world trade had gone a long way to integrate almost all other operational factors of boosting the economy. Transport seeks to connect all other areas of the economy. This goes a long way to impact the individual citizens of the country. Import and exports constitute a major part of balance of payment in a country, unsustainable trade deficit depicts a violation of international budget constraints over time [9]. Import and export are the major drivers of the Gross Domestic Product (GDP) of Ghana. The earnings from this sector has been the uttermost cause of boost in the shipping industry in Ghana.

Transportation itself in the chain of trade generate several cost and revenues which are inevitable; in a way some firms giving and receiving to facilitate import and export. Cost ranging from transport mode cost, handling cost, labor cost, etc. For example, Accepting the drivers of container patronage at the decision- making level is key to the measurement of transportation costs affecting the volume and pattern of international trade [3]. Shipping which a prevailing transport system which significantly revolutionized over the years accounts for about 80% capacity of the total cargo volume of international trade. The United National Conference on Trade and Development reported that International maritime trade volumes accrued about 11 billion of tons in 2018, which was a level which had not been chocked in history of the industry, however, this is expected to increase in the coming years especially with the next four (4) years [7].

Therefore, the assessment of the trade sector which inculcate the import and export is of essence to the economy as such revealing it relevance through studies like this is efficacious. That notwithstanding, this is also to back the point that the transport sector has been the pivotal mark in boosting the trade sector in the economy. It is important to note that advancement in the transportation systems will always promote the flows of international trade [8]; [9] [10] [11] ; [12].

1.1 Overview of the Trade in Ghana

Transportation plays a significant role in the economy of Ghana. It eases the haulage of cargoes and the overall integration of the rural-urban economies [13]. The various modes of transportation within the sector are road, rail, air, inland water, pushcarts, and animal-drawn carts. The road is the major means of transport in Ghana. The main problem encountered in the transportation sector includes inadequate

development of an intermodal transport system, poor intermodal facilities, inadequate funding for maintenance, advancement and rehabilitation of existing infrastructure and management for all modes of transport, poor synchronization and collaboration among appropriate institutions, and an unintegrated method to transport planning and development [14]. Road transport is the largest means of hauling cargoes in Ghana and is the segment that needs the highest attention. Roads carry 95% of passengers and 98% of the country's freight. Ghana's road transport indicators are strong. By virtually all measures, they are well ahead of those found among low-income peers and nearing the levels expected of a middle-income country [15]. It is projected that Ghana has approximately 67,291 km of the road network. Of this, 12,785 km are trunk roads, 42,394 km are feeder roads and 12,112 km are urban roads. 83% of trunk roads, 36% of urban roads and 72% of feeder roads are well-thought-out of being in either good or fair state. The network scope, of which only 17% is paved, grows at a usual rate of 8% per year [16]. Ghana has enhanced its road networks since the 1990s and this has led to its rise as a hub linking the whole West African trade zone [17]. There have been better efficiency in the road transport sector because of the privatization of Ghana's transport and logistics units.

1.2 Transport as A key Engineer of Trade

Economists across the globe in recent years have decided to place emphasis on the significance of transport costs in determining trends of international trade. The world trading environment has been one of the prominent examples of successful international policy cooperation, as countries maintain liberalized trade despite the opportunity each has to gain by raising their import tariffs [21]. Studies has shown that transportation costs pose a barrier to trade at least as large as, and frequently larger than, tariffs. Trade negotiations have steadily reduced tariff rates, with average U.S. import [2].

II. DATA COLLECTION & METHODOLOGY

Recently, international cases related to cost calculation in marine transportation and charterparty have been witnessed. There are few studies concerning reliance damage (wasted expenditure) in charterparty or maritime transport. There are no studies on damage measures related to charterparty. Using three recent cases, we will consider the measure of damage in charterparty. However, these three cases show the results of different judgments. Therefore, by comparing the three cases, we will try to enhance the perspectives of the parties by examining the criteria of wasted expenditure in court, including conceptualization of the wasted expenditure as reliance damage [22].

Kuo (2011) proposed ten criteria for selecting international distribution center location including port rate, import/export volume, location resistance, extension transportation convenience, transshipment time, one stop service, information abilities, port & warehouse facilities, port operation system, and density of shipping line [18] [24]. As the majority of international trade volume is moving via maritime container transportation, international trade heavily relies on maritime transport, which includes nodes, the transport mode, and physical flow [25].

There are studies on the various ways of analyzing transportation costs in economic context and the patterns of technological changes and price indexes for international air and ocean shipping. This emphasis actually reveals the essence of transportation in the affairs of international trade. Trade expert express transportation costs in ad valorem terms, that is, the cost of shipping relative to the value of the good. Which is equivalent to the percentage change in the delivered price as a result of paying for transportation [2].

This research utilized data obtained from the secondary annual time series for the period 1990 to 2020. This secondary yearly time series data was obtained from the Ghana Statistical Service (GSS), Ghana Export Promotion Authority (GPA), World Bank, Bank of Ghana, World Development Indicators, Food and Agricultural Organization on GDP, exports, imports, exchange rates and inflation. These were chosen not only because of their credibility but also because of their comprehensive record keeping of these variables in the statistics. Annual time series data were selected because data on the above variables is normally collected annually in Ghana. Therefore, collecting annual instead of monthly or quarterly time series is simpler. However, because the Ghana Statistical Service (GSS), the Ghana Export Promotion Authority (GPA), the World Bank, the Bank of Ghana, the World Development Indicators, the Food and Agriculture Organization is free and available to the public, data could be easily accessed as there was no need to request prior authorization.

The research used in the study covers the 1990 to 2020 annual time series, or 36 observations that should be adequate to capture the model's short-term and long-term correlation between export, import and economic development. The data collection consists of measurement for GDP, goods and services exports (US\$ currency), and goods and services imports (US\$ currency). Both sets of data are taken from 2014 Global Development Indicators. The methodology of estimation employed in this analysis is the simulation technique of co-integration and error correction. The whole estimation process consists of five steps: first, root unit test, second, co-integration test, third, causality of the Granger and fourth, VAR stability model.

2.1 Correlation Matrix of The Chosen Variables (Covariance Analysis)

A correlation matrix is a table that displays the coefficients of correlation between variables. The table below shows that each of the study's variables

has a perfect correlation with itself, and that all of the variables have a correlation with one another. For example, Gross fixed capital formation and population have an infallible or a perfect correlation with itself (a variable is considered to have a perfect correlation with itself when the variable has a value of 1.000000).

Covariance Analysis: Ordinary

Date: 03/10/21 Time: 09:53

Sample (adjusted): 1 29

Included observations: 29 after adjustment

Covariance					
Correlation	GDP	TRADE	GFCF	POPULATION_GROWTH	INFLATION_RATE
GDP	4.21E+20 1.000000				
TRADE	2.97E+20 0.983062	2.16E+20 1.000000			
GFCF	1.01E+20 0.948778	6.88E+19 0.905746	2.67E+19 1.000000		
POPULATION_GROWTH	9.40E+18 0.998016	6.62E+18 0.980358	2.22E+18 0.936062	2.11E+17 1.000000	
INFLATION_RATE	4.47E+19 0.860414	3.02E+19 0.810851	1.18E+19 0.899990	9.94E+17 0.856355	6.40E+18 1.000000

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Descriptive Statistics of The Chosen Variables

The descriptive statistical data used in this study is shown in the table below. The median and mean values of each variable, as well as their standard deviations, are predicted. The variable with the most variability is Gross Fixed Capital Formation whilst the variable with the least variability is Trade.

Variables	Number of Observation	Mean	Median	Standard Deviation
GDP	29	2.30E+10	8.88E+09	2.09E+10
TRADE	29	1.69E+10	8.85E+09	1.50E+10
GFCF	29	4.98E+09	2.52E+09	5.26E+09
POP. GROWTH	29	5.49E+08	2.21E+08	4.67E+08
INF. RATE	29	3.34E+09	2.23E+09	2.57E+09

Authors Compilation, 2021.

Augmented Dickey Fuller Test

The Augmented Dickey fuller (ADF) test is used to assess the hypothesis (null) that there is a unit root in the time series. The schwarz information criterion was utilized to test the unit root test with a maximum lag of four. The critical value for this research was set at 5% for levels, 1st and 2nd differencing. Since the critical value of the study was fixed at 3.3, a variable is deemed and considered to be stationary if its t-statistics results and the critical value fixed at 5% is more than critical value which is 3.3.

Augmented Dickey Fuller Test (Gdp)

Null Hypothesis: GDP has a unit root (Stationary)

Exogenous: Constant, Linear trend

Lag length: 4, Critical value: 3.3

Variable	Levels		1 st Differencing		2 nd Differencing	
	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	0.739594	-1.613547	-5.521685	-6.093001	-4.735360	-4.643437
Critical Values at 5% level	-2.971853	-3.580623	-2.976263	-3.587527	-2.998064	-3.622033
Probability	0.9909	0.7616	0.0001	0.0002	0.0011	0.0062
Critical Values	3.3		3.3		3.3	

At (1st) differencing with a constant trend and Intercept, the t-statistics result was -6.093001 and it is more than the critical value set at 5% which is -3.587527 with a significant probability value of (0.0002). Therefore, GDP is stationary.

Augmented Dickey Fuller Test (Gfcf)

Null Hypothesis: Gross Fixed Capita Formation has a unit root (Stationary)

Exogenous: Constant, Linear trend

Lag length: 4, Critical value: 3.3

Variable	Levels		1 st Differencing		2 nd Differencing	
GROSS FIXED CAPITA FORMATION	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	-0.200847	-1.855264	-5.023153	-4.945695	-4.929035	-4.798574
Critical Values at 5% level	-2.971853	-3.580623	-2.976263	-3.612199	-2.998064	-3.622033
Probability	0.9274	0.6504	0.0004	0.0030	0.0007	0.0044
Critical Values	3.3		3.3		3.3	

At (1st) differencing with a constant trend and Intercept, the t-statistics result was -4.945695 and it is more than the critical value set at 5% which is -3.612199 with a significant probability value of (0.0030). Therefore, Gross Fixed Capita Formation is stationary.

Augmented Dickey Fuller Test (Trade)

Null Hypothesis: TRADE has a unit root (Stationary)

Exogenous: Constant, Linear trend

Lag length: 4, Critical value: 3.3

Variable	Levels		1 st Differencing		2 nd Differencing	
TRADE	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	1.514963	-1.766416	-3.163075	-3.991380	-5.144969	-5.014202
Critical Values at 5% level	-2.971853	-3.587527	-2.976263	-3.595026	-2.991878	-3.612199
Probability	0.9989	0.6927	0.0337	0.0221	0.0004	0.0026
Critical Values	3.3		3.3		3.3	

At (2nd) differencing with a constant trend and Intercept, the t-statistics result was -5.014202 and it is more than the critical value set at 5% which is -3.612199 with a significant probability value of (0.0026). Therefore, Trade is stationary.

Augmented Dickey Fuller Test (Population Growth)

Null Hypothesis: TRADE has a unit root (Stationary)

Exogenous: Constant, Linear trend

Lag length: 4, Critical value: 3.3

Variable	Levels		1 st Differencing		2 nd Differencing	
Population Growth	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	-1.375634	-2.420219	-4.532920	-4.259812	-8.059428	-8.098723
Critical Values at 5% level	-2.971853	-3.580623	-2.976263	-3.587527	-2.981038	-3.595026
Probability	0.5796	0.3620	0.0013	0.0133	0.0000	0.0000
Critical Values	3.3		3.3		3.3	

At (1st) differencing with a constant trend and Intercept, the t-statistics result was -4.259812 and it is more than the critical value set at 5% which is -3.587527 with a significant probability value of (0.0133). Therefore, Population Growth is stationary.

Augmented Dickey Fuller Test (Inflation Rate)

Null Hypothesis: TRADE has a unit root (Stationary)

Exogenous: Constant, Linear trend

Lag length: 4, Critical value: 3.3

Variable	Levels		1 st Differencing		2 nd Differencing	
Population Growth	Constant	Trend and Intercept	Constant	Trend and Intercept	Constant	Trend and Intercept
T-Statistic Values	0.434778	-1.830823	-5.626949	-6.018837	-4.679905	-4.630522
Critical Values at 5% level	-2.971853	-3.580623	-2.976263	-3.587527	-2.998064	-3.622033
Probability	0.9809	0.6626	0.0001	0.0002	0.0012	0.0064
Critical Values	3.3		3.3		3.3	

At (2nd) differencing with a constant trend and Intercept, the t-statistics result was -4.630522 and it is more than the critical value set at 5% which is -3.622033 with a significant probability value of (0.0064). Therefore, Gross Fixed Capita Formation is stationary.

Vector Auto Regression Estimates

VECTOR AUTO REGRESSION ESTIMATES.

	GDP	TRADE	GFCF	POPULATION INFLATION_ N_GROWTH RATE	
GDP(-1)	-0.555949 (2.97426) [-0.18692]	1.618731 (1.70849) [0.94746]	-0.734388 (1.23425) [-0.59501]	-0.047259 (0.07005) [-0.67468]	-0.042103 (1.03181) [-0.04081]
GDP(-2)	-4.824743 (4.55454) [-1.05933]	-5.046064 (2.61624) [-1.92874]	1.394923 (1.89002) [0.73805]	-0.110357 (0.10726) [-1.02884]	-1.204248 (1.58003) [-0.76217]
TRADE(-1)	0.996201 (0.51877) [1.92031]	1.200136 (0.29800) [4.02735]	0.193775 (0.21528) [0.90012]	0.022702 (0.01222) [1.85818]	0.168190 (0.17997) [0.93455]
TRADE(-2)	1.810034 (0.67002)	0.419518 (0.38487)	0.197186 (0.27804)	0.045211 (0.01578)	0.086487 (0.23244)

	[2.70148]	[1.09001]	[0.70920]	[2.86516]	[0.37209]
GFCF(-1)	-0.903272 (1.00821) [-0.89592]	-1.021424 (0.57914) [-1.76369]	0.745040 (0.41838) [1.78077]	-0.020313 (0.02374) [-0.85549]	0.503854 (0.34976) [1.44057]
GFCF(-2)	3.231123 (1.54557) [2.09057]	2.578498 (0.88781) [2.90432]	-0.613620 (0.64137) [-0.95673]	0.080888 (0.03640) [2.22224]	0.420626 (0.53618) [0.78449]
POPULATION_GROWT H(-1)	27.25209 (124.895) [0.21820]	-63.14260 (71.7428) [-0.88013]	22.59323 (51.8283) [0.43592]	2.077159 (2.94138) [0.70618]	-5.839336 (43.3275) [-0.13477]
POPULATION_GROWT H(-2)	144.7956 (178.050) [0.81323]	177.2540 (102.276) [1.73309]	-50.92548 (73.8864) [-0.68924]	3.186217 (4.19323) [0.75985]	48.66752 (61.7677) [0.78791]
INFLATION_RATE (-1)	-0.870265 (0.88034) [-0.98856]	-0.170557 (0.50569) [-0.33728]	-0.455892 (0.36532) [-1.24793]	-0.022726 (0.02073) [-1.09616]	0.200087 (0.30540) [0.65516]
INFLATION_RATE (- 2)	0.857391 (0.94299) [0.90923]	0.346317 (0.54168) [0.63934]	0.095316 (0.39132) [0.24358]	0.019200 (0.02221) [0.86453]	-0.333668 (0.32713) [-1.01997]
C	-4.30E+09 (1.9E+09) [-2.29981]	-2.05E+09 (1.1E+09) [-1.91296]	5.80E+08 (7.8E+08) [0.74796]	-1.00E+08 (4.4E+07) [-2.28043]	64504549 (6.5E+08) [0.09948]
R-squared	0.986306	0.991007	0.962941	0.984826	0.893174
Adj. R-squared	0.977748	0.985387	0.939779	0.975342	0.826409
Sum sq. resids	1.59E+20	5.25E+19	2.74E+19	8.82E+16	1.91E+19
S.E. equation	3.15E+09	1.81E+09	1.31E+09	74261078	1.09E+09
F-statistic	115.2412	176.3179	41.57463	103.8429	13.37770
Log likelihood	-621.7831	-606.8147	-598.0356	-520.5711	-593.1987
Akaike AIC	46.87282	45.76405	45.11375	39.37564	44.75546

Schwarz SC	47.40076	46.29199	45.64168	39.90357	45.28339
Mean dependent	2.42E+10	1.79E+10	5.28E+09	5.76E+08	3.47E+09
S.D. dependent	2.11E+10	1.50E+10	5.33E+09	4.73E+08	2.63E+09

Determinant resid covariance (dof adj.)	6.80E+85
Determinant resid covariance	4.97E+84
Log likelihood	-2824.334
Akaike information criterion	213.2840
Schwarz criterion	215.9237

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The table above shows the vector autoregressive model used the time series. Vector autoregression (VAR) is a model employed to deduces the relationship between chosen variables as they evolve over time. Each variable is a linear function of its own past lags as well as the past lags of the other variables. For all variables in the set, each variable is a linear function of the lag 1 values.

Johansen Co-Integration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.934463	138.3194	69.81889	0.0000
At most 1 *	0.578942	64.74040	47.85613	0.0006
At most 2 *	0.541998	41.38580	29.79707	0.0015
At most 3 *	0.502336	20.30202	15.49471	0.0087
At most 4	0.052659	1.460583	3.841466	0.2268

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized	Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.934463	73.57898	33.87687	0.0000
At most 1	0.578942	23.35459	27.58434	0.1588
At most 2	0.541998	21.08379	21.13162	0.0508
At most 3 *	0.502336	18.84143	14.26460	0.0088
At most 4	0.052659	1.460583	3.841466	0.2268

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The Johansen Co-integration test results for the analysis are shown in the table above. The results (trace) indicates that there are five co-integration equations with statistical values exceeding the critical value of 5% and corresponding probabilities of less than one percent.

Explanation Of The Normalized Variables.

1 Cointegrating Equation(s): Log likelihood -2856.704

Normalized cointegrating coefficients (standard error in parentheses)

			POPULATIONINFLATION_ _GROWTH	RATE
GDP	TRADE	GFCF		
1.000000	-0.203742	-0.662570	-30.84068	0.123631
	(0.01136)	(0.02056)	(0.31266)	(0.02921)

Adjustment coefficients (standard error in parentheses)

D(GDP)	-8.527714
	(2.56623)
D(TRADE)	-2.958635
	(1.20166)
D(GFCF)	-0.013111
	(1.07524)
D(POPULATI ON_GROWT H)	-0.207725
	(0.06070)
D(INFLATIO N_RATE)	-1.109379
	(0.83024)

GDP is the normalized variable, while Trade, Gross Fixed Capita Formation, Population growth and inflation rate are the independent variables, according to the normalized cointegration result. Furthermore, negative independent variables are explained to have a positive effect on the normalized variable, while positive independent variables are explained to have a negative impact on the normalized variable.

Hence, assuming all other variables are equal, the effects of this equation deduces that Trade, Gross Fixed Capita Formation and Population growth rate

have a positive effect on the normalized variable (GDP), but inflation has a negative impact on the normalized variable. (GDP).

III. SUMMARY OF FINDINGS

3.1 Key Findings

The findings of this study are compatible with other empirical studies which states that Trade has a

positive effect on the GDP (Peng Sun and Almas Heshmati, 2010, Bakari (2017) and Keho (2017) whilst inflation has a negative effect on GDP.

The role of trade in improving GDP is crucial. Countries that are more open to trade tend to expand faster, innovate, increase competitiveness, and provide their citizens with more income and opportunities. Lower-income households' profit from open trade because goods and services are more accessible. Consumers profit from increased buying power in their own wages as a result of increased trade, which leads to an increase in market surplus. Domestic monopolies are often weakened by trade, as more competitive international companies compete with them. Also, many emerging countries rely heavily on active regional and global trade to move from low-income to middle- and upper-middle-income status.

Furthermore, the findings of this study shows that population growth and gross fixed capital formation also have a positive effect on GDP, which is consistent with most of the empirical studies states that population growth expands the labor force, which boosts economic growth. A large population provides the economy with a large domestic sector, increased population encourages competition, which leads to technological advances and inventions. Moreover, Gross fixed capital formation accumulation can boost economic growth in a variety of ways, by generating significant benefits, growing investments through expanded markets and economies of scale, and transferring wealth.

IV. CONCLUSION AND RECOMMENDATIONS

The aim of this study is to use time series data from 1990 to 2019 to explore the effects of Trade on the economic growth. The relationship between Trade and economic growth was studied using multiple

regression analysis. Separate experimental tests such as the Augmented Dickey fuller test, Johansen co-integration test, Vector auto regression test, and Co-variance analysis Vector error cointegration test were used to verify the main hypothesis in the multiple regression analysis. After using and conducting all of these tests, the results indicates that Trade has a positive effect on GDP.

This study mainly focused on exploring the effects of Trade on GDP growth therefore subsequent studies should explore the impact of other macro-economic variables that also has a great influence on economic growth.

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