

## **Exports, Imports, Exchange rates, Gross domestic investment and Growth: Empirical Evidence from Cameroon**

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### ***Abstract***

*The main objective of this study is to investigate whether exports, imports, exchange rates, and gross domestic investment are important in determining economic growth in Cameroon. The Johansen tests of co-integration suggest the presence of a long-run relationship among the variables and all the long-run coefficients have the expected signs and significant at least at 5% level. Specifically, exports, gross domestic investment, and exchange rate positively influence economic growth of Cameroon while the impact of imports on GDP growth is negative; a 1% increase in exports and gross domestic investment increases GDP by approximately 2.4% and 4.5% respectively, while 1% depreciation in Cameroon currency improves the GDP by 2.6% in the long run. Finally, a 1% increase in imports will decrease the GDP of Cameroon by 8% in the long term. The results of Granger causality tests indicate that exports, investment, and imports cause GDP growth in the short-run unidirectional, but bidirectional causality exists between exports and imports. The variance decomposition results suggest that in the 20<sup>th</sup> period horizon, the variation in GDP growth is explained by exports at 41.64%, imports at 19.64 %, gross domestic investment at 17.98 % and exchange rate at 15.02 % suggesting that economic growth in Cameroon has been spearheaded by exports, followed by gross domestic investment, and exchange rate. Imports have negative impact on growth suggesting that, perhaps, most of the imported goods are consumption goods rather than capital goods or intermediate goods.*

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**Keywords:** *exports, imports, gross domestic investments, exchange rate, growth, Cameroon.*

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### **1. Introduction**

The Cameroon economy is made up of three major sectors: the agricultural, manufacturing, and services sectors. The services sector, which is the largest sector, has been contributing significantly to the economy. The share of the services sector in GDP

has been increasing. Specifically in 1980, it contributed about 43% to GDP which increased further to 49% in 2010 and 51% in 2013. Agriculture is the second largest sector in terms of its contribution to GDP. In the early 1980s, it contributed almost 31% to the economy but declined to 20% in 2010. The contribution of manufacturing sector to GDP has been increasing but still remains relatively low compared to the other two sectors. In early 1980s, its share in GDP was only 10% but it increased to 19% in 2013.

In late 1980s, the government of Cameroon implemented a series of development programs to boost the economy to ensure a sustainable economic growth. These include the Structural Adjustment Programme (SAP) in 1990s and the local currency (CFA) devaluation by 100% relative to the French franc (FF) in 1994. The devaluation of the currency caused the exports of Cameroon to be more competitive in the world market which led to the development and growth of the exports products in the industrial sector. Within this period, Cameroon had undertaken a massive development in agricultural infrastructures, roads, railways, petroleum industry, and timber industries.

Cameroon is rich in natural resource endowments such as crude oil, petroleum products, lumber, cocoa beans, and aluminium and has been exporting these commodities in the world market. Its total exports has undergone three main evolutions since independence. Firstly, a period of strong growth from 1960 to 1986 spurred by the good performances of the primary agricultural sector; a down turn from 1987 to 1994 during the oil crisis; and an increasing trend in exports from 1994 till present.

Cameroon depends heavily on the exports of primary commodities to generate growth. In 1970s, the economy was performing very well spurred by high exports growth rate of 16% in 1976 due to the huge contribution from the agricultural sector during the pre-oil boom period. From 1978-1985, oil exports began to increase while agricultural exports started to decline. During this period, exports of Cameroon recorded an average growth rate of about 13.0 % which peaked at 32 % in 1978. In 1986, the value of exports was about USD3.4 billion due to the huge contribution from the oil sector. But by 1987 exports growth rate recorded a negative growth at -15.8% and subsequently the GDP growth rate recorded negative growth at -2.15%.

Prior to the onset of economic crisis in 1987-1994, Cameroon recorded a lowest exports growth and the prices of agricultural products started to fall, especially coffee. The country started to feel the impact of the crisis through trade channels mainly in the exports sector. For example, in 1993 exports growth rate in Cameroon registered negative growth at -18.9% which was the lowest after its independence.

After independence in 1960, the Cameroon economy was growing steadily registering at 4.6% in real terms spearheaded by agriculture which accounted for about 23.3% of GDP. But at the beginning of 1978 the economy of Cameroon experienced a structural change where oil has become the main source of foreign exchange earnings. During this period, Cameroon enjoyed a sustained annual growth rate of approximately 22% as a result of the rise in the oil revenue. This had resulted in a rise in the prices of goods and services. However, by the end of 1986, growth came to an abrupt halt due to a steep decline in the prices of major exports: petroleum and coffee. Thus, between the period

1987-1994, the country experienced low growth rate as economic activities shrank, notably in construction, production of cash crops, retail trading and the petroleum In sector. In 1988 the GDP growth rate dropped to negative at -7.8%.

In 1995, the country started to recover as a result of effective macroeconomic stabilization policy put in place by the government. In the period 1995-2005 the country recorded an average growth rate of 4%.

From the above analysis, we found that the performance of Cameroon's exports has been characterised with major fluctuations which pose some major concerns as fluctuations of exports cause the income of producers to be uncertain, especially in agriculture, and this will adversely affect the country's growth. The exports of Cameroon have been facing the problem of lack of competitiveness due poor packaging, high production cost, and irregularities of supply. The major concern is that even though the contribution of exports to GDP in Cameroon is currently increasing, we are not sure whether it could contribute significantly to the growth of the nation.

Therefore the main objective of this study is to determine the factors in determining economic growth in Cameroon. Specifically, the objectives are: To determine the relationship between exports, imports, gross domestic investment, exchange rate, and economic growth in Cameroon. The first section is the introductory remarks, followed by a discussion on the structure of the economy, exports, and imports. The next section is the model specification and the estimation techniques, results and discussion, and finally the conclusion.

## **2. Review of Literature**

This section gives a brief survey on a number of studies to determine whether exports, imports, gross domestic investment and exchange rates are important drivers of real economic growth.

### **2.1 Exports and Economic Growth**

A number of studies have been carried out to verify the exports led growth hypothesis (ELG) and the results are inconclusive. ELG hypothesis reflects the view that export-oriented policies help stimulate economic growth. Export expansion can be a catalyst for output growth both directly, as a component of aggregate output, as well as indirectly through efficient resource allocation, greater capacity utilization, exploitation of economies of scale, and stimulation of technological improvement due to foreign market competition. Exports provide foreign exchange that allows for increasing levels of imports of capital goods and intermediate goods that in turn raise the growth of capital formation which could further stimulate growth. This implies that if the production possibility of a country increases, the volume of good exported will also increase. In this case, export expansion could be stimulated by productivity gains caused by increases in domestic levels of skilled-labour and technology, Awokuse (2007).

The exports led growth by the neoclassical school support the fact that expanding exports will increase the productivities which will further lead to economies of scale for small economies. Most of this literature attributes the effects of exports on economic growth to several factors. One of the key factors however is that exports promote thresholds effects due to economies of scale, increased capacity utilization, productivity gains, and greater product variety. Abou- Stait (2005) argues that any gains from trade liberalization are often associated with external effects that are dynamic in nature.

Mattoo & Subramanian (2000) argue that an increase in economic growth may lead to trade expansion. This is because an increase in exports could reduce protectionism by facilitating transactions between countries. Thus, there is a possibility of a two-way causal relationship between growth and trade. It is argued that an increase in trade produces more income which then facilitates more trade.

Ekanayake (1999) uses co-integration and error-correction models to analyse the causal relationship between export growth and economic growth in eight Asian developing countries using annual data from 1960 to 1997. His finding came out with strong evidence supporting the export-led growth hypothesis due to the fact that exports growth and economic growth are highly correlated. It is also found bi-directional causality runs between export growth and economic growth in India, Indonesia, Korea, Pakistan, Philippines, Sri Lanka and Thailand and Malaysia.

Gilbert, Lin & Divine (2013) did a study to look at the impact of agricultural exports on economic growth in Cameroon employing an extended generalized Cobb- Douglas production function model for the period 1975 to 2009. They concluded that agricultural exports have mixed effect on economic growth in Cameroon. Coffee export and banana export have a positive and significant relationship with economic growth while cocoa export was found to have a negative and insignificant effect on economic growth. Also, capital, labour and real inflation were observed to have a strong influence on economic growth in Cameroon. Chemedda (2001) analyses the role of exports on economic growth in Ethiopia using the Cobb-Douglas production function for the period 1950 to 1986 time series data. The results pointed that the export growth rate has a positive effect on the economics growth rate. The contribution of exports to economic growth was seen to be greater in the long run than the short run.

Lin &Li (1990) propose a new estimation method to look at the relationship between exports and economic growth in China using demand oriented analysis and ordinary least square method. It was concluded that a 10% increase in exports resulted in a 1% increase in GDP in the 1990s in China. They stressed the fact that past study concludes a weak relationship between exports and economic growth in China which was due to the fact that the traditional method used to estimate the contribution of foreign trade to GDP growth did not distinguish between the different roles of imports and exports in economic growth. Mishra (2000) investigates the dynamics of the relationship between exports and economic growth for India over the period 1970 to 2009 using econometric techniques of co-integration and vector error correction. It was concluded that exports do not Granger cause growth, thus rejecting the hypothesis of export-led growth for India.

Elbeydi, Gesda & Hamuda (2010) looked at the relationship between exports and economic growth in Libya for the period 1980-207 using time series data to test for the direction of causality and the long run relationship. It was observed that GDP, exports, and exchange rate are co-integrated. Moreover, they conclude that both export and economic growth are related to past deviations (error-correction terms) from the empirical long-run relationship. Tesfaye (2011) conducted a study to look at the determinants of exports in Sub-Saharan Africa (SSA) using panel unit root test of a selected 42 countries over the period 2000-2008. Their findings conclude that real GDP and agricultural inputs are statistically significant in determining the exports of most SSA countries. This implies that if a country GDP increases, the volume of goods exported will also increase since GDP measure the total value of goods and services produced within a country for a given period of time. It was also concluded that the demand and supply factors are very essential in determining the Sub Saharan African agricultural exports. Likewise, their studies suggest the fact that most African exports did not rise significantly for the period 1980-2006 particularly when Nigeria and South Africa were not included.

Yusoff (2005) examines the structure and trend of Malaysian bilateral exports and imports to investigate whether these bilateral exports and imports have caused Malaysian economic growth. Using Granger causality test he concludes that it is the bilateral imports that have caused economic growth in Malaysia rather than the bilateral exports. Thus, the imports of manufactured goods play a significant role in determining economic growth and development in Malaysia. Amoro & Shen (2012) examine the factors that influence exports in Ivory Coast with specific reference to Cocoa and rubber using secondary data. The Ordinary Least Squares regression (OLS) suggest that rubber exports were significantly influenced by domestic production and interest rate while cocoa was significantly determined by cocoa production and domestic consumption.

A study carried out by Gbetnkom & Khan (2002) to investigate the determinants of three agricultural exports of Cameroon between 1971/72 and 1995/1996 namely cocoa, coffee and banana using the OLS shows that rainfall played a significant role in determining the volume of exports in agricultural products in Cameroon. They conclude that domestic demand, credit to exporters, improved road networks and the specific policy changes implemented have positively influenced the production of agricultural products in Cameroon.

Hatab & Romstad (2010) employed the gravity model to analyse the main factors influencing Egypt's agricultural exports for the period 1994 to 2008. Their findings pointed out that GDP, distance and language play significant role in inducing the agricultural exports in Egypt. Exports tend to increase between countries in close proximity since the good produced will quickly reach the market on time. Amoro & Shen (2012) look at the determinants of exports in Cote d'Ivoire by applying the OLS and found that domestic demand can be detrimental to exports as an increase in local demand reduces the volume of goods exported. The study also found that output, domestic consumption, interest rate, producer price and exchange rate significantly influence the volume of exports in Cote d'Ivoire.

## 2.2 Imports and Economic Growth

Qazi (2012) investigates the export-led growth, growth-led export, import-led growth, growth-led import and foreign deficit sustainability hypotheses in the case of China, using annual time series data from 1978-2009. The results confirm the bidirectional long-run relationship between the economic growth and exports, economic growth and imports, and exports and imports. He concludes that the exports-led growth, growth-led exports, imports-led growth and growth-led imports hypotheses are valid and foreign deficit is sustainable for China.

Mishra (2012) investigates the dynamics relationship between imports and economic growth in India for the period 1970 to 2010 using techniques such as vector error correction estimates and Granger causality tests. The results show there exist a two-way relationship between import growth and income growth in the long-run. A study by Ahmed & Salah Uddin (2009) on the causal nexus between exports, imports, remittance, and GDP growth for Bangladesh using annual data from 1976 to 2005 finds limited support in favor of export-led growth hypothesis for Bangladesh as exports, imports and remittance cause GDP growth only in the short run. The causal nexus is unidirectional.

Baimbridge (2012) investigates the relationship between exports, imports and economic growth for South Korea and Japan by constructing a Vector Autoregression (VAR) model. Causality is examined between real Gross Domestic Product (GDP), real exports and real imports. The results indicate that the three variables are cointegrated for both countries, implying that a long-run steady state exists. Also, there is evidence of bidirectional causality between imports and economic growth for both countries. Japan seems to experience export-led growth, while GDP growth in South Korea has a negative effect on export growth. These contrasting findings could result from export goods in Japan exhibiting greater non-price competitive aspects, although their success fails to trigger a virtuous circle since growth fails to lead to increase exports, while for South Korea, output growth leads to a decrease in export growth suggesting a strong domestic market.

## 2.3 Gross Domestic Investment and Economic Growth

A study conducted by Ghura (1997) to examine the factors that determine economic growth in Cameroon between the period 1963-1996 using time series data concluded that both private and public investment significantly influence economic growth in Cameroon. They reaffirmed the idea of the endogenous growth theory where investing on human capital as well as physical capital play a significant role in boosting the economic growth of a country. This can be done through improvement in infrastructure and quality education. Numerous studies have been carried out to look at the effect of gross fixed capital formation (investment) on the economic growth. **Tolo (2011)** conducted a study to find out the determinants of per capita GDP growth in Philippines using a panel of 23 selected emerging countries for the period 1965–2008. It was concluded that investment is significant in determining economic growth in Philippine.

## 2.4 Exchange Rate and Economic Growth

Kogid *et al.*(2012) study the effects of exchange rate on economic growth in Malaysia using time series data between 1971-2009 by employing the method of ARDL. They found that the long-run relationship exists between economic growth and exchange rate and that exchange rate causes the Malaysian GDP in the short run. Instability in the rate of exchange might be detrimental to investment growth and the volume of goods exported, especially in medium term. Mcpherson & Rakovski (2000) conduct a study to look at the effect of exchange rate on economic growth in Kenya using vector error correction model. They argue that an overvaluation of real exchange rate will impede growth. He went further to state that the reasons for the poor performance of the Kenya's economy was due to factors such as high dependency on foreign aid, large and inefficient public sector, low rates of saving and investment, persistent and large budget deficits and inconsistent macroeconomic policy. The basic conclusion of their study was that improvements in exchange rate management could make a difference to Kenya's growth prospects, but only within the context of a broader program of adjustment and reform. On the other hand, Hatab & Romstad (2010) use the gravity model to investigate the relationship among the volume of goods exported, exchange rate regime, and economic growth in Egypt. They conclude that depreciating the Egyptian pound against the currencies of its partners stimulates economic growth. On the contrary, Fosu (1992) studies the relationship between agricultural exports and exchange rate using ordinary least square method in Ghana and came out with the conclusion that the real exchange rate does not affect GDP directly but indirectly through its influence on exports and investments.

## 3. Model Specification

We postulate that the real GDP is determined by gross domestic investment, exports, imports, and exchange rate. The model is specified as

$$LRGDP_t = \alpha_0 + \alpha_1 LRGDI_t + \alpha_2 LRX_t + \alpha_3 LRER_t + \alpha_4 LRM_t + \epsilon_t \quad (1)$$

where LRGDP is the log of gross domestic product in real terms, LRGDI is the log of gross domestic investment in real terms and it is represented by the gross fixed capital formation, LRX is the log of real exports, LRER is the log of real exchange rate, and LRM is the log of real imports.  $\alpha_i$  ( $i = 0, 1, 2, 3, 4$ ) are parameters to be estimated and are expected to be positive except  $\alpha_4$  which is expected to be negative.  $\alpha_0$  is a constant term while  $\epsilon_t$  is the white noise and subscript  $t$  is the time period. Following Engle & Granger (1987), equation (1) is re-written in the error-correction model (ECM) as

$$\Delta Z_t = \alpha_0 + \lambda ECT_{t-1} + \sum_{j=1}^k \alpha_i \Delta LRGDP_{j-i} + \sum_{j=1}^k \beta_i \Delta LRX_{j-i}$$

$$+ \sum_{j=1}^k \theta_j \Delta LRER_{j-i} + \sum_{j=1}^k \delta_j LRM_{j-i} + \mu_t \quad (2)$$

where  $Z = \{LRGDP, LRX, LRER, LRM\}$ ,  $\Delta$  is the first-difference operator,  $k$  represents the number of lags of the explanatory variables, and ECT is the error-correction term generated from the Johansen multivariate process, and  $\mu$  is the disturbance term.

### 3.1 Data Sources and Variable Descriptions

The data used in this study are the annual time series data for the period 1971 to 2012. The Gross Domestic Product, exports, imports, and gross fixed capital formation are in constant 2005 USD while the exchange rate is in nominal term. These data were collected from the World Development Indicators online. The nominal bilateral real exchange rate is converted into the real terms using the formula :

$$RER = E \times \frac{P^*}{P}$$

where, RER is the real exchange rate, E is the nominal exchange rates expressed in local currency (French franc) against the USD,  $P^*$  is the US CPI and P is the Cameroon CPI.

### 4. Methods of Estimation

An important assumption underlying the Classical Regression is that the variables must be (covariance) stationary, exhibits mean reversion in that it fluctuates around a constant long-run mean and has a finite variance that is time-invariant. When a time series is non-stationary, it violates at least one of the above assumptions and therefore the regression results could be spurious. We shall investigate the stationary properties of the time series: real GDP, real exports, real gross investment, real exchange rate and real imports for the presence of unit roots by employing the Augmented Dickey-Fuller (ADF) test, Dickey & Fuller (1979) and Phillips-Peron test (Phillips & Perron, 1988).

If the series have unit roots, we then carry out the Johansen (1988) and Johansen & Juselius (1990) tests to verify the co-integration among the variables. Engle & Granger (1987) noted that before proceeding to test for co-integration, all variables should be integrated of the same order,  $I(1)$ . After testing for the unit roots is done and found that all our variables are integrated of the same order,  $I(1)$ , we then proceed to test for the long-run relationship among the variables by applying the Johansen-Julius co-integration tests using the two likelihood ratios (LR): the trace statistics and Max-Eigen tests. However, in the case of small samples data, the likelihood ratio tests can be biased. This problem will be corrected by multiplying the test statistics by  $(T-np)/T$  as suggested by Godbout & Norden (1997) where T is the number of effective observations, n is the number of endogenous variables and p is the number of lags. We will employ the Granger causality test to investigate the causal relationship among the variables. If the variables are co-integrated, then the Vector Error-Correction Model (VECM) will be estimated to investigate short-run and long-run dynamics between the variables in our present model. The Granger causality tests are carried out by using the residuals of the VECM.



## 5. Results and Discussion

The results of Augmented Dickey Fuller (ADF) test and Philips Peron (PP) tests are shown in Table 1 for both tests without trend and with trend in level or first difference. The lag length three of each variable was selected using the Akaike's Information criteria (AIC). The results show that the null hypothesis of the presence of unit root in level for each of the variables is accepted at the 5% level of significance. This signifies that the selected variables are non-stationary in level but become stationary at first difference at 1% level, indicating that all the variables are integrated of order one I(1). For the fact that all the variables are stationary at first difference, it gives room to conduct the co-integration test.

In line with the findings that all the variables are non-stationary in level, the co-integration test is conducted to verify the existence of long-run relationships among the variables: LRGDP, LRX, LRGDI, LRER and LRM using the Johansen's test of co-integration. The results in Table 2 indicate that the null hypothesis of no co-integration among the variables is rejected as the Maximum Eigen value and trace statistics indicate that the variables are co-integrated at least at 5% level of significance. The results also suggest that the exists only one co-integrating vector. Nevertheless, considering our small sample biased, the Johansen test of co-integration statistics have been adjusted for the degree of freedom as suggested by Godbout & Norden (1997). The trace and maximum Eigen value statistics suggest that there is one long run relationship among the variables as the null hypothesis  $r = 0$  is rejected at 1% level. This implies that the variables RX, RGDI, RER and RM influence Cameroonian RGDP in the long run.

Table 1. Results of Unit Root Test

| Test in Level    |            |            |            |            |
|------------------|------------|------------|------------|------------|
| Variable         | ADF        |            | PP         |            |
|                  | No Trend   | Trend      | No Trend   | Trend      |
| LRGDP            | -1.414092  | -0.820235  | -1.450142  | -0.779832  |
| LRX              | -1.674944  | -2.484533  | -1.779413  | -2.484533  |
| LRGDI            | -1.545942  | -1.588785  | -1.824689  | -1.859499  |
| LRER             | -2.641915  | -2.846595  | -2.658568  | -2.841626  |
| LRM              | -2.031099  | -1.412260  | -2.103771  | -1.430075  |
| First Difference |            |            |            |            |
| Variable         | ADF        |            | PP         |            |
|                  | No Trend   | Trend      | No Trend   | Trend      |
| $\Delta$ LRGDP   | -5.748292* | -5.861450* | -5.722276* | -5.864015* |
| $\Delta$ LRX     | -5.008843* | -4.982650* | -6.064979* | -6.025566* |

|                |            |            |            |            |
|----------------|------------|------------|------------|------------|
| $\Delta$ LRGDI | -5.261496* | -5.191753* | -5.296039* | -5.229613* |
| $\Delta$ LRER  | -6.447848* | -6.523195* | -6.451189* | -6.523195* |
| $\Delta$ LRM   | -5.934664* | -6.2915458 | -5.924344* | -6.291476* |

Notes: The values in the table are t-statistics, \* indicate significant at 1 % level.

The estimated long-run coefficients of all the variables in Table 2 show correct signs as expected from the theory. All the variables are positively related to economic growth, except imports having a negative sign. Specifically, a 1% increase in exports leads to an increase in GDP by 2.4%; a 1% increase in investment improves Cameroonian GDP by about 4.5%, while the depreciation of Cameroon currency (CFA) will spur GDP by about 2.6% in the long run. Finally, a 1% increase in imports will decrease the GDP of Cameroon by about 8% in the long term.

This findings in Table 2 show that exports, imports and investment play a major role in economic growth of Cameroon. Considering the positive significance of real exchange rate indicates that measures should be taken by the government to control the exchange fluctuations. Our findings are consistent with the results study of Chemedda (2001) and

Table 2. Results of the Johansen Co-integration Tests

| Test Statistics   |             |                                      |         |                                    |         |
|---|-------------|--------------------------------------|---------|------------------------------------|---------|
| Null  | Eigen Value | Trace                                |         | Maximum Eigen Value                |         |
|   |             | Statistics                           | 5% CV   | Statistics                         | 5% CV   |
| $r = 0$   | 0.8802      | 155.6538*<br>(94.2115) <sup>a*</sup> | 69.8189 | 80.6617<br>(48.8003) <sup>a*</sup> | 33.8769 |
| $r \leq 1$  | 0.6519      | 74.9921*<br>(45.3702) <sup>a</sup>   | 47.8561 | 40.0991<br>(24.2599) <sup>a</sup>  | 27.5843 |
| $r \leq 2$  | 0.4311      | 34.8929*<br>(21.1103) <sup>a</sup>   | 29.7971 | 21.4336<br>(12.9674) <sup>a</sup>  | 21.1316 |
| $r \leq 3$  | 0.2939      | 13.4593<br>(8.1429) <sup>a</sup>     | 15.4947 | 13.2232<br>(8.001) <sup>a</sup>    | 14.2646 |
| $r \leq 4$  | 0.0062      | 0.23617<br>(0.1429) <sup>a</sup>     | 3.8415  | 0.2362<br>(0.1429) <sup>a</sup>    | 3.8415  |
| Long run equation:  |             |                                      |         |                                    |         |
| $\text{LRDGP} = 2.4299\text{LRX} + 4.5092\text{LRGDI} + 2.5903\text{LRER} - 8.1422\text{LRM}$ |             |                                      |         |                                    |         |
| $(0.8043)^b \quad (0.4962)^b \quad (0.7751)^b \quad (0.8933)^b$                               |             |                                      |         |                                    |         |

Notes: \*denotes rejection of the null hypothesis of no co-integration at 1% of significant, the value in parenthesis, <sup>a</sup>Trace and Maximum Eigen statistics which have been adjusted for degree of freedom, (Godbout & Norden 1997), <sup>b</sup>The values in parenthesis are standard errors.

Gilbert, Linyong & Divine (2013). Export was seen to be positively related to economic growth, supporting the exports led growth hypothesis (ELG). The study by Al-Yousif (1999) also concludes the existence of a long run relationship among the selected variables, namely the economic growth, labour, exports, imports, gross capital formation, and exchange rate.

Our findings are in line with recent study conducted by Kogid *et al.* (2012) who found clear evidence that faster economic growth is positively and significantly associated with the real exchange rate. Thus, the depreciation of Cameroon currency will cause the exports to be more competitive and will then increase the GDP of Cameroon. On the other hand, the studies differ from that of Gbetnkom & Khan (2002) in that they focused their analysis on agricultural exports by looking at the effects of cocoa, coffee and banana on economic growth in Cameroon while we focus on the impact of real exports, imports, gross fixed capital formation and exchange rate on economic growth. The results of the study conducted by Ngouhouo (2013) also differs from our findings in that the author focuses on the impact of foreign direct investment on growth using the flying geese model and life cycle theory. It was concluded that foreign direct investment has a positive impact on growth.

We use the VECM residuals to carry out the Granger causality test. Table 3 presents the results of Granger causality tests. The results suggest that the variables: real exports, real GDI, and real imports cause real GDP in the short-run with no feedback while exchange rate does not cause real GDP growth in the short run. The results of the VECM indicate the exogeneity or endogeneity of a variable in the system and the direction of Granger-causality within the sample period. However, it does not provide us with the dynamic properties of the system, Masih and Masih (2001).

Table 3. The Results of Granger Causality Tests

| Dependent Variables | $\Delta$ LRGDP     | $\Delta$ LRX         | $\Delta$ LRGDI       | $\Delta$ LRER        | $\Delta$ LRM         | ECT <sup>b</sup>      |
|---------------------|--------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| $\Delta$ LRGDP      | --                 | 8.7670<br>(0.0326)** | 8.8361<br>(0.0316)** | 1.1258<br>(0.7406)   | 9.7169<br>(0.0211)** | 0.0453*<br>(4.2234)   |
| $\Delta$ LRX        | 5.2259<br>(0.1560) | --                   | 9.6797<br>(0.0215)** | 5.7055<br>(0.1269)   | 12.0207<br>(0.0073)* | -0.0828*<br>(-4.5122) |
| $\Delta$ LRGDI      | 4.9932<br>(0.1723) | 4.1933<br>(0.2413)   | --                   | 19.7807<br>(0.0002)* | 4.7319<br>(0.1925)   | 0.0184<br>(0.7036)    |
| $\Delta$ LRER       | 5.3310<br>(0.1491) | 0.0874<br>(0.9933)   | 7.2643<br>(0.0639)   | --                   | 0.7996<br>(0.8496)   | 0.01867<br>(0.7924)   |
| $\Delta$ LRM        | 3.2908<br>(0.3489) | 8.9084<br>(0.0305)** | 5.1511<br>(0.1611)   | 4.4767<br>(0.2144)   | --                   | 0.0342<br>(1.7247)    |

Notes: \*, \*\* indicate significance at 1% and 5 % level while the probabilities are in parenthesis. <sup>b</sup>The values in parenthesis is t-statistics.

Table 4. Decomposition of Forecast Error Variance of LGDP

| Period | LRDGP    | LRX      | LRDGI    | LRER     | LRM      |
|--------|----------|----------|----------|----------|----------|
| 1      | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2      | 80.71424 | 8.655829 | 8.666492 | 1.326771 | 0.636672 |
| 3      | 45.63117 | 19.02745 | 24.91925 | 3.107735 | 7.314394 |
| 4      | 32.17801 | 26.17940 | 29.98718 | 2.056059 | 9.599349 |
| 6      | 20.86167 | 33.99588 | 33.92641 | 3.033818 | 13.56193 |
| 8      | 12.53356 | 36.16502 | 32.74411 | 3.472164 | 15.08514 |
| 10     | 8.545791 | 39.29224 | 29.48889 | 5.951240 | 16.72184 |
| 12     | 6.567651 | 40.83080 | 26.39246 | 8.235299 | 17.97380 |
| 14     | 5.748092 | 41.65963 | 23.62672 | 10.09918 | 18.86638 |
| 16     | 5.424719 | 41.87513 | 21.32861 | 12.14175 | 19.22979 |
| 18     | 5.493930 | 41.82560 | 19.49226 | 13.66880 | 19.51941 |
| 20     | 5.709186 | 41.63946 | 17.98453 | 15.02159 | 19.64523 |

The analysis of the dynamic interactions among the variables in the post-sample period is conducted by using the variance decompositions analysis. The response to economic growth (LDGP) will be decomposed to a one standard deviation innovation in the variables exports (LX), gross domestic investment (LGDI), real exchange rate (LRER) and imports (LM) within the twenty period horizons.

The results of the variance decomposition analysis in Table 4 suggest that in the first period, 100% of the variance in real GDP is explained by itself. In the 10<sup>th</sup> period, the variation in real GDP is explained by real exports at 39.3%, real domestic investment at 29.5%, real exchange rate at 5.9%, and real imports at 16.7%. In the 20<sup>th</sup> period, the variation in real GDP is explained by real exports 41.6%, RGDI at about 18%, RER at 15%, and RM at 19.6%. The result suggests that in the long-run, real exports is the most determinant of RGDP, followed by real imports, GDI, and real exchange rate.

## 6. Conclusion

This study aims to investigate the factors affecting economic growth in Cameroon.. The Johansen tests of co-integration suggest the presence of a long-run relationship among the variables and all the long-run coefficients have the expected signs and significant at least at 5% level. Specifically, exports, gross domestic investment, and exchange rate positively influence the economic growth of Cameroon while the impact of imports on GDP growth is negative; a 1% increase in exports and gross domestic investment increases GDP by approximately 2.4% and 4.5% respectively, while 1% depreciation in

Cameroon currency (CFA) improves the GDP by 2.6% in the long run. Finally, a 1% increase in imports will decrease the GDP of Cameroon of approximately 8% in the long term. It should be noted that the positive sign of the coefficient of exchange rate implies the depreciation of the currency will improve the trade balance and will positively impact growth in the long run. The results of the Granger causality tests indicate that exports, investment and imports cause GDP growth in the short-run unidirectionally while bidirectional causality runs between exports and imports. The variance decomposition results suggest that in the 20<sup>th</sup> period horizon, the variation in GDP growth is explained by exports at 41.64%, imports at 19.64 %, gross domestic investment at 17.98 % and exchange rate at 15.02 5. These suggest that economic growth in Cameroon is spearheaded by exports, followed by gross domestic investment, and exchange rate. Imports have negative impact on growth. These suggest that Cameroon should focus on the development of the exports sector to promote and sustain economic growth.

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