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# The impact of structural change in exports on economic growth in West Africa: cointegration and causality analysis

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**Abstract**

The paper used the Panel Vector Autoregression(VAR) and Generalized method of moments (GMM) to view the impact of structural Change in export on economic growth in West Africa. Due to many challenges African export is the lowest compare to other regions in the world. The similarity of the export of many countries in West Africa is responsible for the trend it exhibits. The results of our analysis have shown that the shocks in Export levels have a direct impact on the contemporaneous GDP growth, while the current GDP growth change affects Export only in the future also there is a short run relationship between the GDP, the Export and the Import. The structural change occurs in the Export and the Import is responsible for the change in the GDP growth holding other things constant.

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## I.   Introduction

How to provoke an economic growth and to maintain it unto development has become the target of most government in the developing economies in the world. The questions regard to development and the reduction of poverty and the paths to achieve them are the central questions of the scholars and the economics deciders. Over decades governments and institutions mostly in Africa and especially in the West Africa have adopted a number of measures aimed to accelerate growth and development in their domestic economy. Through these measures we assisted on the change in the economy structure. Recently, there are more and more significant literatures that talk about the structural change as a conduct of growth and development. Many scholars debated about the factors that are responsible for that change and their impact on the macroeconomics aggregates. In the last centuries, the world had experienced the effect of structural change. According to the World Bank Group's mission, there has been an important progress on reducing poverty over the past decades. In 2013, 10.7 percent of the world's population lived on less than US$1.90 a day, compared to 12.4 percent in 2012. Nearly 1.1 billion people have moved out of extreme poverty since 1990. In 2013, 767 million people lived on less than $1.90 a day, down from 1.85 billion in 1990. This was mainly driven by East Asia and Pacific (71 million fewer poor) notably China and Indonesia and South Asia (37 million fewer poor) notably India. While half of the extreme poor live in Sub-Saharan Africa. The number of poor in the region fell only by 4 million with 389 million people living on less than US$1.90 a day in 2013, more than all the other regions combined. Among this, more than the majority live in rural areas and are poorly educated, mostly employed in the agricultural sector, and over half are under 18 years of age.

Our paper, titled the Impact of Structural Change in Exports on Economic Growth in West Africa: Cointegration and Causality Analysis, will identify the type of causality that exist between the import, export and GDP and how this relationship goes across the time.

### Background

The export in Africa has been challenged due to many factors that we group into two: intern and extern. From the production to the export, the system that is set is not favorable to develop the domestic factories. Most of the products that Sub Saharan economies are exporting are mainly natural resources that they are not even on control of the prices. This situation makes them, the prices takers. However the goods and services that they can produce are subject to thousands of controls and regulations in the international market which are questionable. There are several trade regimes which impact upon this trade, especially, the General Agreement on Tariffs and Trade (GATT), the Generalized System of Preferences (GSP) and the Fourth Lomé Convention (Lomé IV). GATT, and now the World Trade Organization (WTO).  These trade regimes affect significantly exports from Sub-Saharan Africa to international market in many ways. In order to boost trade among regional economic communities such as ECOWAS, have been created over the last few decades or SADC, ECCA in African countries. Sub-Saharan Africa is one of the fastest growing regions in the world; however in notes of Africa in *Focus Figure*, the Africa's intraregional trade is the lowest compare to other regions. In 2016, intra-African exports made up 18 percent of total exports, compared to 59 and 69 percent for intra-Asia and intra-Europe exports, respectively. Even though there has been a slight improvement in the past decades in the trade, the share of imports, on the other hand, have remained stagnant, despite the increase in total import volume.

We might not minimize the challenges of improving such low levels of intra-African trade which are immense, but policymakers on the continent are increasingly focusing on them as a new wave of interest in regional integration gains momentum. There should be an urge call for more and more diversification for the African trade to able the countries to capture more trade opportunities. According to Mr. William Amponsah, an associate professor of international trade and development at North Carolina State University in the US At present: the regional economic arrangements "exhibit narrow patterns of trade, depend on primary products and involve low levels of inter-country trade,". Since most African countries produce and export raw materials, not processed goods, there is little chance that they are interested in importing from each other.

According to the World Bank reports in sub-Saharan Africa (excluding South Africa) five countries Côte d'Ivoire, Ghana, Kenya, Nigeria and Zimbabwe provide about three-quarters of all intra-African exports but these are mainly primary products. Among these, the petroleum alone occupied for more than 30 per cent of this exchange, animals, maize, cotton, and cocoa add a further 18 per cent. To a lesser extent, fresh fish, vegetables, tea and sugar are also traded. Meanwhile the manufactured goods are only about 15 per cent of such activity, notes a recent World Bank study, *What Can Be Expected from African Regional Trade Arrangements?* These include yarn, medicines, iron and steel, chemicals and industrial machines and equipment. Moreover during the decades there has been a structural change in the export and import. Even though it has not been similar to other region in the world such as Asian countries, these changes have affected positively the economic growth in Sub-Saharan countries especially the West Africa.

The graph bellow shows the change in the export for ECOWAS Countries.

## Graph1: Export
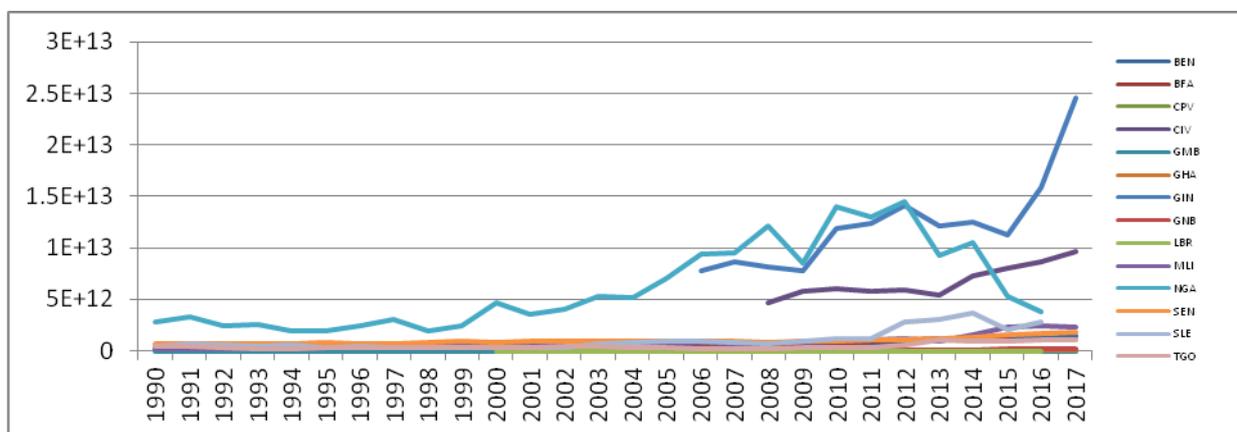


**Source**: WTO data

There is a general increment of the export of all the country in West Africa, even though it is not at the same level. This can be explained by multiple factors. Geographical situation of some, the colonial pacts between some countries and their ancient colons, the general trade agreement between, the preferences toward some raw materials, the industrial progress that some countries have over others and many others positive facts.

## Graph2: Import
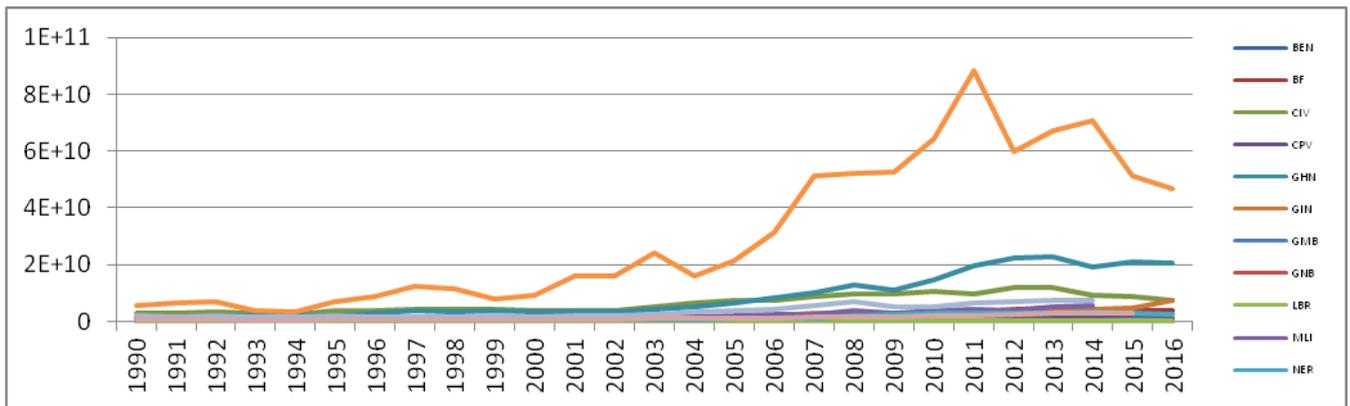


**Source**: WTO Data

The import in West Africa during the decades has not increase considerably. At this point it can be considered as good news for the countries since the objective was to maintain as lower level the trend of the import. From 1990 to 2003, the trend is almost inexistence for the majority of the countries. The case of Nigeria has shown from 1990 to 2016 the highest level follow by Ghana and Ivory Coast.

## Graph 3: GDP current US$
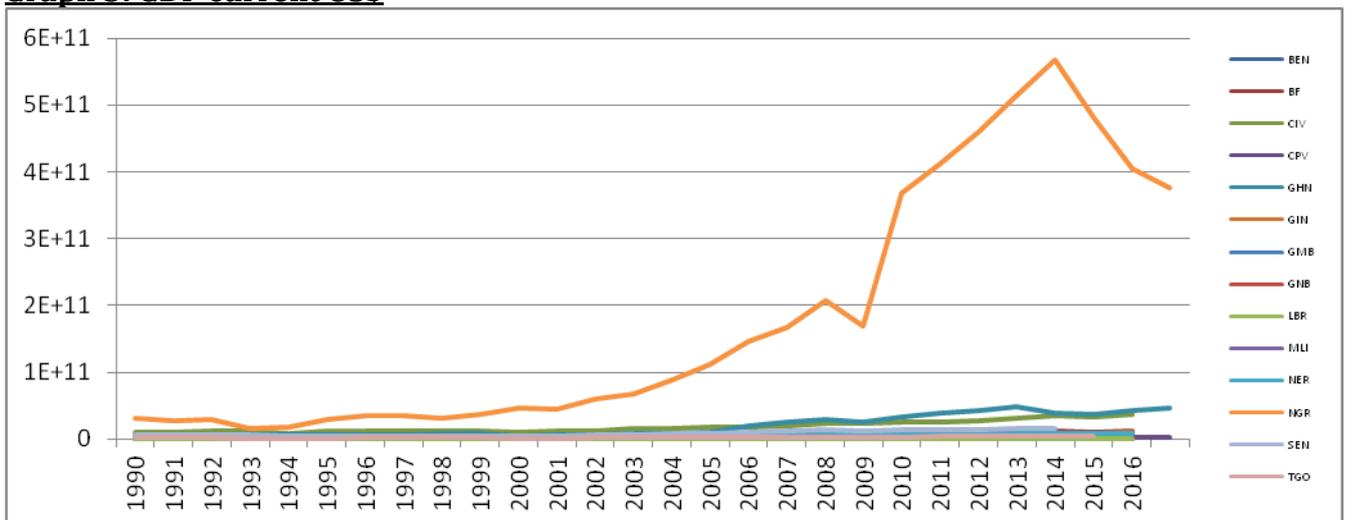


**Source** WTO Data

This graph shows the trend of the GDP in ECOWAS countries. There is a perfect similarity between this graph and the previous graphs meaning there is a positive relationship between the GDP growth, the Export and the Import. We can affirm from these graphs that the Export and the Import jointly cause the GDP growth. As result, the change in the Export and Import are responsible for the change in the GDP.

## 1. Literature Reviews
### 2.1. Empirical Reviews
#### a. Export and Economic growth

The present literatures present tremendous and plausible theoretical arguments in correlation with, and supporting the view that export and overall economic growth are positively related. Firstly we should understand that exporting implies that a country gains access to the wider external demand, which acts as a shove to domestic output and hence economic growth. And secondly, many in strong and supported arguments debate that small domestic markets may not grow continuously and that any positive economic shock leading to the expansion of the domestic market is more likely to decay quickly. For that reason the export expansion can be taken as a stimulus of economic growth (Agosin, 1999; Giles and Williams, 2000; Grossman and Helpman, 1991). Beside that Verdoorn (1949) support the view that exports growth is plausible to generate specialization in the production of export commodities. While on the international markets there are not always growth restrictions on the demand side, and this leads to the exploitation of economies of scale (Bbaale and Mutenyo, 2011). Furthermore, the specialization leads to efficiency gains in the export sector owing to the rise in skills due to the spillover effect and the labor and resources will move from the relatively less productive and non-trade sector to the highly productive exports sector, leading to economic growth. The spillover through international trade may increase productivity and, by extension, lead to economic growth and development (Hart, 1983 and Chuang, 1998). Views that are supported by Futher, Chenery and Strout (1966), Balassa (1978), Buffie, (1992) and Riezman (1996) through an indirect argument linking exporting to economic growth. In other words they affirmed that exporting activities generate foreign exchange that is required to import capital goods. In return, an accumulation of capital goods imports stimulates a country's capacity to produce. These policies should be used in developing countries that are not having an advantage in the production of capital goods.

### b. Export and Structure Change

Feder in 1983 in his subsequent paper has provided strong and supportive ideas on the export-led-growth. He proved that the development can be created or boosted through a resource reallocation of less efficient sectors compare to those that are more efficient. In association with others, they claimed that the external demand-oriented sectors experience more efficiency. It is obvious to understand that through dynamism of the exports the production efficiency and the resource allocation can be improved. Despite the huge literatures on the structural transformation only few have addressed the change in export structure and the economic growth such as Ghatak et al. (1997) and Amin Gutie´rrez de Pin˜eres and Ferrantino (1997), this is the implicit assumption in most empirical literature on export-led growth. In order to capture the latter it would be sufficient to consider the aggregate evolution of exports if their structure held relatively constant in time. Through the researches all along there are significant correlation between exports, growth, import and trade either one way or two ways causality with different econometrics instruments used.

| Name | Study Period | Country | Econometrics Techniques |
|---|---|---|---|
| **Direct Causality: Export causes Growth** | | | |
| Khaled R.M. Elbeydi and al (2010) | 1980-2007 | Libya | Cointegration analysis VECM, Granger Causality tests |
| Güngör Turan and all (2014) | 1984 – 2012 | Albania | OLS |
| **Direct Causality: Growth causes Export** | | | |
| Auro Kumar Sahoo and all (2014) | 1981 – 2010 | India | Cointegration analysis VECM, Granger Causality tests |
| Sachin N. Mehta (2015) | 1976 – 2014 | India | Cointegration analysis VECM, |

| | | | Granger Causality tests |
|---|---|---|---|
| **Direct Causality: Trade causes Export** | | | |
| Kojo Menyah and all (2014) | 1965 - 2008 | 21 African Countries | Granger causality tests |
| **Two ways causality between Growth and Export** | | | |
| Dilawar Khan and al (2012) | 1972 – 2009 | Pakistan | Cointegration analysis |
| Qazi Muhammad Adnan Hye (2012) | 1978 - 2009 | China | Cointegration analysis |
| **Two ways causality between Export and Import** | | | |
| Musibau Adetunji Babatunde (2014) | 1960 – 2014 | Nigeria | Cointegration analysis |
| Velnampy.T and Achchuthan. S (2013) | 1970 – 2010 | Sri Lanka | Correlation analysis |

**Source** from us and Sayef Bakari, Mohamed Mabrouki

## 2.2. Theoretical Reviews

The export-led-growth is the part of the economics thought that suggests that there is a positive impact of export on economic growth. The percentage of the contribution into the GDP growth depends on the size of the market consumption which is the markets, sales to foreign markets represents an additional consumption demand which increases the amount of real output produced in the economy (Giles & Williams, 2000). Furthermore Bernard & Jensen, 1999; Bernard & Wagner, 1997, gave deep explanation by bringing out how the export is link to the productive firms and thus export-led growth. The theoretical explanation and justification of the impact of the export as a way to boost economic through the international trade has been discussed in his paper by Uche (2009). The economics thought throughout centuries have different views about export especially the mechanic trough each it affects the economic growth.  The trade is seen as compulsory for the prosperity and economic growth of a country according to the mercantilism, showed by Roll (1953) and Bhatia (1973) in their papers. Excess of the balance of trade makes the trade more enjoyable however if all the countries involve ensure to get a surplus from it, we will assist on a high degree of protectionism and an increment of the barriers to the trade flow even though we are living in a globalization concept Ajayi (2004).

The classical thought is base on the comparative advantage mainly the cost advantage as a final result the reduction of the poverty gap between poor and rich countries. It affirms that there is an optimum level that the global output will reach if every country specializes in the production of a commodity (or commodities) in which it gains his comparative cost advantage from according Heckscher – Ohlin model with assumptions that the factors of production (labor and capital) are mobile between sectors.  This specialization is based on the relative endowment factor that countries have and that will lead to the factor price equalization. The New Structural economics developed by Justin Lin states that they are two approaches to address the issue of export: the first is to analyze the export impact on the supply side of the economy; hence the export source of the growth roots from increases in factor inputs and the improvement in the efficiency and practically speaking it is included in the residuals of growth accounting. Grossman & Helpman (1991), partisans of the New Growth Theories in their paper "Trade, Knowledge Spillovers, and Growth" have shown that the export promote the technology and knowledge and thus accelerate economic growth, and the Innovation is one of the main causes of increasing returns to scale, mainly in the industrial sector. However it isn't constant as Verdoorn, (1949), Sylos Labini (1995) hypothesis said. Nevertheless the introduction of exports in the production function is been challenging for the econometric analysis. But some scholars have directly inserted it as the third variable while others use more sophisticated methods.

### II.  Data, Methodology And Empirical Results

World Bank and IMF data is used covering a period of 16 (from 1990-2015) years from 11 countries in West Africa.

We consider a k-variate panel VAR of order p with panel-specific fixed effects represented by the following system of linear equations:

$$Y_{it} = Y_{it-1}A_1 + Y_{it-2}A_2 + \cdots + Y_{it-p+1}A_{p-1} + Y_{it-p}A_p + X_{it}B + \mu_i$$
$$+ e_{it} \tag{1}$$
$$i \in \{1,2,\dots N\} \text{ and } t \in \{1,2,\dots Ti\}$$

Where $Y_{it}$ is a $(1xk)$ vector of dependent variables; $Y_{it}$ is a $(1xl)$ vector of exogenous covariates; $\mu_i$ and $e_{it}$ are $(1xk)$ vectors of dependent variable-specific fixed-effects and idiosyncratic errors, respectively. The $(kxk)$ matrices $A_1, A_2 \dots, A_{p-1}, A_p$ and the $(lxk)$ matrix B are parameters to be estimated. We assume that the innovations have the following characteristics: $E[e_{it}] = 0$, $E[e'_{it}e_{it}] = \Sigma$ and $E[e'_{it}e_{it}] = 0$ for all *t>s*

**GMM estimation**

Various estimators based on GMM have been proposed to calculate consistent estimates of the above equation, especially in fixed T and large N settings. With our assumption that errors are serially uncorrelated, the first-difference transformation may be consistently estimated equation-by-equation by instrumenting lagged differences with differences and levels of $Y_{it}$ from earlier periods as proposed by Anderson and Hsiao (1982). This estimator, however, poses some problems. The first-difference transformation magnifies the gap in unbalanced panels. Also, the necessary time periods each panel is observed gets larger with the lag order of the panel VAR. Arellano and Bover (1995) proposed forward orthogonal deviation as an alternative transformation, which does not share the weaknesses of the first-difference transformation. Instead of using deviations from past realizations, it subtracts the average of all available future observations, thereby minimizing data loss. Potentially, only the most recent observation is not used in estimation. Since past realizations are not included in this transformation, they remain as valid instruments. We can improve efficiency by including a longer set of lags as instruments. While equation-by-equation GMM estimation yields consistent estimates of panel VAR, estimating the model as a system of equations may result to efficiency gains (Holtz-Eakin, Newey and Rosen, 1988).

Consider the following transformed panel VAR model based on equation (1) but represented in a more compact form

$$Y^*_{it} = Y^*_{it}A + e'_{it} \tag{2}$$

With
$$Y^*_{it} = \begin{bmatrix} y^{1*}_{it} & y^{2*}_{it} & \cdots & y^{k-1*}_{it} & y^*_{it} \end{bmatrix}$$
$$\overline{Y^*}_{it} = \begin{bmatrix} Y^*_{it-1} & Y^*_{it-2} & \cdots & Y^*_{it-p+1} & X^*_{it} \end{bmatrix}$$
$$e^*_{it} = \begin{bmatrix} e^{1*}_{it} & e^{2*}_{it} & \cdots & e^{k-1*}_{it} & e^{k*}_{it} \end{bmatrix}$$
$$A' = \begin{bmatrix} A'_1 & A'_2 & \cdots & A'_{p-1} & A'_p & B \end{bmatrix}$$

The asterisk stands for the transformation of the original variable. The original variable denotes as $m_{it}$ then the first difference transformation imply that $m^*_{it} = m_{it} - m_{it-1}$

Suppose we stack observations over panels then over time. The GMM estimator is given by

$$A = \left(\overline{Y^*}'Z\widehat{W}Z'\overline{Y^*}\right)^{-1}\left(\overline{Y^*}'Z\widehat{W}Z'\overline{Y^*}\right)$$

Joint estimation of the system of equations makes cross-equation hypothesis testing straightforward. Wald tests about the parameters may be implemented based on the GMM

estimate of $A$ and its covariance matrix. Granger causality tests, with the hypothesis that all coefficients on the lag of variable are jointly zero in the equation for variable $m$, may likewise be carried out using this test.

Following the methodology that others have done so far, considering the relationship between GDP growth, export, import mixing exports and imports into the aggregate production function, and which is used by Francisco F. Ribeiro Ramos (2001), Titus O. Awokuse (2007), Dilawar Khan (2012), Güngör Turan (2014), Rummana Zaheer (2014) and Afaf Abdull J. Saaed (2015), Sayef Bakari, Mohamed Mabrouki (2017), we chose to adopt it with some controls variables

The augmented production function, including both exports and imports is expressed as:

$$GDP_t = f(Exports\ and\ Import) \qquad\qquad 3$$

The function can also be represented in a log-linear econometric format thus:

$$GDP_t = \beta_0 + \beta_1 X_t + \beta_2 M_t + \gamma_i Z_t + \varepsilon_i \qquad\qquad 4$$

Where: $\beta_0$ : The constant term. $\beta_1$ : Coefficient of variable (exports) $\beta_2$: Coefficient of variables (imports) $Z_t$ : Control variables t: The time trend. $\varepsilon_i$ : The random error term assumed to be normally, identically and independently distributed.

Selection order criteria
Sample: 1995 - 2014    No. of obs   =    220
No. of panels  =    11
Ave. no. of T  =   20.000

| Lag | CD | J | J pvalue | MBIC | MAIC | MQIC |
|-----|----|----|----------|------|------|------|
| 1 | .582077 | 110.7737 | .4081067 | -471.7381 | -105.2263 | -253.2334 |
| 2 | .989192 | 64.84122 | .7127729 | -323.5 | -79.15878 | -177.8302 |
| 2 | .9867274 | 38.17692 | .3707606 | -155.9937 | -33.82308 | -83.15879 |

Based on the three model selection criteria by Andrews and Lu (2001)and the over-all coefficient of determination, first-order panel VAR is the preferred model, since this has the smallest MBIC, MAIC and MQIC. While we also want to minimize Hansen's J statistic, it does not correct for the degrees of freedom in the model like the model and moment selection criteria by Andrews and Lu. Based on the selection criteria, we fit a first-order panel VAR model with the same specification of instruments as above using GMM estimation implemented by pvar.
GMM Estimation
Final GMM Criterion Q(b) =    .504
Initial weight matrix: Identity
GMM weight matrix:    Robust

No. of obs　　=　　220

No. of panels　=　　11
Ave. no. of T　=　20.000

| VARIABLES | (1) dlngdp2 | (2) dlnX2 | (3) dlnm2 | (4) dlnpop2 | (5) dlntrade2 | (6) dlntax3 |
|---|---|---|---|---|---|---|
| L.dlngdp2 | -0.606*** | 1.277*** | 1.855*** | 0.000885 | 57.22*** | -12.07*** |
|  | (0.0530) | (0.180) | (0.144) | (0.000767) | (4.335) | (1.417) |
| L.dlnX2 | 0.116*** | 0.0659 | -0.327*** | -0.00135*** | 2.269 | 3.287*** |
|  | (0.0200) | (0.0818) | (0.0921) | (0.000268) | (1.620) | (0.507) |
| L.dlnm2 | 0.633*** | 0.195 | -0.353*** | -0.000751 | -37.16*** | 15.69*** |
|  | (0.0459) | (0.137) | (0.113) | (0.000670) | (3.164) | (1.448) |
| L.dlnpop2 | 6.486*** | 18.95*** | -36.06*** | 0.888*** | -927.4*** | -391.6*** |
|  | (0.708) | (2.367) | (3.183) | (0.0170) | (77.89) | (38.56) |
| L.dlntrade2 | -0.00890*** | 0.00798** | 0.0191*** | 2.15e-05** | 0.667*** | -0.164*** |
|  | (0.000926) | (0.00325) | (0.00250) | (1.07e-05) | (0.0823) | (0.0266) |
| L.dlntax3 | 0.000969 | 0.00181 | -0.00871** | -9.81e-06 | -0.226** | -0.145** |
|  | (0.00113) | (0.00650) | (0.00441) | (1.78e-05) | (0.102) | (0.0639) |
| Observations | 220 | 220 | 220 | 220 | 220 | 220 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We can improve estimation by using "GMM-style" instruments as proposed by Holtz-Eakin, et. al. Instrument lags with missing values are replaced with zeroes. This increases the estimation sample, which results to more efficient estimates.

| VARIABLES | (1) dlngdp2 | (2) dlnX2 | (3) dlnm2 | (4) dlnpop2 | (5) dlntrade2 | (6) dlntax3 |
|---|---|---|---|---|---|---|
| L.dlngdp2 | -0.583*** | 1.580*** | 1.516*** | -0.000265 | 62.89*** | -18.70*** |
|  | (0.0550) | (0.224) | (0.147) | (0.000937) | (5.319) | (2.228) |
| L.dlnX2 | 0.134*** | 0.116 | -0.185** | -0.00114*** | 2.465 | 3.487*** |
|  | (0.0219) | (0.0912) | (0.0823) | (0.000376) | (1.731) | (0.564) |
| L.dlnm2 | 0.603*** | 0.0205 | -0.438*** | 0.000401 | -42.35*** | 13.03*** |
|  | (0.0488) | (0.174) | (0.130) | (0.000796) | (4.569) | (1.472) |
| L.dlnpop2 | 3.948** | 1.153 | -27.42*** | 0.998*** | -854.4*** | -444.0*** |
|  | (1.809) | (5.437) | (5.484) | (0.0288) | (157.2) | (60.85) |
| L.dlntrade2 | -0.00800*** | 0.0125*** | 0.0188*** | 1.07e-05 | 0.794*** | -0.198*** |
|  | (0.00105) | (0.00430) | (0.00286) | (1.30e-05) | (0.109) | (0.0295) |
| L.dlntax3 | 0.00165 | -7.52e-05 | -0.00758** | -1.56e-05 | -0.258** | -0.0991 |
|  | (0.00134) | (0.00764) | (0.00382) | (2.25e-05) | (0.107) | (0.0682) |
| Observations | 253 | 253 | 253 | 253 | 253 | 253 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

## Granger Causality Test

```
   Equation \ Excluded        chi2       df    Prob > chi2

dlngdp2
             dlnX2           37.729       1       0.000
             dlnm2          152.996       1       0.000
             dlnpop2          4.764       1       0.029
             dlntrade2       58.550       1       0.000
             dlntax3          1.508       1       0.219
             ALL            223.933       5       0.000

dlnX2
             dlngdp2         49.778       1       0.000
             dlnm2            0.014       1       0.906
             dlnpop2          0.045       1       0.832
             dlntrade2        8.431       1       0.004
             dlntax3          0.000       1       0.992
             ALL             92.814       5       0.000

dlnm2
             dlngdp2        106.262       1       0.000
             dlnX2            5.069       1       0.024
             dlnpop2         25.007       1       0.000
             dlntrade2       43.079       1       0.000
             dlntax3          3.933       1       0.047
             ALL            145.442       5       0.000

dlnpop2
             dlngdp2          0.080       1       0.777
             dlnX2            9.242       1       0.002
             dlnm2            0.253       1       0.615
             dlntrade2        0.675       1       0.411
             dlntax3          0.483       1       0.487
             ALL             12.586       5       0.028

dlntrade2
             dlngdp2        139.810       1       0.000
             dlnX2            2.029       1       0.154
             dlnm2           85.920       1       0.000
             dlnpop2         29.526       1       0.000
             dlntax3          5.822       1       0.016
             ALL            209.890       5       0.000

dlntax3
             dlngdp2         70.456       1       0.000
             dlnX2           38.219       1       0.000
             dlnm2           78.375       1       0.000
             dlnpop2         53.253       1       0.000
             dlntrade2       45.238       1       0.000
             ALL            167.365       5       0.000
```

These estimations are seldom interpreted by its self. In practice, we are interested in the impact of structural change in export in each economic growth to other variables (Import, Trade, Taxes, Population in the panel VAR system. Prior to estimating impulse-response functions (IRF) and forecast-error variance decompositions (FEVD), however, we first check the stability condition of the estimated panel VAR. The resulting table and graph of eigenvalues confirms that the estimate is stable.

## Eigenvalue Stability Condition

|            | Eigenvalue | Modulus   |
|------------|------------|-----------|
| Real       | Imaginary  |           |
| 1.01487    | 0          | 1.01487   |
| -.7514333  | 0          | .7514333  |
| .6151896   | 0          | .615896   |
| -.0063285  | -.3734224  | .373477   |
| -.0063285  | .3734224   | .373477   |
| -.0776911  | 0          | .0776911  |

At least one eigenvalue lie outside the unit circle.
   pVAR does not satisfy stability condition.
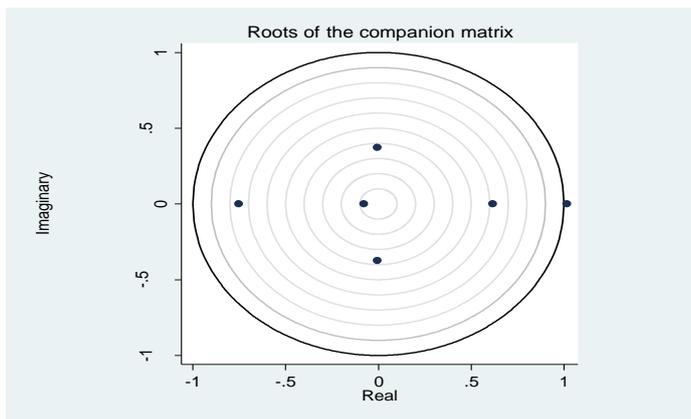
Following the theoretical exposition by Holtz-Eakin, et. al., we argue that shocks in GDP growth levels have direct impact on contemporaneous export, while current structural export change affects GDP growth only in the future.

### III. Conclusion

The aim of our study is to see the impact of structural change in exports on economic growth in West Africa by using the Panel Vector Autoregression(VAR) and Generalized method of moments (GMM). The cointegration test, Panel Vector AR model and Granger causality tests are used here to look into the relationship between these three variables. The results have shown that the model is well specified meaning the export and the import cause economic growth in West Africa. Base on our analysis we can conclude that using the multitude advantages that result from the social, economic and geographic situation of West Africa country that belong will gain more trading with one another. The results also have shown that the shocks in Export levels have direct impact on contemporaneous GDP growth, while current GDP growth change affects Export only in the future also there is a short run relationship between the GDP, Export and Import. The structural change occurs in Export and Import is responsible for the change in the GDP growth holding other things constant. Furthermore the trade in Africa is not diversified since we export typically the same raw materials; everything should be done to encourage the trade even removing the artificial barriers or non-tariff trade barriers, to implementation of trade facilitation measures and so on. The graphs in this study also have shown the similarity of the trends of Export, Import and GDP. As result the Export and the Import jointly cause the GDP growth. As output the change in the Export and Import are responsible for the change in the GDP. And this structure Change is been observed in the other sectors of the economic such as agriculture, industry, and service in West Africa. The question that remains is the change in which sector is the most responsible the ECOWAS countries since the export similar products.

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