Application of 2nd Generation Panel Data Econometric Techniques in Benchmarking Analysis of the Nexus between External Trade Benefits and Unemployment Rate in ESWACs, 1980 - 2013

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Abstract: *This research examines the impact of external trade benefits on unemployment rate of five English Speaking West African Countries (ESWACs) from 1980 to 2013. These countries include; The Gambia, Ghana, Liberia, Nigeria and Sierra Leone). The study expressed external trade benefits as increase in export earnings (EXE), trade openness (TOP), total government expenditure (TGE) and reduction in foreign exchange rate (FER). Theoretically, the study relied on five trade theories, in practice; the study constructs a balanced panel data structure (BPDS) and methodologically, departs from the classical OLS and 1st generation panel econometric techniques to adopting recently developed 2nd generation panel data econometric methods. The results of the study reveal that external trade benefits marginally and significantly impacted on unemployment rate in ESWACs from 1980 to 2013. Based on this result, the study therefore concluded that the impact of external trade benefits on unemployment rate is a trivial matter because external trade benefits have not comprehensively and significantly augmented the status of employment ESWACs. Based on the findings the study recommended, among others, that the governments of ESWACs should encourage and support the real sector through subsidies and investment in social and physical infrastructure and agricultural and manufacturing sectors, and par attention to investment in human capital as this will help to improve the standard of education and health status.*
Keywords:*ESWACs, Benchmarking, External, Trade, Benefit, Unemployment, Panel Data,*

I. Introduction

1. General Overview

External trade has been argued to be one of the factors responsible for economic prosperity of the Western world. The benefits accruable from economic activities of external trade have overtime justified and accentuated as the worthwhileness and viability of external trade relations. External trade benefits are the comparative advantages a country derives from participating in international trade. Such benefits could be political, social, cultural, technological, economical etc. According to World Trade Organization (WTO) reported in Gbosi (2004) external trade benefits are classified into qualitative and quantitative. He argues that the quantitative aspect has monetary dimension which earnings from export happens to be the most prominent.

Economic theories and analyses inform that promotion of economic growth and development is one of the objectives of external trade. In this direction, evidence abound that earnings from external trade relations recorded by English Speaking West African Countries (ESWACs) have overtime appreciated and as such this has equally informed the increase in viability of external trade benefits in addressing development issues. In this regards, Ajie (2008) reports that in 1997, the combined exports earnings from the English Speaking West African Countries (ESWACs) was about $14 million and increased to $16 billion in 2000, excluding that of Liberia which was reported unavailable.

Further, the aggregate export earnings for ESWACs in 2011 was $92.866 billion, this also increased to $98.598 billion in 2012 and maintained an increasing trend up to 2013 to the tune of $101.533 billion. This increase in export earnings of these countries boosted the general government revenue as a percentage of GDP by 26%, 27% and 29% in 2011, 2012 and 2013 respectively. As part of governments' efforts in addressing development issues in ESWACs, the general total real government expenditure as percentage of GDP increased by 27.34%, 38.38% and 47.46% within the same three years respectively (Gbosi, 2011; and WAIFEM, 2014).

Through economic activities, this increase in external trade benefits resulted in the expansion of markets with increase in GDP growth to the tune of 6.34%, 6.40% and 7.6% from 2011 to 2013 respectively, thereby suggesting higher degree of trade or economic openness within the same period.

Despite this significant increase in the economic benefits accrued from external trade relations in terms of increase in export earnings, real government expenditure, and trade openness, the ESWACs still experience

all the trappings of underdevelopment. It is evidenced that external trade benefits have recorded significant increase, however the trappings of underdevelopment such as unemployment, poverty, inequality, low literacy rate and life expectancy, marginal real economic growth, incessant price instability and balance of payment disequilibrium to mention but a few, are still prevalent in ESWACs.

In view of this, extant literature documents near empirical answers to the issues that bother on economic growth and trade, none to the best of knowledge, has actually considered the impact of external trade benefits on economic development in ESWACs for a period of 34 years using 2nd Generation Panel Data Econometric Method. It is against this backdrop that our study extends the worries of Dudley as reported in Kalu (2001) by asking this question on how has unemployment rate fared in the face of external trade benefits over the period? Thus providing theoretical and empirical answers to these questions is the motivation for this study and is an outstanding point of departure from the existing studies. This is the problem of this study and the gap our study contributes in filling. It is against this background that this study aims to investigate the impact of external trade benefits (measured in terms of export earnings, trade openness, export propensity, real government expenditure and foreign exchange rate) on unemployment rate in ESWACs from 1980 - 2013.

Therefore, it is hypothesized that unemployment rate (UNR) is not significantly affected by external trade benefits in ESWACs from 1980 to 2013.

The report of this study is documented in five sections. Section one centred on the introductory part, sectiontworeviewed of related literature on the bases of theoretical and empirical review. Methodological issues were addressed in section three, section four considered data results presentation and analysis of results and lastly section five of the study gives the concluding remarks.

II.   Theoretical Framework and Empirical Literature

This study anchored on certain trade theories, which include the mercantilist trade theory, the absolute cost advantage trade theory, comparative advantage trade theory, the productivity theory of trade and the vent-for-surplus theory. These theories maintained thee earlier idea on foreign trade is to earn foreign earnings that would boost the revenue frontier of a trading country and using such earnings thought government expenditure to pursue the welfare of the nation. According to the theories as noted by Usman, the most important way for a nation to become rich and powerful is to export more than its import, so as to be able to improve on the status of the welfare (development) of its nation. Having seen exports as one of the ways to increase a nation's wealth, mercantilism therefore did not favour free trade. The reason is that in their Mercantilist tenet the word wealth was fixed. Therefore, a nation's gain from trade was at the expense of its trading partners and for the improvement of the economic status of the nation. This arouse the interest of Usman (2011) to note that despite the criticism faced by the foundation of external trade is still alive today, because new trade theories now emphasized employment rather than holding some gold. Hence, the theory also postulates that exports are beneficial as jobs are provided domestically and imports are considered bad as jobs are taken away and transferred to the foreign workers.

On the aspect of empirical literature, Njimanted (2012) carried out a study on the dynamics of export earnings on domestic investment in Cameroon: an econometric investigation. Export earnings have maintained a volatile trend for many years of its history in Sub-Saharan African in general, and Cameroon in particular. Also, export earnings have formed an important source of foreign exchange in developing countries in general, and Cameroon in particular. Consequently, it is one of the major sources of revenue to the government of these Countries. Also, he reports that using time series data from 1970-2011, this study has adopted the Generalized Method of Moment, (GMM) as a suitable technique for a reliable results. The results obtained show that export earnings significantly promote domestic investment in the private sector than it is the case with the government sector in Cameroon.

Njimanted, (2011) reports that Njong carried out a study that shows export performance in Cameroon can be attributed to the diversified export base, although it is highly dependent on primary products and the devaluation of the Franc CFA in January 1994, which made exports more competitive. Also, the liberalization of the market as well as liberalizing the investment policy after 1992 attracted both domestic private and foreign private investments, which in all have helped to reduce the bias against export. However, it is observes that export in Cameroon fell from 3.74% to 2.72% and 2.31% to 1.40% between 1980 and 1998 to 2009 respectively.

Also, Khan (2006) affirms that during the Pre Oil Era in Cameroon, the primary sector dominated by agricultural activities was the principal source of economic growth and foreign exchange earnings realized through the exportation of primary crops like cocoa, coffee and cotton. The average annual export revenue for the period was 25.8% of GDP, while net official capital flow was on averagely 5.4% of GDP. Real GDP grew at an average rate of 4.4% per year during this period. As far as capital formation is concerned, the government's share as a ratio of GDP was low as it averaged just 2.4% per year for the period. Domestic private investment was higher and stood at 15% of GDP (Khan, 2006). Usman (2011) also says that Agbokor investigates the

macroeconomic impact of oil exports on the economy of Nigeria. Utilizing the popular OLS technique and observed that economic growth reacted in a predictable fashion to changes in the regressors used in the study.

Zahoor, Imar, Anam, Saif and Ashraf (2012) examines the impact of total exports to GDP ratio, imports to GDP, terms of trade, trade openness, investment to GDP ratio, and inflation on the economic growth of Pakinstan. The empirical analysis is conducted by using time series data from 1973 – 2010. Chow test is used to test the structural break and model fitness. The OLS technique is used to detect the relationship between exogenous variable and endogenous variable. The estimated results show that explanatory variable have positive and significant impact on the economy of Pakintan. The results also show that an increase in the import of raw materials, the production, employment and output of the country is boosted up. Similarly, trade openness has also positive and significant influence on the economy of Pakistan. It concluded that international trade may play an important role in enriching the economy of Pakistan.

Zahoor, *et al* (2012) reports that Michael conducted a study and found out an optimistic association sandwich between export and growth of economics. Greenway and Sapsford and Yamin also documented in Zahoor, *et al* (2012) found out that a little support for positive impacts of liberation on trade. Miguel (2000) examines the affiliation among openness, export to GDP ratio and economic enlargement for five ASEN nations, and detected co-integration between openness, export to GDP ratio and economic expansion for all nations.

In relation to the subject matter, Usman (2011) also documents that Ezenwe examines against the background of the current world trade relationship, the importance of foreign trade to Nigeria's economic development and the appropriate policy mix required realizing this role in the 1980s. He finds that foreign trade is the most dynamic sector of the economy since independence. Likewise, Obadan documented in Usman (2011) writes on the impact of export instability on the economic development of Nigeria, during 1960-1977. More importantly, the study examines whether or not fluctuations in Nigeria's export earnings have adverse effects on the economy. The results of the study using multivariate analysis as the framework, confirm the hypothesis that export instability is an important obstacle to Nigeria economic development. In particular, export instability is found to be highly detrimental to the growth rate of investment as well as resulting in smaller proportions of national income being invested. The result also supports the claim that Nigeria's economic growth is export led.

Similarly,FrankelandRomer in Umme and Munshi(2012)usingcross-countryregressionsconclude that radehasaquantitatively large,significantandrobustpositiveeffect onincome of a nation. Dollar citedUsman (1992)examinessourcesofgrowthin95developing countriesduring1976-85andfindsastrongpositivecorrelation betweenameasureofoutwardorientation andpercapitaGDPgrowth.BhagwatiandSrinivasan in Umme and Munshi(2012)pointoutthatpracticallyno countrythathasbeenclosetoautarkyhasmanagedtosustainahighgrowthperformanceovera longperiod. Theaboveexamplesprovidestrongevidencethatgreatertradeopennessisgoodforgrowthandpovertyreductionoverthel ongerterm.Italsosuggeststhattheremaybeshortterm costsintermsoffallingrealwagesofunskilledlabourandorinitiallydeclining gemploymentas greatercompetitiondrivesoutinefficientfirmsfrombusiness.Althoughthesetransitioncostsdonotrepresentacrediblec aseagainsttradeopenness,asthelonger-termbenefitwouldinvariablyoffsettheseshort-termcosts, theyneedtobetackledthroughpropercompensatorypoliciesaimedatmitigatingsuchcosts.

III. Analytical Framework

Model Specification

The blue print which was adopted in this study is a quasi-experimental research design. Kpolovie (2010) points out that quasi-experimental research refers to investigations which use designs that are very suitable for adoption to approximate conditions of true experiment in situation that do not permit the control and manipulation of all relevant variables.

Onuchuku and Adoghor (1999) have it that in econometric studies, economic theory should come first in a form of functional relationship. This is because the hypothesis to be modelled or to be tested is about economic behaviours. Therefore, the effort here is to explain as much as possible about the process underlying our panel data. Our concern was to specify the models with which economic phenomenon was be explored empirically. In this regards, Koutsoyiannis (1977) posits that model specification involves the determination of the dependent and explanatory variables which included in the model; a priori or theoretical expectations about the signs and the size of the parameters of the function. Based on this, we proceeded to specify the functional relationship of the panel data regression as follows using pool data technique. Hence, panel data regression models are specified in a functional relationship as follows:

UNR   =   f(EXE, TOP, TGE, FER)
        (3.1)

From the above functional (true or population) models or relationship between the dependent and explanatory variables, the mathematical form of the models are formalized as follows:

$$lnUNR_{it} = \beta_0 + \beta_1 lnEXE_{it} + \beta_2 lnTOP_{it} + \beta_3 lnTGE_{it} + \beta_4 FER_{it} + U_{it}$$
(3.2)

In equation 1,

i = 1, 2, 3, 4, 5 (The five English speaking West African countries – The Gambia (code 1), Ghana (code 2), Liberia (code 3), Nigeria (code 4) and Sierra Leone (code 5).

t = 1, 2, 3, 4, 5 ……. 34 = 170 (5 x 34) observations

Where:

Subscript i (ith subject) and t denote the cross section of the five countries and time period for the variables (34 years) respectively. This therefore suggests that the data will be pooled together to produce total observation of 170, with constant regression coefficient for all the five countries. Where:

UNR = Unemployment Rate
EXE = Export Earnings
TOP = Degree of Trade Openness
TGE = Total Government Expenditure
FER = Foreign Exchange Rate (expressed as official exchange rate)
U = Stochastic Term. This is with the assumption of constant and variable are normally distributed. The error term is assumed to be different over time and countries.

Note that: the estimation of panel data regression models is founded on the assumptions that the intercept and slope coefficients are constant across time and space and the error term captures differences over time and countries; the slope coefficient are constant but the intercept varies over countries; the slope coefficients are constant but the intercept varies over countries and time; and all coefficients vary over countries (Gujarati and Sangeetha, 2007).

Apriori Expectation

Economic trade theories suggest that external trade benefits are an engine of economic growth and propeller of development. Therefore, it is expected that the external trade benefits proxied by export earnings, trade openness, export propensity, real government expenditure and foreign exchange rate should be negatively related to unemployment rate.

Methods of Data Analysis

After structuring the data in panels using pool data technique, we adopted an up-to-date method known as 2nd Generation Panel Data Econometric using CIPS Unit Root Test, ECM Panel Co-integration, Pedorni Dynamic Ordinary Least Square (PDOLS) and Fully Modified Ordinary Least Square (FMOLS), Common Correlation Effects Mean Group (CCEMG), Augmented Mean Group (AMG), Average Correlation Coefficient (ACC) estimators as proposed by Pedroni (2007), Westerlund (2004) and Pesaran (2006). Before these main tests, descriptive and correlation matrix statistical test was conducted and the result were reported before the results of the main tests.

Given the evidence of panel co-integration, the long-run relationships among, UNR, EXE, TOP, TGE and FER, we applied the Westerlund (2007) estimator by expressing the ECM equation thus:

$$\Delta UNR_{it} = \beta_0^{UNR} + \lambda^{UNR}(\beta_i EXE_{st-t}^{UNR} - \beta_2^{UNR} TOP_{i,t-i} - (\beta_3^{UNR} TGE_{1,t-1} - \beta_4^{UNR} FER_{i,t-1}) + \sum_{j=i}^{n} o_{ij}^{UNR} \Delta UNR_{i,t-} + \sum_{j=1}^{a} \emptyset_{ij}^{UNR} \Delta EXE_{+i,t-j} + \sum_{j=i}^{n} \delta_{ij}^{UNR} \Delta TOP_{i,t-j} + \sum_{j=i}^{n} OP^{UNR} \Delta TGE_{i,t-j} + \sum_{j=i}^{b} a_{ij}^{UNR} FER + U_{ij}$$

IV. Presentation And Analysis Of Results

Table 4.1: Pesaran (CIPS) panel unit root test with cross sectional and first difference mean included for the study variables.

Variable	Method	CIPS	CV 10	CV5)	CV1	Decision on Order of integration stationary
EXE	2nd generation Pesaran CIPS	-3.916	-2.070	-2.190	-2.410	Stationary $I(1)$
TOP	2nd generation Pesaran CIPS	-3.002	-2.070	-2.190	-2.410	Stationary $I(1)$
TGE	2nd generation Pesaran CIPS	-4.369	-2.070	-2.190	-2.410	Stationary $I(1)$
FER	2nd generation Pesaran CIPS	-2.392	-2.070	-2.190	-2.410	Non Stationary $I(0)$
UNR	2nd generation Pesaran CIPS	-3.357	-2.070	-2.190	-2.410	Stationary $I(1)$

Note: CV = Critical Values. All tests in our study use Akaike's Information Criterion (AIC) for the selection of lags and length.

Decision rule: (a) if CIPS statistics > CV at any level of significance we fail to reject the null of unit root, suggesting that the variables are non-stationary and integrated order zero I(0 (b) if CIPS statistics < CV at any level of significance we reject the null of unit root, suggesting that the variables are stationary; integrated of order one I(1).

Source: An extract from the result output (See Appendix D – Result Output processed with Stata Version 12)

Table 4.1 documents the Pesaran CIPS panel unit root test result with cross sectional and first differences of the mean included for the variables. The lags criterion division Portmanteau is chosen with AIC.

From the result, the CIPS statistical values of EXE, TOP, TGE, FER and UNRare -3.916, -3.002, -4.369, -2.392 and -3.357respectively. These values are comparatively less than the critical value (CV) at 10%, 5% and 1% which has the values of -2.070, -2.190 and -2.410 respectively. From this result, the null of unit roots is strongly rejected for the series of EXE, TOP, TGE, and UNR. This implies that the series are integrated of order one, $I(1)$ suggesting that there is unit roots in EXE, TOP, TGE and UNR across the countries and along the period of study. On the other hand, the CIPS statistical value of FER is -2392. By comparing these values with the critical values of -2.070, -2.190 and -2.410 at CV 10%, 5% and 1% respectively, it is clear that the CIPS values are greater than the critical values for POL, but CIPS value of FER is greater than 1% critical value. Based on the null unit root hypothesis for FER andPOLexpressed in cross sectional and first differenced form, it implies that the series (FER) are integrated to order zero, $I(0)$. Therefore, there is no unit root in FER is are non-stationary within the ESWACs in the given time and cross sectional dimensions considered in this study. However, our results are not sensitive to the cases of a constant and a trend.

Having established the nature of the hypothesis in the unit roots of the series which produced mixed results, we now proceeded, with a feeling of confidence, to the panel co-integration tests to explore whether there is a long-run equilibrium relationship between external trade benefits (EXE, TOP, TGE and FER) and unemployment rate. Before the panel co-integration is reported, it is important to restate the research hypotheses in null forms, in order to enable us test them. Again, the hypotheses are presented according to each balance panel data structure equation.

The null hypothesis suggests that there is no long-run equilibrium between unemployment rate and external trade benefits. This means that there is no co-integration between the dependent and independent variables. Before we report the result, we first and foremost restate the econometric panel co-integration equation as follows. This cast in the manner of 2nd generation panel data econometric approach.

$$InUNR_{it} = \beta_0 + \beta_1 \, lnEXE_{it} + \beta_2 \, lnTOP + \beta_3 \, lnTGE_{it} + \beta_4 \, FER_{it} + \mu_{it} \qquad 4.1$$

Table 4.1: Result of the Panel Co-integration based Westerlund (2007)
Unemployment Model(Equation 3.2)
Results for H_0: no co-integration
With 5 series and 4 covariates
Average AIC selected lag length: 1.8
Average AIC selected lead length: .8

Statistic	Value	Z-value	P-value
G_t	-2.713	-1.597	0.055
G_a	-6.741	0.987	0.838
P_t	-10.416	-5.368	0.000
P_a	-16.255	-3.102	0.001

Note: Without constant and constant and trend terms.

Source: An extract from the result output (See Appendix D – Result Output processed with Stata Version 12)

From table 4.1, the null hypothesis of no co-integration between indicators of external trade benefits (EXE, TOP, TGE and FER) and economic development indices (UNR, POL, ADL, LER and STL) was tested using Westerlund (2007) and Pedroni's (2004) 2nd generational methods. The first segment of the table reports the result of the Westerlund for all the panels under investigation. Akaike's Information criterion (AIC) selects the maximum lag length of 1.8 and lead length 0.8 for the test. The result of Westerlund test reveals that the two group statistics of P_t (0.000) and P_a (0.001) out of the four panels should reject the null hypothesis. This implies that the 2nd generation test methods can reject the mull hypothesis of no co-integration between the panel variables. However, $G_t(0.055)$ and $G_a(0.838)$ statistics are greater than the 5% default level of significant. Since two out of the four statistics of Westerlund panel test are greater than 5%, we should not the null hypothesis of no co-integration; hence our further analysis relies on that.

Table 4.2: Result of the Panel Co-integration based Pedroni (2004) for unemployment level equation

2nd Generation Test Model	Statistic	Value Panel	Z-value (Group)
AlaPedroni (2004			
	Panel $_v$	0.8616	0.000
Within Statistics:	Panel $_{rho}$	-1.993	1.494
	Panel $_{PP}$	-4.803	5.617
	Panel $_{adf}$	-2.543	2.492
Between Statistics:	Group $_{rho}$	-0.6368	13.99
	Group $_{pp}$	0.3841	5.89
	Group $_{adf}$	-0.0004	0.02309

Note: Equation 4.1 is the conventional econometric specifications for panel co-integration.
The result of the Perodni's test is time demean. Time demean is used to mitigate the impact of cross-sectional dependence. It is a transformational technique in unit root used to subtract the cross-sectional averages for each period from the original data.
Source: An extract from the result output (See Appendix D – Result Output processed with Stata Version 12)

The Pedroni's test as documented in table 4.2 is time demeaned in co-integrating relation. The result of the Pedroni test reveals that the panels (series) are not co-integrated since five out of the seven statistics provided, strongly should not reject the null hypothesis of no co-integration at 5% level of significance, but only Group$_{pp}$ under between statistics (5.89) that is greater than the 5% level of significance. However, the panel statistics of P_t (0.000) and P_a (0.001) should reject. Therefore, the null hypothecs of no co-integration is should not be rejected; hence indicating that there is no co-integration between the variables. Thus, the basis for further analysis in our study is anchored on the rejection of the null hypothesis. The reason is that such result is amenable to economic data and it negates the assumption of the 1st generation panel data method, which enables us to meet the condition of cross sectional dependence. Having established that panel in equation one is co-integrated, the next step in our empirical analysis is to conduct another test so as to obtain the coefficient estimates for co-integrated panels. In doing this, our study appeals to dynamic OLS (DOLS) and fully modified OLS (FMOLS) estimators. These estimators are amenable to our panel regression because they are robust enough to account for cross-sectoral dependence along "*i*" and "*t*". The result is reported below.

Table 4.3: Results of DOLS and FMOLS tests for coefficient estimation of co-integrated relationship (Long-Run Equilibrium) for unemployment equation

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DOLS Hom.Panel data Coint. Estimation results          Number of obs=      150
Group variable: countryid          Number of groups  =    5
Wald chi2(4) =  25.81                                   Obs per group: min =      34
Prob> chi2  =  0.000                                    avg =      34
                        max =       34
                        R-squared     = 0.5278
                        Adj R-squared = -1.2096

------------------------------------------------------------------------------
        |      Coef.    Std. Err.      z         P>|z|       [95% Conf. Interval]
--------+---------------------------------------------------------------------
 lnexe1 |    .0761749   .0236941     3.21        0.001       .0297354    .1226144
  lntge | .0565759     .0268021      2.11        0.035       .0040449    .109107
    fer | -.0001024    .0000702     -1.46        0.145       -.00024     .0000352
  Lntop | -.1186801    .0307282     -3.86        0.000       -.1789063   -.058454
------------------------------------------------------------------------------
```

Source: An extract from the result output processed with Stata Version 12)

As stated earlier, to circumvent the problems in the presence of endogeneity between dependent and independent variables and serial correlation between the co-integrated panels, the DOLS and FMOLS become basically necessary as classical OLS will be biased and inefficient. The result reveals that the *p-values* of the coefficients of the panel series β_1, β_2, β_3 and β_4 at 5% level of significance are significant except for the coefficients of FER which is β_4. This means that coefficient of the estimates significantly affect unemployment rate, thereby suggesting that external trade benefits are significant in the reduction of unemployment rate in ESWACs within the period of study. Having established that the coefficients of the estimation are co-integrately related, that is, possessing the attribute of long run equilibrium, we proceed to conduct the error correlation mechanism (ECM) panel co-integration test by relying on Wasterlund (2007) proposed specification. The estimator is Mean – Group Error Correction Model and the result is reported beneath.

Table 4.4: Mean-group error-correction model of short run coefficients apart from the error-correction term are omitted as lag and lengths might differ between cross-sectional units

Given the evidence of panel co-integration, the long-run relationships among, UNR, EXE, TOP, TGE and FER, we applied the Westerlund (2007) estimator by expressing the ECM equation thus:

$$\Delta UNR_{it} = \beta_0^{UNR} + \lambda^{UNR}(\beta_i EXE_{st-t}^{UNR} - \beta_2^{UNR} TOP_{i,t-i} - (\beta_3^{UNR} TGE_{1,t-1} - \beta_4^{UNR} FER_{i,t-1}) + \sum_{j=i}^{n} o^{UNR}_{ij} \Delta UNR_{i,t-} + \sum_{j=1}^{a} \emptyset_{ij}^{UNR} \Delta EXE_{+i,t-j} + \sum_{j=i}^{n} \delta^{UNR}_{ij} \Delta TOP_{i,t-j} + \sum_{j=i}^{n} OP^{UNR} \Delta TGE_{i,t-j} + \sum_{j=i}^{b} a^{UNR}_{ij} FER + U_{ij}$$

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--------------------------------------------------------------------------------
|      Coef.          Std. Err.          z        P>|z|      [95% Conf. Interval]
----------+---------------------------------------------------------------------
lnexe  |
    L1. |   -.0909622        .0458942        -1.98        0.047     -.1809132    -.0010111
Lntop|
    L1. |    .0143542        .0465396         0.31        0.758     -.0768617     .1055702
lntge  |
    L1. |    .0862346        .0193286         4.46        0.000      .0483512     .124118
fer  |
    L1. |   -.0053283        .0045285        -1.18        0.239      -.014204     .0035474
lnunr |
    L1. |   -.6538355        .1760465        -3.71        0.000     -.9988803    -.3087906

--------------------------------------------------------------------------------
Estimated long-run relationship and short run adjustment
--------------------------------------------------------------------------------
|      Coef.          Std. Err.          z        P>|z|      [95% Conf. Interval]
----------+---------------------------------------------------------------------
ec       |
lnexe|     -4.31706       4.259297        -1.01        0.311     -12.66513     4.031008
lntop  |    .0660137       .0819736         0.81        0.421     -.0946516     .226679
lntge  |    .8162984       .6969693         1.17        0.242     -.5497363     .182333
fer    |       .0180169       .0273897         0.66        0.511        -.0356659     .0716997

----------+---------------------------------------------------------------------
   SR    |
   _ec |   -.6538355       .1760465        -3.71        0.000     -.9988803     -.3087906
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Source: An extract from the result output processed with Stata Version 12)

The above equation above represents the re-parameterization of the regression equation based on panel data structure. From table 4.10, we approach the interpretation of the regression results from the point of view of short-run fluctuations around an already established long run equilibrium relationship. From the result, it is evidenced that the coefficient of export earnings (EXE) which was initially positive, is now by the power of the estimator corrected to a negative sign, suggesting that an increase in EXE would be significant enough to reduce unemployment rate. However, FER also retains its expected sign and every other variable in the panel exhibited expected behaviour. The estimated long-run relationship and short run adjustment reveals that the error correction mechanisms in the short run possess the expected sign to the tune of 0.65.

This implies that the ECM term induces a negative change in unemployment rates (UNR). We also obtain larger absolute values for the ESWACs of 0.65, meaning that it will take the injection of about 65% benefits from external trade into the economies of ESWACs for equilibrium to be restored following any deviation from the long-run equilibrium of unemployment rate (UNR). Interestingly, this also suggests that the speed of adjustment of the coefficients of the explanatory variables is high thereby empirically indicating structural divergences towards the attainment of long run equilibrium between the variables.

Specifically, according to our results, the coefficients of the explanatory variables in the study economies show that, a 100% increase in EXE, TOP, TGE and FER will approximately decrease unemployment rate by 432%, 7% 82% and 1% respectively. This means that for UNR to be significantly reduced in ESWACs, there should be the injection of about 432% and 82% of their export earnings and total government expenditure into the real sector and the degree of trade openness should increase by approximately by 7% while FER would fluctuate between 1% to 10%. Having established that there is a linear combination that keeps the pooled variables in proportion to one another in the long run, which suggests the existence of long run relationship equilibrium, we can proceed to generate individual long-run estimates.

In view of the fact that the classical OLS estimator is biased and inconsistent in addressing the dynamic feedback and spill-over effects when applied to co-integration panel, we therefore utilize the common correlated effects mean group (CCEMG) and average correlation coefficients. (ACC) estimators as proposed by Pesaran (2006). CCEMG relies on mean group panel (MGP) type of estimation. These estimators are suitable in our case because economically speaking, the co-integrating vectors are heterogeneous and likely to be the case for the present applications of economic theories in estimating the relationship between UNR and EX, TOP, TOG and FER in ESWACs. In this case therefore, we introduce estimators that could represent the average long-run relationship as proposed by Pesaran (2006) cross sectional dependence (CD) test. CCEMG and ACC are superb

alternative, because they have the quality of pooling data along the cross sectional and time dimensions. The result of the test is reported in the table below.

Table 4.5: Common Correlated Effects Mean Group Estimation for Unemployment Model ala Pesaran (2006)

All coefficients present represent averages across groups (countryid)
Coefficient averages computed as outlier-robust means (using rreg)
Mean Group type estimation

Number of obs   =   170

Group variable: countryid

Number of groups =   5
Obs per group: min =   34
avg =   34.0
max =   34
Wald chi2(4)   =   911.83
Prob> chi2   =   0.0000

lnunr	Coef.	Std. Err.	z	P>|z|	[99% Conf. Interval]	
lnexe1	-.0265625	.0358181	-0.74	0.458	-.1188238	.0656987
lntop	.088008	.0029176	30.16	0.000	.0804927	.0955234
lntge	-.0442776	.0373724	-1.18	0.236	-.1405426	.0519874
fer	.0001398	.0018413	0.08	0.939	-.0046031	.0048826
_cons	1.534218	.1517289	10.11	0.000	1.14339	1.925046

Root Mean Squared Error (sigma): 0.1684. (RMSE uses residuals from group-specific regressions: unaffected by 'robust').
Note that augmentation of the CCEMG estimator should account for the impact of group-specific linear trends. The latter are unidentified.
Source: An extract from the result outputprocessed with Stata Version 12)

Table 4.6: Augmented Correlation Coefficients of residual series test for unemployment equation

Average correlation coefficients &Pesaran (2004) CD test
Residual series tested: cce_res1

Group variable: countryid
Number of groups: 5
Average # of
observations: 42.50

Panel is: balanced

Variable	CD-test	p-value	corr	abs(corr)
cce_res1	-1.83	0.068	-0.099	0.319

Notes: *his was specified under the null hypothesis of cross-section independence CD ~ N(0,1)*
Source: An extract from the result output (See Appendix D – Result Output processed with Stata Version 12)

Table 4.5 enables us to evaluate if the presence of cross section correlation changes in all the results of the co-integration vector. In the long run coefficients estimated by means of the common correlation effects mean group (CCEMG) estimator of the unemployment model, the result provides in favour of our specification which indicates the absence of cross sectional correlation across the series in the equation. This is because the estimate is significant, thereby corresponding to the co-integrating relationship between the variables. This is confirmed by the constant value of 1.53 which is greater than the default 5% level of significance. In addition to

the standard *stata* panel regression information, the routine reports of the Root mean squared error with the value of 0.1684, which is also greater than 5% lower of significance. This means that the common correlated effects mean group of the certain global shocks or international spill over, recession or imported inflation is significantly augmented or accounted for in the group specific linear trends in our study.

Table 4.6 documents the augmented correlation confident of residual series test of the unemployment equation. The result reveals that the common correlation effect (CCE) of the residuals has CD-test value of -1.83 is less than the p-value of 5% default level of significantly suggesting that it is statistically significant. This means that the null hypothesis of cross-sectional independence is strongly rejected; hence the alternate of presence of cross sectional dependence along the cross sectional and time dimensions of the balance panel data structure cannot be rejected.

4.1: Discussion of Findings

Unemployment rate was found to be significantly affected by the benefits derived from external trade activities in English Speaking West African Countries (ESWACs) from 1980 to 2013. The percentage of variability (coefficients) of the parameters (EXE, TGE, FER and TOP), using DOLS and FMOLS, that can be attributed to the differences in unemployment rate are 76, 57, 0.01 and 12 respectively. The speed of adjustment to the long run equilibrium relationship between unemployment rate and external trade benefits is about 65% and the panel equations (UNR_{it}) does not have cross sectional correlation across the series and they also established the absence of cross sectional dependence in the panels; thereby justifying the use of the 2^{nd} generation panel data econometric method.

The findings of the study in tables 4.6 to 4.11 show that unemployment rate was significantly affected by the benefits derived from external trade benefits in English Speaking West African Countries (ESWACs) from 1980 to 2013, the percentage of variability (coefficients) of the parameters (EXE, TGE, FER and TOP), using DOLS and FMOLS, that can be attributed to the differences in unemployment rate are 76, 57, 0.01 and 12 respectively and the speed of adjustment to the long run equilibrium relationship between unemployment rate and external trade benefits is about 65%. Unemployment equally has slightly high coefficient of variation.

Although the result implies that there is no co-integrating between unemployment and external trade benefits, but in the in the long-run, external trade benefits have not been able to increase significantly the percentage between the amounts of labour employed at current wage levels and working conditions and the amount of labour not lined at these levels. This meaning that the rate of unemployment in ESWACs has been affected significantly, thereby implying that a negative relationship exists between unemployment rate and external trade benefits. From an economic theoretical stand point, it is logical to point out that this result demonstrates a strong support to the macroeconomic expectation of mercantilist trade theory which expects an economy to use the gains from trade (whether local or external) for the improvement of the economic status of the nation, which increases in employment opportunities is an integral part. This is because the central focus of mercantilist trade theory according to Tamuno (2006) is for a nation to increase her national wealth with the plan of increasing production and export through external trade relation and injection of the proceeds into the economy for the propose of addressing macroeconomic issues such as unemployment.

This result of significance of external trade benefits in the reduction unemployment rate is supported by other empirical studies in this area. Worthy of mention is Gbosi (1998) and (2005) and Ajie (2004) and (2011) who did a study on unemployment policy in depressed economy: a case of Nigeria. The result the study indicates that various policies adopted to reduce unemployment in Nigeria have only achieved marginal results, however concludes that unemployment still remains a major macroeconomic problem Nigeria. Consequently, the tendency of the common factor such global shocks in terms of international political atmosphere, imported inflation, recession, global economic crisis, international business cycle shocks, through the cross sectional dependency is responsible for the transmission of this macroeconomic problem (unemployment) across the English speaking west African countries within the period of study.

Nevertheless, unemployment rates remain a useful measure of the status of particular economy overtime. However, the positive coefficients of export earnings (EXE) and total government expend item (TGE) means that increase in those variables will help to adjust the amount of unemployment rate in the countries under study. This means that increase export earnings as a result of external trade and total government expenditure has been marginally significant in address the problem of unemployment. This is why the mean group error correction panel co-integration reveals that UNR maintains a positive interface with those variables (EXE and TGE) this is supported by the empirical evidence that in Nigeria from 2008 to 2009, the rate of change in unemployment level is -40.79 (representing 3.1% reduction rate), in 2010 it astronomically reduced from 23.9 to 7.5, representing -68.62%. Also, within the period of the study, the UNR in Gambia maintained a low single digit and further marginally reduced from 7.9 to 7.7 in 2012. In Ghana, the situation is not totally different as the rate of change in unemployment rate maintains a steady low single digit from 2009 to 2012 with insignificant rate of change in unemployment rate.

In Liberia, from 2009 to 2012, the rate of change in unemployment rate reduced from 4.6% to 3.7% representing -19.57%, but Sierra Leone recorded no change in unemployment rate, though maintained very low and accepted level of unemployment.Perhaps the marginal reduction in unemployment rate could be attributed to increase in export earnings, particularly, in Gambia from 2005 to 2009 increased from 43.30% to 68142.22%, however, reduced drastically to -98.56% in 2010 but also bounced back to the positive side in 2011 and 2013 up to the turn of 14.69% and 9430.30% respectively. Also in Ghana, the volume of earnings from external trade activities equally increased from 3.36% to 74.43% in 2008 and 2010 respectively, but became -92.15% in 2013. In Liberia, it is also clear that earnings from export activities appreciated from 34.36% to 179.29% from 2011 to 2013, while in Nigeria it increased from – 6.23% to 539.80% from 2008 to 2010 respectively, as Sierra Leone had export earning that increased from -91.03% to 20.54% from 2007 to 2012 respectively. This confirms that external trade benefits are sensitive to unemployment in ESWACs.

These noticeable increases in export earnings transmitted to increase in total government expenditure (TGE). For instance, in Gambia, from 2010 to 2011 it, increased by 214.25%, in Ghana, within the same period it increased from -43.85% to 160.96%, this situation is consistent with what is obtainable in Liberia where total government expenditure increase from 1.10% to 91.14% from 2008 to 2013, while in Nigeria it is characterized by fluctuation with evidence of 40.61%, -28.96%, 13.06 and -99.81% from 2010 to 2013, and in Sierra Leone, it staggered from 104.61%, -43.85%, 160.96% and -2.47% from 2009 to 2012.

From the rate of change seen in export earnings and total government expenditure, it is logical to deduce that increase in these two parameters have been able to predict reduced unemployment rate across the countries within English speaking West Africa from 1980 to 2013. This confirms that the effects of low unemployment rate in one country could have a major impact on the economies of countries within the same region. This result is strongly supported by the report in table 4.10 which strongly rejects the null hypothesis of cross section independence in English speaking West African Countries. This finding is consistent with that of Njimanted (2012) who reported that the dynamics of export earnings has a sensitive trend for many years in sub-Saharan African in general, and Cameroon in particular, though it has formed an important source of foreign exchange in developing countries. Lending more support to this, Oviemuno (2007) considered international trade as an engine of growth in developing countries taking Nigeria (1960-2003) as case study.

His study reported that Nigeria's export value acts as an engine of growth in terms of unemployment reduction and this partly accounts for why there is sluggish increase in macroeconomic problems, which unemployment is a central one. Also, Miguel (2000) examines the affiliation among openness, export to GDP ratio and economic enlargement for fine ASEN nations, and detected co-integration between openness, export to GSP ratio and economic expansion for all nations. GlezakosHanigan and Veivodeas cited in Njimanted (2012) examined the relationship between export instability and economic growth using a cross sectional data. Their study found that a negative correlation exists between export instability and GDP and unemployment. Similarly, Bairam in Njimanted (2012) estimates the model for a large sample of developed countries and arrived at the conclusion that the growth and development performance of a country is a function of the values of its income elasticity of both exports and imports. Again, Obadan documented in Usman (2011) examines whether or not fluctuations in Nigeria's export earnings have adverse effects on the economy. The results of the study using multivariate analysis as the framework, confirm the hypothesis that export instability is an important obstacle to Nigeria economic development thereby indicating that export stability addresses unemployment problem. In particular, export instability is forms to be highly instrumental to the growth rate of investment thereby leading to decrease in unemployment's rate.

From a policy stand point, the retrodiction as well as prediction of the theories used in this study, serve as evidence that the postulations of trade theories, particularly, that of the mercantilism, absolute cost advantage and comparative advantage seems to support the findings deduced from equation one. Therefore, the relationship between unemployment rates and external trade benefits in English Speaking West African countries within the period of study conforms to trade theories. This could be suspected to be as a result of other factors that could spur favourable terms of trade and possibly mitigate the global shocks that are directly and indirectly transmitted into the economies of ESWACs which was adequately confirmed in table 4.5.

V.   Concluding Remarks

This present study attempts to empirically examine the short-run and long-run effects of external trade benefits on unemployment rate in English Speaking West African Countries from 1980 to 2013. The study measured external trade benefits on the bases of export earnings (EXE), total government expenditures (TGE), degree of trade openness (TOP) and foreign exchange rate (FER) as a control, and unemployment rate (UNR). Also this study employs the recently developed second (2[nd]) generation panel data econometric methods of unit root test, co-integration, dynamic OLS, fully modified OLS, common correlated effects mean group, augmented mean group, average correlation coefficients estimators as proposed by Pedroni (2007), Westerlund (2004) and Pesaran (2006).

By the application of these estimators the results of the unit root test reveal that EXE, TOP, TGE and UNR are stationary while that of FER are non-stationary using CIPS estimator. The co-integration test result shows that external trade benefits (ETB) did marginally impact on unemployment, but increase in ETB, although there is no co-integrating relation between external trade benefits and unemployment rate within the period of study. This implies that a correction in external trade benefits would reduce unemployment rate by 65% as revealed by the values of the error correction models respectively.

The cross sectional dependence test reveals that the common factors stresses the relevance of dynamic feedback effects or international business cycle shocks in explaining long run equilibrium relationship in cross sectional studies, as we have in the case of assessing the impact of external trade benefits on economic development across English Speaking West African Countries from 1980 - 2013. Thus there is no evidence of long-run equilibrium relationship between external trade benefits and economic development in the countries understudied from 1980 to 2013. Nevertheless, the study also recognizes the presence of heterogeneity, cross sectional dependence and differentials in the series among the ESWACs. Our findings are related to the literature on external trade but establish a balance between the optimistic and pessimistic trade theories or schools of thought in explaining the impact of external trade benefits on unemployment rate in West African countries. This means that external trade partially serve as an engine of growth and propeller of development in developing countries, as evidenced in the results of the study.

Since external trade benefits have marginal positive impact on unemployment rate, it therefore implies that more expenditure into the real sector of the economies of ESWACs will encourage the reduction of unemployment rate by expanding the production base of the countries. After summing up our findings, we submit that external trade benefits have marginal significant impact on unemployment rate. Therefore, we conclude that the impact of external trade benefits on economic development is a trivial matter because external trade benefits have not comprehensively and significantly augmented the unemployment rate in English speaking West African countries within the period of study.

In line with the findings of this study, the following recommendations are advanced for proper policy measures to be taken in order to reduce unemployment rate via the benefits accruable from external trade in English Speaking West African Countries. Hence, the government of ESWACS should encourage and support the real sector of the respective countries through subsidies and investment in social and physical infrastructure so as to encourage the participation of private individuals in the production of goods and services. This will have directly and significantly impact on unemployment.

Policy implication on the result of co-integration test is that more credible expansionary fiscal policy should be pursued as this will help to pump more money into circulation with the aim of creating and expanding employment opportunities that would be able to reduce poverty in the region and the government of ESWACs should direct her total expenditures to provision of economic, social and physical infrastructural facilities that could improve the standard of living of citizens.

Methodologically, the main contribution to knowledge of study is the establishment of panel data co-integrating property of the study variable in investigating impact of external trade benefits on unemployment rate in English speaking West African countries from 1980 – 2013. This was achieved by adapting the recently developed panel data econometric technique designed to control cross sectional dependences and international dynamic feedback and spill-over effects. The study validated that 2^{nd} generation panel data econometric method recently developed by Pesaran (2004), Pedroni (2004) and Westerlund (2007) are valid in cross sectional dependency studies and empirically, the study provided quantifiable explanation of the cross sectional dependency differentials of the effects of EXE, TOP, TGE, FER on UNR in ESWACs from 1980 to 2013. Finally, the study established, in numerical terms, that external trade benefits are marginally significant responsive in explaining unemployment rate.

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