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THE IMPACT OF TIMBER EXPORTS ON ECONOMIC GROWTH IN CAMEROON: AN ECONOMETRIC INVESTIGATION

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ABSTRACT

Cameroon, one of the most likely natural resources-based economies in Africa rely on its natural resource exports for growth. With the fall in international oil prices in Cameroon in the late 1980's, timber resources emerged as one of the major sources of foreign earnings.Since then, statistics reveal that timber exports have grown in volume,constitutinglargely of unprocessed and semi-processed wood products, with little value-added. This study, therefore examines the impact of timber export on economic growth in Cameroon over 34 years (1980 to 2014 inclusive) using time series data from the Food and Agricultural Organization and World Development Indicators. Using the Johansen Cointegration and Error Correction Modelling, the results show that timber export have an insignificant effect on the economic growth of Cameroon in the short run and in the long run it has a significant positive effect. We therefore recommend the increased consumption of locally-manufactured wood products, limitation of imported manufactured wood products, as well as encouraging the establishment of locally-based wood processing industries.

Contribution/ Originality: This study is one of very few studies which have investigated the impact of timber exports on the economic growth of Cameroon. The paper's primary contribution is the finding that timber export have an insignificant short run and a significant long run effect on economic growth in Cameroon.

1. INTRODUCTION

Natural resources play an important role in the economic growth process of most economies in the World (Cronin and Pandya, 2009). Most importantly, no developing economy in the World has the prospect to sustain growth in the absence of natural resources, since they serve as sources of foreign earnings especially oil and timber. It is therefore expected that countries rich in natural resources should perform better than those poor in natural resources. This is because it is believed that economies which are rich in natural resources can accumulate economic infrastructure and human capital easily. However, empirical studies on the natural resource endowment-economic growth relationship reveal that while many countries rich in natural resources have performed poorly, countries poor in natural resources have performed better. Among the countries which have fallen victim of a resource-curse are Nigeria, Angola, Congo, Bolivia, Sierra Leone and Venezuela (Arezki and Ploeg, 2010). From 1965 to 1998, the rate of growth of Gross National Product (GNP) per capita in Iran and Venezuela was on average -1% per year, -2% in Libya, -3% in Iraq and Kuwait. For Qatar, between 1970 and 1995, it was -6% (World Bank, 2000 in Gylfason (2001). Gross National Product per capita fell by an average of 1.3% during 1965-1998 for all OPEC, relative to the 2.2% average per capita growth in all the lower- and middle-income countries. The only countries which are rich in natural resources with long-term investment above 25% of Gross Domestic Product (GDP) on average from 1970-1998, which is equals that of successful industrial countries poor in naturalresources were Botswana, Indonesia, Malaysia, and Thailand (Gylfason, 2001). On average, GDP per capita growth rates for Nigeria, Venezuela and Indonesia from 1998 to 2002 were -0.59%, -3.64%, and -1.38% respectively (Iimi and Ojima, 2005). Some studies in China have also supported the resource-curse hypothesis at provincial levels. These include studies carried out by Zhang *et al.* (2008); Shao and Qi (2009) in Ji *et al.* (2013). The hypothesis of a resource-curse is equally supported by the studies of Papyrakis and Gerlagh (2007) cited in Ji *et al.* (2013) using data from 49 states in the United States of America. Most of these countries have depend on oil revenue for their growth, but since economic growth based on oil is unsustainable due to the exhaustible nature of oil resources, much emphasis is now placed on the role of renewable natural resources in the economic growth process.

The link between primary export growth and economic growth has received a lot of attention in the export-led growth literature, with many findings supporting the fact that growth in export results to economic growth. Some of these studies include those of Levin and Raut (1997); Boame (1998); Ekanayake (1999); Chemeda (2001); Abou-Stait (2005); Dawson (2005); Aurangzeb (2006) and Kalu and Okojie (2009) and Sanjuan-Lopez and Dawson (2010). Gilbert *et al.* (2013) also support the export-led growth phenomenon for some agricultural commodities. However, the study by Faridi (2012) refutes the export-led growth strategy. It has been discovered so far that scientific studies on primary exports and growth have concentrated on cocoa, coffee, banana, rubber and other exports like oil, with the neglect of timber exports. Studies which concentrate on the link between timber exports and economic growth are relatively absent in the literature, probably because timber is considered more as a natural resource than an agricultural commodity. This study therefore bridges an important gap in empirical literature. In terms of the analytical

methods, most of these studies have adopted the cointegration and error correction modelling approach, Granger causality, vector autoregression and impulse response function. These techniques are sound because of their ability to estimate the long run and short run situation, test for the direction of causality between variables and determine effects on the explained variable when a shock is introduced in to the system. The present study adopts the cointegration and error correction modelling approach, not just for the sake of estimating the long and short run situation but because the resource is renewable and it would be very important to consider its long run implications on economic growth.

Timber exports have contributed to the growth of most economies in the World. In France for instance, round wood exports contributed on average about $252 million to the country's yearly total export revenue between 1970 and 2012. Similarly, in Japan and United Kingdom, average annual contributions of total round wood to export revenue were approximately $4.5 million and $252 million respectively (Estimated by Authors from the Food and Agricultural Organization (FAO, 2014). The contribution of timber to the economic growth of Malaysia has been significant. In 2010, it contributed 3.7 of the GDP and 3.2% of the country's total merchandize exports. Timber contributed an estimated $7.4 billion to Malaysia's total export and between 1% and 2% to GDP in 2011 (Harun, 2012). In Gabon and Democratic Republic of Congo, round wood contributed an annual average of about $193 million and $27 million to total export revenue and consequently GDP between 1970 and 2012 respectively(Estimated by Authors from FAO (2014). Gabon's forestry sector contributed 0.3% in GDP in 2011 (African Economic Outlook, 2012). Timber production makes up approximately6% of Ghana's GDP. It provides around 12% of foreign exchange between 1990 and 2000 (Lebedys, 2004).

Timber emerged as a main export commodity in Cameroon in the late1980s. Agriculture was the main source of economic growth from the early 1960's to 1977, where it employed about 80% of the labour force, provided 85% of exports and contributing about 34% to GDP. Annual real GDP averaged 4.8% within this period. From 1978 to 1985, economic growth was realized from oil production, with growth rates as high as 12% (Amin, 2002). Averagely, oil rents as share of GDP were about 13% within this period (World Development Indicators, 2014). In 1986, economic crisis set in because of the fall in the world market prices of its main agricultural exports and poor economic policies. As a result, oil rents as a share of GDP fell to about 7% from 1986 to 1989 (WDI, 2014). Due to structural adjustment policies of the late 1980s, Cameroon needed to broaden its narrow export base in order to secure a favourable balance of trade. And since revenues from oil exports were declining, timber was now regarded as a foreign earner that could support the economy. The contribution of timber to GDP therefore increased steadily from about 3.5% in 1989 (Atyi, 1998) to 6.7% in 1995 and finally reached 12% of GDP in 2000 (Ekoko, 1999; Brown and Schreckenberg, 2001; Siebock, 2002). During the 1994/95 fiscal year, the need to service the external debt and create employment to the increasing population of the country was a driving force for timber harvesting in Cameroon (Siebock, 2002).

Cameroon has a foreign market for timber in Europe, Asia, America and other parts of Africa. In 1970, the volume of total round wood exported was estimated at about 511,200 m^3. This added about $15 million to export revenue, representing about 1.3% of GDP. In 1980, export of all

round wood contributed about $113 million to export revenue and 1.7% to GDP. The shares of exported round wood to GDP in 1990, 2000, 2010 and 2012 are 1.6%, 1.1%, 1.1% and 0.9% respectively. In 2012, the export quantity was estimated at about 514068 m^3, with a corresponding export value of about $214 million. Averagely, annual exports of round wood stood at about 634 m^3 for the period, with a monetary value of approximately $106 million, which represents about 1.2% of GDP over 1980-2014. From the above statistics, it is observed that the contribution of timber exports to GDP is decreasing in value over the years, despite rising quantities exported.

The main problem that has led to the insignificant contribution of timber exports to Cameroon's GDP is that of unprocessed log exports. Unprocessed and semi-processed logs are relatively cheap because value added to them is small. Export of unprocessed logs only makes the balance of payments situation of the country worst-off. The Cameron government has rather taken few measures to resolve this problem. Most government measures are only out to ensure that all the wood harvested and exported should be from a legal origin, ignoring what the activity should add to the GDP. The only main measure which government took to add value to the timber exports of Cameroon is the implementation of the 1999 log export ban that was introduced in 1994. This was meant to encourage local wood processing activities and to protect the local wood processing industries from foreign competition. According to the ban, 70% of logs must be processed locally. This explains why there was a steady fall in the volume of round wood exported from 975,000 tons in 1999 against 1,604,000 tons in 1998 to 237,272 tons in 2005 and later 502,461 tons in 2006 when the ban was lifted. Since the uplift of the ban, there has been no proof of exports of processed wood products. The export of raw logs has, however persisted, implying that the revenue and share of timber exports to the GDP of the country will continue falling. It is within this backdrop that this study is designed.

On the basis of the above problem, this study intends to provide answers to the following research question; To what extent does total labour force, gross capital formation,foreign earnings from timber and imports of goods and services affect the economic growth of Cameroon?. The main objective of this study is therefore to determine whether timber exports have any significant impact on economic growth in Cameroon. Specifically, this study intends to evaluate how total labour force, gross capital formation, foreign earnings from timber and imports of goods and services affects economic growth in Cameroon.

The rest of this paper is organized as follows; in Section two, the relevant literature is reviewed. Section three presents the analytical techniques. Results are presented and discussed in the fourth Section. The fifth section summarizes, recommends and draws an adequate conclusion from the study.

2. LITERATURE REVIEW

Chemeda (2001) examined the role played by exports on economic growth in Ethiopia within the frameworkof the neoclassical Cobb-Douglas production function. The study used co-integration analyses, with a time scope from 1950 to 1986. Findings showed that real exports and ratio of investment to real GDP (proxy for capital stock) co-integrate with real GDP per capita

(proxy for the labour force). The study concludes that real exportsgrowth positively affects the economic growth rate. The results also showed that the contribution of exports to economic growth in Ethiopia is greater in the long run than in the short run.

Abou-Stait (2005) used the Johansen technique, VAR and Granger causality analysis to examine if exports are an engine of growth by testing whether GDP, exports and imports are cointegrated, whether exports Granger cause growth and whether exports Granger cause investment. Results showed that GDP, exports and imports were not cointegrated; exports Granger cause economic growth but does not Granger cause investment. The study called for more trade liberalization as well as the review of trade policies.

Dawson (2005) also studied the contribution of agricultural exports to economic growth in least developed countries using two theoretical models; the agricultural production function, including agricultural and non-agricultural exports as inputs and a dual economy model with agricultural and non-agricultural sectors where each sector was sub divided in to the exports and non-exports sector. Fixed and random effects were estimated in each model using a panel data of sixty two less developed countries from 1974 to 1995. The study found evidence that supported the export-led growth hypothesis, with results highlighting the role of agricultural exports in growth. The study recommended a balancing of export promotion policies.

Sanjuan-Lopez and Dawson (2010) were interested inthe contributionof agricultural exports to economic growth in developing countries by estimating the relationship that exists between gross domestic product and agrarian and non-agrarian exports. Panel co-integration technique was used in analysing data from 42 underdeveloped countries. The results indicated a long-run relationship between agricultural exports and economic growth. Based on the findings, it was suggested that poor countries should adopt balanced export promotion policies whilefor rich countries, non-agricultural exports was recommended for increased economic growth.

Faridi (2012) explored the contribution of agricultural exports to economic growth in Pakistan. The author estimated the relationship between GDP and agricultural and non-agricultural exports for Pakistan using the Johansen long run co-integration technique for the period 1972–2008. The results showed that agricultural exports have a negative significant effect on economic growth. Bidirectional causality was noticed between agricultural exports and real GDP. On the bases of the findings, the study suggested that non-agricultural exports should be promoted in Pakistan.

Gilbert *et al.* (2013) were also interested in investigating whether agricultural exports have a significant effect on economic growth in Cameroon from 1976 to 2009. The authors used the generalized augmented neo-classical Cobb Douglas production function. They applied the Augmented Dickey-Fuller unit root test to test for stationarity of the variables, and the Engle and Grangercointegration analysis to determine long and short run relationships. The ARCH test and the Breusch-Godfrey Serial Correlation LM Test were equally used to test for model stability. Resultsof the study indicated that agricultural export variables have mixed effects on domestic growth. Coffee and banana exports exerted positive and significant effects on economic growth in Cameroon while cocoa export showed a negative and insignificant effect on economic growth.

A plethora of studies have been conducted to examine the effects of exports on economic growth, the so-called export-led growth hypothesis in the last two decades. These studies can be grouped following the statistical techniques used as well as the findings. Some of the early cross-country studies like those of Balassa (1978); Tyler (1981); in Gilbert *et al.* (2013); Kormendi and Mequire (1985) in Faridi (2012); Lopez (1991) and Khalifa Al-Youssif (1997) as cited in Abou-Stait (2005) conclude a high positive correlation between exports and economic growth based on correlation theory. Another group of studies; Voivodas (1973); Feder (1983); Ram (1987); Sprout and Weaver (1993) and Ukpolo (1994) used regression techniques and found that exports positively and significantly affected economic growth. Yet others like Jung and Marshall (1985); Kunst and Marin (1989); Sung-Shen *et al.* (1990); Bahmani-Oskooee and Alse (1991); Ahmad and Kwan (1991); Serletis (1992); Khan and Saqib (1993); Dodaro (1993); Jin and Yu (1995); Holman and Graves (1995) concluded causality between export growth and economic growth using Granger causality tests (Abou-Stait, 2005; Faridi, 2012). Recent studies focus on the Johansen cointegration and error correction models like those of Chemeda (2001); Abou-Stait (2005); Ekanayake (1999); Sanjuan-Lopez and Dawson (2010) and Faridi (2012).

It can be realized in this literature that many studies provide evidence for the export-led growth hypothesis, though a few find inconclusive evidence. The literature is dominated by studies which focus on the effects of total exports on economic growth, with just few on manufactured and agricultural exports. Though primary commodities make up a greater share of exports in Cameroon, it appears it is not given the place it deserves in the export-led growth literature in Cameroon. More so, literature on commodity-specific studies in this country, which has lots of policy implications in terms of which products should be promoted turns to be limited. This is one of the reasons why this current study focuses on timber exports, specifically on round wood which is the most traded wood category in the country. In addition, timber has longer term implications on growth compared to the other primary products which either are exhaustible or have relatively short rotation periods. Like some studies in the literature, this study adopts the Johansen cointegration and error correction modelling since it enables us establish the short run and long run situation particularly in this case of a renewable natural resource. The use of correlation technique and causality test is criticized on the grounds that they do not establish the extent to which one variable causes the other.

3. METHODOLOGY

This study covers a time scope of 34 years(1980-2014 inclusive). This period is considered long enough to capture the effects of any policy reforms within the export sector in general and timber exports in particular on economic growth. Again, it was after the late 1980's that timber emerged as a foreign earner for Cameroon, since world market pricesof oil, cocoa and coffee were falling. Most data required for this study was also available within this period. The study uses secondary data from the Food and Agricultural Organization (FAO) and the World Development Indicators (WDI). Data sources are complementary.

The theoretical foundation on which the model for this study is built is the neoclassical Cobb-Douglas production function that is modified to suit the current study. This is not different from

the methodology adopted by Chemeda (2001); Faridi (2012) and Gilbert *et al.* (2013) in modelling the functional relationship between exports and economic growth. The Cobb-Douglas production function as used and estimated by Cobb and Douglas (1928) is of the form;

$$Y = AL^{\alpha}K^{\beta}(1)$$

Where Y is the output, A is technological knowledge, L is labour input, and K is the capital input, α and β represents the input elasticity. Gross Domestic Product per Capita (GDPPC) is aggregate output (Y), total labour force (TFL) is the labour input while gross capital formation (GKFM) is the proxy for the capital stock (K). Since the aim of this study is to explore the effects of timber exports on economic growth, we augment the Solow production functionality to incorporate foreign earnings from timber (EARN) and imports of goods and services(M).

$$GDPPC_t = A_t\left(TLF_t^{\alpha}, GKFM_t^{\beta}, EARN_t^{\gamma}, M_t^{\delta}\right)(2)$$

Taking the natural logs (ln) on both sides to linearize equation (3.2), and accounting for the error term ($\boldsymbol{\mu_t}$), ourmodel can then be written as;

$$\ln GDPPC_t = \ln A_t + \alpha \ln TLF_t + \beta \ln GKFM_t + \gamma \ln EARN_t + \delta \ln M_t + \mu_t(3)$$

A priori$\boldsymbol{\alpha > 0;\ \beta > 0;\ \gamma > 0;\ \delta > 0}$

In equation (3) α, β, γ and δ are coefficients to be estimated. The non-negative variables of equation (3) are logged to enable interpretation of the estimated coefficients as elasticity. Since the cointegration methodology is used in the analysis, variables in this model are not differenced, though should all be integrated to the order one; I (1). This is because cointegration tests whether a linear combination of non-stationary variables (variables that are non-stationary at level), that is variables of the nature I (1) will become stationary, that is I (0) variables. Therefore, differencing variables in equation (3) is improper. The Johansen cointegration and error correction modelling approach is employed in this study because it shows the short run and long run dynamics. This is especially because the study concerns a renewable resource, which has implications for economic growth even in the long run.

Before delving in tocointegration analyses, the variables were tested for stationarity using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. This was done after the time series plot of each variable. If two or more time series have a unit root or are non-stationary, that is $I(1)$ it is possible that their linear combination can make them stationary, that is $I(0)$. In this case, the $I(1)$variables are said to be co-integrated (Zakrajsek, 2009). Co-integration implies the existence of a long-run equilibrium relationship among the variables. If one non-cointegrated series is regressed on another, it will give rise to a spurious regression. The multivariable system tests of cointegration, developed by Johansen (1988) and later applied by Johansen and Juselius (1990) was thus employed to test for nonsensical regression. To resolve the problem of lag-length which the Johansen test is very sensitive to, theAkaike Information Criterion (AIC), the Schwarz Information Criterion (SIC), Final Prediction Error (FPE) and Hannan-Quinn (HQ) information criterion are used. According to Engle and Granger (1987) if variables arecointegrated, there exist forces which restore equilibriumbetween them when broken. This return to equilibrium is achieved through a dynamic short-run adjustment process,represented by an error correction model. This correction mechanism is needed to recover all information lost during differencing the variables. It does this by introducing an error

correction term that enables us gauge the speed of adjustment of variables to their long-run equilibrium position. The error correction term gives the proportion of all the accumulated disequilibrium errors in the previous period, corrected in the current period (Olubusoye and Oyaromade, 2008). If the coefficient of the parameter is greater, the speed of adjustment of the model from short run disequilibrium to long run equilibrium will be higher.

The economic or a priori test was the first validation test that was carried out to verify whether or not the signs of the estimated coefficients conform to economic theory. Statistical (1st order) test use statistical measures like multiple coefficient of determination (adjusted R^2), t-statistics and F-ratio test to find out the reliability of estimated coefficients. Adjusted R^2 depicts the percentage of the total variation in the dependent variable accounted for by the joint variation of the explanatory variables in the model. The t-statistic test was used to test the significance of estimated regression coefficients. The F-test was used to test for the overall significance of the multiple coefficient of determination, adjusted R-squared. It measures the degree of reliability of the adjusted R-Squared (Koutsoyiannis, 1997). The Langragian Multiplier (LM) test was used to test for autocorrelation. Multicollinearity was tested using the pairwise correlations. Heteroskedasticity was tested using the ARCH test meanwhile the Wald test was used to test for the joint significance of short run regression coefficients.The residual normality test was employed to determine if the residuals of the short run model are well-modelled by a normal distribution.

4. PRESENTATION AND DISCUSSION OF RESULTS

From the results of the pairwise correlations presented on Table 1 (table computed using STATA 11), it can be observed that the correlation coefficients between all the independent variables are sufficiently low (below the threshold value of 0.8). This means that multicollinearity is absent between the explanatory variablesin the model though only the correlation coefficient between DLOG (TLF) and DLOG (EARN) is found to be significant.

Table-1. Pairwise Correlations Result

	DLOG(GDPPC)	DLOG(TLF)	DLOG(EARN)	DLOG(GKFM)	DLOG(M)
DLOG(GDPPC)	1.000000				
DLOG(TLF)	-0.2141 (0.2315)	1.000000			
DLOG(EARN)	-0.2640 (0.1377)	0.6022** (0.0002)	1.000000		
DLOG(GKFM)	0.3972** (0.0021)	-0.1462 (0.4168)	-0.1681 (0.3496)	1.000000	
DLOG(M)	0.4547** (0.0078)	-0.2566 (0.1494)	-0.1243 (0.4909)	0.2538 (0.1540)	1.000000

Figures in brackets ( ) represent t-values. ** = 5% level of significance.

Based on the Augmented Dickey-Fuller and Phillips-Perronunit root test results, all the variables achieved stationarity after first difference, meaning that they are integrated of the order one, I (1). The p-values for the ADF and PP test statistic reveal that the results are 1%

significant. Table 2 shows the unit root tests results computed using Eviews 7. Since all variables are I (1) processes, the pre-condition for the Johansen cointegrationtest is satisfied. However, before conducting the Johansen test, a lag order selection test was carried out to determine the optimal lag-length that is to be used, since this test is sensitive to the number of lags. Most lag selection criteria suggested the use of one lag in carrying out the Johansen test (not presented due to space).

Table-2. Augmented Dickey-Fuller Unit Root Test Results

Variables	ADF Test Statistic			PP Test Statistic		
	Test Statistic	P- Value	Remark	Test Statistic	P-Value	Remark
GDPPC	-5.735386	0.0000*	I (1)	-5.735375	0.0000*	I (1)
TLF	-5.612663	0.0001*	I (1)	-5.613960	0.0001*	I (1)
EARN	-6.969635	0.0000*	I (1)	-11.72101	0.0000*	I (1)
GKFM	-5.191537	0.0002*	I (1)	-7.152417	0.0000*	I (1)
M	-4.394979	0.0015*	I (1)	-5.337959	0.0001*	I (1)

Note: * = significant at 1%

TheTrace statistic (table 3) and Maximum-Eigen statistic (table 4), which are computed using the Eviews 7 software show the existence of two cointegrating equations at 5% level of significance. Therefore, the null hypothesis of no long run relationship between GDPPC, GKFM, TLF, EARN and M is not accepted. By implication, a long run relationship exists between the variables.

Table-3. Unrestricted Cointegration Rank Test (Trace) Results

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05Critical Value	P-Value**
None *	0.667977	93.40449	69.81889	0.0002*
At most 1 *	0.589602	57.02029	47.85613	0.0055***
At most 2	0.393291	27.62956	29.79707	0.0872
At most 3	0.278420	11.13925	15.49471	0.2031
At most 4	0.011178	0.370950	3.841466	0.5425

*= significant at 1%, *** = significant at 10%

Table-4. Unrestricted Cointegration Rank Test (Maximum Eigenvalue) Results

Hypothesized No. of CE(s)	Eigen Value	Max-Eigen Statistic	0.05 Critical Value	P-Value**
None *	0.667977	36.38420	33.87687	0.0246**
At most 1 *	0.589602	29.39073	27.58434	0.0290**
At most 2	0.393291	16.49031	21.13162	0.1975
At most 3	0.278420	10.76830	14.26460	0.1662
At most 4	0.011178	0.370950	3.841466	0.5425

**= significant at 5%

The normalized cointegrating coefficients for the cointegrating equation normalized on GDPPC are thus represented on equation 4. Due to normalization, the signs of these long run coefficients are reversed before comparing to see if they are expected or not.

$$\underset{}{LOG\,(GDPPC)_t} = \underset{[-150.99]*}{0.977LOG(TLF)_t} + \underset{[-17.742]*}{0.6795LOG(EARN)_t} + \underset{[-5.5714]*}{0.087LOG(GKFM)_t} - 0.0001LOG(M)_t \quad (4)$$

Note. *The numbers in parentheses represent t-values.* = significant at 1%*

The results represented by equation 4 show that gross capital formation, total labour force and foreign earnings from timber have a long run positiveand significant effect on economic growth in Cameroon while the imports of goods and services have a long run negative insignificant effect on economic growth in Cameroon within the period of study, all things being equal.Quantitative results reveal that a 1% increase in gross capital formation, total labour force and foreign earnings from timber will each result to a 0.087%, 0.977% and 0.068% increase in the economic growth of Cameroon respectively within the period of study under consideration, everything being equal.This result is statistically significant at 1% level since the calculated t-values, in absolute terms of gross capital formation, total labour force and foreign earnings from timber (5.571, 150.99 and 17.74) are greater than the table value of 1.310. The results of this study confirm to the findings of most of the empirical studies on the export-led growth literature amongst which are the studies of Chemeda (2001); Abou-Stait (2005); Dawson (2005); Sanjuan-Lopez and Dawson (2010) and Ekanayake (1999). However, results show that an increase in imports of goods and services will bring about a negative and insignificant effect on economic growth in Cameroon. The presence of cointegration between GDPPC, GKFM, TLF, EARN and M sets a stage for the estimation of the error correction model, to determine the error correction term. The results of the dynamic short term error correction model are shown on table 5.

Table-5. The Dynamic Short-run Error Correction Model

Dependent Variable: DLOG (GDPPC)

Method: Least Squares

Included Observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-statistic	P-Value
$ECT_{t-1(1)}$	-8.534427	1.952883	-4.370168*	0.0002
$ECT_{t-1(2)}$	0.281505	0.167818	1.677440	0.1059
D(LOG(GDPPC(-1)))	6.156987	3.372974	1.825388***	0.0799
D(LOG(TLF(-1)))	-6.115258	3.363209	-1.818281***	0.0810
D(LOG(EARN(-1)))	-0.146494	0.094220	-1.554798	0.1326
D(LOG(GKFM(-1)))	-0.377702	0.155822	-2.423933**	0.0229
D(LOG(M(-1)))	-0.128490	0.164626	-0.780496	0.4424
C	-0.003940	0.017324	-0.227451	0.8219
Diagnostic Tests				
Adjusted R-squared	0.446211			
F-statistic	4.683388			0.001819
B-G LM Test (Obs*R^2)	8.437892		Prob. Chi Square(1)	0.0037
ARCH Test (Obs*R^2)	0.368857		Prob. Chi-Square(1)	0.5436
Jarque-Bera	0.475212			0.788513

* = significant at 1%;** = significant at 5%; *** = significant at 10%.

From the results of the short-run error correction model, GDP per Capita in the lagged one year period has a positive and significant effect on economic growth in Cameroon within our period of study. So, policy recommendations geared towards influencing economic growth in Cameroon in the short run must consider the lagged one-year period of GDP per Capita.

A 1% increase in GDP per Capita in the lagged one year period will lead to a 6.12% increase in GDP per Capita in the short run within our period of study. Results also reveal that gross capital formation, total labour force, foreign earnings from timber and imports in the lagged one-year period each have negative effects on the economic growth of Cameroon. However, only gross capital formation and total labour force are significant. The negative effect of foreign earnings from timber to the economic growth of Cameroon signifies an eventual decline in the use of timber resources over time.

Furthermore, apart from imposing a limitation on output growth per worker, causing total labour force to be negative and causing a drag on economic growth, foreign earnings from timber may not have been channelled to create the right kind of real capital investmentsrequired to stimulate the economic growthof the country. According to the variety hypothesis, increased real incomes from exports are supposed to stimulate economic growth through imports of variety of goods. Corden's supply driven model also emphasizes increased capital goods imports as a source of growth. Despitethe existence of these imported goods in the Cameroon context, imports still play a negative insignificant effect on economic growth.

The error correction term ($ECT_{t-1(1)}$); the adjustment coefficient is negative and significant at 1% level, implying that at the time t-1, actual (realized) GDP per Capita is below its long run value. Gross Domestic Product per Capita therefore adjusted itself forward to restore equilibrium in the next period. The value of the error correction term is -8.534, meaning 853.4% of errors which occurred in the short run were corrected in the long run to restore equilibrium. So the model adjusted itself very fast towards the long run equilibrium position.

The value of the multiple coefficient of determination is 0.446, implying that about 47% of the total variations in GDP per Capita are caused by the variations in gross capital formation, total labour force, foreign earnings from timber and imports of goods and services, with about 53% accounted for by the disturbance term. The adjusted R-squared is significant at 1% level, given a p-value of the F-statistic of 0.0018 which is less than 1%. We fail to accept the null hypothesis and conclude that the adjusted R-squared is significant. The results are therefore 99% reliable.

Autocorrelation in this short-term dynamic model was tested using the Breusch-Godfrey Serial Correlation LM Test since the lagged dependent variable appears in the model as an explanatory variable. Under the null hypothesis of no autocorrelation, the probability value of the Chi-Square statistic for the serial correlation LM testis 0.0037 which is less than 1%. This study therefore fails to accept the null hypothesis and conclude that autocorrelation is present in the short term model. The ARCH test was also conducted to test for heteroskedasticity in the short run model, under the null hypothesis that there is no ARCH effect.The probability value of the Chi-square statistic for the ARCH test is 0.5436 which is greater than 5%, so the null hypothesis that there is no ARCH effect is not rejected, showing that heteroskedasticity is absent in the

short run model. The residualnormality test was also carried out to determine whether the residuals of the short run model are normal.Under the null hypothesis that residuals of the model are normally distributed, the probability value of the Jarque-Bera statistic is 0.475212, which is more than 5%. Therefore, this null hypothesis is not rejected, meaning that the residuals of the model are normally distributed.

5. POLICY SUGGESTIONS AND CONCLUSION

This study examines the effects of timber exports on the economic growth of Cameroon over 34 years using the Johansen Cointegration and Error Correction modelling approach. The results showed that in the short run, timber exports have a negative and insignificant effect on economic growth in Cameroon whereas in the long run; timber exports have a significant positive effect on growth. This study therefore recommends that timber exports should be limited. This means that most of the wood harvested should be processed locally such that only finished products from the wood are exported.To do this, it is firstof all suggested that industries should be established to transform the harvested wood to fully processed wood products. Furthermore, the professional knowledge and expertise needed to transform this harvested wood to finished products should be made available by training local technicians in the wood processing value chain. We also recommend that the Cameroon government should limit imports of manufactured wood products through foreign trade restrictive measures in order to encourage the consumption of locally made products from furniture. Again, the number of industries involved in merely harvesting timber and exporting to Europe should be limited by tightening conditions required for being granted a harvesting right while at the same time ensuring the establishment of industries transforming wood in to furniture. This is necessary because these harvesting industries have as main objective the export of semi-processed wood with little value addition.Based on our findings, it can be concluded that timber exports has an insignificant negative effect on economic growth in Cameroon in the short run while in the long run, the effect is positive and insignificant.

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