An Econometric Investigation into the Wagner's Law in the Cameroon Economy: The Vector Auto-Regressive Approach.

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ABSTRACT

In this work, we aimed at investigating into the Wagner's Law in Cameroon using data from 1980 to 2012 based on the Structural Vector Auto-regression (SVAR) Methodology under the Cointegration procedures. The findings from this study challenged most previous studies in that our models achieved stability and are also Cointegrated to justify that although short-term instability do exist in the data set, there still exist a long-run equilibrium among the variables. Further diagnostic tests confirm that the data are well behaved. Although our findings reveal that the short-run dynamic impact of government expenditure on economic growth rejects the Wagner's law, the long-run relationship found insignificant influence of government expenditure on economic growth. We observe that government expenditure can change the fortune of Cameroonians if directed to the real sectors of the economy so as to improve on the social welfare of Cameroonians. Furthermore, we recommend that, guided commercialization, liberalization and privatization should be given adequate attention.

Keywords: Wagner's Law; Structural Vector Auto-regression; Cointegration and Dynamics.

Résume

Cette étude vise à examiner la loi de Wagner au Cameroun en utilisant les données de la période allant de 1980 à 2012 basée sur le model d'auto-régression de vecteur structurel de cointegration. Les résultats de l'étude défient ceux des études antérieures étant donné que les variables choisies du model sont restées stables et cointegreés montrant que malgré l'existence d'instabilité des données dans le court terme, il y a la présence d'un équilibre à long terme parmi ces variables. D'autres tests de diagnostique confirment le bon comportement des données. Bien que la relation dynamique du court terme entre les dépenses gouvernementales et la croissance économique réfute la loi de Wagner, la relation du long terme entre les dépenses gouvernementales et la croissance économiques reste insignifiante. Ainsi donc, les dépenses gouvernementales peuvent améliorer le bien-etre social des Camerounais si elles sont canalisées vers les secteurs réels de l'économie du pays. De même, il est nécessaire d'adopter une politique de commercialisation guidée, libéralisation et privatisation au Cameroun.

Mots clés : Loi de Wagner, auto-régression de vecteur structurel, cointegration et dynamique.

INTRODUCTION

The aggregate demand and supply functions explain the extent to which an economy could grow based on the variation of any or all of its components. By the classical view, these aggregate demand and supply indicators determinant economic perform properly without any intervention. However, evidence in Europe and beyond have shown that the free market mechanism could not in 1925 solve the global economic crisis that resulted to high rate of unemployment, high prices and fallen stock market prices.

The emergence of the Keynesians views that advocated the role of government to include: provision for price stability; exchange rate stability; balance of payments surplus; high rate of economic growth; equitable distribution of income; full employment and poverty reduction have changed the classical orientations in favour of government intervention. Interests in Sub-Saharan African countries and beyond have been shifted towards the examination of the sizes of government in the component of aggregate demand. This concern centered on or around the effects of the expansion of government sector on economic activity. Lermes (1984) in Abizadeh and Basilerske (1990) and in Njimanted (1990, 2011) observed that such government expansion would increase aggregate demand but jeopardizes the ability of the market forces to function well in the allocation of resources. In this direction, the interest should be how the revenue and expenditure are determined with the view of assessing the impact of public sector on economic growth.

Between 1960 and 1980 the vision of the government for all Cameroonians underscore the necessity and urgency to build a modern Cameroon that maximizes the potentials of every Cameroonian to become one of the strongest African economy, and a force to be reckoned with within the world before the mid of the 21st century. During this period, the five-year development plan put in place by the government was to coordinate the framework of action in close collaboration with all the stakeholders to consolidate the achievements of every development plan and build a solid foundation for the attainment of Cameroon's long-term vision. The take home wages were good, infrastructure like roads, airports, seaports, rails, recreation centres, schools, universities and ministries although mostly in urban areas were standard. The few university students were paid to study while university drop-out could find their ways into different professional institutions of their choice. Youths migrating from Cameroon to other countries were not for greener pastures, but to acquire knowledge for better job on their return. Companies utilised these advantages, to locate in Douala, and other small towns in Cameroon, linked to other countries by seas, railways, airways and rivers. The marketing board, the Cameroon Banks, the Cameroon Shipping Companies, air-strips, vessels and transportation were noted to have provided employment to thousand of Cameroonians in particular and foreigners in general. Trade between Cameroon and her neighbouring countries especially Nigeria, Gabon, Chad was very active in favour of Cameroon.

Investigation into the government expenditure trend in Cameroon, reveals that in 1961, shortly after independence the first five-year development plan (1961-1966), while government expenditure stood at 52.3 billion FCFA, poverty based on head count index taking 1960 as the base year was low (12 percent). These situations were not very different between 1967 and 1980. During the 5th five-year development plan, (1981-1986) while the targeted real GDP was still 10 percent, the realized real GDP was -3.56 on the average. This was accompanied by total government expenditure of 22.68 billion FCFA on the average, while poverty based on head count index increased from 2.6 percent to 25.56. While in recent time, government expenditure has increased more than 10 times its 1970's value, more than 32.4 percent of Cameroonians are said to be living below the core poor, that is more than 70 percent below the poverty line (Njimanted, 2008).

The shift from the five-year-development plan to the budgetary system has further destroyed the public finance process in Cameroon. In fact, government financing over the years has been characterized by pension crisis, arrears of salary of civil servants huge debts to government contractors and suppliers of goods and services. Misallocation and mismanagement of both human, natural, material capital and financial resources at all levels in the budgetary system in Cameroon are significant. Tribalism, nepotism, corruption, and power fighting have buried the spirits of hard work and creativity. The more than 62.4 percent of Cameroonians who are observed to be living below the core poverty line is said to have been induced by under stressed income inequality, high level of unemployment, high government expenditure in non- productive sector of the economy and high general price level among others.

A cursory perusal into world policy trends revealed that more than 98 per cent of the countries of the world practiced mixed economic system tilted towards

Socialism or Capitalism. In Africa, with few exceptions, the orientation is in favour of government control of the mode and means of production. Wagner (I893), on the basis of empirical findings, came up with a view that there was a long-run tendency for State activities to grow relative to the growth in national income. He deduced his "Law" of increase in State activity (otherwise known as Wagner's Law), in which government expenditure must increase at a rate faster than national output. This law has culminated in a vast literature with various interpretations. The most common interpretation is that growth in government expenditure increases domestic demand, brought about by an increase in per capita income. Previous studies in this area dwell on an appropriate measure of public sector growth; correct interpretation of the Law; finding an index of government size to facilitate comparison between countries; and testing the law by adopting a cause-effect relationship to estimate the income elasticity of government expenditure. While the tests of the Law by some scholars have found evidence to support the Law, others have refuted it. Even among those that have confirmed the Law, their results have been conflicting. However, no attempt has been made to conduct such study in Cameroon or the adaptation of the Vector Auto-Regressive methodology being used by any of the previous studies. Therefore, this paper aims at investigating into the dynamics of government expenditure on the economy of Cameroon and the feedback effect of previous growth on current growth in Cameroon.

To achieve the above objectives, this paper has been divided into five sections. Having gone through section one, (introduction), section II reviews some existing empirical and theoretical literatures. Section III drew on the analytical methodology while section IV discusses the results. Section V draws the work to logical conclusion through summary of major findings and policy remarks.

II LITERATURE REVIEW

The major concerns of economists in public sector growth are the extent to which the economies are controlled by the public sector and the establishment of a cause and effect relationship between variables that could allow government to grow. A turning point of the study of public sector expansion or growth is accredited to Wagner (1893). He observes that government expenditure would increase at a rate faster than national output thus increased industrialization, opens up possibilities leading to the corresponding expansion of those functions which government alone cannot perform (Abizadeh & Basilevsky, 1990).

Although Wagner was not the first economist to make this hypothesis, he was, however, the first to use empirical evidence to support his view. Various studies have utilized a single independent variable in a regression equation to test the validity of the Law, while others have included more than one independent variable to test the same law with conflicting conclusions. While some have vindicated the Wagner's Law others have rejected or failed to confirm it. For instance, Musgrave (1959) regressed nominal spending with Gross Domestic Product (current prices or deflated by GDP deflator) as distinct from the general postulation where it is expected that if the ratio of government expenditure to output (G/GDP) increases as the ratio of output to population (GDP/N) increase, the elasticity value for the relationship would exceed zero. Gupta (1967) used the double logarithmic function fitted at different sub-periods, with per capita total government expenditure and Gross National Product (GNP) as dependent and independent variables, respectively to test, among others, whether a social upheaval is associated with a change in the "income elasticity" of government expenditure, and if such a change was observed or whether it was statistically significant. His conclusion was that significant change in income elasticity was associated with each major upheaval and no generalization could be made about the direction of the change.

A study by Hemning and Tussing (1974) used Indirect Least Squares (ILS) to examine income elasticity estimate of demand for public expenditure in U.S. Even though it shows some improvements by eliminating the bias associated with single equation regression, it was still subject to some degrees of simultaneous equation bias. Ganti and Kolluri (1979) deviated from the Ordinary Least Squares (OLS) and system estimation procedure and cast their model in the mold of Zeliner's (1970) reformulated errors - in-variables framework called regression models containing unobservable independent variables and derived, directly, efficient estimates of the gross private expenditure elasticity of government expenditure before deriving the income elasticity of government expenditures. They claimed their estimates showed improvement over ILS and concluded that there was evidence in favour of Wagner's hypothesis.

Abizadeh and Gray (1985) used panel data from 55 countries, divided into three groups, according to their level of development from 1963-79. Using 5 regressors, they upheld Wagner's Law for the wealthier groups, but not for the poorest ones. This tended to contradict Beck's hypothesis indicated previously. It became clear that no unique test of Wagner's Law existed, and where strong evidence existed, it was fraught with methodological shortcomings. This was as a result of

the fact that all tests so far ignored the time series properties of the data used.

In recognition of this fact, Henrekson (1993) tried to solve this problem by first looking at the stationary of the variables used. In particular, he tested Wagner's Law using the interpretation that government expenditure relatives to GDP reflect better GDP per capita. Based on Swedish data from 1861-1990, he concluded that the two variables are not co integrated and thus, constant elasticity estimate could not be obtained from the relation, and as such Wagner's Law was a spurious relationship. This work aims to go beyond this by adopting the Co integrated and post tests in the Vector Autoregressive Error Correction Mechanism (VARECM) methodology. This method which is straightly applied in time series data is suitable in this study more than the previous studies because of the feedback effects which benefit the government sector due to previous year' government expenditure. Furthermore, the transformation process of government expenditure verified whether it has a time path agreement with other explanatory and predetermined variables.

Theoretical Framework

Closely related to Paul Samuelson's fundamental of (1955) and Musgrave 1986 is the general equilibrium analysis of public sector activities, which takes into consideration the demand and financing of public goods. It emphasizes the optimal allocation of resources between the public and the private sector of a mixed economy like that of Cameroon. The relevance of this model in this work is the fact that it considers both the government revenue and its expenditure in the provision of the public goods. Moreover, it is a model of resource allocation that can be modified to show the interaction between desired levels of public goods, economic growth and the cost of such growth (Barnett, 1993).

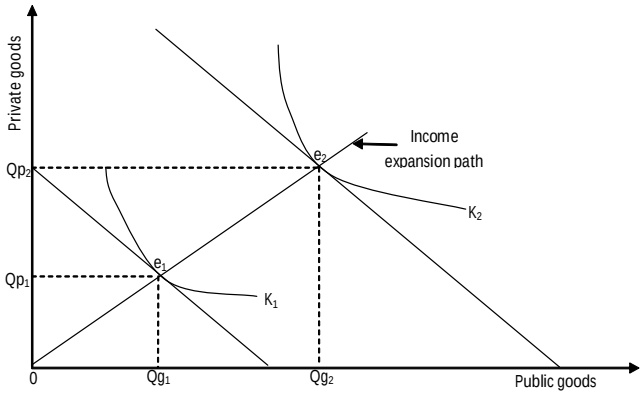
The demand function for public goods especially in Cameroon is derived by considering a utility maximizing behaviour coupled with a description of underlying economic constraints. By this, a rational individual will always choose a most preferred bundle (X) that consists of both public and private goods from a set of affordable alternatives (Xi) that satisfy individual's budget constraint. With fixed amount of income (Y), public goods (Qg) and private goods (Qp), the utility (U) will be a function U = (Qg, Qp). Given the prices of Qg as PQg and Qp as PgP, a rational consumer would choose to allocate the income between public and private goods in such a manner that the marginal rate of substitution of the public good for private good (MRSQg.Qp) equals the ratio of their prices. That is (Silberberg, 1991 and Rubinfield, 1996). This shows that considering the social indifference curve, U(Qg, Qp) and the budget constraints Y = PQg.Qg + PQp.Qp, utility is maximized when;

$$L = U(Qg.Qp) + \lambda(Y - PQg.Qg - PQp.Qp) \ldots\ldots (2.1)$$

Taking the partial derivative of (2.1) with respect to Qg,Qp and λ, we obtain Qg* and Qp*.

The demand for government goods equation which can be generated from the above is dQg = f (PQg, Y, Z); where dQg represents the demand for the public goods by individuals, PQg is the average price paid for the public goods; Y is the individual income and Z is a vector of variables reflecting the economic and political composition of the economy (Barnett, 1993). At each level of output of the public goods, the demand curve shows how much the individual would be willing to pay for an extra unit of the public good. With increase in income, the vertical intercept of the budget line is altered but its slope does not change with fixed prices. The individual can now purchase more of both goods and attain a higher utility - maximizing consumption choice for both public and private goods. This resulting locus of utility-maximizing bundles is known as the income expansion path (Siberberg, 1991; Varian, 1991 and 1997).

Based on the income expansion path, an Engel Curve is derived with related income to the quantity demanded of the public good. A straight income expansion path leads to a linear Engel Curve, through the origin. By this, the individual demands the same proportion of each commodity at each level of income (Wawire, 2006). In the case of utility-maximizing consumers, the income expansion path is expected to bend towards the private good with increase in consumers' income. In this case, both goods are demanded with more of the private goods than the public goods. This might not be true for the Cameroonian economy because the majority of Cameroonians are poor, irrational in consumption, inconsistent and unpredictable over time path. Therefore, in Cameroon, the income expansion path of the Engel Curve is expected to bend towards the demand for public goods as presented below.



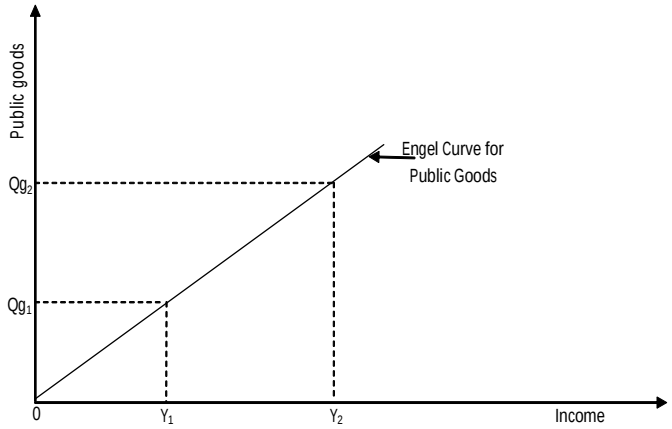


Figure1.2: Engel Curve for Public Goods

From the above, it is possible to justify that increase in government expenditure could enhance economic growth hence in support of the Wagner's Law.

III Analytical Methodology

3.1 Scope and Sources of Data

This study covers the period of 31 years ranging from 1980 to 2012. The choice of this range is due to the availability of data and because it is within this period that government expenditure was observed to match with different policy reforms. The study has also made use of statistical information much of which are extracted from the Cameroon Financial Bills, Annual Reports of the Ministry of Economy and Finance, Department of Statistics and National Accounts (DNCS), the Central Bank for Central African States (BEAC), African Development Indicators, various issues and World Bank World Table of 2010, projected to 2015. Therefore, this study lies on intensive library research.

3.2 Model Specification, Estimation and Validation

In addition to the theoretical and empirical literature, this study has also adopted the augmented Cobb-Douglas production function to include the third and fourth sectors in the aggregate demand function proxied by government expenditure (GOVEXP) and Exchange rate (EXCHR) respectively. In a functional form, the model is specified as:

RGDPt = A0 + A1GOVEXPt + A2INFLAt + A3LABt + A4EXCHRt + U1 -- (3.1)

A priori $A_0 \neq 0$, A1> 0, A2<0, A3>0 and A4<0. Where; RGDP is real Gross Domestic Product; GOVEXP is government expenditure; INFLA is inflation obtained as the first difference of the consumer price index; LAB is the labour force proxied by active population and EXCHR is the exchange rate.

The Vector Auto-Regression (VAR) approach is adopted in the estimation of the parameters of the above model. VAR is quite a pragmatic approach that is commonly used to examine the short and long term interactions between macroeconomic aggregates when it is established that all the variables in question are endogenous. In this work, we have adopted the Structural Vector Auto-Regression (SVAR) framework, which has the ability to investigate into the role of innovations on an economy and their possible determination (SIM, 1982, 1986; Bernake and Blinder, 1992). Sims (1980) explains that VAR framework made it possible to direct both relative meaning and the dynamic effect of the disturbances on macroeconomic variables. Its main criticism has been that it has a largely theoretical identification mechanism with little economic foundation (Cooley and Leroy, 1985). The SVAR methodology is observed to provide improvement on the identification mechanism by imposing restriction based on economic theory. The methodology is generally focused on how innovations to one endogenous variable affect other endogenous variables and the direction of instant correlation between innovated variables can be assessed. It is also possible to determine whether any stocks within the period of study have temporary or permanent effects on the endogenous variables.

The SVAR applied to this study composed of a system of five equations representing five endogenous variables structured as show below.

The process of estimating the SVAR involves five steps. First, a reduced VAR is carried out using the method of Ordinary Least Squares when the appropriate Lag length is selected to ensure no serial correlation from the residuals. In the second step, the structural parameters of the model are identified through imposition of theory-based restrictions. Third, in the case where shocks are assumed to have temporary effects, the short run restriction SVAR model is used. However, where the shocks are assumed to have permanent effects, the long run SVAR is employed. Lastly, the Orthogonalised structural response function and forecast error variance decomposition are analyzed.

Validation of Results

As an econometric study, a series of tests are carried out to validate the SVAR results. We start by testing the stationary of the time series data included in the models. We employ the Univariate Augmented Dickey-Fuller (ADF). The Dickey-Fuller test assumes that the error term Ut is uncorrelated. That is the COV (Ut Ut-1) = 0. There is the breakdown in any system especially when results from such system have their COV (ut Ut-1)> 0. A solution to this is provided when the addition

$$RGDP_t = A_0 + \sum_{j=1}^{31} A_j RGDP_{t-j} + \sum_{j=1}^{31} B_j GOVEXP_{t-j} + \sum_{j=1}^{31} C_j INFLA_{t-j} + \sum_{j=1}^{31} D_j LAB_{t-j} + \sum_{j=1}^{31} E_j EXCHR_{t-1} + U_{1t} \quad \text{---------- (3.2)}$$

$$GOVEXP_t = A_1 + \sum_{j=1}^{31} A_{2j} GOVEXP_{t-j} + \sum_{j=1}^{31} A_{3j} RGDP_{t-j} + \sum_{j=1}^{31} A_{4j} INFLA_{t-j} + \sum_{j=1}^{31} A_{5j} LAB_{t-j} + \sum_{j=1}^{31} A_{6j} EXCHR_{t-1} + U_{2t} \quad \text{---------- (3.2)}$$

$$INFLA_t = A_1 + \sum_{j=1}^{31} A_{2j} INFLA_{t-j} + \sum_{j=1}^{31} A_{3j} RGDP_{t-j} + \sum_{j=1}^{31} A_{4j} GOVEXP_{t-j} + \sum_{j=1}^{31} A_{5j} LAB_{t-j} + \sum_{j=1}^{31} A_{6j} EXCHR_{t-1} + U_{2t} \quad \text{---------- (3.3)}$$

$$EXCHR_t = \alpha_0 + \sum_{j=1}^{31} \alpha_{1j} EXCHR_{t-j} + \sum_{j=1}^{31} \alpha_{2j} RGDP_{t-j} + \sum_{j=1}^{31} \alpha_{3j} GOVEXP_{t-j} + \sum_{j=1}^{31} \alpha_{4j} INFLA_{t-j} + \sum_{j=1}^{31} A_{5j} LAB_{t-1} + U_{5t} \quad \text{---------- (3.5)}$$

lagged value is introduced in the Dickey-Fuller test called the Augmented Dickey-Fuller unit root test given as:

$$\Delta Y_t = b_0 + \delta Y_{t-1} + \sum_{i=1}^{n} \alpha \Delta Y_{t-1} + \sum t \text{------(3.6)}$$

Where; is a white noise process. It is expected that the value calculated should be more negative than those obtained from the table t-value at 10% or less. Based on the data used in this work, no trend is observed. However, there is the presence of the intercept as such our specification of equation (3.6) is an example of stochastic process with drift. Empirical evidences have shown that most non-stationary time series achieve stationary after their first difference. A confirmatory test is also conducted using the Phillips-Perron (PP) unit root test. This is carried out because the ADF test assumed that the error terms Ut and Ut-1 are independent and identically distributed, which is empirically not true. The PP also has added advantage in that it uses non-parametric statistical methods to take care of the serial correlations in the error without adding lagged difference terms. Furthermore, the use of the PP unit root test replaces the use of lags in the ADF test, which has been criticized as being arbitrary (Nyong, 2005). Both the ADF and the PP tests strongly support the hypothesis that the variables used are non-stationary and are stationary after their first difference. The graphical complementary parts of these tests are not presented in this work due to space. However, both tests have been criticized based on the size and power of the tests. By the size of the tests, we mean the probability of committing a type 1 error is high and by the power of the tests, we also mean that the probability of rejecting the null hypothesis when it was not expected to be rejected is also high (Terrence and Mills, 2001).

To overcome the above criticisms and those associated with structural breaks in the system we also made use of the Denis Kwaikowski, Peter CB. Phillips, Peter Schmidt and Yongeheol Shin (1992) unit root test which is strongly related to the language multiplier (LM) test which hypothesized that the random walk has zero variance. The test requires an estimator of the residual spectrum at frequency zero and a set of exogenous regressors (Njimanted, 2011).

Furthermore, this test statistic is based on the examination of the null hypothesis that a given series is level-stationary or stationary around a deterministic trend against the alternative that the series is first or second difference stationary. To improve the power of the unit root test, the Elliot, Rethenberg and Stock (1996) proposed a local approach to unity de-trending of the time series on the basis of which a flexible optimal point "P-test" takes serial correlation of the error term into account. This is strongly an advancement of the Dickey-Fuller (DF) test with GLS de-trending, which is the modification of the ADF test in which the data are de-trended so that

explanatory variables are taken out of the data prior to running the test regression. Finally, the Ng and Perron (NP) test for unit root is employed on the ground that it modifies the PP statistics specification for exogenous regressors and a choice of method for estimating the frequency zero spectrum estimation. The use of Cointegration technique allowed this study to capture the long-run equilibrium relationship between non-stationary series within a stationary model (Adam, 1998; Johnston and Dinardo, 1997). Furthermore, Cointegration avoids both the spurious and inconsistent regression problems which would have otherwise occurred with the regression of non-stationary series. It also permits the combination of the long-run and the short-run information in the same model and overcome the problems of losing information that might had occurred from attempts to address non-stationary series through differencing (Adam, 1998). Cointegration technique makes it possible to capture the information of non-stationary series without sacrificing the statistical validity of the estimated structural equations in VAR.

Testing for Cointegration principally requires the use of Granger (1986) and Engel et al., (1987) two-step procedures in which the residual obtained from the estimation of the specified model using OLS is tested for stationary based on ADF and PP unit root tests. That is; et = Yet-1 + ut, where ut NN (0 δ^2). It has been observed that the Engel and Granger method is based on single equation estimates, it does not systematically provide for separate estimation of multiple Cointegration vector and could not be effectively used in the testing of Cointegration in two or more variable models.

Based on the above limitations, it is clear that consistent conclusion cannot be obtained in our results in the area of Cointegration since our structural models are estimated based on SVAR procedure. In this case, we have adopted the Johansen (1988); Johansen and Juseluis (1992) methodology based on SVAR approach as such suitable for this study. It is applied on more than two variables simultaneously; it is used in estimating and testing for the presence of multiple Cointegrating vectors; it determines both the number of Cointegrating vectors and provides estimates of these vectors together with estimates of the adjusted parameters.

The merits of the above methodology include stable parameter estimates, since analysis are based on stationary time series data. It is also data admissible and existence of theoretical consistency would enhance the forecasting and policy formulation with the model. Furthermore, Co-integration an Error Correction Model (ECM) is used in this study because it adds richness, flexibility and versatility to the econometric modelling and integrates short-run dynamics with long-run equilibrium. Hence, accurate predictions can be confidently made on the economic relationship between economic growth and government expenditure as determinants of growth (Salmon 1982; Niclel, 1985, Domowitz and Elbadawi (1987).

Presentation and Discussion of Results

The graphs of all the variables used in the specification of equation 3.2 project the existence of stochastic trend with drift. In this case, they are non-stationary with intercepts but no particular trend. This therefore, calls for the test of stationarity to be conducted on the variables as presented in table 4.1 below.

As presented in table 4.1, the Augmented Dickey Fuller (ADF), Phillip-Perron (PP), Kwiatkowski-Phillips Schmidt-Shin (KPSS), Elliott-Rotherberg-Stock (ERS) and the Ng. Perron (Ng-P) tests for unit roots suggest that all variables are first difference stationary. That is, they are I(1). By this, they have satisfied the necessary

Table 4:1: Unit Root Tests for Time Series Period 1980-2011.

Series	Level		First Difference		KPSS	ERS	NGP
	ADF	PP	ADP	PP			
RGDP	-2.034	-2.871	-3.121	-3.047	1.739	2.262	-11.682
GOVEXP	-2.531	-3.001	-4.322	-4.360	1.209	1.883	-14.274
INFLA	-0.796	-1.021	-8.824	-27.218	1.500	2.174	-10.891
LAB	-1.421	-2.441	-5.897	-8.239	1.754	1.870	-23.743
EXCHR	-2.361	-3.086	-5.162	-5.163	1.135	1.946	-14.542
C.V 5%			-3.162	-3.007	1.135	1.123	-6.891

C.V stands for the critical values for the various tests of stationarity

Source: Extracted by author from the various test results.

conditions for generating a Cointegrating system.

In estimating the VAR, special consideration is put in place to ensure an appropriate specification of the Lag length to avoid the existence of serial correlation especially from the structural residuals. The tests for the Lag length adopted in this work but not presented due to space include; the final prediction error (EPE) test, Akaike Information Criterion (AIC), and the Hannan-Quinn (HQ) Criterion. Conventional VAR automatically provides results of two lags as presented in table 4.2.

The results reveal a weak negative relationship between government expenditure and real economic growth in Cameroon in the short run. This result is consistent in the current and previous year although its value in two year lag is positive but not significant. While previous real GDP impacts positively on current real GDP, its two years lag reveals an insignificant negative relationship on current real GDP. Inflation has the same response to current real GDP as it is the case with real GDP on itself. An interesting result is the case where one year

Table 4.2 Vector Autoregression Estimates

Sample (adjusted): 1983 2011
Included observations: 18 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	DLOG(GDP)	DLOG(GOVEXP)	DLOG(INFLA)	DLOG(LAB)	DLOG(EXCHR)
DLOG(GDP(-1))	0.550977	-0.008457	2.040987	-0.119075	-0.018547
	(0.38559)	(0.12914)	(2.35667)	(0.04574)	(0.18143)
	[1.42892]	[-0.06549]	[0.86605]	[-2.60313]	[-0.10223]
DLOG(GDP(-2))	-0.053774	-0.115687	0.052686	-0.010083	-0.120481
	(0.32660)	(0.10938)	(1.99612)	(0.03874)	(0.15367)
	[-0.16465]	[-1.05763]	[0.02639]	[-0.26024]	[-0.78401]
DLOG(GOVEXP(-1))	-0.270060	0.385851	7.448064	0.015589	0.105315
	(1.06374)	(0.35626)	(6.50141)	(0.12619)	(0.50052)
	[-0.25388]	[1.08305]	[1.14561]	[0.12353]	[0.21041]
DLOG(GOVEXP(-2))	1.045964	-0.433411	0.974466	0.028080	-0.634744
	(1.11683)	(0.37404)	(6.82586)	(0.13249)	(0.52550)
	[0.93655]	[-1.15872]	[0.14276]	[0.21194]	[-1.20790]
DLOG(INFLA(-1))	0.061161	-0.021137	-0.331809	-0.008760	-0.016574
	(0.06482)	(0.02171)	(0.39619)	(0.00769)	(0.03050)
	[0.94351]	[-0.97360]	[-0.83751]	[-1.13915]	[-0.54341]
DLOG(INFLA(-2))	-0.100370	-0.003514	-0.260908	0.010129	-0.061442
	(0.06435)	(0.02155)	(0.39331)	(0.00763)	(0.03028)
	[-1.55971]	[-0.16306]	[-0.66337]	[1.32685]	[-2.02918]
DLOG(LAB(-1))	0.886703	-1.097467	-0.733334	-1.057253	-0.615130
	(1.76247)	(0.59028)	(10.7719)	(0.20908)	(0.82929)
	[1.63787]	[-1.85923]	[-0.06808]	[-5.05659]	[-0.74176]
DLOG(LAB(-2))	-.293776	0.039816	0.378546	-0.782370	-0.246306
	(2.96208)	(0.99205)	(18.1037)	(0.35140)	(1.39373)
	[-1.11198]	[0.04013]	[0.02091]	[-2.22647]	[-0.17672]
DLOG(EXCHR(-1))	-0.367838	0.069504	-0.113338	0.202089	0.078473
	(0.69055)	(0.23128)	(4.22051)	(0.08192)	(0.32492)
	[-0.53268]	[0.30052]	[-0.02685]	[2.46690]	[0.24151]
DLOG(EXCHR(-2))	-0.511818	0.242504	-1.127380	-0.004654	0.498858
	(0.68340)	(0.22888)	(4.17681)	(0.08107)	(0.32156)
	[-0.74893]	[1.05952]	[-0.26991]	[-0.05740]	[1.55139]

lag labour has positive but insignificant impact on current output. This result is not consistent since two year lag has a negative insignificant impact on current output. Exchange rate has a consistent adverse effect on current output although insignificant. It is also clear that the feedback effects of some of the economic variables are not encouraging.

From the above results, we reject our null hypothesis that government current and previous expenditures increase real output in Cameroon. By this, we accept the alternative hypothesis that government expenditure within the period of our study has not provided any meaningful effects on economic growth.

Stability and Autocorrelation Tests of the SVAR Results

To justify the reliability of the SVAR results, we ascertain whether the models fit the stability and autocorrelation conditions. As presented in Figure 4.1, the results confirm that the model satisfies the stability condition because no root lies outside the Unit Circles. Furthermore, the test of serial correlation is conducted in this work using the Breusch-Godfrey Serial Correlation LM test because of the existence of lags in the structural VAR models. As presented in table 4.3, the null hypothesis for serial correlation in the SVAR model is rejected in favour of the alternative that no serial correlation exists.

In a multivariate modeling, the Johansen-Juselius Method for testing the Cointegration between the set of variables is preferred over the 1989 Engle and Granger two-step procedure. In this work, we have applied the Johansen-Juselius method of trace test to determine the number of Cointegrating vectors in our models. Conventionally, the optimum lag order in VAR is 2 on the basis of which the VAR results using the Johansen procedure are presented on table 4.4 below.

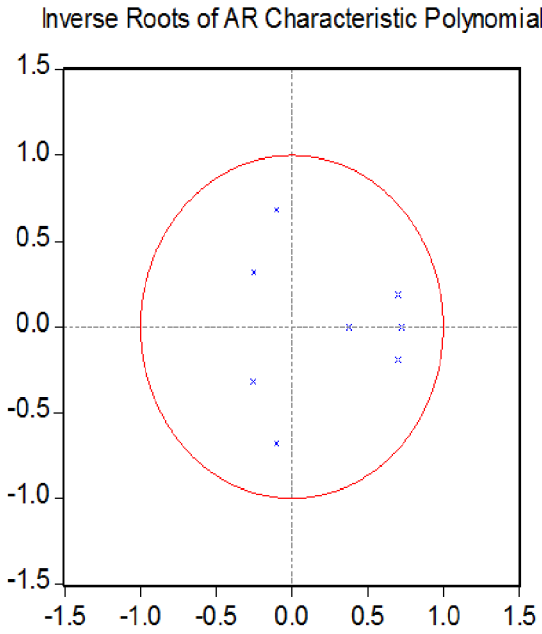


Figure 4.1: Stability Test
Source: Generated by author using Eviews 7

Table 4.3: Breusch-Godfrey Serial Correlation Lag range Multiplier Test.

F-statistics	7,23463	Probability	0.0056
Obs*R-Squared.	14.593448	Probability	0.0074

Source: Computed by Author

Johansen Cointegration Test

From table 4.4, it is observed that there are at most three Cointegrating vectors in the series within the period of our study. Therefore, the coefficient estimated for the Cointegrated vector of the normalized equations for the long-run elasticity are in logarithms forms and are as presented below: LGDP, LGOVEXP, LINFLA, LLAB, LEXCHR.

Thus β^{1}= (1.000 - 0.0502 - 0.9166 + 0.01652 - 0.5163)

That is: DLGDP = 0.0502DLGOVEXP+0.9166DLINFLA - 0.016DLLAB +0.516DLEXCHR ……..4.1

Equation 4.1 indicates the long-run equilibrium relationship among the variables for 1980-2012. The results reveal that there exist a stable long-run or long term degree of responsiveness between real GDP, government expenditure, inflation, labour supply and exchange rate in Cameroon. While short-term effects are observed to be inconsistent, the long-term impact of government expenditure on economic growth is seen to be positive but insignificant. While the coefficient of exchange rate is consistent and statistically significant, those of inflation and labour supply are inconsistent. Also, in the short-run, our findings disagreed with those of Wagner (1893), Musgrave (1959), and Abizadeh and Gray (1985). This finding contradicts that of Henrekson 1993 whose finding observes that in the case of Swedish data obtained from 1861-1990, real GDP and government expenditure are not Cointegrated, meaning that Wagner's Law is spurious related. The results presented above are in support of the Wagner's Law to a limited extend. While there is a positive influence of government expenditure on real economic growth in Cameroon, such influence is not significant within our period of study. Advanced as reasons to support the insignificant impact of government expenditure on the economy of Cameroon are as listed below;

- Heavy government expenditure on unproductive education.
- High degree of dependence on foreign technology and on foreign experts.
- High rate of under-employment especially in the public sector.
- High expenditure on internal and external debt servicing.
- Poor attitude to work especially in the Cameroon public sector; predominance of political decisions over economic decisions and high rate of inflation
- Systematic corruption.
- Excessive involvement of the government in superfluous expenditure.
- Egocentrism, nepotism, tribalism and grid in the management and distribution of the national cake.
- The absence of due process in the execution of public contracts and

These amongst others have assisted in one way or the other to reduce the rate at which government expenditure has impacted on real economic growth in Cameroon.

Summary of Findings, Policy Recommendations and Conclusion

In this work, we aimed at investigating into the Wagner's Law in Cameroon using data from 1980 to 2012 based on the SVAR Methodology under Cointegration procedure. The findings from this study challenged most previous studies especially as the variables specified in our model achieved stability and are also Cointegrated to justify that although short-term instability do exist in the set of data, there also exist a long-run equilibrium among the variables. Other diagnostic tests confirm that the data are well behaved.

Although the short-run dynamic impact of government expenditure on economic growth rejects the Wagner's law, the long-run influence has demonstrated insignificant positive impact of government expenditure on real economic growth. As advanced above, government expenditure has the ability to change the fortune of Cameroonians if directed to the real sectors in the economy. By this, government expenditure needs to be directed in productive education with high degree of research for results. Economic decisions should dominate political decisions in the distribution of the national cake. In fact, due process must be put in place and respected by all. A lot is wasted in politics by politicians in Cameroon and she needs a true democratic structure for self sustainability. In conclusion, the Cameroonian economy has realized tremendous expansion in public spending, of which a greater percentage is directed to transfers, superfluous expenditure and expenditure on day to day running of government services with little directed to the social services and the real sectors. These need to be reversed if the economy has to grow through government expenditure. However, we strongly recommend that while government expenditure should be directed to the real sectors for the improvement of social welfare, guided commercialization, liberalization and privatization should be given adequate attention.

Table 4.4 Johansen Cointegration Test

Included observations: 29 after adjustments
Trend assumption: Linear deterministic trend
Series: GDP GOVEXP INFLA LAB EXCHR
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.551400	55.26335	47.85613	0.0086
At most 1 *	0.452953	32.01627	29.79707	0.0273
At most 2	0.285878	14.52290	15.49471	0.0697
At most 3 *	0.151333	4.758548	3.841466	0.0291

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.551400	23.24708	27.58434	0.1632
At most 1	0.452953	17.49337	21.13162	0.1500
At most 2	0.285878	9.764349	14.26460	0.2279
At most 3 *	0.151333	4.758548	3.841466	0.0291

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

GDP	GOVEXP	INFLA	LAB	EXCHR
0.169860	-0.008533	-0.155699	0.002806	0.551400
0.235984	-0.138392	0.212849	-0.061980	0.452953
-0.190778	-0.098559	0.100948	0.208527	0.285878
0.012318	-0.001790	0.078042	0.291657	0.151333

Unrestricted Adjustment Coefficients (alpha):

DL(GDP)	-1.681507	-1.864315	1.190836	0.364064
DL(GOVEXP)	4.640333	2.976349	7.085760	-0.358416
DL(INFLA)	3.263805	-1.343231	2.755450	-1.254448
DL(LAB)	-0.743968	0.236194	0.138309	-0.412282

1 Cointegrating Equation(s): Log likelihood -333.2853

Normalized cointegrating coefficients (standard error in parentheses)

GDP	GOVEXP	INFLA	LAB
1.000000	-0.050235	-0.916631	0.016521
	(0.18195)	(0.32391)	(0.36967)

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