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    NEED/IMPORTANCE OF THE STUDY

    STATEMENT OF THE PROBLEM

    OBJECTIVES

    HYPOTHESES

    RESEARCH METHODOLOGY

    RESULTS & DISCUSSION

    FINDINGS

    RECOMMENDATIONS/SUGGESTIONS

    CONCLUSIONS

    SCOPE FOR FURTHER RESEARCH

    ACKNOWLEDGMENTS

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    APPENDIX/ANNEXURE

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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FINANCIAL DEVELOPMENT AND AGRICULTURAL SECTOR GROWTH IN CAMEROON

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ABSTRACT

This study investigates the relationship that exists between the development of the financial sector and the growth of the agricultural sector in Cameroon. We employ VAR based granger causality testing techniques to analyze data on Cameroon for the period from 1973 to 2009. We find that there exist no long run equilibrium and causality relationship between financial development and economic growth. We therefore recommend that measures to modernize the agricultural sector should be adopted and that agricultural sector financing mechanism should be developed by the financial sector.

KEYWORDS

financial development, agricultural sector growth, causality.

INTRODUCTION

I
t is now a stylized fact that financial development plays an important role in economic growth. In most developing countries including Cameroon, the agricultural sector accounts for a greater part of economic growth. Before the economic crisis that hit Cameroon in the mid 80s, agriculture accounted on average for about 30% of GDP and 80% of total exports, and after the crisis it contributed for about 27% of GDP and 53% of exports (Gbetnkom and Khan, 2002). Under Structural Adjustment Programs (SAPs) supported by the World Bank and the IMF, most developing countries reformed their real and financial sectors. These reforms aimed at removing the interventionist policies that existed in these countries. It was believed that the market would increase efficiency in the allocation and use of resources thereby improving economic growth and development. The agricultural sector of developing countries not only contributes to economic growth, but is also the sector that employs a greater part of the work force. In Cameroon for example, the agricultural sector employs about 75% of the active labor force and 85% of the total population of the country depend on it for livelihood. Therefore, for countries that suffer growth and poverty problems, it is very important to determine strategies which contribute to the development of its agricultural sector. This study aims to establish the effects of financial development on the growth of the agricultural sector in Cameroon. This study is important as Cameroon under the SAPs reformed its financial and agricultural sector in 1987.

Agriculture plays a prominent role in the economy and society in every country in sub Saharan Africa. Most countries in the region have the natural and human resources needed for strong and sustainable agricultural development and African governments generally put agriculture at the top of their development priorities. Yet agriculture is widely seen as underperforming (World Bank, 2007). Despite some improvements in recent years large percentages of people who depend on farming for a living are in poverty. Income gaps between farm and non-farm households are wide and a too-high percentage of both rural and urban populations suffer from malnutrition and food insecurity. It is an open question, however, whether these problems can be blamed on poor agricultural sector performance or whether they, and stagnant agricultural growth itself, are the consequence of other factors(like the under development of the financial sector) that constrain economic growth more generally.

OVERVIEW OF DEVELOPMENTS IN CAMEROON'S FINANCIAL AND AGRICULTURAL SECTOR

EVOLUTION OF THE FINANCIAL SECTOR

At independence in 1960, the country was in great need of development and so the government put into place instruments to promote economic and social development. It is in this light that five year development plans were drawn up so as to meet and promote social and economic development. The whole economy was thus highly plannified with the government intervening in practically all sectors of the economy. Until 1985, the economy performed very well with agriculture supporting the economy from 1961 to 1977 and petroleum from 1978 to 1985. This let the economy to be regarded as well managed (Amin, 2002). During this period(1961-1985) Cameroon enjoyed a stable macroeconomic environment and an average growth rate of about 7% and it seemed not to be affected by the external shocks of the 70s and early 80s (Amin, 2002).

The financial sector during this period (1960 to 1985) developed under the umbrella of monetary and regulatory policies aimed at supporting the state orchestrated development strategies. The financial sector became an instrument of planned industrialisation policies and operated under a framework characterised by controlled interest rates, directed credit programmes, high reserve requirements and other restrictions on financial intermediation as well as restricted entry into the market. This situation has been termed financial repression by the proponents of financial liberalisation. All banks were owned by the state and credits were directed to sectors deemed important.

By 1987, due to the down turn in the world economy, the demand and the prices of the main exports of Cameroon declined. At the same time, the real exchange rate of the franc appreciated sharply, while the US dollar depreciated by 40% against the CFA and the terms of trade deteriorated by 47%. Oil output also started declining (Amin, 2002). All these let to a drastic collapse of the economy after practically two decades of good performance. The decline in GDP was sudden and drastic from 8% to -5 % per year (Amin, 2002). This situation revealed the fragile nature of an economy that was seemingly well managed and robust to external shocks. The Bretton Woods institutions attributed the problem to poor and mismanaged external and domestic economic policies. They then proposed the structural adjustment programmes (SAPS) that Cameroon adopted in 1987. In these programmes, the role of the state was redefined and a set of policies were undertaken to liberalise the economy in all its sectors. As such public enterprises were privatised, and many monopolies dismantled.

The financial sector was not spared by the crisis in the real sector. The collapse of the real sector made companies not to meet their financial obligations. This, together with other factors such as the incompetence of managers, poor management techniques, competition from the informal financial sector, and state intervention let to serious crises in the financial sector (Wamba, 2001). Many banks went bankrupt and others became illiquid not being able to meet the withdrawals of depositors. Under the structural adjustment programmes, the restructuring of the financial sector was undertaken in which some banks were liquidated and others recapitalised. There was also a change in monetary and financial policies with the liberalisation of financial markets in 1990. A new banking regulatory agency (COBAC) was also established. As such, there was the deregulation of interest rates, the removal of directed credit schemes, the privatisation

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of banks, the creation of the money market, the liberalisation of the capital account and the creation of the Douala Stock Exchange (DSX) that has remained in the embryo. It was believed that such a system would better support an economy that was henceforth regulated by market forces. These reforms marked the end of a Keynesian inspired plannified economy and repressed financial system and the beginning of a classical market based system.

AGRICULTURAL SECTOR POLICY AND REFORMS

Government intervention in agriculture has a long history in Cameroon. Starting from independence, reasons for intervention included raising public revenue, ensuring food supplies, stabilizing farmer incomes and exploiting market power. These policies started with high taxation and government intervention in the first two decades after independence to the reforms in the 1990s.

From 1960 to date, two approaches to agricultural development can be distinguished. The first approach was experienced from independence up to 1987. During this period, government interventions and taxation of the agricultural sector progressively increased, and the sector became the main source of government revenue to finance both public consumption and investment needs. This approach, coupled with external shocks plunged the agricultural sector and the rest of the economy into a deep economic crisis which necessitated important reforms not only in agriculture but in the economy as a whole (Gbetnkom and Khan, 2002).

The second approach started with the adoption of Structural Adjustment Programs (SAPs) in 1988 whose basic objectives were to redefine the role of government and reduce government intervention in the economy. In the agricultural sector, many functions formerly handled by government agencies have been liberalized and the role of these agencies has been limited to research, data gathering, quality control and regulatory functions. In 1994, the cocoa and coffee subsector, formerly controlled in terms of price fixing by the government and marketing of the commodities by the monopsonist parastatal National Produce Marketing Board, was liberalized. The producer prices of these crops were partially linked to the world prices and the Board retreated to the role of buyer of last resort, releasing the bulk of trade to private buyers. As a mechanism of stabilization, the Board continued up to 1996.

LITERATURE REVIEW AND ANALYTICAL FRAMEWORK

ANALYTICAL FRAMEWORK

We draw from the model developed by Gourinchas and Jeanne (2003) to propose the following analytical framework for the analysis of the sectoral effects of financial development.

The main hypothesis of the model is that most of the inequality between nations is due to differences in Total Factor Productivity (TFP) and not factor endowment. This implies that financial development can only reduce differences in output per capita by significantly reducing differences in TFP. This suggests that countries that have a poorly developed financial system tend to have lower rates of TFP and be poorer.

We consider a three time period model with two different types of technology for a given country: an efficient technology and an inefficient one. TFP is higher in the sector with efficient technology ($A_E > A_I$). The two production functions are Cobb Douglass of the form:

$$Y_E = A_E K^\alpha L^{1-\alpha}$$

$$Y_I = A_I K^\alpha L^{1-\alpha} \tag{1}$$

Other assumptions of the model are the following:

- Both technologies have the same factor elasticity.
- Capital income can be taxed in the efficient sector but not in the inefficient sector.
- The country is populated by capitalists and workers and capitalists choose to specialize into one of the sectors at period 0 while workers are endowed with one unit of labor at period 1 and 2.
- Capital income is taxed in periods 1 and 2 and redistributed to workers while capital account can be closed or open. When closed, capital cannot cross the boarders (underdeveloped financial systems), if opened, capital can be rented from abroad freely (financial development).

These imply that, in the case of financial underdevelopment, the capital account is closed in periods 0 and 1. Thus the efficiency of output depends on technology at period 0. In periods 1 and 2,

$$L_E = \left[(1-\alpha)\frac{A_E}{\omega} \right]^{\frac{1}{\alpha}} K_E \tag{2}$$

$$L_I = \left[(1-\alpha)\frac{A_I}{\omega} \right]^{\frac{1}{\alpha}} K_I \tag{3}$$

$$L_E + L_I = L \tag{4}$$

$$W = (1-\alpha) L^{-\alpha} \left(A_E^{\frac{1}{\alpha}} K_E + A_I^{\frac{1}{\alpha}} K_I \right) \alpha \tag{5}$$

The sector "S" equals the sum of the efficient and the inefficient sectors and its return per unit of capital is given as the maximization of:

$$A_s k^\alpha l^{1-\alpha} - wl = k A_s^{\frac{1}{\alpha}} w^{\frac{-1}{\alpha}} k \tag{6}$$

Where, $k = \alpha(1-\alpha)^{\frac{1-\alpha}{\alpha}}$ and the gross rental price of capital $R_s = k A_s^{\frac{1}{\alpha}} w^{\frac{-1-\alpha}{\alpha}}$

Given the fact that government imposes a tax t in the efficient formal sector and does not tax the inefficient informal sector, investment goes to the formal sector only and only if;

$$(1-t_1)R_E + (1-t_2)R_E > 2R_I \tag{7}$$

We can simply assume t' as the average rate of tax over the lifetime of K and then get:

$$t < t' = 1 - \left(\frac{A_I}{A_E} \right)\left(\frac{1}{\alpha} \right) \tag{8}$$

The outcome in financial underdevelopment is that beyond a certain threshold, it does not longer matter for capitalists to invest in the formal and efficient sector whatever the level of efficiency and TFP growth. The higher the efficiency in the sector with high Total Factor Productivity in comparison with the inefficient sector, the higher is the tax rate to discourage entrepreneurs to invest in the formal sector.

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In the case of financial development, we assume that capital account is opened in period 1, but closed in period 0. Although the tax rate t_2 is still predetermined in the previous period, it is not longer the case for the capital stock because at period 1 there is an arbitrage between domestic and international capital flows. From the basic assumptions of the model this means that:

$$(1-t_2)R_2 = R^* \quad , \qquad (9)$$

$$R_2 = kA_E^{\frac{1}{\alpha}}w_2^{\frac{-1-\alpha}{\alpha}} \quad . \qquad (10)$$

If capitalists do not invest in the informal sector, the real wage in the second period is given by:

$$w_2 = (1-\alpha)A_E\left(\frac{K_2}{L}\right)^\alpha \qquad (11)$$

Since the government taxes consumption of workers at period 2 to maximize consumption at period 2:

$$C_2^\omega = \left(\frac{A_E K_2^\alpha L^{1-\alpha} - R^* K_2}{L}\right) \qquad (12)$$

So with financial development, when the capital account is opened in period 1 and closed in period 0, capital is still taxed in period 1 and capitalists receive a return per unit of capital in the following period. The incentive to invest in the formal sector is now:

$$\left(\frac{(1-t_1)R_E + R^*}{2R_E}\right) = \left(\frac{t'+(R^* - R_E)}{2R_E}\right) \qquad (13)$$

When there is scarcity of capital $K\left(R^* < R_E\right)$, the tax rate will be lower than under financial underdevelopment; when financial underdevelopment is an obstacle to the high TFP sector development $\left(t' = \frac{1}{2}\right)$, then financial development in period 1 is Pareto-efficient in the sense that the working class gets higher incomes while the income of the capitalists remains at the underdevelopment level (no one wins at the expense of the other). In other words, under financial development, when property rights are respected and government regulation low (low taxes), the economy faces a switch of resources from the inefficient to the modern sector.

From the above we can conclude that financial development favors the efficient sector in an economy. This therefore implies that if financial development is found not to improve the growth of the agricultural sector in a country, this signifies that the agricultural sector is less efficient and policies should be undertaken so as to modernize the sector.

EMPIRICAL STUDIES ON FINANCIAL DEVELOPMENT AND AGRICULTURE

Studies on the sectoral impact of financial development do not abound in the literature. Most studies on financial development take a holistic approach and analyse the overall effect of financial development on economic growth or development. As regards the effects of the development of the financial sector on agricultural growth, not much has been done.

Perivash and Tarkomani (2008) studied the impact of the development of the financial sector on agriculture in Iran. They used three variate VAR model and found that the financial sector positively and significantly influences the agricultural sector in Iran. They also found that there existed a causality running from financial development to agricultural sector growth. They then proposed that policies to develop the financial sector in this country should be undertaken so as to boost its agriculture.

For the case of Cameroon, no such study exists though the work of Roesch, Wampfler, and Mounkama (2003) indicates that micro-credit was important in determining the performance of cotton producers in northern Cameroon. This study therefore attempts to cover this gap in the literature by studying the relationship between the financial and agricultural sectors in Cameroon.

METHODOLOGY AND DATA
ECONOMETRIC METHODOLOGY

We investigate the relationship between the development of the financial sector and the growth of the agricultural sector using Vector Autoregressive (VAR) causality testing techniques. The standard procedure of testing for causality is the Granger causality test specified as:

$$y_t = \mu_1 + \omega_1(L)x_{t-i} + \psi_1(L)y_{t-i} + \varepsilon_{1t}$$

$$x_t = \mu_2 + \omega_2(L)x_{t-i} + \psi_2(L)y_{t-i} + \varepsilon_{2t} \qquad (14)$$

In this system, x_t causes y_t if $\omega_1(L)$ is statistically not equal to zero. Similarly, y_t causes x_t if $\psi_2(L)$ is statistically not equal to zero. If none of the two scenarios is true then there is no causality between x_t and y_t. However, if both are true there exists feedback or bidirectional causality between x_t and y_t.

The bivariate VAR can be written as:

$$X_t = \mu + \Theta(L)X_{t-i} + \varepsilon_t \qquad (15)$$

$$X_t = \begin{pmatrix} y_t \\ x_t \end{pmatrix}$$

Where

However, this conventional Granger causality test becomes valid only if the variables are stationary (Granger, 1988). In the event that the variables involved are non-stationary then several options are open to the analyst depending on whether such variables are cointegrated or not. If the non-stationary variables are not cointegrated, they enter (14) in differenced form.

If on the other hand they are cointegrated, then the alternative procedure is the VECM representation of the VAR used in the conventional test. This approach has been used in the finance – growth causality studies, among others, by Kar and Pentecost (2000) and Mohapi and Motelle (2006).

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The mathematical representation of the latter is:

$$\Delta y_t = \varsigma_1 + \phi_1(L)\Delta x_{t-i} + \varphi_1(L)\Delta y_{t-i} + \alpha_1 ECM_{t-1} + \varepsilon_{1t}$$

$$\Delta x_t = \varsigma_2 + \phi_2(L)\Delta x_{t-i} + \varphi_2(L)\Delta y_{t-i} + \alpha_2 ECM_{t-1} + \varepsilon_{2t} \qquad (16)$$

In this specification, ECM is the error correction term $\beta^T X$ in which $\beta^T = (\beta_1, \beta_2)$ is the cointegrating vector. The parameters α_1 and α_2 are elements of the adjustment vector[1]. In this specification, there are two sources of causality. System (3) exhibits unidirectional causality from x_t to y_t if $\varphi_2(L) \neq 0$ and $\alpha_2 \neq 0$ in the statistical sense. Non causality in either direction is defined by $\phi_1(L) = 0$, $\varphi_2(L) = 0$ and $\alpha_1 = \alpha_2 = 0$ (Kouassi et al., 2005). The relevant testing procedure in systems (14) and (16) is the Wall test.

The compact representation of system (3) is:

$$\Delta X_t = \varsigma + \Gamma(L)\Delta X_{t-i} + \alpha\beta^T X_{t-1} + \varepsilon_t \qquad (17)$$

The critical distinction between the treatment of non-stationary, non-cointegrated variables and non-stationary, cointegrated variables is the inclusion of the ECM term $\Pi X_{t-1} = \alpha\beta^T X_{t-1}$ in the latter to take into account the equilibrium relationship of the variables implied by the presence of cointegration. The following figure characterizes the modeling philosophy used for the analysis in this study.

FIGURE 1: PHILOSOPHY OF CAUSALITY TESTING
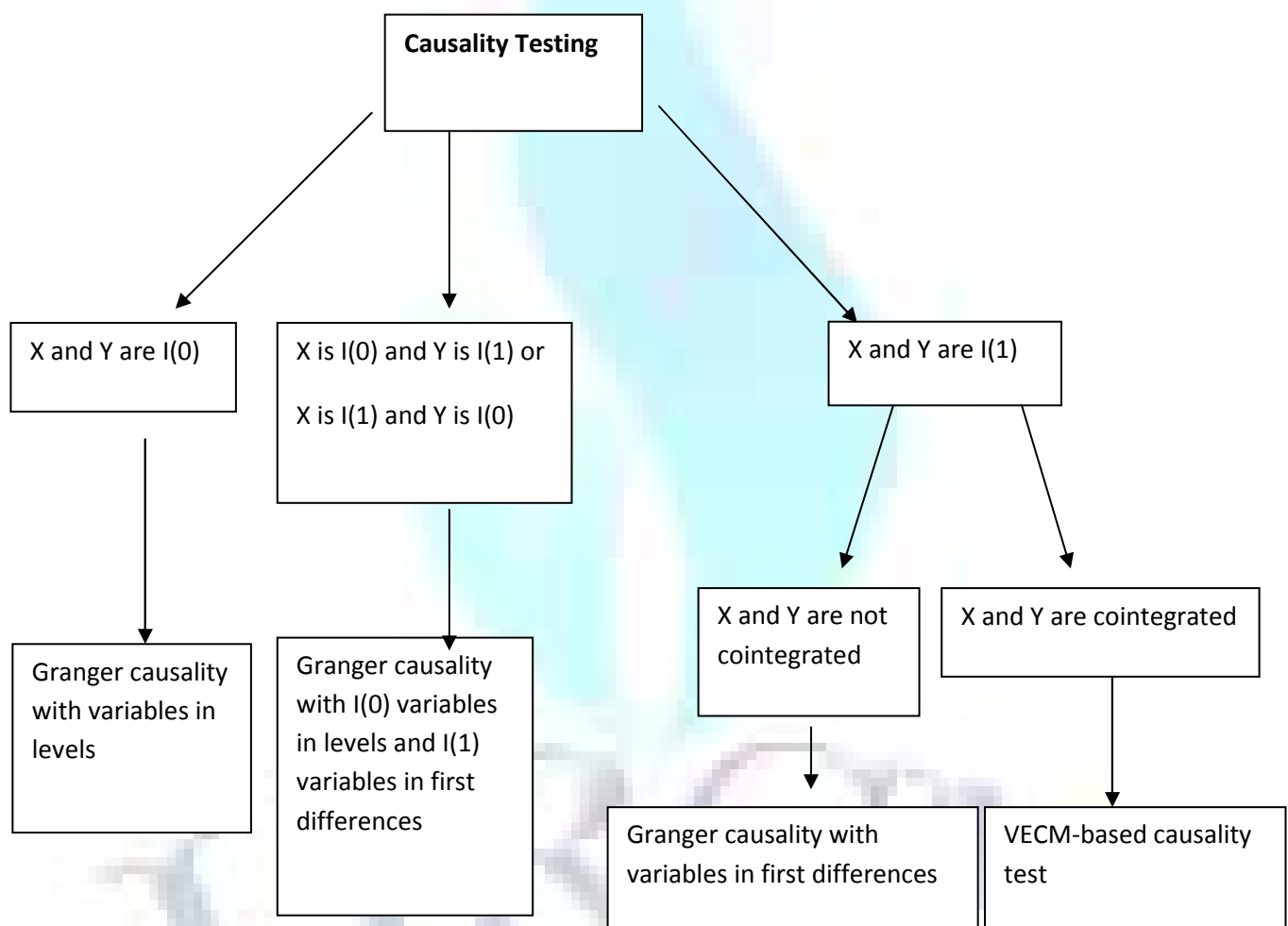
Source: Mohapi and Motelle (2006)

VARIABLES AND DATA SOURCES

Financial development is measured by bank credit to the private sector divided by GDP. This measure has also been used by Tabi et al. (2011), Mohapi and Motelle (2006) and king and Levine (1993) to capture the development of the financial sector. This measure is particularly appropriate for this study as in the process of economic liberalization in Cameroon, state owned agricultural farms were privatized and priority credits and rates that were offered the agricultural sector abolished. This sector therefore had to compete for funds together with others. Therefore, it is the development of the credit activity to the private sector that influences most the development of this sector. This variable is denoted by FD.

Growth of the agricultural sector is measured by its share in GDP. This is measured by dividing the value added of the agricultural sector by nominal GDP. This is denoted by GA.

The data for FD is collected from the International Financial Statistics 2010 CD ROM of the International Monetary Fund and the GA collected from the African Development Database 2010 CD ROM of the World Bank. The period of study is from 1973 to 2009.

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[1]This is the adjustment vector α that combines with the cointegrating vector β^T to form the matrix of long run. parameters $\Pi = \alpha\beta^T$.

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RESULTS AND DISCUSSIONS

UNIT ROOT TEST RESULTS

The starting point of the analyses is to test the unit root properties of the variables. A time series is considered to be stationary if its mean and variance are independent of time. If the time series is non-stationary, i.e., having a mean and or variance changing over time, it is said to have a unit root. If a time series is non-stationary, the regression analysis carried out in a conventional way will produce spurious results. A spurious regression occurs when after regressing a time series variables on others, the tests statistics show a significant relationship between these variables even though no such relationship exist. A non-stationary time series can be converted into a stationary time series by differencing. If a time series becomes stationary after differencing one time, then the time series is said to be integrated of order one and denoted by I(1). Similarly, if a time series has to be differenced d times to make it stationary, then it is called integrated of order d and written as I(d). As the stationary time series needs not to be differenced, it is denoted by I(0).

We test for the order of integration using the augmented dickey- fuller test (ADF). The test is based on the following three models;

$$\Delta Xt = \rho Xt - 1 + \sum_{j=2}^{p} \Phi \Delta Xt - j + \mu t \tag{18}$$

$$\Delta Xt = \rho Xt - 1 + \sum_{j=2}^{p} \Phi \Delta Xt - j + bt + \mu t \tag{19}$$

$$\Delta Xt = \rho Xt - 1 + \sum_{j=2}^{p} \Phi \Delta Xt - j + bt + c + \mu t \tag{20}$$

The principle of this test is, if the Ho hypothesis that $\rho=1$ is accepted in any of the three equations, then, the process is not stationary.

The value p of lags is determined with the aid of the Akaike information criterion. The lag chosen correspond to the one that minimises this criterion.

The ADF test results for the variables are shown in table 1 below.

TABLE 1: UNIT ROOT TEST RESULTS USING THE ADF TEST

	ADF TEST STATISTICS		
variables	level	First difference	Decision
FD	-1.306603	-3.443528**	I(1)
GA	-1.755961	-8.105849***	I(1)

NB: (*), (**), (***) indicates significance at 10%, 5%, and 1% respectively

Source: Authors calculations

The results indicate that all the variables are integrated of order 1. This implies that they need to be differenced once before they become stationary. As the variables are non stationary, the next step consists of testing for the existence of a long run equilibrium relationship between the variables.

COINTEGRATION TEST RESULTS

Cointegration signifies the existence of one or many equilibrium long run relationship(s) that can be combined with the short term dynamics of the other variables in an error correction model. This relationship is the following;

$$\Delta Y_t = \Pi Y_{t-i} + \sum_{i}^{k} \Gamma i \Delta Y_{t-i} + \mu_t \tag{21}$$

Y_t : Vector of variables that we need to study their dynamics

Γi : a matrix number and

Π : A matrix whose rank determines the number of Cointegration Relationships.

The number of optimal lags is determined using the Akaike and Schwarz criteria.

We test for cointegration using the Johansen trace test. The results are shown in the table2.

TABLE 2: JOHANSEN UNRESTRICTED COINTEGRATION RANK TEST

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None	0.131280	6.035635	15.41	20.04
At most 1	0.036116	1.250659	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level

Source: authors calculations using Eviews 4.1.

Trace test indicates no cointegration at both 5% and 1% levels

GRANGER CAUSALITY WALD TEST RESULTS

The relationship between causality and cointegration is such that if two variables are cointegrated, then one can expect Granger causation in at least one direction (Granger, 1988).

The absence of cointegration between agricultural sector growth and financial development spells the expectation of no causality between them. Table 3 summarizes the causality between the first differences of financial development (FD) and agricultural sector growth (GA).

TABLE 3: PAIRWISE GRANGER CAUSALITY TEST RESULTS

Null Hypothesis:	Obs	F-Statistic	Probability
D(GA) does not Granger Cause D(FD)	34	1.41607	0.25895
D(FD) does not Granger Cause D(GA)		1.43206	0.25521

Source: authors' calculations using Eviews 4.1.

Since the probabilities of the F-Statistics are greater than 5%, we accept both null hypotheses of no causality between D(FD) and D(GA). For the case of Cameroon, the development of the financial sector does not cause the growth of the agricultural sector and vice versa.

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CONCLUSION AND POLICY IMPLICATIONS

The objective followed in this study was to determine the relationship between the development of the financial sector and the growth of the agricultural sector in Cameroon. We employed VAR based causality testing techniques on Cameroon data for the period 1973 to 2009. We came out with the results that there exist no long run equilibrium relationship between the development of the financial sector and the growth of the agricultural sector. Also, financial development was not found to granger cause agricultural sector growth and vice versa in Cameroon.

These results indicate that the observed poor performance of the agricultural sector in Cameroon is not caused by the under development of its financial sector. This also implies that the agricultural sector in Cameroon remains rudimentary and has not yet recovered from the past crisis as it cannot efficiently compete for funds with other modern and more developed sectors.

The Cameroonian government in order to boost its agricultural sector should therefore adopt policies that would modernize the sector. Such policies may include the mechanization of production, the promotion of the use of modern techniques, use of improved seeds etc. As the lack of relationship between the two sectors may also indicate that the financial sector has not developed techniques to finance the agricultural sector, this entails that the government should also encourage the opening of agricultural banks so as to guarantee a means of finance for the agricultural sector.

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