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RESPONSE OF AGRICULTURAL GROWTH TO PUBLIC EXPENDITURES AND FOREIGN DIRECT INVESTMENT IN CAMEROON: 1985-2016

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Abstract

Cameroon's agricultural sector growth has been dwindling for the past decade despite programmes and projects set up by the ministry of agriculture and rural development. One of the reasons is the limited capital expenditures from both public and private sectors. Another argument is the conflicting views between Keynesians and Classical economists on the relationships between public expenditures, private investment and growth in the economy. Therefore, this study analysed the response of agricultural growth to public expenditures and foreign direct investment in Cameroon:1985-2016. Data were collected from secondary sources, analysed using ordinary differential equation. This study hypothesizes that public expenditures and foreign direct investment are the engine of agricultural growth. The study supports the theoretical view that states that private investment is the engine of growth in the context of Cameroon. It is recommended that incentives such as reduction of tax should be given to attract more foreign investors in the country. Further, investment on infrastructure such as roads, railways and dam should be done in order to provide adequate environment to foreigners to invest in the agricultural sector.

Keywords: Sensitivity Analysis, agricultural growth, public expenditures, foreign direct investment

INTRODUCTION

Prior to the economic crisis in the 1980s, Cameroon enjoyed steady economic growth and relative social stability for about 20 years following independence in 1960. The average annual growth rate of Gross Domestic Product (GDP) hovered around 5 percent which was driven mainly by the agricultural sector (Benjamin and Devarajan, 1986; Essama-Nssah and Bassolé, 2010). The country's agricultural sector plays an essential role in the economy and needs to extend its contribution to growth and combating poverty. It currently accounts for 21.7 percent of GDP and involves 70 percent of the active population (World Bank, 2013). It plays a determining role in the war on poverty and food insecurity, thanks to the self-provisioning of 2000000 agricultural households in the country and in the supply of food products to neighborhood and urban markets. It is estimated that some 80 percent of the food requirements of the country's population is satisfied by domestic production (World Bank, 2013).

Public expenditures is an aspect of fiscal policy which is widely seen as stabilization tool and hence, plays a very crucial role in stimulating growth. As a wing of government budget, public expenditures has stimulated large empirical debates on its impact on growth (Ahmed and Mubarak, 2014). The role of the government in economic management is performed through the formulation and implementation of economic policy generally and fiscal policy in particular. As recognized by the new growth theory, public expenditures is an important factor for self sustaining productivity gains and long term growth. For instance, government expenditures may contribute to agricultural growth (and hence poverty alleviation), it may indirectly create rural nonfarm jobs and increased wages. The real significance of government expenditures lies in the fact that it imparts a greater amount of "trickle-down" benefits for the poor in the growth process than growth alone (Fan *et al.*, 2000).

It is widely accepted that foreign capital inflows (FCIs) stimulate economic growth in developing countries and make it possible for host countries to achieve investment levels that are higher than their own levels of domestic savings. Moreover, FCIs are a major source of finance which may facilitate the transfer of the modern technology and innovations of industrialized countries to developing countries, thus helping them to accelerate the speed of their economic development. However, some evidence suggests that FCIs growth promotion effects vary from one country to another and that for some countries, FCIs may adversely affect the growth process (Borensztein et al. 1998; De Mello 1999; Lipsey 2000 and Fambon, 2013). FDI inflows reached US\$547 million in 2002 and fell to US\$321 million in 2007. Between 1996 and 2000, FDI inflows hovered between US\$97 and 197 million owing, on the one hand, to the implementation of the privatization process⁶ which led to foreign companies investing heavily in the country and, on the other, to the effects of economic recovery which was essentially brought about by the devaluation of the CFA Franc vis-à-vis the French Franc in 1994 (Fambon, 2013). Despite its great potential for attracting FDI, foreign investors used to consider Cameroon a high-risk area for investment when the political and economic situation of the country deteriorated in the early 1990s. Since the devaluation of the CFA Franc against the French Franc in January 1994, FDI inflows have been increasing steadily, driven almost exclusively by occasional privatization and investment in the oil sector (Economist Intelligence Unit (EIU), 2002; Fambon, 2013). However, FDI inflows have slowed down significantly in recent years due notably to the country's institutional weaknesses, corruption, ineffective legal institutions, political uncertainty and low labour productivity (Fambon, 2013).

Since 1960, government spending has been the major instrument to reduce poverty in Cameroon. Also, private investment is desirable as it may help to stimulate growth in the

economy which is necessary to generate resources required for future spending. Sustainable agricultural progress is an adequate means of providing a permanent solution to poverty traps and increasing the overall welfare of mankind. Therefore, there is need to undertake this study in order to analyse the response of agricultural growth to public expenditures and foreign direct investment in Cameroon.

LITERATURE REVIEW

Theoretical Framework

The theoretical foundation of this study is based on Solow model of economic growth which assumed that growth is mainly determined by exogenous factors subject to law of diminishing returns. Following Djoumessi (2009), the Harrod-Domar model has emphasized exogenous factor accumulation as a determinant of knife-edge growth. As a response to the Harrod-Domar model, Solow has shown that steady state growth is driven by technological change, while the adjustment to stable steady state growth is achieved by endogenous changes in factor accumulation. That is, the Solow model does not emphasize factor accumulation as a determinant of long-run growth. The Solow model assumes that GDP is produced according to an aggregate production function technology. Thus, following a Cobb Douglas form a representation of Solow model can be written as follows:

$$\dots\dots\dots (1)$$

Where,

is the output

is the capital input

is the labour input

Macroeconomist tends to call increase in the technological progress, but ultimately is simply a measure of productive efficiency because an increase in increase the productiveness of other factors. In the common empirical language is also known as total factor productivity(TFP). Thus in addition to equation (1) Solow model also considered the following equations. The

capital accumulation of each period depends positively on the savings and negatively on depreciation of capital which is assumed to take place at the rate.

..... (2)

· The labour input grows at the rate “ n ”

n (3)

Technological progress grows at rate “ g ”

g (4)

A fraction s of output is saved each period.

..... (5)

It is important to bear in mind the two well known features of Cobb Douglas production function which are the constant returns to scale and the decreasing marginal returns to factor accumulation. According to the Solow model the steady growth rate is

n (6)

GDP growth rate.

Thus according to Solow model only the rate of technology which is g and the factor controlling the extent of diminishing marginal return to capital can affect the growth rate of output per worker. Although, from his model high saving rate can produce temporary increases of growth rate of output, it cannot get the economy to a path involving a faster steady-state growth rate as the technological changes. Thus from Harrod-Domar to Solow model the source of economic growth is exogenous (because he considered technological changes as exogenous) (Djoumessi, 2009).

Empirical Review on Simulation/Sensitivity Studies

Gelauff and Lejour (2006) used general equilibrium (GE) model to provide *ex ante* estimates of the impact on labour productivity and GDP growth of achieving the European Union’s target reduction in administration burdens. They found that 25% reduction in administrative costs on average labour productivity and economic growth in the European Union will rise by 1.5% and 0.9% respectively, by 2025.

The Central Planning Bureau (CPB) of the Netherlands Bureau for Economic Policy Analysis (2004) used general equilibrium (GE) model to estimate the Reduction of

administrative burdens for businesses within the European Union and found that the initial impact on GDP from reducing administrative costs by 25% was around 1.1%. The longer-term effect was even larger, with an increase in real GDP of 1.4% attributed to higher savings, more investment and extra capital. When allowance is made for the possibility that a rise in production results in more research and development (R&D) spending in each sector of the economy, the long-term effect on real GDP is 1.7% for the European Union.

Vaqar *et al.* (2013) used dynamic computable general equilibrium model linked with micro simulation model to estimate the macro-micro impact of public infrastructure investment in Pakistan. Two approaches to public investment were considered in their simulations. In the first, production taxes finance the additional public infrastructure investment and in the second, foreign borrowing provides resources. Their results revealed that public infrastructure investments have the same direction of impact whether funded by taxation or international borrowing, particularly when looking at macroeconomic gains and poverty reduction in the long run. However, in the very short run, tax financing puts a strain on output in the industrial sector and thus reduces economic growth in the short run. The financing from international borrowing has a Dutch disease-like impact in the short run.

Estache *et al.* (2009) used computable general equilibrium model to show that foreign aid-funded infrastructure does produce Dutch Disease effects, but that the negative impacts differ by the type of investment. Economic growth attenuates these negative effects.

Dissou and Didic (2011) used computable general equilibrium model to indicate that the crowding out effects of public infrastructure is sensitive to the mode of financing chosen by the government. Overall, their findings suggest that public investment in infrastructure can support private investment and sustain capital accumulation. The positive impact of public investment on

private investment can be explained through the infrastructure financing channels such as public private partnerships and subcontracting which in turn tend to crowd-in private investment.

Wautabouna (2012) used micro simulated general equilibrium approach to analyze public expenditure contribution to pro-poor growth in Ivory Coast. He found that the Ivorian authorities contributed meaningfully to poverty reduction. In other words, the poor benefited from fruits of the economic growth induced by the public investments.

Władysław (2010) used long-term simulation model for Poland economy and found that Poland may have a chance to reach the average level of the European Union (15) countries in 2030 only in the optimistic scenario, while in the pessimistic scenario it would remain at the 46% level.

Conceptual Framework

The response of agricultural growth to public expenditures and foreign direct investment in Cameroon (figure 1) is conceptualized in terms of inflow, stock variables, outflow and policy variables (public expenditures and foreign direct investment). Inflow increases stock variables while outflow decreases stock variables. For instance, employment rate increases workforce while death/firing reduces workforce. Domestic credit to private sector increases gross domestic private investment while depreciation decreases gross domestic private investment. Rate of taxes increases government revenue while subsidies reduces government revenue. Agricultural production increases food supply while consumption decreases food supply. Increases in food supply increases government revenue through taxes paid by investors in the food supply chain and reduces subsidies given by government. Increases in food supply also increases investment in the food chain through demand for credit while decreases in food supply affect gross domestic private investment. Increases in food supply also increases employment in the food supply chain

while decreases in food supply increases death/firing of workers in the food supply chain. Government revenue determine the level of public expenditure. For instance, government purchases the services of households, makes transfer payments in form of old ages pensions, unemployment relief, sickness benefit, etc and also spends on them through allocation in various sector of the economy such as agriculture, health, education, roads and targeted programs (Jhingan, 2010). The indirect effect of public expenditure comes from higher agricultural wages and improved nonfarm employment opportunities induced by growth in the agricultural sector. Public expenditure on education for instance promotes labour, human and physical capital for agriculture as well as public expenditure on health promotes access to primary health care to farmers. In addition, public expenditure on roads enable transfers of agricultural produces from rural to urban areas as well as public expenditure on targeted program increases farmer's efficiency (Fan, 2007). Similarly government purchases all its requirement of goods of all types from private investor, gives subsidies and makes transfer payments to firms in order to encourage production (Jhingan, 2010). Foreign direct investment and gross domestic private investment affects indirectly agricultural growth through infrastructural development, financial sector development, human resources, research and innovation, targeted programs. Moreover, it also affects agricultural production directly through investment on farm houses, orchards, plantations, farm employment, land acquisition and building. Foreign direct investment increases government revenue through the payment of taxes by foreign investors. It also affects gross domestic private investment through their technical expertise and huge capital as well the use of domestic credit that may lead to reduce the competitiveness of domestic investors. Workforce affect agricultural production through supply of manpower. It also affect consumption through purchase of goods and services by workers. It increases government revenue through income tax.

It also increases domestic investment through use of credit by workers, the rate of tax subsidies increase household consumption of workers while death/firing decreases consumption and gross domestic private investment.

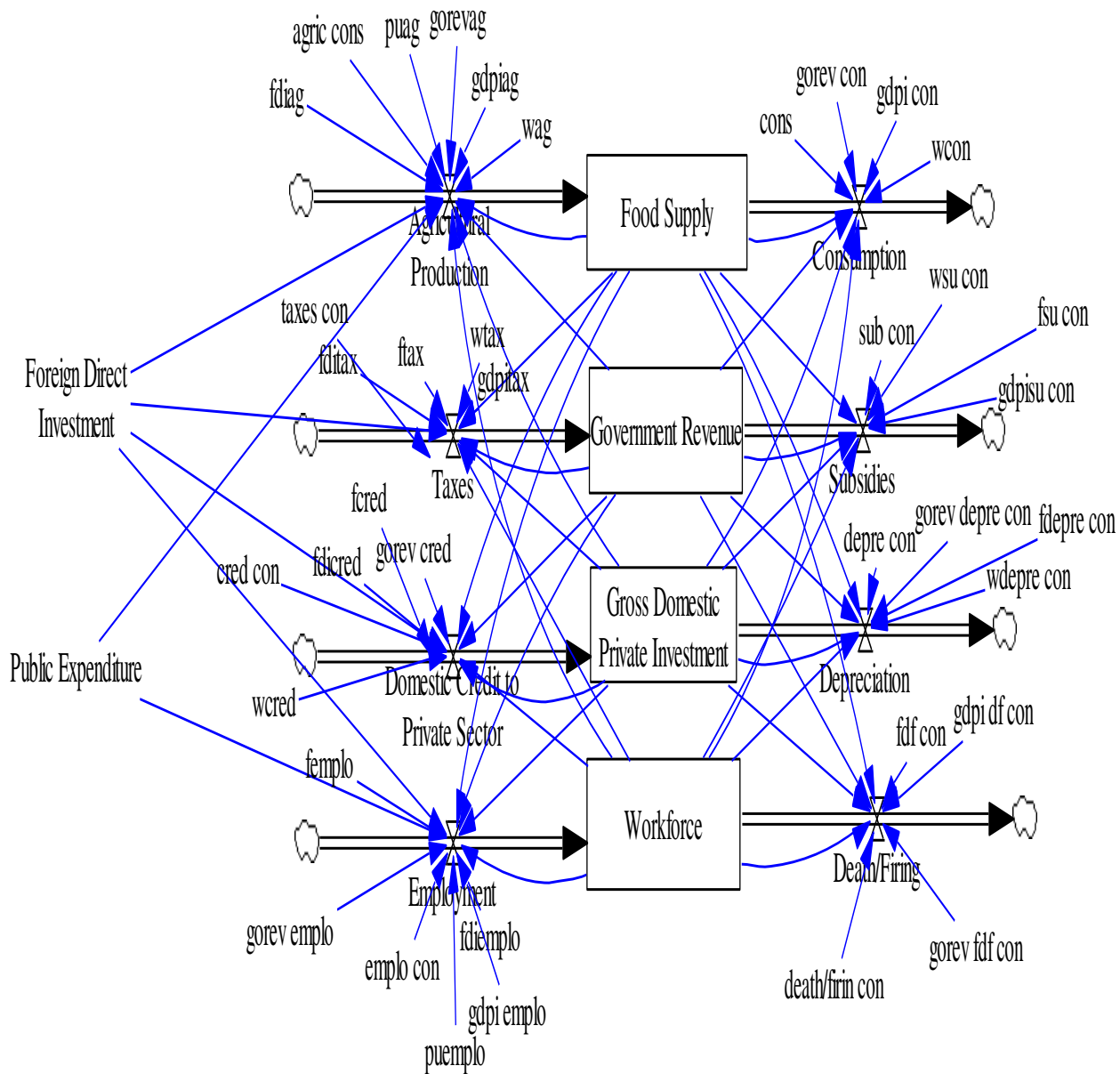


Figure 1: Conceptual Framework for response of agricultural growth to public expenditures and foreign direct investment in Cameroon:1985-2016

Source: Adapted from Sukhdev *et al.* (2015)

agric cons is the rate at which agricultural production affect food supply

gdpiag is the rate at which gross domestic private investment affect agricultural production

fdiag is the rate at which foreign direct investment affect agricultural production

puag is the rate at which public expenditure affect agricultural production

goverag is the rate at which government revenue affect agricultural production

wag is the rate at which workforce affect agricultural production

taxes con is the rate at which taxes affect government revenue

gdpitax is the rate at which gross domestic private investment affect taxes

ftax is the rate at which food supply affect taxes

wtax is the rate at which workforce affect taxes

fditax is the rate at which foreign direct investment affect taxes

cred con is the rate at which domestic credit to private sector affect gross domestic private investment

fdicred is the rate at which foreign direct investment affect domestic credit to private sector

fcired is the rate at which food supply affect domestic credit to private sector

govercred is the rate at which government revenue affect domestic credit to private sector

wcred is the rate at which workforce affect domestic credit to private sector

emplo con is the rate at which employment affect workforce

gdpiemplo is the rate at which gross domestic private investment affect employment

fdiemplo is the rate at which foreign direct investment affect employment

femplo is the rate at which food supply affect employment

goveremplo is the rate at which government revenue affect employment

puexpemplo is the rate at which public expenditure affect employment

cons is the rate at which consumption affect food supply

gorevcon is the rate at which government revenue affect consumption

wcon is the rate at which workforce affect consumption

gdpicon is the rate at which gross domestic private investment affect consumption

sub con is the rate at which subsidies affect government revenue

gdpisu con is the rate at which gross domestic private investment affect subsidies

fsu con is the rate at which food supply affect subsidies

wsu con is the rate at which workforce affect subsidies

depre con is the rate at which depreciation affect gross domestic private investment

goverdepre con is the rate at which government revenue affect depreciation

wdepre con is the rate at which workforce affect depreciation

fdepre con is the rate at which food supply affect depreciation

death/firing con is the rate at which death/firing affect workforce

gdpidfcon is the rate at which gross domestic private investment affect death/firing

fdfcon is the rate at which food supply affect death/firing

goverfdf con is the rate at which government revenue affect death/firing

METHODOLOGY

The Study Area: The study was conducted in Cameroon which has ten regions, namely: Centre; Littoral; Adamawa; Far-North; North; South; East; West; North-West and South-West. The country covers a total land area of 475,442sq km and is located in the Central part of Africa within latitudes 2° and 13° North and longitude 9° and 16° East of the equator (United Nations, 2004). Cameroon is bordered by Nigeria to the West; Chad to the Northeast; the Central Africa Republic to the East and Equatorial Guinea, Gabon and Republic of Congo to the South (World factsbook, 2010).

Method of Data Collection: Due to unavailability of data, annual time series covering a period of 32 years (1985-2016) were obtained from World Bank development indicators data base, Ministry of Economic and Planning. Food and Agriculture Organization, World Atlas data base and United Nations Organization of trade.

Techniques of Data Analysis: Ordinary differential equation (ODEs) was used to analyse the broad objective involving three (3) scenarios

Model Specification

Ordinary Differential Equation

The model was specified as followed

Minimizing (7)

where:

is a defined function

is historical data

Agric is the simulated data

..... (8)

..... (9)

.....(10)

.....(11)

.....(12)

where:

.....(13)

.....(14)

.....(15)

..... (16)

..... (17)

.....(18)

..... (19)

agricultural growth (agric) is measured in tons

food supply (fds) is measured in tons

government revenue (gorev) is measured in cfa

gross domestic private investment (gdpi) is measured in cfa

workforce (workf) is measured per thousands

foreign direct investment (fdi) is measured in cfa

public expenditures (puexp) is measured in cfa

taxes is measured in cfa

subsidy is measured in cfa

domestic credit to private sector is measured in cfa

depreciation is measured in percentage

employment is measured per thousands

death/firing is measured per thousands

is the initial value of food supply

is the initial value of government revenue

is the initial value of gross domestic private investment

is the initial value of workforce

Sensitivity Analysis of Agricultural Growth to Increases/Decreases in Public Expenditures and foreign Direct Investment

By differentiating equation (2) with respect to public expenditures and foreign direct investment, the differential equation for sensitivity of agricultural growth is defined as follow:

..... (20)

where:

changes in agricultural growth (in tons)

foreign direct investment (fdi) is measured in cfa

public expenditure (puexp)is measured in cfa

t = period

P = parameters

RESULTS AND DISCUSSION

Model Validation

The result of test of difference between the original and the baseline simulated data in table 1 showed that t-value (-0.53) was not significant indicating that there is no significant difference between the simulated baseline data and original data. Therefore, the simulated baseline data is fitted to carry out the study.

Table 1: Test of Difference between the Original and the Baseline Simulated Data

	T	df	Significance (2 – tailed)	Decision Rule
Equal variances assumed	-0.53	62	0.59	Accept Ho
Equal variances not assumed	-0.53	38.31	0.59	

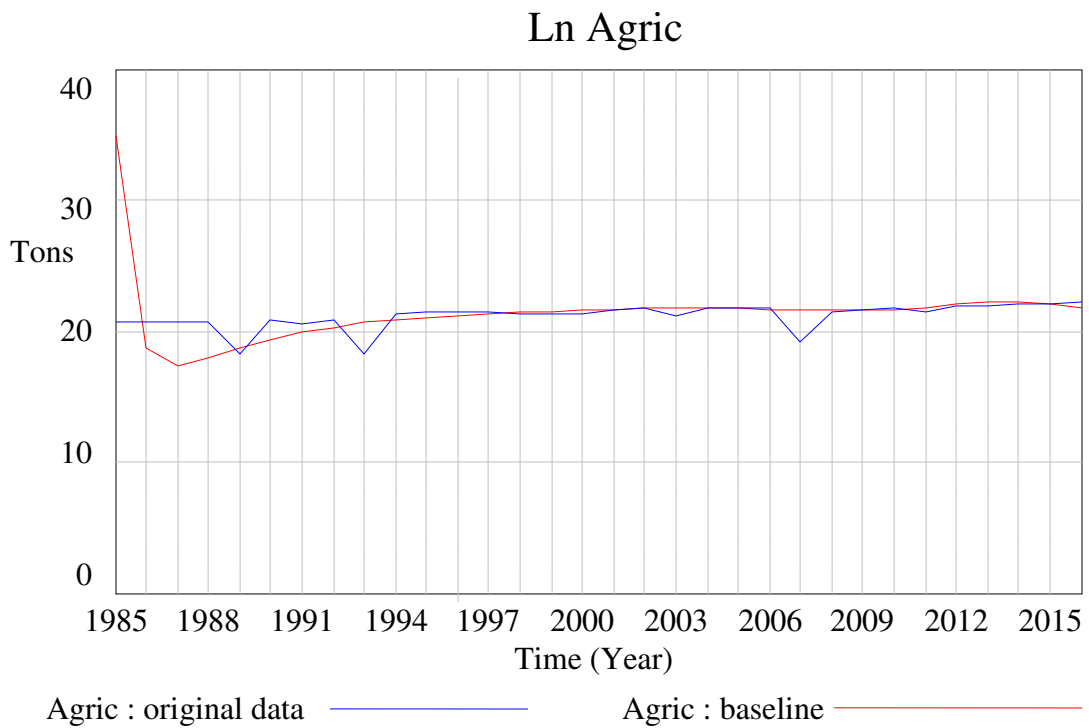


Figure 2: Model Structure Fitness

Sensitivity of agricultural growth to increase in foreign direct investment and decrease in public expenditures by 15% (Scenario 1)

The sensitivity of agricultural growth to increase in foreign direct investment and decrease in public expenditures by 15% is shown in figure 3 while table 2 presents the summary statistics. The results in table 2 showed that the simulated data (scenario1) ranges from 114.43 tons to $1.78E+27$ tons with average of 15,906,600,725.58 tons compared to the baseline which ranges from 31,960,138.10 tons to 1,470,000,000,000,000 tons with average of 1,967,441,884 tons. This result could be attributed to the fact that foreign investors comes with huge capital and technical expertise which may lead to increase in the growth of agriculture. This results agrees with Fambon (2013) who found that foreign direct investment inflow increased the economic growth of Cameroon. Specifically, from 1985 to 1991, the simulated data (scenario 1) was below the baseline from 981,398,783,472,675 to 374,087,393.29 tons compared to 1,470,000,000,000,000 tons to 426,021,341.33 tons for baseline. This could be due to the low rate of foreign direct investment inflow during the period. From 1992 to 1996, the simulated data (scenario 1) rose slightly above the simulated baseline data from 1,112,638,434.75 tons to

5,138,361,030.99 tons compared to 648,388,103.4 tons to 1,578,909,096.08 tons for baseline. From 1997 to 2002, the simulated data (scenario 1) decreased below the simulated baseline from 1,693,392,923 tons to 3,024,464,838.84 tons compared to 1,744,964,415.27 tons to 247,622,2375.16 tons for baseline. From 2003 to 2007, the simulated data (scenario 1) rose above the simulated baseline from 8,883,0864,521.92 tons to 49,736,255,946.41 tons compared to 2,682,459,675.70 tons to 2,577,278,927.36 tons for baseline. This could be attributed to the full implementation of projects set up by foreign investors. This result agrees with the findings of Uboh *et al.* (2012) who found that increased private investment increased the agricultural growth in Nigeria. From 2008 to 2012, the simulated data (scenario 1) decreased slightly below the baseline from 36,397,112.40 tons to 237,993.82 tons compared to 2,379,128,307.05 tons to 2,905,873,876.25 tons for baseline. This may be attributed to the world economic crisis which must have reduced businesses in the country. From 2013 to 2016, the simulated data (scenario 1) rose slightly above the baseline as it ranges from 52,379,128,307.05 tons to 1.78E+27 tons compared to 4,291,919,904.66 tons to 2,994,370,910.87 tons for the baseline. This could still be attributed to full implementation of investment set by foreign investors. This result agrees with the findings of Uboh *et al.* (2012) who found that increased private investment increases the agricultural growth in Nigeria.

Table 2: Summary Statistics for the Simulated Scenario 1 and Baseline Agricultural Growth

	Scenario 1	Baseline
Mean	15,906,600,725.58	1,967,441,884
Minimum	114.43	31,960,138.10
Maximum	1.78E+27	1,470,000,000,000,000

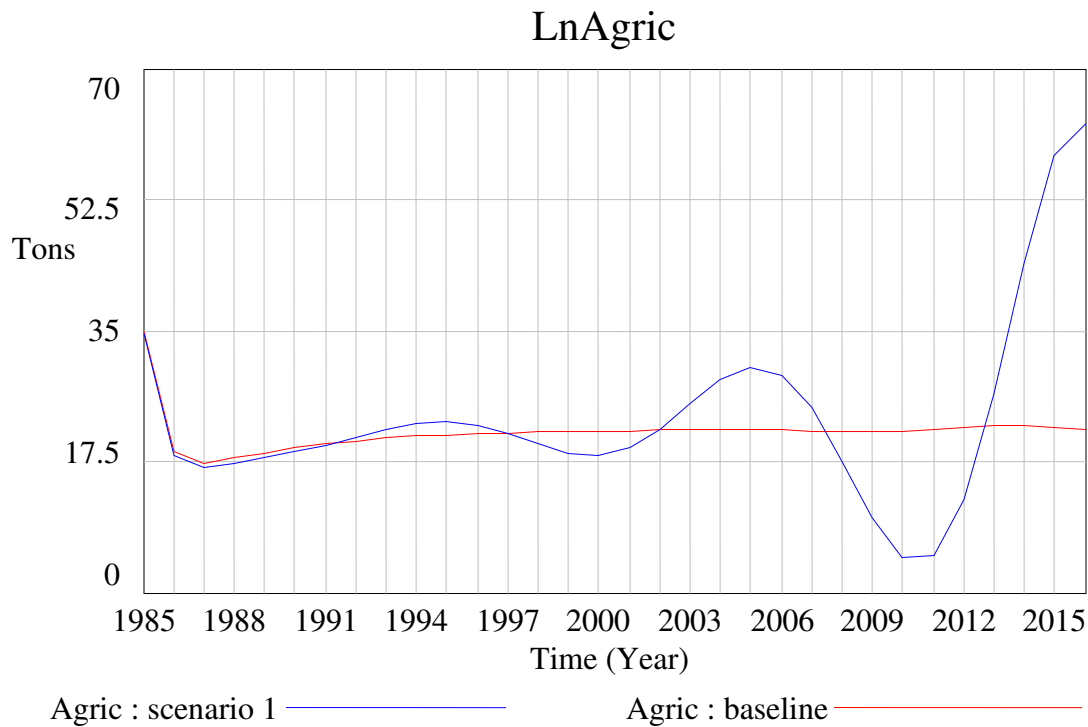


Figure 3: Sensitivity of agricultural growth to increase in foreign direct investment and decrease in public expenditures by 15%

Sensitivity of agricultural growth to decrease in foreign direct investment and increase in public expenditures by 15% (Scenario 2)

The sensitivity of agricultural growth to decrease in foreign direct investment and increase in public expenditures by 15% is shown in figure 4 while table 3 presents the summary. Results showed that the simulated data (scenario 2) ranges from 5.01E-09 tons to 61,634,612,568,897,700 with average of 248,263,192.13 tons compared to the baseline which ranges from 31,960,138.10 to 1,470,000,000,000,000 tons with average of 1,967,441,884 tons. This result may be attributed to the fact that increase in public expenditures is generally associated with increases in taxes which in turn reduces foreign direct investment, therefore

reduces the growth of the agricultural sector. Specifically, from 1985 to 1991, the simulated data (scenario 2) rose slightly above the baseline from 225,066,022,1810,350 tons to 485,165,195.40 tons compared to 1,478,789,141,224,740 tons to 426,021,341.33 tons for baseline. From 1992 to 1996, the simulated data (scenario 2) decreased below the baseline from 374,087,393.3 tons to 480,337,721.1 tons compared to 648,388,103.4 tons to 1,578,909,096.08 tons for baseline. From 1997 to 2001, the simulated data (scenario 2) rose slightly above the baseline from 1,798,106,493.3 tons to 23,493,743,767.65 tons compared to 2,935,078,394.23 tons to 2,263,096,850.33 tons for baseline. From 2002 to 2007, the simulated data (scenario 2) decreased below the baseline from 2,355,455,584.86 tons to 113,805,339.7 tons compared to 2,476,222,375.16 tons to 2,577,278,927.36 tons for baseline. This could be attributed to the fact that investment done by both foreign investors and government invested on capital expenditures which do not necessarily produce expected results in the short run. From 2008 to 2012, the simulated data (scenario 2) rose above the baseline from 112,926,161,045.81 tons to 53,462,415,022,408.8 tons compared to 2,379,128,307.05 tons to 1,762,501,599.20 tons for baseline. This result agrees with the findings of Uboh *et al.* (2012) who found that increase in government agricultural spending led to increase in agricultural growth in Nigeria. From 2013 to 2016, the simulated data (scenario 2) decreased below the baseline from 51,649,961.08 tons to 5.01E-09 tons compared to 4,291,919,904.66 tons to 2,994,370,910.87 tons for baseline. This could be due to inadequate monitoring and evaluation of agricultural targeted programmes by government associated with limited foreign investors.

Table 3: Summary Statistics for the Simulated Scenario 2 and Baseline Agricultural Growth

	Scenario 2	Baseline
Mean	248,263,192.13	1,967,441,884
Minimum	5.01E-09	31,960,138.10
Maximum	61,634,612,568,897,700	1,470,000,000,000,000

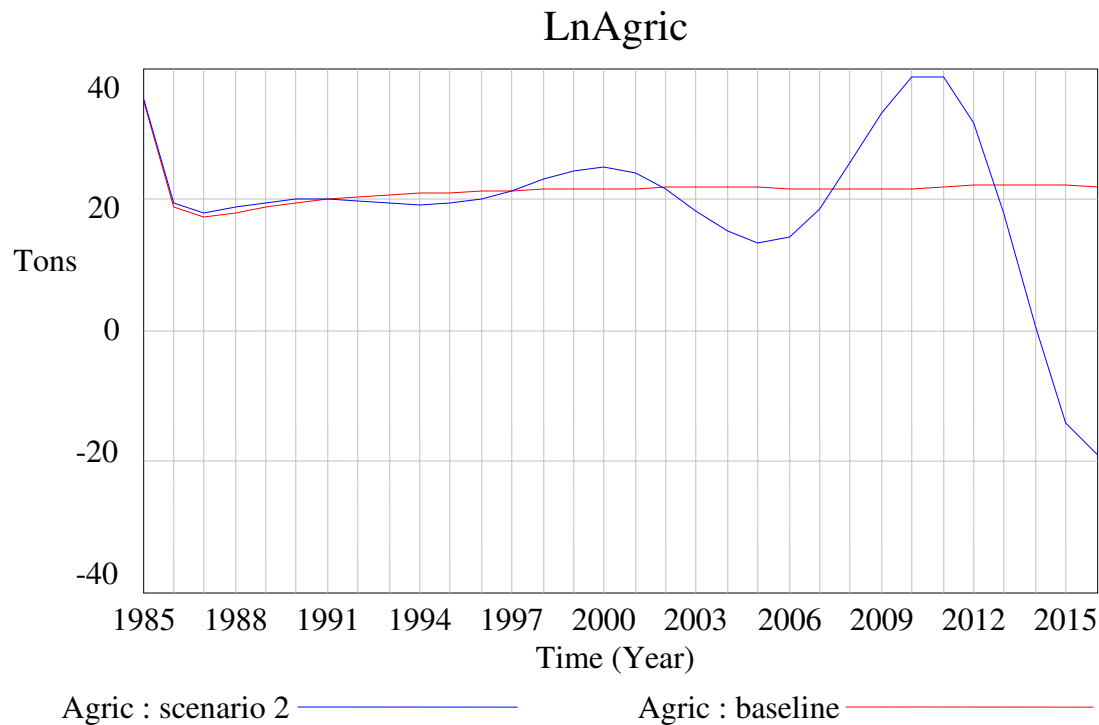


Figure 4: Sensitivity of agricultural growth to decrease in foreign direct investment and increase in public expenditures by 15%

Sensitivity of agricultural growth to increases in foreign direct investment and public expenditure by 15% (Scenario 3)

The sensitivity of agricultural growth to increases in foreign direct investment and public expenditures by 15% is shown in figure 5 while table 4 shows the summary statistics. Results showed that the simulated data (scenario 3) ranges between 2.88E-27 tons to 2.88E+24 tons with average of 28,346,099.64 tons compared to the baseline which ranges from 31,960,138.10 to 1,470,000,000,000,000 tons with average of 1,967,441,884 tons. Focusing on figure 5, it is observed that from 1985 to 1991, the simulated data (scenario 3) rose slightly above the baseline

with values ranging from 3,459,844,358,928,810 to 552,519,895.13 tons compared to 1,478,789,141,224,740 tons to 426,021,341.33 tons for baseline. This may be explained by the complementary policy of increasing both foreign direct investment and public expenditures to sustain the agricultural sector. From 1992 to 1996, the simulated data (scenario 3) were slightly below the baseline from 211,555,937.20 tons to 139,002,155.8 tons compared to compared to 648,388,103.4 tons to 1,578,909,096.08 tons for the baseline. This could be attributed to inconsistency in government policy associated with the slowdown in the activities of foreign investors. From 1997 to 2001, the simulated data (scenario 3) rose slightly above the baseline from 1,852,866,988.55 tons to 248,821,099,679.15 tons compared to 2,935,078,394.23 tons to 2,263,096,850.33 tons for baseline. This is attributed the combined efforts made by government and foreign investors to sustain the agricultural sector. This result agrees with Fatima (2012) who found that the increase in public and private investment had a positive effect on growth. From 2002 to 2007, the simulated data (scenario 3) decreased below the baseline 2,047,734,710.81 tons to 4,685,578.75 tons compared to 2,476,222,375.16 tons to 2,577,278,927.36 tons for baseline. This may be attributed to the slowdown in activities of foreign investors associated with increases in taxes as well as the duplication of agricultural programmes which led to the decline of growth in the agricultural sector. From 2008 to 2012, the simulated data (scenario 3) rose above the baseline from 6,882,478,843,480.97 tons to 1,250,406,034,422,520,000 compared to 2,379,128,307.05 tons to 1,762,501,599.20 tons for baseline. This could be attributed to the complementary policy set up to sustain the growth of the agricultural sector. From 2013 to 2016, the simulated data (scenario 3) decreased below the baseline from 660,003.22 tons to 2.88E-27 tons compared to 4,291,919,904.66 tons to 2,994,370,910.87 tons for baseline. This could be attributed to lack of adequate planning to sustain the agricultural sector.

Table 4: Summary Statistics for the Simulated Scenario 7 and Baseline Agricultural Growth

	Scenario 3	Baseline
Mean	28,346,099.64	1,967,441,884
Minimum	2.88E-27	31,960,138.10
Maximum	2.88E+24	1,470,000,000,000,000

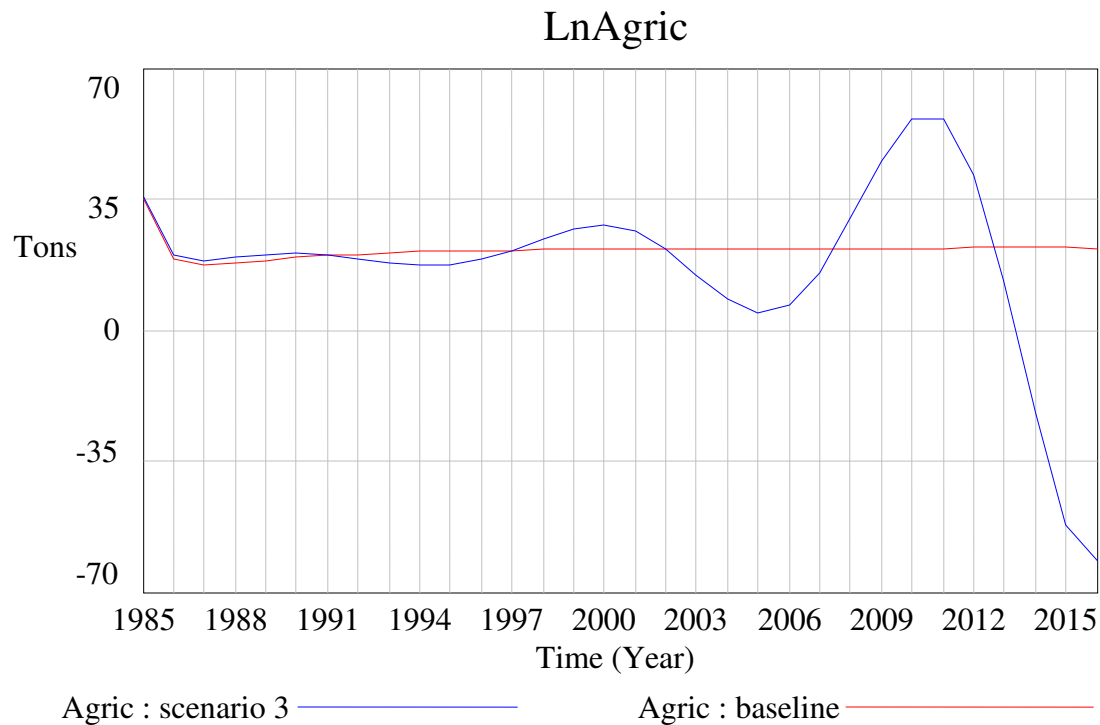


Figure 5: Sensitivity of agricultural growth to increases in foreign direct investment and public expenditures by 15%

CONCLUSION AND RECOMMENDATIONS

This study analysed the response of agricultural growth to public expenditures and foreign direct investment in Cameroon from 1985 to 2016. The study further showed that increase in foreign direct investment and decrease in public expenditures (scenario 1) provided the best alternative for the sustainability of the agricultural growth which validates the classical theory that stated that private investment is the engine of growth compared to increases in public expenditures and foreign direct investment and increase in public expenditures and decrease in

foreign direct investment. Based on the findings of this study, the following recommendations are made:

1. Given that public expenditures and foreign direct investment significantly affect the growth of the agricultural sector, investment on agricultural targeted programmes should be set up to sustain the growth of the agricultural sector in Cameroon.
2. Since foreign direct investment is the engine for agricultural growth in Cameroon, incentives such as reduction of tax should be given to attract more foreign investors into the country.
3. Investment on infrastructure such as roads, railways and dam should be done in order to provide adequate environment to foreigners to invest in the agricultural sector.

References

- Ahmed U J, & Mubarak U J, 2014. Significance of government social infrastructure expenditure on economic growth in Nigeria: 1961-2012. *Yobe Journal of Economics*, A bi-annual publication of the Department of Economics, Yobe State University, Damaturu, Nigeria 1(1):38-48
- Blomstrom M, Lipsey R E, & Zejan, M, 1996. 'Is Fixed Investment the Key to Economic Growth?'. *Quarterly Journal of Economics* 111: 269–76.

- Benjamin N C & Devarajan S, 1986. Oil Revenues and the Cameroonian Economy. In Michael G. Schatzberg and I William Zartman (eds), *The Political Economy of Cameroon*. New York: Praeger. Pp. 23-24
- CPB Netherlands Bureau for Economic Policy Analysis, 2004. Reducing the administrative burden in the European Union, August, CPB. Pp 65-78.
- De Mello L R, 1996. 'Foreign Direct Investment, International Knowledge Transfers, Endogenous Growth: Time Series Evidence'. Kent: Department of Economics, University of Kent.
- Dissou Y, & Didic S, 2011. Public Infrastructure and Economic Growth. Working Paper, Department of Economics, University of Ottawa. Pp 80
- Djoumessi E C K, 2009. Financial Development and Economic Growth: A Comparative Study between Cameroon and South Africa. M.Sc. thesis submitted to the Department of Economics, University of South Africa. 192pp
- EIU (Economist Intelligence Unit), 2002. 'Country Profiles: Cameroon'. London: EIU Ltd.
- Essama-Nssah B, & Bassolé L, 2010. A Counterfactual Analysis of the Poverty Impact of Economic Growth in Cameroon. Policy Research Working Paper 5249. 1-57
- Estache A, Perrault JF, & Savard L, 2009. Impact of Infrastructure Spending in Mali: ACGE Modeling Approach. Université Libre de Bruxelles, Ecares, ECARES Working Papers:2009_009.
- Fambon S, 2013. Foreign Capital Inflow and Economic Growth in Cameroon. Wider Working Paper No 124:1-22
- Fan S, Hazell P, & Thorat S, 2000. Government spending, agricultural growth and poverty in India. *American Journal of Agricultural Economics* 82(4):1038-1051.
- Gelauff G, & Lejour A, 2006. Five Lisbon Highlights, the economic impact of reaching these targets, CPB.
- Lipsey R E, 2000. 'Inward FDI and Economic Growth in Developing Countries. *Transnational Corporations* 9(1): 67-95.
- Jhingan M I 2010. "Macroeconomic Theory". 12th Edition. Nisha Enterprises, Delhi
- Sukhdev P, Kaavya V, Bassi A M, Allen E, & Mumbunan S, 2015. Indonesia Green Economy Model (I-Gem). Final Report, Low Emission Capacity Building Programme, PP 1-300

- Uboh E, Oduh M, & Ujah O, 2012. Drivers and Sustainability of Agricultural Growth in Nigeria. Research paper 8: 1-51. Published by African Institute for Applied Economics 54 Nza Sreet, Independence Layout P.O. Box 2147 Enugu, NIGERIA
- Vaqar A, Ahsan A, & Sofia A, 2013. Public infrastructure and economic growth in Pakistan: a dynamic CGE-micro simulation analysis. Working paper 2013-01. Partnerships for Economic Policy.
- Van de Walle D, 1996. Infrastructure and poverty in Vietnam. LSMS Study Working Paper no. 121. Washington, D.C: The World Bank.
- Wautabouna O, 2012. Public Expenditure Contribution to Pro-Poor Growth in Cote d'Ivoire: A Micro Simulated General Equilibrium Approach. *Modern Economy* 3: 330-337
- Władysław W, 2010. Long-Term Simulation Model for a Knowledge-Based Economy. *Argumenta Oeconomica* 2 (25): 1-20
- World Bank, 2013. Basic agricultural public expenditure diagnostic review(2003–12)republic of Cameroon. Strengthening National Comprehensive agricultural public expenditure in Sub-Saharan Africa. Pp1-131.
- World factsbook. (2010). Cameroon economy. www.cia.gov/cia/publication/factsbook/goes/htm. (Retrieved on 10/11/2015)