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Full Length Research Paper

Poverty incidence in Nigeria: Does financial deepening matter?

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Economic policies in every nation strive to attain basic macroeconomic goals, one of which is poverty reduction. The paper examines empirically whether or not financial deepening has played a significant role in poverty alleviation effort in Nigeria for the period 1990 to 2013. Utilizing both quantitative and descriptive analyses, the paper estimated three models in which poverty rates for the rural areas, urban areas as well as national poverty rates were regressed on financial development indicators. Based on the estimated parameters, the paper found that the coefficient of ratio of broad money supply to GDP reduces poverty rate in Nigeria. The ratio of market capitalization to GDP and ratio of foreign direct investment in equities to GDP have positive impact on rural and urban poverty reduction respectively. However, the ratio of credit to the private sector and the ratio of total stock traded to GDP revealed opposite impact on poverty alleviation at all levels. The descriptive analysis indicated that poverty rate in Nigeria has been unacceptably high in spite of abundant natural and human resources. The paper therefore, recommends the need for urgent reforms in the financial sector that would facilitate development in both the money and capital markets to improve liquidity; reduce interest rate spread to attract deposits and broaden financial access to the poor.

Key words: Poverty rate, financial deepening, ordinary least squares(OLS).

INTRODUCTION

The basic macroeconomic policies of any nation are aimed at achieving all or some of the following: sustained and irreversible economic growth, reduction of inequality, full employment equilibrium, price stability, balance of payment equilibrium and exchange rate stability. These goals play complementary rather than conflicting roles. The overall target of the policies is to improve the wellbeing of the citizenry on a continuous basis.

These goals are usually pursued through well coordinated monetary and fiscal policies of government. The potency and effectiveness of monetary policy in the attainment of these goals depends to a large extent on the level of financial development (deepening) of a nation. Central to these macroeconomic goals to the state is the protection of life and property of its citizens. The responsibility of protection of life and property can be direct which involves

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investment in institutions like the police force, judiciary and defense. The indirect protection comes in the form of provision of enabling environment and opportunities for the citizens to achieve their full potentials, thereby improving their living standard and guaranteeing the dignity of men. Macroeconomic goals fall under the indirect responsibility of government.

It is the differences in governments' commitment to its responsibilities that differentiate the developed nations from the developing nations. The countries which are referred to as backward or developing are so designated because they are economically, politically and socially behind the developed countries. Specifically, they are, in the opinion of Todaro (1997) and Jhingan (2002), characterized by persistent high incidence of absolute poverty, low levels of income per capita, consumption, as well as high mortality rates, administrative incompetence and high dependence on foreign advanced economies. It is widely believed that poverty is largely responsible for the persistence of these characteristics in developing countries. According to Abimiku (2009), this explains why eradicating poverty has not only been seen as the most important goal of human wellbeing but also, removal of hunger, disease and provision of productive employment for all are also an important aspect of poverty reduction.

It is possible to measure poverty statistically by establishing a line expressed in terms of per capita income below which the individual or group concerned encounters unacceptable difficulties in satisfying the basic needs of life. Naturally, the poverty line varies in relation to the general level of development. What is poverty for one may be wealth for another. In developing economies, an adult daily expenditure below two dollars (\$2) is considered as living under the poverty line (International Monetary Fund, 2012).

On the material level, in terms of the distribution of monetary income as the basis of purchasing power in a monetized economy like Nigeria, it has been uneven. At the global level, inequality between nations and within nations has created a social pyramid where the poor are at the base and the minute rich individuals are at the top. Eradication of absolute poverty seems a fruitless effort; as stressed by Bartoli (1991) who observed that, failure to find a cure for poverty, ignorance and death, men have decided, for their own peace of mind, not to think about them. However, the social upheavals and tensions occasioned by perverse poverty suggest that the more men refuse to look for solutions, the more their peace of minds and happiness are jeopardized.

Absolute poverty level in Nigeria has remained persistently above 50% in spite of the nation's enormous wealth (a situation described as a paradox). Between 1994 and 2012, the number of people living below the poverty line continues to rise (Nnadozie, 2012). While poverty level in Nigeria stood at 67% in 2013, data for China, Brazil, Singapore, South Korea, Taiwan, Indonesia, Malaysia, South Africa and Ghana for the

period 2007 and 2013 revealed that poverty level in these countries range from 1.5% in Taiwan to 31.3% in South Africa; with Kenya having 43.4% of its population in poverty as at 2013 (Abimiku, 2014)

Financial development is considered an integral factor in the economic growth of a country. A well functioning financial system that mobilizes saving, allocates resources and facilitates risk management contributes to economic growth by supporting capital accumulation, improving investment efficiency, generates employment opportunities, increases output/income and reduces poverty, all things being equal.

However, the relationship between finance and poverty reduction is neither direct nor automatic as it has to affect other targets through monetary policy transmission mechanism. These targets according to Mbutor (2009) include interest rates, exchange rates and credit channels, which have implications and impact for/on the availability, direction and cost of credit and ultimately poverty level of the people. Governments in developing countries use monetary policy to achieve economic growth that includes equitable income distribution and poverty reduction. In other words, economic growth can be grouped into either growth with rising income inequality and poverty, or growth with falling income inequality and poverty (Beck et al., 2007). The differences between these two can alter the impacts of growth on the poor.

According to Inoue and Hamori (2010) if financial development increases average growth, only by increasing the incomes of the rich and hence worsening income inequality, then financial development has not helped the poor. This is the case with Nigerian economy whose rebasing in 2014 indicated that it is the largest economy in Africa with hundreds of billions of Naira declared as profits by financial institutions while more than 50% of Nigerians are living in poverty.

Poverty reduction is at the centre of development agenda of every nation, Nigeria inclusive. Regrettably, in spite of several reforms in the financial sector couple with the relative improvement in financial deepening indicators, these have not translated to poverty reduction in Nigeria. It is on the basis of the foregoing that this paper seeks to investigate whether financial deepening matters in poverty reduction efforts in Nigeria. In order to achieve this, the paper is structured into five sections: section one is the introduction; section two deals with literature review; section three contains the methodology; while sections four and five discuss the findings and recommendations respectively.

LITERATURE REVIEW

Financial deepening is defined as an increase in the size of financial system and its role and pervasiveness in the economy. From the monetary policy perspective, the

growing diversification of firms' and households' portfolios is especially relevant, as they are more affected by the developments in the financial markets (Visco, 2007). Also, Shaw (1975) refers to the financial deepening as increased provision of financial services with a wider choice of services geared to all levels of society. In other words, it implies an increased ratio of money supply to gross domestic product (GDP). Financial deepening results to financial liquidity. The more liquid money is available in an economy, the more opportunities exist for continued growth as well as improvement in material wellbeing of the citizenry (poverty reduction)

Poverty, on the other hand, describes a condition in which individuals, families or groups are considered to be in want and lack the resources, particularly real income to obtain the types of diets needed to enjoy some fixed minimum standard of living determined by a given society. This minimum standard of living considers some amount of goods and services essential and those who are unable to obtain them are said to be poor (Miller, 1968; Wedderburn, 1974; Plotnick and Skidmore, 1978; Schiller, 1976; Abimiku, 2006).

Financial deepening and financial inclusion work hand in hand. A shallow financial sector lacks the depth to include or accommodate a large spectrum of financial investors and economic agents, thereby resulting in financial alienation for the poor. Financial inclusion and financial deepening play an important role in promoting economic growth and reducing poverty while mitigating systematic risk and maintaining financial stability. However, the focus of this paper is financial deepening.

A growing body of empirical research reveals remarkable consistent results that the services provided by the financial system create a first order impact on long run economic growth. Based on the pioneering work of Bagehot (1873) and Schumpeter (1912), recent researches have produced a key result that countries with better developed financial systems tend to grow faster in terms of income and poverty reduction than those with underdeveloped financial system. Financial services and financial development (as measured by the size of the intermediary sector) stimulate economic growth by increasing the rate of capital accumulation and by improving the efficiency with which economies use that capital in current period as well as in the future (King and Levine, 1993).

Local financial development enhances the probability that an individual starts business, increases industrial competition, widens consumers' choice for goods and services at competitive price, thereby improving economic and social welfare of the people. For a household, financial deepening offers better and cheaper services for saving money and making payments by allowing firms and households to avoid the cost and waste associated with barter or cash transactions, cutting remittance costs and providing the opportunity for asset accumulation and consumption smoothing (Balackrishman

et al., 2013). Thus, it is expected to further improve access to credit for the poor. This is the connection between financial deepening and financial inclusion.

Financial deepening, according to Clarke et al., (2006), not only promotes economic growth but can also help distribute financial resources more evenly. Certain forms of financial development, particularly those that broaden access to finance, can benefit the poor disproportionately by increasing capital flow and increasing efficiency of capital allocation, thereby reducing inequality and poverty in the society (Beck et al., 2007).

Again, better access to credit by the poor, which is both a component of financial deepening and inclusion, enables the poor to pull themselves out of poverty by investing in their human capital and micro-enterprises, thus reducing aggregate poverty (Benerjee and Newman, 1993; Galor and Zeira, 1997; Aghion and Bolton, 1997). This argument is consistent with the AK version of endogenous growth theory advanced by DeGreejorio (1997) which argues that financial liberalization and development increase the quality of human capital by financing education to financially constrained households (the poor) and, by extension, increase their productivity and income.

Ayyagari et al. (2013) submitted that financial development has a significant impact on poverty reduction through channels such as: entrepreneurship and inter-state migration (labour mobility of workers) toward financially more developed states and blue chip enterprises. Although the paper is not on poverty and entrepreneurship, finance affects poverty through entrepreneurship channel as observed above. It is on the basis of this that Abimiku (2014) observed that emerging economies like Brazil, China, Indonesia, Taiwan, South African etc. have been able to drastically reduce poverty, unemployment and inequality and their resultant effects due largely to the growth of the entrepreneurial class supported by a relative sound and developed financial sector.

There has been increasing number of empirical studies on the effects of financial deepening on poverty reduction. For example, Jalilian and Kirkpatrick (2008) examined whether financial deepening can contribute to the goal of poverty reduction in many developed and developing countries including India. Their study incorporates three distinct research approaches. These are the link between financial development and economic growth, the link between economic growth and poverty as well as the link between financial development and inequality. By estimating each link separately, they concluded that financial development helps to reduce poverty; the results indicate that a unit of change in financial development improves the income growth prospects of the poor by almost 0.3%.

In the same vein, Beck et al. (2007) analyzed the impact of financial deepening on the poor by estimating the relationship between finance and changes in both

income distribution and poverty levels, because financial development may affect the poor through both aggregate growth and changes in income distribution. The result reveals that an increase in financial development lowers income inequality, increases the income of the relatively poor disproportionately and is strongly associated with poverty alleviation. These studies were conducted with large sample from different countries.

However, there have been studies on the relationship between finance and poverty within individual countries. For instance, Quartey (2008) investigated the inter-relationship between financial development, savings mobilization and poverty reduction in Ghana from 1970 to 2001. The pair wise granger causality test shows that financial development (ratio of private credit to GDP) Granger-causes poverty reduction. Odhiambo (2009) examined the relationship among financial development, economic growth and poverty reduction in South Africa from 1960 to 2006 using a trivariate causality test based on an error correction model. The causality result indicates that financial development (M2/GDP) and economic growth cause an increase in per capita consumption (a proxy for poverty reduction) and that economic growth causes financial development.

Furthermore, Inoue and Hamori (2010) investigated the effects of financial deepening on poverty reduction in India using unbalanced panel data for 28 states and union territories between 1973 and 2004. From the dynamic Generalized Method of Moments (GMM) estimation, they found that financial deepening and economic growth alleviated poverty in India and separately, in urban areas and rural areas. In Nigeria, there has been little or less attention paid to researches on the relationship between financial development and poverty reduction.

The study that comes close to this is a study by Onwumere (2007) on the impact of capital market on poverty alleviation in Nigeria. The paper was more of a proposal on how capital market could be used as a tool for poverty alleviation; it has no methodology and, therefore, lacks empirical findings. Also, Ugiagbe and Edegebe (2015) identified globalization as being responsible for the financial exclusion of the poor in Nigeria, especially farmers who receive \$2, 000 for a ton of dried cocoa pods/seeds exported abroad and pay \$10, 000 for the processed imported chocolate and bounvita; a bi-product of cocoa they exported.

This paper differs from the reviewed literature in the following ways. First, there is no empirical work on Nigeria's data. Secondly, the variables used in this paper include the money market, capital market and international financial integration indicator. These made this paper broader in terms of variables, unique and novel.

METHODOLOGY

The paper employs both descriptive and quantitative analyses using

secondary data to investigate the impact of financial deepening on poverty reduction in Nigeria. The descriptive analysis use graphical presentation on poverty trend in Nigeria for the period between 1990 and 2013. On the other hand, the quantitative analysis is based on the classical ordinary least squares regression (OLS) technique. This method of analysis is suitable when investigation requires estimating the coefficient of parameters of a linear model because of its properties of; Best, Linear Unbiased Estimator (BLUE) (Gujarati, 2006).

The regression model used to determine the magnitude of the estimated coefficients of financial deepening on poverty reduction in the rural, urban and national levels in Nigeria involved three equations. The equation for rural poverty and financial deepening is presented as follows:

$$RPR = a_0 + a_1RM2/GDP_{t-1} + a_2RCP/CGP_{t-1} + a_3RMC/GDP_{t-1} + a_4RST/GDP_{t-1} + a_5 RFE/GDP_{t-1} \dots\dots\dots (1)$$

Where

RPR = Rural poverty rates
 RM2/GDP = ratio of broad money supply to GDP
 RCP/GDP = ratio of credit to the private sector to GDP
 RMC/GDP = ratio by stock market capitalization to GDP
 RST/GDP = ratio of total stock traded to GDP
 RFE/GDP = ratio of foreign direct investment in equities
 Ut = error term

The estimated parameters a_1, a_2, \dots, a_5 are expected to be less than 0 ($a_1, a_2, \dots, a_5 < 0$) on a priori grounds. Theoretically, we expect financial development to have negative impact on the growth rate of rural poverty.

Poverty rate is one of the economic development indicators. A declining rate of poverty, inequality and unemployment on a sustained basis is an indication that the economy is on the path of sustained development (Eneji, 2014).

Ratio of broad money supply to Gross Domestic Product (GDP) and ratio of credit to the private sector to Gross Domestic Product (GDP) are measures of banking sector development (Money market). Two of stock market development and activities are also used in this paper. First, ratio of market capitalization to gross domestic product is the total value of all shares in the stock market as percentage of GDP; it measures the size of the stock market in relation to the economy. Second, the ratio of value of stock traded to gross domestic product is the value of all shares traded in the stock market as percentage of GDP. It measures how active and liquid the stock market is as a share of the economy (Rioja, 2014).

The third category of variables is the ratio of foreign direct investment in equities to gross domestic product (FD/GDP). This ratio measured the degree of capital market integration to international financial institutions. It equally measures the ease with which foreign investors access the Nigerian capital market and also the ease with which local firms access financial capital from foreign investors, thereby availing local investors/firms with additional source of capital for investment. Equation 1 is expressed in a log linear function. The reasons for this include;

1. To allow the researcher to interpret the coefficient of the dependent variable directly as elasticity in relation to the explanatory variables (Upender, 2003)
2. To minimize the problem of heteroscedasticity and multicollinearity (Gafar, 1988; Doroodia, 1994; Adenikinju and Busari, 2009), and
3. To bring the numerical values of the different variables to a common base. On the strength of the foregoing, Equation 1 is expressed thus:

$$4. \log RPR = a_0 + a_1 \log RM2/GDP_{t-1} + a_2 \log RCP/CGP_{t-1} + a_3 \log RMC/GDP_{t-1} + a_4 \log RST/GDP_{t-1} + a_5 \log RFE/GDP_{t-1} \dots \dots \dots (2)$$

The general use of differencing has been found to minimize the possibility of spurious regression results, especially when dealing with time series data like this (Granger and Newbold, 1974; Philip, 1986). Studies by Layson and Seak (1984); Adams (1992); Anyanwu and Udegbumam (1996) concluded that first differencing achieves stationarity of variables and thus reduces the possibility of spurious results. Based on the conclusion of the studies above, and to roughly gauge the robustness and consistency of our estimation results, equation (2) becomes:

$$\Delta \log RPR = a_0 + a_1 \Delta \log RM2/GDP_{t-1} + a_2 \Delta \log RCP/CGP_{t-1} + a_3 \Delta \log RMC/GDP_{t-1} + a_4 \Delta \log RST/GDP_{t-1} + a_5 \Delta \log RFE/GDP_{t-1} \dots \dots \dots (3)$$

Where: Δ = first difference operator.

The model for poverty rates in urban areas is given as

$$\Delta \log UPR = b_0 + b_1 \Delta \log RM2/GDP_{t-1} + b_2 \log \Delta RCP/GDP_{t-1} + b_3 \Delta \log RMC/GDP_{t-1} + b_4 \Delta \log RST/GDP_{t-1} + b_5 \log RFE/GDP_{t-1} \dots \dots \dots (4)$$

The a priori expectations are as in Equation 1.

Where: UPR = Urban poverty rates and

b_0, b_1, \dots, b_5 are the parameters to be estimated

The model for estimating the impact of financial deepening on national poverty is presented in Equation 5.

$$\Delta \log NPR = \alpha_0 + \alpha_1 \Delta \log RM2/GDP_{t-1} + \alpha_2 \Delta \log RCP/GDP_{t-1} + \alpha_3 \Delta \log RMC/GDP_{t-1} + \alpha_4 \Delta \log RST/GDP_{t-1} + \alpha_5 \log RFE/GDP_{t-1} \dots \dots \dots (5)$$

The a priori expectations are the same as those in equations above.

Where: NPR = National poverty rates and

$\alpha_1, \alpha_2, \dots, \alpha_5$ are the parameters to be estimated

RESULTS AND DISCUSSION

Descriptive analysis

This section looks at the trend in the three poverty rates in Nigeria over the period of study. Figure 1 is based on the poverty data provided in columns 7, 8 and 9 in the appendix.

Figure 1 reveals that poverty in Nigeria has persistently remained above 50% on the average for the period under study, especially as from 1994. Rural poverty is relatively the highest owing to the fact that the rural dwellers have limited access to social amenities, lack the minimum requirement of collateral to obtain loans from commercial banks and the low price of agricultural produce. Urban poverty, as shown on the graph is relatively lower as most investors in the money and capital markets are urban dwellers who have better financial education, could afford collateral and enjoy better social amenities than their rural counterparts. The national poverty rate indicated that poverty was highest prior to the entrenchment of democratic governance in 1999. The

capital market reform of 1999, banking sector reform/consolidation of 2005, the implementation of National Economic Empowerment and Development Strategies (NEEDS) and the relative improvement in the distribution of fertilizers to farmers collectively contributed to the relative decline in national poverty from 1999 to 2010 as shown above. This finding agrees with the submission of Soludo (2006) that poverty in Nigeria has significantly dropped from 70% in 1999 to 54% in 2006 as a result of several reform measures put in place by government and improvement in economic governance.

The banking sector consolidation of 2004 did not benefit the poor as rural poverty started rising from 2008, while national poverty started declining within the same period. The effect of global financial crisis of 2007/2008 adversely affected Nigeria, as Professor Ndi Okereke-Onyiuke explained the drastic fall in capitalization of the Nigerian Stock Exchange to the Senate Joint Committee on Banking Capital Market and Finance in February, 2009. She revealed that between 2007 and 2008, foreign investors withdrew N812 billion from the market (Tella, 2009). This suggests that there were contagion effects on the financial assets of Nigerians. However, national, urban and rural poverty declined during the period. This may not be unconnected to the fact that the poor do not own significant assets in the formal financial sector which was the main victim of the global financial crisis. All the poverty rates increased from 2011 perhaps, as a result of political activities (electioneering campaigns) crowding out economic investments (Dabwor, 2015). Again, the post election violence of that year also compounded the poverty situation.

Quantitative analysis

The quantitative analysis is based on the application of ordinary least square regression technique. This tool is used to empirically estimate parameters of financial deepening indicators and their impacts on the three poverty rates in Nigeria. The impact of financial deepening on the three poverty rates are presented in Tables 2, 3 and 4 respectively. The data for these analyses are obtained from the appendix.

Unit root test (Philip Peron)

The estimation was preceded by a pretest of unit root. This paper employed the Philip Peron (PP) statistics to test stationarity of the series. The PP statistics is chosen because it is more efficient in analyzing unit root. The Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) statistics have low power, that is, they tend to accept the null hypothesis of unit root more frequently than warranted (Gujarati, 2006). According to Granger and Newbold (1974), if a non-stationary time series is

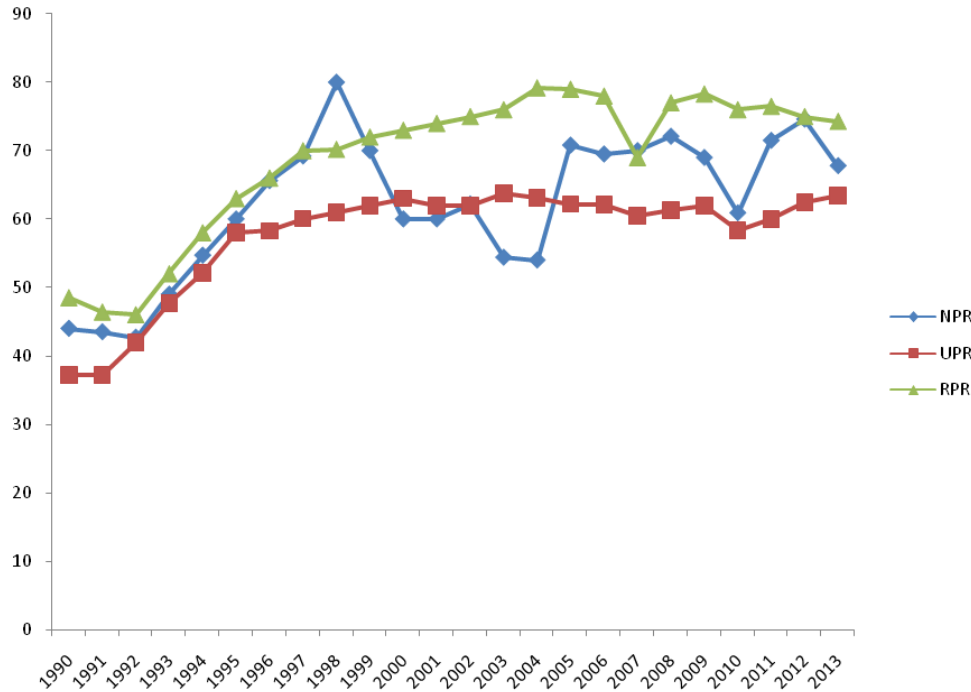


Figure 1. Trends in rural, urban and national poverty rates in Nigeria: 1990-2013.

Table 1. Philip Peron Unit Root Result.

Series	Pp statistics	Critical values	Order of integration	Prob. Value
Δ NPR	- 4.285599	-2.674290***	I(1)	0.0002
Δ RCPS-GDP	- 3.821274	-2.672290***	I(1)	0.0006
RFE-GDP	- 2.135709	-1.956406**	I(0)	0.0341
Δ RM2-GDP	- 3.349641	-2.674290***	I(1)	0.0019
Δ RMC-GDP	- 6.523296	-2.674290***	I(1)	0.0000
Δ RPR	- 3.978707	-2.674290***	I(1)	0.0004
Δ RST-GPD	- 4.310471	-2.674290***	I(1)	0.0002
Δ UPR	- 2.475551	-1.957202**	I(1)	0.0159

Note: (i) ***1%, **5%, *10% Significant Level (ii) Δ represents the first difference operation. Source: E-views 7.0 Version.

regressed on another time series, the outcome may be a spurious regression. Time series data has a high probability to exhibit “random walk”. In other words, the variables in a time series data have the tendency to wander away from their true mean values. The result in Table 1 revealed that the variables had unit root; implying that they were non-mean reverting except ratio of foreign direct investment in equities to GDP which was integrated at level I(0). On the other hand, NPR, RCPS/GDP, RM2/GDP, RMC/GDP, RPR, RST/GDP and UPR were integrated at first difference I(1). By this result, the series have achieved stationarity and can be used to estimate the impact of financial deepening on poverty rates in Nigeria with minimum fear of spurious outcome (Adams,

1992).

The regression result for rural poverty reveals that an increase in the ratio of broad money supply to GDP by 1% reduces rural poverty by 26.7%. On the other hand, a 1% increase in the ratio of market capitalization to GDP reduces rural poverty by 8.0%. The result further indicates that other financial deepening indicators did not contribute to reduction in rural poverty. The result notwithstanding, financial deepening explained rural poverty reduction in rural areas by 73%.

The urban poverty result indicates that 1% increase in the ratio of stock trade to GDP reduces poverty by 2.2% and it is statistically significant at the 5% level. Also, a 1% increase in the ratio of foreign direct investment in

Table 2. Regression result for rural poverty rate in Nigeria.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.968446	0.293362	16.93624	0.0000
$\Delta\text{LOG}(\text{RM2_GDP})$	-0.267031	0.174028	-2.534415	0.0423
$\Delta\text{LOG}(\text{RCPS_GDP})$	0.121983	0.132051	0.923756	0.3678
$\Delta\text{LOG}(\text{RMC_GDP})$	-0.080312	0.065906	-1.218575	0.2387
$\Delta\text{LOG}(\text{RST_GDP})$	0.098263	0.026529	3.704029	0.0016
$\text{LOG}(\text{FE_GDP})$	0.041906	0.023817	1.759499	0.0955
R-squared	0.790800	Mean dependent var		4.218394
Adjusted R-squared	0.732689	S.D. dependent var		0.174469
S.E. of regression	0.090204	Akaike info criterion		-1.761165
Sum squared resid	0.146462	Schwarz criterion		-1.466652
Log likelihood	27.13398	Hannan-Quinn criter.		-1.683031
F-statistic	13.60843	Durbin-Watson stat		1.693041
Prob(F-statistic)	0.000014			

Table 3. Regression result for urban poverty rate in Nigeria.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.068532	0.122316	-0.560288	0.5826
$\Delta\text{LOG}(\text{RST_GDP})$	-0.021655	0.011230	-1.928374	0.0707
$\Delta\text{LOG}(\text{RMC_GDP})$	0.002739	0.027777	0.098587	0.9226
$\Delta\text{LOG}(\text{RM2_GDP})$	0.006386	0.072586	0.087980	0.9309
$\Delta\text{LOG}(\text{RCPS_GDP})$	0.020052	0.055063	0.364153	0.7202
$\text{LOG}(\text{FE_GDP})$	-0.006438	0.011166	-3.576511	0.0018
R-squared	0.500637	Mean dependent var		0.023181
Adjusted R-squared	0.353765	S.D. dependent var		0.046768
S.E. of regression	0.037596	Akaike info criterion		-3.504363
Sum squared resid	0.024029	Schwarz criterion		-3.208147
Log likelihood	46.30017	Hannan-Quinn criter.		-3.429865
F-statistic	3.408668	Durbin-Watson stat		1.835018
Prob(F-statistic)	0.025796			

equities to GDP reduces urban poverty by 0.64% and it is statistically significant at 1% level. Ratios of market capitalization, broad money supply and credit to the private sector to GDP revealed that an increase of 1% in each of the ratios increased poverty in the urban Nigeria by 0.027, 0.064 and 2.00% respectively. This result is in line with the findings of Amoo (2014) who observed that a 10% increase in income resulted in an increase in poverty in Nigeria by 17.2%. The coefficient of multiple determination reveals that variation in urban poverty is 35% caused by financial deepening. This result implies that the marginal productivity of financial resources is higher in the rural areas compared to urban areas in spite of the fact that the rural areas are characterized by informal sector activities and are partly non-monetized. On the other hand, the urban areas are highly monetized and operate in the formal sector of the economy (Tables 2 and 3).

At the national level, the result shows that a 1%

increase in the ratio of broad money supply to GDP reduces poverty by 73% and the coefficient of RM2/GDP is statistically significant at 5% level. 59% change in national poverty is caused by variations in financial deepening. The three results indicate that the ratio of credit to the private sector to GDP did not impact positively on poverty reduction in Nigeria for the period under study. This suggests that the poor do not benefit from credit facilities of banks and other financial institutions in spite of the relative increase in the capital base of commercial banks following the banking sector consolidation of 2005. Banks in Nigeria demand for collaterals that are beyond the reach of the poor as prerequisite for advancing loans (Table 4).

Again, the ratio of stock traded to GDP in the three equations fails to influence poverty reduction positively in Nigeria. This result confirms the findings of Rioja (2014) that on the average, stock market liquidity in developing countries and in the Nigerian capital market have not

Table 4. Regression Result for National Rate Poverty in Nigeria.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.035873	0.368859	13.65255	0.0000
Δ LOG(RM2_GDP)	-0.728147	0.218814	-3.327694	0.0037
Δ LOG(RCPS_GDP)	0.482134	0.166035	2.903813	0.0095
Δ LOG(RMC_GDP)	0.010174	0.082868	0.122776	0.9036
Δ LOG(RST_GDP)	0.063851	0.033356	1.914217	0.0716
LOG(FE_GDP)	0.034565	0.029947	1.154204	0.2635
R-squared	0.681958	Mean dependent var		4.117673
Adjusted R-squared	0.593613	S.D. dependent var		0.177915
S.E. of regression	0.113418	Akaike info criterion		-1.303148
Sum squared resid	0.231547	Schwarz criterion		-1.008634
Log likelihood	21.63777	Hannan-Quinn criter.		-1.225013
F-statistic	7.719251	Durbin-Watson stat		1.831619
Prob(F-statistic)	0.000496			

developed to the required threshold capable of promoting and attracting investment in their capital markets. While the ratio of foreign direct investment in equities to GDP could not contribute to rural and national poverty reduction, the ratio of market capitalization to GDP, on the other hand, was not able to positively impact on urban and national poverty in Nigeria for the period 1990 to 2013.

CONCLUSION AND RECOMMENDATIONS

The descriptive analysis has revealed that poverty is still endemic in Nigeria for the period under investigation. Findings from quantitative analysis revealed that financial deepening guarantees financial inclusion to Nigerians and, by extension, reduces poverty. This therefore, implies that financial deepening matters in poverty reduction strategies based on Nigeria's data. On the basis the findings, this paper proffers the following recommendations.

There is the need for government and financial regulators to design a policy framework that would improve the financial literacy of Nigerians, especially the rural dwellers. Financial literacy will help the rural poor to appreciate the benefits of savings and borrowing for investment which is expected to impact positively on their income and, consequently, poverty reduction all things being equal.

The rural poor should be encouraged to form co-operative societies to be headed by people of impeccable character in the communities. The cooperative societies are expected to provide avenue for members to pool financial resources together that can be accessed as loans by members at lower interest rate. Where their financial resources are not adequate, members can easily raise funds (loans) in the formal financial market using the cooperative societies as collateral.

Government and financial authorities should design

policies that would promote the growth of the financial sector. Since the size of the capital market in relation to the economy is low also, credit to the private sector is equally low and these are indications of a weak financial sector.

To improve on the financial depth, liquidity and financial assets to the poor, there is the need to establish financial institutions (money and capital markets) in the rural areas to encourage savings culture among Nigerians. This should be done simultaneously with improvement in financial markets and instruments such as: derivatives, bond and commodity markets which are largely non-existent or moribund in Nigeria.

There is the need to diversify the Nigerian economy to allow wider participation of Nigerians in productive activities that would improve employment of men and resources, increase the flow of financial income, hence poverty reduction. This is achievable if cottage industries are established in geo-political zones with comparative/absolute advantage in the production and supply of agricultural goods and raw materials for the industries.

This is expected to reduce post harvest wastages, add value to primary products before exports and guarantees stable income to farmers.

Government through the ministry of labour and productivity should sponsor a bill in the national assembly mandating foreign firms to reserve not less than 50% of employment for local content in highly technical formal sectors of the economy (petroleum, mining, manufacturing, and telecommunication). This is expected to widen employment opportunity to more Nigerians to participate in productive venture, thereby improving their income and, consequently, reduce poverty.

Conflict of Interests

The authors have not declared any conflict of interests.

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Appendix. A table showing the relationship between poverty and financial deepening indicators in Nigeria (1990 – 2013).

Year	RCPS_GDP	RM2_GDP	RMC_GDP	RST_GDP	RFE_GDP	UPR	RPR	NPR
1990	7.13	11.24	4.40	0.04	0.014	37.2	48.5	44.0
1991	7.65	13.81	6.80	0.03	0.21	37.2	46.4	43.5
1992	6.68	12.75	4.10	0.04	0.042	42.0	46.0	42.7
1993	11.72	15.26	6.50	0.06	0.086	47.7	52.0	49.0
1994	10.26	16.55	14.9	0.09	0.064	52.1	58.0	54.7
1995	6.29	9.98	7.12	0.04	0.215	58.0	63.0	60.0
1996	5.98	8.62	10.17	0.2	0.303	58.3	66.0	65.6
1997	7.56	9.94	10.17	0.36	0.292	60.1	70.0	69.2
1998	8.85	12.26	9.02	0.49	0.207	61.0	70.2	80.0
1999	9.22	13.48	8.19	0.4	0.236	62.0	72.0	70.0
2000	9.97	13.16	9.13	0.56	0.281	63.0	73.0	60.0
2001	11.11	18.44	12.24	1.12	0.306	62.0	74.0	60.0
2002	11.95	19.32	9.70	0.80	0.489	62.0	75.0	62.2
2003	11.16	19.74	14.03	1.26	5.21	63.8	76.0	54.4
2004	12.54	18.76	16.46	1.89	0.47	63.1	79.2	54.0
2005	12.66	18.19	17.24	1.72	0.539	62.2	79.0	70.8
2006	12.38	20.53	22.56	2.44	1.097	62.1	78.0	69.5
2007	17.82	24.82	51.87	10.07	2.805	60.5	69.0	70.0
2008	28.54	33.08	23.93	9.58	1.445	61.3	77.0	72.1
2009	36.72	38.01	19.66	2.69	1.771	62	78.3	69.0
2010	29.98	32.52	13.88	1.44	1.166	58.4	76.0	60.9
2011	25.55	32.56	9.49	1.00	1.631	60.0	76.5	71.5
2012	36.19	34.37	12.26	0.91	2.928	62.5	75.0	74.6
2013	36.97	37.44	14.06	3.89	2.785	63.4	74.3	67.8

SOURCES:									
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Submission of corrected version of the article.

I went through the reviewers' comments and observations. The following corrections were effected:

- i) Thorough editing of the work to minimize grammatical errors.
- ii) Reduction of self citations.
- iii) Discussion of findings in a juxtaposing manner.
- iv) Unit root test was conducted.
- v) In line with the result of Philip Peron unit root, the model was analyzed in first difference and the results were not altered significantly.

Thank you for your patience and understanding.

Full Length Research Paper

The determinants of interest rate spread: Empirical evidence from the Central African economic and monetary community

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In spite of the reforms undertaken during the 1980s and 1990s in favour of financial deepening, the spread between the lending rate and the deposit rate is still high in the member countries of the Central African Economic and Monetary Community (CAEMC). Thus, the aim of this study is to investigate the determinants of banking spread in those countries. In that vein, the study employs two-step regression proposed by Ho and Saunders using country-level data from 2000 to 2010. On one hand, the study controlled for capital inflows and natural resources endowment. On the other hand, the study took into consideration the legal and institutional framework of the sample countries and the excess liquidity prevailing in their banking systems. The results revealed that among bank-specific characteristics, bank asset, doubtful loan, and the volume of credit significantly determine the observed spread. As for macroeconomic characteristics, oil rents, foreign direct investment (FDI) inflows, and real gross domestic product (GDP) growth significantly affect banking spread. Meanwhile, political stability, corruption, government effectiveness, regulatory quality, and bank concentration in the deposit market are the significant institutional determinants of the interest rate spread in CAEMC countries.

Key words: Panel Data, Commercial Banks, Financial Intermediary, Central Africa.

INTRODUCTION

The difference (spread) between the interest rate that banks charge on loans and the interest rate they pay on deposit is a key financial variable because it indicates the level of efficiency in financial intermediation (Demirgüç-kunt and Huizinga, 1998). Thus, a high interest rate spread like the one prevailing in the member countries of

the Central African Economic and Monetary Community (CAEMC)ⁱ discourages saving through low deposit rates, and rations credit through high lending rate. In that vein, high interest rate spread could adversely affect economic growth, especially in environments where banks are the principal, if not the sole source of external finance.

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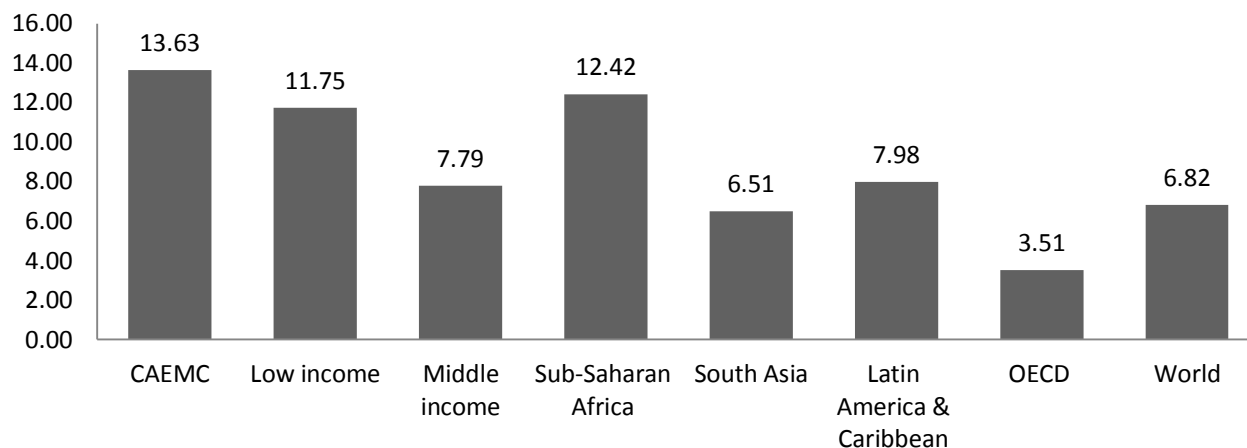


Figure 1. International comparison of banking spread (average for 2000-2006) (Source: Own elaboration based on data from World Development Indicators 2015).

Under the authority of multilateral institutions (IMF and World Bank), the member countries of CAEMC undertook reforms in favour of financial deepening during the late 1980s and the 1990s. As the result of those financial reforms, interest rate spread was supposed to converge over time, toward international standards. However, it is not the case. Indeed, banking spread is still high in the sub-region and does not really show a downward trend over time (Figure 1).

In order to address that issue, the study aims to investigate the determinants of the interest rate spread in those countries. For that purpose, the study employs the two-step regression proposed by Ho and Saunders (1981) using country-level data from 2000 to 2010. This is the first study on the determinants of banking spread to focus on CAEMC countries. The study also contributes to the existing literature by taking into consideration capital inflows, natural resources endowment, the legal and institutional framework of CAEMC countries, as well as, the excess liquidity prevailing in their banking systems.

Descriptive evidence

As revealed by Singh et al. (2009), Central African Economic and Monetary Community (CEMAC) countries implemented many reforms in favour of financial deepening during the 1980s and 1990s. Those reforms were built upon the theoretical wisdom advocated by McKinnon (1973) and Shaw (1973) according to which the efficiency and the flexibility of the financial sector would sustain economic growth. Thus, those reforms liberalized interest rates, abolished selective credit allocations, restructured and/or privatized banks, reinforced banking supervision, and implemented indirect monetary policy instruments.

Those financial reforms led to the creation of a single banking supervisor for the entire community named, the

Banking Commission of Central Africa (COBAC) in 1992, and to the creation of the money market in July 1994. Nevertheless, the general feeling more than two decades later, is that the effects of those reforms are quite mitigated if not disappointing. In that vein, Avom and Eyeffa (2007) noticed that the reforms undertaken by CAEMC countries led to 3 paradoxes.

First, banks operating in those countries suffer from excess liquidity while rationing credit to the private sector. For instance, 40 out of the 43 banks in the sub-region had a liquidity ratio exceeding 100% in 2009 and in 2010 (COBAC, 2010). Furthermore, excess reserves represented 200% of required reserves in 2013 (FMI, 2014). Besides, the 2010 World Bank data revealed that credit to private sector as a percentage of gross domestic product (GDP) was equal to 12.53% in Cameroon, 8.95% in the Central African Republic, 4.2% in Chad, 6.5% in Congo, 9.3% in Equatorial Guinea, and 8.1% in Gabon. These figures are ridiculous compared to the average of 56.64% in Sub-Saharan Africa (developing countries only) and 72.15% in low and middle-income countries around the world.

The second paradox is that the banking sector is highly concentrated in CAEMC countries as shown in Figure 2 while there is a rapid development of microfinance. The prevailing concentration is the result of passed restructurings that reduced the number of banks through mergers, acquisitions, and shutdowns. While the prohibitive prices (low deposit rate and high lending rate), and other conditions required by banks led to the financial exclusion of a vast portion of the population and boosted the development of microfinance as an alternative for those financially excluded people.

Finally, Avom and Eyeffa (2007) noticed that there is a paradox between the internationalization of banks and the absence of financial innovation in CAEMC countries. Indeed, most of the banks in Central African sub-region are foreign banks or foreign-owned banks. They operate

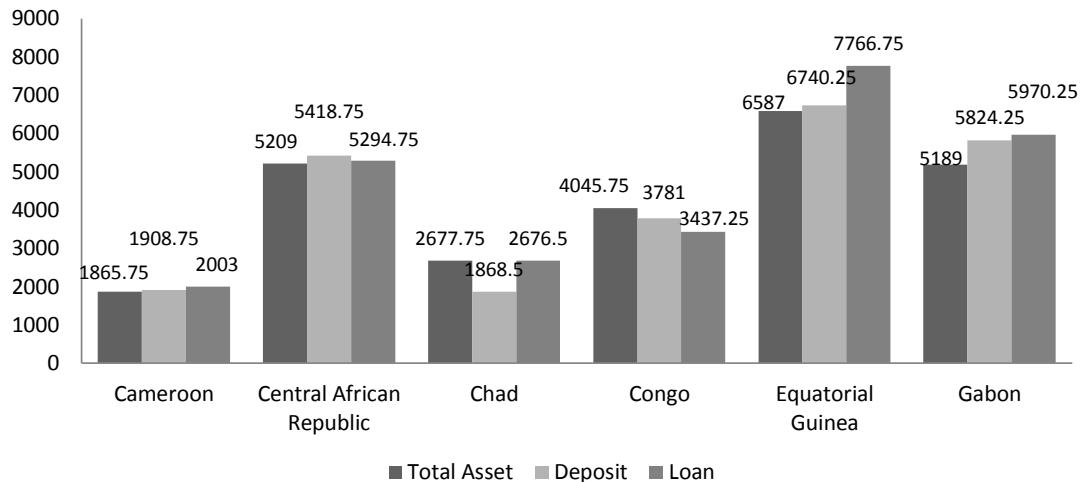


Figure 2. Concentration of the banking industry in CAEMC countries (average HHI for the period 2005-2010)
¹ (Source: Own elaboration based on data from COBAC).



Figure 3. Evolution of banking spread in CAEMC countries from 2000 to 2010 (Source: Own elaboration based on data from COBAC).

¹ The Herfindahl-Hirschman Index (HHI) is the sum of the squared market shares of all the competing banks. $HHI = \sum_{i=1}^n M_i^2$
 HHI < 1,000 indicates low concentration; $1,000 \leq HHI < 1,800$ indicates average concentration; and $HHI > 1,800$ indicates high concentration.

in many countries and carry out international transactions but basic financial products/services like ATM cards, internet banking, and the likes are still considered luxury goods in the sub-region.

Besides those paradoxes, Singh et al. (2009) noticed a gap in financial development between CAEMC countries and other Sub-Saharan African countries. One of the indicators they used to underline this gap is the ratio credit/GDP but it can also be done using banking spread. As revealed in Figure 1, the average banking spread is higher in CAEMC countries compared to various groups of countries (low-income, middle-income, OECD, etc.), even those with similar level of development.

Moreover, Figure 3 shows that excluding Cameroon, banking spread is not really decreasing over time in CAEMC countries. This situation is alarming because after the financial reforms and banking restructurings undertaken in the 1980s and 1990s, interest margins were supposed to converge over time, toward international standards. On the one hand, the high interest margins observed in Central African countries is associated with low interest rate on deposits (3.25% a year on average in 2010) that leads to low domestic savings. Thus, if not for security purposes, many people would have preferred to invest their savings in a Rotating Savings and Credit Association (ROSCA) where it yields more or to hoard it up. On the other hand, high spread is associated with high interest rate on credits and leads to both credit rationing and adverse selection of potential borrowers. The situation is serious in Central African countries because banks constitute the major if not the sole source of external finance for most of the economic agents.

Finally, Singh et al. (2009) argued that the gap in financial development between CAEMC countries and other Sub-Saharan African countries could be explained by the differences in their institutional framework. They highlighted the importance of institutions because they believed that liberalization and macroeconomic stability are required but not sufficient conditions for financial development.

As to institutional soundness, CAEMC countries are characterized by inefficient judicial systems with lengthy proceedings, weak contract enforcement, and weak protection of property rights. Furthermore, the sub-region is associated with poor governance, high corruption and political instability. As a result, Central African countries are usually ranked among the worst in the world when it comes to institutional quality.

LITERATURE REVIEW

Theoretically, studies that aimed to explain how banks set their interest rates and their interest margins can be traced back to the influential articles of Klein (1971) and Monti (1972). These researchers proposed a micro-

economic model of the banking firm that aims to explain how the equilibrium scale of the bank, the composition of its asset and liability portfolios, and the interest rates it applies on loans and deposits are determined endogenously. They modelled each side of the bank's balance sheet separately and justified the existence of interest margin by the addition of the monopoly power of the bank, the marginal cost of deposits, and the marginal cost of loans.

Knowing that a bank can use its margin on loans (or deposits) to cross-subsidise its interest rate on deposits (or loans), Ho and Saunders (1981) considered the two-sided nature of bank's interest rate setting and made a seminal contribution in the explanation of banking spread. Ho and Saunders (1981) modelled the bank as a risk-averse dealer in the credit market acting as a middleman between depositors and borrowers. The stochastic and asynchronous nature of deposit supplies and loan demands exposes the bank to interest rate risk. Therefore, the bank requires a positive interest margin similar to the bid-ask spread of a security dealer. Ho and Saunders (1981) justified the existence of interest margins by the presence of transaction uncertainty and named the margin due to that uncertainty the "pure spread". Their dealership model revealed that the pure spread depends on four factors, namely: the degree of bank management risk aversion, the market structure of the industry, the average size of bank activities, and the volatility of interest rates.

The dealership model was extended by many researchers and some of the assumptions made by Ho and Saunders (1981) were relaxed to take into consideration various types of loans (Allen, 1988), the money market interest rate (McShane and Sharpe, 1985), default risk, interest rate risk and their interaction (Angbazo, 1997), operating costs (Maudos and Fernandez de Guevara, 2004), non-traditional activities (Carbó and Rodriguez, 2007), etc. All together with the original dealership model, these new models constitute the bedrock on which many empirical studies were built. Those empirical studies revealed a multitude of factors covering the macro and microeconomic determinants of banking spread in different environments. Those factors can generally be classified into four non-exhaustive groups referring to bank-specific characteristics, the market structure of the banking industry, the macroeconomic environment, and the legal and institutional framework in which banks operate.

Bank-specific characteristics

At the level of individual banks, a key factor to consider in the determination of interest margin is risk. Indeed, banks are exposed to a wide range of risks (interest rate risk, default risk, foreign exchange risk, legal risk, etc.) inherent in their activities. They hedge their exposure to those risks

by widening their interest margins. In that vein, Afanasieff *et al.* (2002) analysed data from 142 commercial banks and found that a rise in risk premium led to higher spread in Brazil during the period spanning from 1997 to 2000. While Angbazo (1997) revealed that the most important risks in the setting of interest margins are default risk and interest rate risk.

Costs (overhead costs, operating costs, etc.) are among other important micro characteristics affecting interest rate spread. They represent a loss profit that banks deal with by increasing their interest margins. Beck and Hesse (2006), Barajas *et al.* (1999), and Demirgüç-kunt and Huizinga (1998) found evidence that higher operating costs led to higher spreads in Uganda, in Colombia and in a sample of 7,900 commercial banks from 80 countries respectively. Implicit costs like reserve (or capital) requirements are also associated with higher interest margins. Indeed, the opportunity cost of holding reserves that do not earn at all or do not earn enough interest is usually channeled by banks to their clients through lower interest rates on deposits or higher interest rates on loans. Chirwa and Mlachila (2004) and Brock and Rojas (2000) found evidence supporting the positive correlation between reserve requirements and banking spread in Malawi and Latin America respectively.

Another factor to consider in the explanation of interest margins is the size of the bank since larger banks are associated with narrower interest margins when returns to scale are increasing (Demirgüç-kunt *et al.*, 2003). The size of a bank's transactions and especially the size of its non-traditional activities also affect its interest margins. Banks usually cross-subsidize their traditional activities (savings and lending) with the revenues they earn from their non-core or fee-based activities (Carbo and Rodriguez, 2007). So, Demirgüç-kunt *et al.* (2003) studied a sample of 1,400 banks from 72 countries during the period from 1995-1999 and revealed that regulations restricting banks from underwriting securities, investing in real estate, owning non-financial firms or engaging in insurance led to higher interest margins in the banking industry.

Industry-specific characteristics

The structure of a banking sector in terms of size, competition, concentration, contestability, number of banks, banks' ownership, and bank regulation affects the interest margins of all the banks operating in that industry. Thus, Crowley (2007) argued that in a free-market economy, interest rate spread should be negatively correlated to factors affecting the overall level of competition since less competition gives more market power to banks and leads to wider spreads. As to Demirgüç-kunt *et al.* (2003), they found evidence of a positive correlation between concentration and interest margin. Because of the empirical ambiguity surrounding the relationship between concentration and competition,

Maudos and Fernandez de Guevara (2004) recommended to use a direct measurement of market power (like the Lerner index) instead of a structural measurement of competition (like concentration).

Claessens and Laeven (2004) instead opted for contestability since the competitive pressure coming from the free-entry and free-exit conditions would reduce the market power of the existing banks and therefore lead to lower interest margins. Levine (2003) added that when the competitive pressure is coming from foreign banks, the contestability of a banking sector becomes much more important in the determination of interest margins. Working with a sample of 1,165 banks from 47 countries, he found that restricting foreign bank entry positively and significantly increased banking spread. Meanwhile restricting domestic bank entry or foreign bank ownership did not significantly affect interest margin.

Detragiache *et al.* (2006) studied the role of foreign banks in poor countries. They revealed that these well-capitalized banks come with advanced technology, better management, and increase the competition in the banking industry. With all these characteristics put together, one could have inferred that foreign banks would lead to lower interest margins as Gelos (2006) found in 14 Latin American countries. But surprisingly, Detragiache *et al.* (2006) found that the presence of foreign banks was associated with less access to credit in poor countries, while this adverse effect disappeared in developed countries. Furthermore, Demirgüç-kunt and Huizinga (1998) found evidence that foreign banks had higher spread in developing countries while the opposite was true in developed countries.

The degree of state involvement in the banking industry is also cited as one of the determinants of interest margin. Demirgüç-kunt *et al.* (2003) and Crowley (2007) found evidence that state ownership of banks was positively associated with banking spread. This is due to the fact that state-owned banks are incited to grant cheap credits to some particular persons, companies, or economic sectors. They then have to apply higher lending rates on other credits in order to cover the loss profits coming from those cheap credits.

Macroeconomic environment

At the aggregate level of a country, factors like the level of financial development, inflation, economic growth, the volatility of interest rate or exchange rate, trade or budget deficit, or the overall uncertainty surrounding macroeconomic performances have an impact on banking spread. Among those macroeconomic characteristics, inflation is the most cited determinant of interest margin, especially in developing countries. Indeed, inflation was found to be positively correlated to banking spread in Malawi (Chirwa and Mlachila, 2004), in Indonesia (Raharjo *et al.*, 2014), in a panel of 18 English-speaking African countries (Crowley, 2007), and in a panel of

1,400 banks from 72 countries (Demirgüç-kunt et al., 2003). The reason of this positive effect of inflation on interest margin is that it creates a monetary depreciation that allows borrowers to reimburse in real terms, less than what banks lent to them. Therefore, banks cover this loss profit by increasing their lending rate and widening their interest margin. This is particularly true in developing countries because they suffer from higher and more volatile inflation compared to developed countries.

Another macro factor determining banking spread is economic growth. Indeed, the growth of output improves the creditworthiness of economic agents and reduces their default risk (Gelos, 2006). It also increases the resources that banks can lend because they receive more deposits (Khan and Khan, 2010). Banks react to these favourable conditions by lowering their interest margins. One should also notice that banking spread affects economic growth in return by its effect on saving and mostly on investment (Kiptui, 2014). The negative correlation between banking spread and economic growth has been supported empirically by Demirgüç-kunt et al. (2003) and Afanasieff et al. (2002). Finally, one should notice after Ndung'u and Ngugi (2000) and Gelos (2006) that macroeconomic instability –the volatility of interest rate, exchange rate, growth rate, trade deficit, budget deficit, etc. – is positively associated with interest margin because it increases the various risks faced by banks. Another group of factors increases the risks faced by banks and leads to higher banking spreads. This group of factors is gaining interest in the scientific community and especially in developing countries where its adverse effects are much more serious. This last group of factors refers to the legal and institutional framework in which banks operate.

Institutional framework

Banks do not usually have much information about the daily transactions they carry out for their clients as the latter do. Therefore, they require collaterals in an attempt to overcome the resulting adverse selection and moral hazard described by Stiglitz and Weiss (1981). So, the legal risk surrounding collateral repossession in cases of default shapes financial contracts (Galindo, 2001) and should affect banking spread as a result. Using a sample of 129 countries, Djankov et al. (2005) found evidence that in economies where the legal framework and the judicial institutions in charge of contracts enforcement and creditor rights protection worked efficiently, there was more credit to private sector. Suggesting that in such environments, banks reduce their lending rates and narrow their margins due to less legal risk. The researchers added that the beneficial effect on credit is also felt in economies where there are institutions collecting and disseminating information about lenders because they reduce the information asymmetry between

banks and their clients.

The quality of a country's governance also affects the interest margins of the banks operating in that country. Thus, Demirgüç-kunt and Huizinga (1998) revealed that banks reduce their risk premium and their interest margin in countries with less corruption. Furthermore, as revealed by La Porta et al. (2008), the historical origin of a country's legal framework shapes the way its institutions function as well as its economic outcomes.

Following the legal origin theory, La Porta et al. (2008) revealed that French legal origin (civil law) and English legal origin (common law) are the most distinct philosophies of law and regulation. They added that compared to common law, civil law is associated with less investor (or creditor) protection, more regulation, more state involvement in economic activities, and less independent judicial systems. As a result, civil law leads to less financial development, more corruption, weak contracts enforcement, and weak protection of property rights. All these factors put together should incite banks to widen their interest margins and ration credit. Using a sample of 4,000 firms from 38 countries, Beck et al. (2004) found evidence that the correlation between legal tradition and firm's access to external finance was statistically and economically significant.

Beside those four groups of factors identified by the literature, there may be other country-specific factors affecting banking spread. This may be the case of natural resources endowment in CAEMC countries.

METHODOLOGY

The methodology used in this study is the two-step regression proposed by Ho and Saunders (1981) to empirically assess the determinants of banking spread. This methodology allows the study to assess the micro and macroeconomic determinants of interest rate spread; it also allows estimating the pure spread prevailing in CAEMC countries. Before presenting the two-step approach, it is necessary to go back to its theoretical foundations. As revealed by Afanasieff et al. (2002), the theoretical model formulated by Ho and Saunders (1981) was adapted from a model of bid-ask prices of security dealers. Thus, the authors modeled banks as risk-averse dealers in credit market acting as middlemen between depositors and borrowers. Playing the middlemen's role, banks require a positive interest margin similar to the bid-ask spread of a security dealer because the stochastic and asynchronous nature of deposit supplies and loan demands exposes them to interest rate risk. The one-period decision model proposed by Ho and Saunders (1981) assumed that it is costly for banks to process deposits and credits. It also assumed that banks maximize the expected utility of their end-of-period wealth. Therefore, the optimal interest margin was given by the following equation:

$$s = a + b = \frac{\alpha}{\beta} + \frac{1}{2} R \sigma_l^2 Q \quad (1)$$

Where a and b represent the fees charged on deposit and loan respectively. α is the intercept and β the slope of the symmetric deposit and loan arrival functions. The dealership model proposed by Ho and Saunders (1981) revealed that the optimal spread

depends on four factors: the degree of bank management risk aversion (R), the market structure of the industry or the risk-neutral spread ($\frac{\alpha}{\beta}$), the average size of bank activities (Q), and the volatility of interest rates (σ_I^2).

From their theoretical model, Ho and Saunders (1981) proposed a two-step regression to empirically assess the determinants of banking spread. The first regression is run with banking spread as the dependant variable while a vector of bank-specific characteristics and a vector of time dummies are used as the independent variables. The constant term of the first regression and the coefficients of the dummy variables generate a new variable (the pure spread). The second regression is then run with the pure spread as the dependant variable while a vector of macroeconomic variables is used as the independent variables.

The two-step approach has been used by many researchers (Brock and Rojas-Suarez, 2000; Afanasieff et al., 2002) to underline the determinants of banking spread in different environments. This study also borrowed that methodology in order to assess the micro as well as the macro determinants of banking spread in CAEMC countries. Thus, the following equation was used in the first step of the methodology:

$$S_{it} = \omega + T\varphi + B_{it}\theta + \varepsilon_{it} \quad (2)$$

Where i and t denote country and time indices respectively, S is the interest margin, T is a vector of time dummy variables taking the value 1 in the corresponding year and 0 elsewhere, B is a vector bank-specific characteristics, ε is the error term, and ω , φ , and θ are parameters to be estimated. The vector of bank-specific characteristics was made of the following variables: asset, doubtful loan, deposit, credit, and capital. Details about the definition and the calculation of all variables are reported in the appendix. The following equation allowed to calculate the pure spread observed in each country:

$$PS_{it} = \omega + \varphi_t + \delta_i \quad (3)$$

Where i and t denote country and time indices respectively, PS is the pure spread, ω is the constant term of the first regression, φ is the coefficient of year t dummy variable, and δ is the individual effect of each country. As to the second step of the methodology, the study first evaluated the macroeconomic determinants of interest margins in CAEMC countries using the following equation:

$$PS_{it} = \alpha + M_{it}\beta + \mu_{it} \quad (4)$$

When i and t denote country and time indices respectively, PS is the pure spread, M is a vector of macroeconomic variables, μ is the error term, and α , and β are parameters to be estimated. The vector of macroeconomic variables was made of the following variables: real GDP growth rate, inflation rate, FDI inflows, and oil rents. The last two variables aimed to control for capital inflows and natural resources endowment in Central African countries.

Still in the second step of the methodology, the study evaluated the institutional determinants of banking spread in Central Africa. This evaluation was done because many researchers (Beck et al., 2004; Djankov et al., 2005; La Porta et al., 2008) pointed out the impact of the institutional framework on economic outcome. Furthermore, Singh et al. (2009) argued that institutional factors may explain the differences in financial deepening between CAEMC countries and other Sub-Saharan African countries. Thus, the following equation was used:

$$PS_{it} = \gamma + I_{it}\rho + \epsilon_{it} \quad (5)$$

Where i and t denote country and time indices respectively, PS is the pure spread, I is a vector of institutional variables, ϵ is the error term, and γ , and ρ are parameters to be estimated. The vector of institutional variables was made of the following variables: political stability, rule of law, control of corruption, regulatory quality, government effectiveness, and voice and accountability. Because the study viewed the structural excess liquidity prevailing in CAEMC banking systems as an institutional problem, the Herfindahl-Hirschman Index on deposit was added in this step of the methodology to take into consideration that institutional problem.

The dataset of the present study was made of 66 annual observations covering the six countries of the CAEMC (Cameroon, the Central African Republic, Chad, Congo, Equatorial Guinea, and Gabon), during the period spanning from 2000 to 2010. These data were collected from the Banking Commission of Central Africa (COBAC), the Central Bank of Central African States (BEAC), and the World Bank (World Development Indicators 2015 and Worldwide Governance Indicators 2013).

Estimation results

Hausman test revealed that the random effects model is the most suitable for the first step of the methodology. The results revealed that asset, doubtful loan, and credit, were the significant bank-specific factors determining interest rate spread in CAEMC countries. They also revealed that the estimated coefficients were of the expected signs and the model was globally significant. Furthermore, the results revealed that banking spread decreased significantly during the years 2004, 2005, 2008, 2009 and 2010; while the time dummy variables were not globally significant.

On one hand, interest rate spread was found to be lower in countries where banks have more assets or high bank asset/GDP. This may be because those banks can benefit from economies of scale and reduce their unit costs. On the other hand, interest margins were found to be positively associated with doubtful loans. This positive correlation may be due to the fact that doubtful loans convey information about the uncertainty surrounding credit activities. Thus, an increase in doubtful loans may signal an increase in the overall uncertainty level and may threaten the reimbursement of credits. Banks may then react to this threat by charging a risk premium on their lending rate and widen their interest margin.

As to the volume of credit and deposit, there are found to be negatively associated with banking spread because a bank specialized in one or both of those activities may be able to benefit from economies of scale and reduce its unit costs. Moreover, credit had the highest coefficient (in absolute terms) among all bank-specific variables, may be because it is an interest-generating activity. Table 1 also revealed that capital is positively associated with interest margin in CAEMC countries. This may be due to the fact that banks face a loss profit trying to respect or to exceed their capital requirements. Thus, they channel the loss profit to their clients through wider interest margins.

The results obtained from the first estimation and equation (3), allowed to compute the pure spread or the

Table 1. Bank-specific determinants of interest rate spread in CAEMC countries.

Dependant variable: Spread	Coefficients	Standard errors
Asset	-0.0916**	0.0391
Doubtful loan	0.0707**	0.0317
Credit	-0.892***	0.206
Deposit	-0.0219	0.047
Capital	0.176	0.133
Cons	17.707***	4.222
Time dummies significance	$\chi^2 (10) = 12.25$	Prob > $\chi^2 = 0.2685$
R-Squared	0.552	
Wald $\chi^2 (15)$	61.67	Prob > $\chi^2 = 0.001$
Number of observations	66	
Hausman test	$\chi^2 (15) = 2.52$	Prob > $\chi^2 = 0.999$
Modified Wald test for group wise heteroscedasticity	$\bar{\chi}^2 (6) = 1.02$	Prob > $\bar{\chi}^2 = 0.985$
Wooldridge test for autocorrelation in panel data	$F(1,5) = 0.594$	Prob > F = 0.475

Notes: * denotes significance at 10% confidence level, ** denotes significance at 5% confidence level, and *** denotes significance at 1% confidence level.

fraction of spread that is not explained by bank-specific characteristics. In that vein, the study found that the correlation coefficient between spread and pure spread was equal to 0.72 and it was significant at 5% confidence level. Moreover, a comparison of spread and pure spread (Figure 4) revealed that the latter is generally superior to the former in Central African countries. This finding is consistent with what Afanasieff et al. (2002) found in the case of Brazil, and it suggests that macro factors do explain banking spread in Central African countries better than micro factors. Therefore, the comparison between spread and pure spread justifies the second step of this methodology.

The Central African Republic was not included in the second step of the methodology because of data availability on oil rents while the same series started in 2003 for Chad. Hausman test could not help choosing between the random and the fixed effects model, while the individual effects were not significant in both models. Besides, the study faced serial correlation and heteroscedasticity. Therefore, an AR (1) term was added and a pooled regression with correlated panels corrected standard errors was run. Estimation results are shown in Table 2.

The results revealed that oil rents, FDI net inflows, and real GDP growth were the significant macroeconomic factors determining interest rate spread in CAEMC countries. Moreover, Table 2 revealed that interest margin is counter-cyclical. It rises during economic recession and falls during expansion. This may be due to the fact that the creditworthiness of economic agents increases during expansion and decreases during recession. Thus, banks

may narrow and widen their interest margins accordingly. Furthermore, inflation was found to be positively associated with banking spread although the correlation was not significant. This positive relationship was expected because inflation creates a monetary depreciation that reduces the real value of loan reimbursements and may lead to higher spreads.

As to FDI inflows, they were found to be positively and significantly correlated with interest margins. This finding reveals that FDI inflows may cream-skim and reduce the available investment opportunities. Therefore, domestic investors may be left with riskier opportunities that banks finance at higher lending rates. Concerning the significant positive correlation between oil rents and banking spread, it could be explained by the fact that the oil industry is among the biggest borrowers in CAEMC countries. The industry may need less credit when oil rents increase and may lead banks to widen their margins in order to cover their corresponding loss profit. The opposite may be true when oil rents decrease.

Still in the second step of the methodology, the study followed the intuition of Singh et al. (2009) that institutional factors may explain the differences in financial deepening between CAEMC countries and other Sub-Saharan African countries. Thus, it evaluated the institutional determinants of banking spread. Moreover, because the structural excess liquidity prevailing in CAEMC banking systems was viewed as an institutional problem, the Herfindahl-Hirschman Index on deposit was added in this step of the methodology to take into consideration that institutional problem.

Two different models were run because multicollinearity

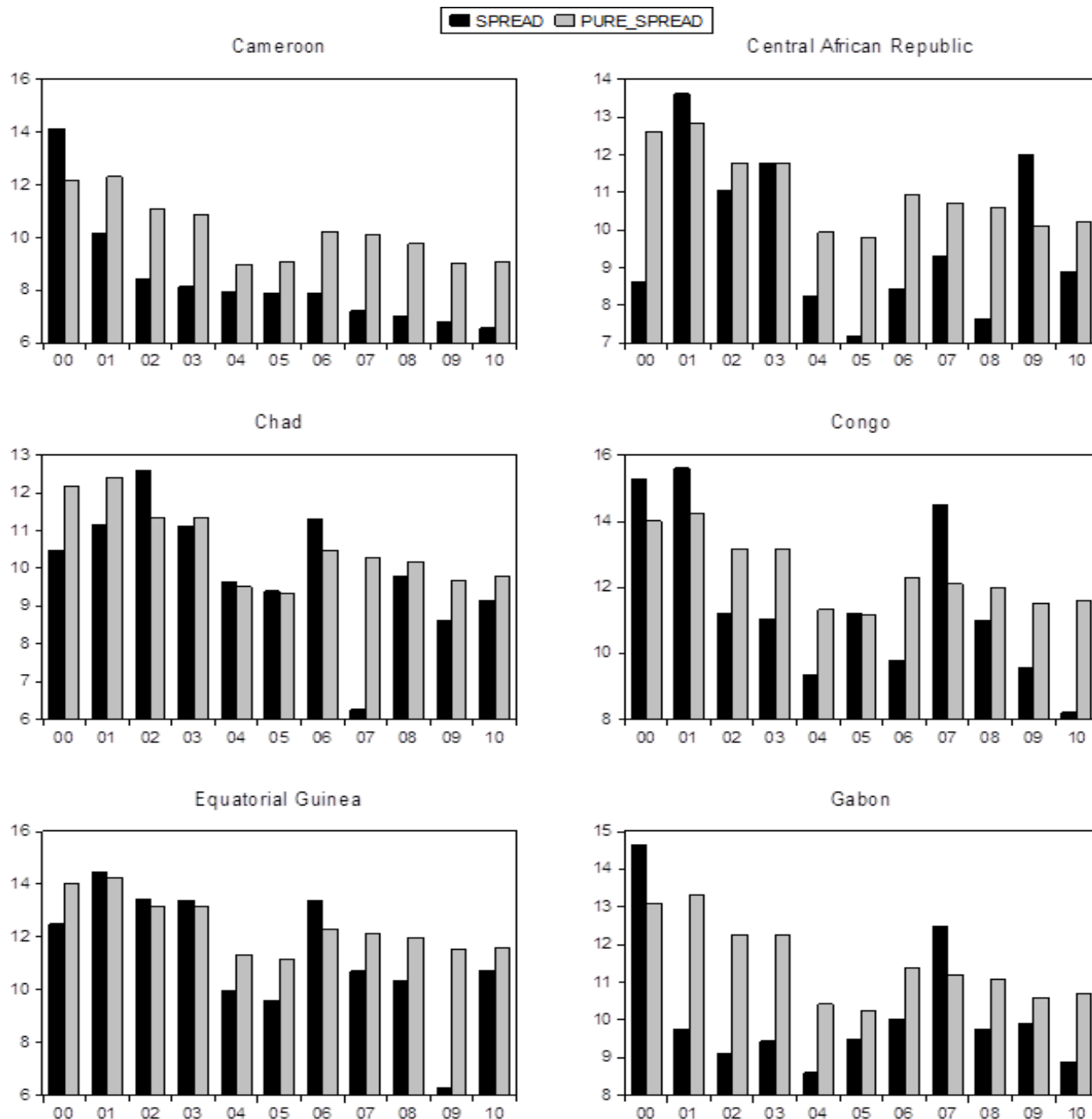


Figure 4. Comparison between spread and pure spread in Central African countries (Source: Own elaboration based on data from COBAC and estimation results (Table 1)).

prevented the study to put all the variables into the same model. The individual effects were not significant and problems occurred with heteroscedasticity. So, the study ran a pooled regression with correlated panels corrected standard errors in both cases and added an AR (1) term in the first model because of serial correlation. All the six CAEMC countries were included in the sample but data on institutions were just available for the period 2002-2010. Furthermore, data on bank concentration started in

2005. So the model was run with 36 observations and Table 3 presents the results.

Those results revealed that political stability, corruption, government effectiveness, and bank concentration in the deposit market were the significant determinants of interest margins in CAEMC countries. Political stability was found to be positively and significantly associated with banking spread. This may be because; following the definition of the variable, political stability reflects the

Table 2. Macroeconomic determinants of interest rate spread in CAEMC countries.

Dependant variable: Pure spread	Coefficients	Panel-corrected standard errors
Oil rent	0.024***	0.007
FDI inflow	0.029***	0.011
Inflation	0.011	0.037
Real GDP	-0.018*	0.011
Cons	10.209***	0.604
R-Squared	0.84	-
Number of observations	52	-
Wald χ^2 (4)	38.24	Prob > χ^2 = 0.001

Notes: * denotes significance at 10% confidence level, ** denotes significance at 5% confidence level, and *** denotes significance at 1% confidence level.

Table 3. Institutional determinants of interest rate spread in CAEMC countries (First model).

Dependant variable: Pure spread	Coefficients	Panel-corrected standard errors
Political stability	0.704***	0.208
Corruption	0.974*	0.554
Rule of Law	-0.867	0.983
Government Effectiveness	-1.177*	0.626
HHI_Deposit	1.999***	0.557
Cons	2.966	1.968
R-Squared	0.53	-
Number of observations	36	-
Wald χ^2 (5)	127.97	χ^2 = 0.001

Notes: * denotes significance at 10% confidence level, ** denotes significance at 5% confidence level, and *** denotes significance at 1% confidence level.

likelihood of a bad event. Therefore, it may increase the institutional risk faced by banks and lead them to widen their interest margins accordingly.

As to corruption, it may weaken creditor rights as well as the legal protection of collaterals. That may explain why it was found to be positively correlated to banking spread although the correlation was not significant. Government effectiveness on the other hand, was found to be negatively correlated with interest margin because sound government policies may create a low-risk environment in which banks can easily carry out their activities. Therefore, those banks would narrow their interest margins as a result of the safer environment they perceive.

Rule of law may also be associated with a safer environment since it was found to have a negative correlation with banking spread. Indeed, an environment in which agents abide by the rules may lead to property and creditor rights securitization, as well as contract enforcements. *Ceteris paribus*, these virtues would reduce the overall legal risk and lead to narrower interest margins. Finally, bank concentration in the deposit market

was found to be positively associated with interest margins. This variable was added in this stage to control for the structural excess liquidity prevailing in CAEMC banking systems because the issue was viewed as an institutional problem. In the first step of the methodology, deposits were found to be negatively correlated with spread despite the fact that the sample banking systems are suffering from excess liquidity. Meanwhile in this step, bank concentration as high as it is in CAEMC countries is positively correlated to it. These findings suggest that compared to other banks, the few banks controlling most of the deposit market may suffer more from excess liquidity and therefore use their market power to reduce the interest rate they pay on deposit. *Ceteris paribus*, the lower interest rate they pay on deposit will lead to higher interest margins.

Taking into consideration the other institutional variables, a second model was run and the results reported in Table 4. The results revealed that the estimated coefficients are of the expected signs and the model is globally significant. Moreover, they revealed that political stability, regulatory quality, and bank concentration

Table 4. Institutional determinants of interest rate spread in CAEMC countries (second model).

Dependant variable: Pure spread	Coefficients	Panel-corrected standard errors
Political Stability	0.473***	0.1567
Voice and Accountability	-0.322	0.433
Regulatory Quality	-1.854***	0.568
HHI_Deposit	1.872***	0.396
Cons	3.519***	1.337
R-Squared	0.61	-
Number of observations	36	-
Wald χ^2 (4)	768.23	Prob > χ^2 = 0.001
Wooldridge test for autocorrelation in panel data	F(1,5) = 1.989	Prob > F = 0.217

Notes: * denotes significance at 10% confidence level, ** denotes significance at 5% confidence level, and *** denotes significance at 1% confidence level.

in the deposit market are the significant determinants of interest margins in CAEMC countries.

Moreover, bank concentration in the deposit market and political stability maintained their positive signs and their level of significance. As to voice and accountability, and regulatory quality, there were found to be negatively associated with banking spread. Regulatory quality was even significant at 1% confidence level. These two variables may lead to narrower interest margins because following their definition they are associated with safer environments for economic activities.

CONCLUSION AND RECOMMENDATIONS

The present study revealed that, bank asset, doubtful loan, and the volume of credit were among bank-specific characteristics, the significant determinants interest rate spread in CAEMC countries during the period spanning from 2000 to 2010. On the other hand, oil rents, FDI inflows, and real GDP growth were the significant macro-economic determinants; meanwhile, political stability, corruption, government effectiveness, regulatory quality, and bank concentration in the deposit market were the significant institutional determinants. Besides, the results revealed that in Central African countries, macro factors do explain banking spread better than micro factors. Therefore, the policy recommendations will focus on macro factors in general and the institutional framework in particular.

First, the member states of the CAEMC should indeed strengthen their institutional framework. In that vein, they could take a bold step toward democracy by implementing independent electoral boards, transparent electoral codes, full biometric elections, as well as the opposition statute. Furthermore, policy makers in CAEMC countries should abide by the law and stop anti-democratic practices such as the recurrent constitutional changes carried out by the reigning presidents in order to get rid of the articles

limiting their term in office. *In fine*, the walk toward democracy would have a positive impact on voice and accountability within CAEMC countries and would ultimately improve the effectiveness of their governments, their political stability, as well as the effectiveness of their fight against corruption. *Ceteris paribus*, these improvements would lead to narrower banking spread.

Second, given that CAEMC economies rely heavily on natural resources (oil, ore, and forest), they should comply with the Extractive Industries Transparency Initiative (EITI) in order to reinforce the institutions dealing with those corruption-sensitive industries. But, up to March 2016, Cameroon, Chad, and Congo were the only countries that have fulfilled all EITI requirements; while the Central African Republic was temporarily suspended in April 10, 2013 because of political turmoil. As to Equatorial Guinea and Gabon, they have lost their status as EITI candidates because they could not fulfill all the requirements on time. The fulfilment of EITI requirements could bring transparency, accountability, and effectiveness in the management of those industries usually described as corruption nests. Such a commitment could improve the living standards and the creditworthiness of CAEMC citizens, and incite banks to reduce their interest margins.

Third, policy makers in CAEMC countries should improve their legal and judiciary systems. Magistrates should be independent, property and creditor rights secured, contracts reinforced, and legal procedures shortened. Such measures could facilitate the repossession of collaterals, reduce doubtful loans, and lead to narrower interest margins. Fourth, because common law institutional framework has been proved to be better for economic activities (Beck et al., 2004; La Porta et al., 2008), a country like Cameroon that was colonized by both France and Great Britain and that has a hybrid institutional framework although dominated by civil law could implement an institutional shift from its civil law-dominated framework to common law framework.

This institutional shift could lead to narrower interest rate spreads and higher growth rates more compatible with the ambition of becoming an emerging country.

Finally, the institutional reforms proposed earlier coupled with a sound regulation of economic activities could reduce the overall macro-risk perceived by banks and lead to lower interest margins. Moreover, these reforms could limit the positive impact of oil rents and FDI inflows on banking margin as well as the corresponding crowding out effect they may have on domestic investment. Furthermore, a sound institutional framework, associated with the low inflation and the moderate to high economic growth characterizing CAEMC countries could incite banks to grant more credits and therefore solve the structural excess liquidity problem they face.

Conflict of interests

The author has not declared any conflict of interests.

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Appendix. Description of the variables.

Variable	Description
Spread	Annual difference between the average lending rate and the average deposit rate (Source: COBAC)
Asset	Ratio bank total asset/GDP in percentage (Source: COBAC)
Doubtful loan	Ratio provision for doubtful loan/loan in percentage (Source: COBAC)
Credit	Ratio loan/total asset in percentage (Source: COBAC)
Deposit	Ratio deposit/total asset in percentage (Source: COBAC)
Capital	Ratio registered capital/total asset in percentage (Source: COBAC)
Pure spread	Fraction of spread that is not explained by bank-specific characteristics (Source: Own calculation)
Oil rent	Ratio oil rents/GDP in percentage. While oil rents are the difference between the value of crude oil production at world price and total cost of production (Source: WDI 2015)
FDI inflow	Ratio foreign direct investment net inflows/GDP in percentage (Source: WDI 2015)
Inflation	Annual percentage inflation (Source: BEAC)
Real GDP	Annual GDP growth rate in percentage (Source: BEAC)
Political	“Reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism” (Source: WGI 2013)
Corruption	“Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests” (Source: WGI 2013)
Rule	“Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence” (Source: WGI 2013)
Government	“Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies” (Source: WGI 2013)
Voice	“Reflects perceptions of the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media” (Source: WGI 2013)
Regulatory	“Reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development” (Source: WGI 2013)
HHI_deposit	Log Herfindahl-Hirschman Index on deposit (Source: COBAC)

ⁱ The Central African Economic and Monetary Community (CAEMC) is monetary union made of Cameroon, the Central African Republic, Chad, Congo, Equatorial Guinea, and Gabon. These countries are under the authority of the same central bank (BEAC) as well as the same banking supervisor (COBAC). They share a common currency (CFA Franc) that was pegged to French Franc (1 French franc = 100 CFA franc) up till 1998. Since January 1999, the CFA Franc is now pegged to the euro (1 euro = 655.957 CFA Francs).

Full Length Research Paper

Empirical evidence on capital structure determinants in NIGERIA

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The purpose of this paper is to investigate empirical evidence on capital structure determinants in Nigeria. This research has been performed using a sample of 50 companies listed on the Nigeria Stock Exchange from 2001 to 2010. The relationship between the short-term and long-term debt and four explanatory variables were observed. The results of the cross-sectional OLS regression revealed that the static trade-off theory and agency cost theory are relevant to Nigerian companies whereas there was a little evidence in support of pecking order theory. The findings of this study confirm that profitability, growth, firm size and tangibility are explanatory variables of capital structure.

Key words: Capital structure, static trade-off theory, pecking order theory, agency cost theory.

INTRODUCTION

In the past several decades, the role of capital structure has been an important consideration in corporate finance (Chen and Chen, 2011). A number of theories have explained the variations in capital structure across firms and these theories suggest that the selection of capital structure depends on attributes that determine the various costs and benefits associated with debt and equity financing. Modigliani and Miller (1958 and 1963) posit that, in a frictionless world, capital structure is independent of the value of a firm but in a world of tax, value of a firm is influenced by capital structure. Due to Modigliani and Miller hypothesis (1958), three theories have been developed. These theories include static trade-off theory, pecking order theory and agency cost theory. The static trade-off theory (also known as tax-based theory) posits that optimum capital structure is achieved at a point where the net tax advantage of debt financing balances various costs associated with

leverages such as bankruptcy cost. Pecking order theory states that companies finance new investment internally with retained earnings, debts and equities. The agency cost theory of capital structure states that an optimal capital structure will be determined by minimizing the costs arising from conflict of interests between the parties involved.

Jensen and Meckling (1976) argued that agency costs play an important role in financing decisions due to the conflict that may arise between shareholders and debt holders. Most empirical studies on capital structure are based on data from developed countries (Rajan and Zingales, 1995; Bevan and Danbolt, 2000 and 2002; Antoniou et al, 2002).

Few empirical researches were conducted on determinants of capital structure in developing countries (Pandey, 2001; Omet and Nobanee, 2001; Al-sakran, 2001; salawu, 2007).

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The aim of this research is to provide further evidence on the determinants of capital structures relating to developing countries. The paper concentrates on the structure theory that is relevant in the Nigerian context.

LITERATURE REVIEW

Financial managers should choose an appropriate mix of capital structure so as to maximize shareholders' wealth. A number of factors have been suggested to have an influence on a firm's capital structure. There is a wide range of empirical studies on the determinants of firm's capital structure but the findings of these studies are not consistent in terms of direction and strength of the relationship between capital structure and its determinants. Cross – countries empirical studies (Rajan and Zingales, 1995; Booth et al., 2001) argued that the influence of institutional characteristics is as important as the influence of firm's characteristics on capital structure. Both theoretical and empirical studies have generated mixed results (Buferna et al., 2008). Some broad categories of capital structure determinants have emerged as a result of various studies.

Bancel and Mitto (2002) conducted a survey on managers of firms in seventeen European countries on capital structure and its determinants. They found that financial flexibility, credit rating and tax advantage of debt are the most important factors influencing debt policy while the earnings per share dilution is the most important factor influencing equity.

Banner (2004) investigated the determinants of capital structure in Czech Republic, Hungary, Poland and Slovak Republic from 2000 to 2001. The research evidence shows that capital structure is influenced by size, profitability, tangibility, growth opportunities, non-debt tax shields and volatility.

Rajan and Zingales (1995) investigated how different country backgrounds affect capital structure among G-7 countries. This research evidence shows that capital structure is affected by bankruptcy laws, the development of bond market and patterns of ownership.

Gleason et al. (2000) examined the determinants of capital structure in the fourteen European countries. They found that legal environment, tax environment, economic system and technological capabilities influence capital structure.

Bervan and Danbolt (2001) examined capital structure of 822 UK companies and found that determinants of capital structure appear to vary significantly depending on the component of capital structure being analyzed. Most of the empirical studies on the determinants of capital structure are based on data from developed countries. It was not until the last ten years that some researchers focused their attention on developing countries, for example, Booth et al. (2001) analyzed data from ten developing countries (Brazil, Mexico, India, South Korea,

Jordan, Malaysia, Pakistan, Thailand, Turkey, and Zimbabwe). Pandey (2001) analyses data from Malaysia, Chen (2004) analyses data from China, Omet and Nobanee (2001) analyse data from Jordan, Al-Sakran (2001) utilizes data from Saudi Arabia and Deesomsak et al. (2004) utilize data from the Asia Pacific region.

Like other developing countries, research on capital structure determinants is still unexplored in Nigeria only Salawu (2007) has carried out a study in this area. He examined the determinants of capital structure in Nigeria banking industry.

His study revealed that capital structure is influenced by ownership structure and management control, growth opportunity, profitability, issuing cost and tax advantage associated with debt.

In this study, four key variables will be considered as identified in studies by Rajan and Zingales (1995), Bevan and Danbolt (2002) and Booth et al. (2001). The selected explanatory variables are profitability, tangibility, size and growth opportunities. The following three conflicting theories of capital structure will be examined. These include static trade-off theory, pecking order theory and agency cost theory.

Static trade – off theory

The static trade-off theory (also known as tax-based theory) suggests that optimal capital structure could be achieved at a point where the net tax advantage of debt financing balances leverage related costs such as bankruptcy cost. The static trade-off theory states that more debt will be employed by profitable firms since they may likely have high tax burden and low bankruptcy risk (Ooi, 1999).

Um (2001) posits that a high level of profit gives rise to a higher debt capacity and accompanying tax shield. He argued further that firms with high level of tangible assets will be able to provide collateral for debts. If the company defaults on its obligations on debts, the assets will be seized but the company may be in a situation to avoid bankruptcy.

Companies with high level of tangible assets are less likely to default and will be able to secure more debts which may result in a positive relationship between tangibility and capital structure. Most of the empirical studies conducted in developed countries found a positive relationship between tangibility and capital structure, for instance, Titman and Wessels (1988), Rajan and Zingales (1995) among others while empirical studies in developing countries found mixed relationship between tangibility and capital structure; for instance, Wiwattanakantang (1999) in Thailand reported a positive relationship between tangibility and capital structure while other studies showed that tangibility is negatively related to capital structure, for instance, Booth et al. (2001) in ten developing countries, and Huang and Song (2002) in

China.

Antoniou et al. (2002) argued that size is a good explanatory variable for a firm's capital structure. Bevan and Danbolt (2002) assert that large firms tend to hold more debt because they are regarded as "too big to fail" and therefore gain better access to capital market.

Hamaifer et al. (1994) also argued that large firms are able to hold more debt than small firms because large firms possess higher debt capacity. Wiwattanakantang (1999), Booth et al. (2002), Pandey (2001), and Huang and Song (2002) reported a significant positive relationship between capital structure and size in developing countries. Rajan and Zingales (1995) also found a positive relationship between size and capital structure in G-7 countries. On the other hand, Bevan and Danbolt (2002) found that size is negatively related to short-term debt and positively related to long-term debt.

Pecking order theory (information asymmetry theory)

The pecking order theory of capital structure holds that managers or insiders possess private information about the characteristics of the firm's return or investment opportunities which is not known to common or equity investors. Consistent with the pecking order theory, Titman and Wessels (1988), Rajan and Zingales (1995), Antoniou et al. (2002) and Bevan and Danbolt (2002) in developed countries, Booth et al. (2001), Pandey (2001), Wiwattanakantang (1999), Chen (2004) and Al-Sakran (2001) in developing countries reported a negative relationship between profitability and capital structure. Booth et al. (2001) found a positive relationship between growth and capital structure except for South Korea and Pakistan. Pandey (2001) reports a positive relationship between growth and capital structure in Malaysia.

Titman and Wessels (1988) and Rajan and Zingales (1995) found a positive relationship between tangibility and capital structure for developed countries whilst Wiwattanakantang (1999) reported that a positive relationship exists between tangibility and capital structure in Thailand and South Korea, respectively.

Agency cost theory

Debt agency cost arises as a result of conflict of interests between debt providers and shareholders on one hand and, shareholders and managers on the other hand (Jensen and Meckling, 1976). The use of short-term sources of debt may reduce the agency problems.

Titman and Wessels (1988) argued that agency related costs between shareholders and debt holders are likely to be higher for firms in growing industries, hence, a negative relationship is expected between growth and capital structure. Consistent with these predictions,

Titman and Wessels (1988), and Rajan and Zingales (1995) reported a negative relationship between growth and capital structure in developed countries.

Jensen and Meckling (1976) asserted that the use of secured debt might mitigate agency cost of debt. Um (2001) asserts that if a firm's level of tangible asset is low, the management may choose a high level of debt to mitigate equity agency costs. Therefore, a negative relationship between tangibility and capital structure is consistent with an equity cost explanation.

This study aims to present empirical evidence on the determinants of capital structure in Nigerian context. This study also provides an avenue to access the private sector in Nigeria, identify its constraints and proffer solutions. Another issue in prior research is the robustness of results under different estimation techniques and different measures for both the dependent and the explanatory variables. Limiting the data analysis to certain estimation techniques for dependent and explanatory variables may produce subjective results.

Therefore, it is important to conduct a comprehensive analysis that considers these issues in order to avoid such bias.

This study will provide empirical evidence on the model of capital structure that is applicable to Nigerian firms. Extending the debate beyond debt-equity mix is important in Nigerian context because there is no perfect capital market from which firms can raise capital. The research will help policy makers on how they can use policy to reduce financial constraints for firms so that they can have a wider and affordable choice of finance resources. It is perceived that the result of the study will serve as a guide to researchers in conducting future studies on the determinants of capital structure in Nigeria.

RESEARCH DESIGN AND METHODOLOGY

The broad objective of this research is to investigate the determinants of capital structure in Nigerian context. The data to be used for the purpose of this study will be obtained from balance sheets and income statements of 50 companies quoted on the Nigerian Stock Exchange (NSE). A period of 10 years will be considered (2001 – 2010). The data will be averaged over the 10-year period to smooth the capital structure and explanatory variables. To test the hypothesis, the relationship between the level of debt and four explanatory variables representing profitability, growth, tangibility and size will be examined using ordinary least square regression.

The study will decompose debt into long-term and short-term debt. The debt ratios to be considered are total debts to total assets, short-term debts to total assets and long-term debt to total assets. Tangibility will be measured by the ratio of fixed assets to total assets, growth will be measured by the percentage change in the value of total assets, size will be measured by the natural logarithm of assets and profitability will be measured by the ratio of profit before tax to the book value of total assets.

Bevan and Danbolt (2002) argued that studies on the determinants of capital structure based on total debt may disguise the significant differences between long-term debt and short-term

Table 1. Summary of descriptive statistics for explanatory variables.

Firms	Profitability	Growth	Tangibility	Size	Short-term debt ratio	Long-term debt ratio	Total debt ratio
Mean	0.14	12.325	0.176	12.436	0.522	0.078	0,615
Median	0.001	7.720	0.162	12.412	0.510	0.020	0.608
Std Dev	0.075	28.422	0.136	2.105	0.426	0.131	0.410

Note: Profitability is measured by the relationship between earnings before tax and total assets. Growth is measured by the percentage change in total assets. Tangibility is measured as the ratio of fixed assets to total assets. Size is defined as the natural logarithm of assets. Long-term debt ratio is measured by the relationship of long-term debt to total assets. Short-term debt ratio is measured by the ratio of short-term debt to total assets. Total debt ratio is measured by the ratio of total debt to total assets.

debt.

Consistent with Bevan and Danbolt (2002) and Michaels (1998), this study decomposes debt into long-term and short-term debt. Total debts to total assets, short-term debts to total assets, and long-term debts to total assets are the debt ratios to be considered. The cross-sectional regression to be used in this study is based on models used in Rajan and Zingales (1995), Bevan and Danbolt (2002), with some adjustments on both the leverage and explanatory variables.

In line with studies by Rajan and Zingales (1995), tangibility is measured by the ratio of fixed assets to total assets and growth is measured by market to book ratio of assets.

The first regression model to be used for the study is as follows:

$$Z = \alpha + \beta_1 X_n + \beta_2 D + \beta_3 X_{nD} + \mu$$

Where:

Z represents capital structure or leverage

α represents the intercept

X_n represents the explanatory variables ($n=1, 2, 3$ and 4)

- 1- Profitability is measured by the ratio of profit before tax to the book value of total assets
- 2- Growth is proxied by the percentage change in the value of assets
- 3- Tangibility is proxied by the ratio of fixed assets to total assets
- 4- Size is proxied by the natural logarithm of total assets

D represents a dummy value

μ is the stochastic error term

The second regression analysis with four dummy variables is done to examine industry classification effect with the manufacturing industry as the intercept. DR (firm i) is the dependent variable in all regression models representing the two long-term debt ratios for each firm and D1 to D4 represent the four industry dummies utility, real estate, conglomerate, and oil and gas respectively. The variables are defined as follows:

$$DR(\text{firm } i) = \alpha + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \mu$$

The third regression analysis is done to estimate whether firm characteristic variables influence capital structure.

The model is stated as follows:

$$DR(\text{firm } i) = \alpha + \beta_1 T + \beta_2 S + \beta_3 G + \beta_4 P$$

Where α = intercept

T = Tangibility

S = Size

G = Growth

P = Profitability

$$DR(\text{firm } i) = \alpha + \beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 T + \beta_6 S + \beta_7 G + \beta_8 P$$

Most studies of this nature focus on quoted companies as the units of measurement. The reason is that such firms have a wide range of sources for raising capital. This study also uses quoted companies as the units of measurement.

The fourth regression model includes both industry dummies and firm characteristic variables. This model is developed to provide an explanation on whether firm characteristics are significant in explaining the choice of capital structure after controlling for variation across industries,

ANALYSIS AND RESULTS

The variables used for the purpose of the study were deflated by the book value of total assets according to Bevan and Danbolt (2000 and 2002) to control for potential heteroscedasticity. This study also employs White (1980)'S heteroscedasticity-consistent standard errors and covariance so as to mitigate heteroscedasticity in calculating the T-statistics. As could be seen in Table 3, explanatory variables provide high explanatory power as provided by R² values of 0.90 for total debt, 0.86 for short-term debt and 0.72 for long-term debt respectively.

Significant positive slope coefficients are expected for explanatory variables such as profitability, tangibility and size if the static trade-off theory holds. There is a strong evidence for the static trade off theory for total debt and long-term debt as revealed by the coefficients of profitability and size. Given that most Nigerian companies rely on long-term debt, there is a strong support for the static trade-off theory. This shows that larger companies with higher profits will have higher debt capacities and thus, will be able to borrow more and take advantage of any tax shield.

The results of various explanatory variables and leverage measures for selected firms are summarized in Table 1. It could be seen that Nigerian companies have a low rate of profitability (14%). The growth rate on average is 12.33%. Correlation matrix of the leverage and explanatory variables are presented in Table 2. The results revealed that growth and size are positively

Table 2. Correlation matrix.

Variables	Profitability	Growth	Tangibility	Size	Short- term debt ratio	Short-term debt ratio
Tangibility	-0.212					
Growth	0.025	-0.049				
Size	0.123	-0.036	-0.168			
Short-term debt ratio	-0.080	-0.018	-0.114	-0.422		
Long-term debt ratio	0.542	0.32	0.058	0.025	-0.300	
Total debt ratio	-0.078	-0.075	0.089	-0.431	0.896	0.084

Table 3. Results of OLS at different degrees of leverage.

Variables	Total debt ratio	Short- term debt ratio	Long-term debt ratio
Intercept	-0.0003(2.58)	-0.0002(-3.92)	-0.0006(2.40)
Profitability	2.638(14.70)	2.926(6.84)	-0.112(-1.21)
Growth	-0.021(-3.50)	-0.024(-4.22)	0.002(1.14)
Tangibility	0.032(0.05)	0.014(0.03)	0.006(0.19)
Size			
Adjusted R ²	0.90	0.86	0.72
F	128.32	43.22	9.40
Dum profitability	0.058(0.135)	0.615(1.24)	-0.549(-0.64)
Dum growth	0.003(3.20)	0.005(2.48)	-0.002(-1.36)
Dum tangibility	-0.065(-0.41)	0.612(2.78)	-0.029(-1.40)
Dum size	-0.016(-1.59)	-0.048(-3.15)	0.032(2.40)

Notes: The explained variable and explanatory variables are scaled by total assets. Dum represents dummy variables. T-Statistics are in parentheses. The values indicated in the table are significant at 10, 5 and 1% respectively.

Table 4. The expected coefficient signs for capital structure theories.

Proxy	Measure	Static trade-off theory	Asymmetric information cost theory	Agency theory
Profitability	Profit before tax	+	-	NIL
	Book value of total assets			
Tangibility	Fixed assets	+	+	+ Debt cost
	Total assets			- Equity cost
Growth	% change in the value of assets	NIL	+	--
Size	The natural logarithm of total assets	+	NIL	+

related to profitability whereas tangibility has a negative relationship with profitability. This justifies that large firms and growing firms tend to have higher profitability whereas less tangible assets are possessed by profitable firms (Table 4).

Although the correlation matrix ignores joint effects of

more than one variable on leverage, the tangibility and growth variables have positive correlation with long term debt and a negative correlation with short-term debt ratios. This implies that growing firms and firms with high levels of tangible assets tend to use long-term debt rather than short-term debt. Large and profitable firms are more

likely to use long-term debt and less likely to use short-term debt.

Conclusion

The findings of this paper provide further evidence on capital structure determinants in Nigeria during the period of 2001 to 2010. The relationships between short-term and long-term debt and four explanatory variables such as profitability, growth, tangibility and size were examined to explain the capital structure theory that is relevant in Nigerian context.

The results show that profitability and size are negatively correlated with short-term debt ratio and positively correlated with long-term debt ratio and total debt ratio.

The results also show that growth and size are positively correlated with profitability whereas negative relationship was found between tangibility and profitability. Given that most Nigerian firms rely heavily on long-term debt, there is a strong evidence for static-trade off theory. A significant negative correlation was found between tangibility and leverage which provides further evidence in support of agency cost theory.

The results suggest that both static trade-off theory and agency cost theory are relevant theories in Nigeria whereas there was a little evidence in support of pecking order theory.

Conflict of interests

The authors have not declared any conflict of interests.

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Full Length Research Paper

Bank lending behavior and economy financing in CEMAC countries: Should we grease the wheel?

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For the proponents of the “greasing the wheel” position, in the context of market imperfections, corruption helps in alleviating distortions in the credit market, facilitates access to bank credit and promotes the financing of the economy. The aim of this paper was to interrogate the impact of corruption on bank lending behavior in CEMAC countries, not only ranked among the most corrupt economies in the world by international institutions, but also confronted with problem of difficult access to banking services for most economic operators. To achieve this goal, an explanatory model of bank lending behavior in which corruption appears as an argument beside a set of control variables, was built. The model estimation on CEMAC countries’ data shows that corruption has a significant negative effect on commercial bank credit behavior. Given the importance of bank credit in financing development, such a finding is an additional argument for integrating governance considerations into any policy targeting the emergence in community countries.

Key words: Corruption, bank, financial development, Africa.

INTRODUCTION

Since the work of Schumpeter (1911), major strands of the economic literature agree with the essential role of credit in the economic development process. The awareness of that role has sparked a growing debate on the determinants of bank lending behavior in various contexts. Recent contributions highlight the significant role of corruption in this dynamic even if the direction of the credit behavior-corruption relationship remains a subject of controversy.

Indeed, for the proponents of a negative effect of corruption on credit behavior, the increased banks uncertainty and the inability of the banker to recover funds in the case of bankruptcy due to the imperfection of the legal system have resulted in higher levels of bank

credit rationing. A rising level of corruption will therefore lead to a reduced supply of credit banks with adverse consequences in the financing of the economy. For the proponents of a positive effect, given information asymmetries between lenders and borrowers, the credit will permanently be rationed (Stiglitz and Weiss, 1981). It is precisely the existence of rationing that creates a situation conducive for corruption. To obtain credit, individuals have to pay higher interest rates at the prescribed rate (Weill, 2011). Corruption has the advantage in a context of imperfect courts to allow an acceleration of the banking procedure and recovery mechanisms at the legal level. This results in easier access to credit. Individuals who have the best chances

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of getting loans are those who bribed bank employees. So, in a context of market imperfections, “greasing the wheels” helps in alleviating distortions in the credit market, facilitates access to bank credit and promotes the financing of the economy.

Even though numerous studies emphasized the role of corruption in the development process, both to celebrate its virtues and to decry its perverse effects¹, papers devoted to the analysis of the phenomenon’s effects on bank behavior remains mostly focused on industrialized and transition economies cases². In the Economic and Monetary Community of Central Africa (CEMAC) considered by international institutions as being particularly affected by corruption, the recent decrease in oil price³ reinforce the need for economies diversification and financing, the proportion of people accessing formal financial services remains the lowest in the world (World Bank, 2011) despite a persistent excess liquidity of banks. The question then arises on whether corruption can be a significant factor in explaining bank lending behavior in CEMAC countries?

To address this concern, an explanatory model of bank lending behavior in which corruption is a side argument of a set of control variables, was built. Both contribute to the literature on the determinants of bank credit behavior and that on the effects of corruption in the African context. If Anaere (2014) questions this relation globally in the context of sub-Saharan Africa countries, to the author’s knowledge, no study has been conducted specially in the community countries to discuss the relationship between banks’ lending behavior and corruption. The remainder of the paper is organized as follow:

Bank lending behavior and corruption: Theoretical considerations

There are two positions in the literature regarding corruption-bank lending behavior relationship. In the first, corruption is considered as a constraint on bank credit behavior. It also has a sand effect on bank credit behavior. In the second, corruption positively affects bank credit behavior. It also has a “greasing the wheels” effect.

Corruption as constraints on banks’ lending behavior: The sand effect

Laporta et al. (1998) is amongst the pioneering

¹Even if the most important part of the literature support the idea of a negative effect of corruption in the development process (Murphy and al, (1993); Shleifer and Vishny, (1993); Mauro,(1995, 1997); Bardhan, 1997; Ehrlich et Lui, 1999; Wei, 2000 Adit, 2009), for some researchers interested in this problem, corruption can also have a positive effect by improving the allocation of resources efficacy (Leff, 1964) or in the special case of highly regulated economies(Dreher and al(2013)

²See Khwaja and Mian (2005), Weill (2011), Anaere(2014) for the negative effect of corruption and Chen (2003) for the positive effect of corruption.

³Since 2014, the oil market is facing a decline. Crude oil barrel was halved between June 2014 and January 2015 reaching its lowest level in 2009 (45.1 dollars). First export product, it account for 35% of GDP in the subregion and 54.7 budget revenues.

contributors showing the negative impact of corruption on bank loans. In their perception, a legal system characterized by well-functioning of institutions, because it protects banks and guarantee contracts, allows the latter to increase their efficiency. A well-functioning legal system facilitates, in the case of bankruptcy, the funds lent by banks recovery procedures, and positively influences their behavior in terms of credit. Many empirical studies support this positive impact of the legal environment on bank loans. For instance, Dankov et al. (2007), showed that a legal system characterized by effective protection of the various stakeholders (shareholders, creditors and investors) and a high level of respect of contracts is associated with an increase in bank loans. Corruption is a characteristic of failed legal and institutional systems which results in increased uncertainty in banks and inability to recover funds loaned in the case of bankruptcy. Corruption will then have a negative impact on banks’ lending behavior. It will negatively affect their incentive to take more risk. Thus, in a macroeconomic environment characterized by high levels of corruption, banks will be reluctant to extend credit.

Beyond the legal framework, connivance between the lender and the borrower will result in an overstatement by the lender of the feasibility of the project, or an ineffective supervision of the business of the borrower. The borrower has in such a context no incentive to achieve higher profitability of the project. A negative aspect of corruption in this case is that, the funded project will not necessarily be the most profitable, but the one proposed by the most corrupt individual. Corruption then appears in the financial sector, as a sort of rationing due to the amount of “bribe”.

This theoretical position is supported by many empirical studies. For instance, Khwaja and Mian (2005), showed that companies with political connections obtain more easily, bank credit, but ends up with higher defaults rate. For Charumilind et al. (2006), studying the case of Thailand, firms with connections to politicians have better access to long term bank loans and this access less depends on collateral. Weill (2011) found a decrease in credit rates with the severity of the corruption in Russia. The result of Anaere (2014) confirms that of Weill (2014) in the African context.

Corruption and alleviation of credit markets distortions: The “greasing the wheels” effect

For the proponents of the “greasing the wheel” position, under certain conditions, corruption may also have a positive impact on banks’ lending behavior. For instance, according to Weill (2003), this is particularly the case when corruption contributes to the improvement of borrower-lender relationships. In the case where an acceleration of the banking procedure requires the banker extra work, corruption can be seen as a real “lubricant” of banking. Furthermore, as suggested by

Stiglitz and Weiss (1981), given the asymmetry of information between lenders and borrowers, the credit will permanently be rationed. In such a situation, people should pay higher rates for the credit. This creates a favorable environment for corruption. Individuals who have the best chance of obtaining bank financing are those who bribe bank employees. Corruption can then promote good quality credits in a context characterized by banks' risk aversion. To the extent that financial development positively affects economic growth, corruption is thus assumed to have a positive effect on growth through the credit channel.

The paper of Chen et al. (2003) provides the supportive evidence for the greasing effect of corruption. In the case of China, Chen et al. (2003) showed that bribery enable more productive firms to be granted larger loans.

Corruption in CEMAC countries

The Economic and Monetary Community of Central Africa (CEMAC) is an organization of states of central Africa established by Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea and Gabon to promote economic integration among countries that share a common currency, the CFA franc. A specificity of this group of countries is that they share a common financial regulatory and legal structure and maintain a common external tariff on imports from non CEMAC countries.

The framework of CEMAC countries seems ideal to confront the opposed theoretical positions on corruption and bank lending behavior relationship. The awareness of the extent of corruption and the will to address it has departed, in addition to efforts at the national level by the political authorities of these economies⁴, towards the establishment of sub-regional structures to fight the phenomenon. First, the observatory against corruption in Central Africa (OLCAC) created in 2006 aimed, among others, to disseminate national and international legal instruments relative to the fight against corruption in Central Africa by the way of promoting the ratification of these instruments, and encouraging authorities to implement them; the ultimate goal being to strengthen the capacity of civil society and citizens, which should play a decisive role in this dynamics. Then, the network of national anti-corruption institutions (INAC) created during a workshop organized jointly by the United Nations Economic Commission for Africa, the Economic Community of Central African States, and the Advisory Board on Corruption commission of the African union, plays the role that facilitates cooperation between

national institutions for the fight against corruption at the regional level in particular through the exchange of experiences and information. Finally, the Action Group against Money Laundering in Central Africa (GABAC) created in 2000 by an additional Ndjamen Act of the Conference of Heads of States of Central Africa plays the role of promoting standards, instruments and control standards against money laundering and thus to implicitly reduce leeway corrupt officials. The package, however, is slow to yield significant results, as depicted in Figure 1 as a result of the evolution of corruption in the CEMAC countries.

Gabon with a score above 30 for the last decade is the less corrupt CEMAC country followed by Cameroon. Central African Republic and Congo are at an intermediate level. Chad appears to be the most corrupt CEMAC country. Only Equatorial Guinea seems to be characterized by a significant positive evolution in 2014 that takes this country almost to the same level as Cameroon. But overall, as compared to other contexts, CEMAC countries remain, despite the efforts devoted, deeply affected by the corruption⁵.

If supply and demand factors can explain the situation, the existence of rent opportunities deserves adequate attention in the credit market case. Indeed, the search for treatment in a context of discrimination or credit rationing creates a breeding ground for corruption. In CEMAC countries, despite a relative improvement of the banking rate and a persistent bank excess of liquidity, the proportion of people accessing financial services remains among the lowest in the world. Even as the fall in oil products strengthens the needs of diversification and funding, the financial sector contributes very little to the financing of CEMAC's economies. Table 1 compares the number of borrowers in commercial banks per 1,000 adults in CEMAC countries to that observed in other groups of developing economies.

Access to bank credit in CEMAC countries is the lowest in Africa over the period compared notably to East and North Africa. Gabon and Cameroon have the best performance of the community regarding credit access all along the analysis period although Equatorial Guinea outreaches Cameroun in 2014. Even if one can note a positive evolution in all CEMAC countries in the table, in Chad only 9.1 per 1000 adults had access to credit in 2014. As noted in the Franc zone report (2014), the low level of bank intermediation can help in understanding this situation. Table 2 provides an overview of the number of commercial banks branches for 100 000 adults in CEMAC countries. Apart from Gabon and Equatorial

⁴The Cameroon for example created on March 11, 2006 by presidential decree, the National Anti-Corruption Commission (CONAC) which is operational since March 15, 2007. Similarly in Congo since 2004 is the national commission against corruption, bribery and fraud (CNLCCF) consisted originally of ministers and general managers.

⁵The IT index, essentially a poll of polls, is the average of the results of surveys of business people and country assessment analysts from various sources regarding the prevailing levels of corruption. The procedure of averaging the results from different sources would reduce measurement error if the errors in various surveys are independent.

⁶ This is the root of the legal approach that stresses the importance of the legal system for the finance growth nexus. See for instance Levine(1998), Levine(1999) Levine and Zervos(1998) Levine Loaysa and Beck(2000)

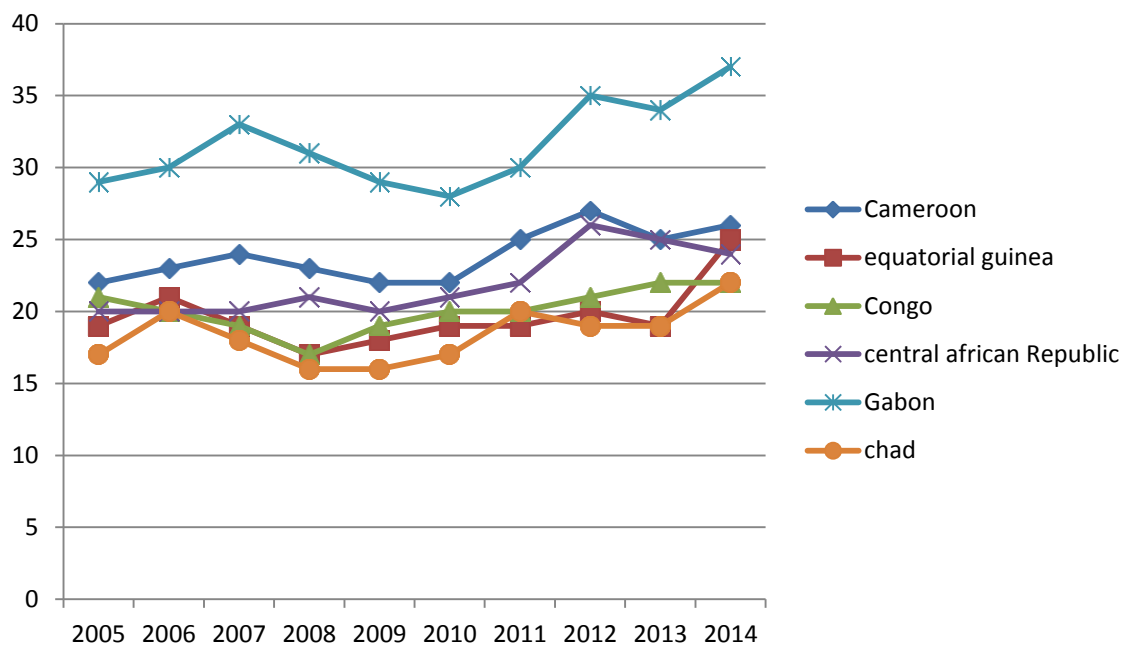


Figure 1. Evolution of corruption index in CEMAC countries. Source: Author.

Table 1. Access to bank credit in CEMAC countries (per 1,000 adults).

Countries	2010	2011	2012	2013	2014
Cameroon	11.1	17.6	20.6	21.9	20.2
Equatorial Guinea	9.6	10.3	12	15.2	28.5
Congo	1.1	1.5	3.6	3.4	4.9
Gabon	17.5	21.7	27.6	48	108.3
Chad	2.2	2.8	3.2	3.6	9.1
Subsaharan Africa	19.9	18.3	21.5	23	
North and eastAfrica	81.1	89.5	81.6	107.8	

Source World Development Indicators, 2015.

Table 2. Bank branches per 100 000 adults in CEMAC countries.

Countries	2010	2011	2012	2013	2014
Cameroon	1.7	1.7	1.8	1.9	1.9
Equatorial Guinea	4.5	4.6	5.6	6.3	6.5
Congo	2.2	2.7	2.8	3.5	
Gabon	5	5.7	9.9	9.9	10.4
Chad	0.6	0.7	0.7	0.7	1
Subsaharan Africa	3.4	3.5	3.6	3.8	3.9
North and East Africa	11	11	11	10.2	15.2

Source World Development Indicators, 2015.

Guinea, all CEMAC countries intermediation levels are below the average noted for sub-Saharan Africa. Moreover, observed levels are very low as compared to

North and East African countries. There is a constant improvement in the level of intermediation in all CEMAC countries on the period 2010-2014. Gabon and Equatorial

Guinea are the two countries with the higher level of intermediation although they are far below non CEMAC African countries. Chad with only one branch per 100 000 adults have the worst performance. Moreover, the contractual environment in CEMAC countries is still characterized by weak legal enforceability of financial contracts.

As reported by the World Bank databases (2015), the time required for the legal enforcement of a financial contract is above 500 days in all CEMAC countries. The number of procedures required is very high. It is for example 60 in the case of Cameroon. These considerations added to banks' inability to assess risk in a context dominated by small opaque sized companies with low informational level and insufficient guarantees and collateral mechanisms push banks to ration credit. Information on asymmetries gives bank managers in CEMAC countries, a wide scale of discretion on the credit decision. Contrary to the prospect of Akerlof (1981) where only the borrowers with bad projects seek to borrow at high interest rates, the credit market in the CEMAC, in spite of a prevalent bank excess of liquidity, imposes a competition between good and bad borrowers for access to funds. In a context of endemic corruption, such a situation creates the conditions that can allow the bankers to take private rent for credit transactions: The resultant is an increase in transaction costs and an accentuation of the difficult access to bank financing. So taking into account the literature and the reality in the CEMAC's context, our main hypothesis stated in the alternative form is:

The higher is corruption prevalence in CEMAC countries, the less are banks prone to lend to the private sector.

MATERIALS AND METHODS

To test this hypothesis, the bank lending behavior in the CEMAC countries as a function of the level of corruption and a set of control variables is expressed.

Variables and data

As in many cross countries, studies on bank lending behavior, explained that variable is bank credit defined as the ratio of total credit issued to private sector by deposit money bank to gross domestic production (GDP). Data for this variable are from the financial structure database.

The explanatory variable of primary concern is corruption. To measure corruption in CEMAC countries, we start from the idea that the bank credit behavior can be affected not only by bank's internal corruption, but also by corruption in other sectors⁶. As in Park (2012), the level of corruption in the banking sector is expected to strongly correlate with overall corruption of the economy. Wei(2000), Mo (2001) and Adit (2009) suggest the use of corruption

⁶For example, corrupt politicians may induce or instruct banks to lend credit to non-creditworthy friends, which leads to higher risks on the assets of banks, although bankers are incorruptible.

perception index proposed by Transparency International (*T index*). This is a composite indice aggregating surveys based on information from risk analyst and residents. But we need to make two adjustments. First, this index ranges from zero (the most corrupt situation) to ten (the least one); we present it in the form $CI = 10 - T index$ to allow a higher value to be associated with a higher level of corruption. Secondly, to correct the bias linked to the diversity of methodology in Transparency International surveys all along the sample period (Lambsdorff, 2008), the CI index of year t in the country j was divided by the average CI indices in all countries for each year. The used adjusted index of corruption⁷ is thus given as follows:

$$\text{Adjusted corruption} = \frac{CI_{j,t}}{(\sum_{j=1}^n CI_{j,t})/n}$$

To assess the link between corruption and bank credit, the authors controlled for other potential determinants of bank credit. The authors then introduced the model bank control variables corresponding not only to bank internal factors that may affect their credit behavior, but also to proxies for the contractual environment and macroeconomic conditions.

Regarding the banking variables, we include in the model, the bank's size (bank size). Berger and Udell (2006), for example, showed that large banks tend to ration small enterprises which are dominant in the productive sectors of CEMAC countries. The logarithm of total bank assets is used as a proxy for bank size. Anaere (2014) approach was followed.

The contractual environment can also affect credit behavior. It is seized by banking regulations. If Diamond and Rajan (1999) pointed out a positive effect of capital requirements on credit growth, Borio et al. (2001) noted that banks can choose the most effective way to meet the capital requirements. Since the cost of raising new capital is generally higher for financial institutions with low capital, banks are then likely to cut lending to meet the regulatory requirement. To take into account capital requirements, the capital ratio was computed. A negative relation with bank lending behavior was expected.

We must take into account the structure of the banking market. Indeed, competition in the banking industry because it results in lower interest rates and increasing of the bargaining power of bank managers (Weill, 2011) can help to counteract the effects of corruption on loans⁸. A widely used measure of competition is the concentration ratio. In the traditional literature, higher concentration is generally linked to a lower level of competition within the banking industry (Laeven and Levine, 2009). But, concentration ratio mostly reflect the existing market structure and they may not capture the potential competition in the banking industry. Furthermore, concentration measures may endogenously reflect the market share gains of efficient firms rather than represent an exogenous measure of competition. Following Claessens and Leaven (2004), The Herfindhal index is used to measure the degree of competition in CEMAC countries banking market. Based on the premise that banks employ different pricing strategies in response to changes in input prices, depending on the market structure, Panzar and Ross

⁷This adjusted index has the particularity to indicate the level of corruption in a country over a "typical" country. A rise in the index of a country then means that the country becomes relatively more corrupt.

⁸In the presence of market power, banks are encouraged to develop customer relationships while increasing the amount of credit offered. Boot (1997) adds that even if agents incur a higher interest rate, the amount of credit available is higher. Beck et al. (2004) reported on the negative effect of concentration of bank lending behavior. For a discussion on causes of corruption, see for instance Treisman(2000) or Svensson(2005).

(1987) developed the H-statistic which measures the elasticity of banks revenues relative to input prices. Under perfect competition, an increase in input prices raises both marginal costs and total revenues by the same amount, and hence the H-statistic equals 1. Under a monopoly, an increase in input prices results in a rise in marginal costs, a fall in output, and a decline in revenues, leading to an H-statistic less than or equal to 0. When H is between 0 and 1, the system operates under monopolistic competition. A negative sign of this variable is expected.

We must also consider the macroeconomic conditions and policies. Particularly, as suggested by Dell'Ariccia et al. (2006), credit behavior is procyclical. A high rate of economic growth will result in a higher growth rate of bank credit because in such a context banks tend to adopt a lax credit behavior. This is controlled by the logarithm of gross domestic production per capita. Inflation has also a role to play as pointed by Boyd et al. (2001). Demand for bank credit by firms reduces with inflation as higher inflation is related to lower productivity levels (Huybens and Smith, 1999). Inflation is defined as the consumer price index grow rate. A negative impact of this variable on the bank lending behavior is postulated.

Finally, interest rate in the model was included. Indeed, a recent strand of the literature consider that monetary policy may constrains the ability of banks to make new loans, making credit less available to borrowers who depend on bank financing.

Moreover, according to the lending view of bank credit channel of the monetary policy, the volume of new loans should decline and loans rate should rise relative to market rates when monetary policy is tightened.

Some studies use a short term interest rate such as treasury bill rate to measure policy action. Others use a record of dates of significant monetary policy actions developed by Romer and Romer(1989). In this study, monetary policy is measured by the first order difference in central bank intervention rate (TIAO) as it is reported to be highly correlated with the lending conditions of banks⁹. A positive value implies a contractionary monetary policy and a negative value an expansionary monetary policy adopted by the central bank. A lower interest rate due to expansionary monetary policy may have a positive effect on bank lending behavior. A negative relation between bank lending behavior and interest rate dynamics is expected.

Benchmark model and data

Based on the above discussion, to explore the impact of corruption on bank lending behavior, it is assumed that a bank lending response in country i at the time j can be represented as follows:

$$\text{Bank lending}_{ij} = a_0 + a_1 \text{corruption}_{ij} + a_2 \text{bank size}_{ij} + a_3 \text{competition}_{ij} \\ + a_4 \text{inflation}_{ij} + a_5 \text{capitalratio}_{ij} + a_6 \text{GDP}_{ij} + a_7 \text{interestrate}_{ij} + v_i + u_{it}$$

Where v_i is time invariant country specific effect and u_{it} is the idiosyncratic error.

The dataset used in this study is compiled from three main sources on the period 2010-2014: The world development indicators (inflation, GDP per capita), the international monetary fund database (interest rate) and the reports of the Banking Commission of Central Africa (COBAC) for banking variables. Table 3 identify data sources and provides descriptions and expected

⁹Bank lending rate may adjust asymmetrically to an increase or a decrease in monetary policy rate or money market rate for more on the effect of monetary policy see for instance (Leuvenn Steijn, Sorensen, Bikker and Van Rrexel(2013) (Leuven et al., 2013)

signs of key variables.

EMPIRICAL RESULTS

Specification tests and estimation

To perform estimations, the approach taken was followed, in most econometric analysis to convert variables into log forms to remove heteroskedicity from the analysis. panel regressions was implemented. But, to decide whether to use fixed or random effects should be considered. The Hausman test suggests the use of fixed effects because the regressors are correlated with time invariant country specific variables¹⁰.

The issue of endogeneity is limited as we do not observe bribing behavior at the individual level. Individual willingness to bribe is unlikely to affect the results. Moreover, countries were controlled for fixed effects and thereby remove all unobservable time invariant variables that can potentially contribute to reversing the causality between corruption and credit. The results of the panel regressions are shown in Table 4.

The most important finding is that corruption hampers bank credit behavior in CEMAC countries. As can be seen in the table, the coefficient of corruption is the negative and statistically significant at 5% level. The results suggest that, when corruption increases by 1%, the supply of credit to the economy by CEMAC's commercial banks decreases by 20%. The judicial system seems to be the mechanism through which corruption hinders loans in the area. This result confirms the findings of Weill (2011) for Russia and Anaere (2014) for sub-Saharan African countries and strongly supports this theoretical hypothesis that more corruption is associated with less private sector bank lending in CEMAC countries.

Also consistent with these predictions, the market structure contributes significantly to explain the studied phenomenon. The coefficient of competition is negative and statistically significant at 5% level. Furthermore, the level of economic activity (GDP) positively affects banks' lending behavior as expected. The estimate coefficient is statistically significant at 1% level. However, a significant relationship between Interest rates or inflation rate and bank lending behavior was not found. This can respectively be explained by the prevalent excess liquidity in the CEMAC's banking system that prevents commercial banks to depend on the central bank for credit operations and the rigidity of the franc CFA guarantee mechanism that maintain a relative stable and low inflation rate in the community.

Robustness tests

To test the robustness of findings, other various

¹⁰ Results of the Hausman test are presented in Annex 1

Table 3. Explanatory variables of the econometric model.

Explanatory variables	Symbols	Expected sign	Data sources
Corruption	Corruption	Negative	Transparency international
Monetary policy	Interest rate(first order difference)	Negative	IMF
Bank market structure	Competition	Negative	Author's calculations
Regulation	Capital ratio	Negative	Author's calculations
Economic activity	GDP	Positive	WDI
Inflation	Inflation	Negative	WDI
Bank size	Bank size	Negative	COBAC data

Table 4. Corruption and lending behavior of banks in CEMAC.

Explanatory variables	Coefficient	Standard error	T	Probability
Constant	6.352391***	1.338296	4.75	0.000
Regulation	0.5509406 ***	0.1294424	4.26	0.000
Monetary policy	0.364769	0.571674	0.64	0.526
Bank market structure	-0.2391474 **	0.1012601	-2.36	0.021
Corruption	-0.1900143 **	0.0923942	-2.06	0.044
GDP	0.8527611 ***	0.1989162	4.29	0.000
Inflation	-0.17016*	0.099558	-1.71	0.092
Bank size	-1.317038***	0.0884527	-14.89	0.000

Number of obs = 78 Number of groups = 6; R-sq: within = 0.7984 Obs per group: min = 13; between = 0.1777 avg = 13.0; overall = 0.4887 max = 13; F(5,67) = 53.05; corr(u_i, Xb) = -0.4375 Prob> F = 0.0000; sigma_u 1.2399345; sigma_e 0.6554244; rho .78160801 (fraction of variance due to u_i); F test that all u_i=0: F(5, 67) = 20.78 Prob> F = 0.0000; Source : Author; *Significant at 10 per cent level; **Significant at 5 per cent level; ***Significant at 1 per cent level.

Table 5. Corruption and bank credit relationship in other econometric specifications.

Dependent variable: bank credit	Random effects	Fixed effects with IV	PraisWinsten
Corruption	-0.167466*	-0.062024***	-0.172765**
	(0.085)	(0.006)	(0.030)
R square	0.2157	0.1111	0.2458

Source: Author ; P-value in parentheses ; *Significant at 10 per cent level ; **Significant at 5 per cent level ; ***Significant at 1 per cent level.

econometric methodologies were adopted to test if they will render consistent results.

Firstly, as suggested by Wooldridge (2010), fixed effect estimator can lead to imprecise estimates when the key variable in regressors do not vary much over time. In our estimation, the corruption is the key variable and it does not vary enough all over the period of interest (2010-2014). So, in spite of the result of the Hausman test, the estimation by the random effects estimator was also presented. The coefficient of corruption is still negative and significant.

Although endogeneity is limited, it was not possible to test it as the number of observations is insufficient to realize the endogeneity Hausman test. To check if results are consistent, instrumental variable (IV) estimator was

employed. This finding is still consistent with the negative and significant effect of corruption on bank lending behavior.

The Prais Winsten estimator which is the generalized least squares method when errors are assumed to follow an AR(1) process, was employed.

The coefficient of corruption is still negative and significant.

In Table 5, the coefficient of corruption in the different approaches was presented.

Conclusion

If the argument according to which corruption may

hamper bank credit shows that bank official exploits his power in loan granting by demanding a bribe in exchange, which increase the cost of loan, for a significant strand of the literature, corruption may also be beneficial for bank credit in some cases. The borrower may be inclined to give a bribe to the bank official to enhance his chances to obtain a loan. In such a case, corruption has a greasing effect on the bank credit behavior and by this mean, improves the financing of development needs.

This paper examines the role of corruption on bank lending behavior in the CEMAC countries. To reach this target, an explanatory model of commercial bank credit behavior in the CEMAC countries in which corruption is an argument was built beside a set of control variables. The model is estimated using panel regression techniques. To check the robustness of these findings, alternative econometric methods were used.

The results indicates that corruption does not have a greasing effect on CEMAC countries. There is evidence to support a sand effect of corruption on bank lending behavior in these countries. The study reveals that CEMAC's bank lending behavior is negatively and significantly affected by the prevailing corruption.

Consequently, monetary and banking authorities in this group of countries, if targeting an optimal financing of their economies, should pay attention to the creation of a safe institutional and contractual bank environment. Among reforms to be undertaken, rule of law relative to time required to adjudicate a case, number of cases on the docket and other measures of judicial effectiveness should go together with the necessary internal mobility of bank staff to prevent occurrence of corruption and create a friendly market financial environment.


As suggested by Djankov et al. (2007), information sharing can also play a significant role in decreasing the lending corruption. Private credit bureaus should then complete the existing public risk registry of the central bank of community countries to help alleviate the phenomenon.

Conflicts of Interests

The author has not declared any conflict of interests.

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