SOE’s vs private enterprises and the efficient management of credit risk in CEMAC

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Abstract. State owned-enterprises (SOEs) influence on CEMAC banking sector has grown considerably, with the potential of affecting both the banks and the private sector. This study aims to determine the influence of borrower’s nature on the improvement of credit risk in CEMAC Sub-region. The methodology used in the study consists of Data Envelopment Analysis and Tobit model. A panel dataset of the CEMAC countries from 2004 to 2014 is constructed from COBAC yearly reports, WDI and The Fraser Institute. The main findings from this research suggest that there is a negative and significant link between the tendency of CEMAC economies of using more private firms than SOEs investments and banking sector efficiency. The negative relationship is explained through weak CEMAC institutions. This study, unlike others studies on banking performances, do not neglect the risk’s particular effect. Indeed, the study even determined the risk-efficiency as the efficiency of the bank in producing healthy loans.

Keywords. Bank efficiency; Credit Risk; Public enterprises; Private enterprises.

JEL. G28, G14, J16, L33.

1. Introduction

While sub-Saharan frontier countries have recorded significant improvements into their per capita growth since 90s, CEMAC economies’ performances only have improved moderately (IMF, 2014). Issues like the weakness of business & governance climate, the infrastructure’s gap, the low total factor productivity and the weak structural competitiveness among others, seem to be behind this underperformance. Leading CEMAC Sub-region’s financial system unable to fund the economic development of the Sub-region (Hugon, 2007; Fouda, 2009). Indeed, the issue of CEMAC banking sector’s inefficiency has been considerably highlighted in by the literature; linking inefficiency to banking competition, off-balance sheet activities and governance (Bany, 2015; Ningaye, Madaha, & Nembot, 2014; Eloundou & Befen Djinja, 2016). But, these studies neglect the risk’s particular effect on CEMAC banking sector performances. Indeed, as argued by Clark (1996), removing risk

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factors can misguide the results of banks’ efficiency (Clark, 1996). And, the risk can be either come from private or state borrowers.

About that, the IMF (International Monetary Fund) explains that, because they are characterized by low bid-ask spreads and high turnovers, the developed Government bonds markets contribute to the reduction of the market risks. Moreover, they ease the use of government securities as collateral, not only for central bank operations, but also between market operators (IMF, 2014). About that, in 2013, the Treasuries of Cameroon, of Central African Republic and Gabon have started issuing Treasury and Government bonds, leading to some liquidity sterilization (CEMAC banking sector faces what literature call the excess liquidity paradox\(^2\)). Indeed, as the interest rates are not efficient, the conduct of the monetary policy relies on liquidity. But, CEMAC economy is exposed to external shocks and its banking system potentially exposed to liquidity shocks. Indeed, Governments expenditures depends on oil revenues, which in turn affects banks resources and liquidity (IMF, 2014). According to the IMF, the lack of suitable instruments for liquidity management, lead banks to hold excess reserves during positive liquidity shocks. Thus, the inefficient liquidity management from individual banks, the high risk due the climate of business, information asymmetry, and the lack of collaterals explain the high lending rates. Consequently, the banks inability of efficiently assess the risk from borrowers, collapse the credit granted to the private sector.

For instance, in Cameroon, the largest economy of the sub-region, banking system vulnerabilities are quite important (IMF, 2018). According to an IMF report, there are substantial disparities across Cameroonian banks on meeting the prudential ratios. Indeed, 4 banks (around 13% of total banks’ assets) are in distress; and, 3 of them even have negative capital. Together with declining economic activity, this have contributed to condense the private sector growth; Indeed, the latter has declined from 14 to 2% per year between 2014 and 2018 (IMF, 2018). Such a negative situation of banks is linked with some State-owned enterprises’ (SOEs)\(^3\) situation. Indeed, the financial situations of SOEs have considerably been deteriorated during the recent CEMAC economic recession. 8 of the 12 biggest State-owned companies have experienced net losses in 2016; 2 of them, including SONARA (an oil-refinery Cameroonian SOE), even have negative capital. Moreover, SOEs’ value added ratio to GDP has declined by 29%, driven by CAMTEL (a telecommunication Cameroonian SOE),

\(^2\) The paradox of credit rationing with excess of liquidity is caused by, *ceteris paribus*, the lack of reliable information on borrowers (Avom & Eyeffa Ekomo, 2007). This paradox lead to inefficient monetary policy and the inefficiency of banking sector as bank cannot optimally allocate funds.

\(^3\) Indeed, SOEs in Cameroon play a key role in the economy despite a share of less than 1% of the GDP. SOEs hold monopolies in key sectors of the economy including energy, telecommunication, water, and crop farming export (International Monetary Fund, Cameroon, 2018).

State owned-enterprises influence on CEMAC banking sector has grown considerably. In Cameroon, SOEs' arrears have been increasing with the potential of affecting both the government and the private sector. From IMF reports, SOEs' arrears have almost doubled since 2013, so as to reach 3.4% of GDP (compared to 1.8% of GDP in the past years); they are driven by SONARA (53%) and CAMTEL (13%). Indeed, SONARA is the main driver of Cameroonian banking system's risks. The latter accounts for 65% of SOEs' deposits and 62% of SOEs' credits, according to the IMF. And, among the 6 banks that have a positive net exposure to SONARA: one bank has negative capital, three banks will fail to meet minimum capital requirement if SONARA defaults, and two banks will lose around 50 to 85% of their respective excess capital (IMF, 2018).

So, are State owned-enterprises in CEMAC Sub-region riskier to fund by banks than private enterprises?

2. Related literature

2.1. Bank efficiency and credit risk

Economic literature goes both ways. An older view supports that measures taken by authorities and regulators are an important factor in improving the positive relationship between capital adequacy, credit risk management and bank efficiency (Aggarwal & Jacques, 1998; Jacques & Nigro, 1997; Shrieves & Dahl, 1992). The other side of the relationship places a special emphasis on the link between banks and their customers. Indeed, the quality of the credit granted to customers is crucial for banks (Arriaga & Miranda, 2009). Arriaga & Miranda (2009) have explained that the risk indicators used by banks, whether qualitative or quantitative, help to increase efficiency and reduce non-performing loans. Therefore, according to the latter, the problem is whether the risk assessment affects the efficiency of the banking sector or whether it affects the customer relationship of the bank.

About that, the economic literature will not last long before providing some key element of answer. Indeed, the recent cases of bank failures in several countries have been largely attributed to the rise in toxic assets in the commercial bank loan portfolio (Onaolapo, 2012). The latter suggest that there is a minimal causal link between deposit exposure (credit risk substitution management) and bank performance, but with a high dependence on operational efficiency parameters. The operational efficiency of banks is therefore essential to the proper functioning of the economy. Indeed, commercial banks play an important role as financial

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4 This information comes from IMF reports.

5 According to the IMF, SOEs affect the financial sector through several channels: (i) directly in the form deposits and loans; (ii) through their fiscal relations with the government (taxes, subsidies, and contingent liabilities), and SOEs arrears accumulated towards their suppliers.
intermediaries for savers and borrowers in an economy. All sectors depend on the banking sector for their resilience and development (Odunga, Nyangweso, Carter, & Mwarumba, 2013). This operational efficiency of banks results from credit risk and capital adequacy measures (Odunga, Nyangweso, Carter, & Mwarumba, 2013). One of the direct implications will be that the history of a company’s performance will influence how a company develops itself, in order to streamline their operational strategies. Thus, according to Odunga, Nyangweso, Carter, & Mwarumba (2013), banks must seek mechanisms in order to improve their risk-based capital ratio in the way of improving their efficiency.

Others researches integrate credit risk in order to monitor bank efficiency, by using a by-production approach. They reach the conclusion that, although the fact that banks usually exhibited efficiency improvements over time, their credit risk performances on the other side can go declining (Salim, Arjomandi, & Dakpo, 2017). Considering this, Salim, Arjomandi, & Dakpo (2017) suggest that bank’s credit quality can be better monitored across Iranian banks. Not very far from Iran, in China, Yong & Christos (2018) have investigated the interrelationships among banking risk, competition, and efficiency. They have found that Chinese commercial banks that record the higher efficiency scores have higher credit risk and insolvency risk, but lower liquidity risk and capital risk. They argue that greater competition decreases credit risk and insolvency risk, but increases liquidity risk. Moreover, credit risk and insolvency risk are significantly and positively related to efficiency, while liquidity risk and capital risk are significantly and negatively related (Yong & Christos, 2018). One could think that risk do not have the same cultural meaning in Middle East than in the rest of the world. But, on the other side of the relationship, non-performing loan (leading to the increase of the credit risk) is a significant predictor of bank’s bankruptcy and, this is a major cause of financial weakness all over the world (Koju, Koju, & Wang, 2018). Indeed, an increase in loan percentage over the total assets does not automatically lead to an increase in non-performing loans. In fact, Koju, Koju, & Wang (2018) suggest that in India, high capital requirements and large bank size do not reduce default risk, however high profitability and strong income diversification policies lower the likelihood of default risk. Thus, the credit quality in the banking industry is mostly driven by profitability, banking supervision, high credit standards and strong investment strategies (Koju, Koju, & Wang, 2018).

2.1.1. Public vs private firms financing

The economic literature around the issue of access to finance differences between private and public enterprises is not well documented. However, a closer issue, the private vs. public financing of companies is sufficiently documented. Work in this area can be traced back to Sharp (1951). But long before this debate, there is another, much more controversial. Indeed, privatization in developing countries is provoking much controversy. A debate around this topic is born, and can be summed up by the following
question: what is the most important factor for business performance, is it competition or private property? This question gives rise to the following one: Do state-owned enterprises suffer more from corporate governance issues? As Shirley & Walsh (2000) explain, the answers to these questions are in favour of corporate private ownership. In most cases, empirical research strongly favours private ownership in competitive markets over a state-owned counterfactual scenario. In addition, the choice governments face is choosing between keeping or privatizing, rather than between privatization and optimality (Shirley & Walsh, 2000). Thus, factors like quality in the governance of companies can be at the origin of their constraints of access to financing.

In this regard, the table below presents some differences that exist in the governance of state-owned enterprises Vs. private enterprises.

<table>
<thead>
<tr>
<th>Governance</th>
<th>Private Sector</th>
<th>Public Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation</td>
<td>Corporations Act</td>
<td>Statutory legislation</td>
</tr>
<tr>
<td></td>
<td>Regulator and regulated</td>
<td></td>
</tr>
<tr>
<td>Agents</td>
<td>For Shareholders</td>
<td>For Public</td>
</tr>
<tr>
<td>Objectives</td>
<td>Profit</td>
<td>Public good</td>
</tr>
<tr>
<td>Authority</td>
<td>Board</td>
<td>Government Minister/s Department Board</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Legal Responsibility of board</td>
<td>Responsibility diffused</td>
</tr>
<tr>
<td>Independence</td>
<td>Legal Independence of board Selection and appointment of members</td>
<td>Ministerial control</td>
</tr>
<tr>
<td>Accountability</td>
<td>To Shareholders</td>
<td>Diffuse</td>
</tr>
<tr>
<td>Reporting</td>
<td>Annual Report to shareholders</td>
<td>Ministers Parliament Auditor general Agency Heads Treasury and Finance</td>
</tr>
</tbody>
</table>

Source: Author from literature and Armstrong, Jia, & Totikidis (2005).

Differences between state and private enterprises in governance may explain some differences in the sources of financing for these firms. Cull & Xu (2003) focus on the factors that determine the sources of business investment financing, such as retained earnings, bank financing and government transfers. They explain that direct government transfers are not significantly associated with business profitability. In contrast, bank financing is positively related to profitability and reforms. Indeed, the reforms that allowed managers to self-select and expose themselves to higher risk are positively associated with the acquisition of bank funding (Cull & Xu, 2003). Although, private firms are smaller, opaquer in terms of information, riskier and more dependent on commercial credit and bank loans than state-owned enterprises (Dierkes, Erner, Langer, & Norden, 2013).
Financing private companies receives fewer attention from researchers because of lack of data. Huynh, Paligorova, & Petrunia (2013) argue that debt ratios are lower for state owned-enterprises (SOEs) and the difference is almost entirely due to the greater reliance of private firms on short-term debt. The authors explain that debt financing by private and public firms responds differently to industry shocks. In periods of positive industrial shocks, private firms rely more on long-term debt than public enterprises; Meanwhile, state-owned enterprises are making more use of short-term debt when conditions in the sector deteriorate (Huynh, Paligorova, & Petrunia, 2013).

There are also differences in the distribution of cash flows between private enterprises and public enterprises. According to Drobetz, Janzen, & Meier (2016), public enterprises are much more sensitive to investment than private companies. A rather rare fact, indeed, the authors suggest that the differences in sensitivity between investments and cash flow are not due to the stricter financial constraints imposed on public companies (Western European Companies). Instead, they suggest an agency-based explanation, as they believe that differences in the sensitivity of investments to cash flow can only be observed for the unexpected part of business cash flows. But, it should be noted that these findings are based on low-ownership country companies and liquid equity markets, where shareholders have less incentive to monitor executives and instead sell their shares in case of dissatisfaction (Drobetz, Janzen, & Meier, 2016). Findings difficult to accept in a context like the one of CEMAC economies where stock markets are gloomy. Stock market seems to have a significant contribution on that debate, but out of African countries. Acharya & Xu (2017) explain that SOEs in the external finance industries spend more on research and development and generate a better patent portfolio than their private counterparts (United States Firms). However, public enterprises in industries that depend on internal finance do not show a better innovation profile than private companies (Acharya & Xu, 2017).

### 3. Methodology

#### 3.1. Data envelopment analysis

Due to the objective of this study, the orientation chosen to measure technical efficiency is the output orientation and the intermediation approach. About that, economic literature argues that services provided to the debtors of financial institutions are the appropriate concept of output in the process of decision making (Sealey & Lindley, 1977).

As CEMAC banks are not working in an optimal scale, the study chooses VRS (Variable Return to Scale) instead of CRS (Constant Return to Scale). Anyway, as explained by Berger & Humphrey (1997), there is no consensus on the preferred method for determining the best-practice frontier in order to measure the relative efficiencies.

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The model is derived in order to determine the efficiency of CEMAC Sub-region banks when the objective is to produce Healthy Loans instead of just producing Gross Loans. Healthy loans at the time (t) for the bank (i) are Gross Loans at the time (t) for the bank (i) minus unrecovered loans for the same DMU at the same period.

Inputs: Deposits, Labour expenses, and General expenses;
Outputs: Healthy loans.

The mathematical model to solve is, therefore, the following one:

\[
\begin{align*}
\text{Max} & \left( \frac{\beta_1 \cdot \text{Healthy Loans}_{it}}{\beta_1 \cdot \text{Healthy Loans}_{it}} \right) \\
\text{Subject to:} & \quad \sum (a_1 \cdot \text{Deposits}_{it} + a_2 \cdot \text{Labour Exp}_{it} + a_3 \cdot \text{General Exp}_{it}) \\
& \quad \sum (\alpha_1 \cdot \text{Deposits}_{it} + \alpha_2 \cdot \text{Labour Exp}_{it} + \alpha_3 \cdot \text{General Exp}_{it}) \leq 1
\end{align*}
\]

With \( i \in [1; 6] \) for the CEMAC countries;
With \( \sum \alpha_k = 1 \): input weight and \( \sum \beta_k = 1 \): output weigh;
With \( t \in [2004; 2014] \) for the years, the study’s data cover.

3.2. Tobit model
The specification of the Tobit model is presented as follows:

\[ y^*_{it} = \sum_{k=1}^{K} x_{it_k} \cdot \beta_k + \epsilon_{it} \]

Where \( k \) is the number of independent variables.

- **Dependent variable:**
  Bank Risk-Efficiency scores, computed with the Data Envelopment Analysis method. The data used to compute those efficiency scores come from COBAC yearly reports.

- **Independent variables:**
  The independent variables are constituted of both external determinants (Macroeconomic aspect) and internal determinants (Microeconomic aspect) of banking performance. The description of those variables is given into the following Table 2:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Micro-Economic Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Gap α</td>
<td>The variable Gap α is computed from the data obtained in COBAC yearly reports. The objective of this variable is to measure the influence of removing the adverse selection-based risk that is the ratio Net Loans to Gross loans. $\text{Gap} , \alpha = 1 - (\text{Net Loans}/\text{Gross Loans})$</td>
</tr>
<tr>
<td>Risk β</td>
<td>The variable Risk β is made to determine the influence of a moral hazard-based risk on banks efficiency. Below is how it is computed: $\text{Risk} , \beta = \text{Net Provisions}/\text{Gross Loans}$</td>
</tr>
<tr>
<td>Banking Sector Size</td>
<td>The variable Banking Sector Size measures the number of banks operating in each CEMAC countries over time. Data are from COBAC yearly reports.</td>
</tr>
<tr>
<td>Equity to Asset Ratio</td>
<td>The variable is computed from COBAC annuals report as the ratio of aggregated bank equity to the total balance sheet.</td>
</tr>
</tbody>
</table>
Public Credit Registries are a measure of information asymmetry on financial markets. The study uses public instead of private credit bureaus as there is no private credit bureau in CEMAC up to 2017. Another reason is as on (Djankov, McLiesh, & Shleifer, 2007): public credit bureaus is a feature of French civil law countries.

As lending interest rates were not available over the period of study for the selected countries, the study chooses Deposit Interest rate to measure the influence of interest rates. Deposit interest rate is as defined on WDI: the rate paid by commercial or similar banks for demand, time, or savings deposits.

The index measures the degree of economic freedom of each country. It focuses on five key aspects of the economic environment over which governments typically exercise policy control: the size of government; the legal system and security of property rights; the sound money; the freedom to trade internationally; and the regulation. The higher the value of the index, the higher the economic freedom and the lower the burden of institutions. This variable is useful to control the influence of institutions, and indirectly the influence of information asymmetry. The variable comes from The Fraser Institute.

The variable provides evidence on the extent to which the banking industry is privately owned. According to Iannota, Nocera & Sironi (2007), public banks are less efficient than private ones.

Self-employment is a relatively practical measure when it comes to measuring entrepreneurship in SSA countries. The lack of data imposes to exclude the use of indicators such as those from the Global Entrepreneurship Monitor or Global Entrepreneurship Development Institute. The choice of this variable is inspired from Nyström (2008), who uses it to investigate the institutional determinants of entrepreneurship OECD countries. The variable comes from the WDI.

The female self-employment is the share of female self-employment over the total female employment. Indeed, self-employed is defined as: the workers who are working on their own account, with a several partners or cooperative. Variable extracted from the WDI.

The male self-employment is the percentage of male self-employed over the total male employed. The data also come from the WDI.

The variable Gender is the difference between male self-employment and female employment.

The variable comes from The Fraser Institute Database. It measures the extent to which countries use private investment and firms rather than government investment and enterprises. The idea is that, state-owned enterprises play by rules that are different from those to which private enterprises are exposed. The variable increases when countries use more of private firms than government investments or state-owned firms.

# Variables for Borrower’s nature

<table>
<thead>
<tr>
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</tr>
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* The data are not available over time when it comes to African countries. In addition, not all the CEMAC countries are represented over each indicator in most databases.
3.3. Data

The data cover 6 CEMAC countries (Cameroon, Central African Republic, Congo, Gabon, Equatorial Guinea & Chad) and comes from COBAC\(^7\), yearly reports from 2004 to 2014, The Fraser Institute database and the World Development Indicator database (WDI\(^8\)).

DEA model variables come from aggregate countries’ banking sector financial statements. As of December 31, 2014, the CEMAC banking system has 50 operating banks: 13 in Cameroon, 4 in Central African Republic, 10 in Congo, 10 in Gabon, 5 in Equatorial Guinea and 8 in Chad (COBAC, 2014).

4. Results and discussion

4.1. CEMAC banking sectors need state-owned enterprises to improve their risk-efficiency

An unexpected result! This study revealed the existence of a negative and significant link between the strong absence of state-owned enterprises and the level of risk-efficiency of the CEMAC banking sectors. The variable is labelled “Government enterprises” and measures the extent to which CEMAC countries use private investment and firms rather than government investment and enterprises. An institutional variable that increases when the countries use more of private firms than government investments or state-owned firms. The results are presented in the Table 3 below:

| Bank risk-efficiency                      | Coef.  | Std. Err. | z     | P>|z|   | [95% Conf. Interval] |
|------------------------------------------|--------|-----------|-------|-------|---------------------|
| Self-employment                          | 0,0066*** | 0,001     | 4,99  | 0,000 | 0,004               | 0,009               |
| Gap α                                     | 0,4824 | 0,351     | 1,38  | 0,169 | -0,205              | 1,170               |
| Risk β                                    | -2,3861** | 1,050     | -2,27 | 0,023 | -4,444              | -0,328              |
| Equity to Asset ratio                    | 2,1951*** | 0,459     | 4,78  | 0,000 | 1,296               | 3,095               |
| Public credit registry                   | 0,0093*** | 0,001     | 6,6   | 0,000 | 0,007               | 0,012               |
| Economic Freedom Index                   | 0,2488*** | 0,087     | 2,85  | 0,004 | 0,078               | 0,420               |
| Government enterprises                   | -0,0285*** | 0,010     | -2,92 | 0,004 | -0,048              | -0,009              |
| Legal System & Property Rights           | 0,0319 | 0,033     | 0,96  | 0,337 | -0,033              | 0,097               |
| State ownership of banks                 | 0,0173 | 0,018     | 0,96  | 0,339 | -0,018              | 0,053               |
| Private sector credit controls           | -0,0122 | 0,008     | -1,56 | 0,119 | -0,028              | 0,003               |
| Interest rate controls                   | 0,0274 | 0,030     | 0,92  | 0,356 | -0,031              | 0,086               |
| _cons                                    | -1,4459*** | 0,392     | -3,69 | 0,000 | -2,213              | -0,678              |
| /sigma_u                                 | 9,7E-07 | 898,71    | 0     | 1,000 | -1761,4             | 1761,4              |
| /sigma_e                                 | 8,0E-02*** | 0,013     | 6     | 0,000 | 0,054               | 0,106               |
| rho                                      | 1,5E-10 | 0,272     | 0     | 1     | 1                   |                    |

Wald chi2(11) = 209,63
Log likelihood = 59,635
Prob > chi2 = 0,000

Source: Author from Stata software

\(^7\) Banking Commission of Central Africa.
\(^8\) Depending on the availability of the data.

The reasons that may explain this result are not exhaustive. The main one is that the weak institutional context marked by the prevalence of information asymmetry between private companies and banks makes the state-owned companies much more secure to finance. Indeed, the majority of enterprises in the CEMAC Sub-region are informal and operate in an environment where information asymmetry is high. It is therefore more profitable and less risky for banks to lend to the state than to private companies.

Moreover, it is known that states rarely go bankrupt. Indeed, about public financing, the risk-bearing is transferred to the tax-payer (Sharp, 1951). Lending to the state or to its companies would therefore reduce the risk of having unpaid debts. This would help increase the risk-efficiency of banks, and, not having the opportunity to lend to the state would represent a shortfall for the banks. This is why the strong presence of state-owned enterprises improve the risk-efficiency of CEMAC banks.

Why to encourage the presence of state enterprises in the credit market when the majority of the literature is opposed to? In this regard, Keynes speaks of the possibility of eviction effect following a strong presence of state investments. He explains that private businesses may lack funding due to eviction. As response, in the CEMAC sub-region, companies are already short of funding and yet the banks are in excess of liquidity (Avom & Eyeffa Ekomo, 2007). In addition, the context of sub-Saharan African countries is a context in which the asymmetry of information creates distortions in the markets, as economic theory explains for the whole markets (Akerlof, 1970).

Therefore, this study finding does not encourage the presence of state’s owned enterprises in the whole world, in Europe or America, but this study finding does encourage the presence of state’s owned enterprises in CEMAC sub-region. Indeed, State investment are still extremely needed in CEMAC. About that, a report from the International Monetary Fund (IMF) states that like in most of sub-Saharan Africa, the infrastructure gap in the CEMAC Sub-region remains large. From the World Bank’s Africa Infrastructure Country Diagnostic estimates, USD 93 billion of spending per year in public infrastructure was needed from 2005 to 2015 for sub-Saharan Africa to fill its infrastructure gap. In most of CEMAC Sub-region, even basic infrastructure needs remain unmet according to the IMF. Moreover, around USD 6 billion per year till 2025 would be needed to meet basic infrastructure requirements in CEMAC countries (IMF, 2014).

4.2. Robustness of the relationship

Even by controlling the effect of our variables of interest by multiple other variables used in the literature, the initial hypothesis is still confirmed. That is the case of the banking sector size and the level of interest rate. Including CEMAC banking sectors’ sizes do not remove the significance of Government enterprises’ influence on banking risk-efficiency. Indeed, the results presented in the above table are closed to the
economic though suggesting that the size of the banking sector has a positive impact on performance (Short, 1979). This study shows that CEMAC banking sector size has a positive and significant influence on CEMAC banking sector efficiency. This, without hampering the link between the nature of borrowers and the bank risk-efficiency.

| Table 4. Robustness of the results of Tobit model estimation for bank risk-efficiency |
|---------------------------------------------|-----------------|-----------------|-----------------|
| Bank risk-efficiency                       | Coef.           | Std. Err.       | P>|z|   |
|                                             | Model 1         | Model 2         | Model 3         |
| Self-employment                            | 0.0040***       | 0.007           | 0.003           |
| Female Self-employment                      | 0.0034***       | 0.002           | 0.003           |
| Male Self-employment                        | 0.0042***       | 0.001           | 0.003           |
| Gap α                                       | 1.1644***       | 0.381           | 0.002           |
| Risk β                                      | -3.5674***      | 1.020           | 0.000           |
| Equity to Asset ratio                       | 2.4495***       | 0.446           | 0.000           |
| Public credit registry                       | 0.0076***       | 0.001           | 0.000           |
| Economic Freedom Index                      | 0.1435          | 0.086           | 0.094           |
| Government enterprises                      | -0.0200**       | 0.009           | 0.033           |
| Legal System & Property Rights              | 0.0052          | 0.033           | 0.087           |
| State ownership of banks                    | 0.0057          | 0.017           | 0.064           |
| Private sector credit controls              | -0.0164**       | 0.007           | 0.024           |
| Interest rate controls                      | 0.0106          | 0.028           | 0.070           |
| Interest Rate                               | -0.0464**       | 0.019           | 0.014           |
| Size of banking sector                      | 0.0210**        | 0.008           | 0.011           |
| _cons                                       | -0.4750         | 0.462           | 0.304           |
| /sigma_u                                    | 0.0000          | 97.480          | 1.000           |
| /sigma_e                                    | 0.0730***       | 0.012           | 0.000           |
| rho                                         | 0.0000          | 0.272           | 0.272           |
| Wald chi2(11)=                              | 263.9           | 252.22          | 272.85          |
| Log likelihood =                            | 64,690001       | 63,678773       | 65,438995       |
| Prob > chi2 =                               | 0.0000          | 0.0000          | 0.0000          |

Source: Author from Stata software

It's the same for the interest rate control. Indeed, the economic literature suggests that in some countries, interest rates negatively affect the profitability of banks (Afzal, Raja, Imran, & Saima, 2018). This is also the case of this study for CEMAC countries. An influence that, like the previous one, is not detrimental to the link between the nature of the borrower and the efficiency of the banking system in CEMAC Sub-region.

The fact that the gender difference in entrepreneurship does not affect credit risk management does not mean that entrepreneurship does not affect credit risk management. The self-employment variable shows it enough. Indeed, the variable has a positive and significant influence on banking risk-efficiency. Moreover, an environment marked by the presence of female entrepreneurs improves efficiency in credit risk management; It is the same for an environment where there is male entrepreneurship. Although the effect of male entrepreneurship seems to be slightly higher than female, as might be expected from a part of the theory (Loscocco & Robinson, 1991), there is no significant gender gap in the efficient management of credit risk in CEMAC on the period of study. As Male entrepreneurship, female's entrepreneurship does contribute to improve the efficient management of credit risk in CEMAC. Therefore, women

entrepreneurs should not have their credit application rejected because of their gender.

5. Conclusion

State owned-enterprises influence on CEMAC banking sector has grown considerably. In some countries of the Sub-region, SOEs’ arrears have been increasing with the potential of affecting both the government and the private sector. SONARA, one of the biggest SOE of the biggest Economy of the Sub-Region is the main driver of the latter’s banking system risks. Among the 6 banks that have a positive net exposure to SONARA: one bank has negative capital, three banks will fail to meet minimum capital requirement if SONARA defaults, and two banks will lose around 50 to 85% of their respective excess capital. This is one of the two factors that motivate the investigation of the influence of some borrower’s nature on the efficient management of credit risk in CEMAC Sub-region.

The study focuses itself on 2 types of borrowers’ nature influence on banking risk-efficiency management: The public borrower (through the prevalence of State-owned enterprises and investments) and private borrower (through private entrepreneurship).

The methodology used in the study consists of Data Envelopment Analysis and Tobit model. On the first hand, the DEA method is used to compute the risk-efficiency scores of CEMAC banking sectors. The data are on a panel basis: The overall 6 CEMAC countries and from 2004 to 2014, depending on the availability of the data source. Indeed, they are constituted from end of year’s COBAC reports. On the other hand, the Tobit model is used to find the influence of borrowers’ nature on bank risk-efficiency through the linear regression model with panel-level random effects. The data comes from WDI and The Fraser Institute.

The main findings from this research suggest that there is a negative and significant link between the tendency of CEMAC economies of using more private firms than SOEs or investments and banking sector efficiency. Therefore, the nature of the borrower as private or public firm matters.

But, the negative sign of the influence is quite unusual. The reasons behind this can be found into the institutional environment and the state of public infrastructures. Indeed, the weak institutional context marked by the prevalence of information asymmetry between private companies and banks makes the state-owned companies much more secure to finance. Moreover, the majority of enterprises in the CEMAC Sub-region are informal and operate in an environment where information asymmetry is high. It is therefore more profitable and less risky for banks to lend to the state than to private companies. Lending to the state (buying state’s bonds and others) or to its firms would therefore reduce the risk of having unpaid debts. This would help increase the risk-efficiency of banks, and, not having the opportunity to lend to the state would represent a shortfall for the banks. This is why the strong presence of state-owned enterprises improve the risk-efficiency of CEMAC banks. Therefore, this study finding

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does not encourage the presence of state’s owned enterprises in the whole world, in Europe or America, but this study finding does encourage the presence of state’s owned enterprises in CEMAC sub-region where there is still a huge need of infrastructures.

The study recommends to CEMAC authorities to harmonize credit policies such as reserve requirements across the Sub-region. Indeed, as suggested by IMF, harmonizing the reserves requirements may definitely lead to progress in the regional money market growth, and the ability of the BEAC to effectively manage the overall liquidity issues in the sub-region. Another recommendation is to encourage CEMAC government bond issues to finance infrastructure projects. Direct loans to SOEs must be carefully monitored. Indeed, even if they are more profitable and less risky, an exogenous shock could cause considerable damage to the banking system.

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References


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