

DOES THE EVOLUTION OF PRUDENTIAL STANDARDS AFFECT THE RISK OF NON-COMPLIANCE BANKS IN CEMAC COUNTRIES?

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The Great Financial Crisis of 2007-2008 led to a significant increase in the number of regulations and the likelihood of compliance risk as well as the fines said risk sanctions. Now, the prospect of a bank or management company going bankrupt as a result of such an event is being seriously considered. In response to the various banking crises, the international community, through the Basel Committee, has regularly adapted the rules of banking supervision. The main goal is to ensure the stability of the banking system as a global public asset through effective supervision of banks and promotion of mutually beneficial cooperation between supervisors (Lasserre, 2010). However, there remains the risk for banks of not being compliant with these prudential rules. Such compliance risk is defined as a failure to comply with regulatory standards applicable to banking and financial activities, including those relating to the prevention of money

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laundering and terrorist financing but also as a failure to comply with professional and ethical standards and practices (Martin, 2000).

The adaptation of banking supervision rules internationally has taken place since 1988 through three agreements. The 1st Basel I Accord, known as the “Cooke” ratio, was published in 1988. It proportions the risks to which the bank is exposed to the amount of capital it can mobilise to meet its commitments to its creditors (Hugon *et al.*, 2009). The quick evolution of techniques and changes in banking systems, and the incentive for regulatory arbitrage undermined the effectiveness of Basel I as a reliable indicator of solvency. Thus, in 2004, the Basel Committee adopted Basel II, known as the “McDonough” ratio. It is based on minimum capital requirement, a supervisory review process and the implementation of market discipline. With the GFC, the weaknesses of Basel II became apparent as banks proved unable to cope with recurring shocks, leading the Basel Committee to issue the Basel III Accord in 2010, which compels the regulatory framework to remain focused on a risk-based capital requirement system with liquidity and leverage ratio indicators (Hache, 2012). The monetary authorities were given the opportunity to adapt it to different contexts, taking into account the evolution of the banking system (Aglietta, 2011).

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In the CEMAC (Central African Economic and Monetary Community)¹, alignment with the international prudential framework coincided with the reforms implemented in response to the financial crisis of the 1980s and 1990s (Avom *et al.*, 2007). Reforms included a complete overhaul of the regulatory framework, as well as supervisory tools. The new regulatory framework combined with internal control should have an effective impact on business, competition, deposits and credit supply, but also on the solvency and organisation of banks (Dietsch, 2005). These reforms came with a rationing of the credit supply despite the growing financing needs of agents – mainly SMEs/SMIs that depend on bank lending (Bikai *et al.*, 2019).

As of 30 June 2019, CEMAC countries comprised 50 banks, 32 of which were in compliance with the requirements for minimum capital representation. In terms of solvency, 41 had a net capital-to-risk weighted assets ratio equal to or greater than the minimum of 8%. Under the risk-splitting standards, 41 met the overall limit of 15% of capital, while 31 met the limit of 45% of net capital. Regarding the coverage of fixed assets by permanent capital, 40 achieved a ratio greater than or equal to the minimum of 100%. Regarding the liquidity ratio, cash and cash equivalents are greater than or equal to the regulatory minimum of 100% of the same term liabilities for 43. As for compliance with the long-term transformation coefficient (net table

funding ratio), 39 managed to finance at least 50% of their needs with permanent capital. Finally, 35 kept the sum of liabilities to their shareholders, directors and officers, and staff below the regulatory limit of 15% of net capital (BEAC, 2019).

Despite the overall compliance of CEMAC banks with regulatory requirements, this system has led to unintended consequences (Larosière *et al.*, 2009). For example, the multiplicity of constraints and their parameterisation will lead, even after the adaptation and transition period, to an increase in the cost of credit, and to a contraction of supply with increased competition. This increased competition reduces financial margins, leads to a decrease in statutory value and an increase in risk-taking. Two criticisms are associated with developments in banking regulation and supervision (Combe *et al.*, 2013). On the one hand, the accounting framework is considered to be procyclical, as it increases the variability of balance sheets and results, which change with business cycles. Moreover, it is not very readable and thus requires explanations (elimination of general provisions, generalised recognition of unrealised capital gains, including on models), while strongly accentuating leverage. On the other hand, the prudential system appears to be extremely complex, cumbersome to audit, and favours the capital of large banks (the riskiest in systemic terms), thus guaranteeing self-regulation, especially for large banks (Leroy, 2013).

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The environment in which CEMAC banks operate requires them to master an increasing number of techniques and regulations and to implement an increasingly rigorous risk management policy (Italianer, 2010). Indeed, there has been a diversification of banking activities, an increase in the range of banking products, a development of complex operations and an intensification of competition between banks, which has resulted in increased profitability constraints. Overall, CEMAC banks have seen their risks increase and diversify within evolving legal frameworks (Avom *et al.*, 2017). This trend implies a very high level of vigilance on the compliance of their operations, where disintermediation is encouraged by the regulations themselves (Frison-Roche, 2013).

This article focuses on compliance risk. More specifically, it examines the possible orientations of this risk to better understand, measure, control and limit its impact. First, it reviews, in the light of the work carried out within the Basel Committee and examples of specific regulations recently drawn up in the CEMAC, the envisaged methods of regulating the control of compliance risk. It then recalls the CEMAC regulatory cornerstone from which the control of compliance risk can already be exercised. Finally, with a view to strengthening internal control, it attempts to define several suggestions for reflection on the ways in which such control could be structured.

The prudential rules in force in the CEMAC are based on Basel I and Basel II requirements. However, neither the 8% threshold of the Cooke ratio, nor the definition of capital in the McDonough ratio, nor risk-weighted assets were chosen according to the regional banking environment. More than twenty years have already passed since the implementation of these reforms, and it is appropriate to objectively question the perverse effects on the region's prudential system. To what extent does the international capital standard promote banking competition in the CEMAC? What is the effect of prudential ratios on the level of compliance risk of CEMAC banks? This article attempts, through empirical investigations, to provide answers to these important questions. As far as we know, few studies have examined the perverse effects of banking regulation in this space. One of the main objectives is to address this shortcoming and to conclude on the factors that could lead to cyclical variations of capital requirements in CEMAC.

After this introduction, the rest of the study is organised as follows: Part 1 presents an overview of the state of the art. Part 2 presents the empirical strategy. Part 3 discusses the results, while part 4 concludes and suggests a few recommendations.

SUMMARY OF THE STATE OF THE ART

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It is not our ambition to provide an exhaustive review of the abundant literature on the determinants of compliance risk for banks. We will limit ourselves to a very brief discussion of three main determinants which are decisional, financial and regulatory.

Decision-making determinants

They encompass the set of institutional constraints that limit the competitive dynamics driven by market forces and reduce banks' interest margins during periods of excessive credit growth (Shekhar *et al.*, 2012). These constraints stem mainly from the unification of the legal framework, the abolition of compulsory uses, the lifting of credit control, the gradual liberalisation of interest rates, the stimulation of the money market and the strengthening of prudential rules. Indeed, a number of parameters are at the discretion of banking supervisors, including the risk measurement model used by each financial institution (Borio, 2009). This 'freedom' appears to be counterproductive as it potentially subjects supervisors to political pressure and disgruntled shareholders. This is why Rochet (2010) is concerned about the Basel Committee's difficulty in identifying the endogeneity of banking and financial risks resulting from the decisions of agents, which are not incorporated by the Basel Committee on Banking Supervision (BCBS). These criticisms are compounded by the BCBS's long-

standing and much-maligned inability to anticipate and take account of the increasing complexity of financial instruments.

Bonneau (2010) also notes the difficulties of the Basel Committee in taking financial innovations into account. This limitation is directly attributed to the prudential authorities which allow financial institutions to introduce new techniques directly at the heart of the financial system. These new techniques, the shortcomings of which are largely unknown, maintain a particular cycle that Leroy (2013) summarises as innovation - buzz - panic - overregulation. Indeed, banking supervision as part of risk management and the role of central banks as lenders of last resort contribute strongly to the risk of moral hazard. Supporters of Adam Smith's invisible hand criticise government intervention as it encourages risk-taking by financial institutions, which are guaranteed public relief if they run into trouble. This approach, which has been heavily criticised, is quickly confronted with the problem of systemically important financial institutions (SIFIs). These too-big-to-fail institutions play a very important role in new regulations. The SIFIs, which include TBTF (*too big to fail*) and LCBOs (*large and complex banking organisations*), were assured at G20 summits of unconditional and systematic public support in case of default. Hache (2010) argues that this support, "even if it were justified *ex post*, was catastrophic in terms of moral hazard and market discipline".

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Financial determinants

The financial determinants of banks' non-compliance are largely due to the inability to physically isolate the production of certain services or the performance of certain duties, or to the existence of 'connected' products, the implementation of which is inseparable (Repullo, 2004). Such productivity is seen in terms of financial development, which is measured by the volume of loans granted (Fouda Owoundi, 2009). These constraints stem mainly from imperfect capital markets. One of the characteristics of developing countries is that they are structurally capital-intensive (Bobbo, 2016). This capital deficit becomes more pronounced during economic downturns (Bonneau, 2010). The inability to secure sufficient financial resources to limit such decline and reverse the trend then results in procyclical regulatory policies increasing in low phases of the cycle (Leroy, 2013).

The different works identify the financing constraints from the aspects of the banking industry. From this lens, through the market crisis variable, Shehzad *et al.* (2010) emphasise the financing constraints linked to an increase in the risk borne by banks on the assets of their balance sheet. A large part of the banks' business is the securitisation of complex products. To avoid burdening their balance

sheets and to not be constrained by regulation, these instruments do not stay on the banks' balance sheets but are sold on to the market. Banks, wishing to avoid reputational and liquidity risk, decide to repatriate these assets leading to the implementation of a procyclical regulatory policy, i.e. their propensity to amplify the real shocks suffered by the economy. Avom *et al.* (2018) focused their analysis on the liquidity crisis in the market, the main source of bank financing. This liquidity crisis led to a drastic reduction in loans granted, a major factor in the spread of the financial crisis to the real economy. In contrast, Garcia *et al.* (2008) based their analyses on the inadequate levels of banks' capital. For the latter, market capitalisations have been considerably reduced and reinforced by accounting rules. The risk borne by banks' assets has increased and, as a result, the level of capital required to meet prudential ratios has also increased. Banks are forced to seek liquidity, but in a climate of generalised mistrust, this proves extremely difficult (Gambacorta *et al.*, 2013).

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One of the most destabilising elements of the crisis was the procyclical amplification of financial shocks throughout the banking system, financial markets, and the wider economy (Idot, 2014). The tendency of market participants to behave in a procyclical manner has been amplified in various ways, including by accounting standards (Zhang *et al.*, 2008). Credit procyclicality and increased compliance risk occur when the state of confidence expands, and interest rates remain below expected profit rates. Credit fuels growth without banks always being able to properly assess the creditworthiness of borrowers (Arjani, 2009). The credit boom encourages excessive speculation and then price rises, then replaced by asset price inflation. This again feeds the cumulative process. The risk of non-compliance is underestimated during booming and euphoric phases. This reflects, among banks, low spreads, excessive exposure growth, artificial collateral inflation and reduced provisions (Allen *et al.*, 2004). Conversely, this risk is overestimated in phases of economic slowdown or downturn. It is in this respect that financial systems can generate both procyclical effects on output and increased financial instability, leading to longer phases of growth, but also to more severe and longer-lasting downturns (Aghion and Marinescu, 2007).

Regulatory determinants

The regulatory determinants compensate for the insufficient explanation of the decisional and financial factors. Competition between banks can encourage them to improve the value for money of financial services and foster innovation. Thus, capital adequacy regulations can put banks at a disadvantage compared to other non-bank financial institutions. It seems unlikely, however, that the loss of market share by

banks is due to capital requirements. Financial innovation, technological development or strong regulatory constraints play a key role in explaining this trend. In such a setting, and in the absence of regulatory barriers, there is an increasing financial safety net related to the cost of capital² on the part of banks that have tried to capture a larger market share by requiring more barriers to entry (Beck *et al.*, 2008). The empirical analysis of such measure was led by Jenny (2009) on a sample of Canadian banks over the 1992-2006 period. The author developed a methodology to assess a bank's risk exposure and the quality of its risk management practices. His study will be enriched by that of Jelloul *et al.* (2011) which, in addition to regulatory distortions, also highlight the loss of confidence induced by massive deposit withdrawals, severely restricting the bank's lending capacity or even causing its bankruptcy. According to the latter, such an environment is conducive to the development of pro-cyclical regulatory behaviour. As a result, regulatory pressures are exacerbated in times of economic recovery. This triggers perverse effects, notably the decrease in the bank's profitability induced by the increase of the "equity/assets" ratio. Banks' investment policy is changing as a result of reduced profitability (Scialom, 2011).

The contributions of Betbeze *et al.* (2011) also show that the increase in risk is the result of tighter capital requirements. Interbank credit is a major channel of contagion, but also a source of regulatory procyclicality. In a competitive system in particular, capital regulation indirectly affects the transparency of banks' balance sheets by encouraging banks to use securitisation more intensively (Massoud, 2013). These lead to an excessive build-up of capital in relation to the consistent management of the bank's balance sheet over time. As a result, for the same amount of loans, the bank needs more capital, which reduces dividends for existing shareholders. The new shareholders compensate for this loss by paying a price on the market for the shares issued by the bank. These shareholders usually then seek to increase spending in favour of their shares, thereby generating a policy of procyclical behaviour (Calderon *et al.*, 2011). Banks, as with any other form of constraint, try to circumvent regulation through the development of techniques based on a cost-benefit analysis of their compliance with regulatory obligations (Ginsburg, 2014).

While the distortions resulting from the operation of competitive systems generate procyclical regulatory policies, Bikai *et al.* (2019) argue that the move towards financial innovation, especially in CEMAC countries, also exacerbates them. Using signal theory, they show that shareholders tend to take advantage of distortions related to regulatory pressure that increases (decreases) during economic downturns (upturns), thus inducing procyclicality in capital adequacy rules.

The issue is even more crucial in the case of financial conglomerates or large, complex financial institutions, which generally have many and varied activities (Bing Xu *et al.*, 2013). Setting a minimum capital in line with the risk profile is an important factor for financial efficiency (Idot, 2014). This reform will encourage the recognition of banks' risky behaviour, by making risky assets more expensive in terms of capital (Boot *et al.*, 2001). The allocation of regulatory capital would become fairer between banks, as bank portfolios with low average quality would be penalised and facilitated by the absence of strict regulation (Gordy, 2002).

The contribution of this study is to empirically assess in this section, for CEMAC countries, the determinants of the compliance risk of exposed banks. It shows that the development of the prudential system adopted by CEMAC countries explains, in the same way as the traditional determinants, the procyclical behaviour of prudential regulations and that of banks. The decision to adopt the new Basel capital standards for credit institutions by CEMAC prudential authorities was taken in 2003. This decision was aimed at bringing the prudential system of the sub-region in line with international standards and came in a context of previously initiated reforms for the harmonisation of rules relating to Basel Core Principles for effective banking supervision.

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Regarding the organisation of the governance of credit institutions in the CEMAC, the texts in force also require: (1) the preparation and publication of financial statements and, where applicable, consolidated financial statements under specific conditions; (2) the auditing of these financial statements by statutory auditors; (3) the establishment of an adequate risk management and internal control system and the definition of an appropriate remuneration policy (Massoud, 2014). These rules are linked to monetary policy. On the one hand, prudential aspects sometimes interfere with the conduct of monetary policy because of excessive risk-taking by intermediaries. On the other hand, BEAC' (Banque des États de l'Afrique centrale) statutes often refer to a mission concerning the proper functioning of payment systems, or even the prudential supervision of credit institutions and the stability of the financial system, and in fact BEAC frequently gets involved in these areas. A financial dysfunction is reflected in a stronger differentiation of rate conditions according to the degree of commitment of agents in the riskiest activities. BEAC avoids setting reserve requirements at levels that would excessively set back credit institutions in relation to their foreign competitors and the financial markets.

With regard to the relationship between monetary policy and prudential supervision, the theoretical arguments in favour of the independence of each from the other (eliminate conflicts of objectives between

monetary policy and banking supervision, theoretical arguments in favour of independence (eliminating conflicts of objectives between monetary policy and banking supervision, giving more importance to market discipline) are counterbalanced by those against total separation (ensuring the safety of payment systems through liquidity management, preventing systemic risk through the role of lender of last resort) and, in practice, interdependent relationships between the institutions are more common than they appear (Duquesne, 1997). Moreover, as in the case of monetary policy, “independence from external and, above all, political pressures are an essential condition for effective banking supervision: this principle must be complemented by adequate coordination between banking supervision and monetary policy, whatever the institutional framework” (Trichet, 1994; Mishkin, 1996).

EMPIRICAL STRATEGY

In this section, we present the empirical model by assessing how banks respond to the requirements imposed by the regulators, the estimation technique of the model and the data used.

The empirical model: justification and specification

The main hypothesis to be tested is that of the procyclicality of prudential regulation in the CEMAC. In other words, it is a matter of assessing whether, for the 2000-2018 period during which prudential ratios have been progressively strengthened by the COBAC (Central African Banking Commission), there is a negative and significant relationship between the development of these prudential ratios and the compliance risk of banks established in the CEMAC. We thus looked at the relationship between prudential ratios, the level of interest margins and default risk, using the simultaneous equation model, which comprises two equations the dependent variables of which are theoretically interdependent and vary simultaneously (Demirgüt-Kunt *et al.*, 2004). Following Ahrend *et al.* (2009), Carbo *et al.* (2009) and adopting the H statistic of Mueller *et al.* (2013), this bank reaction function takes the following form in equation (1):

$$\begin{aligned}
 \Delta \text{Comb}_{it} &= \alpha_1 X_{it}^k + \alpha_2 Z_{it}^p + \alpha_3 \Delta \text{Re } g_{it} + \alpha_4 \Delta \text{Risk}_{it} + \alpha_5 \text{Comb}_{i,t-1} \\
 &+ \mu_i + \varepsilon_{it} \\
 \Delta \text{Risk}_{it} &= \beta_1 X_{it}^k + \beta_2 Z_{it}^p + \beta_3 \Delta \text{Re } g_{it} + \beta_4 \Delta \text{Comb}_{it} + \beta_5 \text{Risk}_{i,t-1} \\
 &+ \mu_i + \varepsilon_{it} \\
 \varepsilon_{it} &= \rho \varepsilon_{i,t-1} + v_{it} \quad (1) \\
 \Delta \text{Comb}_{it} &= \text{Comb}_{it} - \text{Comb}_{i,t-1} \\
 \Delta \text{Risk}_{it} &= \text{Risk}_{it} - \text{Risk}_{i,t-1} \\
 \Delta \text{Re } g_{it} &= \text{Re } g_{it} - \text{Re } g_{i,t-1} \quad (2)
 \end{aligned}$$

Equation (2) represents the observed changes in the level of banking competition, the risk taken by the bank and the prudential ratios respectively, as a function of the desired levels for country i at time t .

$$Comb_{it-1}, Risk_{it-1} \text{ et } Reg_{it-1} \quad (3)$$

The factored terms in equation (3) are respectively the discretionary changes in bank competition, in risks taken by the bank and in prudential ratios that are proportional to the difference between the desired and observed levels in period $t-1$. This means that the observed changes are a function of the desired levels, the lagged variables and the random shocks u_i and ε_{it} respectively. The desired levels of banking competition, risk taken by the bank and prudential ratios are not directly observable but are assumed to depend on a group of observable variables describing the financial condition of the bank and the state of the economy in each country. X the macroeconomic characteristics of the countries, Z the macrofinancial and managerial variables of the bank, u the specific impact of each bank, ε the error term that captures the financial shocks.

This specification is consistent with studies that look at individual countries or a group of countries collectively (panel studies). Several indicators are used to measure banking competition (net interest margin, overheads and cost/income ratio, etc.). However, some of them have been the subject of much criticism. Overheads and the cost/income ratio, for example, are considered to reflect the outcome of competition policy and are endogenously affected by the actions of competition authorities (Dietsch, 2005; Degryse *et al.*, 2008). Like most of the literature on bank competition (*Comb*), this article focuses on the gap between the bank's lending rate and its refinancing rate. The interest rate cap leads to over-investment in services and an excessive number of new entrants, which fosters a risk of regulations being held hostage. The evolution of prudential standards (*Reg*) has been modelled according to a composite measure developed by Frison-Roche (2010) and Idot (2014), which is constructed from several microprudential and macroprudential indicators: the liquidity ratio (*Liqd*), the solvency ratio (*Solt*), the bank credit ratio (*Cred*), bank operating expenses (*Fgot*) and loan provisions representing the funds that banks set aside to cover non-performing loans. (*Prov*). Moral hazard theory predicts that a bank approaching the minimum regulatory capital ratio may have an incentive to increase capital and reduce risk. The aim is to avoid regulatory costs caused by any non-compliance with capital regulations (Drehmann *et al.* (2013).

A wide range of banking variables commonly used in the literature are introduced. The economic growth of real GDP per capita (*Cros*) and the inflation rate (*Inft*) to monitor the level of economic development of the country. The size of bank assets, as measured by the

Napierian logarithm of total assets (*Tail*), could influence competitive decisions and compliance risk. Large banks may have implicit insurance in that they are perceived as *too big to fail* and can therefore increase their asset risk. Recent empirical studies indicate that size induces higher risk (Mueller *et al.*, 2013)³. Staff expenditure measured by staff costs/total assets (*Frag*). We also add the bank's capital management (*Capt*) as an indicator of financial innovation, the banking penetration rate (*Banc*) indicating the network of the banking environment and the disclosure of information (*Ehob*) as a source of information production in the banking sector.

Technic estimation

The goal of the estimation is to assess the impact of changes in prudential standards on compliance risk, considering competitive distortions and the components of non-compliance with the capital quota. First, we test the hypothesis that the constant term is the same for all banks using the Fisher test which shows that there is no reason to assume the existence of specific effects. This confirms that our panel structure is not perfectly homogeneous. Therefore, our model is either with fixed individual effects or random individual effects. The specification of these two effects according to the Hausman test (1978) indicates that the model that fits the structure of our sample is the fixed effects model. Furthermore, the White test indicates a lack of heteroscedasticity.

In dynamic panels, the simultaneous equations technique relies on the orthogonality conditions between the lagged variables and the error term, both in first differences and in levels. When the dynamic model is expressed in first differences, the instruments are in levels, and *vice versa*. In the model to be estimated, the use of lagged variables as instruments differs according to the nature of the explanatory variables. For exogenous variables, their current value is used as an instrument. For predetermined or weakly exogenous variables (variables that may be influenced by past values of the dependent variable but remain uncorrelated with future realisations of the error term), their values lagged by at least one period can be used as instruments. For endogenous variables, their values lagged by two or more periods can be valid instruments.

The system of simultaneous equations defined by equation 1 is estimated by the triple least squares (3SLS, three-stage least squares) method. The use of this estimation method is motivated by the fact that there is interdependence between the endogenous variables. Therefore, this method provides robust parameter estimates. Moreover, it is preferable to the double least squares (2SLS, two-stage least squares) method because it is a full information technique, i.e. it allows all parameters to be estimated simultaneously. Moreover, the 3SLS consi-

ders inter-equation correlations. Thus, using this technique, we obtain estimates that are asymptotically more efficient than those obtained by the 2SLS technique. This method, defined by Zellner and Theil (1962), takes the two steps of the 2SLS method and incorporates a third step consisting in applying generalised least squares to estimate all parameters α_i and β_j simultaneously. The 3SLS method is based on the fact that it takes into account a probable correlation between the error terms (which are correlated with the endogenous variables) of the structural form of the model.

Data

The basis for the estimation is data from the six CEMAC countries collected over the 2000-2018 period, i.e. a panel of 456 observations. It thus forms an unbalanced panel that makes it possible to exploit the spatial and temporal dimension of the data. They are taken from the World Bank's World Development Indicators (2018), the International Monetary Fund's (IMF) International Financial Statistics (2017), the BEAC's Activity Reports, the annual reports of the COBAC and the National Institute of Statistics (INS). Table 1 presents the descriptive statistics of the variables.

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Table 1
Descriptive Statistics of Compliance Risk Variables in the CEMAC

Variables	Comments	Average	Standard deviation	Minimum	Maximum
ΔComb	456	-0.01045	11.0148	-102.821	104.121
ΔRisk	456	-0.02670	16.0071	-136.204	130.186
Tail	456	15.42233	6.0276	7.109	33.987
Capt	456	6.01873	2.7572	1.897	13.777
Inft	456	3.89333	2.8832	1.101	12.987
Banc	456	17.1989	7.2569	6.664	33.121
Ehob	456	2.43762	0.5931	2.649	4.3018
Cros	456	6.75203	0.4709	5.823	8.2197
Frag	456	2.17472	0.7632	0.564	3.809
ΔLiqd	456	0.00883	4.0938	-28.082	17.311
ΔSolt	456	0.00806	4.2622	-47.109	38.242
ΔCred	456	0.07862	6.1747	-78.757	87.764
ΔProv	456	-0.00531	11.2846	-81.988	75.943
ΔFgot	456	0.01355	4.2722	-34	29.88

Source: from the authors using Stata.

Banks operating under an uncertain environment have little information about borrowers seeking credit. Before starting the analysis of

the model and the econometric specification, we need to check the existence of multicollinearity between the independent variables (see Table 2 below).

The average of $\Delta Comb$ over the period and for all banks in the sample is 1.04%. The average risk weighted solvency ratio is 0.81% and the average liquidity ratio is 0.88%. Recalling that banks must have a risk-weighted capital ratio of at least 8% and a risk-weighted liquidity ratio of at least 100%, we observe that CEMAC banks are sufficiently capitalised to cover the risks incurred. The change in credit for CEMAC banks is 7.86% and the change in provisions is 0.53%. The inflation rate averaged 3.89% for all CEMAC countries over the study period. The average variation of the financial sector in GDP is 14.3% in the CEMAC.

OUTCOME PRESENTATION AND ANALYSIS

In this section, we present and discuss the results of the estimations of the different reaction functions of the banks in our sample of six countries over the 2000-2018 period. From the different estimates, we extract three main results.

CEMAC banks must adapt to new competitive conditions without changing prudential standards

Prudential standards act as a brake on unwarranted risk-taking by allowing banks to better adapt to the new deregulated and fiercely competitive environment. Banks that comply with regulations have a lower probability of compliance risk. This situation is characterised by a reduction in breaches of customer protection rules in the banking and insurance activities of bankers, thereby enhancing the stability of the banking system. This test corroborates the empirical results obtained by Kenkouo (2019) who shows that increasing competition in the banking market is possible by giving the general public enough information to compare not only products and services, but also banks. The information on pricing and competitive conditions that is available can serve as a basis for the regulator.

The various prudential ratios in Table 3 (below) have negative signs, indicating that, all other things being equal, any increase in these ratios (tighter prudential regulations) leads to a reduction in the level of banking competition. This outcome can be justified insofar as tighter prudential regulation, by severely affecting the organisation and activities of small banks forced to upgrade, may further increase the concentration of market shares around larger banks, thus limiting the level of competition in the sector. This result is contrary to that obtained by Andrea *et al.* (2012), who argue that stronger prudential rules improve competition conditions.

Table 2
Correlation of Compliance Risk Variables in the CEMAC

		Correlations													
		ΔCONB	TAIL	INFT	CAPT	CROS	BANC	FRAG	EHOB	ΔRISK	ΔLIQD	ΔSOLT	ΔCRED	ΔPROV	ΔFGOT
ΔCONB	1.000														
TAIL	0.0130**	1.000													
INFT	-0.0511	-0.2134	1.000												
CAPT	-0.1632	0.0384**	0.0102*	1.000											
CROS	-0.0104**	0.5227**	-0.0343	0.1300	1.000										
BANC	-0.0364**	0.1269**	-0.1067**	0.0506	0.0562*	1.000									
FRAG	-0.0094	0.0270	-0.1468**	0.2889*	0.0577	0.1594	1.000								
EHOB	-0.2863**	0.4949**	-0.1475**	-0.1106*	0.5310**	-0.2173**	0.1981**	1.000							
ΔRISK	-0.1393**	0.5224**	-0.2667**	-0.0081	-0.0320	-0.2450	-0.0551**	0.1762**	1.000						
ΔLIQD	-0.1114**	0.0058**	0.0773**	-0.1587**	0.1706**	-0.1069**	-0.0551**	0.3219**	0.7109**	1.000					
ΔSOLT	-0.0468*	0.0300	0.0393	-0.1050	0.0565**	-0.0029**	-0.0138	0.2390**	0.4563**	0.4109**	1.000				
ΔCRED	-0.2288*	-0.0015*	0.0642**	0.5153	0.0534**	0.0039**	0.1603**	-0.2552**	-0.2567	0.451	0.569***	1.000			
ΔPROV	-0.3113**	0.0328**	-0.0299**	0.235642	0.0171**	0.0786	0.0690**	-0.2273	-0.3519**	0.2806**	0.7613**	0.2713***	1.000		
ΔFGOT	-0.1282	0.0609	-0.0455**	0.3927**	0.0665**	-0.1493	0.1788**	-0.2389**	0.0117**	0.1498**	-0.1439**	0.5321**	0.1245**	1.000	

Remark: * significance of 1%; ** significance of 5%; *** significance of 10%.

Source: from the authors using Stata.

Table 3
Net Interest Margin and Banking Risk in the CEMAC (3SLS)

Variables	Banking competition ($\Delta Conb$)	Banking risk ($\Delta Risk$)
TAIL	-0.021483 (-1.25)	-0.370*** (-2.09)
CROS	0.882*** (3.72)	4.260 (0.11)
INFT	0.024 (0.23)	-0.228 (-0.72)
CAPT	0.079*** (2.36)	0.981*** (2.11)
FRAG		-1.501 (-0.88)
EHOB	-0.002 (-0.41)	
BANK	-0.033*** (-2.38)	
$\Delta CONB$		-0.531 (-0.25)
$\Delta RISK$	-0.026 (-1.42)	
$CONB_{t-1}$	-0.159*** (-4.42)	
$RISK_{t-1}$		-0.173*** (-5.01)
$\Delta LIQD$	-0.065*** (-2.51)	-0.745*** (-2.93)
$\Delta SOLT$	-0.071*** (-2.93)	-0.632*** (-2.43)
$\Delta CRED$	-0.089*** (-3.74)	-0.765*** (-2.84)
$\Delta PROV$	-0.026*** (-2.05)	-0.502*** (-5.55)
$\Delta FGOT$	-0.071** (-3.21)	-0.419 (-1.56)
INTERCEPT	-3.886** (-2.43)	-20.964 (-1.15)
N	456	456
R ²	0.531	0.577
χ^2	77.47***	106.71***
Number of countries	6	6
Prov>F	0.0000	0.0000

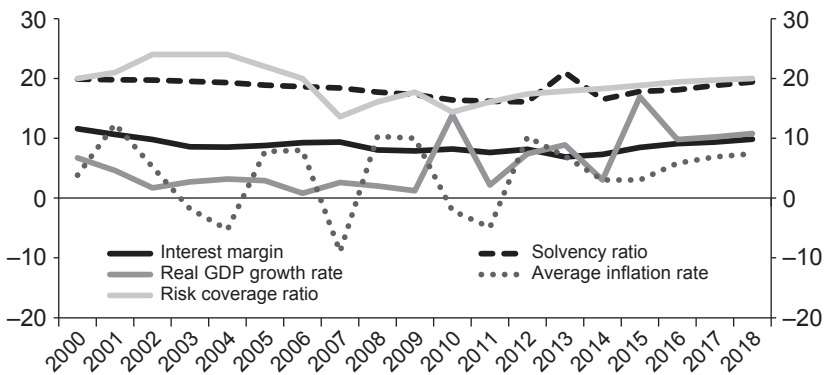
Note: * significance of 1%, ** significance of 5%, *** significance of 10%.

Source: from the authors using Stata.

Indeed, it must be acknowledged that prudential rules affect banking players differently, depending on their size and level of organisation. In general, subsidiaries of large foreign banks adapt quickly to changes in prudential regulations, while smaller or predominantly locally owned institutions often struggle to adjust. This may eventually lead to a loss of market share for these smaller banks in favour of more adaptable banks. Similarly, Fischer (2013) shows that prudential standards are better equipped than bank customers to monitor pricing and identify undesirable practices. A high level of competition gives bank customers an advantage in choosing financial products and services and fosters the creation of high quality products and services that are both competitive and innovative (OECD, 2011). It appears that in the CEMAC area, the publication of pricing conditions contributes not only to consumer protection, but also to better financial inclusion and the promotion of competition in the banking sector. The dissemination of information (*Ehob*) improves competition and reduces the costs of financial services by 0.2%. Compliance within banks is therefore of vital importance for their autonomy in monitoring, analysing, and implementing the requirements expected by the various supervisory authorities to which their activities refer (see chart 1).

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Chart 1
Developments of the Regulatory Framework and Economic
Situation in the CEMAC
 [%]

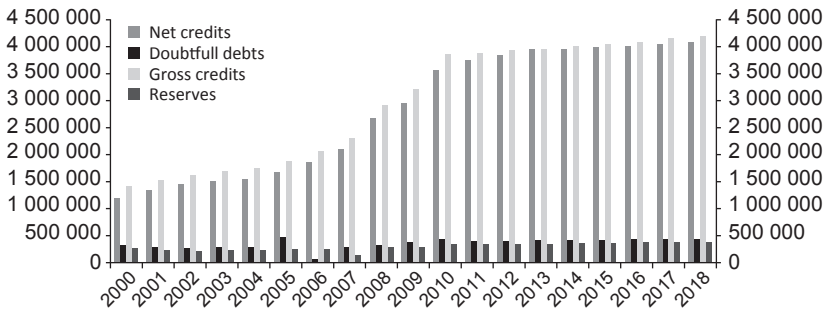


Source: from the authors based on WDI and COBAC data.

Solvency was generally satisfactory, and 43 banks had a risk coverage ratio of 8% or more. Similarly, 50% of banks did not comply with the risk-splitting standard that limits exposures to a single beneficiary to 45% of capital (COBAC, 2019). Thus, a higher level of these ratios is associated with a higher probability of default. This result, in line with

that obtained by Borio (2013), can be explained by excessive risk-taking. In addition, the increase in compliance risk may exist if the problem between shareholders and managers leads to excessive risk-taking or if regulators force the riskiest banks to build up a higher capital ratio depending on their activities, as shown in Chart 2 (Drehmann *et al.*, 2013).

Chart 2
Banking Activity Developments in the CEMAC
(in millions of CFA francs)



Source: from the authors based on COBAC activity reports (2000-2018).

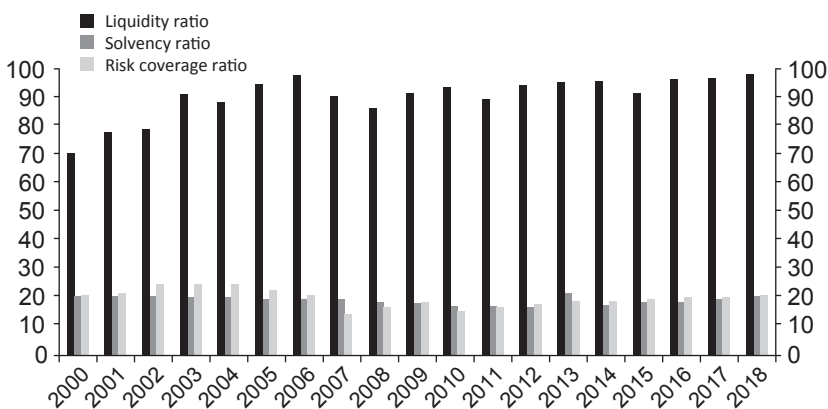
Despite CEMAC regulations considerably increasing the number of channels to access the pricing conditions of banks, they are still very difficult to access (Tankou *et al.*, 2019). When making a decision about a bank or a banking product, it is difficult, if not impossible, to access exhaustive information. Obtaining the bank terms and conditions is only one step. The content of these terms and conditions must also be understandable to customers.

*CEMAC banks that comply with prudential standards
are protected from risks arising from their operations,
particularly credit risk*

Banks with a higher bank lending ratio, all other things being equal, exhibit better risk management and therefore lower compliance risk. The credit granting activity is the one in which CEMAC banks have the best expertise. For this reason, the banks that are most active in this field have a 76.53% lower compliance risk. The coefficient for the ratio of equity to total assets (Capt) is positive and significant, meaning that at 98.10%, a higher ratio is associated with a higher risk of non-compliance. There are two possible interpretations of this result. Firstly, a very high level of deposits to assets indicates a low level of capital or equity and therefore a lower solvency. Secondly, for CEMAC banks, the stability of deposits is a source of moral hazard in terms of

asset substitution, the negative effect of which in terms of risk-taking more than offsets the positive effect linked to the stability of the resource. CEMAC banks that devote a relatively larger share of their asset value to staff costs have a lower compliance risk. With the evolution of prudential ratios (see Chart 3), banks allocate a significant share of staff costs to risk management, internal control or portfolio selection (Ginsburg, 2014).

Chart 3
Developments in Prudential Standards for Banks in the CEMAC
[%]



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Source: from the authors based on COBAC activity reports (2000-2018).

Larger size leads to 37.07% lower compliance risk for CEMAC banks. Diversification by size allows for economies of scale and scope. By increasing the size of their assets, large banks would benefit from better diversification and reduce their level of default risk. It should also be noted that most large banks in the CEMAC are subsidiaries of large pan-African or international banking groups, which generally have an organisation and rules that allow for strict compliance monitoring. Also, due to their size, these institutions are also subject to stricter supervision by the banking supervisor, which could therefore justify their low level of non-compliance. Also, the fact that banks have institutional support and greater proximity to political and economic decision-makers facilitates their access to large projects. This result is in line with that obtained by Gambacorta *et al.* (2013). The shareholder structure does not influence the compliance risk of CEMAC banks (Kamgna *et al.*, 2009).

High growth rates are associated with a lower risk of non-compliance. This result indicates not only that banks choose the least risky assets during periods of economic growth, but also that improved

income increases the ability of agents to meet their obligations (Garcia-Marco *et al.*, 2008). However, a growing share of the financial sector in GDP is a source of banking compliance risk. This result is also in line with our predictions, although it should be noted that the weight of the financial sector in the GDP of CEMAC countries is very different from that of developed countries that have been more extensively researched. Thus, the weight of bank loans in GDP is generally under 18% in CEMAC countries, while it is greater than 100% in OECD countries. There is no significant impact of inflation on bank compliance risk.

According to the work of Tchapga (2014), three main actions are taken by the compliance function. Firstly, the detection and prevention of compliance risk, consisting in the implementation of an internal and external monitoring system⁴, the development of a reference framework of obligations⁵ and the development of a compliance risk map. Secondly, the treatment of compliance risk consisting of the implementation of a compliance control plan and the monitoring of compliance risk. Finally, communication on compliance risk to establish a compliance risk reporting mechanism as soon as possible.

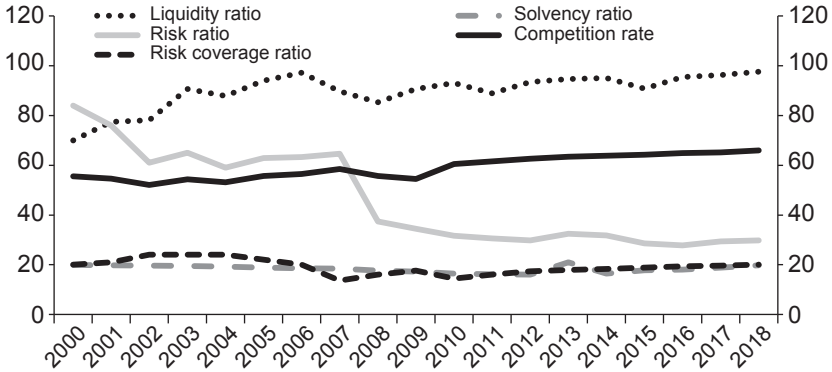
A confirmed procyclical orientation of the prudential framework

The extent of regulatory procyclicality is highlighted by our results through reforms that encourage risk-taking in banking behaviour, by making risky assets more costly in terms of capital (Andrea *et al.*, 2012). However, one concern with this regulatory stance is the pressure of minimum capital requirements on bank capital and hence on bank credit supply over the cycle (Danielson *et al.*, 2001). Regulatory pressure tends to increase by 22.8% during economic downturns, with credit levels increasing by 76.8% during periods of economic growth. To assess the procyclicality of banking activities in the CEMAC, credit quality and aggregates over the cycle must be studied. In times of economic downturn, eligible capital is negatively affected, as past provisions reduce profits with a build-up of credit loss reserves. As banks are capital constrained, they may have to limit their lending capability (Hellman *et al.*, 2002).

According to Aglietta (2011), capital requirements play a crucial role in aligning the interests of bankers with depositors and other creditors. Drehmann and Juselius (2013) highlight the dangers of increasing banks' sensitivity to risk and capital requirements, which could reinforce their procyclical behaviour. This is an attempt to externalise a large part of the risks off the banks' balance sheets to avoid the obligation to comply with prudential standards (see Chart 4 below). This outsourcing is done by taking advantage of financial innovations, such as the securitisation of receivables or through financial derivatives.

This leads to an increased diffusion of risks and their transfer to less supervised players such as institutional investors and hedge funds.

Chart 4
The Evolution of Prudential Ratios and the Compliance Risk in the CEMAC
[%]



Source: from the authors, based on COBAC activity reports (2000-2018).

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The risk coverage ratio, equivalent to the Cooke ratio, is at the heart of the CEMAC's prudential framework. The minimum requirement when the ratio was introduced in 1990, which is defined as the minimum ratio of capital to risky assets, was 4%. But very early on, banking supervisors felt the need to align with international standards that require a minimum of 8% for this type of ratio. Changes in this ratio do not include market risk. However, there is a rise in risks that feed into systemic risk because of the interlocking nature of financial relationships. Procyclicality is confirmed by the circumvention of prudential rules, which is characterised by financial innovation and quick technological development (Repullo, 2004). These help banks to strategically reposition themselves in relation to their competitors. As a result, banks are more willing to lend money when competition is weaker, thus consolidating the procyclicality of the banking industry. Such decisions have direct impacts on banks' performance, business management strategy, risk taking and capital mobilisation (Idot *et al.*, 2014).

The prudential framework is procyclical, forcing banks to trade-off between a system where they must hold a constant proportion of their loan portfolio in reserve and a more risk-sensitive system where they adjust their reserves according to the current risks associated with their loans (Borio *et al.*, 2001). In the first case, it is likely that the amount of reserves will be inadequate as they are too high in upward phases of the cycle and too low in downward phases. This system is not optimal from the banks' point of view: at the top of the cycle, the profitability of their

capital is reduced by the opportunity cost of unused reserves, but it is not optimal either from the regulator's standpoint, as the amount of reserves is insufficient when risks rise and occur at the trough of the business cycle (Arjani, 2009). In the second case, the advantage of regulation is that it is adapted to the management of current risk and the goal of banks to increase the profitability of their capital. The problem is that it encourages banks to adopt a procyclical credit policy, which translates into lending more in times of high cycle and less during lows.

The prudential framework favours the development of an unregulated shadow banking sector, which allows banks to offload the risks associated with the loans they provide (Scialom, 2011). Regulation puts banks at a disadvantage. However, it seems unlikely that the loss of market share by banks is due to capital requirements. State cash flow difficulties and greater difficulties for companies affected by the Covid-19 crisis would further threaten financial stability, [potentially] leading to major bank defaults (ECA, 2020).

CONCLUSION

The aim of this article was to assess the impact of changing prudential standards on the compliance risk of CEMAC banks. We first set out the determinants of the compliance behaviour of banks in the CEMAC and their reaction to prudential standards. Second, we specified an econometric model that we estimated on a panel of 50 banks over the 2000-2018 period.

Four main results emerge. Firstly, compliance with some prudential standards remains low, but the disclosure of pricing conditions presents a lower probability of compliance risk. Secondly, banks with a higher bank lending ratio are more likely to value the compliance function than those with a relatively higher proportion of asset value spent on staff costs, and larger banks with stronger permanent controls display lower compliance risk. Thirdly, in the presence of asymmetric information, the decrease in the net interest margin leads banks to select the least risky projects to comply with prudential standards. Fourthly, a change in the level of risk leads banks to adjust their level of competition through an informational advantage over borrowers. The procyclicality of prudential regulation is amplified and the risk of non-compliance is weakened.

The ambition of CEMAC monetary authorities is therefore to contain systemic risk by limiting procyclical forces and sources of financial fragility. On a first level, an appropriate strategy would be to integrate into the measurement of credit risk certain macroprudential warning metrics that have been empirically demonstrated to predict

rising vulnerabilities and probabilities of future distress (such as the interbank lending/GDP ratio and competition). On a second level, we can aim to strengthen minimum risk provisions in periods of high economic activity, even though financial institutions tend to reduce them and rating agencies, in the same way, are not very sensitive to business cyclicity as long as it remains strong. On the other hand, such provisions should be allowed to decrease, within a certain limit, during slowdowns. The aim would therefore be to limit runaway effects and, above all, to strengthen future resilience when overall business conditions deteriorate.

This study suggests that compliance with prudential capital standards should be strengthened to avoid the duplication of large-scale compliance risk in the CEMAC. In addition, banks should continue to disclose pricing conditions that promote financial inclusion and provide the general public with sufficient information to compare not only products and services, but also banks. At the very least, banking supervision should focus on verifying the principle of compliance in all matters relating specifically to banking and financial activities, as part of the more general system of permanent internal control of operations. The compliance function should be independent and should comprehensively cover the compliance risk in the bank. Ultimately, the main contribution of this study is to have highlighted that the evolution of prudential standards influences the risk of non-compliance in relation to its business cycle. The regulatory landscape and the measures taken by governments at national level are expected to evolve rapidly (CEMAC, 2020).

Possibilities of extending this study by considering bank governance variables and the determinants of the procyclicality of prudential ratios could be explored. Similarly, the analysis of the link between banking regulation and the behaviour of banks in relation to business cycles is a promising line of research.

NOTES

1. CEMAC has been created in 1994 and gathers six countries: Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic and Chad.
2. The cost of capital is defined as the cost of investing in a project at an opportunity cost, which is the rate of return on the alternative use in the financial market under the same risk conditions, which must be forgone if the project is accepted.
3. In 2008, the largest US bank defaulted, calling into question the *too-big-to-fail* doctrine.
4. Monitoring is the instrument that allows the compliance function to identify any changes in the legal and/or regulatory environment (Carbo *et al.*, 2009).
5. A repository of obligations should be developed to identify and consolidate all legal and regulatory requirements with which the bank must comply (Wise, 2005; Dahan, 2009).

BIBLIOGRAPHY

- ADRIAN T., ASHCRAFT A., BOESKY H. and POZSAR Z. (2010), "Shadow Banking", Federal Reserve Bank of New York, Staff Report, *Working Paper*, No. 458.
- AGHION P., ANGELETOS G. M., BANERJEE A. and MANOVA K. (2009), "Volatility and Growth: Credit Constraints and the Composition of Investment", *Journal of Monetary Economics*, In Press.
- AGLIETTA M. (2011), "Risque systémique et politique macroprudentielle : une nouvelle responsabilité des banques centrales", *Revue d'économie financière*, No. 101, pp. 193-203.
- AHREND R., ARNOLD J. and MURTIN F. (2009), "Prudential Regulation and Competition in Financial Markets", OECD, Economics Department, *Working Paper*, No. 735, OECD Publishing.
- ALLEN F. and GALE D. (2004), "Financial Fragility, Liquidity and Asset Prices", *Journal of the European Economic Association*, No. 2, pp. 1015-1048.
- ARJANI N. (2009), "La procyclicité et les fonds propres bancaires", *Revue du système financier*, June-July.
- ARNOLD B., BORIO C., ELLIS L. and MOSHIRIAN F. (2012), "Systemic Risk, Macroprudential Policy Frameworks, Monitoring Financial Systems and the Evolution of Capital Adequacy", *Journal of Banking & Finance*, Vol. 36, No. 12/2012, pp. 3125-3132.
- AVOM D. and BOBBO A. (2018), "Réglementation de l'industrie bancaire et exclusion financière dans la CEMAC", *Afrique contemporaine*, Vol. 2018/2, No. 266, pp. 175-190.
- AVOM D. and EYEFFA EKOMO S. M-L. (2007), "Quinze ans de restructurations bancaires dans la zone CEMAC : qu'avons-nous appris ?", *Revue d'économie financière*, No. 89, pp. 193-205.
- AVOM D. and NANA KUINDJA R. (2017), "Les barrières à l'entrée expliquent-elles le comportement des banques dans la CEMAC ?", *Revue d'économie financière*, No. 127, pp. 309-333.
- BEAC (Banque des États de l'Afrique centrale) (2019), "Rapport du gouverneur de la Banque des États de l'Afrique Centrale, à la Conférence des chefs d'État", Communauté économique et monétaire de l'Afrique Centrale, Union monétaire de l'Afrique Centrale, Yaoundé, 21 et 22 novembre.
- BECK T., DEMIRGÜC-KUNT A. and MARTINEZ PERIA M.S. (2008), "Banking Services for Everyone? Barrières to Bank Access and Use around the World", World Bank, *Revue économique*, No. 22, November, 67 p.
- BETBEZE J.-P., BORDES C., COUPPEY C. J. and PLIHON D. (2011), *Banques centrales et stabilité financière*, Conseil d'analyse économique, Report, La Documentation française.
- BIKAI J. L. and KENKOUO G. A. (2019), "Analyse et évaluation des canaux de transmission de la politique monétaire dans la CEMAC : une approche SPVAR-X", *Mondes en développement*, No. 185, pp. 109-132.
- BOBBO A. (2016), "Régime de change et cyclicité budgétaire dans les pays Africains", *L'actualité économique, Revue d'analyse économique*, No. 92, September.
- BONNEAU T. (2010), « Efficacité et avenir de la régulation financière », in *Le droit face au risque financier, Revue de droit bancaire et financier*, Lexis-Nexis, No. 6, November-December, pp. 67-70.
- BOOTH J. R., CORNETT M. M. and TEHRANAIAI H. (2002), "Boards of Directors, Ownership and Regulation", *Journal of Banking and Finance*, Vol. 26, pp. 1973-1996.
- BORIO C. (2009), "L'approche macroprudentielle appliquée à la régulation et à la surveillance financière", *Revue de la stabilité financière*, No. 13, pp. 35-45.
- BORIO C. (2013), "The Create Financial Crisis: Setting Priorities for New Statistics", BIS, Monetary and Economic Department, *Working Paper*, No. 408, April.
- CALDERÓN C. and SERVÉN L. (2011), "MacroPrudential Policies over the Cycle in Latin America", World Bank, *Unpublished Manuscript*, 46 p.
- CARBO S., HUMPHREY D., MAUDOS J. and MOLYNEUX P. (2009), "Cross-Country Comparisons of Competition and Pricing Power in European Banking", *Journal of International Money and Finance*, No. 28, April.
- CARLETTI E. (2008), "Competition and Regulation in Banking", in *Boot & Thakor, Handbook of Financial Intermediation*, North-Holland, Chapter 14, pp. 449-482.

- CEAC (Communauté économique des États de l'Afrique centrale) (2020), "Réponse de l'Afrique au Covid-19. Sauver des vies et l'économie", March 20 and 21.
- CEMAC (Communauté économique et monétaire de l'Afrique centrale) (2020), "Incidences économiques et financières du Covid-19 sur les économies de la CEMAC et esquisses de solutions", CEMAC, Yaoundé, March 22 and 23.
- COBAC (Commission bancaire de l'Afrique centrale) (2019), *Rapport annuel des activités, 2019*.
- COMBE E., DE DROUAS M. and PATRICK H. (2013), "La politique de la concurrence, un instrument au service de la croissance et de l'emploi", *Revue concurrences*, No. 1-2013, Art. No. 50517, February.
- DAHAN T. (2009), "Régulation concurrentielle", *Revue concurrences*, No. 34, May.
- DAOUD BARKAT D. (2003), "Quelle réglementation du capital bancaire pour les pays en développement ?", *Revue d'économie financière*, No. 73, pp. 311-323.
- DEGRYSE H. and ONGENA S. (2008), "Competition and Regulation in the Banking Sector: a Review of the Empirical Evidence on the Sources of Bank Rents", in Thakor A. et Boot A. (dir. pub.), *Handbook of Financial Intermediation and Banking*, Elsevier, pp. 483-542.
- DEMIRGÜÇ-KUNT A. and HUIZINGA H. (2004), "Determinants of Commercial Bank Interest Margins and Profitability: some International Evidence", *World Bank Economic Review*, Vol. 13, No. 2, pp. 379-408.
- DIETSCH M. (2005), "La place de la concurrence dans l'organisation et le fonctionnement du secteur bancaire", Cycle de conférences : droit, économie et justice dans le secteur bancaire, November-December, 29 p.
- DREHMANN M. and JUSELUI M. (2013), "Evaluating Early Warning Indicators of Banking Crises, Satisfying Policy Requirements", BIS, Monetary and Economic Department, *Working Paper*, No. 421, August.
- DUQUESNE P. (1997), "Le rôle de la banque centrale dans le contrôle bancaire", Intervention at the IMF seminar on "Banking Soundness and Monetary Policy in a World of Global Capital Markets", *Bulletin de la Commission bancaire*, No. 16, April.
- FISCHER R. (2013), "Ending Too Big to Fail, a Proposal for Reform Before It's Too Late", Remarks before the Committee for the Republic, Washington DC, January 16.
- FOUDA OWOUNDI J. P. (2009), "Le bilan mitigé des réformes bancaires en Afrique centrale: les paradoxes du développement financier", *Économie appliquée*, No. 3, pp. 73-114.
- FRISON-ROCHE M.-A. (2010), "Les commissions interbancaires : le bras de fer entre concurrence et regulation", *Banque & Droit*, hors-série, December, pp. 6-8.
- GAMBACORTA L. and SIGNORETTI F. M. (2013), "Should Monetary Policy Lean Against the Wind? An Analysis Based on a DSGE Model with Banking", BIS, Monetary and Economic Department, *Working Paper*, No. 421, July.
- GARCIA-MARCO T. and ROBLES-FERNÁNDEZ M. D. (2008), "Risk-Taking Behavior and Ownership in the Banking Industry: the Spanish Evidence", *Journal of Economics and Business*, Vol. 60, No. 4, pp. 332-354.
- GINSBURG D. H., JENNY F., GRAF T. and WRIGHT J. D. (2014), "Brevets : les autorités de concurrence sont-elles en mesure de corriger les dysfonctionnements du système ?", (New Frontiers of Antitrust, Paris, 21 February 2014)", *Revue concurrences*, No. 2/2014, May.
- GOURIEROUX C. and TIOMO A. (2007), "Risque de crédit : une approche avancée", in *Les Cahiers du CREF*, ISSN : 1707-410X.
- HACHE F. (2012), "Bâle III en 5 questions: des clés pour comprendre la réforme", *Finance Watch*, 8th edition.
- HAUSMAN J. A. and TAYLOR W. E. (1981), "Panel Data and Unobservable Individual Effects", *Econometrica*, Vol. 49, No. 6, pp. 1377-1398.
- HELLMAN T. F., MURDOCK K. and STIGLITZ J. (2000), "Liberalization, Moral Hazard in Banking and Prudential Regulation: Are Capital Requirements Enough?", *American Economic Review*, Vol. 90, No. 1, pp. 147-165.
- HUGON P., NICET-CHENAF D. and ROUGIER E. (2009), "Les effets de la crise mondiale sur les pays émergents", *Working Paper*, October-November, 32 p.

- IDOT L. (2014), "How Has Regulation Affected the Role and Work of National Competition Authorities?", *The French Example, Revue concurrences*, No. 1/2014, Art. No. 66394, January.
- IMF (International Monetary Fund) (2006), *Communauté économique et monétaire de l'Afrique Centrale : évaluation de la stabilité du système financier et Rapports d'observation des normes et codes du secteur financier (transparence des politiques monétaires et financières)*, IMF Report, No. 06/321, August.
- ITALIANER A. (2010), "Priorities for Competition Policy", *St Gallen International Competition Law Forum*, 20th edition, May.
- JELLOUL B. M. (2011), "Réforme financière de Bâle III: chemin parcouru et enjeux futurs", Centre d'analyse stratégique, *La Note d'analyse*, No. 209, 11 p.
- JENNY F. (2009), "La crise économique et financière, la régulation et la concurrence", *Doctrines/Concurrences*, No. 2/2009, pp. 35-46.
- JOSEPH A. (2002), "La réforme du secteur financier en Afrique", OECD, Center of development, *Working Paper*, No. 190, July, 75 p.
- KAMGNA S. Y., TINANG NZESSEU J. and TSOMBOU KINFAK C. (2009), "Macroprudential Indicators for CEMAC Banking System", Munich Personal RePEc Achives, July, <http://mpira.ub.uni-muenchen.de/16555/>.
- KENKOU G. A. (2019), "Conjoncture économique internationale et stabilité bancaire de la CEMAC", Direction générale de la BEAC, *Working Paper*, August.
- LACOUÉ-LABARTHE D. (2004), "L'évolution de la supervision bancaire et de la réglementation prudentielle (1945-1996)", *Revue d'économie financière*, No. 73.
- LASSERRE B. (2010), "La régulation concurrentielle, un an après sa réforme : un point de vue d'autorité (I)", *Doctrines/Concurrences*, No. 3/2010, pp. 35-46.
- LEROY A. (2013), "Pouvoir de marché, risque individuel et risque systémique : des relations contradictoires dans l'industrie bancaire européenne", *European Finance Review*, No. 8, pp. 35-80.
- MARTIN S. (2000), "Product Market Competition Policy and Technological Performance", in Norman G. et Thisse J.-F. (eds.), *Market Structure and Competition Policy, Game Theoretic Approaches*, Cambridge University Press.
- MASSOUD M. (2013), "Le Management de la BEAC face aux principes de bonne gouvernance", Université du Littoral CO, *Cahiers du laboratoire RII*, No. 259, June.
- MASSOUD M. (2014), "Quelles perspectives pour la gouvernance de la Banque des États de l'Afrique centrale – BEAC ?", *Marché et organisations*, No. 20, pp. 53-71.
- MISHKIN F.-S. (1996), "What Monetary Policy Can and Cannot Do", Speech at the conference organised by the National Bank of Austria on "Monetary Policy in Transition", Vienna, November 17-19.
- MUELLER O. and UHDE A. (2013), "Cross-Broder Bank Lending; Empirical Evidence on New Determinants from OECD Banking Markets", *Journal of International Financial Markets, Institutions and Money*, No. 23, pp. 136-162.
- OECD (2011), "Réglementation prudentielle et concurrence dans le secteur bancaire : trouver un bon dosage", in *Réformes économiques 2011 : objectif croissance*, OECD editions.
- REPULLO R. (2004), "Capital Requirements, Market Power and Risk-Taking in Banking", *Journal of Financial Intermediation*, No. 13, June, pp. 156-182.
- ROCHET J.-C. (2010), "Risque systémique: une approche alternative", *Revue de la stabilité financière*, July, pp. 431-498.
- SCIALOM L. (2011), "Stratégies et instruments d'une régulation macroprudentielle", *Revue d'économie financière*, No. 103, pp. 171-184.
- SHEHZAD C. T., DE HAAN J. and SCHOLTENS B. (2010), "The Impact of Bank Concentration on Impaired Loans and Capital Adequacy", *Journal of Banking and Finance*, No. 34, pp. 399-408.
- SHEKHAR A., CALOMIRIS C. W. and WIELADEK T. (2012), "Does Macroprudential Leak?, Evidence from a UK Policy Experiment", *Working paper*, 52 p.
- TANKOU MEFENYA H. and BALIE DJONG F. (2019), "Publication des conditions tarifaires par les banques au Cameroun : enjeux, état des lieux et perspectives", *Proposition BEAC Occasional Paper, Working Paper*, August.

TCHAPGA F. (2014), "La concurrence dans l'économie du Cameroun", United Nations Conference on Trade and Development (UNCTD), July, pp. 1-82.

TRICHET J.-C. (1994), "La stabilité des marchés de l'argent – Le rôle des banques centrales", *Futuribles*, November.

VIVES X. (2011), "Competition and Stability in Banking", in Céspedes L. P., Chang R. et Saravia D., *Monetary Policy under Financial Turbulence*, Central Bank of Chile.

WISE M. (2005), "Competition Law and Policy in France", OCDE, *Journal of Competition Law and Policy*, Vol. 7, No. 1, pp. 7-81.

XU B., VAN RISTEL A. and VAN LEUVENSTEIJN M. (2013), "Measuring Bank Competition in China; a Comparison of New Versus Conventional Approches Applied to Loan Markets", BIS, Monetary and Economic Department, *Working Paper*, No. 422, August.

ZELLNER A. and THEIL H. (1962), "Three-Stage Least Squares: Simultaneous Estimation of Simultaneous Equations", *Econometrica*, Vol. 30, No. 1, pp. 54-78.

ZHANG Z., WU J. and LIU Q. (2008), "Impacts of Capital Adequacy Regulation on Risk-Taking Behaviors of Banking", *Chinese Language Journal*, No. 28, pp. 183-189.

APPENDIX

Table 4
The Main Steps from Basel I to Basel II in the CEMAC

July 1988	Adoption of the Accord on the measurement of capital standards ("Cooke ratio").
November 1991	Amendment to not include provisions on non-performing loans in the capital.
December 31, 1992	Implementation of the Cooke ratio.
July 1994	Amendment on criteria related to risk-weighted assets for OECD countries.
April 1995	Amendment to the bilateral netting of banks' derivative exposures.
January 1996	Amendment of the Accord to extend it to market risk.
January 1998	Agreement by the central bank Governors of the 10 countries to reform the 1988 Accord.
June 3, 1999	Publication of the first consultative document on a new capital adequacy system setting out the general framework of the reform.
January 16, 2001	Publication of the second consultative document widening the scope of options.
April 29, 2003	Publication of the third consultative document finalising the proposals.
May 5, 2003	Publication of the results of the third impact assessment.
October 11, 2003	New proposal for the calibration of capital requirements, subject to consultation until 31 December 2003.
June 2004	Publication of the final accord.
December 31, 2006	Implementation of Basel II.
January 1, 2009	Entry into force in the CEMAC area of the new regulation, including Pillars 2 and 3, applicable to all banks.

Table 5
Changes in Decision Variables in the CEMAC
 (in millions of CFA francs)

Characteristics	Size	Reserves	Capital	Provisions	Ownership interest
Cameroon	Average	46 470.2	61 936.2	1 218 239	203 391.4
	Max	2 626 223	104 654	213 548	601 847
	Min	986 266	32 118	82 344	95 299
Central African Republic	Average	3 036.9	6 375.8	14 704.9	11 929.6
	Max	4 436	29 222	18 900	17 662
	Min	1 031	1 850	9 215	9 180
Congo	Average	3 719.7	13 203.2	2 165.9	32 552.1
	Max	763 479	29 222	4 495	62 832
	Min	273 665	1 850	0	8 481
Gabon	Average	1 081 964	91 861.8	45 964.8	106 972.3
	Max	1 807 367	159 083	60 745	147 669
	Min	681 336	59 399	21 242	10 543
Equatorial Guinea	Average	401 047.3	9 687.7	14 894.4	36 470.6
	Max	968 657	23 740	35 431	105 258
	Min	61 794	2 740	2 651	10 543
Chad	Average	232 632.5	17 102.7	14 711.9	26 395.2
	Max	385 481	3 543	17 215	44 258
	Min	148 240	8 165	12 450	15 676

Source: from the authors based on COBAC activity reports (2000-2018).

Table 6
IMF Recommendations for CEMAC Compliance with Basel Core Principles

Principle	Recommended action
1. Objectives, independence, powers and resources	Significantly increase the workforce at COBAC, preferably doubling it over the medium term. Strengthen its independence and diversify the composition of COBAC board members. Adopt rules for the liquidation of credit institutions.
3. Licensing criteria	Review the conditions for licensing credit institutions, executives and external auditors (especially the role of national finance ministers in issuing and withdrawing licences).
5. Acquisitions and investments	Impose an obligation to postpone proposed acquisitions to give COBAC the opportunity to challenge them or establish the rules of any such acquisitions.
6. Capital adequacy	Gradually raise the minimum capital adequacy ratio above 8%. Harmonise the regime (risk weights) with the Basel Committee recommendations.
8. Assessment of assets and provisions	Gradually shorten the time frame before automatic provisioning is mandatory.
9. Large exposure limits	Reduce the large exposure limit from 45% to 25% in line with the Basel Committee recommendation. Remove the requirement for a 90% limit for certain companies of recognised strategic importance.
10. Monitoring of connected borrowers	Broaden the definition of connected borrowers.
12. Market risk	Establish a regulatory framework.
14. Internal control	Carry out the internal control inspections planned for 2006 and ensure that the follow-up confirms that the institutions comply with the regulations.
18. Stand-alone and consolidated checks	Issue the necessary instructions for the application of the regulations on a stand-alone and consolidated basis.
22. Corrective measures	Ensure that COBAC applies its sanctioning powers to credit institutions, executives and external auditors in cases of serious breach. Consider the benefits of adopting an "automatic" licence withdrawal procedure for credit institutions that remain in a critical situation for too long.

Table 7
Definition of All the Variables in the Empirical Model

Variables	Definitions
Tail	Banks may adopt different competitive behaviours, depending on their size (too big to fail) and specifically, their economies of scale. They are therefore assumed to be more competitive, as they undertake policies to gain market share.
Cros	Economic growth may cause the level of competition to vary according to prevailing economic fluctuations or cycles.
Inf1	Inflation increases competition among bankers depending on the depreciation or appreciation of money by varying the interest rate.
Capt	The bank's capital management can influence its capacity for innovation. The higher the capital, the stronger the incentive to innovate. However, the opposite effect can occur, as the regulation of bank capital may induce the bank to engage in anti-competitive practices by creating barriers to entry or by colluding to limit access to other banks.
Frag	Staff expenditure measured by staff costs/total assets.
Ehob	Disclosure of information will make it easier for banks to produce information (information asymmetry between borrowers and banks), which is a source of competition between banks.
Banc	Some regulations on network banking transactions tend to reduce the level of banking
Conb	The net financial margin between the interest rate that banks pay for their funds (deposits and borrowing) and the interest rate charged on loans. The lower interest margin may be the result of a lowering of barriers to entry and/or a more immediate focus on reducing costs to customers, both indicating greater competition between banks. This margin expresses the ability of each bank to charge above marginal cost.
Risk	Credit risk refers to debt instruments for which it is not certain that they will be repaid when due, usually due to the poor financial standing of the debtor, and for which a provision must therefore be made.
Liqd	The liquidity ratio, following Basel I and II, is 100% within the bank, creating healthy competition in the banking sector.
Solt	The solvency ratio covers at least 8% of their total lending, promotes adequate supervision of banks, protects depositors, and reduces barriers to entry.
Cred	The bank lending ratio is the maximum amount of credit granted by banks. The more loans the bank grants, the more income it generates and the more competitive it becomes.
Prov	The provisions on loans reflect the low quality of the assets. If provisions are higher, this implies a high degree of competition.
Fgot	Banking operating expenses are the operating expenses on competitive behaviour which revealed that overly stringent regulations on barriers to entry hinder competition.

Source: from the authors.