International Business Research; Vol. 16, No. 12; 2023
ISSN 1913-9004 E-ISSN 1913-9012
Published by Canadian Center of Science and Education

Regulatory Requirements and Banks' Level of Risk

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Received: October 29, 2023 Accepted: November 29, 2023 Online Published: November 30, 2023

doi:10.5539/ibr.v16n12p63 URL: https://doi.org/10.5539/ibr.v16n12p63

Abstracts

This article evaluates the effect of prudential standards and good governance practices on the level of risk exposure of banks.

Using banks in the West African Monetary Union (WAMU) as a framework for study, we conducted a study on a base of 14 banks from 2006 to 2017.

Empirical analysis using a system of simultaneous equations reveals that changes in prudential regulation, as well as structural and functional changes at board level, result in an increase in banking risk.

Keywords: Banking, prudential regulation, board of directors and risk

1. Introduction

Baron and Myerson (1982) theory of regulation states that by subjecting credit institutions to prudential measures of external control and the organization of effective internal control, the risk of a financial crisis affecting the system as a whole is limited. Because they influence banks' behavior in the direction of better management of the individual risks they incur.

Paradoxically, if we look at the results of scientific research into banking regulation, we see that this type of intervention is perhaps not as effective as the attention paid by regulators would have us believe. Indeed, "there seems to be no natural incentive for banks to adopt a balance sheet management approach that might be considered more 'reassuring' by the authorities, and the minimum capitalization requirement is more likely, a priori, to increase risk-taking by institutions than to reduce the expected volatility of bank earnings" (Venard, 1994).

Yet, for several years now we have been witnessing a growth in regulatory requirements for governance and compliance control in the WAMU banking sector. For example, we have:

- the transition from Basel I to Basel II and III (in progress);
- the transition from the 1996 PCB to the 2000 and 2018 PCBs;
- the review of internal policies and procedures, with the eventual revision of procedures manuals as a corollary;
- the reinforcement of the supervision system: circulars n°005-2011 and n°01-2017/CB/C/CB.

With these reforms, the supervisory authorities sought to improve governance and reduce risk in order to make the WAMU banking sector stable. Unfortunately, the zone's banking sector remains fragile. By way of illustration, "the prudential situation provided by the Banking Commission in its 2017 annual report shows that the zone's banking system remains fragile..."[1]. So, we wonder: are regulatory requirements in terms of governance and prudential regulation steering the level of exposure to banking risks downwards or upwards ?

[1] The cash position of credit institutions in the zone has been on a downward trend since 2013; 28 credit institutions, representing 12.2% of assets and 13.3% of risks, are not complying with the liquidity ratio; the gross outstanding loans of credit institutions increased by 194 billion to 2392 billion; the gross and net deterioration rates of the banks' portfolio are 13.5 and 5.2% respectively. There is also, insufficient capital and a high concentration of loans, due to risk-policy timidity (IMF, 2015; Beck et al, 2012).

To answer this question, we adopted a quantitative research approach, and collected data by studying the annual reports available on the websites of banks in the WAMU zone, BRVM and BCEAO. As eligibility criteria for the research, we retained only banks that publish financial and non-financial information. Thus, the study will focus on 14 commercial banks established in 6 WAMU member countries for the period from 2006 to 2017, i.e. a panel of 168 observations. The empirical analysis will be carried out using a system of simultaneous equations solved using Roodman's (2011) Conditional Mixed Process model (CMP).

In the rest of the paper, we present the theoretical framework concerning the regulator's positioning in bank risk governance. Next, we present the empirical framework, setting out the methodology and results of the research. The final section is devoted to the conclusion and implications of the research findings.

2. Regulatory Framework and Banking Risks: State of the Art and Research Proposal

The aim here is to present the situation of banks in the WAMU zone with regard to risk and governance, on the one hand, and to formulate a research proposal, on the other.

2.1 Risk and Governance in WAMU Banks

The banking sector has been undergoing radical change since the 2000s, with a trend towards commercial and geographic diversification and sustained growth marked by a take-off in banking, thanks to: (i) a strengthening of financial inclusion, (ii) an environment conducive to better access to financial services, (iii) the development of new high-potential products (microfinance, bank-insurance) and (iv) an increasingly competitive market with the expansion of major regional banking groups.

In addition, there are "three categories of banking establishments in the sub-region: subsidiaries of banking groups, non-subsidiary banks with predominantly foreign capital, and domestic banks. Of the 27 groups operating in the WAMU banking market, with a combined market share of 84.6%, two-thirds (2/3) are based outside the WAMU zone[2]. This preponderance of cross-border banking groups, some of which are facing multiple challenges in terms of governance, insufficient capital or tight liquidity, poses new types of risk. Indeed, some subsidiaries have built on the strategic and managerial choices of their parent company, at odds with the realities of the countries in which they operate. For example, in a report dated March 6, 2015, the International Monetary Fund (IMF) gives its analysis: the fast-growing regional banking groups, which account for almost 70% of banking assets in the WAMU, open up new opportunities, but also present risks since bank holding companies are not subject to consolidated banking regulation or supervision in the region. In addition, there has been a profound and gradual change in the capital profile of the WAMU banking sector. If the current trend towards internationalization of the shareholder base were to continue, ceteris paribus, there would be no local banks left in the zone in around ten years' time. It's not the future disappearance of so-called domestic banks that we need to worry about, but the emergence and growth of large banks, subsidiaries of powerful financial groups with considerable market power, which can be very difficult for the zone's prudential authorities to control. Indeed, the complexity of their organizational structure and the multi-dimensional nature of their parent company could make their activities less legible for the Community regulator, thus freeing them from the latter's grip. Practitioners are well aware that the majority of banking subsidiaries function as counters, or front offices, for their parent company, due to their weak local power, which is almost marginal. All strategic decisions, even the most routine ones (above a threshold), are taken at group headquarters" (Financial Afrik, 2018).

In addition, the prudential situation of the WAMU banking system provided by the Banking Commission in its 2017 report, shows that 12 credit institutions (out of 113), representing 8.6% of the zone's banking assets were below the minimum threshold of the solvency ratio. Although the WAMU banking sector is highly profitable overall, it is also characterized by very fragile banking governance. Indeed, the banking supervisory body has noted serious shortcomings in the application of regulatory texts, particularly those relating to governance issues. This explains the high number of disciplinary sanctions imposed on several credit institution players in recent years. By way of illustration, from 2014 to 2017, 31 sanctions grouped into 7 categories were taken (WAMU Banking Commission Report, 2017):

- **5 resignations :** Two CEOs for "receiving numerous benefits in the form of remuneration, daily interference in the management of the bank in violation of the texts in force as well as good practices for sound risk management". Three GMs for "irregular acts of mismanagement involving personal liability".
- **8 injunctions :** To "ensure that risk management complies with current regulations", and to "improve governance and strengthen the internal control system".

[2]See Ecodafrik; http://www.ecodafrik. and http://www.ecodafrik.com/classification-of-luemoa-banks-file/

- **4 hearings :** For simple hearings of bank executives.
- **9 warnings :** To maintain the close supervision measure.
- **1 prohibition :** from exercising the functions of director, manager or executive officer For "serious shortcomings in the management of the establishment concerning acts of mismanagement involving personal liability".
- **3 reprimands :** For "acts of mismanagement, as well as numerous shortcomings in governance, risk management and other assets".
- **1 license withdrawal :** For "persistent serious breaches of banking regulations and lack of prospects for recovery".

Armed with these imperfections, on September 27, 2017, the WAMU Banking Commission took new measures[3] to strengthen the supervision of subject institutions. These new measures are complemented by close cooperation with the supervisors and regulators of foreign banking groups operating in the WAMU. Periodic meetings of the Colleges of Supervisors of these different groups, the sharing of information and experience, and joint and cross-audit missions could alleviate the concerns raised.

Nevertheless, new threats remain, stemming from the reforms undertaken by the Central Bank of West African States (integration of Basel II and III into the regulatory framework since January 1, 2018), Online Payment Services, Money Transfer Services, Telecom Operators and Web Giants.

This transposition presents a major challenge for institutions in the Union, both in terms of training and upgrading human resources, bringing internal procedures into line with the new requirements, upgrading information systems, and strengthening governance frameworks.

2.2 Research Proposal

A healthy banking system is essential to economic development. Regulators and supervisors thus constitute an external force, independent from the market, which concerns both owners and managers (Ciancanelli and Reyes-Gonzalez, 2000). The growing internationalization and interconnection of markets, the complexity of operations and the increasing amounts at stake make this supervisory role both fundamental to the economy and more complex and difficult to fully assume. What's more, in order to be profitable in its lending role, the bank must take risks, while trying to strike a balance between the confidence it must inspire in order to attract deposits, and the risk-taking necessary for its financial stability. Risk management is thus an integral part of the banking profession (Spindler, 1998). The theories of financial intermediation that developed in the 1980s and 1990s highlighted the problem of asymmetric information between banks and providers of funds. The capital structure of banks reflects their role as financial intermediaries: owners rarely hold more than 10% of the funds lent. Bondholders and depositors hold the remainder. The vast majority of a bank's liabilities are debts. Unlike a company, these debts are spread over a large number of depositors, who are the main contributors of funds, but who do not individually have the necessary means to control how their deposits are used. The depositors' information capacities and skills limit the relevance of their control role (Couppey and Madiès, 1997). According to the same authors, in reality, depositors have neither the skills nor the incentives to exercise effective supervision. Banks also tend to be opaque to the market. If banks were totally transparent to market players (Morgan, 2000), pressure from the regulator could be reduced. However, the regulator considers it difficult for the market to control what a bank actually does, partly because of the difficulty of valuing the bank's assets,

[3] The five circulars implemented in July 2018 are :

- Circular No. 01-2017/CB/C relating to the governance of WAMU credit institutions and financial companies of September 27, 2017;
- circular No. 02-2017/CB/C relating to the conditions of exercise of the functions of directors and officers within WAMU credit institutions and financial companies of September 27, 2017 ;
- Circular no. 03-2017/CB/C on internal control in credit institutions and financial companies in WAMU of September 27, 2017 ;
- Circular No. 04-2017/CB/C relating to risk management in credit institutions and financial companies in the WAMU of September 27, 2017;
- Circular No. 05-2017/CB/C relating to the management of compliance with standards in force by credit institutions and financial companies in the WAMU of September 27, 2017.

which are subject to constant variation and change. The need to regulate banks stems in particular from governance problems resulting, among other things, from the separation between owners and managers (Dewatripont and Tirole, 1993). Recent regulatory developments illustrate the return of the "regulatory state", as Hoarau (2013, cited by Bon-Michel and Collomb, 2014) puts it, which seeks to remedy the deficiencies of a market that struggles to control the stability of the financial system as a whole. Danisman and Demirel (2019) studied the effect of market power and banking regulation on the stability of 6936 banks in developed countries. Their research shows that high market power helps reduce risky behavior in the banking sector. In addition, compliance with capital requirements is a powerful tool for reducing banking risk when the market is efficient.

The bank finds itself having to take into account increasingly stringent regulatory requirements, not necessarily in line with shareholder expectations (Laeven and Levien, 2009; Adams, 2009). According to Baron and Myerson (1982) theory of regulation, the regulator maximizes social well-being under informational constraints. For example, the results of Mursalov's research (2022) confirm the effectiveness of banking regulation in predicting the stability of the banking system. Thus, to minimize systemic banking crises, Mursalov (2022) recommends strengthening banking regulations relating to the control of non-performing loans. The aim is therefore to influence the behavior of credit institutions in the direction of better management of the individual risks they incur, by subjecting them to prudential measures of external control and the organization of effective internal control. The banking internal control system influences the credit risk, profitability and compliance of the American banking sector (Koutoupis and Malisiovas, 2023).

All these measures are intended to reduce the "systemic" risk to the payment system and financial intermediation.

Paradoxically, a closer look at the results of scientific research into banking regulation reveals that this type of intervention is perhaps not as effective as the attention paid by regulators would suggest. Indeed, "there seems to be no natural impetus for banks to adopt a balance sheet management that might be considered more 'reassuring' by the authorities, and the minimum capitalization requirement is more likely, a priori, to increase risk-taking by institutions than to reduce the expected volatility of banking results" (Venard, 1994). However, the WAMU has seen its prudential and regulatory framework evolve in terms of governance, with the transition from Basel I to Basel II, and more recently Basel III, on the one hand, and the transition from circular N°01-2011/CB/C to that of N°01-2017/CB/C relating to the governance of banks in the zone, on the other. The policies implemented are strongly oriented towards the effectiveness of governance for a high-performance financial system within the WAMU area. Consequently, these prudential measures aim to promote the transparency of financial information and avoid bankruptcies and crises. Furthermore, the effectiveness of the regulatory framework is directly conditioned by the degree of risk aversion of banks. If the latter is relatively low, the second effect may outweigh the first, and regulatory action, far from preventing banking risk, could actually increase it. On the other hand, according to Oz kan-Gunay and Gunay (2007), the role of bank supervision and prudential regulation is to prevent, predict and manage crises.

Consequently, strengthening banking supervision plays a key role in the governance of the banking firm. For example, Ahn and Choi (2009) show that the regulatory framework reduces credit risk by preventing borrowers' moral hazard. In this way, the strengthening of capital and the regulations governing it aim to reduce the probability of bank insolvency by providing them with sufficient loss-absorbing capacity. In this context, changes in the regulatory framework can lead to an overall reduction in the probability of default by financial institutions.

Although the results of the few studies that have been carried out on this issue lead to mixed conclusions (obviously to the best of our knowledge), we make the following proposal: the evolution of the regulatory framework leads to a decrease in the level of risk exposure of banks.

3. Empirical Framework

In this section, we will first outline the methodological protocol and then present and analyze the research results.

3.1 Research Methodology

To answer the research question, we conducted a study of 14 WAMU banks from 2006 to 2017. We then specify a system of simultaneous equations (SSE) solved using the CMP method. This choice is justified, on the one hand, by the fact that a SES makes it possible to take into account reciprocal links between endogenous variables (Rime, 2001; Andr é, Khemakhem and Sakka, 2006) and, on the other hand, by the fact that the CMP (Conditional Mixed Process model) estimator developed by Roodman (2011) makes it possible to estimate a SES

involving explained variables of a qualitative and quantitative nature. Overall, the CMP modeling framework offers greater flexibility in system estimation, allowing a wider set of models to be estimated, while offering the possibility of varying the model according to observations. This is important in a panel microdata context, where many questions require consideration of selection issues and categorical measures. Thus, the use of this method will ensure that the research results are not affected by biases linked to the endogeneity of the variables of interest.

Given that the RISK_LEVEL bank risk variable we are considering is an ordered qualitative variable with three ranked modalities, an ordered multinomial probit model is suitable. Let's denote by RISK_LEVEL * the latent variable underlying the multinomial variable RISK_LEVEL as follows:

$$\text{RISK\_LEVEL}_{it} = \begin{cases} 1 & if \quad \text{RISK\_LEVEL}^{*}_{it} \leq c_1 \\ 2 & if \quad c_1 < \text{RISK\_LEVEL} \leq c_2 \\ 3 & if \quad \text{RISK\_LEVEL}^{*}_{it} > c_2 \end{cases}$$

Assuming that effectiveness in bank risk supervision is determined by the synergy existing between governance mechanisms, we must first estimate the simultaneous equation model involving the board of directors (STRU_CA) and prudential regulation (REG_PRU) as follows:

$$(1) \quad \begin{cases} \text{STU}_{\text{CA}_{it}} = a_{rpr}^{fca} * \text{REG}_{\text{PRU}_{it}} + Control_{it}^{fca} * c^{fca} + a_i^{fca} + e_{it}^{fca} \\ \text{REG}_{\text{PRU}_{it}} = a_{fca}^{rpr} * \text{STU}_{\text{CA}_{it}} + Control_{it}^{fca} * c^{rpr} + a_i^{rpr} + e_{it}^{rpr} \end{cases}$$

With :

- a_{rpr}^{fca} ; a_{fca}^{rpr} , representing the correlation coefficients,
- $Control^{y}$ is a vector of control variable in the equation of variable y,
- c^{y} the coefficient vector associated with 〖Control〗^y ,
- e_{it}^{y} the error term in the equation for variable y. It is assumed to be a Gaussian vector,
- and a_a_i^{y} the random effects[4] of the banks.

Then, to capture the effect of changes in the regulatory framework on banks' level of risk exposure, we divide the study period into two (I1 and I2)[5] and each relates to the governance regulatory framework prevailing in the union. Thus, in equation 2 below the variable 〖RISK_LEVEL〗^* depends on the cross-effects between the two banking governance mechanisms (STRU_CA and REG_PRU), the indicator variables for the different periods of change in the governance regulatory framework (I_1 and I_2) and the control variables. Finally, the system involving equations 1 and 2 is estimated simultaneously.

$$(2)\ \text{NIV}_{\text{RISK}_{it}}^{*} = a_{fca}^{1} * \text{STRU}_{\text{CA}_{it}} * I_{it}^{1} + a_{fca}^{2} * \text{STRU}_{\text{CA}_{it}} * I_{it}^{2} + a_{rpr}^{1} * \text{REG}_{\text{PRU}_{it}} * I_{it}^{1} + a_{rpr}^{2} * \text{REG}_{\text{PRU}_{it}} * I_{it}^{2} + Control_{it} * c + u_i + e_{it}$$

For this system, the control variables are the bank's stock market listing (COT_BRS) and group membership (APP_GRO).

The empirical analysis covered 14 large retail banks established in 6 WAMU countries observed over 12 years, i.e. a panel of 168 observations. Data was collected by studying the annual reports available on the websites of banks in the WAMU zone, BRVM and BCEAO. As research eligibility criteria, we only selected banks with financial and non-financial information available in the period from 2006 to 2017.

According to Circular N°01-2017/CB/C on the governance of credit institutions in the WAMU, the governance system must cover all the risks incurred by the institution and any potential conflicts of interest. Thus, four types of banking risk weretaken into account in this research, namely:

[4] The random-effects model is better suited to very limited data, as it requires very few additional coefficients to be estimated.

[5] The binary variables *I*1 and *I*2 refer respectively to the period "2006 to 2011" when no regulatory framework on the specificity of banking governance is available in the WAMU and the period "2012 to 2017" relating to the application of circular N°001/2011/CB/UMOA. The latter is the first governance code specific to WAMU banks.

- Credit risk (**Risk_Crédi**) is the risk of loss inherent to a borrower's default on repayment of these debts. It is measured by the ratio of doubtful debts to total debts, as in Boussaada (2012) and Pathan (2009). Banks with a ratio above 1% are considered to be exposed to credit risk (Kanagaretnam and Lobo, 2014).
- Liquidity risk (**Risk_illiqui**) relates to the possibility of depositors withdrawing funds from the bank. It is measured by the ratio of total loans to customers to customer deposits. Banks with a total loan to total deposit ratio in excess of 100% are considered to be exposed to liquidity risk (new banking law in the WAMU zone).
- Insolvency risk (**Risk_Insolva**) is the risk of a bank's losses exceeding its equity. It is measured by the Z-score, as in the work of Pathan (2009) and Rachdi & al. (2013). Banks with a Z-score below 10% are considered at risk of insolvency (Lepetit and Strobel, 2015).
- Operational risk (**Risk_Opera**) is the risk of loss resulting from the failure of personal procedures and the internal system. It is measured by a binary variable that takes the value "1" if the statutory auditors have observed fraud, an error in the financial year or notify that legal and statutory obligations have not been met, and "0" otherwise.

However, following the example of Ellul and Yerramilli (2013), banking risk is measured by an index of the level of exposure to banking risk, made up of four risk typologies. Thus, a rating is assigned according to three modalities:

$$Y_i = \begin{cases} 1 \text{ for low risk exposure (if } yi \leq 0.25) \\ 2 \text{ for medium risk exposure (if } 0.25 < yi \leq 0.5) \\ 3 \text{ for high risk exposure (if } yi > 0.5) \end{cases}$$

With regard to bank governance variables, we mobilized two mechanisms in the empirical phase: prudential regulation and the board of directors (BoD). The different variables making up each governance mechanism were defined and operationalized in the light of the literature review. In addition, to ensure the appropriate selection of governance variables, we retained variables from codes of good governance practice, such as the WAMU Banking Governance Circulars (2011, 2017) and the Bale Code of Banking Governance. Table 1 below summarizes the variables making up each governance mechanism.

Furthermore, to synthesize the information, we have calculated an index for each governance mechanism: (i) prudential regulation (4 items) and (ii) the board of directors (6 items). The items reflect the criteria of good governance practice. The index is calculated in 4 stages: "(i) each item is dichotomized to observe whether the bank complies with good governance practices. Thus, for each item of each mechanism, the bank is given a score of "1" when the standard is met, and "0" otherwise; (ii) to determine the actual score obtained by each bank, the scores obtained by all the items making up each mechanism are added together.

Table 1. Variables making up each governance mechanism

Mécanismes	Items	Mesures	Sources
Prudential regulation (REG_PRU)	Compliance with minimum capital **(Resp_Cap_Regl)**	Dichotomous variable taking the value 1 if the bank holds core capital at least equal to the legal minimum capital CFA 1Million before 2008, CFA 5Million between 2008-2013, CFA 10 Million from 2014 and 0 otherwise.	Prudential framework applicable to WAMU banks: Article 23, Article 26, Article 45 of Law N ° 058-2008/AN of 23/12/2008 on banking regulations.
	Compliance with the capital adequacy ratio (**Ratio_Couv_Risk**)	Dichotomous variable taking the value 1 if the bank's "equity/risk" ratio is 8% between 2006 and 2011 or 10% between 2012 and 2017 and 0 otherwise.	
	Compliance with the rule limiting the indebtedness of officers and directors in relation to shareholders' equity **(Reglim_EndPer_Fonpro**)	Dichotomous variable taking value 1 if the ratio of directors' and officers' debt to equity does not exceed 20%.	
	Compliance with the rule limiting fixed assets and holdings in relation to	Dichotomous variable taking the value 1 if the ratio of the value of fixed assets and investments to regulatory capital for	

	regulatory capital (**Reglim_ImPar_Fonpro**)	each bank does not exceed 100%, and 0 otherwise.	
Board of Directors (STRU_CA)	Specialized committees (**Exist_Com_Au_Ris_Crd)**	Dichotomous variable with a value of 1 if the Board has audit, risk and credit committees, and 0 otherwise.	Circular N°001 /2011/CB/UMOA ; Essingone Ndoume (2017) ; Pathan (2009)
	Functioning of corporate bodies (**Fon_Org_Socio)**	Dichotomous variable with a value of 1 if the statutory auditor declares that the corporate bodies are functioning properly, and 0 otherwise.	
	Independence o fthe bank's Board of Directors (**Degré_IndCA**)	Dichotomous variable taking the value 1 if at least 1/ 3 of the Board members are independent and 0 otherwise.	
	Women on the Board of Directors (**Pre_ fem_CA**)	Dichotomous variable taking the value 1 if at least one Board member is a woman and 0 otherwise.	
	Cultural diversity on the Board of Directors (**IDN_CA**)	Dichotomous variable with a value of 1 if there are at least 3 different nationalities on the Board and 0 otherwise.	
	Separation of control and management functions (**SEP_FCD**)	Variable dichotomique prenant la valeur 1 si le CA est présidé par un PCA et 0 sinon (lorsqu'il est présidé par un PDG). Dichotomous variable taking the value 1 if the Board is chaired by a Chairman of the Board of Directors and 0 otherwise (when it is chaired by a Chairman and Chief Executive Officer).	

Source: Adapted from literature review

This score helps to assess the scope of the mechanism, but does not measure the quality of governance; (iii) for each bank and each mechanism, we calculate the theoretical score corresponding to the maximum score it could obtain. In our paper, this theoretical score is equal to the number of items in each mechanism; (iv) once the actual score and the theoretical score have been calculated, the quality index for each governance mechanism is calculated by dividing the actual score by the theoretical score. A high index value implies a higher intensity of monitoring and advice on the part of the governance body". This calculation method is identical to that used by Wédé (2009) to construct an aggregate index of microfinance governance in Benin and Chabi (2021) to construct an aggregate index of governance for Senegalese DFSs.

3.2 Presentation and Discussion of Results

In this section, we present the results of the statistical test used to answer the research question.

Analysis of the results in Table 2 shows firstly that the coefficients of the board's risk sensitivity (I1_STRU_CA; I2_STRU_CA) in the periods from 2006 to 2011 and from 2012 to 2017, are positive and respectively equal to 2.860294 and 3.248516. Each having a significant p-value at the 1% threshold (0.001 and 0.002 respectively), this makes them significant predictors of banking risk exposure. Furthermore, the fact that the sensitivity coefficient of I2_STRU_CA (3.248516) is higher than that of I1_STRU_CA (2.860294), shows that the quality of the "structure and operation of the Board of Directors" improved after the reform. However, the improvement in STRU_CA does not contribute to a reduction in the bank's level of risk.

Secondly, the analysis (Table 2) shows that pre-reform (I1_REG_PRU) and post-reform (I2_REG_PRU) prudential regulations (REG_PRU) have no significant influence on banks' risk exposure. In fact, the coefficients of the risk sensitivity of prudential regulations in the periods from 2006 to 2011 and from 2012 to 2017 are positive and have p-values greater than 10%, therefore non-significant.

In sum, the research results lead to the conclusion that the evolution of prudential regulation, as well as structural and functional changes at board level, result in an increase in banks' level of risk exposure.

This apparently counter-intuitive conclusion can be explained, on the one hand, by the nature of the prescriptions of the first circular (N°001/2011/CB/WAMU) on the code of good practice for banking governance in the WAMU. Indeed, in this circular, the prescriptions are essentially focused on satisfying shareholders' interests, without any real orientation towards the cognitive foundations of governance. For example, recommendations aim to discipline managers, limit their discretionary power and provide solutions to problems of information asymmetry between managers and shareholders (Aguilera and Cuervo-Cazurra, 2004; Wirtz, 2004). Are these recommendations likely to limit excessive risk-taking in banks?

This disciplinary dominance, aimed at consolidating the means of control available to shareholders, can have the perverse effect of diverting the attention of directors and managers from banking realities to satisfying shareholder expectations, with the attendant risk of major financial drift.

So, risk management is not just a defensive matter, involving the control or protection of access to critical resources. Rather, it is based on a more dynamic conception of efficiency, in which governance must help the bank to build strategies that create sustainable value. Thus, in line with cognitive and behavioural theories of corporate governance, risk management strategies within banks are based on the knowledge and skills that exist and are built up within the bank (Moxey and Berendt, 2008). Indeed, this is why calls for reform of the financial sector argue that the lack of financial expertise among board members played a major role in the 2007 financial crisis (Kirkpatrick, 2009). For example, at the start of the financial crisis, JP Morgan Chase had 12 independent directors, only two of whom had financial expertise (Minton, Taillard and Williamson, 2011).

The boards of the banks in our analysis will face more challenges than ever. Most of these challenges are rooted in the fundamental principles of good corporate governance: a good board must have, on the one hand, sufficient independence to allow for objective, external views and, on the other hand, the expertise that the bank does not have, in order to add muscle to the skills that already exist. So, great care needs to be taken in setting up the board of directors to avoid being surrounded by people who are collaborative or complacent. This analysis is consistent with the recent circular N°01-2017/CB/C on the governance of credit institutions, which stipulates that one-third of the members of the deliberative body must be independent, competent directors.

On the other hand, its explanation may lie in the inter-temporal aspect of bank capital regulation. Indeed, in the long term, banks have time to recompose their asset portfolios to seek out those that maximize their utility, given their degree of risk aversion (Godlewski, 2005). This result is consistent with portfolio choice theory, which indicates that tightening the regulatory capital constraint can, contrary to the regulator's expectations and under certain conditions, raise bank portfolio and default risks (Kim and Santomero, 1988; Rochet, 2003).

Table 2. Panel data regression results

NIV_RISK	Coef.	Std. Err.	Z	P>z	[95% Conf. Interv]	
I1_STRU_CA	2.860294	0.889114	3.22	0.001	1.117662	4.602926
I2_STRU_CA	3.248516	1.038363	3.13	0.002	1.213362	5.283669
I1_REG_PRU	0.764532	0.857512	0.89	0.373	-0.916161	2.445224
I2_REG_PRU	0.468772	0.922731	0.51	0.611	-1.339746	2.277291
COT_BRS	-0.597861	0.217422	-2.75	0.006	-1.024000	-0.171723
APP_GRO	-1.432179	0.429814	-3.33	0.001	-2.274598	-0.589759
Fixed effects and/or random effects						Yes
Cross-eq correlations		**Estimate**	**Std. Err.**		**[95% Conf. Interv]**	
NIV_RISK STRU_CA		-0,4183	0,1469	-0,6609	-0,0964	
NIV_RISK REG_PRU		0,3463	0,1835	-0,6469	0,0474	
STRU_CA REG_PRU		0,9875	0,0532	-0,9325	0,9999	
Mixed-process multilevel regression						Number of obs = 168

Source: author's estimates in STATA

4. Conclusion and Implications of the Research

The aim of this research was to assess the effect of prudential standards and good governance practices introduced by banking supervisory authorities on the level of risk exposure of banks in the WAMU zone. Indeed, given the importance of the bank's role (money creation) in the economy, any dysfunction can have considerable effects on society as a whole. This being the case, the regulator is strengthening its position within bank governance by encouraging banks to disclose more information and by intensifying its controls to ensure that banks are properly capitalized in relation to their risk-taking.

However, in the literature, these injunctions are not as effective as regulators' attention would suggest. We therefore set out to measure the consequences of applying these decisions to the risk management inherent in the banking business. We thus proposed that the evolution of prudential regulation and structural and functional changes at board level should lead to a downward trend in banks' risk exposure. To test this hypothesis, we conducted a study of 14 WAMU banks from 2006 to 2017, i.e. a panel of 168 observations. The empirical analysis shows that the quality of the "structure and functioning of the Board of Directors" improved after the reform. However, the improvement in the latter does not contribute to a reduction in the bank's level of risk. Similarly, prudential regulations before and after the reform have no significant influence on banks' risk exposure. Indeed, the coefficients of the risk sensitivity of prudential regulation during both periods (2006 to 2011 and 2012 to 2017) are positive. Therefore, the evolution of prudential regulation, as well as structural and

functional changes at board level, result in an increase in bank risk.

From a managerial point of view, then, the research findings imply that risk management should not be carried out solely from a defensive, control-based perspective, but in line with the knowledge and skills that already exist and have been built up at bank level. In other words, a more dynamic conception of efficiency, where governance must help the bank to build strategies that create value in a sustainable way. At the theoretical level, the analytical tool mobilized would help guide researchers in choosing the analytical method to be adopted to reduce endogeneity bias in the field of corporate finance, where many concepts are blurred and multiform.

Notwithstanding the interesting conclusions and contributions of this research, certain numbers of ideas have not been exploited in this work and constitute points of further investigation likely to provide additional insight. For example, the calculation of different risks is solely based on accounting variables, it would be interesting to integrate ESG risks which arise from environmental, social and governance factors that a bank must take into account and manage.

Acknowledgments

"Not applicable."

Authors contributions

Dr Kevin Ghislain ADJE was responsible for the design. He therefore wrote and revised the manuscript.

Dr Gildas Essohouna MOUKPE was responsible for data collection.

Furthermore, all authors read and approved the final manuscript.

Funding

"Not applicable."

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Canadian Center of Science and Education.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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