Governance mechanism and risk management of Congolese commercial banks

Louison TETE SULA

Senior Lecturer and researcher, Faculty of Economics and Management, University of Kinshasa, louison.tete@unikin.ac.cd

Yannick NSIESILA MANZANZA

Senior Lecturer and researcher, Faculty of Economics and Management, University of Kinshasa, nsiesilayan@gmail.com

Alain-Percy PAYANZO NTSOMO

Teaching Assistant and Researcher, Faculty of Economics and Management, University of Kinshasa, prcntsomo@gmail.com

Received: August 17, 2024 Accepted: February 01, 2025 Published: June 30, 2025

Abstract

Purpose: This study assesses the impact of accounting governance and quality management on the risks of commercial banks in the Democratic Republic of Congo.

Methodology: The methodology applied in this study is based on the DEA (Data Envelopment Analysis) method and the CAMELS stochastic modeling method, used to identify banks whose financial health is deteriorating, i.e. banks at risk of insolvency. The results of the DEA application on the efficiency of banks that measure quality management and then the results of the CAMELS method in terms of accounting governance leading to the procedure for identifying banks exposed to insolvency risks.

Results: Our analysis allows for a global classification of banks at risk of insolvency and solvent banks in the Democratic Republic of Congo (DRC). A value greater than or equal to 1 indicates that the bank is "highly efficient," while a value less than 1 indicates that the bank is "moderately efficient." In other words, banks remaining in the "Best" category include those with an index equal to or greater than 1; those with an index between 0.90 and 0.999 belong to the "Average" category. The low efficiency category includes banks with an index between 0.70-0.88, and finally, the inefficient category includes very inefficient banks with an index below 0.50. Regardless of the specification chosen, the results of this study are quite mixed. Overall, the results obtained are consistent but not as good as those for European, American and Asian banks. This is due to the monetary policy of the Democratic Republic of Congo which different from that of Europe, America and Asia.

Originality of the paper: In this study, we present two indicators that measure risk: the anticipated bank insolvency indicator and credit risk. The insolvency indicator is quantitatively assessed using the CAMELS method, which combines six criteria carried out on a panel of 12 banking institutions between 2010 and 2020.

Keywords: Banking governance, risk management, DEA method, CAMELS method

Mécanisme de gouvernance et de gestion des risques des banques commerciales congolaises

Résumé

Objetif : Cette étude évalue l'incidence de la gouvernance comptable et du management quality sur les risques des banques commerciales en République Démocratique du Congo.

Méthodologie : la méthodologie appliquée dans cette étude s'appuie sur la méthode DEA (Data Envelopment Analysis) et la méthode de modélisation stochastique de CAMELS, utilisées pour identifier les banques dont la santé financière se dégrade c'est-à-dire les banques présentant le risque d'insolvabilité. Les résultats de l'application DEA sur l'efficacité des banques mesurant ainsi le management quality puis les résultats de la méthode CAMELS en termes gouvernance comptable conduisant à la procédure d'identification des banques exposés aux risques d'insolvabilité.

Résultats : Notre analyse permet une classification globale des banques à risque d'insolvabilité et des banques solvables en République Démocratique du Congo (RDC). Une valeur supérieure ou égale à 1 indique que la banque est « très efficace », tandis qu'une valeur inférieure à 1 indique que la banque est « moyennement efficace ». En d'autres termes, les banques restant dans la catégorie « Meilleures » incluent celles dont l'indice est égal ou supérieur à 1 ; celles dont l'indice est compris entre 0,90 et 0,999 appartiennent à la catégorie « Moyenne ». La catégorie d'efficacité faible retient les banques avec un indice compris entre 0,70-0,88, et enfin, la catégorie inefficace regroupe les banques très inefficaces avec un indice inférieur à 0,50. Quelle que soit la spécification choisie, les résultats de cette étude sont assez mitigés. Globalement, les résultats obtenus sont cohérents mais pas aussi bons que ceux des banques européennes, américaines et asiatiques. Cela est due à la politique monétaire de la République Démocratique du Congo qui diffère à celle de l'Europe, Amérique et d'Asie.

Originalité : Dans cette étude, nous présentons deux indicateurs qui mesurent le risque : l'indicateur anticipé d'insolvabilité des banques et le risque de crédit. L'indicateur d'insolvabilité est évalué quantitativement en utilisant la méthode CAMELS, qui combine six critères, effectuée sur un panel de 12 institutions bancaires entre 2010 et 2020.

Mots clés : Gouvernance bancaire, gestion des risques, méthode DEA, méthode CAMELS

Introduction

The monetary system is considered the main lever for countries to control the life cycle of economic growth and is also one of the most important indicators of financial, economic and social development. It affects long-term economic growth by affecting the efficiency of intermediaries between savers and ultimate borrowers; the degree of regulation of users of external funds, affecting the productivity of capital employed and, finally, its impact on the amount of savings, which determines the economy; production capacity to earn future income(De Serres and Roux, 2006).

Therefore, advanced economic systems must have complex monetary mechanisms that promote internal and external economic balance and encourage investment activities through credit and guarantees.(De Serres and Roux, 2006).

More than ten years ago, the subprime crisis was a striking example. The process of outsourcing this risk from bank balance sheets to financial markets intensified the crisis through the principles of securitization. The risk therefore also extends to market risk, which is another factor that can cause difficulties for financial institutions. In terms of credit risk and insolvency risk, many observers and regulators point to the inability of governance institutions to regulate risk-taking by managers.(Agénor, 2015; Baklouti et al., 2018).

Therefore, the lack of oversight by bank executives at the governance level raises questions about the role of these institutions. According to the OECD (2022), governance contributes to the relationships between management, the board of directors, shareholders and stakeholders of an organization(Salma, 2022). It also provides the structure to define the company's objectives and implement means of monitoring performance. This issue is important for two reasons. First, banks play a leading role in the financial system and are the engines of economic growth. In most countries, banks are therefore an important source of financing for businesses.(King and Levine, 1993; Levine, 1997).

Indeed, the successive bank failures in the Democratic Republic of Congo over the last two decades have highlighted the consequences of non-compliance with the management of bank balance sheets and the absence of strict control and supervision by the competent authorities. The banking system implements prudential rules and standards to ensure the viability and stability of banks. These failures have caused the bankruptcy of some banks and the loss of public confidence in these institutions. Between 1980 and 1997, the banking sector faced a series of crises.

In 1980, the Congolese banking sector experienced solvency problems. From 1991 to 1992, four state banks became insolvent and a fifth was recapitalized with private sector participation. From 1994 to 2003, the non-performing loan rate reached 75%, two state banks were liquidated and two others privatized. Finally, in 1997, 12 banks experienced serious financial difficulties.(Claessens et al., 2003).

This difficult situation is caused by political instability, theft and various wars of aggression. The crisis has led to the weakening of the Congolese financial system.

On the other hand, it should be noted that the Banque Internationale d'Afrique au Congo (BIAC) is the third financial institution in the Democratic Republic of Congo and is administratively supervised by the Central Bank of Congo (BCC). In December 2014, the auditors gave the prudential indicators of BIAC: in terms of overall solvency, it was 13% compared to the standard of 10% set by the BCC, indicating that BIAC has performed better at this level.

Basic solvency is 9%, compared to the BCC standard of 7%; overall liquidity is 79%, compared to the BCC standard of 100%; Finally, in terms of medium and long-term transformation, compared to the standard of 80% set by the BCC for BIAC in 2014, it reaches 96%.

These measures reflect the robustness of BIAC. But this robustness is only a veneer for the maintenance of the BCC, which regularly covers BIAC's deficits. When the recapitalization ceased, BIAC proved unable to repay its debts and was placed in receivership. In addition, two other banks, FIBANK and MECRECO, were also subject to supervision due to their inability to repay their debts. This series of bank crises and bankruptcies has highlighted BCC's lack of rigor and supervision in the control of credit institutions.

1. Conceptual Framework

A company is exposed to multiples risks such as financial ones. Management of financial risks requires identifying, evaluating and running those risks to avoid the company to be exposed to their misdoing. Those risks are mainly related to financial markets (exchange rate risk, credit risk, etc.), fluctuation in different prices, potential losses on investments, etc. Companies can apply various strategies to manage financial risks they can face such as using derivative finance instruments to overcome price fluctuations, invest in diversified projects, implementing liquidity management policies or removing appropriate insurance (Konde, K and Tsakala, P, 2024). Establishing an appropriate risk environment is a must to a financial risk management in need to identify and measure banks' exposure to risk, reducing risk exposure, controlling risk and implementing management to protect the bank against financial risks. (Githinji, 2013; Njiru and Githinji-Muriithi, 2018).

1.1. General information on Banking Risk Management

Stability and profitability can be ensured by banking risk management as a critical process for financial institution. It provides the identification, assessment and management of various types of risks which a bank is exposed to as well as market risk, credit risk, operational risk, liquidity risk and reputational risk. Banks put in place risk management policies to manage risks effectively, also control and monitoring processes. They also use risk analysis and modeling methods to establish and measure the impact of these risks on their activities (Konde, K and Tsakala, P, 2024).

1.1.1. Objectives of risk management

The management of risks leads to a series of objectives: Ensure the continued operation of the institution through the efficient distribution of resources and a proper distribution of equity; this will lead to better coverage of anticipated losses and will expand the internal management from simply monitoring the performance of the institution to also monitoring associated risks. This will facilitate the decision-making process for new operations and will enable them to be billed to customers and have a better association with the institution (Dietsch, M. and Petey, P. 2003).

1.1.2. Role of banks

❖ *Management of payment methods*

Banks maintain a register of the transfer of money between clients and manage the accounting system. In this context, commercial banks conduct the following transactions:

- Act as a transit in foreign exchange transactions.
- They control sight deposits and offer optional means of payment: checks, transfers, bank cards, etc. These fast and simple methods of payment are intended to facilitate transactions and promote economic activity;
- They fill out the utility of value conservator (gold, securities, etc.).

❖ *Conversion of due dates*

The forward change of commercial banks has to:

- Organize the resources of agents with financing capacity and provide financing to agents with financing needs by granting loans or purchasing securities.
- Convert short-term and liquid deposits collected from many savers into long-term financing to carry out large investment projects.
- Participate in risk distribution and diversification. Centralized transactions save the transaction costs for non-financial organizations.

❖ *Diversification of risks*

To expand risk, the company's productive risks concentrated by banks guarantee safe returns to depositors. Risk diversification is quite relevant not only for risk-averse savers but also for a whole economy.

❖ *Banking Sector Risk Assessment*

The underwriting process can be simple or complex, depending on the purpose and some other facts such as the amount of the loan. According to small personal loans, a credit assessment based on income, lifestyle and known debt may be sufficient. For project financing, on the other hand, the process includes technical, commercial, marketing, financial and management assessments, as well as implementation schedules and capabilities. Credit risk assessment involves with measures taken by banks to avoid or minimize the negative effects of credit risk.(Ndyagyenda, 2020).

1.2. Risk governance

Research on governance seeks searches to explain how systems of power distribution delimit the areas of action of managers. In Last decade, corporate governance has become among the most important street of research in organizational finance (Charreaux, 2004; Germain and Trebucq, 2004). The governance concept is an ancient word. The term come from ancient Greek, since it is expressed in Latin. The word "governance" was used as a synonym for government in Old French and has extended in English since the 14th century. Even if the term "governance" has some others applications, there is a common variation in the use of the concept, namely that regardless of how the term is applied in the public or private sector, it denotes a movement of decentralization of decision-making.(Carrier and Côté, 2001).

1.3. Organizational approach to risk

At the corporate level, regulatory compliance has its pros and cons. As argued Jüttner et al. (2003) argue, the costs of such compliance can reach 5% of the assets of banks and microfinance organizations during the first year. Majority of regulations require banks and microfinance institutions to report financial information about themselves to regulators. This aim to continuous reporting of the information provided (Jüttner et al., 2003).

This representation ask for intervention of an external force illustrated by national, community and international institutions which define the principles of the game of the activity, supervise the activity, promote prudent management of these organizations and regulate the comportment of the organization.(Dewatripont and Tirole, 1993)Regulation is a management tool designed to protect customers (savers) against opportunistic behavior by the company.

Jensen (1993) said that regulation is an external governance mechanism that is intended to act as a replacement for failures of internal control systems.(Jensen, 1993). The study by Caprio and Levine (2002) and Macey and O'hara (2003) distinguish banks and microfinance institutions from non-financial organizations.(Caprio and Levine, 2002; Macey and O'hara, 2003). In a perfectly efficient market, where resources are allocated optimally and everyone has equal access to information, there's no need for government intervention. Companies that misbehave or perform poorly will naturally face consequences. Investors will withdraw their support, leading to the company's decline and eventual

exit from the market. This self-regulation mechanism ensures that only the most efficient and well-managed companies survive.

This model suggests that some form of external oversight is necessary to ensure fair and responsible behavior within organizations. This oversight can come from various sources, including national governments, community groups, and international institutions. These entities play a crucial role by establishing clear rules, acting as impartial arbitrators in disputes, promoting sound management practices, and regulating the organization's conduct. Dewatripont and Tirole (1993) emphasize that regulation serves a vital purpose: protecting customers, particularly those who entrust their savings to the organization, from potential harm resulting from opportunistic or unethical behavior by the company. (Dewatripont and Tirole, 1993).

Rochet (1992) posits that, in most scenarios, commercial banks, driven by the pursuit of maximum profits, may be inclined to take on excessive risk. (Rochet, 1992) This is because maximizing profits can often be achieved by engaging in riskier ventures. Conversely, Blum (1999) argues that, when viewed within a dynamic framework, regulatory constraints, while seemingly restrictive, can actually encourage banks to improve their efficiency and productivity. This dynamic perspective suggests that regulations, by imposing certain limitations, can ultimately benefit the banking sector. (Blum, 1999). He argues that banking regulations, while potentially impacting a bank's profitability, ultimately serve a crucial purpose. By limiting risk-taking behavior, regulations help prevent bank failures, particularly those triggered by bank runs. These failures have significant negative consequences for the broader economy. Diamond (1984) highlights the importance of loan diversification for banks. However, he also acknowledges that bank failures can have detrimental effects on the entire economy. This recognition of systemic risk justifies the regulatory principle of "too big to fail," where authorities intervene to prevent the collapse of large financial institutions that could trigger a collapse across the financial system, especially in sectors with high market concentration.

1.4. Allocative efficiency

Allocative efficiency, also known as "price efficiency," describes how effectively a company chooses the best combination of inputs (assumed to be competitive) ased on their market prices. Essentially, it means that the company uses the most cost-effective mix of resources (Albouchi et al., 2005). This efficiency is achieved when the company adjusts its input usage so that the rate at which it can substitute one input for another (like replacing some labor with more machinery) exactly matches the ratio of the prices of those inputs. In simpler terms, the company ensures it's getting the most "bang for its buck" by using the least expensive combination of resources to produce a given level of output.

2. Methodological approach

The methodology applied in this study is based on the DEA (Data Envelopment Analysis) method and the CAMELS stochastic modeling method, used to identify banks whose financial condition is deteriorating, i.e. banks at risk of insolvency. This point presents the results of the DEA application on the efficiency of banks, thus measuring quality management, then the results of the CAMELS method in terms of accounting governance leading to the procedure for identifying banks exposed to insolvency risks and concludes with the Probit regression giving roughly similar results to the discussion of the results. In order to obtain measures of the technical efficiency of all the banks in our sample based on 12, we carry out our own estimates.

The aim is to analyze, on the one hand, the evolution of the Malmquist index, which captures the efficiency of Congolese banks from 2010 to 2020.

3. Study results

3.1. Analysis of banking efficiency indicators

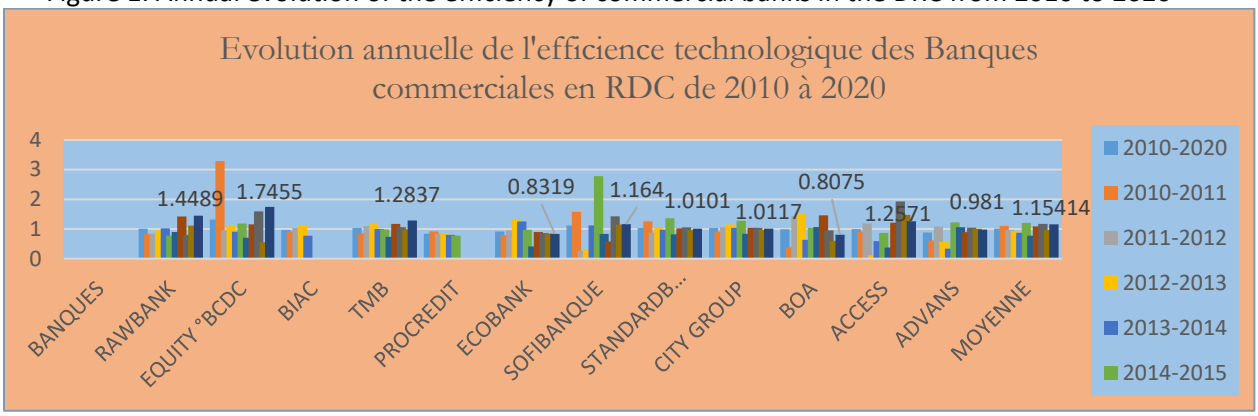
Banking efficiency scores are measured by the DEA method based on 12 Congolese banks during our study period (i.e. 2010 to 2020), including LA RAWBANK, L'EQUITYBCDC, LA BIAC, LA TMB, ACCESS, BOA, CITYGROUP, SOFIBANQUE, STANDARBANK, ECOBANK, PROCREDIT and L'ADVANS, benefit from the Malmquist index, explained as follows: A value greater than or equal to 1 indicates that the bank is "very efficient", while a value less than 1 indicates that the bank is "moderately efficient". In other words, banks remaining in the "Best" category include those with an index equal to or greater than 1; those with an index between 0.90 and 0.999 belong to the "Average" category. The low efficiency category includes banks with an index between 0.70-0.88, and finally, the inefficient category includes very inefficient banks with an index below 0.50.

Table 1. Evolution of the technical efficiency index of Banks in the DRC

ANNEES	2010-2020	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
BANQUES	Indice de l'efficience moyenne	Indice de l'efficience technologique									
RAWBANK	1,01107	0,829	0,8411	0,9588	1,0215	0,7817	0,9003	1,4187	0,797	1,1137	1,4489
EQUITY °BCDC	1,31901	3,2886	0,9509	1,1048	0,9106	1,1844	0,7025	1,1552	1,5941	0,5535	1,7455
BIAC	0,96535	0,9217	1,0317	1,1358	0,7722						
TMB	1,03477	0,8526	1,0957	1,176	0,9995	0,984	0,7381	1,1716	1,0587	0,9878	1,2837
PROCREDIT	0,83772	0,9194	0,8375	0,8583	0,8023	0,7711					
ECOBANK	0,914	0,7926	0,9541	1,3235	1,2525	0,9738	0,4105	0,8976	0,8577	0,8458	0,8319
SOFIBANQUE	1,12101	1,5781	0,2674	0,315	1,119	2,7788	0,8357	0,5794	1,4241	1,1486	1,164
STANDARDBANK	1,03481	1,2608	0,8639	1,0311	0,973	1,3621	0,8143	1,0212	1,0517	0,9599	1,0101
CITY GROUP	1,03291	0,9156	1,0623	1,1506	1,0404	1,2753	0,8368	1,0354	1,0354	0,9656	1,0117
BOA	0,98806	0,3773	1,4293	1,5193	0,6334	1,0362	1,065	1,4613	0,9501	0,6012	0,8075
ACCESS	0,9923	0,9138	1,1916	0,114	0,5882	0,8681	0,3757	1,2105	1,9301	1,4739	1,2571
ADVANS	0,88142	0,6142	1,0807	0,5712	0,3393	1,2238	1,0618	0,8909	1,0441	1,0072	0,981
MOYENNE	1,011035833	1,105308333	0,967183333	0,9382	0,870991667	1,20357273	0,77407	1,08418	1,1743	0,96572	1,15414

Source: Authors, based on data from the non-parametric estimation of the Malmquist index

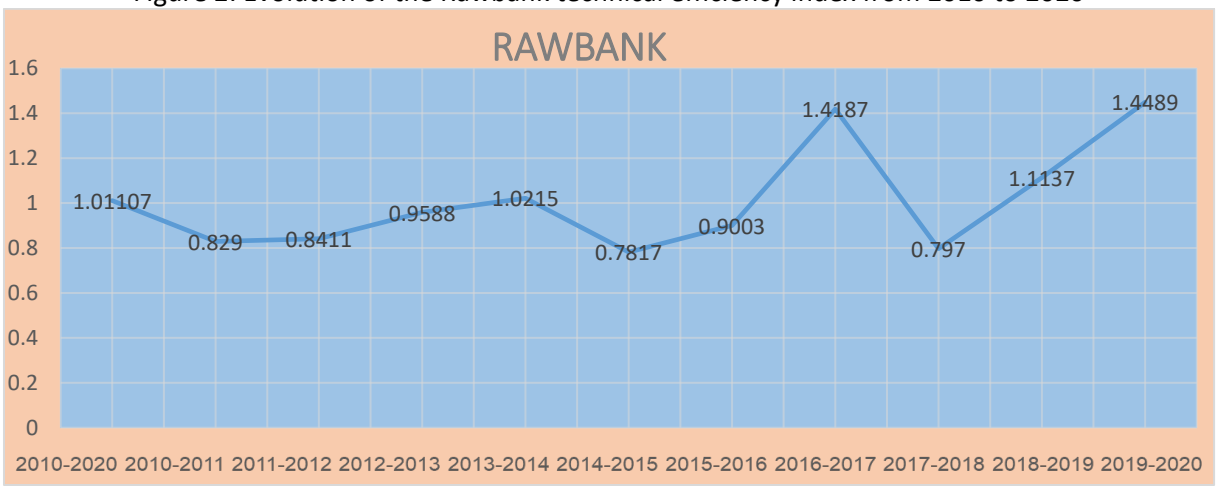
Figure 1. Annual evolution of the efficiency of commercial banks in the DRC from 2010 to 2020



***Source*: Authors, based on data from the non-parametric estimation of the Malmquist index**

From the graph, we can see that commercial banks in the Democratic Republic of Congo are efficient with an average score of 1.003 between 2010 and 2020. For the annual analysis of this indicator, we observe a peak at 1.74 for the year 2011 then 1.44 in 2015. In terms of minimums, a minimum of 0.80 was recorded in 2014, reflecting average efficiency.

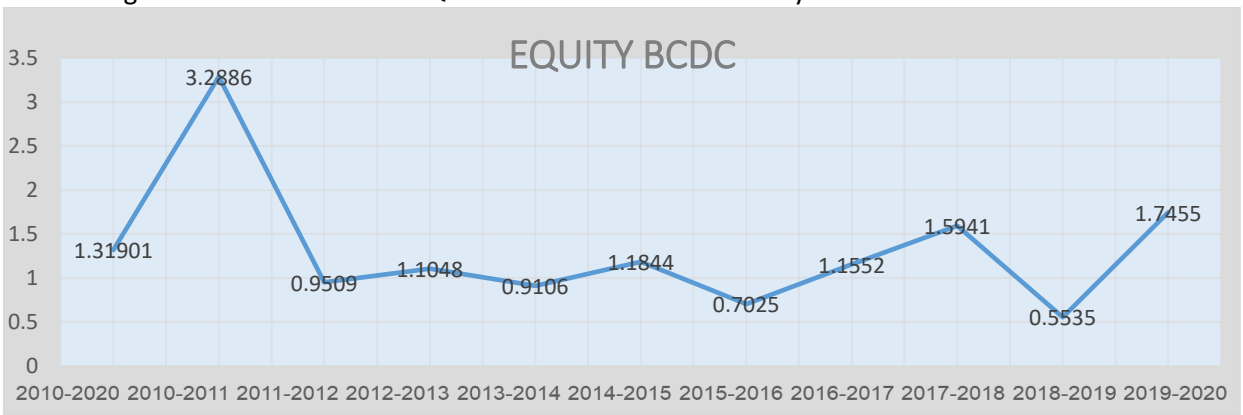
Figure 2: Evolution of the Rawbank technical efficiency index from 2010 to 2020



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

It can be noted that Rawbank is a resilient bank, with an average efficiency index of 1.01 between 2010 and 2020. The fact that the bank has recorded an average performance over time, with an average effective index of 0.829 in 2010, 0.84 in 2011, 0.95 in 2012, 0.78 in 2014, 0.90 in 2016 and 0.797 in 2017. This may indicate that the bank is not optimizing the use of its resources or that it is facing obstacles that limit its performance. This can have several reasons, such as high costs, poor risk management, operational inefficiencies or intense competition. However, the bank's performance has been exceptional, including 1.02 in 2013, 1.418 in 2016, 1.11 in 2018, and 1.448 in 2019. This shows that the bank is using its resources efficiently to generate revenue and minimize costs. This may be the result of efficient management, improved business processes, advanced technology, or other positive factors.

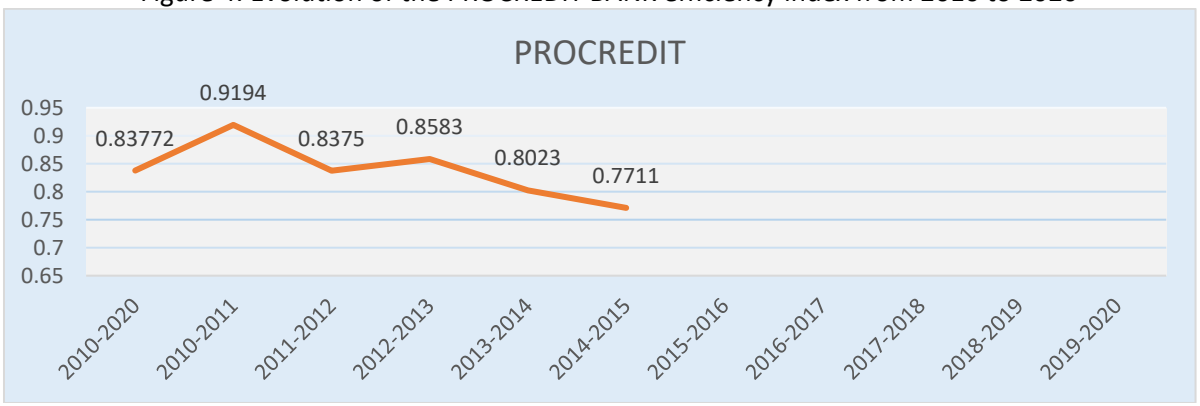
Figure 3: Evolution of the EQUITY BCDC technical efficiency index from 2010 to 2020.



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

Equity-BCDC Bank was generally more efficient during our study period, with an average efficiency index of 1.319. The index accurately and quickly reflects the information available in the financial markets. This may indicate that the bank has strong financial analysis capabilities or uses advanced technology and models to aggregate and analyze market data. Furthermore, it also performed very well in 2010, with an efficiency index of 3.28. The index can be considered a solid basis for making investment decisions, as it effectively reflects market trends and developments. The bank continued this trend with 1.10 in 2012, 1.84 in 2014, 1.15 in 2016, 1.59 in 2017 and finally 1.75 in 2018. The average efficiency index in 2011 was 0.95 and in 2013 it was 0.91. In 2015 and 2018, its efficiency index was very low, 0.70 on the one hand and 0.55 on the other. This usually indicates that the bank is not using its resources efficiently to generate revenue or reduce costs. This can be a sign of various internal problems.

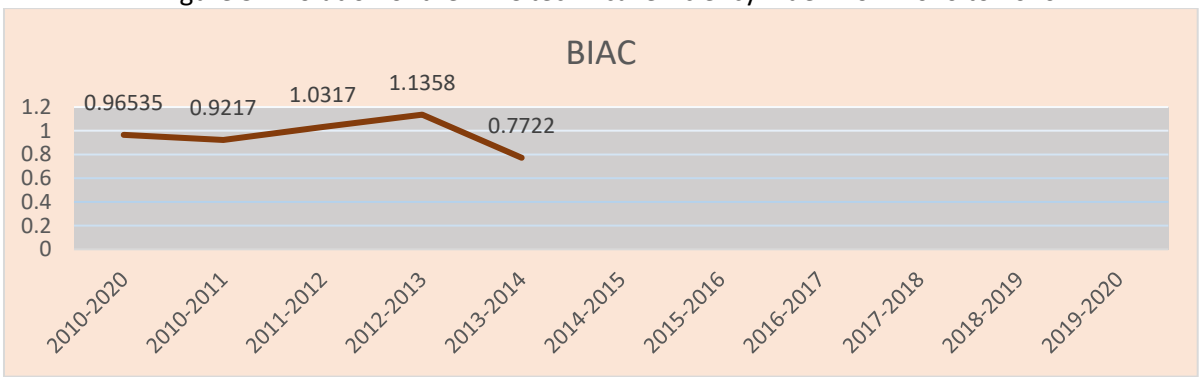
Figure 4: Evolution of the PROCREDIT BANK efficiency index from 2010 to 2020



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

PROCREDIT BANK Evolution of the technical efficiency index from 2010 to 2020. The bank ceased its activities in 2016. But during the study period, its average efficiency score was 0.8, which classifies it as moderately efficient. It can be said that PROCREDIT BANK has used its resources efficiently.

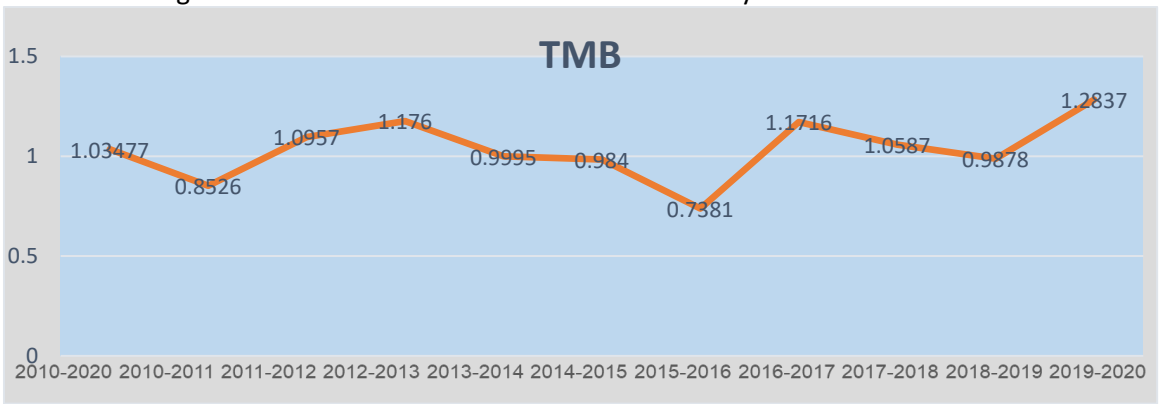
Figure 5: Evolution of the BIAC technical efficiency index from 2010 to 2020



Source: Author, based on data from the non-parametric estimation of the Malmquist index

The bank ceased operations in 2015. However, its efficiency score for the period 2010-2015 was highly efficient at 1.12. It can be said that BIAC has remained efficient in terms of resource utilization, cost management, operational profitability and business growth. The efficiency scores were 1.03 and 1.13 in 2011 and 2012; poor performance was observed between 2010 and 2013.

Figure 6: Evolution of the TMB technical efficiency index from 2010 to 2020.

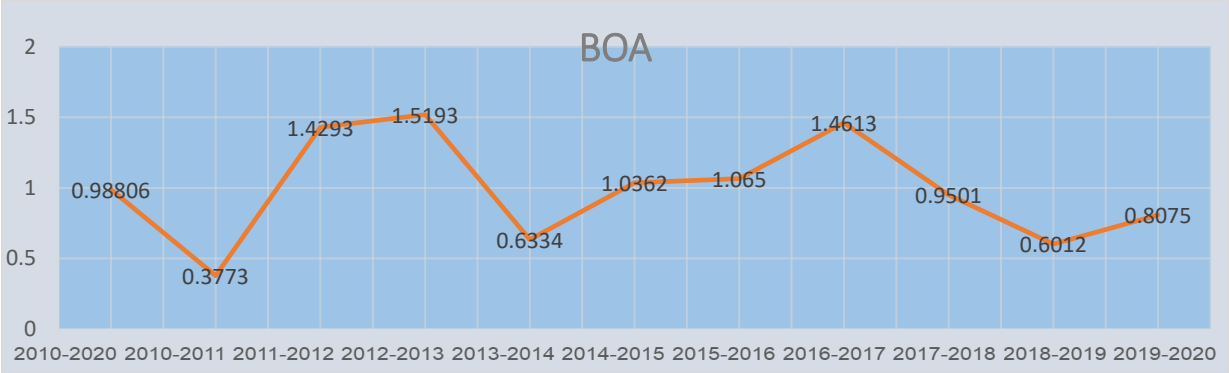


Source: Author, based on data from the non-parametric estimation of the Malmquist index

By reading this figure, it emerges that TMB is a resilient bank with an average efficiency index of 1.03 for the period from 2010 to 2020. However, this bank shows strong instability over time, it recorded largely negative results over the entire period, i.e. 0.73 in 2015, still an inefficient score, however, even

more so this bank also recorded performances during the year 2019 with a score of 1.28, then in 2016 with a score of 1.17. So, for these two years, the bank was very efficient.

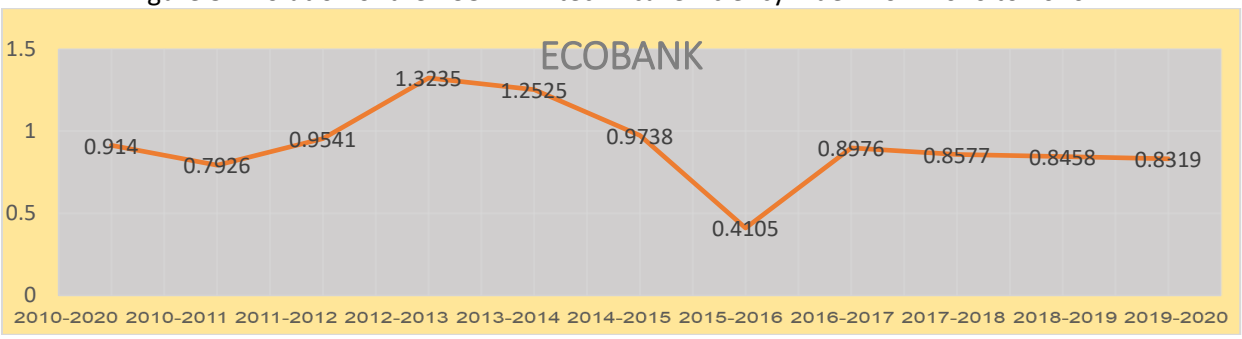
Figure 7: Evolution of the BOA technical efficiency index from 2010 to 2020.



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

The graphical analysis of the evolution of the BOA technical efficiency index shows an overall average of 0.98 for the period from 2010 to 2020, an efficient score. However, the evolution of this index for the period from 2010 to 2020 shows a certain weakness, particularly in 2018 with 0.60 and a low efficiency index of 0.80 in 2019.

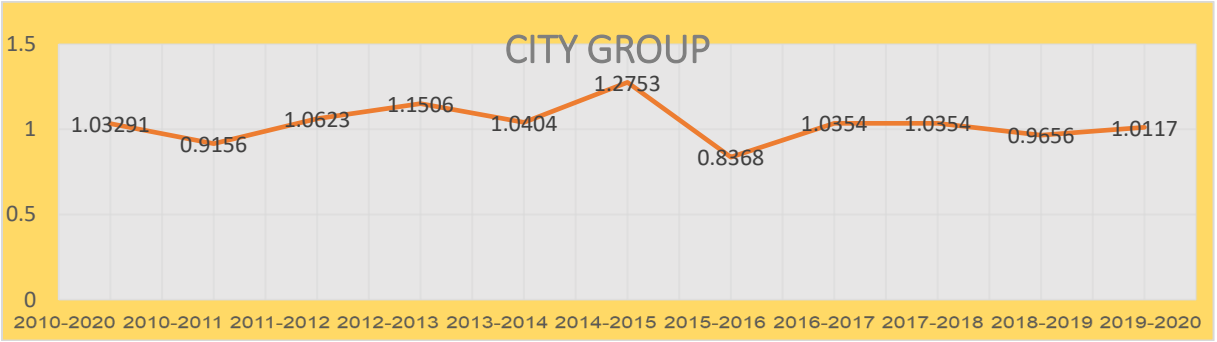
Figure 8: Evolution of the ECOBANK technical efficiency index from 2010 to 2020



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

By reading the table, it shows that the evolution of the technical efficiency index of Ecobank from 2010 to 2020, we observe that this bank has an average efficiency rating of 0.91. However, reading the developments reflects certain weaknesses, particularly between 2010 and 2015. It is observed that the bank reached a level of technical inefficiency in 2015 with a rating of 0.41. We can also say that the bank achieved a certain performance in 2012 with a rating of 1.3 and in 2013 with a performance rating of 1.25.

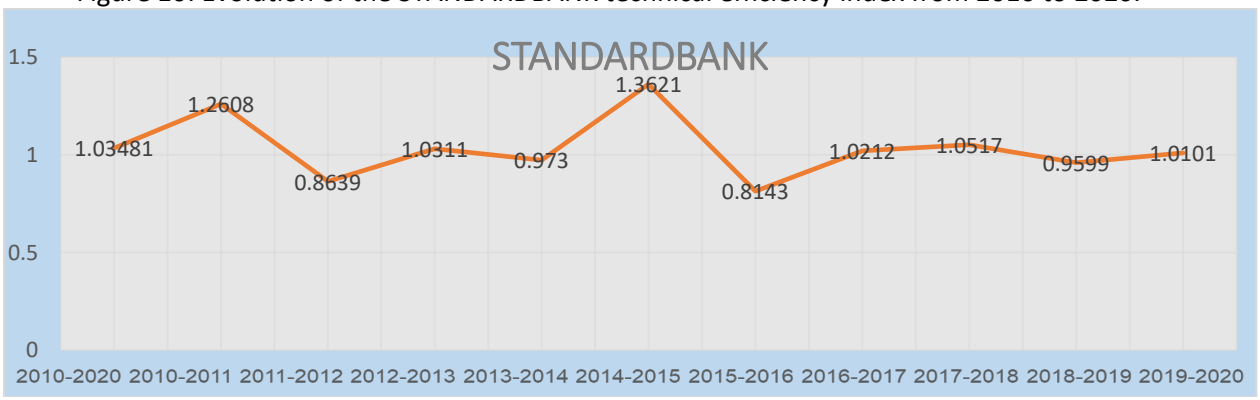
Figure 9: Evolution of the CITY GROUP technical efficiency index from 2010 to 2020



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

The CITIGROUP technical efficiency index over the period from 2010 to 2020 shows that the bank is resilient and efficient over the entire period of the study. Indeed, we observe that CITIGROUP combines its production factors well and ensures financial intermediation well with an average score of 1.03.

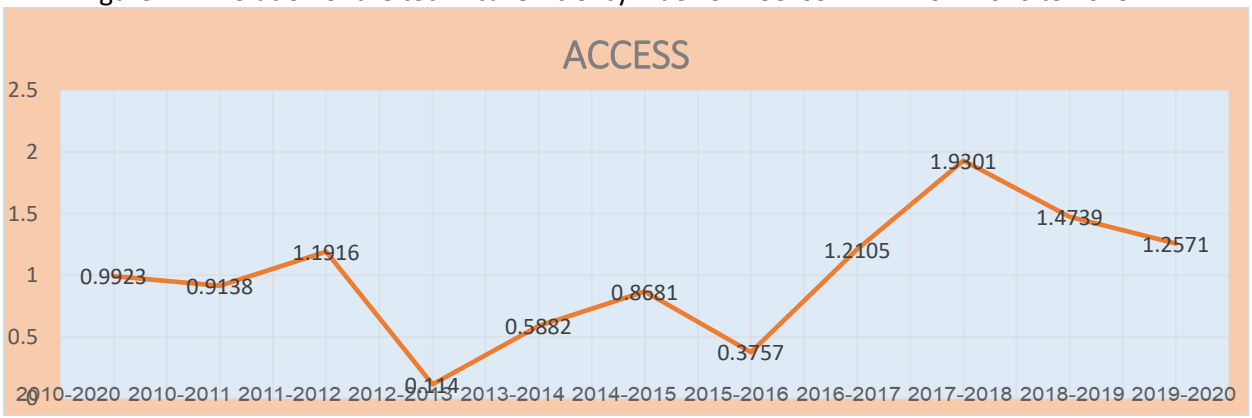
Figure 10: Evolution of the STANDARDBANK technical efficiency index from 2010 to 2020.



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

Reading the evolution of this bank's score for the period 2011 to 2020 shows a stable efficiency score of 1.03. Reading its evolution shows a certain instability over time, taking in the inefficiency score 0.81 for the year 2015, and the efficiency score of 1.36 for 2014 and 1.26 in 2010.

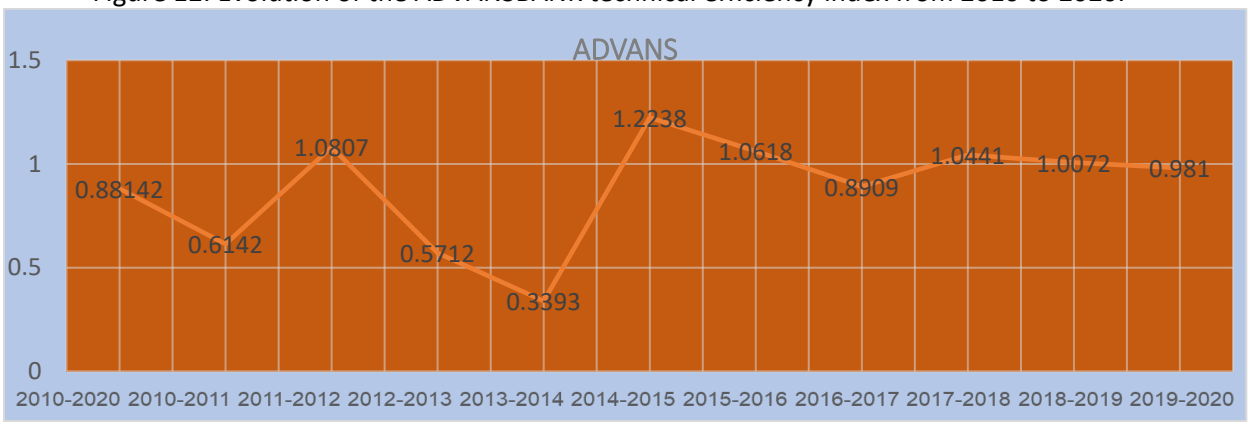
Figure 11: Evolution of the technical efficiency index of ACCESS BANK from 2010 to 2020.



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

From reading this figure, it emerges that Access Bank recorded an average efficiency score of 0.99 for the period from 2010 to 2020. However, this bank shows strong instability over time, it recorded largely negative results over the entire period, i.e. 0.11 in 2012, or a low efficiency score of 0.37 in 2015. However, even more so, this bank also recorded performances during the year 2017 with a score of 1.93, then in 2018 with a score of 1.47. So, for these two years, the bank was very efficient.

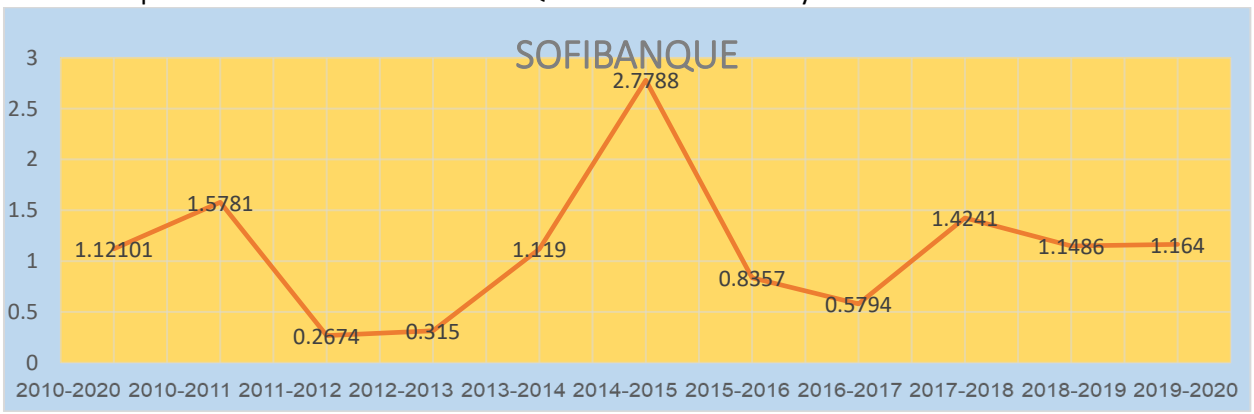
Figure 12: Evolution of the ADVANSBANK technical efficiency index from 2010 to 2020.



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

The evolution of the technical efficiency index of Advans Bank through its intermediation function for the period from 2010 to 2020. This bank has an average score of 0.8, therefore a moderately efficient score. This inefficiency is also observed in 2013 with a low score of 0.33. This bank had to record good performances in particular in 2014 with 1.22, a very efficient score.

Graph 13: Evolution of the SOFIBANQUE technical efficiency index from 2010 to 2020.



Source: Authors, based on data from the non-parametric estimation of the Malmquist index

The graphical analysis of the SOFIBANQUE technical efficiency index shows an overall efficiency level of 1.12 for the period 2010 – 2020. From 2011 to 2012, the bank had been marked by a weak evolution with a peak recorded in 2011 shows a low level of efficiency with a score of 0.26 and 0.31 for 2012. In 2010, the bank effectively combined its intermediation function with the production factors, which justifies it by a very efficient score of 1.57.

3.2. **The Malmquist Index: Productivity Analysis**

A model using the Malmquist index allows to derive five indices for each bank and an annual geometric mean for each index. These measure respectively the change in overall technical efficiency (ETG) (with respect to constant returns to scale), the change in technological progress (TP) and the change in pure technical efficiency (ETP) (with respect to constant returns to scale). Change in scale), change in efficiency to scale (EE) and change in total factor productivity (TFP).

3.3. **Results of the insolvency risk assessment**

If the CAMELS model, the six variables acquired subsequently from a qualitative examination of banks, then in this research we rely only on accounting variables. The six variables are defined as follows: 1. Solvency (solvency ratio), measured by two ratios: the third-party solvency ratio (7%) and the total solvency ratio (10%); The quality of assets held (total solvency ratio) quality) The loan/deposit ratio

(50%) is measured; the quality of management (Management quality) is measured by technical efficiency; profitability (profitability) is measured by the total profit of the asset; Liquidity status is measured by two ratios including short-term ratios - long-term liquidity ratio (minimum 80%) and long-term liquidity ratio (minimum 80%) and Risk sensitivity (sensitivity to market risk) is measured by foreign exchange risk ratio (up to 15%).

Table 2: Results of the estimation of the determinants of the ratios of banking insolvency risk

	Loan/deposit ratio (Max 50%)(A)	Tier I Capital Adequacy Ratio (Min 7%)(L)	Total capital adequacy ratio (min, 10%) (L)	Short-term liquidity ratio (min, 80%) (C)	Long-term liquidity ratio (min, 80%) (C)	Exchange rate risk ratio (max, 15%) (S)	Quality management (M)
Expected effects	(+)	(-)	(-)	(-)	(-)	(+)	(-)
Control sample (88 observations)							
Average (0)	54,535	13,839	15,827	86,033	148,186	8,446	1,019
Standard deviation (0)	1,356	1,159	0.692	0.800	8,719	0.624	0.050
Bank in difficulty (33 observations)							
Average (1)	54,672	10,364	15,555	93,463	85,544	5,318	1,028
Standard deviation (1)	1,705	0.468	0.702	2,176	2,140	1,073	0.053
(1) - (0)	0.136	-3,476	-0.272	7,429	-62,642	-3,127	0.009
T-stat	0.056	1,812*	0.225	3,991**	4,370***	2,581***	0.099
Probit							
Coefficient	0.018	4.81	10,155	-1,499	-2,605	0.782	0.098
z-stat	0.06	0.01	1.02	-1.98**	-2.08**	2.40**	1.34

Note: *, **,* denotes significance at the 1%, 5% and 10% threshold.**

4. Discussion of results

Our analysis allows for a global classification of banks at risk of insolvency and solvent banks in the Democratic Republic of Congo (DRC). A value greater than or equal to 1 indicates that the bank is “highly efficient”, while a value less than 1 indicates that the bank is “moderately efficient”. In other words, banks remaining in the “Best” category include those with an index equal to or greater than 1; those with an index between 0.90 and 0.999 belong to the “Average” category. The low efficiency category includes banks with an index between 0.70-0.88, and finally, the inefficient category includes very inefficient banks with an index below 0.50. The list of banks that failed at least once during the study period: ADVANS (10 times: 0.93) a number that describes an insolvency risk score, CITY GROUP (5 times: 0.91) a number that represents the average efficiency with an insolvency risk, BIAC (5 times: 0.91), 0.84), BCDC (5 times: 0.90)) a number that represents an insolvency risk score, Standard Bank (4 times: 0.92) a number that describes an insolvency risk score, TMB (2 times: 0.97) a number that describes the average efficiency of the bank with an insolvency risk, BOA (1 time: 0.97), PROCREDIT (1 time: 0.99) a number that describes an insolvency risk score. These scores made these banks insolvent. Regardless of the specification chosen, the results are quite moderate. Overall, they do not give rise to rejecting the hypothesis of a link between financial difficulties of banks and CAMELS-type indicators. But they also do not allow us to conclude that these advanced indicators are indeed valid for Congolese banks.

Overall, the results obtained are consistent but not as good as those of European, American and Asian banks. This is due to the monetary policy of the Democratic Republic of Congo which is not so good compared to that of Europe, America and Asia. In fact, the study of Barr, Seiford and Siems (1994), is related to our study insofar as, it proposes a new approach to quantify the efficiency of bank

management. It explicitly applies a DEA analysis model, which allows multiple inputs and outputs and provides a scalar measure of efficiency. This new measure captures what until then defied measurement but was also the most important: the quality of management.(Barr et al., 1994,). However, a study conducted in the Democratic Republic of Congo by Lonzo and Mpiana (2017), supports our results, since its conclusion shows that Congolese banks are generally inefficient and their inability to convert deposits into credit cannot be explained by compliance with prudential standards (solvency ratios and liquidity ratios). By the Central Bank of Congo(Lonzo Lubu and Mpiana, 2017).

Thus, the use of a control system based solely on accounting data appears more consistent with the Congolese banking system for several major reasons: accounting data are considered tangible and verifiable evidence of a company's financial performance. In the context of the Congolese banking system, where transparency and reliability of financial information are essential for assessing the credit risk of borrowers, accounting data provide a solid basis for assessing a bank's solvency; the Congolese banking system relies heavily on financial criteria to grant loans; based solely on accounting data, banks can assess a company's financial health, payment history, ability to repay a loan, and risk level; accounting data also allows banks to closely monitor and use borrowed funds; by analyzing a company's financial statements and cash flows, banks can ensure that loaned funds are used efficiently and responsibly; and finally, the control system based on accounting data guarantees a certain objectivity in the assessment of the financial risks of borrowers, financial figures and ratios are qualitative indicators that allow banks to objectively compare the financial performance of a company with its peers and to assess its level of risk in a more rigorous and reliable manner.

This conclusion must however be qualified for at least two reasons. First, it must be kept in mind that the lack of statistical information on the failures of the Congolese banking system requires us to carry out an ex-ante identification of banks in difficulty, as required by the micro prudential supervision regulations of the Basel Committee II and III. Potential strategies or tools that could be developed would be: regular monitoring of financial risk indicators, such as the capital ratio, the liquidity ratio, the solvency ratio; the use of forecasting models and algorithms to detect warning signs of potential problems, such as the deterioration of financial performance, the increase in bad debts, etc.; the analysis of the bank's past performance and comparison with other banks in the same sector to identify possible anomalies; the research and analysis of macroeconomic factors and market trends that could have an impact on the bank's financial health; implementing stress tests to assess the bank's resilience to adverse economic scenarios as well as working with other regulators and supervisors to share information and best practices in detecting troubled banks.

5. Involvement and recommendations

Involvement and recommendations on the governance and risk management mechanism of Congolese commercial banks are essential to ensure stability and confidence in the financial sector. Here are some suggestions for involvement and recommendations to improve this mechanism:

- Strengthening transparency: It is essential that Congolese commercial banks are transparent in their governance and risk management. This involves regularly publishing reports on their activities, financial performance and risk management measures.
- Strengthening internal control bodies: Congolese banks should strengthen their internal control bodies such as risk management committees, compliance and internal control departments to ensure the effectiveness of internal control processes.
- Strengthening regulation and supervision: Regulatory and supervisory authorities, in this case the Central Bank of Congo, must strengthen their surveillance of commercial banks to ensure that they comply with prudential standards and regulations in force.
- Promotion of good governance practices: Congolese commercial banks should promote good corporate governance practices such as diversity on the board of directors, independence of directors and the establishment of specialized committees.

Therefore, the involvement of the stakeholders concerned, and the implementation of recommendations aimed at strengthening the governance mechanism and risk management of Congolese commercial banks are essential to guarantee the stability and sustainability of the financial sector in the country.

Conclusion

At the end of this study on “Governance mechanisms and risks of Congolese banks”. Based on an analysis of twelve Congolese banks: RAWBANK, EQUITYBCDC, BIAC, TMB, ACCESS, BOA, CITYGROUP, SOFIBANQUE, STANDARBANK, ECOBANK, PROCREDIT and ADVANS over the period from 2010 to 2020. The result of the DEA analysis carried out on the 12 banks as financial intermediaries whose role is to transform agents' deposits into financing capacity in credit for agents in need of financing, allowed us to identify 6 inefficient banks (with a technical efficiency index lower than 1) namely BIAC, PROCREDIT BANQUE, ECOBANQUE, BOA, ACCESS BANK and ADVANS, the first two of which do not exist to date either through bankruptcy or absorption.

Regarding the estimation of bank insolvency risk, we used the CAMELS model whose variables are obtained through a qualitative and accounting examination of the banks. To ensure the robustness of the results, we implemented two test models. First, we compare the means of the CAMELS variable for two samples: the first sample consists of banks whose insolvency risk did not worsen between 2010 and 2020 (88 observations over the same period showed the opposite, same risk); 33 observations). Second, we regress the CAMELS variable on the dependent variable using a probabilistic model, obtaining a value of 0 if the bank is recorded from the first sample and a value of 1. In short, accounting governance and quality management have a significant influence on the insolvency risk of banks.

The main recommendations of this study are addressed to the authorities of the BCC and those of commercial banks: To the managers of the Central Bank of Congo to increase banking surveillance and supervision based on insolvency risks; to revitalize banking intermediation which remains fragile with nearly 50% of banks not efficient, that is to say, incapable of transforming deposits into credits; The capacity of Congolese banks to transform deposits into credits is not explained by compliance with prudential standards (solvency ratio and liquidity ratio) set by the Central Bank of Congo; to broaden the range of coercive measures and apply them in the event of non-compliance with established standards and rules, in order to dissuade all banks that do not comply with the texts; to make public all information concerning the banking system likely to attract investors and increase confidence in the banking system. To the managers of commercial banks to optimize the tools and strategies promoting banking intermediation; Promote financial transparency; align commercial banks with the instructions of the BCC in terms of prudential regulation.

References

Agénor, P.-R., 2015. International financial integration: Theories, evidence, and lessons from recent experiences. OCP Policy Cent.

Albouchi, L., Bachta, MS, Jacquet, F., 2005. Estimation and decomposition of the economic efficiency of irrigated areas to better manage existing inefficiencies, in: Economic Instruments and the Modernization of Irrigated Areas. Cirad, pp. 19-p.

Baklouti, N., Gautier, F., Lamarque, É., 2018. Performance, governance and financial distress: A comparison of cooperative banks and public limited companies in Europe between 2005 and 2011. Rev. Fr. Gest. 1, 163–178.

Barr, RS, Seiford, LM, Siems, TF, 1994. Forecasting bank failure: A non-parametric frontier estimation approach. Search Economic Louvain Econ. Rev. 60, 417–429.

Blum, J., 1999. Do capital adequacy requirements reduce risks in banking? J.Bank. Finance 23, 755–771.

Capelle-Blancard, G., Vandelanoite, S., 2002. Intraday relationships between the CAC 40 index and index options: Which market is preferred by informed investors? Ann. Econ. Stat. 143–177.

Caprio, G., Levine, R., 2002. Corporate governance in finance: Concepts and international observations. Finance. Section. Gov. Public Private Roles Sect. 17–50.

Carrier, M., Côté, S., 2001. Reflections on governance 334–338.

Charreaux, G., 2004. Theories of governance: from corporate governance to the governance of national systems. University of Burgundy-CREGO EA7317 Center for research in management of ….

Claessens, S., Klingebiel, D., Laeven, L., 2003. Resolving systemic crises: policies and institutions. World Bank Sept. 8, 1–48.

De Serres, A., Roux, M., 2006. Social responsibility strategies in banks: how to contribute to strengthening social cohesion through financial activities? Rev. Int. Gest. 31, 101–109.

Dewatripont, M., Tirole, J., 1993. Efficient governance structure: implications for banking regulation. Cambridge University Press, Cambridge.

Diamond, DW, 1984. Financial intermediation and delegated monitoring. Rev. Econ. Stud. 51, 393–414.

Germain, C., Trebucq, S., 2004. The overall performance of the company and its management: some reflections. Sem. Soc. Lamy 1186, 35–41.

Githinji, CM, 2013. Factors affecting sustainability of community based projects; a case study of Mutomo District of Kitui County. Unpublished. MBA Thesis Kenyatta Univ.

Jensen, M. C., 1993. The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems. J Finance 48, 831–880.

Jüttner, U., Peck, H., Christopher, M., 2003. Supply chain risk management: outlining an agenda for future research. Int. J.Logist. Res. Appl. 6, 197–210.

King, RG, Levine, R., 1993. Finance, entrepreneurship and growth. J. Monet. Econ. 32, 513–542.

Levine, R., 1997. Financial development and economic growth: views and agenda. J.Econ. Bed. 35, 688–726.

Lonzo Lubu, G., Mpiana, C., 2017. Prudential regulation & effectiveness of commercial banks in DR Congo. MPRA.

Macey, JR, O'hara, M., 2003. The corporate governance of banks. Econ. Policy Rev. 9.

Ndyagyenda, A., 2020. The Credit Risk Appraisal: A Review of Measures Employed by Banks to Avoid or Minimize Adverse Effects of Credit Risk. J. Finance. Risk Management. 9, 1–12.

Njiru, JM, Githinji-Muriithi, M., 2018. Effect of Financial Management Policy Implementation on Financial Performance of NGOs in Nairobi County. Int. J.Manag. Account. Econ. 5.

Pastor, J., Perez, F., Quesada, J., 1997. Efficiency analysis in banking firms: An international comparison. Eur. J. Oper. Res. 98, 395–407.

Rochet, J.-C., 1992. Capital requirements and the behavior of commercial banks. Eur. Econ. Rev. 36, 1137–1170.

Salma, L., 2022. Proceedings of the Third Meeting of the Coordination Committee.