ANALYSIS OF THE STABILITY OF THE BURUNDIAN FINANCIAL SECTOR: APPLICATION OF THE POISSON MODEL

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ABSTRACT

This study aimed to analyze the effects of Burundian banks' activities on the stability of the Burundian financial system. The data used in this study come from the Bank of the Republic of Burundi and cover the financing activity of Burundian banks for the period 2018 to 2023. By applying the fish model, the econometric results revealed highly interesting findings leading to economic policies to improve the stability of the Burundian financial sector. For illustration, the financing of short-term trade receivables has a positive effect on the stability of the Burundian financial sector, while export credit has a negative effect on the stability of the financial sector. These results reveal a low contribution from products originating in Burundi, thus contributing to the instability of the Burundian financial sector through the deterioration of the credit portfolio. To solve this problem, the Burundian government needs to put in place incentive policies aimed at developing the business sector so as to ensure not only production but also the processing of local products with high added value prior to export. Similarly, Burundian banks must comply with the prudential and non-prudential measures laid down by the central bank in order to improve the stability of the financial sector. To achieve this, Burundian banks need to design and implement more appropriate technology for exchanging borrower data in order to improve transparency and reduce fraud in credit transactions.

Keywords : *Financial Stability; Poisson's Law; Burundi*

Received : 11-12-2024
Revised : 06-06-2025
Approved : 26-06-2025
Published : 01-07-2025

INTRODUCTION

Several shocks, such as the effects of the covid-19 pandemic and the war between Russia and Ukraine, have slowed global economic growth, resulting in a downward trajectory for the world economy(Arndt et al., 2023). Rising household and corporate indebtedness, volatile financial markets and rising global commodity and energy prices are adversely affecting the resilient global financial system(Arndt et al., 2023; Abdoulrahman A. et al, 2024). To enable a country's economic growth, a number of actions are taken by political and banking authorities, including the mobilization of trade receivables, and the granting of credit for exports, imports or equipment. These various interventions have an impact on the country's financial stability(Kobugabe et Rwakihembo, 2022).

A stable financial sector is a prerequisite for a country's development. As a result, financial sector risk assessment is increasingly gaining ground in the academic sphere. This helps prevent risks that could lead to bankruptcy (Kobugabe et Rwakihembo, 2022). In recent years, we have witnessed unprecedented financial crises. In particular, in the case of Burundi, analysis of the financial system reveals that credit granted is mainly oriented towards the trade (32.5%), equipment (24.4), construction (19.4%), agriculture (13.2%), industry (9.1%) and tourism (1.4%) sectors. Most of the credit distributed by banks is short-term (42.4%), while medium- and long-term credit represented 23.4% and 34.2% respectively in 2022, compared with 26.8% and 29.2% in 2021. The deterioration rate of the sector's credit portfolio fell by 0.7%. As a result, the overall deterioration rate fell from 3.4% at end-December 2021 to 2.7% at end-December 2022 (Banque de la République du Burundi, 2022).

This situation inevitably leads to a scarcity of foreign currency, with major repercussions in all the country's socio-economic areas. This is materialized not only by the scarcity of goods and services, but also by their high cost. This study aims to analyze the factors influencing the stability of the financial sector, using the Poisson regression model. To address this concern, the first section outlines the literature on the financial stability of a financial system. The second section reviews the methodology. The third section presents the results and their discussion. The fourth section concludes.

LITERATURE REVIEW

A financially healthy household or individual is one that has the capacity to repay its debts, and this capacity tends to increase as financial inclusion increases. Financial inclusion increases with the stability of the country's financial system (Ntwiga and Wafula, 2021). For Mody and Nedeljkovic (2018), the rate of financial inclusion is positively linked to the actions of the central bank, which are reflected in the behavior of commercial banks. It also depends on the activity financed.

So, Ozili (2020) asserts that financing social activities has a positive impact on financial stability in the short term, especially in African countries, and that in the long term, this type of financing would have negative effects on financial stability. He concludes his analysis by confirming that social inclusion has an economic value for the stability of companies and the financial system, and that in the long term, it would be desirable to direct investments into productive projects.

But Li et al (2023) point out that social activities increase social capital at corporate level and establish a stakeholder-centric culture within a bank. This synergy between stakeholders thus strengthens social trust and public confidence in the bank's risk monitoring. This inevitably leads to the maintenance of banks' financial stability. In practice, these activities depend on the nature of the monetary policies applied in the country. Indeed, policy mechanisms have an impact on the behavior of companies in

terms of short-term credit to finance long-term investments. By way of illustration, Zheng et al (2023) show that flexible monetary policy significantly inhibits the behavior of state-owned companies, especially those with low technology, and companies in regions where banking competition is high. The authors explain this state of affairs by the fact that these banks need to review the structure of the credit conditions they offer and the monetary system.

This is the banking methodological problem (Gulmira, 2023). For this author, the stability of the banking system requires an improvement in the methodological underpinnings of database creation in commercial banks, and continuous monitoring of their activity and management. This stability is also closely linked to the nature of credit. These results are similar to those of (Huang et al., 2023). For these authors, credit risk and, in particular, liquidity risk, are important determinants of short-term yield spreads.

This depends on the size of the company. In fact, long-term debt is associated with lower productivity for small and medium-sized companies, while large companies are able to use long-term financing to improve their productivity. Conversely, short-term debt is also associated with higher productivity (Nakatani, 2023). The author explains these results by (i) the moral hazard effects of long-term debt resulting from less intense monitoring of firm performance and less fear of liquidation, and (ii) the disciplinary effects of short-term debt to improve short-term performance, such as facilitating access to more productive technologies. The author concludes his analysis by saying that as the financial market develops, the positive disciplinary effects of short-term debt on productivity weaken, while the negative moral hazard effects of long-term debt dissipate.

In the Kenyan case, Kinini et al., (2023) show that there is a positive relationship between income diversification and commercial bank liquidity creation, implying that well-diversified banks have a high level of liquidity creation and vice versa. However, their study found a negative relationship between capital adequacy and liquidity creation. The authors explain this situation by the hypothesis of the avoidance of financial fragility. In order to avoid financial fragility, bank diversification efforts must be stepped up to increase liquidity creation. In addition, an optimal level of capital is needed to provide protection against shocks without having a negative impact on liquidity creation, a crucial channel through which banks contribute to the economy.

METHOD

The data used in this research are secondary data relating to the financial sector in Burundi. They were collected by the Bank of the Republic of Burundi. They cover the period from 2018 to 2023. They highlight the temporal risk of the Burundian financial sector according to the activity financed.

Given the nature of the data to be used in this article, we will use the Possion model. Poisson regression is a non-linear multiple regression model in which the dependent variable (Y) is an observed number that follows the Poisson distribution. Thus, the possible values of Y are non-negative integers(Eke, 2019). According to this author, Poisson regression accounts for the regression equation as well as goodness of fit, confidence limits, likelihood and deviance. It is used to model counting. In Poisson regression, suppose the Poisson incidence rate μ is determined by a set of k regression variables (Xi).

For Eke (2019), Poisson's law is used to model random phenomena where the future is independent of the past. The Poisson distribution is a discrete probability distribution that models the probability of y countable (discrete) events with the formula :

$$\Pr\left(Y = y/_{\mu}\right) = \frac{e^{-\mu}\mu^{y}}{y!}$$
$$(y_i = 1,2,3, \dots \dots)$$

In the Poisson distribution, mean and variance are equal and there is only one parameter. This is an extension of simple linear regression. It studies the relationship between several independent variables and al dependent variable. The regression model developed is given by :

$$Y_i = \beta_0 + \beta_1 creance\_ccial_{CT} + \beta_2 credit\_export_{CT} + \beta_3 credit\_import_{CT} + \beta_4 credit\_tresorer_{CT} + \beta_5 credit\_habit_{MT} + \beta_6 credit\_equip_{MT} + \beta_7 credit\_habit_{LT} + \beta_8 credit\_equip_{LT} + \beta_9 engag_{an} + \varepsilon_i$$

Y_i : dependent variable (in this case, the stability of Burundi's financial sector)
β_i : model parameters
ε_i : error term
X_i: independent variables

RESULTS AND DISCUSSION

To analyze the effects of each explanatory variable on financial stability in Burundi, we estimated the Poisson model. The following table shows the sensitivity of financial stability (here the variable to be explained) to each explanatory variable.

Table 1
Effects of Burundian banks' activities on the stability of the Burundian financial system

Tot_Risk	Coefficient	Std. err.	z	P>|z|	[95% conf.	interval]
Short Term						
Trade And Other Receivables _CT	.0236181***	.0287565	0.82	0.000	-.0327437	.0799798
Export Credit_CT	-.0502315	.0240375	-2.09	0.258	-.0973441	-.0031189
Import Credit After Shipment_CT	.0041999	.0275128	0.15	0.188	-.0497242	.0581239
Treasury Credit _CT	-.0492505	.0284947	-1.73	0.145	-.1050991	.0065981
Medium-Term						
Habitat Credit _MT	.0066582***	.0261842	0.25	0.000	-.0446619	.0579783
Equipment Loan _MT	.0104501	.0275121	0.38	0.232	-.0434726	.0643729
Long Term						
Credit Habitat_LT	-.0494844***	.0254719	-1.94	0.009	-.0994084	.0004396
Equipment Loan _LT	.0131617***	.0292388	0.45	0.008	-.0441453	.0704686
Signature_Commitment	.0395613***	.0326777	1.21	0.022	-.0244859	.1036085
_cons	2.329756	.2945075	7.91	0.000	1.752531	2.90698

Source: BRB data on Burundi's financial system, 2008-2023
*** ; ** and * : significance of variables at 1%, 5% and 10% respectively

The econometric results reveal that the nature of the activity financed has an impact on the stability of the financial system. The short-term trade receivables estimator has a positive effect on the stability of the Burundian financial system. Indeed, trade receivables, as a financial means offered to companies to acquire financial resources in order to improve their working capital requirements, enable them to stabilize their financed activity and thus meet their financial commitments (D'Mello and Toscano, 2020). For these authors, the uncertainty faced by companies stems from monetary and fiscal policies, taxes and regulations. These policies are profoundly changing trade credit.

These types of credit are less risky for financial institutions, and do not require them to have a large financial base to respond to borrowers' requests. In most cases, they meet cash flow needs (Stiglitz, 1990). The short-term export credit estimator has a negative effect on the stability of Burundi's financial system. Export credits are state guarantees granted to exporting companies. They are intended to support a country's exports in order to improve its trade balance through increased participation in international trade (Turguttopbas, 2013). The negative sign could be due to the nature of exports from Burundi or even the quality of these guarantees or even the practices of Burundian exporters in complying with international export standards. In practice, Burundi's exports consist mainly of unprocessed primary products. These therefore have little added value in terms of wealth creation (Andersone and Bogdanova, 2013). For these authors, exporting creates market diversification to offset sales at a time when fluctuations are observed on domestic markets. The authors conclude their analysis by saying that exports have a significant impact on domestic trade and economic stability. It is therefore desirable for the Burundian government to implement macroeconomic policies aimed at transforming locally-produced goods prior to export, on the one hand, and promoting exports, on the other.

It should also be noted that large-scale projects generally require substantial liquidity provided by banks, which importers alone do not have at their disposal to cover the entire investment expenditure. This type of business requires export know-how and a complex knowledge of the business environment. Many entrepreneurs still fail at the very beginning of their export attempts, due to lack of export experience or failure to follow the roadmap (Pícha et al, 2016).

In the medium term, housing finance has a positive effect on financial stability in Burundi, and is significant at the 1% threshold. This type of credit involves obtaining a property. Indeed, access to housing is a sine qua non condition for being productive (Aarland and Reid, 2018). Thus, promoting homeownership policy can help promote social goals as well as access to mortgage credit in order to improve individual productivity. These results are corroborated by the medium-term credit equipement estimator, which also has a positive impact on the stability of the financial system in Burundi. This implies that Burundi's financial institutions need to improve their monitoring systems, using digital techniques to transmit information on credit portfolios in a timely fashion.

For Scott and al (2024), blockchain technology appears to be a promising tool for improving transparency and reducing fraud in credit transactions. For these authors, by providing a secure and immutable record of credit and transaction histories, blockchain can improve the confidence and reliability of credit assessments. These technologies can help financial institutions make more accurate risk assessments and implement more effective risk mitigation strategies. These innovations not only improve the stability and resilience of financial operations, but also contribute to a safer and more reliable financial system.

On the other hand, the long-term credit equipement estimator has a negative effect on the stability of the Burundian financial system, significant at the 1% threshold. This is a reminder that financial institutions need to apply both prudential and non-prudential measures to monitor their credit portfolios, especially in times of reform. In this regard, Dell'Ariccia and al (2016) note that credit booms are often associated with financial reform and economic growth. For these authors, these booms also tend to be more frequent under fixed exchange rate regimes. These booms tend to be larger and last longer. They conclude their analysis by saying that macroprudential tools have sometimes proved effective in containing booms, and more often in limiting the consequences of recessions, thanks to the buffers they have helped to build.

However, Shin and al (2016) find mixed results in the Malaysian case. For these authors, there is a negative relationship between corporate credit and financial stability. This means that an expansion in corporate credit would lead to financial instability on the one hand, while an increase in household credit would not necessarily have a negative influence on financial stability on the other. It would therefore be desirable for Burundian banks to implement incentive policies to mobilize more short-term household savings.

Min and al (2023) in the Chinese case explain this state of affairs by the existence of parallel finance. For these authors, traditional bank credit and parallel bank credit affect property prices and financial tensions. They conclude their analysis by showing that (a) the effects of bank credit shocks and parallel bank credit shocks have adverse implications on housing prices partly offset each other, (b) increasing bank lending during a recession will increase financial instability, while increasing parallel bank lending in a recession will reduce financial instability, (c) that commercial bank lending plays a more important role in explaining fluctuations in house prices, while parallel bank lending plays a more important role in explaining fluctuations in financial stress.

To ensure the financial stability of Burundi's financial system, the sector needs to strengthen confidence not only in households, but also in businesses and investors. Indeed, for the financial system to function properly, households and businesses need to have confidence in it, and investors need to know what they are investing in and what risks they are taking.

CONCLUSION

The aim of this study was to analyze the effects of Burundian banks' activities on the stability of the Burundian financial system. The data used in this study come from the Banque de la République du Burundi and cover the financing activity of Burundian banks for the period 2008 to 2023. By applying the fish model, the econometric results revealed some very interesting findings, leading to economic policies to improve the stability of the Burundian financial sector.

Indeed, the financing of short-term trade receivables has a positive effect on the stability of the Burundian financial sector, while export credit has a negative effect on the stability of the financial sector. These results reveal a low contribution from products originating in Burundi, thus contributing to the instability of the Burundian financial sector through the deterioration of the credit portfolio. In order to make up for this shortfall, the Burundian government should put in place incentive policies aimed at developing the business sector to ensure not only production but also the processing of high value-added local products prior to export.

Similarly, Burundian banks must comply with prudential and non-prudential measures decreed by the central bank in order to improve the stability of the financial sector. To achieve this, Burundian banks need to design and implement more appropriate

technology for exchanging borrower data, in order to improve transparency and reduce fraud in credit transactions.

As a result, this work has highlighted the effects of Burundian banks' activities on the stability of the Burundian financial system. Due to the lack of data on the demand for banking services, we have used supply-side data in this research. To complete this analysis, it would be interesting to analyze the same theme from the demand side.

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