

# Financial Market Stimulants in the Democratic Republic of the Congo: Experimental Analysis of the Impact on Financial Securities Volume

Matabaro Senga<sup>1</sup>, Gilbert Niyongabo<sup>2</sup>, Théogène Nsengiyumva<sup>2</sup>, Janvier Mwisha Kasiwa<sup>3</sup>

<sup>1</sup>Ecole Doctorale, Université du Burundi, Bujumbura, Burundi

<sup>2</sup>Faculty of Administration and Management, Department of Economics Sciences, University of Burundi, Bujumbura, Burundi

<sup>3</sup>Faculty of Administration and Management, University of Goma, Goma, Democratic Republic of the Congo

Email: senga.matabaro@student.ub.edu.bi, niyongabog@gmail.com, nsengiyumvatheogene@yahoo.fr, kasiwaja@gmail.com

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## Abstract

This study examines financial market stimuli and their impact on financial securities development in the DRC from 2005 to 2023. Despite low volume, financial securities are influenced by various factors, notably the enduring effects of financial companies' net income, enhancing long-term investor confidence. Notable stimuli include inflation rates and interbank market volume, with stable inflation fostering economic growth and benefiting securities during expansion. Additionally, macroeconomic factors like GDP and monetary policies such as interest rates play pivotal roles. This research underscores the interplay of diverse variables in shaping the Congolese financial landscape and highlights both short-term and long-term effects. To achieve the desired results, we were able to identify the central bank as our unit type to procure the requisite data concerning the volume of financial securities, interbank market volume, interest rate, inflation rate, and an array of other variables. Additionally, the ordinary least squares method proved instrumental in determining the effects of the explanatory variables on the dependent variable in our study.

## Keywords

Debt Securities, Financial Market, Financial Market Stimulants, DR-Congo

## 1. Introduction

The financial market is one of the key tools for fostering corporate finance and, potentially, economic growth. Every productive enterprise requires capital, and

the financial market, particularly the stock market, serves as a platform for raising funds (Aidi, 2022). This pursuit of funding is crucial for driving economic activity and growth.

Globally, stock markets, such as the New York Stock Exchange, with a market capitalization of \$23.12 trillion as of March 2018, and NASDAQ, with a market capitalization of \$10.93 trillion, have been established to stimulate financial and economic revitalization. Other significant stock exchanges include the Tokyo Stock Exchange, housing over 3575 listed companies with a market capitalization of \$6.22 trillion, and the Shanghai Stock Exchange, with a market capitalization of \$5.01 trillion (Hakkou & Berjaoui, 2020). These findings align with those of (Boultache, 2022; Aidi, 2022; Lila & Naima, 2022; Ahlam et al., 2020), all emphasizing the pivotal role of the financial market in economies, particularly in the African context.

Several studies have been conducted on this issue to shed light on the determinants of the financial market and their contributions to its development. To address the various challenges related to the underdevelopment of the financial market as a driver of economic growth, Konte et al. (2017) conducted a study aiming to investigate the determinants of stock market development in Sub-Saharan Africa. The authors used the variable of stock market capitalization as a percentage of GDP as a measure of stock market development. For the banking sector and economic growth, broad money supply and the rate of economic growth per capita (differentiated value of the logarithm of GDP per capita) were utilized. Other economic factors, including stock market turnover rate, inflation rate, level of foreign direct investment as a percentage of GDP, degree of trade openness, and exchange rate, were used as control variables. The study's results reveal a reciprocal causality between economic growth, broad money supply, and stock market capitalization, validating the use of Panel-VAR. An improvement in economic growth leads to an increase in stock market capitalization. However, an increase in broad money supply leads to a short-term decrease in stock market capitalization (substitution effect), but the effect becomes positive in the medium term. Furthermore, the results show that all control variables except the growth rate of Foreign Direct Investment as a percentage of GDP and the exchange rate have a significant effect on stock market capitalization, as well as its value lagged by one period. The inflation rate negatively influences stock market capitalization, while the Luxembourg economy is heavily dependent on the financial sector.

In China, for example, a study examines the impact of capital market openness on Corporate Environmental Performance (CEP). The authors concluded that capital market openness is accompanied by an increase in company value (Zhang et al., 2023). The majority of research analyzing the relationship between shareholder presence and company performance finds positive relationships. This is evident in Egypt with the work of (Azzam et al., 2013), and in Ghana, Kenya, and Zimbabwe, with a study conducted by (Ramachandran & Shah, 1998).

Additionally, the role of interbank market intervention in financial market

development in certain regions is noted. The behavior of interbank market rates after the global financial crisis has drawn the attention of various economies, and the interbank market has quickly become one of the main indicators of market tensions and expectations (Angelini et al., 2011; Kanyumbu, 2021; Quartey & Gaddah, 2007).

Studies conducted between 2018 and 2024 have demonstrated the importance of financial market stimuli for the development of financial securities. The identified solutions include accommodative monetary policies, fiscal stimuli, strengthened regulations, targeted government initiatives, and technological innovations. These interventions have collectively contributed to the growth and stabilization of financial markets, thus fostering an environment conducive to the development of financial securities (Bosire & Maina, 2021; Huang, 2019).

The study (Bernanke, 2019; Vyas & Bajaj, 2020) examines the impact of negative interest rate policies on the development of financial securities markets in several developed economies. The analysis shows that these policies have stimulated investment in stocks and bonds by making borrowing cheaper and encouraging risk-taking by investors. The analysis of the effects of fiscal stimuli, such as tax cuts and increased public spending, on stock market performance in different countries indicates that tax cuts for businesses and individuals have had a significantly positive impact on stock market growth (Doetsch, 2023).

The objective of this article is to understand the factors influencing the financial market in the Democratic Republic of the Congo (DRC), specifically focusing on their impact on the volume of traded financial securities, in order to better comprehend the underlying mechanisms and propose recommendations for improving the financial system. Utilizing panel data spanning from 2005 to 2022, the objectives include:

- Identifying the economic, political, and technological factors driving the financial market in the DRC;
- Examining the effect of these stimuli on the volume of financial securities transactions;
- Offering policy recommendations and strategies to strengthen the Congolese financial market and promote sustainable economic growth.

To achieve these objectives, the paper will address a key question: What are the primary factors driving the financial market in the Democratic Republic of the Congo (DRC), and how do these stimuli affect the volume of financial securities traded on the market? This central question is accompanied by a set of important inquiries, including: What are the key factors driving the financial market in the Democratic Republic of the Congo (DRC)? How do these stimuli impact the volume of financial securities traded on the market?

## 2. Methods and Methodology

Unit-type sampling is a non-probabilistic research method used to select participants or elements from a population by first identifying representative unit types

(Ajar et al., 1983; Huot, 2003), and then including them in the sample. This method is commonly used in qualitative studies, particularly in field studies in anthropology, sociology, and other social science fields where it is difficult or impossible to define an exhaustive list of the population (Gil-Pérez, 1993; Godard & Hubert, 2002; Merah, 2020; Kisa et al., 2023).

With this method, we successfully selected the central bank as our unit type to determine the necessary data related to the volume of financial securities, inter-bank market volume, interest rate, inflation rate, and many other variables.

The Ordinary Least Squares (OLS) method (Baey, 2019), was employed to determine the problem model. To verify if the identified stimuli in the DRC have a significant impact on the existence of the financial market in the DRC, and thus deduce that they are also significant tools in shaping or organizing the financial or stock market to boost its volume, we will estimate an Auto Regressive Distributed Lag (ARDL) model. This model, belonging to the category of dynamic models, allows for the consideration of temporal elements (adjustment time, expectations, etc.) when explaining a variable. The independent variables and their lagged values over time are their own lagged values. The characteristics of these types of models are drawn from two previous models and are referred to as Auto Regressive Distributed Lag (ARDL) models. The following forms are:

$$TCA_t = \varpi_0 + \sum_{i=1}^p \beta_i Vmf_{t-i} + \sum_{i=1}^q \gamma_i X_{t-i} + \varepsilon_t \quad (1)$$

where represents all the components of the lagged financial market stimuli that explain this dynamic model. Following the stationarity test by Pesaro (2001), which is among the quintessential tests in multivariate models, the appropriate model for our data is the ARDL model as mentioned above.

### 3. Theoretical Framework on Financial Securities

This section focuses on explaining financial securities in a general manner, whereas, in a specific fashion, we will present each security and its implication in creating enterprise value.

Companies, regardless of their size, require financing throughout their lifecycle for various purposes. Whether it's to raise funds to support growth, transition to a new strategy, bolster cash reserves during tough times, or simply meet the standard obligations required by their operations, companies may turn to various external financing options (Sobreira, 2004) such as bank loans, crowdfunding, equity capital liberalization, or issuing securities in the financial market, as they may not always have sufficient internal resources.

Since 1985, funding levels have ranged annually between 600 billion francs and 1 trillion francs. Up until 1991, they were primarily provided by the banking system, accounting for approximately 50% to 60%, and by markets for 40% to 50% (Icard & Drumetz, 1994). Every year, additional resources ranging from 300 billion francs to 400 billion francs have been injected into the economy in the form of stocks, bonds, or short and medium to long-term securities. In 1992, the

percentage of non-intermediated financing rose to 80%, a trend that intensified in 1993, while the amount of credit extended to resident agents remained largely unchanged (Icard & Drumetz, 1994).

Sub-Saharan Africa experiences economic underdevelopment linked to financial underdevelopment. Currency often constitutes the sole financial asset. Monetary markets are few and inactive. There is little issuance of commercial paper by corporations, certificates of deposit by banks, or tradable Treasury bills. Financial markets are either in their infancy or nonexistent (Hugon & de Bandt, 1988). The state is the primary player (public debt, securities of public corporations), and institutional operators conduct over 90% of transactions. The banking system, supported by Hugon (Blommestein & Horman, 2008), is exclusionary towards the majority of the population in terms of deposits and towards the vast majority of operators in terms of loans. The establishment, under voluntarist policies during independence, of state-backed financial systems with external aid supplementing the network of commercial banks of colonial origin, has not yielded the expected results.

The value of negotiable security fluctuates with the market: equity securities (stocks) or debt securities (bonds). This market-driven fluctuating value serves as the basis for calculating expected returns (Sidibe & Broma, 2019; Sindayizeruka, 2023).

### **Short-Term Capital Market (Short-Term Negotiable Securities Market)**

Negotiable debt rights on financial markets are called negotiable debt securities (NDS). They represent a distinct segment of the money market, covering maturities ranging from one day to five years, depending on their nature. They are issued by corporations, financial institutions, and the government to meet their short-term liquidity needs (Berger, 1986; Dupuy et al., 2018). An NDS represents a subscriber's claim on the issuer and earns a freely negotiated interest rate, either fixed or variable. They are negotiable and highly liquid compared to other securities, but they are dematerialized securities.

The NDS market (Montoussé, 2006) is divided into two distinct parts: the first concerns short-term securities with an initial duration of less than 1 year, while the second concerns medium-term securities with a duration of more than 1 year and can be traded on a regulated market (Berger, 1986).

Since May 2016, the market has been organized around three types of NDS: Negotiable European Commercial Paper (NEU-CP), Negotiable European Medium Term Note (NEU MTN), and French Treasury Bills (BTF) (Beitone & Rodrigues, 2017). The NDS market is composed of four segments which we will illustrate as follows: A treasury bill is a borrowing instrument issued by the government that can be redeemed at the end of the contract. A treasury bill is a debt representing a loan issued by a government (de Emmanuel Zamble, 2017). The holder of a treasury bill becomes a creditor of the government as an investor-saver. The government, in turn, commits to repay it at a predetermined maturity date

and to pay interest to the holder. The money market allows the trading of treasury bills on the stock exchange. They are classified as Negotiable Debt Securities (NDS).

Commercial papers are negotiable debt securities, issued at par for a minimum amount and a certain duration. They are debt securities created in December 1985 (Belouard & Seder, 2009) and (Montoussé & Dominique, 2023) and traded, issued by companies on the money market for a duration ranging from one day to one year, and they yield a freely negotiated fixed interest rate at issuance referencing the money market. The issuance of commercial paper is permitted provided that the issuing company has been in existence for two years and has produced two certified balance sheets (Berkani & Chabli, 2018; Chambost, 2013; Ahlam et al., 2020; Braquet & Mourey, 2018).

Established in February 1992, negotiable medium-term notes (NMTN) are medium and long-term securities. These notes have a duration at issuance ranging from 1 year to unlimited. They are accessible to all issuers capable of issuing certificates of deposit or commercial paper. There are two categories: assimilable NMTN (the issuer regularly contributes to a parent security or root security) and structured NMTN issued on a case-by-case basis (Cohen, 1991). Entities with negative cash flows seeking short-term funding resort to issuing negotiable securities such as commercial paper. They serve as financing instruments for large corporations and banks.

## 4. Negotiable Securities in the Financial Market

The financial market has played a significant role in financing the modern economy, transitioning from a debt-based economy to a market economy. Generally, it represents the entirety of long and medium-term demands and offers. The financial market is a medium and long-term capital market where stocks and bonds are the primary traded assets (de Emmanuel Zamble, 2017).

### 4.1. Stock Market

A stock represents ownership percentage in a company. The stockholder has the right to inspect the generated income and all securities issued by the company of which they are shareholders. They also have entitlement to profits (dividends) and capital gains generated through increasing prices (Jean-Pierre, 1998).

The collective stocks represent the equity capital of a company because, during its establishment, associates contribute funds for the company's formation, thereby becoming shareholders and owners of the enterprise.

When a company opens its capital to external fund providers, it issues stocks through a public offering, and these stocks are traded on the stock exchange. Each shareholder holds a set of rights which we will mention later, and the stock entails two types of income: dividends (variable income in the form of compensation or profit distributed to shareholders) and capital gains (income generated by selling stocks and obtained by the difference between the purchase price and the selling price). Generally, we find common or ordinary stocks, but there are different types

of stocks.

## 4.2. Bond Market

A bond is a debt instrument that can be issued by a private or public company, the government, or public authorities. It is a loan component typically issued for 10 to 20 years. Interest payments are made to the bondholders. “The Stock Exchange” (Cohen, 1991; Ahrikenchikh & Aberkane, 2021).

We understand that a bond is a debt security (a security representing a debt) for the issuer and a claim for the subscriber representing a fraction of a loan typically of medium to long-term with a well-defined maturity date (Foli, 2019).

Through this instrument, the issuer (the borrower) acknowledges that they will have to pay the holder (the lender) a series of predetermined financial flows, including the repayment of this fraction of the loan and the interest due on it, throughout the life of the bond. The debt security can be traded on the financial market after its issuance (Cohen, 1991). The main advantage of a bond over a traditional bank loan is that it offers some liquidity to the holder. Therefore, the identity of the bondholder (the lender) may change during the life of the security due to the succession of buying and selling transactions.

## 4.3. Other Stimulants of the Financial Market

### 4.3.1. Central Bank Monetary Policy

The actions of central banks, such as lowering or raising interest rates, quantitative easing programs, or adjustments to reserve requirements, can have a significant impact on financial markets.

When a central bank has brought short-term nominal interest rates close to zero, it is generally believed that monetary policy can do no more to stimulate the economy. Empirical analysis of the American experience during the Great Depression, a period when short-term Treasury bond rates practically reached a zero threshold, has demonstrated that this theory is clearly incorrect (Dai et al., 2007). Through open market operations, central banks can pursue an expansionary monetary policy aimed at increasing liquidity within the economy, but this does not necessarily only involve short-term government securities (Zhang et al., 2023). By fostering expectations of a general price level increase and boosting prices of other assets, this liquidity expansion promotes economic recovery, thereby stimulating overall demand through the channels described earlier. Consequently, monetary policy can play a crucial role in economic recovery in situations where short-term interest rates are nearly zero. Implementing an expansionary monetary policy is the essential tool for enabling the revival of a deflationary economy, given the inherent delays in fiscal policy and the political constraints on its use (Soumare, 2009).

### 4.3.2. Central Bank's Role in Financial Stability

It is justified that central banks play a significant role in financial stability (Patat, 2000) because assuming responsibility for monetary stability inherently promotes

financial stability. However, these institutions also have a crucial responsibility, which manifests in various ways in two essential areas for financial stability: banking regulation and supervision on one hand, and the security of payment systems on the other. One of the twenty-five fundamental principles mentioned earlier, stating that banking supervision should be conducted by an independent body, can be the source of legitimacy for the responsibilities of central banks in the realm of regulation and banking supervision.

#### 4.3.3. Economic Indicators

Economic data such as GDP, inflation, employment, retail sales, etc., can impact investor confidence and influence investment decisions.

According to (Jeanneney & Kpodar, 2006), there are two measures to gauge financial progress at the end to demonstrate the role of the GDP factor in promoting the financial market: the proportion of liquid assets to GDP or loans granted by financial intermediaries (other than the central bank and government agencies) to the private sector. These two ratios are not identical. The first examines the impact on the development of economic monetization (reduction of transaction costs, McKinnon effect). The second, by excluding credit for the public sector, illustrates the role of financial intermediaries in financing the productive sector. They have been used interchangeably as there was a strong correlation between the two indicators of financial development. Each of them is linked to an instability indicator. It consists of the average of the absolute values of the residuals from the estimation of the long-term trend of the considered ratio, calculated over each five-year period and performed separately for each country in the sample over the entire estimation period. This measure of financial instability assumes that growth is affected by absolute variations in the Liquid Assets/GDP or Credits/GDP ratio rather than by the percentage change in this ratio, which would have led to calculating the average deviation (or standard deviation) of the growth rate of the financial development ratio.

Empirical findings (Claeys, 2016) clearly support a balanced financial system structure between banks and markets to maximize their positive effects on growth.

#### 4.3.4. Capital Flows

Capital movements across different geographical regions can influence exchange rates, interest rates, and other financial variables. When a country attracts foreign capital, it experiences an increase in demand for its currency, as investors need to convert their original currency into the local currency to invest. This can lead to an appreciation of the local currency against other currencies. Conversely, when capital flees a country, there is an increased supply of its currency in the foreign exchange market, which can result in depreciation of its currency (López-Mejía, 1999).

Capital flows are often also influenced by interest rate differentials between countries. Investors tend to seek higher returns, so a country offering higher interest rates can attract capital flows. This can lead to an appreciation of its currency.

Decreases in interest rates in a country can lead to capital outflows, which can result in depreciation of its currency. Investors tend to seek stable economic and political environments for their investments. Capital flows to countries perceived as stable can strengthen their currency, while outflows can weaken their currency if stability is called into question. Although massive capital flows can bring significant economic benefits to developing countries, if mismanaged, they can also lead to economic overheating, increased exchange rate volatility, and eventually an exodus (López-Mejía, 1999). How can governments reduce risks while maximizing benefits?

During the 1990s, many countries experienced financial crises due to an influx of foreign capital, casting doubt on these flows' ability to stimulate long-term economic growth in developing countries. While capital flow volatility certainly hampers growth, it appears that countries are becoming better at managing it (Ducastel, 2016; Mishra & Mody, 2001). Therefore, the possibility of reaping a growth dividend is offered by the inexorable process of global financial integration; however, it is not automatic: it must be earned. Moreover, an increase in outflows and a change in the composition of transfers imply that the positive impact of capital flows on growth will evolve as countries open up to capital movements. The main impact will change, shifting from stimulating growth through investment to increasing productivity.

The impact of capital flows on growth depends on the improvement of national policies over time, the speed at which countries loosen control over capital movements, and the evolution of the composition of flows. Beyond these key drivers, we have geopolitical events, company reports, investor psychology, technology, and innovation.

## 5. The Stimuli of the Financial Market and Their Contribution to Financing Financial Enterprises in the DRC: A Philosophical Approach

In this subsection, we aim to analyze the impact of stimuli on the financial market and their contribution to financing financial enterprises in the Democratic Republic of the Congo (DRC). We will thus examine two aspects: a reminder of the research hypotheses and the analysis and interpretation of these hypotheses.

Data: Nature and Source:

The data under study are annual and sourced from the databases of the Central Bank of Congo (BCC). They cover the period from 2005 to 2023, spanning a duration of 19 years. **Table 1** below outlines the variables used.

Global characteristics of the distribution:

Descriptive statistics will provide us with a range of tools to summarize, analyze, and interpret the data. In the context of our study, below are valuable insights on distribution, central tendency, and dispersion of variables as follows.

From **Table 2** below, it is notable that all variables are generally volatile based on the standard deviation (std. Dev). It will be preferable to use the Augmented

Dickey-Fuller (ADF) test rather than the Andrews Zivot test to verify the unit root of all variables, which are affected by other explanatory variables such as the economy or the finance of financial enterprises in the Democratic Republic of the Congo or related to national behavior.

**Table 1.** Study variables.

Model Variables	Nature in the Model	Label	Expected Consequences
VM-Inteba	ID	Interbank Market Volume	+
TCA	DV	Debt Securities and Equivalents	
Tximo	ID	Interest Rates (Indicator of the Central Bank's Monetary Policy)	+
McapDeb	ID	Debit Capital Movements	-
Txinf	ID	Inflation Rate (One of the Economic Indicators)	+
Rnet	ID	Net Income of Financial Enterprises	+
CA	ID	Net Banking Income	+
Pib	ID	Gross Domestic Product (One of the Economic Indicators)	+

Source: Author (our estimations using Stata 18).

**Table 2.** General characteristics of our distribution.

Variable	Obs	Mean	Std. Dev	Min	Max
TCA	19	200.1022	261.1658	0.001	1006
Pib	19	1.59e+07	2.70e+07	5670065	1.27e+08
VMInteba	19	1837.811	1782.625	99.9	6575
McapDeb	19	189.645	146.9596	10.5	493.1
TxiMo	19	15.39842	16.02787	1.61	66.5
CA	<b>19</b>	499.1489	279.042	136.9	1058.6
TxInfla	<b>19</b>	8.071632	10.62843	0.001	42

Source: Author (our estimations using Stata 18).

## 6. Result

It is important to emphasize that we used Stata 18 software to study the stationarity of the series, perform co-integration tests, causality tests, and conduct estimations. In its "18" version, this software, which is also suitable for econometric analyses and user-friendly, allows for various tests that were not integrated before (in other versions of the software) such as the bounds co-integration test, the Toda-Yamamoto causality test, etc.

### 6.1. Stationarity of the Series

A time series whose mean and/or variance varies over time is said to be non-

stationary; this non-stationarity (of the deterministic or stochastic type), if not treated (stationarized), can lead to “spurious” regressions. Recall that several tests help to verify whether a series is stationary or not (has a unit root): Augmented Dickey-Fuller/ADF test, Phillippe-Perron/PP test, Andrews and Zivot/AZ test, Ng-Perron test, KPSS test, Ouliaris-Park-Perron test, Elliott-Rothenberg-Stock test, etc. Of all these tests, the first three are easy to apply and commonly used. In fact, the ADF test is effective in case of error autocorrelation, the PP test is suitable in the presence of heteroskedasticity, and the AZ test is used for a series that shows a structural break or regime change identified endogenously. In this study, we used the ADF test, and the results are as follows:

From **Table 3**, it follows that the interest rate in the Democratic Republic of the Congo is stationary at level, meaning a stable or constant interest rate over an extended period. This implies that the interest rate in the DRC does not fluctuate significantly in either direction but rather remains relatively constant around a given value. This is indicative of a consistent and stable monetary policy conducted by the Central Bank of Congo during the period from 2010 to 2019, as well as overall macroeconomic stability, as you can also observe stationarity at level. If the central bank acts predictably and does not make drastic changes to its monetary policy, this can stabilize interest rates.

**Table 3.** Series stationarity tests with ADF at 5% threshold.

	<i>P</i> -Value (level)	<i>P</i> -Value (First Difference)	Constant
TCA	0.8371	0.0000	I(1)
Tximo	0.0345	-	I(0)
McapDeb	0.3876	0.0003	I(1)
Txinf	0.0596	0.0002	I(1)
Rnet	0.9018	0.0006	I(1)
CA	0.9933	0.0016	I(1)
Pib	0.0013	-	I(0)
VM-Inteba	0.0301	-	I(0)

Source: Author (our estimations using Stata 18).

Stationary debt securities in first difference refer to debt securities that have a constant rate of difference between interest rates. In other words, these securities have payment flows that vary at a constant rate relative to a reference interest rate, as you would notice in the DRC in the table above, often a risk-free rate, of course, which attracts investors like Treasury bonds and others.

## 6.2. Cointegration Test and Model Estimation

Cointegration Test: The Pesaran cointegration test is a powerful method for testing cointegration in panel data, providing robust analysis of long-term relationships between variables observed across multiple entities and periods (Pesaro,

2001).

In accordance with the results of the Pesaran test (**Table 4**), bounds cointegration test confirms the existence of a cointegration relationship (i.e., a long-term relationship) between the explanatory variables and the explained variable including debt securities and other similar securities. This is because the Snedecor's F-test appeared to be greater than all the test bounds (the value of F-stat is >than that of the upper bound). This provides the opportunity to estimate the long-term effects of debt securities and its explanatory variables as discussed above, and foremost, we attempt to take a glance at the correlation and causality between variables.

**Table 4.** Pesaran test bounds.

Variable	TCA, Rnet, TxInfla, TxiMo, VMInterb	
Calculated F-Stat	13.925	
Critical Threshold	Lower Bound	Upper Bound
1%	2.45	3.52
5%	2.86	4.01
10%	3.74	5.06

Source: Author (our estimations using Stata 18).

### 6.3. Correlation Coefficients and Multicollinearity Analysis Test

The simple correlation matrix between variables below indicates a weak link between the dependent variable (TCA) and the explanatory variables, with the degree of association not exceeding 0.50 in the first column, except for a significant correlation with net income of banks where this coefficient is 0.8087, representing a determination degree of 65.39%. However, there seems to be a potential multicollinearity between the inflation rate (TxInfla) and the volume of the interbank market, although not significant. In other words, when the inflation rate increases, the volume of transactions in the interbank market tends to increase as well (**Table 5**).

**Table 5.** Correlation matrix with significance coefficients.

	TCA	Rnet	TxInfla	TxiMo	VMInteba
TCA	1.0000				
Rnet	0.8087	1.0000			
TxInfla	0.2394	0.0468	1.0000		
TxiMo	-0.1561	-0.3704	-0.1559	1.0000	
VMInteba	0.2589	0.2576	0.5877	-0.3228	1.0000

Source: Author (our estimations using Stata 18).

This may indicate that banks are seeking ways to manage the effects of inflation on their activities, for example by increasing interbank exchanges to offset inflationary pressures.

#### 6.4. Estimation of the Corrected Model

The information criterion (AIC) was used to select the ideal ARDL model, the one that provides statistically significant results with the fewest parameters. The estimation results of the optimal ARDL model are presented below (Table 6):

**Table 6.** ARDL (1,1,0,0) regression.

Sample: 2010-2022		Number of obs = 13				
Log likelihood = -41.028881		R-squared = 0.9238				
		Adj R-squared = 0.8604				
		Root MSE = 10.4511				
D.TCA	Coef	Std.Err	t	P >  t	[95% Conf. Interval]	
ADJ						
TCA						
L1.	-1.865423	0.2863922	-6.51	0.000	-2.503545	-1.227303
LR						
Rnet	5.326255	0.4381913	12.16	0.000	4.349904	6.302606
TxiMon	2.003553	1.32189	1.52	0.161	-0.9418011	4.948907
TxInfla	8.07358	1.626366	4.96	0.001	4.449811	11.69735
VMInteba	-0.07223448	0.0142663	-5.06	0.000	-0.1040222	
SR						
TxiMo						
D1.	-3.18402	1.863784	-1.71	0.118	-7.336788	0.9687492
WMInteba						
D1.	0.0762023	-0.0207238	3.68	0.004	0.0300276	0.1223788
_Cons	11.38561	86.11108	0.13	0.897	-180.4818	203.2531

Source: Author (our estimations using Stata 18).

A long-term relationship between the net income of financial companies in the DRC and debt securities, as demonstrated by our model, is explained by several interdependent factors. Financial companies, including banks, often invest a portion of their equity funds in debt securities to generate income. Thus, their net results are influenced by the returns and performance of the debt securities they hold (Hakkou & Berjaoui, 2020; Kanyumbu, 2021). Further analysis of the coefficients of this model is provided in the following sections. Other Model Tests: Autocorrelation, heteroscedasticity, normality, and kurtosis tests in an ARDL model are crucial for assessing the model's fit to the data and verifying whether underlying statistical assumptions are met. These tests help identify potential issues in model specification or data, thereby enhancing the reliability of econometric

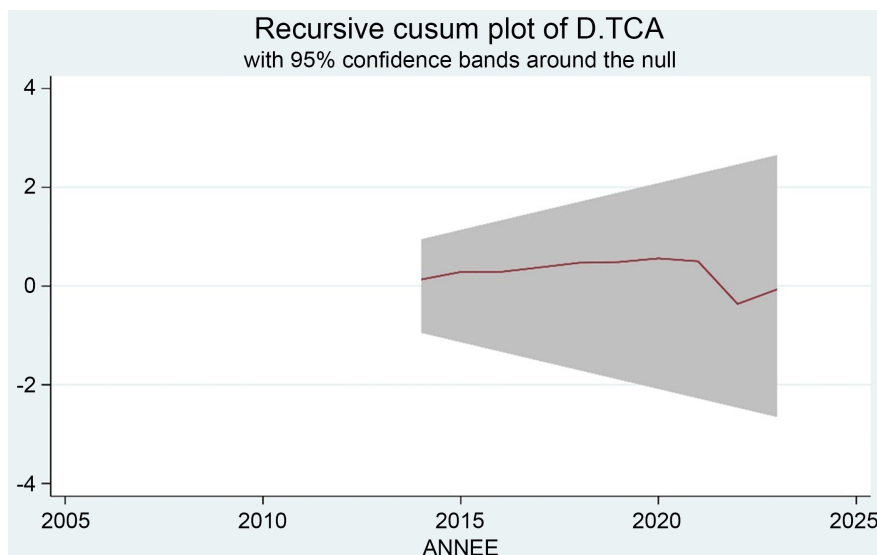
results obtained from the ARDL model. The null hypothesis states that there is no autocorrelation (Table 7).

**Table 7.** Other model test.

Hypothesis to Test	Hypothesis Tests	Test Statistic Value	Probability
Autocorrelation	Breusch-Godfrey	5.035	0.024
	Durbin-Watson	2.69755	$1.9 \leq P \leq 3$
Heteroscedasticity	Breusch-Pagan-Godfrey	9.22	0.0024
Normality	Skewness/ Kurtosis	2.23	0.3284
Skewness	White	3.80	0.8021
Kurtosis	White	0.88	0.3486

Source: Author (our estimations using Stata 18).

All these tests accept the null hypothesis. Thus, our model is statistically confirmed. The estimates of the ARDL model (1, 0, 1, 0, 1) are generally satisfactory and explain 88.53% of the variation in financial securities traded on the interbank market in the DRC from 2005 to 2023. The Skewness test shows low information asymmetry. Model Stability Test: The model stability test is used to evaluate whether the parameters of an econometric model remain constant over a given period of time. This test indicates that the regression coefficients are stable over the considered time period, which enhances confidence in the results of our model and the ensuing analyses as shown in Figure 1.



**Figure 1.** Cusum test.

### 6.5. Discussion: Analysis of Long-Term Coefficients and Short-Term Dynamics of the Model

In the above model, the adjustment coefficient, or the force of recall, is statistically significant, standing at  $(-1.8654)$ . This ensures the existence of an error correction

mechanism, hence the presence of a long-term relationship (cointegration) between the variables (See **Figure 1**). More specifically, an adjustment or error correction coefficient of  $-1.8654$  indicates that if a variable in this model is one unit above its long-term equilibrium level, it will decrease by approximately 1.8654 units per period until it reaches this equilibrium (Victor et al., 2023; Juma et al., 2016; Sindayigaya, 2023a, 2023b). Similarly, if it is one unit below its long-term equilibrium level, it will increase by approximately 1.8654 units per period until it reaches equilibrium. Additionally, we note the following (See **Tables 1-3**).

The above model provides us with the estimated long-term coefficients or elasticities. Here, we find that the effects of net income generated by financial companies in the Democratic Republic of Congo on the emergence of financial securities remain positive in the long term and appear to be more than proportional: a \$1 million increase in the company's value one year later leads to a \$5.326255 million increase in the volume of debt securities in the long-term securities market.

$$\frac{\partial TCA}{\partial Rnet} = 5.326255 \text{ Million} \quad (2)$$

Furthermore, unlike the short-term results, the volume of the interbank market exhibits negative effects on the volume of financial securities (Agliardi & Agliardi, 2019; Hong & Kim, 2005; Ndayisenga & Sindayigaya, 2024; Nduwimana & Sindayigaya, 2023a, 2023b; Sindayigaya, 2024). A negative coefficient suggests an inverse long-term relationship between the interbank market volume and long-term debt securities, although there is no robust relationship between the two variables; this coefficient is economically weak in the specified model (See **Table 4** and **Table 5**). A one million increase in the interbank market volume is then associated with a decrease in long-term debt securities of  $-0.072$  million, and vice versa, while both variables indicate a positive relationship between them in the short term.

Similarly, a positive long-term coefficient of inflation rate on debt securities is observed, indicating a positive relationship between these two variables in the long term, whereby a 1% increase in the inflation rate is associated with an increase in volume ranging from 8.073 million in debt securities volume, and vice versa (See **Table 6**). This implies that, over the long term, an increase in the inflation rate in the Democratic Republic of Congo (as it is for all economic indicators such as GDP) may coexist with an increase in debt securities.

$$\frac{\partial TCA}{\partial TxInfla} = \$8.073 \text{ Million} \quad (3)$$

Additionally, a positive long-term and negative short-term relationship between the interest rate and debt securities is also noted, although the coefficients are not greatly significant.

## 7. Conclusion

A positive net income from financial companies reflects their financial health and ability to generate profits, thus enhancing investors' confidence in the long-term

financial market of the DRC. Profitable financial companies can attract investors by offering attractive return opportunities, thereby stimulating investment in the financial market and contributing to the country's economic development.

To achieve this, the implementation of policies that promote a stable, predictable, and business-friendly environment can encourage the growth of financial companies and their ability to generate profits in the long term. This may include streamlining administrative procedures, reducing excessive tax burdens, and protecting property rights. It is also essential to establish robust and effective regulations to oversee the financial market, protect investors, and ensure market transparency and integrity. This can help strengthen investor confidence and reduce systemic risks. Enhancing financial education for investors and the general public can help improve understanding of financial markets, promote more informed and responsible participation, and reduce speculative behaviors. The Democratic Republic of Congo should encourage innovation in financial products and services to stimulate the growth of the financial market by offering new investment opportunities and meeting the diverse financial needs of financial companies.

A moderate and stable inflation rate can promote economic growth by encouraging consumption and investment. In this context, financial securities can benefit from an expanding economy and potentially higher long-term return prospects as observed in this study. In a moderate inflation environment, investors may seek financial assets offering inflation-adjusted returns. Financial securities that manage to generate positive real returns can therefore become attractive to long-term investors.

To this end, the monetary authorities of the DRC must adopt a prudent monetary policy aimed at maintaining moderate and stable inflation. This may require close monitoring of the money supply, interest rates, and other economic indicators to prevent excessive inflation or deflation. In addition to effective monetary policy, it is essential to promote overall macroeconomic stability. This involves maintaining sound public finances, fostering a favorable business climate, strengthening financial regulation, and promoting transparency in the financial market. They must also encourage diversification of financial instruments available in the market to offer investors a range of options to meet their needs and preferences. This may include the development of inflation-indexed financial products or products linked to other underlying assets.

A high volume in the interbank market can have a positive short-term effect on financial securities by improving market liquidity and facilitating transactions, as our study results demonstrate. This stimulates activity and demand for short-term financial securities. However, a negative long-term effect suggests that excessive volume in the interbank market could be associated with systemic risks or inefficiencies in the financial system, which could affect long-term stability and confidence in financial securities.

After conducting this study, we observe that it is crucial to enhance regulation and supervision of the interbank market to reduce risks and ensure its proper

functioning. This may include measures to limit risky practices and strengthen capital requirements for financial institutions. Increasing transparency in the interbank market can help reduce information asymmetries and strengthen investor confidence. This may involve regular publication of information on interbank transactions and financial positions of institutions.

This study encourages financial companies in the DRC to diversify their sources of funding beyond the interbank market to ultimately reduce their dependence on it and mitigate the long-term negative effects on financial securities. This may include the development of more robust capital markets and support for non-banking institutions such as bond markets and investment funds

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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