

The impact of credit risk management on improving economic growth levels in Algeria during the period 2000-2023

أثر إدارة المخاطر الائتمانية في تحسين مستويات النمو الاقتصادي في الجزائر خلال الفترة 2000-2023

Hamza Djilali Toumi*, Djilali Bounaama University of Khemis Miliana (Algeria)

Laboratory of Digital Economy in Algeria

Hamza.toumi@univ-dbk.m.dz

Received: 04/09/2025; **Revised:** 09/11/2025; **Accepted:** 31/12/2025

Abstract:

This study aims to examine the impact of credit risk management on economic growth in Algeria during the period 2000–2023, employing the Autoregressive Distributed Lag (ARDL) model, which allows for the assessment of both short- and long-term relationships between the variables under investigation. The findings reveal that a one-unit reduction in non-performing loans, resulting from effective credit risk management, contributes to an improvement in economic growth by 0.50 units. Moreover, economic growth is positively influenced by inflation control through monetary policy instruments, as a one-unit decrease in inflation leads to an increase of 0.41 units in the economic growth index.

Keywords: Credit risk; Non-performing loans; Economic growth; monetary policy; ARDL.

Jel Classification Codes: G21; G32; E44; O47; C32.

* Hamza Djilali Toumi

I- Introduction :

The Algerian economy has undergone many fundamental changes since the 1990s, perhaps the most prominent of which is the transition from a socialist economy oriented towards a market economy based primarily on the bases of supply and demand. This new trend required radical reforms, especially with regard to the banking system, as the banking system of any country consists of a number of banks that differ from each other in terms of specialization in addition to the role they play. Algeria, like other countries, rushed after its independence to try to build a new banking system by relying on public funds in order to achieve the goals of economic policy aimed at achieving acceptable levels of economic growth. Returning to the activity of Algerian commercial banks, which has recently witnessed great development over the past years, deposits are considered the main source of financing for commercial banks, as well as loans are considered the main use of those funds. Therefore, the process of granting credit is considered the main function provided by banks, but this process is accompanied by another element, which is the element of risk, which is considered an integral part of this system, especially with the intensification of competition and the technological development that accompanies it and the doubling of the volume of transactions compared to the past. Today, banks face various risks that they must manage in order to achieve their main goal, which is mainly survival, continuity, and obtaining acceptable returns.

Banking risk management is one of the most important topics in finance, receiving increasing attention from bankers worldwide, especially with the successive global crises in which banks were the common factor, especially with the increasing risks they faced on the one hand and their failure to manage them as required on the other.

Among the most important of these risks to which banks are exposed in their business environment are credit risks, which have received considerable attention from the Basel Committee on Banking Supervision.

Hence, the close relationship between credit risk management and economic growth in Algeria can be highlighted through the role banks play in mobilizing financial resources and directing them towards productive sectors. Effective risk management enables financial institutions to reduce the possibility of credit default and improve the quality of the credit portfolio, which enhances investor confidence, reduces financing costs, and supports overall financial stability. In contrast, disruptions resulting from weak credit supervision and the accumulation of outstanding debt restrict banks' ability to lend, slowing investment flows and hindering economic growth. Therefore, an integrated risk management framework is considered a prerequisite for achieving strong and sustainable economic growth, especially in economies that rely heavily on bank financing, such as Algeria.

Despite the great importance of credit risk management in promoting financial stability and directing financing towards productive sectors to achieve acceptable levels of economic growth in Algeria, the banking sector still faces major challenges related primarily to the high rates of non-performing loans and the weak effectiveness of risk control and prevention mechanisms. In light of these challenges, a fundamental question arises about the extent to which credit risk management contributes to improving banks' performance and its impact on achieving sustainable economic growth rates during the period 2000-2023. Accordingly, the main problem of our study is as follows :

To what extent did credit risk management contribute to supporting and improving economic growth levels in Algeria during the period 2000-2023 ?

I.1 Hypotheses : To answer the content of the main question, the following main hypothesis should be formulated :

- Proper application of credit risk management contributes to reducing the percentage of non-performing loans, which leads to improving the efficiency of bank intermediation, which in turn enhances economic growth by increasing the ability of banks to finance investment activities effectively.
- The low levels of inflation resulting from the application of monetary policy tools allow for enhanced levels of economic growth in Algeria.

I.2 Importance of the study :

This study highlights the important role of credit risk management in supporting and improving economic growth levels in Algeria. The importance of this topic also stems from the vital role that credit risk management plays in enhancing the stability of the financial system and improving the efficiency of the banking sector as a basic channel for financing economic activities in Algeria. With the continuing challenges associated with the high rates of non-performing loans and the weak effectiveness of credit supervision, the need to study the relationship between risk management practices and the performance of the economy as a whole increases. This study is also of particular importance in light of the reforms adopted by Algeria during the last two decades to modernize the banking sector, which coincided with economic developments varying between periods of growth and slowdown. This study would contribute to a deeper understanding of how credit risk management tools can be used as a mechanism to improve the quality of credit portfolios and support investment, thus contributing to achieving sustainable economic growth.

I.3 Study objectives :

The overall objective of the study is to analyze the impact of credit risk management on improving economic growth levels in Algeria during the period 2000-2023. This is achieved by examining the relationship between the efficiency of credit practices in Algerian banks and the level of overall economic performance, with a focus on the role of financial policies and reforms in strengthening this relationship. There are also a number of other objectives, which we summarize as follows :

- Defining the most important risks to which banks are exposed, which are credit risks.
- Highlighting the impact of credit risk management on banking brokerage activity.
- Analyzing the reality of credit risk management in the Algerian banking sector, focusing on the most prominent challenges and imbalances associated with it.
- Evaluating the relationship between the effectiveness of credit risk management and the level of economic growth in Algeria.

Proposing a set of practical recommendations that would enhance the efficiency of credit risk management in a way that serves economic growth goals.

- Enriching the scientific debate on the relationship between the financial system and economic growth, with a focus on the Algerian context.

I.4 Method followed :

This study relied on the descriptive analytical approach because it is the most appropriate for analyzing economic and financial phenomena by collecting data related to credit risk management and studying its development and impact on economic growth indicators in Algeria during the period 2000-2023.

I.5 Previous studies : The link between credit risk management and economic growth is one of the topics that has received increasing attention in the economic and financial literature because of the importance of this interaction in supporting financial stability, especially in developing countries that depend to a large extent on the banking sector as a main source of financing. In this context, these studies review a selection of previous literature with the aim of identifying the most prominent findings and identifying the research gaps that the current study seeks to address in the Algerian case. The following are some of these studies :

01- Study (Yichang Chen, 2023) entitled The Impact of Macroeconomic Factors on Bank Credit Risk.

This study aimed to highlight the status of credit risk as one of the most prominent risks to which banks are exposed in their activities due to the increasing demand for loans. At the same time, bank credit risk may be affected by a number of factors, including the rate of expansion of the gross domestic product (GDP), changes in interest rates, the unemployment rate, and more. These macroeconomic factors are crucial in determining how banks' credit risk is shaped. This study concludes the various influences of different macroeconomic factors discussed in several research papers on bank credit risk, and explains how changes in the GDP growth rate and interest rate affect credit risk.

Through a comprehensive literature review and empirical research, this study found that macroeconomic factors, including GDP expansion rate and interest rate, have a significant impact on banks' credit risk. Bank credit risk will also decrease as GDP growth increases ; however, bank credit risk will increase as interest rates rise. This study also presented a set of recommendations, perhaps the most prominent of which is monitoring macroeconomic factors and adjusting credit policies under different circumstances, in addition to banks and relevant regulatory bodies formulating clear strategies for managing risks in banks.

02- Study (Ha Nguyen, 2023) entitled Credit Risk and Financial Performance of Commercial Banks Evidence from Vietnam.

This study aimed to highlight the relationship between credit risk management measured by the percentage of non-performing loans and the financial performance of banks in Vietnam during the period 2006-2016. A sample of 26 commercial banks was also relied upon. The results also showed that increased credit risk is associated with a decrease in return on assets and return on equity, while GDP growth showed a positive impact on financial indicators.

03- Study (Hemlata Sharma, Aparna Andhalkar, Oluwaseun Ajao, Bayode Ogunleye, 2024) entitled Analysing the Influence of Macroeconomic Factors on Credit Risk in the UK Banking Sector.

This study aimed to highlight the impact of macro factors such as GDP, inflation, unemployment, and others on credit risk in the British banking sector. Predictive analysis was used using statistical tools and artificial intelligence techniques such as the multi-split decision tree to identify the most important influences. This study found a positive relationship between credit risk, unemployment rates, and inflation, while there is a negative relationship between GDP and national income components.

04- Study (Laxmi Koju, Ram Koju, Shouyang Wang, 2020) entitled Macroeconomic determinants of credit risks ; evidence from high-income countries.

This study aimed to provide an empirical analysis of macroeconomic factors affecting credit risks in the banking sector within a group of developed countries (49 countries) during the period 2000-2015. It also used the GMM method to address the problem of dynamic bias and dependency, and relied on multiple economic indicators of economic activity such as GDP growth, commodity exports, and industrial development. One of its most notable findings is that the development of the industrial sector and the expansion of exports are key to improving loan quality and reducing non-performing loans. It also recommends expansionary economic policies such as increasing per capita income and productivity as effective tools for reducing credit risk.

II. The theoretical framework of the study:

II.1 What is credit risk.

Before discussing credit risks, we must first define credit.

II.1.1 The concept of bank credit: Credit is considered the basis of banking work, as it is the most investment area for commercial banks and the most effective in achieving profitability for the latter. It is the exchange of present value for a future value. An example of this is the lender who offers the borrower an amount of money. He exchanges it for present value in the hope of obtaining a future value when the loan amount is repaid on the agreed future date (Arshid & Gouda, 1999, p. 31) It can also be considered as a promise to fulfill the term with the loan amount plus, in most cases, a predetermined value (interest), as the loan depends mainly on mutual trust between the two credit parties (debtor and creditor). This trust is assumed by the bank or financial institution to a natural or legal person in exchange for this party's commitment to fulfill its obligations and commitments in exchange for the other party receiving a certain return This trust is mainly based on several factors, the most important of which are the customer's reputation and morals, and other factors, including the borrower's ability to fulfill his obligations, and this depends primarily on his financial position (zaidanin, 1999, p. 41)

II.1.2 Bank Credit Parties: Based on the above concepts, credit parties can be identified as the first party that grants this credit or the lender, expecting to receive its equivalent within a specific time in addition to interest in the future. The second party is the borrower or debtor who undertakes to repay the loan on time in the future in addition to interest.

II.1.3 Definition of credit risk: Credit risk is defined as the possibility that the bank's counterparty will not fulfill its obligations within the agreed upon terms. It is not limited to the borrowing function only, but extends to other activities such as commercial financing, deposits with banks, and foreign exchange operations (Sisi, 2004, p. 47) Or it can be expressed as those risks that arise as a result of the customer's default, i.e. their inability to pay the principal and interest due on the date specified for that, and the default results in a total or partial loss of any loaned amount or a decline in the customer's credit position, thus increasing the possibility of default (Zayoud, 2006, p. 205)

Therefore, it can be considered that credit risks arise due to failure to pay in full and on time, which results in a financial loss. According to this definition, credit risks are divided into the following : (zubaidi, 2000, p. 174)

***Direct lending risks :** These are risks related to non-repayment of the loan and other types of credit.

***Potential lending risks :** These are risks associated with indirect credit, such as credits and guarantees, which can turn into direct lending risks for the duration of the credit or guarantees.

***Exporter risk :** This type of risk arises due to the issuer's position in debt securities, which results in a change in the value of the bond, which leads to loss.

***Pre-settlement risks :** These are risks related to the inability of one of the trading partners to pay its obligations.

***Settlement risks :** These relate to the risks involved in paying on behalf of a trading partner and before ensuring that it has fulfilled the required undertaking.

***Collection risks :** These are risks that arise as a result of an action and transfer based on a customer's instructions before he makes payment.

II.1.4 Credit Risk Management : Credit risk management is defined as the process of analyzing, measuring, evaluating, developing and developing strategies to manage risks and taking appropriate measures to mitigate and reduce their effects on a cost-benefit basis, achieving a balance between the degree of tolerable risks and the level of profitability, and monitoring these risks on an ongoing basis (Sahraoui, 2016, p. 227) Credit risk management can

also be considered as an administrative activity that aims to control risks and reduce them to acceptable levels Or it is identifying, measuring and controlling the risks faced by banks, (Qurain & Bougherra, 2020, p. 143) it also means management that aims to identify, measure and monitor the risks arising from the possibility of loan default and to keep the risks within acceptable limits and meet regulatory requirements (Omar & Amair, 2020), and risk management is based on three basic principles, which are as follows: (Kabaili, 2014, p. 167)

*Optional, i.e. choosing at least a number of debts with zero risk.

*Setting a risk limit, depending on the type and category of loan.

*Diversity : This is done by avoiding concentrating loans for specific clients.

II.1.4.1 Credit Risk Management Approaches: Credit process management refers to how credit decisions are made at various administrative and organizational levels. This policy includes general standards and guidelines that branch credit institutions must adhere to avoid credit risks. In general, credit management focuses on two types of approaches through which credit is analyzed to determine the degree of risk. We explain them as follows: (Kabaili, 2014, p. 167)

*The first approach, known as the discriminatory approach, is based on the idea of evaluating clients, taking a general idea of their personality, social status, and credibility, and determining the purpose of the credit application, the type of funded activity, and the nature of the guarantee provided. The credit department focuses on studying the family's ability and desire to repay the loan value with interest by determining their financial solvency.

*The second approach is known as the experimental approach. After verifying the borrower's identity, solvency, and the compatibility of the guarantees with the credit volume, a point or weight is then given to each measure, provided that it matches the weights specified by the credit administration.

II.1.4 The impact of credit risk management on banking intermediation activity : Credit risk management is one of the basic pillars on which banking activity is based, especially within the framework of financial intermediation, as banks play a pivotal role in accumulating savings and directing them towards investment and lending uses, in a way that achieves financial balance and contributes to stimulating the economic cycle However, this function is not without risks, foremost among which is the risk of customers being unable to meet their financial obligations, which is known as credit risk. Therefore, the bank's success in performing its role as an intermediary is inseparable from its efficiency in managing these risks, which have become a strategic element within modern banking governance (Djaafar ; Badirouni, 2022, pp. 17-30)

Banking intermediation assumes the ability of a banking institution to accurately assess the creditworthiness of customers, whether individuals or institutions. This requires a robust system for collecting and analyzing financial data, as well as quantitative and qualitative tools to predict the level of risk. The importance of this lies in ensuring the effective distribution of financial resources and reducing the possibility of default on granted loans, which positively reflects on the quality of the credit portfolio and the bank's profitability (Dardouri, 2015, pp. 145-160) Risk management also plays a key role in formulating credit granting policies, determining terms and guarantees, and implementing periodic monitoring mechanisms to monitor loan performance and control potential deviations (Hakimi & Boussaada, 2020)

The importance of integration between credit risk management and banking brokerage activity is increasing in light of the rapid transformations that the financial sector is experiencing, such as increased competition, complexity of banking products, and increased openness to international markets, which requires banks to develop their internal models for risk management in line with governance standards and international decisions such as Basel 03, (Basel, 2010) In this context, risk management is not viewed only as a supporting function,

but also as a strategic element that directly affects the bank's ability to grow and achieve a sustainable competitive advantage. (Khalifi, 2018)

From the above, it can be said that the relationship between credit risk management and bank brokerage activity is one of integration and interaction, as the efficiency of brokerage cannot be imagined without a solid risk management structure. Furthermore, the effectiveness of this management becomes more evident as the bank's role as a financial intermediary between savers and investors increases.

II.1.6 The relationship between banking intermediation and economic growth: The issue of banking intermediation services and their impact on economic growth occupies an important place in the literature of contemporary economic development thought. It is certain that this role is not direct, but rather through some intermediary channels, which are usually mentioned as potential indicators of economic growth rates. Despite the multiplicity of these channels, the most important of them can be mentioned below :

***Creating deposit money:** The process of creating money occurs when a bank lends part of its available financial resources, then the borrower or beneficiary re-deposits the loan in one of the banks from which the banking sector is based, so it deducts from it the legal reserve and what remains it lends again, and the lending process continues until the amount that the banks lend becomes theoretically zero, as the latter directs its customers to invest in several areas, including forming the bank's securities portfolio Lending and lending operations and many other areas. These areas result in an increase in the volume of investments, which results in an increase in the level of productivity and incomes, which achieves an improvement in economic growth. (Labza, Dhaif Allah , & Awadi, 2018, p. 26)

***Money supply :** The money supply base is demonstrated by the credit facilities provided by banking financial intermediation, which help drive the country's economic growth.

*** Savings mobilization:** The accumulation of savings by the public is considered the second major process of the banking sector. Without the success of banks in attracting deposits, they will not succeed in their economic role, which is based primarily on granting credit and providing the necessary liquidity for the financial deficit units in the economy. Banks work to achieve a balance between supply and demand for money in the economy, which reflects positively on economic growth. (Tayseer, 2012, p. 75)

***Facilitating transactions :** Banking financial intermediation can work to develop the allocation of technological innovations and economic growth by supporting specialization in concluding deals with economic agents, which motivates them to develop technological innovations. Also, creating a less expensive banking intermediation for exchanges would allow expanding the possibility of production using highly technological methods, which motivates the producer to specialize, and thus the emergence of many types of goods Therefore, bank financial intermediation facilitates the process of specialization, which contributes to economic growth. In the absence of bank intermediation, it is difficult to finance projects with effective production techniques. In addition, saving is considered the source of all investments and capital accumulation is the source of growth. It has become necessary to develop means that will increase the attraction of savings. (Belhadia, 2009, p. 85)

*** Liquidity :** The liquidity of banking financial intermediation institutions reflects their ability to meet credit requests at any time on the one hand, and to fulfill depositors' desires when withdrawing on the other hand. The availability of liquidity at the level of banking institutions makes them able to contribute to increasing investment projects through loans directed directly to them or through consumer loans, which in turn work to stimulate demand, which is positively reflected in expanding investment projects Then increase employment opportunities, raise productivity and achieve economic growth. (Sahraoui J. Y., 2011, p. 25)

*** Diversification of risks :** Banks employ their funds to diversify the investor's portfolio, and also push him to invest in projects with high risk but high returns, which contributes to increasing economic growth. (Qanouni, 2014, p. 102)

III. A standard analytical study of the impact of credit risk management on economic growth in Algeria during the period 2000-2023.

In order to test the relationship between credit risk management and economic growth in Algeria during the study period, we will rely on data issued by the Bank of Algeria to calculate the study variables. To achieve this, we will address the following :

III. 1 Study variables.

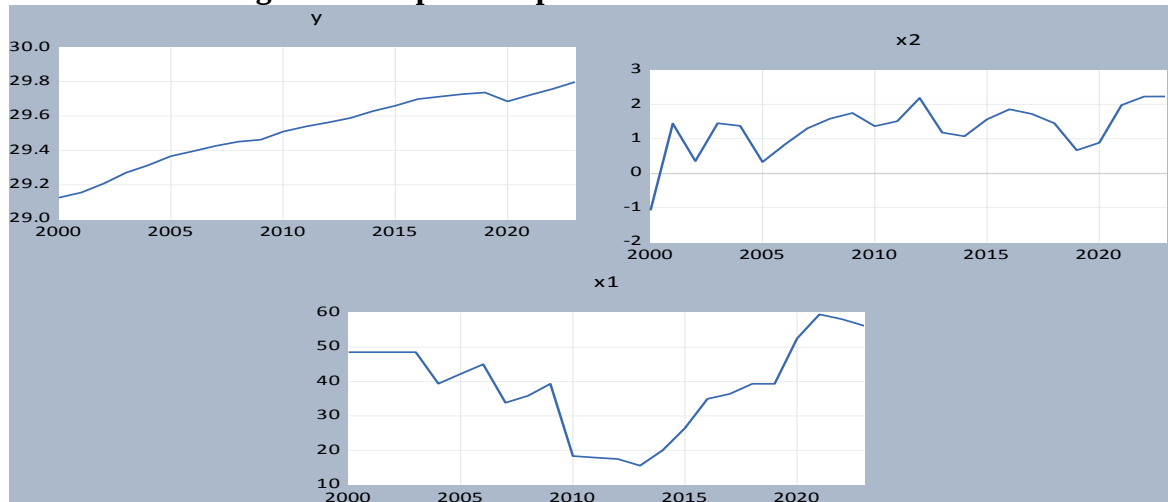
Code	Indicator	Indicator Category	Description
Dependent Variable			
Y	Gross Domestic Product	Economic Growth	This means an increase in average real per capita income over time, as average income is expressed as the ratio of total income to the total population. This indicates that economic growth not only reflects an increase in total income, but more than that, it may also indicate the extent to which an individual's standard of living has improved by increasing his share of total income.
Independent Variables			
X1	Total Non Performing Loans	Credit Risk Management	These are loans in which customers stop paying their obligations on time, despite the bank's demand to repay them, for various reasons. A low percentage of these loans is a positive indicator of the efficiency of banking management and its ability to effectively manage credit risks, while a high percentage indicates a weakness in follow-up and collection policies or a flaw in assessing customers' creditworthiness.
X2	Inflation	Ultimate Objective of Monetary Policy	Inflation expresses the perceived increase in the general price level resulting from the development of the quantity of money with greater growth than the increase in economic growth. The decrease in this percentage indicates the ability of the monetary policy tools used by the Bank of Algeria to control inflation levels, which contributes to enhancing economic growth.

III. 2 Model estimation.

Before estimating the optimal model, you must go through a set of stages, which are :

III. 2.1 Time series stability study.

Before relying on the ADF and PP tests to study the stability of time series, we will graph the series to get a preliminary idea of their characteristics, as it is clear from the graphical representation of the time series of the study variables that their development over time does not take a stable pattern, so we assume that these series are not static.

Figure 1: Graphical representation of time series.

Source: Prepared by the researcher based on the outputs of the Eviews 12 program.

Table 01: Unit root test results for time series.

At Level										
Time Series	Augmented Dickey Fuller Test					Philips Perron Test				
	With Constant and Trend		With Constant Only		Without Constant and Trend	With Constant and Trend		With Constant Only		Without Constant and Trend
	*b=0	$\lambda=0^*$	*c=0	$\lambda=0$	$\lambda=0$	b=0	$\lambda=0$	c=0	$\lambda=0$	$\lambda=0$
y	0.094	0.159	0.021	0.158	0.793	0.094	0.185	0.021	0.184	0.865
X1	0.136	0.927	0.330	0.744	0.639	0.136	0.931	0.330	0.717	0.639
X2	0.095	0.204	0.040	0.294	0.287	0.095	0.204	0.040	0.294	0.287
After First Differencing										
y	0.244	0.000	0.442	0.000	0.000	0.244	0.000	0.442	0.000	0.000
X1	0.117	0.000	0.833	0.003	0.000	0.117	0.004	0.833	0.003	0.000
X2	0.892	0.025	0.385	0.005	0.000	0.769	0.000	0.531	0.000	0.000

Source: Prepared by the researcher based on the outputs of the Eviews 12 program.

It is clear from the outputs of the table above, and based on Dickie Fuller's methodology for verifying the root of unity in time series, the stability of time series can be summarized as follows:

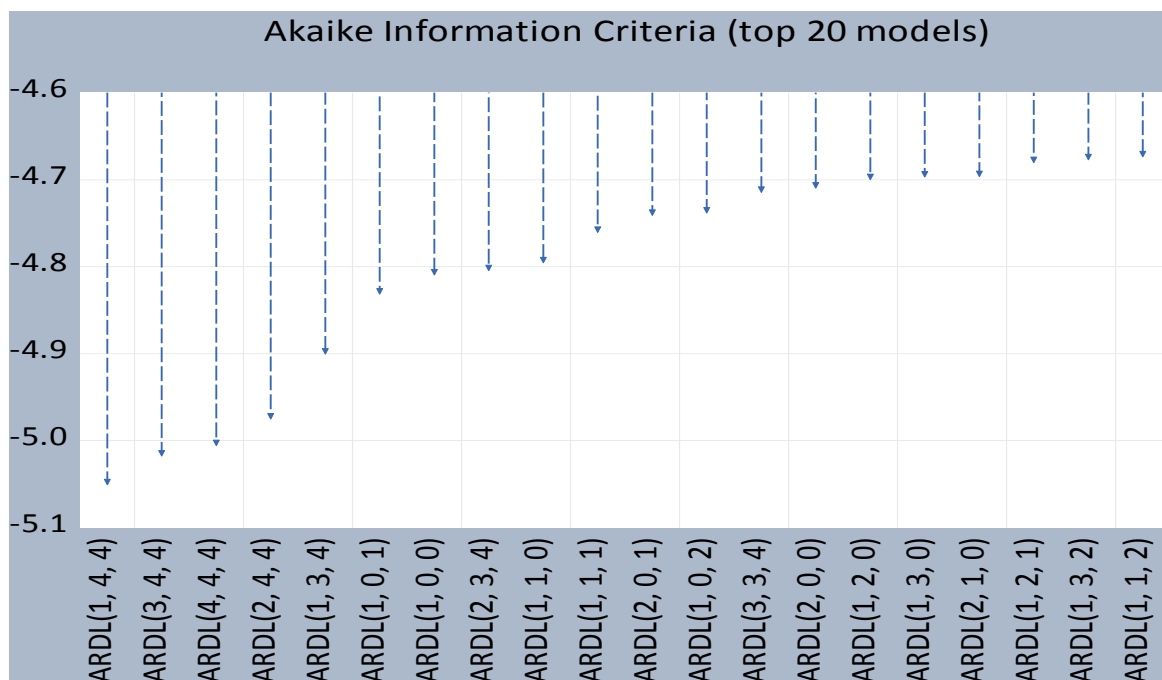
- The economic growth rate series (y) is stable at the first difference and we write : $Y \rightarrow I(1)$
- Non-performing loan series (x1), stable at the first difference and we write: $X1 \rightarrow I(1)$
- Inflation rate series (x2), stable at first difference: $X2 \rightarrow I(1)$

III. 2.2 Cointegration test.

Since time series are stable at the first degree, we resort to the technique developed by (Besaran and Shin) and Besaran et al., and since the series used meet the basic condition of this technique, the systematic sequence of this method can be traced to ensure the existence of synchronization of time series in the long term. This technique can be applied through the following steps :

- Choosing the optimal deceleration period for the first differences of the variables in the model. Using the statistical program Eviews12, we estimate the various models, giving values for the two aforementioned criteria, which facilitates the selection process, as confirmed by the results of the figure as follows.

Figure 02 : Optimal ARDL model within 20 selected models.



Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

The figure shows that the lowest value of the Akaike criterion corresponds to the longest column (because the values are negative), which intersects with the ARDL (1.4.4) model ,

-Estimate the model shown using the ordinary least squares method OLS, then confirm the existence of the simultaneous integration relationship using the Wald test. After performing this test on the aforementioned model, we obtain the following results:

Table 2 : Wald test results to confirm the existence of a simultaneous integration relationship.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic : n=1000				
F-statistic	13.15431	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

We note from the table that Fisher's calculated statistical value (F-statistic=13.15) is greater than the tabular upper limit value at all confidence levels, and therefore we say that there is

synchronization between time series in the long term, which allows us to continue estimating the line correction model based on ARDL technology.

III. 2.3. Estimating long-term parameters and error correction model.

A- Estimating long-term parameters : We can summarize the results of parameter estimation in the following table :

Table 03 : Results of estimating long-term parameters.

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	-0.502065	0.001295	1.595268	0.0493
X2	-0.418973	0.047639	8.794809	0.0000
C	2.917388	0.108469	267.1164	0.0000

Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

b- Estimation of short-term parameters and error correction model :

Table 4 : Results of estimating short-term parameters.

ARDL Error Correction Regression

Dependent Variable : D(Y)

Selected Model : ARDL (1, 4, 4)

Case 2: Restricted Constant and No Trend

Date : 08/13/25 Time : 17:25

Sample : 2000 2023

Included observations : 20

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X1)	0.001328	0.000627	2.119195	0.0669
D(X1(-1))	0.002344	0.000566	4.143897	0.0032
D(X1(-2))	0.002783	0.000586	4.750671	0.0014
D(X1(-3))	0.001409	0.000682	2.067409	0.0725
D(X2)	0.040485	0.008689	4.659327	0.0016
D(X2(-1))	-0.130737	0.019171	-6.819610	0.0001
D(X2(-2))	-0.083612	0.015285	-5.470102	0.0006
D(X2(-3))	-0.037659	0.008294	-4.540693	0.0019
CointEq (-1)*	-0.492801	0.057937	-8.505803	0.0000

Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

It is clear from Table No. (4) that the value of the error correction factor is significant and negative at a significant level of 5%, where the negative value indicates : 0.49- that the imbalances included in the proposed model in the short term are automatically adjusted after the imbalance occurs.

III. 2.3 Diagnostic tests of the estimated model.

III. 2.3.1 Self-correlation test for errors.

**Table 5 : Test results for the presence of the autocorrelation problem
For the residual estimate.**

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

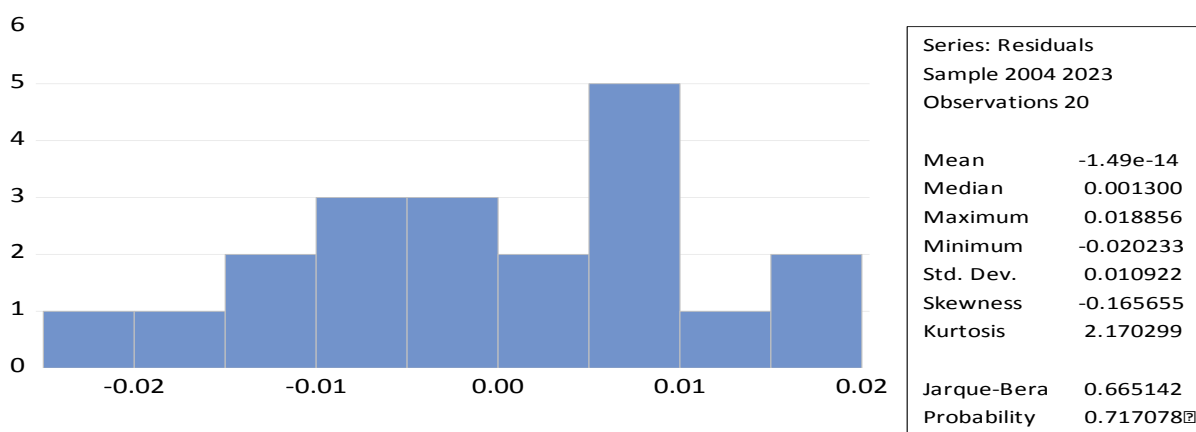
F-statistic	0.232768	Prob. F(2,6)	0.7992
Obs*R-squared	1.440055	Prob. Chi-Square(2)	0.4867

Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

From the results of the table, we find that the calculated value of Fisher's test (F-statistic=0.232) is less than the tabular value at a significance level of 5%, and thus we accept the null hypothesis, which translates into no autocorrelation between the residuals of the estimate.

III. 2.3.2 Natural distribution of the remaining estimate.

Figure 3 : Jarque-Bera test results on residual estimation.



Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

The figure shows us that the graph columns with the remaining estimates have a distribution similar to the Bell shape of the normal distribution. In addition, we find that the probability of the Jarque-Bera test (equal to 0.71) is greater than 5%, and thus we accept the null hypothesis.

III. 2.3.3 testing the hypothesis of non-variance of the error limit.

Table 6 : Breusch-Pagan-Godfrey test results.

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis : Homoskedasticity

F-statistic	1.158666	Prob. F(11,8)	0.4277
Obs*R-squared	12.28742	Prob. Chi-Square(11)	0.3424
Scaled explained SS	1.150397	Prob. Chi-Square(11)	0.9999

Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

Since the calculated value of Fisher's test is less than the tabulated value at a significance of 5%, we accept the null hypothesis that indicates the stability or homogeneity of the error limit variance of the estimated model.

III. 2.3.4 Ramsey Reset Test.

Table 07 : Ramsey Reset Test Results.

Ramsey RESET Test
Equation : UNTITLED
Omitted Variables: Squares of fitted values
Specification : Y Y (-1) X1 X1(-1) X1(-2) X1(-3) X1(-4) X2 X2(-1) X2(-2) X2(-3) X2(-4) C

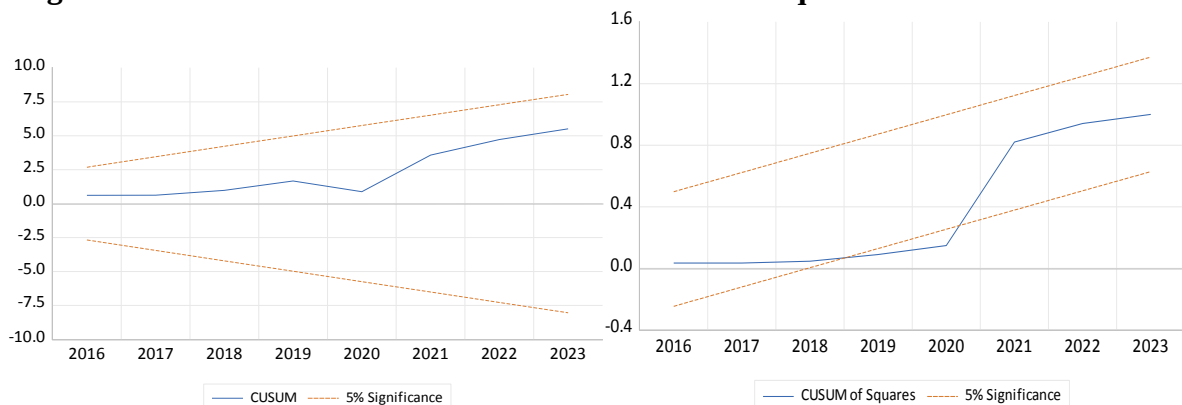
	Value	df	Probability
t-statistic	0.046600	7	0.9641
F-statistic	0.002172	(1, 7)	0.9641
Likelihood ratio	0.006203	1	0.9372

Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

Since the probability value of Fisher's test is greater than the significance level of 5%, the proposed functional form can be accepted to express the relationship between the economic variables studied.

III. 2.3.5 Structural stability test of the estimated ARDL model.

Figure 4 : Cumulative sum of residuals and cumulative square sum of residuals.



Source : Prepared by the researcher based on the outputs of the Eviews 12 program.

It is clear from Figure No (4) that the estimated coefficients of the ARDL model used are structurally stable over the study period.

IV. Analyze and discuss the results:

From the results of Table 3, we can write the regression equation as follows :

$$y = 2.91 - 0.502056x_1 - 0.4189734x_2$$

The results of the regression equation allow us to accept the first hypothesis, which states the proper application of credit risk management in reducing the percentage of non-performing loans, which leads to improving the efficiency of bank intermediation, which in turn enhances economic growth by increasing the ability of banks to finance investment activities effectively, because reducing the percentage of non-performing loans by one unit leads to an increase in economic growth levels by 0.50 units. This is due to the fact that the decrease in the percentage of non-performing loans resulting from banks adopting preventive mechanisms is a pivotal factor in enhancing economic growth. Providing sound management of credit risks reduces the size of potential losses and maintains the capital adequacy index, which increases the ability of banks to expand in granting financing directed to investment

and production. This decrease also contributes to enhancing confidence in the banking system. This encourages the flow of more savings and investments into the financial sector, which reflects positively on economic growth levels.

The results of the regression equation support the acceptance of the second hypothesis, which states that the availability of low levels of inflation resulting from the application of monetary policy tools contributes to enhancing levels of economic growth in Algeria. This is because a decrease in inflation rates by one unit contributes to enhancing economic growth by 0.41 units. This is evident in the fact that a decrease in inflation rates leads to an improvement in the purchasing power of individuals and the stability of the investment environment. This stimulates aggregate demand and promotes the expansion of productive activities on the one hand. On the other hand, controlling inflation rates reduces financing costs and reduces uncertainty that may hinder investment and consumption decisions. Therefore, adopting monetary policies capable of reducing inflation rates is an effective strategy for strengthening economic growth levels in Algeria.

V. Conclusion :

From the above, it is clear that credit risk management represents a fundamental pillar for ensuring the stability and sustainability of the banking sector, which is directly reflected in the levels of economic growth. The Algerian experience during the period 2000-2023 showed that the weakness of risk monitoring and control mechanisms contributed to the increase in the volume of non-performing loans and the decline in the efficiency of the banking system. This has negatively impacted its ability to effectively finance economic activities. In contrast, strengthening risk management tools such as accurate credit capacity analysis, adopting early warning systems, and developing the legislative and regulatory framework constitutes a real gateway to supporting financial stability, stimulating investment, and thus achieving more sustainable economic growth. Therefore, the future of the Algerian economy depends on the extent to which its financial institutions are able to establish a culture of credit risk management as a strategic means of protecting resources and directing them towards productive sectors capable of creating wealth and added value.

V.1 Results :

- Credit risks are considered one of the most prominent challenges facing Algerian banks, as they directly affect their stability and financing capacity.
- Effective credit risk management contributes to improving the quality of the loan portfolio and reducing default rates, which enhances confidence in the banking system.
- Bank brokerage activity is closely linked to the level of risk management, as banks that implement a strict and precise loan policy are better able to expand the volume of financial brokerage.
- Banking intermediation represents a major driver of economic growth through its role in mobilizing savings and directing them to productive investment.
- The relationship between credit risk management and economic growth is indirect, as it passes through the banking intermediation channel, which acts as a bridge linking financing and growth.
- Algerian banking units enjoy acceptable levels of efficiency in managing credit risks, which has had a positive impact on their ability to support and improve economic growth by reducing non-performing loans.

- The stability of the economic environment, resulting from lower inflation rates thanks to the effectiveness of monetary policy tools, contributes to supporting and enhancing economic growth rates, as this stability reduces uncertainty and encourages investment and production activity.

V.2 Recommendations :

- Strengthening credit risk management systems within Algerian banks by adopting modern analysis techniques such as statistical models and artificial intelligence, in addition to early warning systems.
- Developing the legislative and regulatory framework to ensure greater rigor in assessing creditworthiness and reducing unsecured loans.
- Investing in human capital by training and qualifying banking frameworks in the areas of risk management and internal control.
- Expanding the banking intermediation base by integrating new financial instruments and encouraging financial innovation in line with the needs of the national economy.
- Diversify the loan portfolio to reduce credit concentration and limit banks' exposure to the risks of fragile sectors or customers with weak solvency.

VI. Reference list :

- Arshid, A. R., & Gouda, M. (1999) Credit Management, Wael Publishing House, first edition, pp. 31-32.
- Basel Committee on Banking Supervision (2010), Basel Final Decisions 03 : Strengthening the resilience of the banking sector, Bank for International Settlements
- Belhadia, A. (2009). The Impact of Banking Intermediation on Sustainable Economic Growth, Magstar Thesis, Saad Dahlab University, Blida, p. 85.
- Dardouri, L. (2015). The role of credit risk management in the continuity and success of banking institutions, Journal of Humanities, University of Biskra, Issue 39, pp. 145-160.
- Djaafar, I., & Badirouni, I. (2022). The role of credit risk management in reducing the problem of credit default - a case study of a group of commercial banks in Algeria, Journal of Economic Notebooks, Volume 13, Issue 1, pp. 17-30.
- Hakimi, A., & Boussaada, r. (2020) the interactive Relationships Between Credit Liquidity Risk and Bank Profitability in MENA Region Global Business Review ; <https://doi.org/10.1177/0972150919879304>.
- Kabaili, H. (2014). Credit Risk Management, Journal of Economic Notebooks, University of Djelfa, Volume 05, Issue 01, p. 167.
- Kabaili, H. (2014). Previous reference, p. 167.
- Khalifi, A. K. (2018). Risk Management in Commercial Banks : Concept and Challenges, Dar Al-Huda, Algeria
- Labza, H., Dhaif Allah , M., & Awadi, M. (2018). The impact of banking financial intermediation services on economic growth, a case study of Algeria 1990-2015, Al-Bashar Economic Journal, Bashar University, Volume 4, Issue 1, p. 26.
- Omar, A. B., & Amair, D. (2020). Basel Committee Standards in Credit Risk Management - A Case Study of a Group of Algerian Banks, Journal of Economics, Management and Commercial Sciences, University of M'Sila, Volume 13, Issue 01', p. 143 .Qanouni, H. (2014). Banking Intermediation and Economic Growth in Algeria, PhD Thesis, University of Tlemcen, p. 102
- Qurain, Z. L., & Bougherra, R. (2020). The role of bank credit risk management in reducing risks in commercial banks -a case study of the Bank of Agriculture and Rural Development, Blida Agency, Journal of Law and Human Sciences -Economic Studies, University of Djelfa, Issue 26, p. 300.
- Sahraoui, I. (2016). Credit Risk Management for Small and Medium Enterprises in Banks with Reference to the Algerian Banking Sector, Journal of Economic Sciences and Management Science, University of Setif 01, Issue 16, p. 227.
- Sahraoui, J. Y. (2011). The Impact of the Development of the Financial Market and the Development of the Banking System on Economic Growth, Jordan Case Study 1979-2009, Magstar Thesis, Mutah University, Jordan, p. 25.

- Sisi, S. E. (2004). Contemporary Banking Issues (Bank Credit - Bank Guarantees - Documentary Credits), First Edition, Dar Al-Fikr Al-Arabi, Egypt, p. 47.
- Tayseer, M. A. (2012). The Role of the Banking Sector in Financing Palestinian Economic Development 1995-2011, Master's Thesis in Development Economics, Islamic University of Gaza, Palestine, p. 75.
- zaidanin, D. S. (1999). Fundamentals of the Financial System, Wael Publishing House, first edition, p. 41.
- Zayoud, L. (2006). Accounting disclosure in the financial statements of banks in accordance with International Accounting Standard No. 30, an applied case in the Commercial Bank of Syria, Tishreen Journal for Scientific Studies and Research, Volume 28, Issue 2, p. 205
- zubaidi, H. M. (2000). Bank Credit Management and Credit Analysis, Al-Warraq Publishing and Distribution Corporation, Amman, p. 174.