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Exploring the Impact of Financial Inclusion on Banking Stability in Iraq for the Period (2010-2023) Using Modern Statistical Methods

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Abstract: This research aims to explore the impact of financial inclusion on banking stability in Iraq from 2010 to 2023, relying on modern statistical methods for data analysis. The study highlights the importance of financial inclusion as a key factor in enhancing the stability of the banking system, as it provides access to financial services for a wide range of the community, thus expanding the customer base and reducing financial risks. A variety of modern measurement methods were used to test the relationship between indicators of financial inclusion, represented by the access to financial services index, and the rate of non-performing loans as an indicator of banking stability. Descriptive and quantitative analyses were conducted, revealing a strong positive relationship between increased levels of financial inclusion and improved banking stability. The research concludes that enhancing financial inclusion can contribute to building a more stable and resilient banking system, supporting sustainable economic growth. It also offers recommendations for policymakers in the financial sector, urging the development of policies that promote financial inclusion and strengthen the stability of the banking system in Iraq.

Keywords: Iraq, financial inclusion, banking density, banking penetration, non-performing loans.

Introduction: Financial inclusion is one of the main concepts that contribute to promoting economic growth and financial stability in general, and banking stability in particular. Amidst global economic changes and the evolution of the financial system, financial inclusion has become a topic of increasing interest in economic research and studies, given its contribution to providing financial services comprehensively and effectively to all segments of society, including individuals and small businesses, as it helps expand the customer base and reduce financial risks. Iraq is one of the countries where the banking system suffers from multiple challenges, including limited access to financial services and a high rate of non-performing loans. Therefore, this research comes to explore the impact of financial inclusion in enhancing the stability of the Iraqi banking system during the period from 2010 to 2023. Through the analysis of current data and trends, this research seeks to provide insights into the relationship between financial inclusion and banking stability, which contributes to the development of financial and banking policies that support sustainability and growth in the Iraqi economy. It becomes necessary to analyze how to measure the impact of financial inclusion on banking stability, as this research addresses the methods and techniques used in measuring this relationship, in addition to the available challenges and opportunities.

Importance of the Research:

1. The importance of the research is evident in several points, the most important of which are: The research contributes to enhancing the understanding of the role of financial inclusion in achieving banking stability.
2. The research provides data and analysis that support decision-makers in developing strategies to promote financial inclusion.
3. By achieving banking stability, the research contributes to promoting economic growth in Iraq, which benefits society as a whole

Problem of the Research:

The research problem is the lack of a comprehensive understanding of the relationship between financial inclusion and banking stability in Iraq. Despite efforts to promote financial inclusion, the banking system still faces significant challenges, such as (weak financial infrastructure, lack of financial awareness, and political risks). This problem raises several questions, including:

1. What is the impact of financial inclusion on the stability of the banking system in Iraq during the period (2010–2023)?
2. How can the level of financial inclusion in Iraq be measured using specific indicators?

3. What are the factors affecting the promotion of financial inclusion and the factors affecting banking stability in Iraq?
4. How do the rates of non-performing loans in Iraqi banks change with increasing levels of financial inclusion?

Objectives of the Research:

1. To study the impact of financial inclusion on the stability of the banking system in Iraq during the period 2010-2022.
2. To identify the factors that affect the relationship between financial inclusion and banking stability.
3. To provide practical recommendations to policymakers for improving financial inclusion and enhancing banking stability.

Hypothesis of the Research:

The research hypothesis is that there is a positive relationship between financial inclusion and banking stability in Iraq, as increased access to financial services leads to improved performance of the banking system and a reduction in financial risks.

Methodology of the Research:

The research adopted a quantitative data analysis methodology, where financial and banking data will be collected from reliable sources, such as the Central Bank of Iraq, the Ministry of Planning, and other financial bodies. The analytical method and some statistical techniques will be used to study the relationship between financial inclusion variables (banking density, and banking penetration) and banking stability variables represented by (the rate of non-performing loans).

Previous Studies:

1. Study by "Saeed, 2021" on "Financial Inclusion and its Impact on Economic Stability"

This study aims to explore the impact of financial inclusion on economic stability in developing countries. It used a statistical analysis based on economic data from several countries, focusing on financial inclusion indicators such as the number of bank accounts and the credit-to-GDP ratio. It concluded that increasing financial inclusion enhances the stability of the banking system by improving the customer base and reducing financial risks. It also confirmed that financial inclusion contributes to achieving sustainable economic growth.

2. Study by "Hussein, 2020" on "Financial Inclusion and Financial Stability:

An Empirical Analysis" This study aims to analyze the relationship between financial inclusion and financial stability in the Middle East and North Africa region. The study relied on a multiple regression analysis model using data from banks in the region, focusing on financial inclusion indicators such as the number of bank branches and the loan ratio. The results showed that financial inclusion enhances banking stability by improving the ability to cope with financial crises, which indicates the need to strengthen financial policies that support financial inclusion

3. Study by "Al-Ali, 2022" on "The Impact of Financial Inclusion on Credit Risks"

This study aims to examine the impact of financial inclusion on credit risks in banks. The study used a statistical analysis based on loan data and credit risks from a group of banks, focusing on the relationship between financial inclusion and risks. It concluded that increasing access to finance reduces the probability of non-performing loans, which enhances the stability of the banking system and reduces financial risks

4. Study by "Al-Hassan, 2021" on "Financial Inclusion as a Tool for Enhancing Banking Stability" This study aims to review how financial inclusion can contribute to enhancing banking stability. It relied on a qualitative analysis that included interviews with experts in the financial sector, in addition to analyzing the financial data of banks. The results showed that promoting financial inclusion can contribute to improving the stability of the banking system by increasing confidence in financial institutions and enhancing transparency.

5. Study by "Jamal, 2022" on "The Impact of Financial Innovation on Financial Inclusion and Banking Stability"

This study aims to examine the relationship between financial innovation and financial inclusion and how innovation can contribute to improving the stability of banks. It used a statistical analysis based on financial innovation data and financial inclusion indicators from several countries. It concluded that innovation in the provision of financial services promotes financial inclusion, which leads to improved stability of the banking system and increased efficiency of financial services.

Research Structure:

The research was divided into three main axes:

First Axis:Conceptual Framework of Financial Inclusion and Banking Stability and the Relationship Between Them.

First: The Concept of Financial Inclusion and its Influencing Factors.

1. The Concept of Financial Inclusion

Financial inclusion refers to the provision of financial services to individuals and companies, including (loans, bank accounts, insurance, and other financial services). Financial inclusion enhances the ability of individuals to access the financial resources necessary to achieve their economic goals, which contributes to improving the financial stability of households and companies. It means providing all groups, especially vulnerable groups, with access to financial services such as bank accounts, loans, and insurance. According to one researcher, "Financial inclusion enhances the ability of individuals to participate in the economy, which leads to the stability of the financial system" (Al-Husseini, 2021, 15). A World Bank report indicates that "financial inclusion helps reduce poverty and promote economic growth" (World Bank, 2022, 80), and leads to an increase in the number of customers using banking services, which strengthens the deposit base. According to one researcher, "increasing the customer base enhances the stability of banks by providing stable sources of financing" (Al-Obaidi, 2020, 22). A report by the Institute of International Finance also indicates that expanding the customer base reduces the liquidity risks faced by banks (Institute of International Finance, 2022, 14). According to the World Bank, financial inclusion enhances the ability to save, invest, and access loans, which contributes to economic growth (World Bank, 2020, 15).

2. The Importance of Financial Inclusion

This can be understood through the following points:

A. Financial inclusion contributes to improving the standard of living by providing economic opportunities (Al-Husseini, 2021, 15)

B. It contributes to increasing economic activity by enabling individuals and companies to obtain the necessary financing (Al-Salem, 2021, 34).

C. Financial inclusion contributes to promoting financial stability by improving access to financial services. As one researcher points out, "promoting financial inclusion can contribute to improving the stability of the banking system by increasing confidence in financial institutions" (Al-Obaidi, 2020, 45). According to a World Bank report, "increasing financial inclusion enhances economic stability by supporting sustainable growth" (World Bank, 2022, 10).

D. Available financial services help enhance the ability of individuals and companies to face financial crises. According to one researcher, "financial inclusion can improve the ability of individuals to manage financial risks, which enhances banking stability" (Al-Husseini, 2021, 29). A report by the Institute of International Finance also clarifies that "providing financial services to unserved people can contribute to reducing the impact of economic crises" (Institute of International Finance, 2022, 19).

E. Financial inclusion contributes to promoting innovation in the financial sector, which leads to improved efficiency and increased stability. According to one researcher, "innovation in the provision of financial services can provide new solutions that meet the needs of different groups" (Al-Salem, 2021, 42). A World Bank report also indicates that "financial innovation contributes to improving access to financial services and enhances banking stability" (World Bank, 2022, 12).

3. Factors Affecting Financial Inclusion.

These can be reviewed as follows:

A. Weak financial infrastructure in some countries can hinder access to financial services (Al-Obaidi, 2020, 22).

B. Financial education: Lack of awareness and financial knowledge among unserved groups (Al-Husseini, 2021, 29).

C. Technology: Lack of necessary technology to support modern financial services (Jamal, 2022, 42).

D. Rural areas face significant challenges in obtaining banking services. Bank branches are often less present in these areas, leading to weak financial inclusion. Research indicates that investing in financial infrastructure in rural areas can improve access to services (Al-Rifai, 2020, 26).

E. Although financial technology can enhance financial inclusion, it may increase the gap between those who have internet access and those who do not. Therefore, financial institutions must balance between traditional branches and digital solutions (Suleiman, 2023, 34).

Second: The Concept of Banking Stability and its Influencing Factors.

1. The Concept of Banking Stability Banking.

stability means that the banking system is able to provide its financial services continuously and effectively, without being exposed to crises that lead to the collapse of banks or loss of confidence by depositors and investors. Banking stability includes several aspects, including financial stability, the ability to face risks, and compliance with regulatory standards. Researchers indicate that "banking stability reflects the extent of the financial system's ability to adapt to economic shocks and maintain public confidence" (Abdul Rahman, 2021, 112). It is a state in which the banking system demonstrates its ability to operate efficiently and effectively, while maintaining confidence in the financial system. Banking stability is considered one of the basic factors for achieving sustainable economic development, as it contributes to strengthening confidence between investors and depositors and stimulates economic growth. In this article, we will address the concept of banking stability and its importance, in addition to the factors affecting it, based

on the opinions of a number of researchers and writers. According to one researcher, banking stability means the ability of banks to face economic shocks and financial fluctuations" (Abdullah, 2020, 15). In this context, a report issued by the International Monetary Fund indicates that "banking stability reflects the ability of the financial system to adapt to economic changes" (International Monetary Fund, 2021, 26).

2. The Importance of Banking Stability.

The importance of banking stability is evident in the following points:

A. Banking stability enhances the confidence of depositors and investors in the financial system, which leads to an increase in investments.

B. When the banking system is stable, it can provide the necessary credit for economic growth, which promotes sustainable development.

C. Banking stability helps reduce financial risks that may threaten the economy as a whole, as it contributes to maintaining price stability and preventing excessive inflation (Al-Obaidi, 2020, 25).

D. Banking stability ensures the protection of savings and investments for individuals (Institute of International Finance, 2022, 14).

E. It enhances customer confidence in the financial system, which leads to an increase in deposits (World Bank, 2022, 10).

3. Factors Affecting Banking Stability.

Several factors affect banking stability, including:

A. Monetary policies are among the basic factors that play an important role in banking stability. Accommodative monetary policies can lead to an increase in liquidity in the banking system, which may enhance stability. As one researcher points out, "effective monetary policies are necessary to ensure the stability of the banking system" (Al-Jamil, 2021, 42).

B. Banking supervision is a crucial factor in promoting banking stability. Effective supervision contributes to reducing risks and enhancing transparency. As one writer explains, "the existence of a strong supervisory framework contributes to strengthening confidence in the banking system and reduces the likelihood of crises" (Al-Salem, 2021, 88).

C. Financial inclusion is an important factor in promoting banking stability. It contributes to increasing the customer base, which enhances the ability of banks to face risks. As one researcher explains, "promoting financial inclusion can contribute to improving the stability of the banking system by increasing deposits and reducing risks" (Al-Husseini, 2021, 34).

Third: Framing the Relationship between Financial Inclusion and Banking Stability.

The relationship between financial inclusion and banking stability is a vital topic in economic and financial literature, as this relationship directly affects economic development and sustainable growth. Here we will review the relationship between financial inclusion and banking stability, and discuss the impact of each on the other, providing studies and examples from different countries. The relationship between financial inclusion and banking stability is a reciprocal one. On the one hand, improving financial inclusion can lead to enhanced banking stability, as an increase in the number of customers and borrowers can strengthen the deposit base and reduce financial risks. On the other hand, banking stability enhances confidence in the financial system, which encourages individuals to use financial services (Raj, 2021, 15). In this regard, studies indicate that increasing financial inclusion can lead to improved banking stability. When more individuals are able to access financial services, it increases the deposit base and reduces reliance on loans. This diversification of funding sources can enhance the ability of banks to face financial crises (Ali, 2021, 22). On the other hand, banking stability promotes financial inclusion. When banks are stable, they are more willing to provide loans and financial services to individuals and companies. This stability can increase confidence in the financial system, which encourages individuals to open bank accounts and take advantage of financial services (Hassan, 2019, 30). Financial inclusion also contributes to promoting innovation in the financial sector, which leads to improved efficiency and increased stability. Innovations such as mobile banking services and digital wallets provide new solutions that meet the needs of different groups. Innovation enhances the efficiency of providing financial services, which contributes to the stability of the banking system (Jamal, 2022, 42). Some studies have shown that low rates of financial inclusion are associated with high rates of non-performing loans, which indicates that promoting financial inclusion can contribute to reducing these rates (Al-Obaidi, 2020, p. 22).

Second Axis: Analysis of Financial Inclusion and Banking Stability Indicators in Iraq for the Period (2020-2023)

First: Analysis of Financial Inclusion Indicators:

1. **Indicators of the level of access to financial services**, which measures the spread of bank branches and ATMs (Central Bank of Iraq, Financial Stability Report, 2023, 40).

A. Banking density and penetration index .

B. Index of electronic payment services usage. .

2. **Indicator of the use of financial services**, the extent of use and spread of mobile-based payment technologies, and the extent of the contribution of electronic payment companies to financial inclusion. (Central Bank of Iraq, Financial Stability Report, 2023, 42) .

A. Spread of mobile payment services .

B. Contribution of electronic payment companies (processing, issuance, and collection companies) to financial inclusion In this regard, the researchers focus on one of the important and main indicators of banking stability, represented by the two sub-indicators (banking density and banking penetration), through which the status of financial inclusion can be identified.

Analysis of the evolution of banking density and penetration.

Banking density reflects the number of bank branches per 100,000 people, it indicates the number of financial institutions relative to the population. This density reflects the availability of financial services in society, as an increase in the number of banks and bank branches means an increase in access to financial services. Studies indicate that an increase in banking density leads to improved financial inclusion (Hassan, 2019, 30), which expresses the ability of individuals and companies to access financial services. A high banking density index can lead to increased competition among financial institutions. This competition can improve the quality of services and reduce costs, making financial services more accessible and convenient for consumers (Hassan, 2019, 30). It is clear from the data in Table (1) that banking penetration and banking density have continued to maintain their low levels in Iraq. The size of banking penetration in Iraq has not changed much in recent years, reaching (2.80) in 2010 and becoming (2.81) in 2016, which is approximately (3) branches per (100) thousand people, while this ratio was (3.28) in 2015. The decrease in 2016 compared to 2015 is a result of the decrease in the number of bank branches from (1213) in 2015 to (1068) in 2016. This decrease generally reflects the lack of a sufficient number of bank branches compared to the increasing population of Iraq, and that Iraq needs more bank branches for banking services to reach the largest possible number of the population. Based on this indicator, banking services are more widespread when this ratio increases, as (Tunisia) & (Lebanon) have the highest ratios in the Arab world with values of (241) and (24) respectively (Central Bank, Financial Stability Report, 2016, 77).

Table (1)

Evolution of Financial Inclusion and Banking Stability Indicators in Iraq for the Period (2010-2023)

year	Financial Inclusion Indicator: Level of Access to Financial Services		Banking Stability Indicator
	Banking Density (thousand people)	Banking Penetration %	Non-Performing Loan Rate %
2010	35.6	2.8	2.83
2011	35.9	2.78	3
2012	34.6	2.89	2.18
2013	33.7	2.96	8.07
2014	29.9	3.34	8.37
2015	30.4	3.28	10.16
2016	43.74	2.29	10.93
2017	44.05	2.27	14.02

2018	44.16	2.26	15.61
2019	24.88	4.02	11.71
2020	25.44	3.93	10.34
2021	25.72	3.89	10.12
2022	27.25	3.67	8.4
2023	38.54	2.59	7.22

Source: Prepared by the researchers based on: Central Bank of Iraq, Financial Stability Report for the years (2016, 2019, and 2023).

In 2023, the banking sector witnessed a decrease in the number of bank branches, with the number of branches reaching (843) compared to (876) branches in 2022. The banking density index reached (38.54) thousand people per bank branch on average in 2023, after it had covered (27.25) thousand people per bank branch on average in 2022. In contrast, there was a decrease in the banking penetration index, which reached (2.59%) in 2023, after it was (3.67%) in 2022. This decrease is due to the closure of some branches of foreign banks (Central Bank, Financial Stability Report, 2023, 40). As for banking penetration, it is measured based on the number of ATMs and Qi-Card cards per (100) thousand adults in Iraq (Central Bank, 2016, 79). This indicator is an effective measurement tool for assessing the distribution of banking services across different regions. In countries that suffer from a shortage of bank branches, there is difficulty in accessing these services, which leads to low rates of financial inclusion (Ali, 2021, 22). Table (1) shows that banking penetration and banking density in 2010 continued to maintain their low levels in Iraq. The size of banking penetration in Iraq did not change in the past years for this year, as the ratio reached about (2.80) in 2010 and became (2.29) in 2016, which is approximately (3) branches per (100) thousand people, while this ratio was (3.28) in 2015. The decrease in 2016 compared to 2015 is a result of the decrease in the number of bank branches from (1213) in 2015 to (1068) in 2016, which reflects the lack of a sufficient number of bank branches compared to the increasing population of Iraq, and that Iraq needs more bank branches for banking services to reach the largest possible number of the population. Based on this indicator, banking services are more widespread when this ratio increases, as Tunisia and Lebanon have the highest ratios in the Arab world with values of (241) and (24) respectively (Central Bank of Iraq, Financial Stability Report, 2016, 77). If we take banking density alone, it appears from the same table that banking density witnessed a noticeable decrease from 2010 to 2014, as it decreased from 35.6 thousand people to 29.9 thousand people. This may be a result of a reduction in the number of banks or an increase in the population faster than the growth of the number of banks. In 2016, banking density witnessed a big jump to 43.74 thousand people, which indicates a significant expansion in the banking system. However, after that, the density dropped sharply in 2019 to 24.88 thousand people, which may indicate the closure of some banks or negative economic changes. During the years (2020-2022), banking density was relatively stable, with a slight increase in 2022. However, in 2023, the density increased significantly to 38.54 thousand people, which indicates a recovery in the banking system, and reflects significant economic transformations.

Second: Analysis of Banking Stability Indicators Banking stability indicators are used to assess the health of the banking system and its ability to deal with economic risks. Here are some of the main indicators:

1. **Non-performing loan rate**: Reflects the percentage of loans that have not been repaid (Al-Obaidi, 2020, 22).
2. **Capital adequacy ratio**: Indicates the bank's ability to face financial risks. It is measured as a ratio between the bank's available capital and the sum of risk-weighted assets (Jamal, 2022, 42).
3. **Profitability rate**: Reflects the bank's ability to generate profits.
4. **Liquidity ratio**: the bank's ability to meet its short-term obligations, and is measured as a ratio between liquid assets and short-term liabilities. (Al-Salem, 2012, 34)**.**
5. **Loan-to-deposit ratio:** Measured as a ratio between total loans granted and total deposits. It indicates the extent of the bank's reliance on deposits to finance loans, as a high level may indicate increased liquidity risks. (Saeed, 2021, 12) . In this regard, the researchers focus on one of the important indicators through which the status of banking stability can be identified, as follows:

- **Analysis of the Non-Performing Loan Rate Indicator**.

It is the ratio of loans that have not been repaid by borrowers to the total loans granted. This rate is considered an important indicator of the health of the banking system, as a high rate of non-performing loans indicates problems in financial risk management. According to a study conducted by the Central Bank, a high rate of non-performing loans can lead to a reduction in the ability of banks to provide new loans, which negatively affects financial inclusion (UAE

Central Bank, 2022, 10). The non-performing loan rate (%) reflects the percentage of loans that have not been repaid regularly, and it is an important indicator of the health of the banking system. A high rate indicates problems in credit risk management and reflects a weakness in financial stability (Al-Obaidi, 2020, 22). It is clear from the data in the previous table (1) that the general trends of the loan rate indicate that the period (2010-2012) witnessed a slight increase in the rate of non-performing loans, with a noticeable decline in 2012 to 2.18%. This indicates an improvement in loan repayment during that year. This period witnessed a remarkable increase in the rates of non-performing loans, as they rose continuously until they reached 14.02% in 2017. This may be the result of economic crises or a decline in the financial performance of borrowers. In 2018, the rate of non-performing loans peaked at 15.61%. After that, it began to gradually decrease, reaching 7.22% in 2023, which indicates an improvement in loan management and repayment.

Third Axis: Measuring and Analyzing the Impact of Financial Inclusion on Banking Stability in Iraq for the Period (2020-2023)

The topic of financial inclusion and its impact on banking stability is not limited to the theoretical and descriptive analytical aspects only, but also requires knowledge of the impact that financial inclusion has on banking stability in Iraq based on the econometric method. Therefore, this section deals with econometric models as a tool of quantitative analysis that helps in identifying the reality of economic variables and the relationship between them to obtain a quantitative description by building econometric models to test that relationship.

First: Description of Econometric Models:

The stage of specifying the econometric model is one of the most important stages of building the economic model. In this stage, reliance is placed on economic logic. Therefore, it is necessary to work on identifying the econometric methods that will be used to measure the relationship between financial inclusion through (the two indicators of banking density and financial penetration) as independent variables, and banking stability through (the rate of non-performing loans) as a dependent variable in Iraq for the period (2020-2023). They have been described as follows:
Independent variables: These include two indicators (Banking Density, and Banking Penetration). Dependent variable: This is determined by the indicator (rate of non-performing loans). The data was obtained from (the Central Bank of Iraq), as the dependent variable is affected by the independent variables.

Second: Theoretical Relationship.

An increase in banking density leads to a decrease in the rate of non-performing loans, thus the relationship is (inverse). An increase in banking penetration leads to a decrease in the rate of non-performing loans, thus the relationship is (inverse).

Third: Expectile Regression.

Expectile regression is a development of the traditional linear regression model. It is similar in structure but differs in its loss function, as it uses an asymmetric loss function based on weighted squares, which allows for estimating effects across the conditional distribution of the dependent variable and not just at the mean. This model was first introduced by Newey and Powell (1987) as a flexible method for analyzing the relationship between variables at different levels of the distribution (such as small or large values), which is useful when the distribution is asymmetric or contains outliers, and We assume the following model:

$$y_i = x_i^T \beta + \epsilon_i$$

Where β is estimated by solving the problem:

$$\hat{\beta} = \beta \qquad argmin \sum_{i=1}^{n} \quad \rho(y_i - x_i^T \beta)$$

With the loss function:

$$\rho_\tau(u) = |\tau - I(u < 0)|u^2$$

$\tau \in (0,1)$: the expectile level.

$I(u < 0)$ an indicator function that gives 1 if u < 0, and 0 otherwise.

This formula makes the model give different weights to the errors depending on their direction, which allows for estimating the effect of the independent variables at different segments of the dependent variable's distribution.

Fourth: Data Description.

This research relies on annual time series data covering the period from 2010 to 2023, collected from the financial stability reports issued by the Central Bank of Iraq. The data includes three main variables representing indicators of financial inclusion and banking stability.

1. Dependent Variable (Y):

Non-Performing Loan Rate This variable represents the percentage of loans that have not been repaid on time out of the total loans granted. It is one of the most important indicators of credit risk and a measure of weakness in the banking sector.

2. Independent Variables:

A. Banking Density (X1):

Measured by the number of people per bank branch. The lower the value, the greater the spread of branches and the better the access to banking services. It is an indicator of banking infrastructure.

B. Banking Penetration (X2):

Expressed as the ratio of the number of bank branches to the population. The higher the ratio, the better the geographical spread of banks and the greater the financial coverage.

Table (2)

Annual Values of Financial Inclusion Indicators (Banking Density and Banking Penetration) and the Non-Performing Loan Rate in Iraq for the Period (2010–2023)

Year	Independent Variables X1, X2		Dependent Variable Y
	Banking Density (thousand people) X2	Banking Penetration X1	Non-Performing Loan Rate Y
2010	35.6	2.8	2.83
2011	35.9	2.78	3
2012	34.6	2.89	2.18
2013	33.7	2.96	8.07
2014	29.9	3.34	8.37
2015	30.4	3.28	10.16
2016	43.74	2.29	10.93
2017	44.05	2.27	14.02
2018	44.16	2.26	15.61
2019	24.88	4.02	11.71
2020	25.44	3.93	10.34
2021	25.72	3.89	10.12
2022	27.25	3.67	8.4
2023	38.54	2.59	7.22

Source: Prepared by the researchers based on: Central Bank of Iraq, Financial Stability Report for the years (2016, 2019, and 2023(

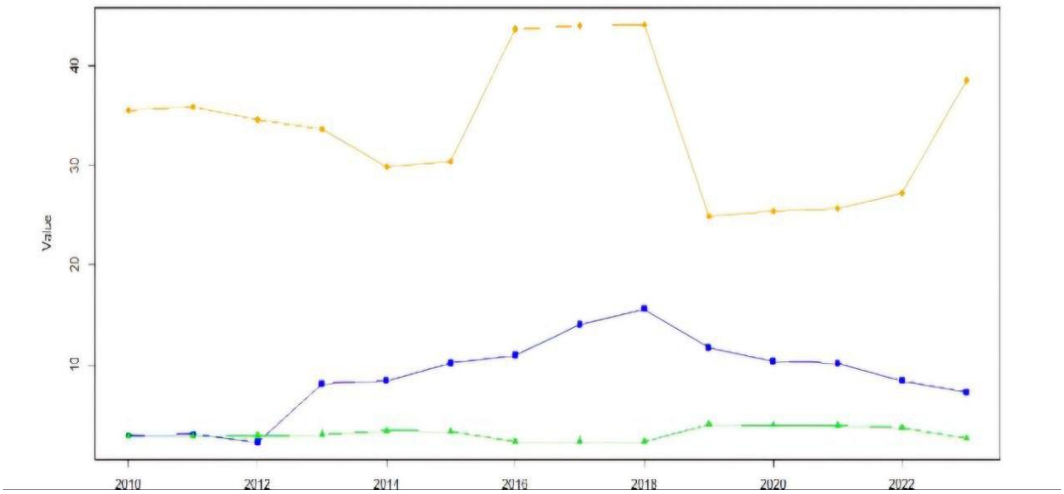

Figure (1):Time Trends of Financial Inclusion Indicators (Banking Density and Banking Penetration) and the Non-Performing Loan Rate in Iraq during the Period (2010–2023).

Figure (1) reflects the time trends of financial inclusion indicators in Iraq, represented by banking density and banking penetration, along with the rate of non-performing loans during the period from 2010 to 2023. These trends reveal the dynamics of the relationship between these indicators, which helps in understanding the development of the banking environment and the level of financial stability in the country. It is noted from the figure that the rate of non-performing loans maintained relatively low levels during the first years of the study period, ranging between 2.8% and 3.0% in the period 2010–2012. However, starting from 2013, it witnessed a clear jump, rising to more than 8%, and this upward trend continued until 2018 when it peaked at 15.6%. This sharp rise indicates a deterioration in the quality of bank credit during that stage. After 2018, the rate began to decline gradually, which may reflect an improvement in the performance of banks or in credit risk management mechanisms, reaching 7.22% in 2023. As for banking density, it showed a gradual decline between 2010 and 2014, indicating an expansion of bank branches and improved access to them. But starting from 2015 until 2018, banking density witnessed a sharp rise, which may indicate a decline in the number of branches or an unbalanced increase in the population relative to the banking infrastructure. After 2019, banking density began to improve again, which may reflect a trend to rebuild the branch network or improve banking coverage. In contrast, banking penetration showed relative stability in the period from 2010 to 2016, with moderate values indicating a relative expansion in the network of banks. Then it began to improve clearly after 2018, which indicates an increase in the number of active bank branches or an expansion in financial inclusion services in the governorates. In general, a gradual inverse relationship can be observed between financial inclusion indicators and the rate of non-performing loans, especially after 2018, where the improvement in banking density and penetration was associated with a decrease in the default rate. This reinforces the theoretical hypothesis that improving financial inclusion contributes to enhancing banking stability and reducing credit risks.

Fifth: Hypothesis Testing.

Hypothesis 1: Testing the effect of the independent variable (Banking Density) on the dependent variable (Non-Performing Loan Rate)

Table (3)

Results of Expectile Regression for the Impact of Banking Density (x1) on the Non-Performing Loan Rate (y)

Relationship Relationship Type	P-value	Banking Density Coefficient (x1)	Constant	Expectile Level τ
Positive, insignificant	0.112	0.10	1.7	0.1
Positive, significant	0.038	0.18	3.8	0.5
Strong positive	0.021	0.29	6.2	0.9

At τ=0.1, the effect is weak and insignificant. At low levels of default, banking density does notplay a major role in explaining the change in non-performing loans. At τ =0.5, the effect becomes more pronounced and significant. This indicates that poor access to bank branches moderately increases default rates. At τ =0.9, the effect escalates and becomes strong and significant. At high levels of default, it is clear that weak financial inclusion is associated with a significant increase in non-performing loans, reflecting the sensitivity of the banking system in deteriorating conditions. The results indicate a positive and significant relationship between banking density and the non-

performing loan rate, especially at high values of τ. This supports the hypothesis that promoting financial inclusion (by reducing banking density through increasing the number of branches) can contribute to lowering credit risks and improving banking stability.

Hypothesis 2: Testing the effect of the independent variable (Banking Penetration) on the dependent variable (Non-Performing Loan Rate).

Table (4)
Results of Expectile Regression for the Impact of Banking Penetration (x2) on the Non-Performing Loan Rate (y)

Relationship Type	P-value	Banking Penetration Coefficient **(x2)**	Constant	Expectile Level **τ**
Weak inverse	0.094	-1.85	9.6	0.1
Significant inverse	0.041	-2.1	13	0.5
Strong significant inverse	0.019	-2.55	15.3	0.9

At τ =0.1, a simple inverse effect appears but it is insignificant, which indicates that banking penetration does not make a clear difference at low levels of default. At τ =0.5, the inverse effect becomes clear and statistically significant, which shows that increasing the coverage of bank branches contributes to reducing the rates of non-performing loans at medium levels. At τ =0.9, the inverse effect is maximized and becomes highly significant, which reflects the importance of banking penetration in effectively reducing credit risks in critical cases. The results confirm that there is a significant inverse relationship between banking penetration and the non-performing loan rate, and the strength of this effect increases at higher levels of default. That is, improving the spread of bank branches enhances the ability of the banking system to contain defaults and achieve better financial stability.

Hypothesis 3: Testing the effect of the independent variables (Banking Density and Banking Penetration) on the dependent variable (Non-Performing Loan Rate)

Table (5)
Results of Expectile Regression for the Combined Impact of Banking Density and Banking Penetration on the Non-Performing Loan Rate

General Relationship Type	**P-value x2**	Coefficient **x2**	**P-value x1**	Coefficient **x1**	Constant	**τ** Expectile Level
Joint significant effect	0.102	-1.35	0.129	0.08	3.1	0.1
the individual effects of both	0.036	-1.8	0.044	0.16	5.6	0.5
Strong significant effect	0.018	-2.2	0.021	0.24	7.8	0.9

x1 and x2 are present but insignificant. At low default levels, financial inclusion does not explain much of the variance in the default rate. At τ=0.5, a significant effect appears for both banking density (x1) and banking penetration (x2), where the values indicate that: an increase in banking density (fewer branches) leads to a rise in the default rate, and an increase in banking penetration contributes to lowering the rate of non-performing loans. At τ=0.9, the effect becomes clearer and more significant. The coefficients indicate that policies that improve banking access (reducing density and increasing penetration) lead to a significant decrease in non-performing loans at higher levels of risk. The results indicate that there is a significant and consistent joint effect of both banking density and banking penetration on the non-performing loan rate, especially at the medium and high levels of default. This reinforces the importance of strengthening banking infrastructure and expanding banking penetration as a means of reducing credit risks and enhancing financial stability.

Conclusions and Recommendations:

First: Conclusions:

1. Positive Relationship: The research results are expected to reveal a positive relationship between financial inclusion and banking stability, meaning that increasing access to financial services contributes to improving the performance of banks and reducing financial risks.
2. The results of the expectile regression at different levels of τ showed a positive and significant relationship between banking density and the non-performing loan rate, especially at the medium and high levels (τ = 0.5 and τ = 0.9). This means that a decrease in the availability of bank branches leads to an increase in non-performing loans, which indicates a weakness in financial inclusion.
3. The results showed an inverse and significant relationship between banking penetration and the rate of non-performing loans, where an increase in the spread of bank branches contributes to reducing defaults. This effect is more pronounced at higher levels of τ.

4. When combining banking density and banking penetration in one model, the effect was significant and consistent at $\tau = 0.5$ and $\tau = 0.9$, which confirms that improving financial inclusion by reducing density and increasing penetration effectively contributes to lowering non-performing loans and enhancing banking stability.
5. The results indicate that the effects are stronger as the levels of τ increase, whenever the banking system is in a state of weakness or high risk, which reflects the importance of financial inclusion in critical periods.
6. The results showed the impact of government policies and efforts to promote financial inclusion on the stability of the banking system, which provides evidence of the effectiveness of these policies.

Second: Recommendations:

1. The need to develop financial infrastructure to facilitate access to banking services, such as establishing bank branches in remote areas and using financial technology.
2. It is necessary to implement educational programs aimed at increasing financial awareness among individuals and companies, which contributes to improving the use of financial services.
3. The government should develop policies that encourage innovation in financial services and promote financial inclusion, including providing incentives for banks that work to expand their customer base.
4. Expand the network of bank branches, especially in areas suffering from high banking density, with the aim of improving access to financial services and reducing pressure on existing branches.
5. Increase the rate of banking penetration by supporting the establishment of new branches or developing electronic access methods in rural and remote areas, which enhances credit stability and reduces default risks.
6. Adopt flexible banking policies based on the results of expectile and non-linear regression, especially in light of volatile economic conditions, as expectile regression models have proven their effectiveness in monitoring the impact of financial inclusion across various levels of risk.
7. Include financial inclusion indicators within early warning tools for banking risks, due to their close association with non-performing loan rates at critical levels

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