Impact of Finacial Inclusion on Banks Credit Risk in Afghanistan: Empirical Evidence from Afghanistan's Banking Sector

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Abstract

This paper investigates the impact of financial inclusion on credit risk in nine commercial banks in Afghanistan, covering the data of 12 years from 2010-2021. Financial inclusion has been measured by the number of loan accounts, number of deposits, number of branches, and number of ATMs. Moreover, other bank-specific and macroeconomic variables are used as control variables like CAR, AGR, LTD, INT, INF, and GDP. This study applied panel data, random regression to test the hypothesis, and a generalized method of moment (GMM) regression model to test the effect of financial inclusion on credit risk. This study's findings show that the number of loans on credit risk is positive and significant. However, the impact of the number of deposits on credit risk is affirmative but insignificant. On the other hand, the impact of the number of branches on credit risk is positive and significant, while the effect of the number of ATMs is significant and negative. Among the control variables, the finding of this paper indicates that CAR, AGR, GDP, and LTD have a negative link with credit risk and considerably impact decreasing Credit risk. INR and INF positively link with credit risk, but their impact is insignificant. This research will contribute to the DAB and other government-involved policymakers to use the valuable findings of this study while developing the future financial inclusion strategy in cooperation with bank managers to expand financial inclusion in line with commercial bank targets.

Key Words: *Financial inclusion, Credit Risk, Branches, Afghanistan Banks*

JEL Codes: *G32, F52, C22, E58*

Introduction

The concept of financial inclusion was introduced in 2005. In recent years, economists, scholars, government officials, policymakers, and financial investors have received the core attention to reach economic and social benefits (Ali, Devi, Furqani, & Hamzah, 2020). In Afghanistan, the banking sector has partially reformed; however, lousy governance (Qazizada & Wani, 2020) and political instability (Muram & Wani,2020) have jeopardized the country's economic fabric. Financial inclusion is described as the access of the people and industries of a country to valuable and reasonable financial services and products for the fulfillment of their needs, such as insurance, transfers, credit, dealings, deposits, and other financial facilities that could be offered in a responsible and maintainable way. According to WBG, financial inclusion is the primary enabler in reducing extreme poverty and enhancing mutual blooming (World Bank,2022). Hence, the enlargement in financial inclusion contributes to channeling funds to banks as deposits, which are vibrant for increasing capital accumulation, investment decreasing poverty, enlightening economic development, and inspiring economic growth (Park & Mercado, 2018). Financial inclusion means providing financial products and facilities like loans, protection, saving, and a reimbursement system reachable to every individual in a society, which will help the economic growth of a country.

Financial inclusion helps individuals and companies embark on education, save for the future, benefit from business opportunities, and protect themselves against uncertainty (Kunt, Beck, & Honahan, 2008). Financial inclusion similarly improves the effectiveness and reachability of financial products and services in a harmless, easy, efficient as well as in a low-cost way (Ikram, I., & Lohdi, S. 2015). Financial inclusion is likewise known as an ongoing method of enhancing of circumstance, number, and effectiveness of financial institution products (Babajide, Adegboye, & Omankhanlen, 2015). Global Financial system fluctuation is the primary concern that has forced countries to prioritize financial stability over financial growth. In the long run, instability in the financial system may cause the unsustainability of economic growth (Schneider & Woodcock, 2008). Many countries, for the getting of financial stability have strengthened their financial regulation (Spratt, 2013). Commercial banks play the role of financial intermediaries in an economy. Their primary tasks are collecting money, issuing loans to the borrower, and providing transmission services to the public. In addition, financial institutions (Banks) have a significant part in implementing government financial plans, especially in transmitting financial and fiscal policy to the public (Ongore & Kusa, 2013). Financial institutions (banks) must be stable to act as an intermediary for providing liquidity (Najimi, Wani, & Deshpande, (2022). Since the financial crisis of 2007-2008, bank stability has been the main concentration of international policymakers (Salome et al., 2018). Non-performing loan (NPL) ratio measures individual bank stability (Mostak & Sushanta, 2015).

The prominent source of income for commercial banks is loans (asset quality). One of the main elements of bank performance is the quality and class of credit portfolios by the banks Ongoro & Kusa (2013). Delis et al. (2014) found that NPL is a good instrument for measuring credit risk. NPL is a considerable concern for commercial banks, and the level of NPL is always kept low because this will negatively affect banks' profitability. NPL is calculated by dividing the non-performing loan by the total loan in a bank. When the borrower cannot pay his loan amount in full, the loan will be counted as default without considering its collateral (Poutines, 2014). Shihadeh (2019) in his study found that expanding financial inclusion, like branches and other indicators of financial inclusion as a tool of banking penetration, will reduce the risk and increase the banks' return. The level of their NPL is high for commercial banks, which have riskier loans, which has caused a reduction in the level of profit and earnings of Turkish banks Partovi (2018). The issue of financial inclusion has significance for most nations. The considerable gap in access to financial inclusion has encouraged policymakers in more than 60 countries to target the financial inclusion program in their nations (Sahay et al., 2015). Because of its importance, many emerging studies have investigated the impact of financial inclusion on different dimensions like financial inclusion and poverty reduction, financial inclusion and economic inequality (Takeshi Inoue, 2018; Park et al., 2017); financial inclusion and bank profitability (Kumar et al., 2021) Inoue (2018) examined the impact of financial inclusion on the poverty condition in India through commercial banks from (1973-2004). Previous studies support that financial inclusion will cause economic growth and poverty reduction. This research studies the impact of financial inclusion on credit risk in commercial banks in Afghanistan. Furthermore, credit risk is one of the financial institution risks which defect the class of loans. Commercial banks with more credit risk also have more NPL (Han & Melecky, 2013). Therefore, this study is designed to investigate the impact of financial inclusion on credit risk in the banking sector of Afghanistan. The rest of the study is divided into five sections. The first section contains an introduction and background of the study, the second section discusses the literature review and relevant matters, the third section discusses the research design, the fourth

section contains model specification and analysis, and the last section of this research discusses the conclusion and recommendation of the research.

2. Literature Review

The issue of financial inclusion has a very high significance for most countries. The considerable gap in access to financial inclusion has encouraged policymakers in more than 60 countries to target the financial inclusion program in their nations (Sahay et al., 2015). Because of its high importance, many emerging studies have investigated the impact of financial inclusion on different dimensions like financial inclusion and poverty reduction, financial inclusion and economic inequality (Inoue, 2018; Park et al., 2017), financial inclusion and bank profitability (Kumar et al., 2021). This study reviews previous papers to examine the relationship between financial inclusion and credit risk. With the help of past studies, we can develop a concrete model for our studies. Past studies reviewed for this study were conducted between the years (2010-2021). Previous studies considered in this study are not limited to financial inclusion and risk but all aspects of financial inclusion, such as financial inclusion and economic growth, profitability, and financial performance.

Theoretical Propositions

Three theories theoretically support this study: financial growth theory, intermediary financial theory, and asymmetry information theory. Bagehot (1973) gave financial growth theory, and according to this theory, financial inclusion prepares the environment for economic growth. This theory supports financial stability, which helps smooth financial intermediaries' smooth running (Salome, 2018). Moreover, the following theory, which explains the connection between financial inclusion and financial institution (Bank) credit risk, is the intermediary financial theory. This theory was given by Diamond in 1984 and describes how banks work as mediators between the borrower and savers. Financial intermediation is seen when the financial institutions bring the surplus spending unit and the deficit spending unit (Ndebbio, 2004). Diamond (1984) cited that banks can effectively monitor borrowers. It will be a comparative advantage if the Bank reduces its monitoring cost. The asymmetry theory can also reveal the relationship between financial inclusion and credit risk. This theory says that in a debt contract, one party has more information than another party is called information asymmetry. This concept was given by Akerlof (1970), and he found out that it might be hard to differentiate between good and worst debtors. Financial inclusion is the entry of new, inexperienced, huge customers into the financial sectors Hansen (2010). Entry of new customers will create challenges for the debt market, making it difficult for the lender to specify the excellent risk, which will threaten the financial performance and constancy. Hence, it is hard for financial institutions (Banks) to know whether financial inclusion is a low-risk good asset.

Empirical Scholarship

Pure studies on the relationship between financial inclusion and credit risk are limited. Most of the studies have examined the connection of financial inclusion with other variables. Most papers arrive at the same conclusion of the link between financial inclusion, the financial performance of the lending division, and economic growth in any nation. So, this preliminary research explores the link between financial inclusion and credit risk. Several researchers have explored the connection between financial inclusion with poverty and income dissimilarity in different regions, and almost all have achieved

a positive relationship between both. In a study, Park (2017) assesses the impact of financial inclusion on poverty and income inequality in 176 economies, including 37 developing Asian countries. their finding reveals that financial inclusion positively correlated with income inequality and lower poverty levels for all samples. However, in Asian countries, no link was found between financial inclusion and economic inequality.

Further, several papers have explored the elements of financial inclusion and have mentioned and considered various factors of financial inclusion. (Asuming, 2018; Abdu, 2021; Fungacova, 2014; Ali, 2020; Eldomiaty, 2020; Dar, 2020). Assuming (2018) investigates the recent trends and elements of financial inclusion in Africa between the period of (2011-2014). The finding reveals that the total level of financial inclusion has improved between mentioned years. This study also discovers that individual-level like (age, learning, femininity, and capital), macroeconomic elements (GDP growth rate and existence of financial institutions), and Industry Liberty are influential forecasters of financial inclusion. Likewise, Abdu (2021) did the same investigation in the Afar area. This paper stated that the most significant determinants connected to financial inclusion are age, uses, financial literacy, and mobile banking. It also mentioned that the barrier to financial inclusion, such as lack of security, interest rate, the problem of access to credit, lack of access to bank ATMs and offices, illiteracy, absence of confidence in lending institutions, problems with internet access and absence of cash are the core impediment of financial inclusion is Afar region. Different results have been found to measure and study financial inclusion. Kumar (2021) used the number of bank offices (branches), loan accounts, and ATMs to measure financial inclusion and ROA and ROE as instruments for measuring profitability. It also adds that financial inclusion is necessary for developed countries, as demonstrated by cost management, credit risk management, and bank size as crucial drivers of bank profitability in Japan. Similarly, Kondo (2008) also concluded a similar conclusion and found that ATMs do not impact banks' return on assets (ROA). However, ATMs had a positive effect from 2000–2003 on fees and commissions at Japanese banks.

In another empirical study regarding the variable, the number of branches, several studies explored how branch expansion affected bank efficiency and cost efficiency. Kozo (2016) studied the impact of branch expansion on bank productivity in Japan. The findings of this study reveal that when branches expand to an adequate level, it has a beneficial effect on regional bank performance in Japan. Likewise, Bernini (2017) investigates the effect of bank office (branch) extension on the cost efficiency of the Italian cooperative Bank from 2006–2013. Their results indicate that expansion of the bank network has an inverse effect on efficiency, except for those banks with a more diversified offering of products. They believe that expansion will increase the distance between the headquarters and the bank branch and the cost of the branch's operation. It also stated that an efficient local bank and larger banks with more credit availability could boost the local economy. So, this paper has accepted the most suitable practical models and the best appropriate variables for financial inclusion and credit risk. In addition, unlike past studies, this research has included more and more common variables to measure financial inclusion. Therefore, this is the only paper in Afghanistan that studies the connection between financial inclusion and credit risk using this methodology.

Conceptual Framework
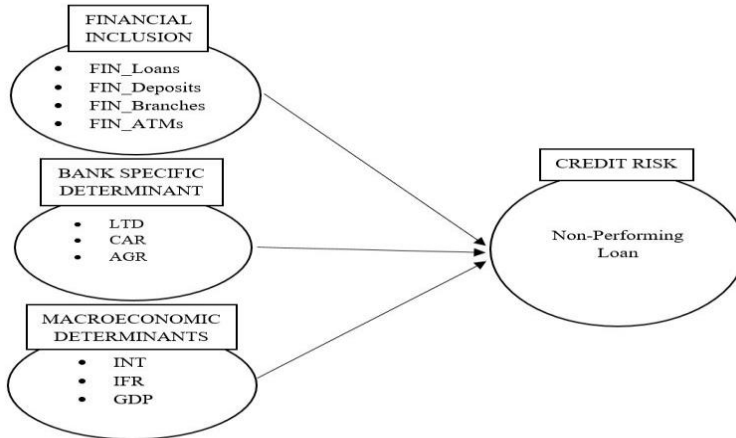
3. Data and Methodology

Research Design

This study has used the positivism philosophy, deductive approach, and quantitative design to extract the impact of financial inclusion on credit risk. In this study, we have developed hypotheses to test this theory in Afghanistan. The type of data that will be used is quantitative data. As the data used in this study are secondary, this research has used quantitative data to measure dependent and independent variables. The data for this research paper were collected from the World Bank Group, the DAB, commercial banks' annual statements, and the Statista website.

Population and Sample of Study

The central Bank of Afghanistan licenses twelve banks. These are three state-owned banks, two overseas banks, and seven commercial banks. Because of Afghanistan's low participation in economic growth, this study excluded two foreign banks and one domestic Bank. 2 state-owned banks and seven local commercial banks are the main focus of our study, and 12 commercial banks operating in Afghanistan are our population. This study will cover only nine commercial banks in Afghanistan.

Instrumentation and Operationalization of Study

All the variables used in this research are quantitative. Thus, the variables will be measured through the total deposit accounts with financial institutions (banks) for every 1,000 adults. Loan accounts with banks for every 1,000 adults, ATMs for every 100,000 adults, and commercial bank branches for every 100,000 adults. On the other hand, this study has used non-performing loans (NPL) to measure credit risk. The NPL ratio will measure non-performing loans. In this study, we will calculate the NPL as (Doubtful+Loss)/Total gross loan. Moreover, this study has used some control variables like the loan to deposit, asset growth rate CAR, inflation rate, interest rate, and growth rate, for which the data was extracted from the national statistics organizations in Afghanistan and the World Bank data set.

Empirical Model

Following the model applied by Kumar et al. (2021), we estimated the below model for this study:

$$NPL_{it} = \beta_0 + \beta_1 FIN\ DEPOSIT_t + \beta_2 FIN\ LOAN_t + \beta_3 FIN\ BRANCH_t + \beta_4 FIN\ ATM_t + \beta_5 CAR_{it} + \beta_6 LTD_{it} + \beta_7 AGR_{it} + \beta_7 INF_t + \beta_8 INT_t + \beta_9 GDP_t + uit$$

Where:

- NPL is a non-performing loan of a financial institution (Bank) and our dependent variable for measuring credit risk
- I denote the financial institution (
- Bank), and t denotes the time period.
- FIN_DEPOSIT, FIN_LOAN, FIN_BRANCH, and FIN_ATM are the variables that are independent and used for the measuring of financial inclusion in a country;
- CAR is a capital adequacy ratio is Bank specific control variable;
- LTD is a loan-to-deposit ratio is Bank specific control variable;
- AGR stands for Asset Growth Rate and bank-specific variables, which are used as some control variables in this study; and
- Gross Domestic Product (GDP), Interest Rate (INT), and Inflation Rate (INF) denote financial institutions' (banks') specific macroeconomic variables, which are used as control variables.

Definition and Expected Sign of Variables

Table 1: Description and Estimated Sign of the dependent and independent Variables

Variables	Notation	Measure	Expected Sign
Dependent Variable			
Non-performing Loan	NPL	Non-Performing Loan/Total Loan (%)	
Independent Variables			
Financial Inclusion Variables			
Number of Deposit Accounts	FIN_DEPOSIT	Number of Deposit Accounts with commercial banks per 1000 adults	+
Number of Loan Accounts	FIN_LOAN	Number of Loan Accounts with commercial banks per 1000 adults	+
Number of Branches	FIN_BRANCH	Number of Branches with commercial banks per 100,000 adults	+
Number of ATMs	FIN_ATM	Number of ATMs with commercial banks per 100,000 adults	+
Control Variables			
Capital Adequacy Ratio	CAR	Tier 1 Capital+Tier 2 Capital / Risk-Weighted Asset	-
Loan to Deposit Ratio	LTD	Total loan/Total deposit *100	+
Asset Growth Rate	AGR	Current year Asset-Previous Year Asset/Previous Year Asset*100	-
Inflation Rate	INF	Yearly percentage change in CPI (%)	+
Interest Rate	INT	Policy Rate set by DAB (%)	+
Growth Rate	GDP	Yearly GDP growth rate (%)	-

Source: Data output from E-Views 10.0

Data Collection Procedure

This research has used panel data, which includes time series and cross-sectional analyses, to analyze the impact of financial inclusion on credit risk. The data for this study were collected from commercial banks' annual reports, DAB reports, and the World Bank website for the period 2010–2021 for nine commercial banks out of 12 banks, containing 108 observations. The data for a bank's specific variables have been extracted from its annual report using its balance sheet and income statements and a formula for calculating ratios. This paper pulls macroeconomic variables from the World Bank data set, Statista, and the national statistics organizations of Afghanistan. This paper has covered those commercial banks that have branches in most provinces of Afghanistan and have been offering financial inclusion services to people. The three excluded banks are two foreign banks operating only in Kabul and a local commercial bank banned from loan disbursement since 2010. Generally, of the 12 commercial banks operating in Afghanistan, nine are considered in this research paper.

4. Data Analysis and Findings

Descriptive Statistics

Table 2 displays the descriptive statistics, which provide the mean, standard deviation, minimum, and maximum values of the dependent and independent variables. NPL is the dependent variable, and the rest are the independent variables, classified into financial inclusion and control variables. The mean value for the NPL is 12.6, with a minimum of 0.1 and a maximum of 54.5. Furthermore, the mean for the FIN Loan is 4, with a minimum of 0.0001 and a maximum of 43.14. Besides, of every 1,000 adults in Afghanistan, only 103 have a deposit account with a commercial bank.

Table 2: Descriptive Statistics of dependent and independent variables for the period of 2010-2021 (number of observations 108)

Variables	Mean	Std. Dev.	Minimum	Maximum
Dependent Variables				
NPL	12.60	17.08	0.10	54.50
Independent Variables				
Financial Inclusion Variables				
FIN_Loans	4.00	10.51	0.0001	43.14
FIN_Deposits	102.7	138.24	7.68	638.8
FIN_Branches	2.09	10.85	0.57	4.93
FIN_ATMs	1.15	15.56	1.90	6.21
Control Variables				.
LTD	31.10	21.60	0.500	85.00
CAR	28.40	19.10	-13.00	52.00
AGR	9.10	20.70	-59.40	90.8
INT	12.10	5.00	-1.20	18.50
INF	4.80	3.40	-0.70	11.8
GDP	3.50	5.00	-2.70	14.3

Source: Data output from E-Views 10.0

As per the table, the average number of ATMs is 1.15 for every 100,000 adults, with a minimum of 1.9 and a maximum of 6.21. The average number of branches is 2.09 for every 100,000 adults, meaning that for every 100,000 adults in Afghanistan, there is approximately one ATM and two branches. Regarding the bank-specific control variables, the average loan-to-deposit ratio is 31, the average value for the CAR is 28, and the average asset growth ratio is 9. Moreover, among macroeconomic variables, the

average interest rate between 2010 and 2021 is 12, the average inflation rate is 4.8, and the average GPD growth rate is 3.5 between the study periods.

Correlation Analysis

Table 3 shows the correlation result for the dependent and independent variables. According to table 3, FIN_loan, FIN_deposit, FIN_branch, interest rate, and inflation rate have positive relations with the NPL of the banks; on the other hand, FIN_ATM, CAR, asset growth of the Bank and GDP growth rate have antagonistic relations with the credit risk of the banks.

Table 3: Correlation Matrix

Variables	NPL	Loan	Deposit	Branch	ATM	LTD	CAR	AGR	INR	IFR	GDP
NPL	1.00										
FIN_Loans	0.21	1.00									
FIN_Deposits	0.06	-0.02	1.00								
FIN_Branches	0.06	0.13	0.55	1.00							
FIN_ATMs	-0.07	-0.21	0.45	0.26	1.00						
LTD	-0.26	0.64	0.13	0.05	-0.35	1.00					
CAR	-0.24	0.12	-0.17	0.00	-0.29	-0.22	1.00				
AGR	-0.16	-0.05	-0.18	0.07	-0.12	-0.12	0.15	1.00			
INR	0.21	-0.04	0.17	-0.14	0.20	-0.19	0.03	-0.34	1.00		
IFR	0.03	0.01	-0.07	-0.02	-0.08	0.08	0.02	0.09	-0.46	1.00	
GDP	-0.23	0.03	-0.15	0.14	-0.20	0.11	-0.02	0.16	-0.29	-0.19	1.00

Source: Data output from E-Views 10.0

Empirical Result and Discussion

Unit Root Tests and Results

We used the ADF test to determine whether our dependent and independent variables were stationary. Performing a unit root test aims to avoid the ambiguity or regression resulting from using non-stationary data. The results that we gained from the test are posted in Table 4 as follows:

Table 4: Unit Root Test Results

Variables	ADF-Statistics	Prob
NPL	13.55	0.75
FIN_Loans	29.87	0.038
FIN_Deposits	28.85	0.05
FIN_Branches	15.90	0.59
FIN_ATMs	10.98	0.81
LTD	46.17	0.00
CAR	21.03	0.27
AGR	65.75	0.00
INR	26.55	0.08
IF	26.86	0.08
GDP	2.08	1.00

Source: Data output from E-Views 10.0

The result in table 4 indicates that FIN_Loans, FIN_Deposits, LTD, and AGR were stationary because there is no unite root test, and their P-values are less than 0.05, which indicates that the null hypothesis for the presence of a unite root test is rejected. The unit root test results for NPL, FIN_Branches, FIN_ATM, CAR, INR, IFR, and GR were non-stationary because their P-values were more significant than 0.05. Thus, this study took the first difference of the non-stationary variables to make the static variable. The results are displayed in the below table:

Table 5: Unit Root Test Result (1st Variance)

Variables	ADF-Statistics	Prob
NPL	30.09	0.03
FIN_Loans	43.67	0.00
FIN_Deposits	48.07	0.00
FIN_Branches	18.96	0.03
FIN_ATMs	27.90	0.03
LTD	45.70	0.00
CAR	50.89	0.00
AGR	75.29	0.00
INR	72.39	0.00
IF	60.43	0.00
GDP	57.62	0.00

Source: Data output from E-Views 10.0

After conducting the first difference unit root test on a non-stationary variable, the results show that all variables become stationary as their P-values are smaller than 0.05. Therefore, we discard the null hypothesis of the presence of a unit root in our variables.

Multi-collinearity

This study runs the variance inflation factor for the testing of multi-collinearity. According to the rule of thumb, the value of VIF must be less than 10. The value of VIF with more than 10 indicates the presence of multi-collinearity in data.

Table 7: Multi-collinearity Tests

Variable	Coefficient Variance	Uncentered VIF
FIN_Loan	0.00	1.28
FIN_Deposit	1.37	1.99
FIN_Branch	0.20	1.83
FIN_ATM	0.06	2.28
LTD	0.03	1.75
CAR	0.01	1.09
AGR	0.00	1.49
INR	0.17	2.33
IFR	0.27	1.58
GDP	0.18	1.41

Source: Data output from E-Views 10.0

Table 7 shows the result of multi-collinearity, which indicates that all variables values in VIF are less than 10. The maximum value of the variables is 2.33, which is less than 10. This VIF result indicates no threat of a multi-collinearity problem in our variables. As a result, the value of VIF is less than 10, which is tolerable.

Hausman Test for Model Specification

We have conducted the Hausman test at this stage for the specification of the fixed or random effect regression model for this study. Based on the Hausman test, as shown in table 8, the P value is more than 0.05 and is not significant. Therefore, this test signifies that the random effect model suits this study.

Table 8: Huasman Test

Variable	Fixed	Random	Var(Diff.)	Prob.
FIN_Loans	0.34	0.36	0.00	0.56
FIN_Deposits	0.00	0.00	0.00	0.26
FIN_Branches	0.48	0.40	0.00	0.07
FIN_ATMs	-0.50	-0.46	0.00	0.26

LTD	0.45	0.45	0.00	0.97
CAR	-0.46	-0.45	0.00	0.39
AGR	-0.13	-0.11	0.00	0.65
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random		9.08	7	0.24

Source: Data output from E-Views 10.0

Random Effect Model

Table 9 shows the outcome of conducting the random effect regression after the Hausman test suggested a random effect. The result of the random effect shows that from our independent variable, three of them have a positive coefficient with credit risk, and one has a negative coefficient, which shows an inverse relation with credit risk.

Table 9: Random Effect

Variables	Coefficient	Std. Error	t-Statistic	Prob.
FIN_Loans	0.36	0.02	0.82	0.04
FIN_Deposits	0.00	0.00	0.14	0.88
FIN_Branches	0.40	0.17	2.27	0.02
FIN_ATM	-0.46	0.13	-3.56	0.00
LTD	-0.45	0.11	-3.85	0.00
CAR	-0.45	0.09	-4.92	0.00
AGR	-0.11	0.07	-1.58	0.11
INR	0.43	0.38	1.14	0.25
IFR	0.11	0.50	0.23	0.81
GDP	-0.83	0.32	-2.54	0.01
C	0.33	0.10	3.37	0.00
R-squared	0.55			
Adjusted R-squared	0.48			
Prob(F-statistic)	0.00			

Source: E-Views 10.0

Table 9 shows an R-square result of 0.553115, which indicates that financial inclusion indicators, along with some other bank-specific factors, influence the credit risk of the financial institution (banks), which NPL measures. On the other hand, the value of (P) is 0.000003, as it is smaller than 0.05. The p-value indicates a considerable impact on the credit risk of the banking sector in Afghanistan. As of table 9, we consider the coefficient and P-value for our variables. The coefficient value of the FIN_Loan is 0.369961, which indicates that when the quantity of loan accounts increases by one unit, it will increase the credit risk by 0.36 percent, and the value of P=0.04, which is smaller than 0.05, indicating that there is a considerable effect of this variable on credit risk. Thus, we accept the (H1) hypothesis that the link between the FIN-Loan and credit risk is positive. Likewise, the regression coefficient result for the second variable is 0.000232, which implies that if the FIN_deposit increases by one unit, the credit risk will increase by 0.0002 percent. On the other hand, its p-value is 0.8832, which is more than 0.05; thus, its impact on credit risk is insignificant. Hence, we accept the second (H2) hypothesis that there is a positive link between the FIN_Deposits and credit risk, but its effect could be more considerable. Further, the coefficient value of FIN_branches is 0.401787, which indicates that when the number of branches increases by one, the credit risk increases by 0.40 percent. The p-value for the branch is also less than 0.05 and significant; thus, we accept the (H3) hypothesis that the link between the number of branches and the Bank's credit risk is positive. Furthermore, the FIN_ATMs coefficient value is -0.464712, indicating that increasing the number of ATMs by one unit reduces credit risk by 0.46 percent. Their p-values are less than 0.05, which indicates a significant effect on credit risk. Hence, we discard the (H4) assumption that the link between the number of ATMs and credit risk is

positive. Furthermore, the coefficient regression results for the control variables GDP -0.836152, CAR -0.451530, AGR -0.118233, and LTD -0.458893, respectively, indicate that when the GDP value rises by 1 unit, the credit risk will decrease by 0.83%; if the values of CAR, AGR, and LTD increase by one unit, the credit risk will decrease by 0.45, 0.11, and 0.45 respectively. The p-values for GDP, CAR, and LTD are less than 0.05, which significantly affects credit risk. Additionally, the coefficient results among the macro-economic variables, interest rate, and inflation rate coefficients are 0.43 and 0.11, which indicate that when the interest rate increases by one unit, it increases the credit risk by 0.43 and 0.11 percent. Both P-values are more than 0.05 and have an insignificant effect on credit risk.

GMM Method

Table 10 shows the results of the GMM regression model. The result of the GMM regression shows that of our four independent variables, three have positive coefficients with credit risk, and one has a negative coefficient, which shows an inverse relationship with credit risk. The result is almost identical to the random effect model, with a slight value difference.

Table 10: GMM Method

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FIN_Loans	0.36	0.133	0.51	0.01
FIN_Deposits	0.014	0.00	2.16	0.53
FIN_Branches	0.37	0.50	0.74	0.04
FIN_ATMs	-0.21	0.25	-0.84	0.03
LTD	-0.08	0.21	-0.40	0.68
CAR	-0.71	0.30	-2.37	0.01
AGR	-0.03	0.06	-0.64	0.51
INR	0.36	0.60	0.60	0.54
IFR	0.16	0.62	0.25	0.79
GDP	-0.42	0.31	-1.32	0.00
J-statistic	21.26			
Prob(J-statistic)	0.04			

Source: Data output from E-Views 10.0

As the table 11 above, we consider the coefficient and P-value for our variables. The coefficient value of the number of loan accounts is 0.368647, which indicates that when the quantity of loan accounts increases by one unit, the credit risk will increase by 0.36 percent. The value of p is 0.0165, as it is smaller than 0.05, indicating a considerable effect of this variable on credit risk. The co-efficient regression result for the second variable is 0.014736, which implies that if the deposits increase by one unit, the credit risk will increase by 0.014%. The p-value for this variable is 0.5333, which is more than 0.05 and insignificant on credit risk. The coefficient value of the number of branches is 0.371745, which indicates that when the number of branches increases by one unit, the credit risk rises by 0.37, and the value of P is smaller than 0.05, which is significant. Moreover, the ATM coefficient value is reversed and significant. In addition, the regression coefficient results for the control variables CAR are -0.71, AGR is -0.03, and GDP are -0.42, which indicate that when the CAR value rises by one unit, that will increase the credit risk by 0.71%, and when the rates of AGR and GDP increase by one unit, the credit risk will decrease by 0.039% and 0.42%, respectively. The p-values for the CAR and GDP are less than 0.05, which indicates their significant effect on credit risk. The coefficients from remaining control variables like interest rate and inflation rate are positive but insignificant because their P-values are more significant than 0.05.

Discussions

This study conducted the Hausman test for the determination of the regression model for our study. The most suitable recommended model for our study was the random effect. Moreover, we conducted a GMM regression model to analyze the impact of financial inclusion on credit risk. The findings of this study have been discussed below:

FIN_Loan: The regression tests showed that the number of loan accounts was related to credit risk in a positive way. The level of loan account exposure to credit risk is considerable. The p-value for the loan was also significant for credit risk, indicating that an increase in the number of loans increases credit risk by a certain amount. The above findings agree with the results of (Gokhale, 2009; Allen et al., 2012).

Bank_Branches: Expanding financial inclusion through bank branches and increasing the number of bank customers may attract risky customers to the banking system. When the loan is disbursed, and the client fails to repay it, the banking system's credit risk increases. These findings are consistent with Musau et al. (2018), who found that increasing bank accessibility through loans and deposits increases credit risk and leads to instability. Moreover, Han and Melecky (2013) found that financial institutions (banks) that have given more loans are more susceptible to credit risk. Credit risk is one of the risks that financial institutions face when making loans. Those commercial banks that have more credit risk also have more non-performing loans.

FIN_Deposit: As pointed out in Table 7, the coefficient value of the number of deposits is positive. Based on the coefficient sign, the link between the number of deposits and credit risk is positive but not considerable. Moreover, the P value is more significant than 0.05, which is insignificant. Our finding in this regard contradicts Musau et al. (2018), who studied the relationship between financial inclusion with credit risk. They studied financial institutions' reachability, convenience, and practice in 2018. They found that increases in bank accessibility through deposit, loan, and mobile are more vulnerable to credit risk and will lead to instability.

FIN_Branch: The coefficient of the number of branches is also positive. Based on the coefficient sign, the relationship between the number of branches and credit risk is positive. Moreover, the level of its effect is considerable, and the value of P is less than 0.05 and significant. This paper's findings contradicted (Shihadeh et al.,2019), who found that branches as a factor of financial inclusion could reduce the Bank's risk. Moreover, this finding needs to be more consistent with Schmeits and Boot's (2000) mention that the Bank's risks can be decreased and diversified with the help of financial inclusion. Besides, this finding contradicts Chen, and Wang's (2018) claim that a rise in financial inclusion decreases non-performing loans; it means that when the level of financial inclusion rises, it will cause an increase in the number of bank clients and diversify the risk.

FIN_ATM: Moreover, the number of ATMs has a negative relationship with credit risk because the coefficient value is negative, which shows an inverse relationship with credit risk, and their P-values are less than 0.05, indicating their significant impact on reducing the credit risk in the banking sector of Afghanistan. The finding of this paper is in line with Schmeits and Boot's (2000) mention that the Bank's risks can be decreased and diversified with the help of financial inclusion. Besides, this finding conforms with Chen and Wang's (2018) claim that a rise in financial inclusion decreases non-performing loans; it means that when the level of financial inclusion rises, it will cause an increase in the number of clients of the banks and diversify the risk.

Control Variables: Conversely, among the bank-specific and macroeconomic variables, IFR and INR coefficient results show a positive relationship, and CAR, GDP growth, LTD, and asset growth rate show a negative relationship with credit risk. These findings conform with (Shihadeh et al.,2019) that asset growth and GDP could reduce bank risk.

5. Conclusion and Recommendations

This research has examined the impact of financial inclusion on credit risk in the banking sector of Afghanistan. In this study, the number of loans, number of deposits, number of bank offices (branches), and number of ATMs are used as elements of financial inclusion. According to this paper, the impact of loan accounts on credit risk is positive and significant. The number of deposits positively impacts the Bank's credit risk, but it is insignificant. Besides, the relationship between the number of branches and credit risk is positive. Regarding the number of ATMs, this research found that the relationship between the number of ATMs and credit risk is negative. Among the control variables, our results recommend that IFR and INR coefficient results show a positive relation and CAR, LTD, GDP growth, and asset growth rate have a negative relation with credit risk. These findings conform with (Shihadeh et al., 2019) that asset growth and GDP could reduce bank risk.

Policy Recommendation

Financial inclusion is necessary for a country's development. Furthermore, the level of financial inclusion is shallow, and the credit risk is high in Afghanistan. Therefore, this study recommends the following policy discourse to commercial banks, the Central Bank, and policymakers:

Commercial banks should consider the borrower's 5Cs (capital, condition, capacity, collateral, and character). Commercial banks should avoid granting loans to related parties and political exposure. The loans to the borrower shall not be processed in branches; they should only be engaged in collecting the documents. Commercial banks shall increase the loan-to-value ratio while granting loans and requesting mortgages for valuable property. The Central Bank (DAB) shall supervise all the loans to political parties and related parties. The Central Bank (DAB) should restrict the regulation of lending to commercial banks. Commercial banks should provide financial inclusion through branchless and digital banking to different regions of the country. Commercial banks can develop strategic plans to enhance their network through branches, ATMs, and POS machines to enhance their profits and reduce risk. Commercial banks could reduce their management fees to encourage people to use banking services. With the cooperation of commercial banks, the central Bank must develop a financial inclusion policy that could assist startup businesses and SMEs.

Future scope of work

In this study, a few essential determinants of financial inclusion have been considered. At the same time, future investigators are highly encouraged to add some other essential factors of financial inclusion like the number of POS machines, the number of ATM card users, the sum of mobile money transactions, the sum of life insurance policies, deposits accounts of SMEs in commercial banks, the sum of mobile money agent offices, and other factors to study the relationship of financial inclusion and credit risk in Afghanistan, or future researchers could investigate the impact of financial inclusion on the performance of the commercial banks, financial growth, and poverty in Afghanistan.

Limitations of Study

This paper has constraints, such as the limited number of financial inclusion factors because of the absence of records. There needs to be more data on financial inclusion factors to affect the result of our study. For instance, this study could not include the number of POS machines, number of credit cards, number of mobile money users, or other components of financial inclusion, so the outcome may need to be more comprehensive. In addition, this study could not include some other financial institution (Bank) variables and macroeconomic elements that might influence the credit risk of the banks like, cost-to-income ratio, bank size, equity ratio, asset concentration, and broad money growth, which may affect the banks' credit risk. Thus, future researchers could include or add more components of financial inclusion to study its link with credit risk.

Authors Contributions

The authors confirm their contribution to the paper as follows: study conception, data collection, model evaluation, analysis, and design: ZF; interpretation of results and draft manuscript preparation: MI. All authors reviewed the results and approved the final version of the manuscript.

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