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## The Effects of Credit Risk on the Profitability of Commercial Banks in Afghanistan

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### Abstract

The purpose of this study is to examine the effects of credit risk on commercial banks' profitability in Afghanistan. Due to the availability of limited data, this study applies the Fixed Effects estimator on balance panel data of six domestic private commercial banks over the period 2014–2018. The study uses LLRTL, TLTA, and TLTD as credit risk indicators, size as bank-specific determinant, ROAA, ROAE, and NIM as profitability indicators. The study finds a robust negative and significant effect of LLRTL on ROAA, and ROAE, but positive and insignificant on NIM. The results also reveal significant positive effect of TLTA on NIM, however insignificant negative on ROAA while insignificant positive on ROAE. The study finds negative effect of TLTD on ROAA, ROAE, and NIM, but only significant on NIM. Further, this study reveals a robust negative and significant effect of size on all profitability indicators. The mean comparison of profitability demonstrates that NIM is in a better situation than others profitability indicators, which is a good sign for the Afghan banking sector. The findings of this study suggest that improving credit management, increasing efficiency of asset management or effectiveness of business model can increase commercial banks' profitability in Afghanistan.

**Keywords:** Credit Risk, Bank Profitability, Commercial Banks, Fixed Effects Estimator, Afghanistan

**JEL Classification Code:** G20, G21, G30, G32, M41

### 1. Introduction

Commercial banks play a vital role in the economic and financial development of a country. The banks accumulate the idle savings of the people and make them available for investments. Due to capital market weaknesses and limitations, and a lack of sufficient sources of financing, banks are the main sources of credit in the domestic markets in developing countries (Zidan, 2014). A bank is like any other business, but for banks, profitability is going to depend on risk management. Banks face different types of risk, but credit risk is the biggest one faced by banks and financial intermediaries (Poudel, 2012). Credit risk is defined as

“the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms” (Basel, 2000). Credit risk negatively affects the volatility of expected returns in banks. Thus, managing credit risk for efficient management of a financial institution has gradually become the most crucial task (Bangladesh Bank, 2005).

Limited institutional capacity, volatile interest rate, poor management, inappropriate credit policies, low capital and liquidity levels, inappropriate laws, directed lending, reckless lending, the poor credit assessment, carelessness in credit assessment, poor lending practices, government interference, and inadequate supervision by the central bank are the main sources of credit risk in banks (Muritala & Taiwo, 2013). As an internal determinant of bank performance, credit risk affects banks' profitability (Ekinci & Poyraz, 2019). Having effective credit risk management in banks support sustainability and profitability of their operations and also contribute to economic stability and efficient allocation of capital in the economy (Psillaki et al., 2010). However, ineffective credit risk management is one of the main causes of serious banking problems in the world. The result of high credit risk is non-performing loans that lead to financial weaknesses for banks and customers

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(Madugu et al., 2020). Effective credit risk management in commercial banks need to establish an appropriate credit risk environment, operating under a sound credit-granting process, maintaining an appropriate credit administration, measurement, and monitoring process, and ensuring adequate controls over credit risk (Basel, 2000).

Private banking in Afghanistan does not have a long history. Compared to other countries in the region, it is very young. The history of private banking began when a new banking law was introduced and established in 2003. There are 12 commercial banks in the sector consisting of three state-owned, seven private, and two branches of foreign commercial banks. The banking sector assets were \$4.3 billion and amounted to 22.83 percent of GDP; only 3.1 percent of GDP was intermediated as loans from banks to the private sector in 2017. Despite the new banking law, Kabul Bank, one of the largest private commercial banks, collapsed in 2010, and it, in turn, imposed high fiscal costs for the country. Various risk factors in the Afghan banking sector affect the profitability of the banks. However, the main risk drivers are credit risk, liquidity risk, and operational risk. Credit risk is the most relevant risk driver. Furthermore, missing and lack of expertise in risk management have adverse consequences on the stability and performance of commercial banks in the sector. (Rasa, 2017a).

The financial sector is mostly controlled by commercial banks in Afghanistan. Capital markets in the country are in the primary stage as well as in the developing process. The existence of different ways of lending in Afghan commercial banks shows that banks have different possible sources of income, different attitudes toward risk or perceived risk, or face different credit risks (Charap & Pavlovic, 2009). Fraud, embezzlement, high credit risk, liquidity risk, and operational risk were the main factors of Kabul Bank's run in 2010 (Rasa, 2017b). The recent Kabul Bank run was the last major financial threat to the Afghan banking sector. Due to the Kabul Bank financial crisis, the banking sector has faced governance concerns, deteriorating assets, and weak profitability. The main deficits in the risk management procedures that negatively impact the whole Afghan banking industry are lack of technical knowledge, qualified and trained personnel in risk management, difficulties in quantifying risks, quality of information, and high cost of information technology (Rasa, 2017a).

## 2. Literature Review

Credit can be financial resources in forms of cash finance, running finance, term finance, personal loan, local purchase, order credit, direct credit facility, export credit, import facility, equipment leasing, etc., which are made available for customers at interest rate by banks to get profit (Kayode et al., 2015). Risk is defined as “the volatility of

returns leading to unexpected losses, with higher volatility indicating higher risk” (Crouhy et al., 2006). There are many factors that directly or indirectly influence the volatility of returns, which are called risk factors. According to Crouhy et al. (2006), risk factors have been broadly grouped into the following categories: credit risk, market risk, operational risk, liquidity risk, legal and regulatory risk, business risk, strategic risk, and reputation risk. Credit risk is defined as “the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms” (Basel, 2000). Credit risk negatively affects the volatility of expected returns in banks. Thus, managing credit risk for efficient management of a financial institution has increasingly become the most decisive task (Bangladesh Bank, 2005). Besides that, effective credit risk management is an integral element of an inclusive approach to risk management and essential to the long-term success of any banking organization (Samuel, 2015).

Granting credit is one of the main sources of income for commercial banks. However, if it is not effectively and efficiently managed, it would have an adverse impact on the banks' returns. In terms of importance, it is the first of all risks; consequently, a default of a small number of important customers of commercial banks can generate large losses to the banks, which could possibly lead the banks to insolvency (Bessis, 2002). In addition, credit risk is one of the threats to commercial banks' reliability (Ishak et al., 2016). The marginal cost of debt and equity could be raised by an increase in credit risk, which will increase the cost of funds for banks and hence result in liquidity and solvency constraints (Almekhlafi et al., 2016).

To minimize the aggregate credit risk in banks, good risk management of retail and corporate lending is obligatory (Heffernan, 2005). Lack of an appropriate monitoring process on credit records and instability of governance are providers of increased credit risk in banks (Munangi & Sibindi, 2020). Therefore, it is a crucial task of banks to regularly monitor their borrowers to ensure the repayment of debts in accordance with the agreements. Profitability is one of the main concerns of banks, as acquiring higher returns on their investments allow banks to renew their capitals, improve processes, expand and increase their value creation (Gilces et al., 2020). Since credit risk is considered an important factor affecting the profitability of banks, banks should ensure sound risk and capital management, especially importance should be given to credit risk management through increasing the efficiency of credit analysis and debtor monitoring processes (Pervan et al., 2015). Athanasoglou et al. (2006) and Bucevska and Misheva (2017) indicate that variations in bank profitability are largely dependent on variations in credit risk, and increased exposure to credit risk is usually linked with decreased bank profitability.

Profitability is a business's ability to produce a return on an investment based on its resources in comparison with an alternative investment (Horton, 2019). Profitability is an instrument of the ability of banks to carry risk and/or raise the capital of banks. It implies the competitiveness of banks and measures the quality of management (Li & Zou, 2014). Profitability determinants of commercial banks can be grouped into two main categories, namely, those that are management controllable and those that beyond the control of management. Management controllable factors are classified as internal determinants and basically reflect on the differences in bank management policies and decisions in regards to sources and uses of funds management, capital and liquidity management, and expenses management. The external factors of commercial banks' profitability are environment-related factors and firm specific factors (Guru et al., 1999). Maintaining the stability of the banking system in the economy is an essential issue, which highly depends on healthy and sustainable profitability. In case a bank has high solvency, poor profitability weakens the capacity of the bank to absorb negative shocks, which will ultimately affect the solvency of the bank (García-herrero et al., 2009).

Higher profitability allows banks to generate funds to grant more credit to the economy. Though, it is also absolutely necessary for bank's supervisors because it guarantees more flexible capital ratios, even in the situation of a riskier business environment (Trujillo-Ponce, 2013). Banks with higher profitability have proven to have lower non-performing loans because they can afford adequate credit management practices (Rachman et al., 2018). A healthy and profitable banking sector is an integral element of a stable financial system. It is better able to resist negative shocks and help to the stability of financial system in the economy (Athanasoglou et al., 2008). An efficient and profitable banking system is an essential condition for economic growth (Dietrich & Wanzenried, 2014). Furthermore, the role of banks as intermediaries is considered as the accelerator of economic growth (Ekinici & Poyraz, 2019).

Prior studies have examined the effects of credit risk on banks' profitability in different countries. Findings of prior studies both from developed and developing countries indicate mixed results. Ekinici and Poyraz (2019) investigated the impact of credit risk on bank performance in Turkey between 2005–2017 for 26 commercial banks using panel regression model. The study indicated that there is a negative relationship between credit risk and profitability in Turkey. Kolapo et al. (2012) examined the effect of credit risk on commercial banks' profitability in Nigeria for the period 2000–2015. The study employed fixed-effects (FE) panel data model. ROA was used as a profitability indicator while the ratios of non-performing loan to loan and advances, total loan and advances to total deposit, and loan loss provision to classified loans were used as a credit risk indicator.

The results indicated that non-performing loan and loan loss provision have negative impact, but total loan and advances has positive impact on commercial banks' profitability in Nigeria. In another study, Gadzo et al. (2019) examined the effects of credit risk and operational risk on the financial performance of universal banks in Ghana during 2007–2016, using a partial least squared structural equation model approach. The results revealed that credit risk influences financial performance negatively contrary to the empirical study but in line with the information asymmetry tenant of the lemon theory.

Munangi and Sibindi (2020) investigated the impact of credit risk on the financial performance of 18 south African banks for the period 2008–2018 using pooled ordinary least squares, FE, and random-effects (RE) estimators. The findings revealed that credit risk is negatively related to financial performance. Gathigiamuriithi et al. (2016) examined the effects of credit risk on the financial performance of 43 commercial banks in Kenya for the period 2005–2014. Using FE and GMM estimators, the study found significant negative relationship between credit risk and profitability.

Abbas et al. (2019) studied the impact of bank capital, bank liquidity, and credit risk on profitability in post crisis period between 2011–2017 in Asian developed economies in comparison with the USA banking industry, using two-steps GMM and two-stage least squares simultaneous equations model. ROAA, ROAE, and return on average earning assets were used as profitability proxies and loan loss provisions to the risk of loans of banks as a credit risk proxy. The findings revealed that credit risk has a negative impact on commercial banks' profitability in both Asian developed economies and the USA. Though, the influence in Asia is lower than in the USA banking sector. However, Margono et al. (2020) found that capital adequacy and liquidity have a positive, but credit risk does not have a positive effect on bank performance.

Almekhlafi et al. (2016) investigated the determinants of credit risk and its implication on bank performance in Yemen from 1998–2013 using panel data. The findings revealed a causal relationship between credit risk and bank performance in Yemen. Dietrich and Wanzenried (2011) examined the profitability of 372 commercial banks in Switzerland over the period from 1999 to 2009, using the GMM estimator. The study employed ROAA, ROAE, and NIM as profitability indicators while loan loss provisions over total loans as one of internal factors. The results indicated that loan loss provisions to total loans have significant negative impact on profitability during the crisis years. In another study, Athanasoglou et al. (2008) examined bank-specific, industry-specific, and macroeconomic determinants of bank profitability in Greek banks during 1985–2001 using the GMM model. Using ROA and ROE as profitability indicators while loan loss provisions to total loans as credit risk indicator. The results revealed that credit

risk is significantly negatively related to profitability in Greek Banks.

Sufian (2011) analyzed commercial banks' profitability in Korea during the period 1992–2003, using unbalanced panel data. The study employed FE panel data model. ROA and ROE were used as profitability indicators, while LLPTL as one of the bank-specific factors. The study revealed that credit risk has a negative impact on bank profitability. Moreover, Noman et al. (2015) examined the effect of credit risk on profitability of the banking sector in Bangladesh for the period 2003–2013. Using RE model, GLS, and system GMM, the results indicated significant negative effect of NPLGL and LLRGL on all profitability indicators. Besides that, the effect of CAR on ROAE was significant negative.

Ishak et al. (2016) studied credit risk management and profitability of banks listed on Bursa Malaysia for the period 1998–2015, using a regression model. ROE and ROA were used as profitability indicators while the TLTA, TLTD, and NPLTL were used as credit risk indicators. The study showed most of the credit risk indicators have a negative impact on profitability. Al-homaidi et al. (2018) investigated the impact of bank-specific and macroeconomic determinants of banks' profitability of Indian commercial banks from 2008 to 2017 using pooled, FE, RE models, and GMM. Profitability was measured by ROA, ROE, and NIM. The study used bank size, assets quality, capital adequacy, liquidity, operating efficiency, deposits, leverage, assets management, number of branches, GDP, inflation rate, interest rate, and exchange rate as independent variables. The study indicated that all bank-specific determinants, except the number of branches, have a significant effect on NIM. It also found that all macroeconomic determinants have a negative effect on Indian commercial bank profitability. Moreover, bank size, number of branches, assets management ratio, and leverage ratio are highly significant factors of profitability as measured by ROA.

## 2.1. Research Questions and Hypothesis Development

Based on the literature review, the following research questions and null hypotheses are developed:

### 2.1.1. Research Questions

1. What is the relationship between credit risk and commercial banks' profitability in Afghanistan?
2. How credit risk affects the profitability of commercial banks in Afghanistan?
3. Which credit risk indicators mostly affects commercial banks' profitability?

4. What are the important policy implications that improve effective and efficient credit risk management in commercial banks?

### 2.1.2. Hypotheses

**H1:** *There is no significant relationship between LLRTL and commercial banks' profitability in Afghanistan.*

**H2:** *There is no significant relationship between TLTA and commercial banks' profitability in Afghanistan.*

**H3:** *There is no significant relationship between TLTD and commercial banks' profitability in Afghanistan.*

**H4:** *There is no significant relationship between SIZE and commercial banks' profitability in Afghanistan.*

## 3. Data and Methodology

At present, 12 commercial banks are operating in Afghanistan, including three state-owned, seven private, and two foreign commercial banks. Due to the non-availability of the required data, all state-owned and foreign commercial banks have been excluded from this study, therefore the study sample reduced to six private commercial banks (Table 1). This study covers the period 2014–2018 and the data is balanced panel data. The data for both dependent and independent variables were collected from the annual audited reports, audited financial statements of the study sample's commercial banks, and Afghanistan Banks Association.

The following commercial banks are the study sample:

- Afghanistan International Bank
- The First Microfinance Bank
- Afghan United Bank
- Islamic Bank of Afghanistan
- Maiwand Bank
- Azizi Bank

The study sample accounts for 50% of the Afghan banking sector and its market share is more than 60%, which well represents the population. In term of market share, AIB and Azizi Bank are in the more dominant positions and their market shares are 22.87% and 12.57%, respectively.

### 3.1. Dependent Variables

Numerous studies have been conducted in different countries to study the impact of credit risk on banks' profitability. The studies commonly used Return on Asset (ROA), Return on Equity (ROE), and Net Interest Margin (NIM) proxies to measure profitability (e.g., Tafri et al., 2009; Munangi & Sibindi, 2020; Ozili, 2017; Athanasoglou et al., 2008; Ekinci & Poyraz, 2019; Kayode et al., 2015; Kaaya & Pastory, 2013; Kolapo et al., 2012; Boahene et al., 2012;

**Table 1:** List of Commercial Banks (Study Sample) in Afghanistan

No	Name	Abb.	Data of Establishment	Assets in AFN	Share %
1	Azizi Bank	Aziz Bank	2006	169,047,234,000	12.57
2	Maiwand Bank	MB	2008	117,627,297,000	8.71
3	Islamic Bank of Afghanistan	IBA	2009	77,096,611,000	5.71
4	Afghan United Bank	AUB	2004	100,909,143,000	7.47
5	The First Microfinance Bank	FMFB	2004	53,377,231,000	3.95
6	Afghanistan International Bank	AIB	2004	308,823,289,000	22.87
	Total Assets			826,880,805,000	61.24

Sufian & Habibullah, 2009; Petria et al., 2015; Yüksel et al., 2018; Miguel et al., 2019; Madugu et al., 2020; Yanikkaya et al., 2018; Poudel, 2018; Alshatti, 2015). ROA is measured as the percentage of a year's net profit to the total assets of the same year. Further, ROE is computed as the percentage of a year's net profit to the total equity of the same year. Besides that, NIM is expressed as a percentage and is defined as the net interest income divided by total assets. This study uses ROA, ROE, and NIM as proxies for banks' profitability.

### 3.2. Independent Variables

#### 3.2.1. Bank Specific Determinants

Loan Loss Reserve to Gross Loans (LLR/GL): LLRTL ratio is a credit risk indicator which is used by various studies (e.g., Noman et al., 2015; Boahene et al., 2012; Kolapo et al., 2012; Kayode et al., 2015; Chowdhury et al., 2017; Tan, 2016). This ratio measures the percentage of gross loan, which has been set aside, but not yet charge off. Empirical studies indicate that the higher ratio is the indication of week loan portfolio management quality and high credit risk (Noman et al., 2015).

Total Loans to Total Assets (TL/TA): Most of the revenues of commercial banks are acquired by loans. The banks' loans are riskier and less liquid than other assets (Almekhlafi et al., 2016). Prior studies (e.g., Almekhlafi et al., 2016; Muritala & Taiwo, 2013; Ishak et al., 2016) used TLTA ratio as a credit risk indicator to measure asset quality in banks. When commercial banks are exposed to high-risk loans, the higher is the accumulation of unpaid loans, indicating lower returns to commercial banks.

Total Loans to Total Deposits (TL/TD): TLTD is used as a measure to find the liquidity of the bank. Previous studies (Kolapo et al., 2012; Ishak et al., 2016; Lee & Hsieh, 2013; Hamza, 2017) used the ratio as a measure of credit risk. Loans to deposits ratio indicates how efficiently the bank makes use of depositors' fund on credit activity which is to be expected to risk of default (Kishori & Sheeba, 2017).

Bank size (SIZE): Size is measured by total assets. To identify potential size effects, prior studies used the natural logarithm of total assets as a proxy for measuring bank size (Berger et al., 2010; Dietrich & Wanzenried, 2011; Kaaya & Pastory, 2013; Tan, 2016; Al-homaidi et al., 2018; Fang et al., 2019; Kasana, 2016; Ekinci & Poyraz, 2019; Yanikkaya et al., 2018). This study also uses bank size as a bank specific determinant to explore whether bank size has effect on profitability in the Afghan banking sector.

### 3.3. Econometric Specifications

The data for this study contains information on cross sectional unites observed over time, therefore, a panel data estimation technique is adopted. The panel data model takes the following form:

$$\pi_{it} = \alpha + x'_{it}\beta + \varepsilon_{it} \quad (1)$$

where  $\pi_{it}$  is the profitability (dependent variable) of bank  $i$  at time  $t$ ,  $\alpha$ ; is the intercept term on the explanatory variables, is a  $k \times 1$  vector of a parameter to be estimated, and vector of observations is  $x'_{it}$  which is  $1 \times k$ ,  $t=1, \dots, T$ ;  $n=1, \dots, N$ , and  $\varepsilon$  is the error term.

The operational form of the profitability function Equation (1) can be defined as follows:

$$\text{Profitability} = f(\text{bank\_specific\_variables}) \quad (2)$$

Profitability is measured by ROAA, ROAE, and NIM. Bank-specific variables consist of LLRTL, TLTD, TLTA, and SIZE. The expanded models for the three proxies of profitability are as below:

$$\pi_{it} = \alpha_i + \beta_1 \text{LLRTL}_{it} + \beta_2 \text{TLTA}_{it} + \beta_3 \text{TLTD}_{it} + \beta_4 \text{SIZE}_{it} + \varepsilon_{it} \quad (3)$$

In all three models,  $i$  shows an individual bank,  $t$  refers to year,  $a$  is a constant term,  $\beta_1: \beta_4$  are the coefficients of explanatory variables and  $\varepsilon$  is the error term, and all other variables. These three models have been constructed to examine the effects of credit risk on commercial banks' profitability in Afghanistan.

Recent studies have used both static and dynamic panel data models to investigate the determinants of banks' profitability. In static relationships the literature usually applies least squares methods on FE or RE models (Athanasoglou et al., 2008). This study uses three dependent variables (ROAA, ROAE, and NIM), therefore for every dependent variable different tests have been performed in order to decide which model is the most appropriate for estimation. Table 2 presents the dependent variables and relevant tests for the model selection. To compare OLS and FE model for all three dependent variables,  $F$  test is performed. Based on the test result, there is enough evidence to reject the null hypothesis, and therefore it is more appropriate to use the FE model rather than OLS. Besides that, Breusch-Pagan test is used to decide between OLS and RE model. The test result indicates that the null hypothesis is accepted, therefore OLS model is the appropriate model to be used for estimation for all three dependent variables.

When FE and RE models are found to be significant in the panel data, then Hausman specification test is conducted to choose an appropriate model for the estimation. According to the  $F$  test and B-P LM test, only FE model is significant for all three dependent variables. However, the

test has been conducted and the results indicate that the null hypothesis is rejected both for ROAA and ROAE, and is accepted for NIM. Based on the tests results, FE model is the appropriate model for the estimation of all three dependent variables.

### 3.4. FE Model Diagnostic Tests

Since the FE model is the more appropriate model for the estimation in this study, so the diagnostic tests of the FE model are required to be done. Following the results exhibited in Table 3, it is clearly stated that FE model fails to meet homoscedasticity assumption for ROAA, homoscedasticity and serial correlation assumptions for ROAE, and serial correlation assumption for NIM. The null hypothesis of homoscedasticity is rejected for ROAA and ROAE models while it is accepted for the NIM model at 5% level of significance. Furthermore, the null hypothesis of serial correlation is accepted for ROAA while it is rejected for the estimated model of ROAE and NIM at 5% level of significance. There is sufficient evidence to accept the null hypothesis of normality in the residual for all three models at 5% level of significance. As far as heteroskedasticity and autocorrelation are concerned, following (Cameron & Trivedi, 2009), the problems of heteroskedasticity and autocorrelation can be overcome by using cluster-robust standard errors. Cluster-robust standard errors accommodate for heteroskedasticity and/or autocorrelation of the selected FE model for the study.

**Table 2: Model Selection**

ROAA					
No	Model	Test	P-value	Hypothesis	Model Selection
1	Fixed effect	$F$ test	0.0266	H0 reject	FE
2	Random effect	B-P LM test	0.2123	H0 accept	OLS
3	FE or RE	Hausman Test	0.3382	H0 accept	RE
ROAE					
1	Fixed effect	$F$ test	0.0253	H0 reject	FE
2	Random effect	B-P LM test	0.0852	H0 accept	OLS
3	FE or RE	Hausman Test	0.5917	H0 accept	RE
NIM					
1	Fixed effect	$F$ test	0.0000	H0 reject	FE
2	Random effect	B-P LM test	0.1407	H0 accept	OLS
3	FE or RE	Hausman Test	0.0000	H0 reject	FE

**Table 3:** FE Model Diagnostic Tests

No	Diagnostic test	Test	Hypothesis	P-value	Decision
<b>ROAA</b>					
1	Groupwise heteroskedasticity	Modified Wald	Homoscedasticity	0.0000	H0 reject
2	Serial correlation	Wooldridge	No first-order correlation in residuals	0.4535	H0 accept
3	Normality	Jarque-Bera	Normality in residuals	0.0855	H0 accept
<b>ROAE</b>					
1	Groupwise heteroskedasticity	Modified Wald	Homoscedasticity	0.0000	H0 reject
2	Serial correlation	Wooldridge	No first-order correlation in residuals	0.0002	H0 reject
3	Normality	Jarque-Bera	Normality in residuals	0.2074	H0 accept
<b>NIM</b>					
1	Groupwise heteroskedasticity	Modified Wald	Homoscedasticity	0.0711	H0 accept
2	Serial correlation	Wooldridge	No first-order correlation in residuals	0.0155	H0 reject
3	Normality	Jarque-Bera	Normality in residuals	0.3167	H0 accept

**Table 4:** Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
ROAA	30	0.2088407	1.180633	-3.020537	2.122915
ROAE	30	-0.8156439	18.22286	-67.56036	21.06511
NIM	30	3.72357	3.053977	0.491731	10.93399
LLRTL	30	8.966133	6.986344	0.6665829	32.87738
TLTA	30	25.82585	15.43111	4.346067	50.37672
TLTD	30	34.15518	25.47569	4.625945	85.08581
SIZE	30	16.9594	0.5881039	15.94509	18.08833

## 4. Results and Discussion

### 4.1. Descriptive Statistics

Table 4 presents descriptive statistics of the variables. The table reports three profitability ratios which are return on average assets, return on average equity, and net interest margin, and three credit risk indicators which are LLRTL, TLTA, and TLTD ratios, and SIZE; the natural logarithm of total assets as a proxy for size.

The descriptive statistics indicate that all the sample banks in term of ROAA and NIM are profitable, but in term of ROAE are not profitable during the study period. The mean of ROAA, ROAE and NIM are 0.209 percent, -0.816 percent and 3.724 percent, respectively. Higher standard deviations of all profitability indicators are evident that

performance among commercial banks is different from each other. Mean of NIM is 3.724 percent indicating that most of the Afghan commercial banks have a higher return on NIM. ROAA is very low 0.209 percent while ROAE is even negative -0.816 percent. The negative ROAE reveals that all commercial banks fail to generate consistent positive profits over the year 2014 through 2018. Poor performance may be an indicator of inefficient asset management or an ineffective business model. Having a high ROAE depends on upholding liquidity, efficient asset management, and the proper use of debt (Brightam & Houston, 2009). In addition, financial stability and economic growth are increased by efficient intermediation of banks, however insolvency leads to economic crisis (Banna et al., 2017). The poor performance of commercial banks in the late 1980s was because they provided many high-risk loans in the early 1980s, which turned out to be bad. During this period, the

substantial increase in loan loss reserves directly led to a decline in net income, which led to a decline in ROA and ROE (Mishkin, 2004).

The standard deviations of the profitability indicators show that Afghan commercial banks profit making competency is different from each other. High standard deviations of credit risk indicators reveal that credit risk management quality differs among the commercial banks in Afghanistan. The LLRTL ratio among the commercial banks in Afghanistan is varied from 0.67 percent to 32.88 percent with the mean and standard deviation 8.97 and 6.99 percent, respectively. It shows that there is a high volatility among the banks' ability in credit risk management. A higher credit risk ratio indicates poor credit management and poor loan quality. The ratio of TLTA among the banks is varied from 4.35 percent to 50.38 percent with the mean and standard deviation 25.83 and 15.43 percent, respectively, which indicates TLTA ratio is different among the banks. The higher ratio implies the inability of banks to meet liquidity requirement, which forces banks to borrow emergency funds at excessive cost, therefore it might lower profitability of the bank. The high standard deviation indicates high variation among the banks in the ratio of TLTD, which is 25.48 percent. The ratio of TLTD is used to determine the viability of the bank after accepting the deposits withdrawn by its customers, and the bank's ability to meet loan demand by reducing its liquid assets (Kishori & Sheeba, 2017). The higher ratio of TLTD may lower bank profitability. Bank size recorded a lower standard deviation value of 0.59, which indicates the dataset of the study sample is not largely spread from the mean value.

Profitability indicators of the study are depicted in Figure 1. ROAA of IBA and MB are largely negative during the study period. In addition, ROAE of IBA and MB are mainly negative over the year 2014 through 2018, which is not a good sign for investors. The reason behind the poor performance in term of ROAE is highly likely inefficient asset management in the sector.

## 4.2. Empirical Findings and Discussion

This study used FE estimator to investigate the effects of different credit risk indicators and bank-specific determinant on commercial banks' profitability in Afghanistan. Table 6 reports the effects of credit risk indicators and bank-specific determinant on each profitability indicators. The *F*-statistics values in all models indicate that all variables are jointly significant at 1% significance level. The *R*-squared values are 57.7 percent, 44.9 percent, and 63.3 percent for ROAA, ROAE, and NIM, respectively.

The relationship between LLRTL ratio and profitability is found negative and significant in ROAA and ROAE models, but insignificant positive in NIM model. The significant negative in ROAA and ROAE indicate that high LLRTL in commercial banks reduces the profitability. The more profit as buffer against loan loss is used by banks, the lower will be their profitability. To avoid the negative impact of the ratio on profitability, banks are required to have sound credit risk management as a precondition in order to reduce the LLRTL and increase the profitability. Furthermore, the results indicate that one percent increases in LLRTL decreases ROAA by 0.074 percent, and ROAE by 1.063 percent respectively. Previously, Noman et al. (2015) and Athanasoglou et al. (2008) suggested that ROAE of banks decreases due to the increase in loan loss ratio. Furthermore, LLRTL is negatively and significantly related to ROAA in the study sample banks in Afghanistan. It is consistent with Chowdhury and Rasid (2017) and Athanasoglou et al. (2008). The coefficient of LLRTL shows that one percent increase in the ratio increases NIM by 0.008 percent, but insignificant, which is not unusual as supported by Haris et al. (2019).

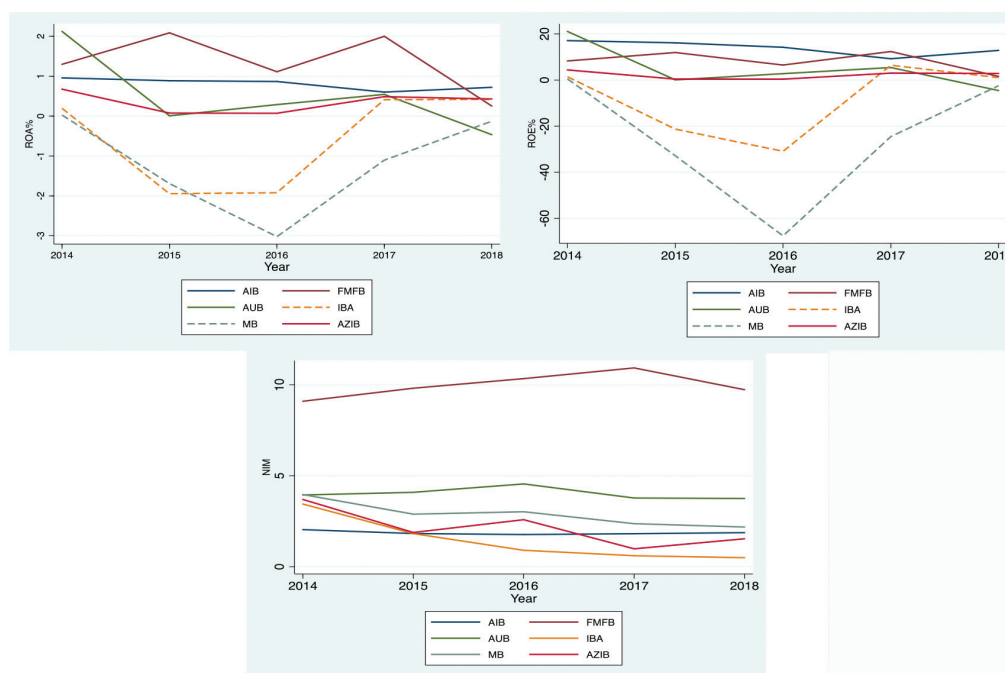
The results indicate different effect of TLTA ratio on the profitability indicators. ROAA is negatively, but insignificantly affected by the ratio, while ROAE is positively and insignificantly affected by the ratio. The results are consistent with Muritala and Taiwo (2013), and Ishak et al. (2016). Besides that, NIM is positively and significantly

**Table 5:** Correlation Matrix

	ROAA	ROAE	NIM	LRRTL	TLTA	TLTD	Size
ROAA	1.0000						
ROAE	0.9265*	1.0000					
NIM	0.4341*	0.2090	1.0000				
LRRTL	-0.6974*	-0.6601*	-0.2164	1.0000			
TLTA	0.1281	-0.0696	0.7521*	-0.0092	1.0000		
TLTD	0.3000	0.0731	0.9025*	-0.0882	0.9344*	1.0000	
SIZE	-0.0514	0.1200	-0.6383*	-0.1141	-0.5687*	-0.6551*	1.0000

\*Significance at 5%.





**Figure 1:** ROA%, ROE%, and NIM%

Source: Author

affected by TLTA which is on the right direction with Amuakwa-Mensah and Marhuh (2015). In addition, the result indicates that one percent increases in TLTA increases NIM by 0.294 percent.

The effect of TLTD ratio is found negative in every model, but only significant at 1% significance level in NIM, which reveals that high TLTD reduces the profitability in commercial banks in Afghanistan. The results further indicate that one percent increase in TLTD decreases NIM by  $-0.226$  percent. The higher ratio of TLTD indicates the effectiveness of banks in lending decisions. Moreover, TLTD indicates how efficiently the bank makes use of depositors' fund on credit activity which is to be expected to risk of default (Kishori & Sheeba, 2017).

In the literature, a mixed relationship is observed between size and profitability. The study findings report negative significant relationship between size and profitability in all models. ROAA and ROAE are significant at 5%, and NIM is significant at 1% significance levels. Further, the results indicate that one percent increases in size decreases ROAA by  $-2.844$  percent, ROAE by  $-39.20$  percent, and NIM by  $-3.805$  percent, respectively, which is consistent with the findings of Batten and Vo (2019). Besides that, the findings of Tan (2019) indicated significant negative relationship between ROA, NIM, and profitability. Another study conducted by Gilces et al. (2020) found that ROAA

is negatively related to banks' profitability. However, the results of this study is contradicting with Pervan et al. (2015), which found significant positive relationship between ROA and size in Croatia. Furthermore, Yao et al. (2018) found significant positive and *U*-shape relationship between size and profitability of banks in Pakistan.

## 5. Conclusion

A balanced panel data of six commercial banks over the period 2014–2018 was used to investigate the effects of credit risk indicators, and size on ROAA, ROAE, and NIM of commercial banks in Afghanistan. During the model investigation and selection process, various tests have been performed to select a proper model for the study. Based on the results of F test, B-P LM test, and Hausman test as stated in Table 2, it is confirmed and concluded that FE model is the appropriate model for the estimation.

Findings of the study reveal a robust significant negative relationship between LLRTL and ROAA, and ROAE in the study sample commercial banks in Afghanistan. Therefore, the study rejects the  $H_{01}$ . More specifically it is found that one percent increase in LLRTL decreases ROAA by 0.074 percent, and ROAE by 1.063 percent, respectively. The results indicate a robust significant positive relationship between NIM and TLTA, which is on the right direction with

**Table 6:** FE Estimator Output

Model	(1)	(2)	(3)
VARIABLES	ROAA	ROAE	NIM
LLRTL	-0.0738*** (0.00543)	-1.063*** (0.0833)	0.00798 (0.00996)
TLTA	-0.0135 (0.0689)	0.209 (0.839)	0.294*** (0.0318)
TLTD	-0.0379 (0.0658)	-0.691 (0.664)	-0.226*** (0.0309)
Size	-2.844** (0.718)	-39.20** (13.57)	-3.805*** (0.925)
Constant	50.75** (12.9)	691.8** (237.9)	68.31*** (16.02)
Prob > F	87.68***	526.35***	46.60***
Observations	30	30	30
R-squared	0.577	0.449	0.633
Number of ID	6	6	6

Robust standard errors in parentheses. \*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$   
*Note:* FE estimator was applied to balanced panel data. The values in the table above indicate the coefficient of the variables and the values within parenthesis indicate robust standard error of the estimates. Furthermore, \*\*, and \*\*\* indicate significant of the coefficient value at 5%, and 1% respectively. LLRTL, TLTA, and TLTD ratios were identified as credit risk indicators, Size as bank-specific variable, and ROAA, ROAE, and NIM as profitability indicators.

Amuakwa-Mensah and Marhuah (2015). It is also found that one percent increases in TLTA increases NIM by 0.294 percent, which partially rejects the H02. The effect of TLTD is found negative on ROAA, ROAE, and NIM, but only significant on NIM. More specifically it is found that one percent increase in TLTD decreases NIM by -0.226 percent, which rejects the H03.

The study results indicate that effect of size on all profitability indicators is found significant negative, which rejects the H04. Further, the findings show that one percent increase in size decreases ROAA by -2.844 percent, ROAE by -39.20 percent, and NIM by -3.805 percent, respectively. Compare to the other two profitability indicators, the effect of size on ROAE is very large. The significant negative relationship between size and profitability indicates that there are no economies of scale in the study sample commercial banks. The reasons behind of no economies of scale in the study sample commercial banks may be poor management, ineffective assets management, bureaucracy and others. In general, the analysis finds that credit risk negatively effects

commercial banks' profitability in Afghanistan. Therefore, commercial banks in Afghanistan need to strengthen credit risk management, effective assets management, and prevent poor management, and bureaucratic activities.

The results of this research are useful to academics, banks, investors, government and others stakeholders. The policy implications of this research related to commercial banks' profitability in Afghanistan are, firstly, the credit management of commercial banks in Afghanistan is still weak because the average LLRTL of commercial banks of Afghanistan is higher than the average LLRTL of banks in other emerging countries such as Bangladesh (Noman et al., 2015) and Pakistan (Yao et al., 2018). In addition, the average TLTA is also higher in commercial banks in Afghanistan than the average TLTA of banks in other emerging countries such as Ghana (Amuakwa-Mensah & Marhuah, 2015), and Pakistan (Yao et al., 2018). They should avoid making higher-risk loans to increase the profitability of commercial banks in Afghanistan. Secondly, the study results indicate that the overall performance of commercial banks in Afghanistan is poor; to strengthen the performance, commercial banks should increase the efficiency of asset management or effectiveness of their business model. Thirdly, the current study is only limited to six private commercial banks; to have a robust finding, future studies should include all commercial banks (private, state-owned, and foreign banks) in their study samples. Fourthly, due to the lack of data availability, this study used limited bank-specific variables; future studies should use more bank-specific and macroeconomic determinants to derive a robust inclusive conclusion about Afghan banking sector performance.

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