

The Relationship between Corruption and Credit Risk in Commercial Banks of Pakistan

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This study investigates the relationship between corruption and non-performing loans in Pakistan using a sample of 18 commercial banks for period 2000-2017 where panel regression models of OLS estimator, fixed effect and random effect are employed. The results show a significant negative relationship between control of corruption and credit risk as measured by non-performing loans indicating that tighter control of corruption would lower the non-performing loans. Furthermore, bank size shows a positive impact signifying that larger banks tend to take more excessive risks. In contrast, return on assets and capitalization negatively impacted on the non-performing loans demonstrating that those banks which generate higher earnings and have higher capital portion could reduce the level of non-performing loans. In addition, macroeconomic variables of GDP and inflation rate indicate significant relationship with non-performing loans since good economic situation can increase borrower creditworthiness which leads to lower default payments. Furthermore, both Hausman and Lagrangian Multiplier tests show that the random effect is preferred over fixed effect and OLS, respectively. The findings provide insights to policy makers in making strategic decisions regarding non-performing loans with regards to corruption as well as bank-based and macroeconomic indicators.

Key words: *Non-performing loan, Panel regressions, Corruption, Pakistan.*

Introduction

The significance of the banking industry in any economy is the fact that it is the foremost channel in providing the credit facility to various sectors for commercial usage (Emel et al., 2003; Kamel, 2005; Kamran et al., 2018; Richard, 2011). Meanwhile, the soundness of the banking sector is reflected through earning stability (Ghosh, 2017; Kim et al., 2019; Yin, 2019), improvements in the profitability (Tan et al., 2017; Trujillo-Ponce, 2013), increasing the volume of funds from depositors to borrowers (Jakab & Kumhof, 2015), and provision of quality services for their customers (Rafiq & Siddiqui, 2018; Zameer et al., 2015). However, the overall position of the bank is reflected through its risk management practices. Banking industry in developing and emerging economies have some different trends in terms of stability and managing the risk factors as compared to developed economy. The reason is that developing economies are undersized and have different risk dynamics.

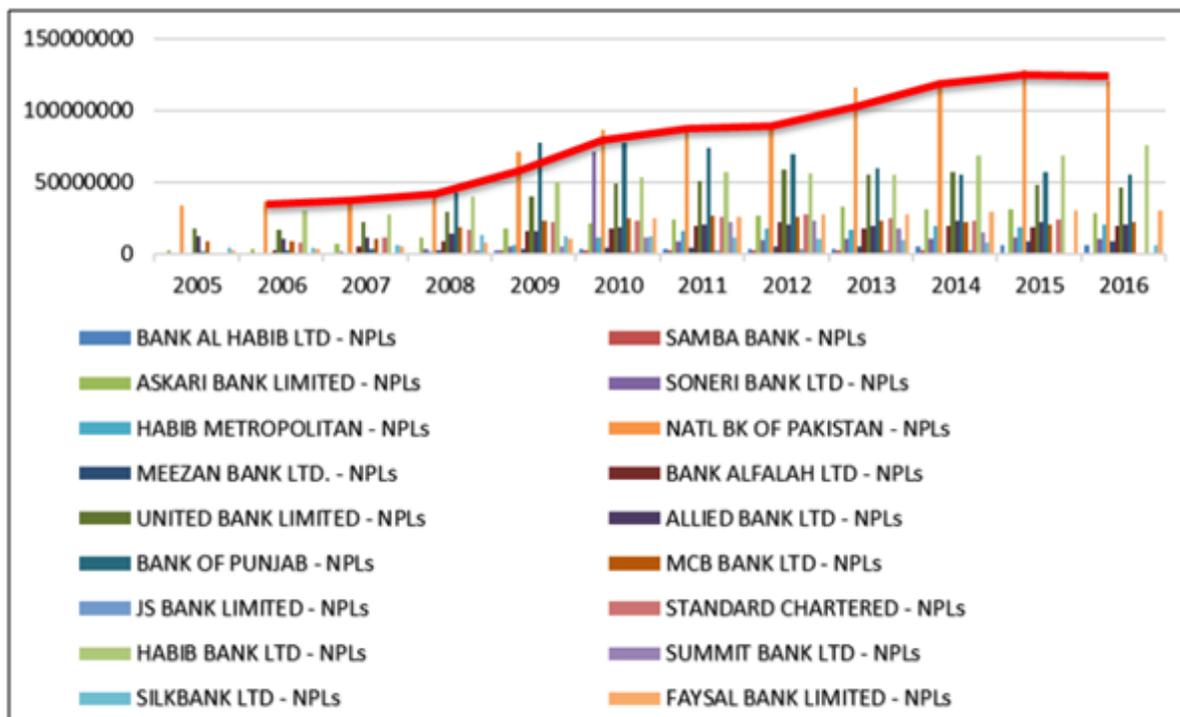
For this reason, the banking sector in such economies performs its role as crucial intermediary while providing the loan facilities to various sectors and individuals in their relative economies (Bougatef, 2016). In addition, banks are known for “doing the business of risk” due to the presence of various risk factors in their operational and other market-based activities (Omarova, 2018; Waemustafa & Sukri, 2015). More specifically, one of the significant risks which emerged as a major threat to all types of bank risks is known as credit risk (Ghosh, 2017). This type of risk appears when a bank is expecting a repayment of the loan or interest or both from its clients, but they are unable to repay such financial obligations (Derban et al., 2005; Emekter et al., 2015; Schiantarelli et al., 2016). Such risk factor is raised whenever there is a change in financial condition of the counterparty who is responsible for the payment of loan amount on the due date.

Focusing on the Pakistani economy, the banking system is used as a key player in providing financial support to the overall economy (Arif & Nauman Anees, 2012). However, in recent years, it has been observed that there has been a concern about the increasing issue of low quality assets such as non-performing loans (NPLs) in the country. Such risk factor has not only caused a lower stability of the banks but also limited credit facility to various sectors. Kamran et al. (2019) find that corruption, political stability, market structure and credit risk are key determinants of financial stability for Pakistani commercial banks. Moreover, since 2006 overall analysis of the banking sector shows that it is vulnerable towards increasing credit risk. During the last decade, the value of NPLs stood at Rs. 446.05 billion and it increased to Rs. 611.81 billion by 2017 (Kamran et al., 2018). As a result, many banks have faced lower earning and increasing operational costs. For example, the National Bank of Pakistan (NBP), a leading public bank, has the highest level of NPLs for 2005-2016 while other banks have also faced a similar issue indicating the inefficiency in managing such risk as shown in Figure 1 below.

In Pakistan, the issue of corruption has caught the attention of researchers during the last decade. Among the governance measures, control of corruption is a key indicator to provide a good understanding regarding the current and past performance of the country's officials in performing their duties without accepting any illegal financial or other benefits (Ho et al., 2016). According to The Global Economy (2017), there is an ongoing issue regarding the control of corruption and lower rank in Pakistan. Furthermore, the country is facing negative score in controlling corruption (i.e -1.05=2005, -0.78=2017). This value shows strong evidence that control of corruption is a growing issue in Pakistan. Hence, this study is undertaken to examine the effect of control of corruption along with bank-based and macroeconomic variables on the NPLs of commercial banks of Pakistan.

The paper proceeds as follows. Section 2 reviews the relevant literature and Section 3 describes the data and research methods used in the study. Empirical results are discussed in Section 4, while Section 5 concludes the study.

Figure 1. NPLs in Listed Banks of Pakistan: 2005-2016



Source: Kamran et al. (2018)

Literature Review

Many studies have been conducted regarding the credit risk and its determinants. Bank-related and regional economic indicators of NPLs are examined by Cantor & Packer (1996), Chaibi & Ftiti (2015), Collin-Dufresn et al., (2001) and Wong, 1997). Zribi & Boujelbegrave (2011)

determine the factors of credit risk in the commercial banks of Tunisia from 1995 to 2008 with annual data observations whereas Louzis et al. (2012) examine macroeconomic indicators that influencing the NPLs in the Greek banks. In a more recent study, Kamran et al. (2019) investigated the determinants of NPLs in the world economy using the aggregated and disaggregated analysis. They found that bank capital to assets ratio, lending interest rate, and exchange rate have a significant influence on the NPLs in the banking sector of the world economy. Using 28 Malaysian banks in 2000-2010, Waemustafa and Sukri (2015) found that financing for the risk sector and capital regulations have significant influence on credit risk whereas loan loss provision, debt to asset ratio, size, earning, capital regulation and liquidity are also significant, for Islamic and conventional banks respectively.

Similarly, Rafiq and Siddiqui (2018) investigated those components which are affecting the credit risk in in both Islamic and conventional banks of Pakistan and observed that credit risk in Islamic banks is higher compared to conventional banks due to Shariah compliance. Moreover, Ghosh (2017) examines the different categories of NPLs in the US economy using a sample of 100 commercial banks for 1992-2016. Results show that NPLs have most pronounced effect on housing price, real GDP and housing starts whereas disaggregated analysis shows that NPLs in construction, land, and development have pernicious impact on the sector-specific employment growth. In addition, other studies have discussed the problem of NPLs in relation to banks (Bholat et al., 2018; Ghosh, 2015; Khan et al., 2018; Louzis et al., 2012; Rajaraman & Vasishtha, 2002; Saba et al., 2012; Vouldis & Louzis, 2018; Wood & Skinner, 2018).

With regards to corruption, Goel and Hasan (2011) analyse the impact of corruption on bad loans in different regional economies. This study reveals that greater corruption in the targeted countries leads towards more bad loans as opposed to lower loan defaults in those economies which have faster growing rate and higher lending rates. Similarly, Bougatef (2016) examines the impact of corruption on the quality of bank assets in different emerging economies over the period of 2008-2012. Findings indicate a positive relationship between the factor of corruption and NPLs. Moreover, Park (2012) explores the impact of corruption on the banking sector and economic growth of 76 economies during 2002-2004. The results show that corruption is significantly related to bad loans and hence suggest that corruption has worsened the NPL and distorts allocation of funds from good to bad projects, reducing the quality of private investment which decreases economic growth. Chen et al.(2015) examined the impact of corruption on the risk taking behaviour of 1200 banks in 35 emerging economies during 2000-2012. They found that higher level of corruption caused a consistent behaviour in the form of risk taking bank behaviour. Toader et al. (2017) investigated similar terms of credit risk in emerging economies and found that financial stability exists in those banks which are working under good corporate governance conduct. In this regard, higher level of corruption control in banks can increase stability and reduce NPL.

Data and Research Methods

The data used in this study are those listed commercial banks on the Pakistani Stock Exchange during the period of 2000-2017. After several conditions were imposed on the data, 18 banks comprised the final sample with annual observations. Using the panel data, details of the variables are presented in Table 1 below:

Table 1: Variables Description

Nature of the Variable	Title of the Variable	Measurement	Literature Source	Expected sign	Data source
Dependent Variable	Non-performing Loans (NPL)	Non-performing loans to gross advances	(Ghosh, 2017)		Datastream, annual reports, state bank publications
Independent Variable	Control of Corruption (COC)	Estimate of control of corruption (ranges from -2.5 (weak) to +2.5 (strong))	(Toader, Onofrei, Popescu, & Andrieș, 2017)	-	World Development Indicator (WDI)
Bank specific Control Variables	Bank size (SIZE)	Log of total assets	(Chaibi & Ftiti, 2015)	+	Datastream, annual reports, state bank publications
	Profitability (ROA)	Return on assets before interest and tax	(Vithessonthi, 2016)	-	Datastream, annual reports, state bank publications
	Capitalization (CAP)	Equity capital to total asset	(Saif-Alyousfi, Saha, & Md-Rus, 2018)	-	Datastream, annual reports, state bank publications
	Income Diversification (INCDIV)	Non-interest income to total income	(Alhassan, Coleman, & Andoh, 2014)	-	Datastream, annual reports, state bank publications
Macroeconomic Control Variables	Gross Domestic Product (GDP)	GDP growth rate	(Chaibi & Ftiti, 2015)	-	World

	Inflation (INF)	Consumer price index (annual)	(Pop, Cepoi, & Anghel, 2018)	-	Development Indicator (WDI)
	Lending Interest rate (INT)	Lending interest rate (annual)	(Amuakwa-Mensah, Marbuah, & Ani-Asamoah Marbuah, 2017)	-	

Based on the panel methods, OLS regression estimator, fixed effect and random effect regression models are employed in the study. NPLs is the dependent variable while control of corruption is the independent variable along with bank-based and macroeconomic variables. As in the previous studies, such as Toader et al. (2017) and Chen et al. (2015), the regression equation below is used:

$$NPL_{i,t} = \alpha + \beta_1 COC_t + \beta_2 SIZE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 CAP_{i,t} + \beta_5 INCDIV_{i,t} + \beta_6 GDP_t + \beta_7 INF_t + \beta_8 INT_t + \varepsilon_{i,t}$$

Where:

$NPL_{i,t}$ = Non performing loan of bank i at year t / Gross loans

COC_t = Estimate of control of corruption, ranges -2.5 (weak) to +2.5 (strong) at year t

$SIZE_{i,t}$ = Logarithm of total assets of bank i at year t

$ROA_{i,t}$ = Earnings before interest and tax of bank i at year t / Total assets

$CAP_{i,t}$ = Equity capital of bank i at year t / Total assets

$INCDIV_{i,t}$ = Non interest income of bank i at year t / Total Income

GDP_t = GDP growth rate at year t

INF_t = Consumer price index (annual) at year t

INT_t = Lending interest rate (annual) at year t

ε = error term of the regression

$NPL_{i,t}$ = Non-performing loans of bank i at year t / Gross loans ratio is used as a dependent variable while some studies use Loan loss provision (LLP) ratio as an alternative measure of credit risk (CR) in the banks. NPLs is measured as non-performing loans to total gross loans as used by Al-Khazali and Mirzaei (2017), Ghosh (2015), Guan et al. (2017) and Zhang et al. (2015).

COC_t = Estimate of control of corruption, ranges -2.5 (weak) to +2.5 (strong) at year t is used to measure corruption. The factor of control of corruption (COC) analyzes perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms

of corruption, as well as "capture" of the state by elites and private interests (Kaufmann et al. 2009). This estimate ranges from -2.5 to +2.5, where -2.5 means lowest control of corruption (high corruption) and +2.5 indicates highest control of corruption (low corruption). Toader et al. (2017) find that better control of corruption (less corruption) would reduce NPLs of the banks. Higher levels of corruption increases the NPLs because corruption aggravates NPLs problems in the banks. Park (2012) indicates that corruption distorts allocation of funding from good projects to bad projects. Thus, this study anticipates that COC will have a negative relationship with NPL.

$SIZE_{it}$ = Logarithm of total assets of bank i at year t . The bank size is measured by the natural logarithm of bank total assets (Ben Saada, 2018; Chaibi & Ftiti, 2015; Tarchouna et al, 2017). Under the "too big to fail" assumption, Chaibi and Ftiti (2015) and Louzis et al. (2012) find that the bank size has a positive impact on NPLs. It is expected that size will have a positive relationship with NPL.

ROA_{it} = Earnings before interest and tax (EBIT) of bank i at year t / Total assets. Peric and Konjusak (2017) and Vithessonthi (2016) use return on assets (ROA) as measured by the ratio of EBIT to total assets. Peric and Konjusak (2017) find that ROA has a significantly negative effect on NPLs where higher ROA leads to lower the NPLs. Hence, ROA is anticipated to have a negative relationship with NPL.

CAP_{it} = Equity capital of bank i at year t / Total assets. Saif-Alyousfi et al. (2018) use capitalization variable as measured by the ratio of equity capital to total assets. They find the impact of capitalization ratio is significantly negative on the NPLs of banks. Bank managers with the lower value of capital are facing moral hazards to engage in risk based lending (Keeton & Morris, 1987). This 'moral hazard' assumes a negative relationship between the capital ratio and NPLs. It is expected that CAP will have a negative relationship with NPL.

$INCDIV_{it}$ = Noninterest income of bank i at year t / Total Income. As found by Ghosh (2015), Vithessonthi (2016) and Ghosh (2017), income diversification as measured through ratio of non-interest income to total income shows how much banking firms rely on non-interest earning along with traditional income measures. Alhassan et al., (2014) find that it has significantly negative influence on NPLs. It is expected that INCDIV will have a negative relationship with NPL.

GDP_t = GDP growth rate at year t . GDP is widely accepted as economic indicator as measured through annual growth of the domestic products and services. Alhassan et al. (2014) find that GDP growth rate has significantly negative impact on NPLs for the banks. This study anticipates that GDP will have a negative relationship with NPL.

INF_t = Consumer price index (annual) at year t . Chaibi and Ftiti (2015) and Pop et al. (2018) find that inflation significantly decrease the NPLs while (Castro) 2013) shows that inflation reduces the real value of outstanding loans. It is expected that INF will have a negative relationship with NPL.

INT_t = Lending interest rate (annual) at year t . Amuakwa-Mensah et al. (2017) shows that lending interest rate has a negative and significant effect on NPL. Ahmad and Bashir (2013) claim that with a higher lending rate, banks are in a position to recover the interest from borrowers. Provision for the bad-debts in bank financial statements will be lower, causing a decline in the value of NPLs. Therefore, INT is anticipated to be negatively related to NPL.

Empirical Results

This section discusses the panel regression results for OLS estimator, Fixed Effect and Random Effect. Table 2 (Model 1) below provides the findings for the Linear OLS covering the impact of control of corruption along with other control variables on NPL. It is found that through COC, the impact on NPL is negatively significant at 1% with the coefficient value of -0.141 and the standard error of 0.045. COC shows a negative impact which means that the more control over corruption, the lower NPL and vice versa. In addition, ROA and CAP show significantly negative influence except size with a significantly positive impact on NPLs. Moreover, the macroeconomic variables are also found to significantly influence NPL with the exception of interest rate. The coefficient of -1.248 and -0.509 specifies that GDP and inflation negatively influence NPL respectively, which is significant at 1%.

Further, Table 2 (Model 2) below provides the regression findings for the Fixed Effect where it is observed that effect of COC is negative with the coefficient of -0.155 and the standard error of 0.038. This shows that COC has adverse and significant impact on NPL at 1%. In addition, the effect of SIZE provides a positively significant impact on NPLs. In contrast, ROA and CAP is significantly negative at 5% and 1% with the coefficients of -1.276 and -0.840 respectively. It shows that both of these factors are adversely impacting on NPL in commercial banks of Pakistan. For macroeconomic variables, GDP and inflation have shown negative and significant impact on NPL at 1%.

Meanwhile, the Random Effect results which is the preferred model among the three based on Hausman and Lagrangian Multiplier tests, are shown in Table 2 (Model 3) below. The effect of COC on NPL is -0.149 with the standard error of 0.039 is significant at 1%. This shows that COC has a negative influence on NPL which is aligned with Toader et al. (2017) who found that better control over the corruption factor or less corruption can reasonably lower the value of NPLs. On the other hand, higher corruption can cause an upward shift in bad loans for banks. Similarly, Park (2012) shows that corruption can contribute to worsening the issue of

bad loans as allocation of funds shift from good to bad projects, which is consistent with Bougatef's (2016) findings.

For the control variables, effect of size is positively significant at 1% whereas for ROA, it is found to be significantly negative at 5%. As found by Peric and Konjusak (2017) and Vithessonthi (2016), more earnings in the form of ROA, lower the value of NPL and vice versa. Similarly, the effect of CAP is also negatively significant, indicating that higher capital portion in the business can reduce the value of NPL which is consistent with the findings of Saif-Alyousfi et al. (2018). As for the macroeconomic variables, impact of GDP growth and inflation are significantly negative at 1%. Pop et al. (2018) indicate the factor of inflation which significantly decreases the value of NPLs and a similar trend is observed by Castro (2013). Furthermore, Peric and Konjusak (2017) and Alhassan et al. (2014) explain that GDP growth rate has negative and significant impact on the NPLs. However, better economic situation in the country can increase the creditworthiness of the borrower with greater loan repayments.

Table 2: Panel Regression Findings

Variables	Predicted sign	Model 1 (OLS)	Model 2 (Fixed Effect)	Model 3 (Random Effect)
COC	-	-0.141*** (0.0454)	-0.155*** (0.0383)	-0.149*** (0.0388)
SIZE	+	0.0385*** (0.0114)	0.0506** (0.0213)	0.0394*** (0.0146)
ROA	-	-1.544*** (0.411)	-1.276** (0.568)	-1.191** (0.478)
CAP	-	-1.322*** (0.254)	-0.840* (0.487)	-1.203*** (0.369)
INCDIV	-	-0.0985 (0.0848)	-0.131 (0.0919)	-0.135 (0.0820)
GDP	-	-1.248*** (0.412)	-1.383*** (0.367)	-1.390*** (0.362)
INF	-	-0.509*** (0.156)	-0.491*** (0.147)	-0.518*** (0.139)
INT	-	-0.0914 (0.155)	-0.245 (0.151)	-0.167 (0.145)
Constant		-0.167 (0.116)	-0.271 (0.202)	-0.172 (0.141)

R-squared		0.535	0.493	0.527
F-statistic		23.19***	17.52***	
Chi ²				158.42***
Observations		170	170	170

***Significant at 1% level, **Significant at 5% level, *Significant at 10% level

Further analysis was conducted as shown in Table 3 below using the Hausman and B.P Lagrangian Multiplier test. Firstly, the difference between the fixed effect and random effect coefficients is calculated to analyze the standard error of the coefficients where their difference is significant as determined through the Hausman test with the following hypotheses:

H₀: difference in the coefficients is not systematic, or random effect is a preferred model

H₁: difference in the coefficients is the systematic or fixed effect is a preferred model.

The value of chi² for HM test is 6.74, insignificant at 5% which means that for the HM test, H₀ will be accepted; the difference in the coefficients is not systematic, or random effect is a preferred model. After the HM test, the LM test for the random effect was applied, which compared the random effect and simple OLS regression estimator. Hence, the following hypotheses:

H_{0LM}: variance across the entities is zero or OLS is preferable

H_{1LM}: variance across the entities is not zero, or random effect regression estimator is preferable.

It is observed that the value of chi² is 52.31 is significant at 5%, indicating that H_{1LM} is accepted which is in favour of the random effect for decision making.

Table 3: Findings for the Hausman and B.P Lagrangian Multiplier Tests

Variables	Fixed	Random	Difference	S.E.
COC	-.1545479	-.1488954	-.0056526	.
SIZE	.0506329	.0393886	.0112443	.015471
ROA	-1.275716	-1.190644	-.085072	.3063534
CAP	-.840408	-1.203081	.3626734	.3176666
INCDIV	-.1314125	-.134573	.0031605	.0414249
GDP	-1.382559	-1.390098	.0075386	.0562551
INF	-.4911021	-.5178308	.0267287	.0463399
INT	-.2446437	-.1673853	-.0772584	.0407705
Hausman (1978) specification test				

$\chi^2(8) = (b-B)'[(V_b - V_B)^{-1}](b-B) = 6.74$
Prob > $\chi^2 = 0.5645$
Breusch and Pagan Lagrangian multiplier test for random effects
$\chi^2(01) = 52.31$
Prob > $\chi^2 = 0.0000$

Conclusion

This study examines the impact of control of corruption as well as bank-based and macroeconomic indicators on credit risk in the form of NPL for Pakistani banks. Results show the existence of significantly negative influence of control of corruption on the credit risk which justifies the claim that with better control over corruption, higher bad loans or low quality of bank assets could be diminished. In addition, bank-based variables such as bank size, return on assets and capitalization have significant influence on NPL. Further, macroeconomic variables of GDP and inflation have also provided significant results on NPL.

Overall, the study results contribute to policy implications in that more effort could be taken to control the credit risk through NPL for Pakistani banks. Further, stability of the banking sector can be applied in developing the policies regarding asset quality and lower level of bad loans by the risk departments. Meanwhile, the lower rank of Pakistan in controlling the corruption issue also provides significant evidence for some sound policymaking and its implication at country level. Future studies could look into other governance measures such as voice and accountability, rule of law, political stability and absence of violence, and government effectiveness in relation to NPL.

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