Impact of Intellectual Capital on Credit Risk of Conventional Banks in Pakistan

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Abstract
This study intends to examine the insight that credit risk is connected to intellectual capital. The global problem of credit risk has been persistent and lead to financial crises in the past. This issue is relatively higher in Pakistani banking sector. Many studies were carried out to investigate the determinant of credit risk, yet the problem has remained unexplained and more research is needed. Most of the previous studies have focused on macroeconomic and other environmental variables, industry-specific and bank-specific determinants of credit risk but gave less attention to the moderating role of intellectual capital on the relationship between internal factors and credit risk in the context of conventional banks of Pakistan. Based on the identified gap this study proposes a framework by adding moderating role of intellectual capital on the relationship between internal variable and credit risk of conventional banks of Pakistan. The study has used secondary data on variable of interest from 2006 to 2017. The sample consists of 20 conventional banks with 240 observations. The study used fixed effect and hierarchical regression model for the data analysis. The study found that intellectual capital moderate the relationship between internal variables and credit risk. Based on the findings it is suggested that intellectual capital serves as important toll to manage credit risk effectively. The findings provide new insights about credit risk determinants which will be useful to the practitioners, policy makers and for the academicians to study further.

Keywords: Credit Risk, Bank Specific Determinants, Intellectual Capital, Moral Hazard

Introduction
Risk taking is perhaps among the core activities of the banking operations. Among all other risks, credit risk is at center which is associated with the activities of lending to borrowers (Ghosh, &Maji, 2014). Although, more than decade has passed but still many studies have been carried out to find the major reason of Global Financial Crisis (GFC). The major factors causing the 2008 GFC are firstly, the weakness of the international financial market which is based on interest-based financial system. Secondly, many banks facing high non performing loans due to inability of the borrowers to pay their loan commitments, speculative and overleveraging activities by the financial institutions in mortgage market (Laeven& Valencia, 2008) and thirdly, agency problems which occurred due to the moral hazard issues in bankers and rating agencies who did not notice early warning signals (Nor & Ahmad, 2015).

The consequences of the credit risk caused by non performing loans reduces the asset quality. This causes the reduction in bank’s income and leads to reduction in bank’s profitability (Nor & Ahmad, 2015). This further leads to low level of investment activities, economic growth and stability at micro and macro level (AbdKarim, Chan & Hassan, 2010). In the review past literature it is found that many factors have been identified as contributing factors to credit risk such as bank specific determinants and macroeconomic or external factors (AbdKarim, Chan & Hasan, 2010, Ahmad & Ahmad, 2004, Ahmad &Ariff, 2007; (Khamrej&Pasha, 2009). Although, some studies such as Mohd Sultan (2008) argued that lack of staff efficiency played major role in the accumulation of huge NPL. It was further argued that staff efficiency is essential in the credit process such as selection, screening, analysis and evaluation of loan applications and justification for their approval; however less attention has been given to this argument empirically.

Moreover, BASEL Committee has issued many guidelines in the shape of BASEL 1, BASEL 11 and BASEL 111 from time to time on the most important aspects, such as Capital, Leverage, Funding and liquidity in order to promote more flexible and stable banking system. However, in the present knowledge based, fast changing and technology intensive economy the traditional financial and physical resources are losing its importance.

The knowledge based asset or Intellectual Capital (IC) are becoming the driving force in the new economy to get competitive advantage and creating difference between book value and market value (Ghosh, &Maji, 2014). Furthermore, according to Ulrich(1998) there are three important aspects to include IC in the service industry like banks; Human Capital (increasing demand for knowledge based work force), Customer Capital (importance of customer relations) and Structural Capital (the growing importance of innovation and learning).
In the knowledge based economy, in the knowledge based sector such as banks the importance of IC has gone up considerably. However, its role in managing the credit risk has given less attention by Basel committee, banks and even previous researchers except some work by (Ghosh, & Maji, 2014). The knowledge skills, professional experience and imaginative mind play important role in the success of credit activities. This helps and enables them for proper identification and analysis of early warning signals at the early stage of loan proposal. In addition, consist of information system, data base, process, patents, copy rights, and relationship with other to support the human resources this will help in attracting the new customers and retaining the existing. Thus, human capital and structural capital in the tough competitive environment help to attain the stability and solvency of banks.

In context to Pakistan, the situation of credit risk caused by NPL is not good. The comparison of NPL of Pakistan is carried out in Figure 1. Pakistan lies at fifth number among the highest non performing loan accumulation in Asia.

<table>
<thead>
<tr>
<th>Year</th>
<th>Worldwide</th>
<th>NPL Pakistan</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>3.90</td>
<td>14.75</td>
</tr>
<tr>
<td>2011</td>
<td>3.71</td>
<td>16.21</td>
</tr>
<tr>
<td>2012</td>
<td>3.69</td>
<td>14.47</td>
</tr>
<tr>
<td>2013</td>
<td>4.03</td>
<td>12.99</td>
</tr>
<tr>
<td>2014</td>
<td>4.06</td>
<td>12.27</td>
</tr>
<tr>
<td>2015</td>
<td>3.93</td>
<td>11.36</td>
</tr>
<tr>
<td>2016</td>
<td>4.11</td>
<td>10.06</td>
</tr>
<tr>
<td>2017</td>
<td>3.4</td>
<td>8.43</td>
</tr>
</tbody>
</table>

Source: The World Bank 2016

The high credit risk has resulted badly on the banking sector of Pakistan. For instances some merger collapse are shown in Table 2.
Table 2
List of Mergers/Acquisitions in banking sector of Pakistan during 2005-2016

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Merged Bank Name</th>
<th>Merged to Bank Name</th>
<th>Merged Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Union Bank Ltd</td>
<td>Standard Chartered Bank</td>
<td>29-12-2006</td>
</tr>
<tr>
<td>2</td>
<td>PICIC Commercial Bank Ltd</td>
<td>NIB Bank Ltd</td>
<td>01-01-2008</td>
</tr>
<tr>
<td>3</td>
<td>The Royal Bank of Scotland Ltd</td>
<td>Faysal Bank Ltd</td>
<td>03-01-2011</td>
</tr>
<tr>
<td>4</td>
<td>Atlas Bank Ltd</td>
<td>Summit Bank Ltd</td>
<td>11-01-2011</td>
</tr>
<tr>
<td>5</td>
<td>My Bank Ltd</td>
<td>Summit Bank Ltd</td>
<td>06-07-2011</td>
</tr>
<tr>
<td>6</td>
<td>Barclay’s Bank Plc</td>
<td>Habib Bank Ltd</td>
<td>29-04-2015</td>
</tr>
<tr>
<td>7</td>
<td>KASB Bank Ltd</td>
<td>BankIslami Pakistan Ltd</td>
<td>11-06-2015</td>
</tr>
<tr>
<td>8</td>
<td>HSBC Oman</td>
<td>Meezan Bank Ltd</td>
<td>30-09-2015</td>
</tr>
</tbody>
</table>

Source: Competition Commission of Pakistan (2015)

Although, there are many researches carried out to find the reasons for high accumulation of NPL causing the credit risk, yet little attention has been given to the intellectual capital in relation to credit risk. Moreover, based on literature reviewed the major problem caused by huge accumulation is the information asymmetry which result in moral hazard and adverse selection. Anifowose, Abdrashid, and Annuar, (2017) pointed out that there is an inverse relationship between intellectual capital and information asymmetry. However, less attention has been given empirically the relationship of intellectual capital and credit risk particularly in co Pakistani context. Thus, there is a dare need to explore this topic in the knowledge based economy and knowledge based sector such as banks.

Against this background this study attempts to empirically investigate the impact of IC as a moderator variable in the relationship of bank specific and credit risk and following question are derived.

- Do internal factors (Operating Efficiency, Loan growth, Liquidity and Profitability) influence credit risk of conventional banks of Pakistan?
- Does intellectual capital moderate the relationship between internal factors (Operating Efficiency, Loan growth, Liquidity and Profitability) and credit risk of conventional banks of Pakistan?

The rest of paper is divided into section 2 for literature review and 3 for Methodology and Findings and conclusion are discussed in section 4 and 5 respectively. Finally section 6 drew the conclusion.

Literature Review

Generally, credit is referred to “the potential loss of valuable assets caused by probable deterioration in the creditworthiness of counterparty or its inability to meet contractual obligations”. Banking sector has been faced many types of risks, however credit risk is the most prominent among them which occurs due to the lending activities working as financial intermediary (Basel Committee, 2001). The major source of credit risk is NPL.

Berger and DeYoung (1997) illustrate the links between bank-specific factors and focus on efficiency indicators and problem loans. Specifically, Berger and Young formulate possible mechanisms, “namely ‘bad luck’, ‘bad management’, ‘skimming’ and ‘moral hazard’, relating efficiency and capital adequacy”. They conclude that, generally, decreases in measured cost efficiency lead to increased future problem loans. In addition, Ariff and Khalid (2000) stressed that the internal or bank specific weaknesses of a bank, such as weak in credit policy credit screening, imprudent lending and moral hazard activities may cause credit risk.

According to Ezeoha (2011) who examines the influence of banking credit crisis and asset quality in Nigeria's vulnerable banking sector for the period 2004 to 2008 found positive credit risk affected by asset liquidity and increased liquidity levels, bank asset quality decreased. The author further revealed that liquidity is positive and significant in relation to credit risk in Nigeria.

In addition similar result were found in study done by Ahmad and Ariff (2007) which analyzes credit risk providers for the country since 1996 to 2002 and found that the liquidity ratio has a positive correlation with credit risk in Australia, India, Korea and the United States. Meanwhile, Ahmed, Akhtar and Usman (2011) who are investigating Pakistan's Islamic banking and risk management practices or the period from 2006 to
Azeem and Amara (2014) reviewed the relationship of profitability and NPL in sixteen major banks in Pakistan for the period 2006 to 2012. They argue that the bank's profitability is significant but negatively associated with the level of credit risk. This decision is supported by Messai and Jouini (2013); McCann and Culder (2012) examined the rejection factors of SME loans in Ireland and Guy and Lowe (2012) analyzing the credit risk and stability of banks in Barbados using the six fixed-rate Fixed-rate models for 1996 to 2010. They found that there was a significant and negative relationship between credit gains and risks. Furthermore, Godlewski (2004) analyzing capital regulation and bank credit risk taking in new emerging market economies; Ezeoha (2011) analyzes banking crisis, credit crunch and asset quality in Nigeria's vulnerable system for the period 2004 to 2008 and Khan, Anuar, Choo and Khan (2011) also finds a negative relationship between profit and credit risk. They expose increased profits, credit risk decreases.

In comparison, Abusharbek (2014) analyzes the credit and profits of Islamic banks in Indonesia for the period 2008 to 2013, whose variables used in their studies, are returns on assets, equity returns, returns on stocks and credit risk. He found that profits had a positive relationship with Islamic bank credit risks in Indonesia but not important. He also disclosed that profits had no significant effect on Islamic bank credit risk in Indonesia. This result is supported by Kosmidou (2006) which studies the determinants of profit and margin of bank in Greece during the EU financial integration period reveals that profits have a positive impact on bank profitability. Messai and Jouini (2013) analyze microcredit and macro risks of 85 banks in Italy, Greece and Spain for the period 2004 to 2008. They find that loan growth has a positive relationship with credit risk in Italy, Greece and Spain but not important. This result is supported by Hess, Foos, Norden and Meber (2010); Grimes and Holmes (2009) and Salas and Saurina (2002). They found that there was a positive relationship between loan growth and credit risk. They also revealed that high lending growth which raised low quality loans has contributed to the increased credit risk. On the contrary, Bercoff, Giovanni and Grimard (2002) analyzed credit growth and the credit crisis of the Argentinean banks found out that loan growth have negative impact on the credit risk. Further, this result is supported by Khemraj and Pasha (2009) who analyzed the determinants of credit risk of Guyanas’ bank for the period from 1994 to 2004 which employ regression analysis and panel data on macroeconomic and bank specific factors. They found out that growth in loans and advances is negatively related to credit risk. They further suggested that an increase in disbursement of new loan with quality loans would reduce default, hence, lowers the credit risk of the bank.

The definition of IC given by researchers contains some common key words like “skill, knowledge, experience, information, intangible assets, know-how, new process, innovation and good relationship that are essential for a firm to gain sustainable and smooth growth and competitive advantages and enhance corporate value” (Stewart, 1997; Edvinsson and Malone, 1997; and Clarke et al., 2011). “Resource-based theory also describes firm as a collection of productive resources’ (Penrose, 1959) and suggests that knowledge on organizational competencies is rooted in the organizational resources” (Mouritsen and Larsen 2001; and Hamzah and Ismail, 2008) that provide the basis for organizations’ competitive advantage (Barney, 1991; and Peteraf, 1994). Using the RBT, empirically most of the researchers have observed positive direct influence of resources on firm performance (Wernerfelt, 1984; Penninggset al., 1998; and Hittet al., 2001).

According to Edvinsson and Malone, (1997) IC is categorized into three components namely into human capital and structural capital and relational capital.

Overall, structured capital includes all supportive infrastructures, strategies, work environments, information systems and database systems, technologies, inventions, copyright, trademarks and other relationships, in which the firm's strategy is necessary to implement (Ordonez, 2004).

Many studies are carried out to test the impact of IC and its components in the performance related studies measured by profitability, productivity and sale growth. Pulic (2000), introduce the measurement of IC through VAIC. Some studies used the VAIC method in performance studies.

Pulic (2000), used model for measuring IC, Value Added Capital Intellectual Value (VAIC), observed a strong positive association between IC and Market Value Added (MVA) from a sample of 30 listed firms randomly selected during 1992-1998. Using the VAIC method, some studies have reviewed the IC's impact on financial performance. For example, Shiu (2006), Ting and Lean (2009) and, Clarke et al. (2011), Chen et al. (2005) argued that there is a positive association of IC with the performance. Pulic model for measurement of IC
through VAIC is widely used and this study also adopted this method.

Few researcher such as Pulic (2002) and Yalama and Coskun (2007) are conducted on the banking sector and tested the impact of IC on the performance of banking sector. They suggested IC is vital component of performance and compared it with physical capital. Similarly in Japan banking sector Mavridis (2004) found similar results. Moreover, Ismail and Karem (2011) examine the tangible effects of physical capital (capital used) and human capital in firm performance in the banks of Bahrain. The same result was found in the case of India’s banking sector during 2001-2010 by Ghosh and Maji (2012). This study examines the significant positive influence of IC and human capital in bank performance, but conflicting results are found on the influence of working capital and structural capital. However, Appuhami (2007) has a positive but not significant competition between the ICs and the capital gains of the Thai banking, finance and insurance sectors.

METHODOLOGY

The secondary data was collected from the annual statements of twenty banks through State Bank of Pakistan (SBP). The period of the study is 2006 to 2017. There are many local and international events in the financial markets took place in this period. The Pulic model is used to measure the IC. The independent variables consisted of four internal factors (LIQ, LGR, ROA, and OE,) and the moderating factor, Intellectual Capital (IC). The dependent variable was credit risk. Fixed Random effect model and hierarchical regression model are used.

Hypotheses

H1: There is significant and a negative relationship between (1) liquidity ratio, (2) Profitability ratio, (3) Operational Efficiency, and (4) loan growth and credit risk.

H2: The influence of internal factors, namely, liquidity ratio, profitability ratio, operational efficiency and loan growth on credit risk is moderated by intellectual capital.

Multiple Regression Models

\[ CR_{it} = \alpha_0 + \beta_1 OE_{it} + \beta_2 LGR_{it} + \beta_3 LIQ_{it} + \beta_4 ROA_{it} + \varepsilon_{it} \]

Hierarchical Moderated Multiple Regression Model

\[ CR_{it} = \alpha_0 + \beta_1 OE_{it} + \beta_2 LGR_{it} + \beta_3 LIQ_{it} + \beta_4 ROA_{it} + \beta_5 IC_{it} + \beta_6 OE_{it} * IC_{it} + \beta_7 LGR_{it} * IC_{it} + \beta_8 LIQ_{it} * IC_{it} + \beta_9 ROA_{it} * IC_{it} + \varepsilon_{it} \]

Where

- \[ \alpha = \text{constant} \]
- \[ i = \text{bank} \]
- \[ t = \text{time period} \]
- \[ \varepsilon_{it} = \text{Error term of bank } i \text{ on time } t \]
- \[ OE = \text{Operating Efficiency} \]
- \[ LGR = \text{loan growth} \]
- \[ LIQ = \text{liquidity ratio} \]
- \[ ROA = \text{profitability} \]

Moderating variable:

\[ IC = \text{Intellectual Capital} \]

FINDINGS

Diagnostic tests for heteroscedasticity, autocorrelation and penal data test were performed and results are given in 5.

Table 3

<table>
<thead>
<tr>
<th>Test</th>
<th>(Prob &gt; F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homoscedasticity/Heteroscedasticity Test</td>
<td>0.0000</td>
</tr>
<tr>
<td>Auto-correlation Test</td>
<td>0.000</td>
</tr>
<tr>
<td>Panel Data Test (Hausman Test)</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Note: *p<0.05, **p<0.01
The diagnostic test of Breusch-Pagan was used to check the heteroskedasticity. The results reject the null hypothesis, an indication for presence of heteroscedasticity in the model. Gujarati and Porter (2010) suggested applying White Heterosceastic Test for fixing of this issue. Similarly, Wooldridge test was performed to identify the problem of autocorrelation in panel data. The Hausman test was conducted for regression analysis. Based on the result the fix effect model was selected appropriate for regression analysis. In addition, hierarchical regression was conducted to determine the impact of independent variables (LIQ, LGR, OE and LIQ) on dependent variables (CR) and the influence of intellectual capital (IC) as moderator on the relationship of internal factors and credit risk.

Table 4
The Moderating Effects of intellectual capital on Internal Factors and credit risk for conventional Banks in Pakistan.

| Variable | Model 1 | | Model 2 | | Model 3 | |
|----------|---------|----------|---------|----------|----------|
|          | β       | p-value  |         | β       | p-value  |         |
| OE       | -1.53   | 0.98     | -0.001  | 1.99    | -0.0010.472 |          |
| LIQ      | 0.004   | 0.001    | 0.005   | 0.000   | 0.013    | 0.013   |
| LGR      | -0.062  | 0.010    | -0.023  | 0.000   | 0.030    | 0.658   |
| ROA      | 2.27    | 0.000    | -1.73   | 0.000   | -3.592   | 0.000   |
| IC       | -0.023  | 0.000    | -0.010  | 0.312   |          |         |
| IC*OE    |         |          |         | 0.0012  | 0.312    |         |
| IC*LGR   |         |          |         | -0.003  | 0.050    |         |
| ROA*IC   |         |          |         | -0.033  | 0.030    | 0.017   |
| R²       | 0.7912  | 0.8375   | 0.8457  |         |         |         |
| Adjusted R² | 0.5677 | 0.6241  | 0.6553  |         |         |         |
| Sig F-Statistics | 0.0000 | 0.0000  | 0.0000  |         |         |         |
| F-Statistics   | 34.105 | 44.15    | 39.1    |         |         |         |

Note: *p<0.10, **p<0.05, ***p<0.01

Model 1:
In model 1, dependent variables (LIQ, ROA, OE, and LGR) were found to be significant at the level of 0.0000 with a value of R² adjusted from 0.5677. Of the four, three predictors, LIQ (β = 0.004, P = 0.01), LGR (β = -0.062, P = 0.010), ROA (β = -2.27, P = 0.000) were found significant.

Model 2:
In model 2, Intellectual Capital (IC) is introduced as moderating variable. The results shown in Table 4 show that this model is significant at the level of 0.0000 with adjusted R² 0.6241. There were four predictors found to be significant, LIQ (β = 0.005, P = 0.000), LGR (β = -0.023, P = 0.000), ROA (β = -1.73, P = 0.000) and IC (β = -0.023, = 0.000) However OE is not significant.

Model 3:
It describes the results of interactions (OE, LIQ, LGR, ROA, IC, IC * OE, IC * LIQ, IC * LGR and IC * ROA) used to investigate the impact of intellectual capital on CR of conventional banks in Pakistan. The result shown in Table shows that this model 3 becomes significant at the level of 0.000 with adjusted R² 0.6553. The model could explain 65.53 percent variation in CR. Three interaction variables such as IC * LIQ, IC * LGR and IC * ROA were found significantly effecting the relation of internal factor with credit risk.

CONCLUSION
This study is an attempt to investigate the impact of intellectual capital on the credit risk of conventional banks in Pakistan. In the context of knowledge economy, IC is considered as primary factor for organizational success. Perhaps, this is most likely to be true in the services sector such as banks. There are many empirical evidences in support of this view however; most studies have found such impact on profitability of firms. Nevertheless, credit risk has not been tested to capture the role of IC in managing it. Therefore, this study is an effort in this regard, particularly in context of Pakistan. The study found that IC is a significant determinant of credit risk in the banks in Pakistan. The motivation for this addition stemmed from the need to understand why credit risk is high in the Pakistan as compared to other Asian countries and rest of the World. In addition, whether intellectual capital could reduce the high credit risk ratio in Pakistan. Based on our findings and consistent high problem of credit risk in Pakisti banks, it is suggested that banks should build an efficient structure of intellectual capital (human capital, structural capital and relation capital) to reduce and mitigate the credit risk to
increase the long term sustainability of the banks. Future researches are recommended to explore the component of intellectual capital among other bank related factors.

References


