Effects of credit Risk indicators on shareholders' value of commercial banks in IRAN

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ABSTRACT: This research aim to determine indicators of credit risk and investigates effects of this indicators on shareholders' value in commercial banks of Iran. For this goal all of the accepted commercial banks in Tehran stock exchange in a 6 years period from 2005 to 2010 investigated. This study answer to: whether indicator of financial risk has significant effect on shareholders’ value of commercial banks or not? With one main hypothesis, four indicators of credit risk investigated and hypothesis tested. Hypothesis testing and data analyzing done based on linear regression by Spss.v19. results confirmed effective role of credit risk indicators on shareholders’ value mean fundamental hypothesis of research confirmed.

Keywords: credit risk, shareholders value, return on equity (ROE), loan loss provision, commercial banks.

INTRODUCTION

Banking industry is one the most important sector of each economic. Because banks, insurance, and stock exchange are fundamental of financial markets. Banking has significant importance in Iran's economic. Lack of required development in financial markets forced banks to financial providence in long and short periods. Financing is one of the important sectors of each bank financial providing has importance form economical point of view and always is with level of risk and inattention to this, lead to unwanted results (Rasini and Soori, 2007). Equipping and allocating of investment resources to economical activities done by financial markets and banks credit markets is one of the parts of this markets. Most important activity of banks is gathering financial resources and allocates them to different economical parts. Note that these resources provide banks requirement for financing in one hand and banks have to allocate their limited resources as optimized to production and services that mean effective activity of financial firm, because from view points of economic theory, efficiency is results of production optimization and resources allocation (George and Shori, 1987). Economical regime investigation in international level shows there is close relationship between investment and economical development of a country. Mean countries with effective pattern in resource allocation to different economical sectors, usually have developed economic and then higher welfare (Gutman, 1994). Then banks try to allocate their loans to individuals with low risk, provide proper interest based on provided finance. This goal achieved when banks can determine their legal and real customers and could classify them based on ability and tendency to full and on time refund based on proper financial and non financial indicators; because in such systems loans given to customers that have less risk and high probability of full and on time refund. These resources can be use as financial resources to giving next loan, then have significant role in increasing of investment, economical development and growth (John and Edward, 1998). In this condition one of the important tasks of banks is determine credibility in proper manner and individuals that apply for finance of banks. In past years one of the problems in banks and credit institution is exponential increasing of debate, mean receivables increasing and related problem and un fluent return of resources lead to increasing risks for banks and decreasing banks interest in one hand and collecting lead to massive costs for bank and long duration of justice process in resource return has fogy result. Standard for outstanding claims is about five percent and this rate in developed countries is less than one percent , and from view point of their managers five percent increase in outstanding claims versus total given loan lead a country to economical crisis and this rate in Iran is higher than warning boundaries. High volume and high rate of these demands lead to decrease of banks profit and finally decrease of system profitability.
Then role of banking regime in each economical systems, for gathering deposits (equipping resources) and use of them in financial providing of investment plants (allocating resources) with proper validation has high importance. This issue by enacting especial regulations forces governments to use proper policies, leading financial resources to achieving economical goals, and banks have special role in this field. Then measuring banks activity has especial importance and because banks are financial institution, investigation factors such as credit risk and validation systems that affect profit and value of bank’s stock is important (Jalili et al, 2011). In this study based on importance of credit risk in commercial banks activities, at first by determining important indicators of credit risk trying to investigate effect of these variables on shareholders’ value of commercial banks accepted in Tehran stock exchange. Then all accepted commercial banks accepted in TSE investigated for a 6 years period from 2005 to 2010. For achieving to Main goal of study that is detection credit risk indicators and investigation effect of these factors on commercial banks shareholder’s value in Iran one basic hypothesis defined. Four indicators of credit risk: "Noncurrent receivables (expired, outstanding and doubtful debts) ratio to total given loans", "Base capital ratio to adjusted assets by risk (capital adequacy)", "total given loans and advances ratio to total deposits" and " ratio of doubtful debts storage to total given loans" was investigated and effect of these indicators on shareholders’ value was evaluated. Financial data and information were used in this study are annual and audited. For hypothesis testing and data analyzing multiple linear regression models used. Results confirmed effective role of credit risk indicators on shareholders’ value that will be explained on following parts of this research.

**Theoretical foundation and background**

Loan portfolio is one of the significant commercial banks’ properties. Main proficiency of these banks is resource absorption from investors and gives loan to applicant. Absorbed deposits oblige banks to return interest and absorbed deposits in expiry date and this is in condition that given loans abstaining banks. Then validation of applicants for loan given has special importance. Credit risk root in that counterparty can’t or don’t want to do his obligation. Traditional effects of this risk measure by Rials cost of default counterparty. Losses of credit risk may be happen before applicant retracted. Then credit risk is potential loss because of one credit happening. Credit happen, occurring when ability of counterparty to do his obligations, change. Based on this definition, change value of debit market because of credit ranking (or change of market understanding about contractor ability for doing his/her obligations) is as credit risk too (Rapdou, 2011). Activities of banks and credit institutions in different field such as loan giving, investments, bonds, certification of deposits, issuing, opening different letter of credit and … faces these organizations with different risks. Facing with different risks is one of the requirements of banking industry. Different risks in banking industry affect on efficiency of bank and bank is a financial organization that by exchanging risk and efficiency reaches to profit (Elahi, 2010). Chen and Pan (2012) suggest that credit risk is level of value fluctuation in debit tools and derivatives, based on fundamental changes in loan givers quality of credit. Coyle (2000) definition of credit risk is losses of inability or refusal of borrower for him/his debit. Funso et al (2012) define credit risk as esters tolerated by banks because of not paid debt after maturing date. Lopez (2001) defines credit risk as loan’s value reducing factor because of change in solvency ability. This change can be real unpaid or change in ability of paid. Kargi (2011) believes credit risk management increases profitability of banks by keeping and maintaining pressure of this risk in acceptable boundaries to creating a framework for understanding effect of credit risk management. Demircuk-Kunt, A. and Huzinga (1999) believe credit risk management has two aspects. Mean credit risk management become real when losses happened (loan retarded) therefore these losses become intolerable and progress of these losses in other activities of bank and non banking competitions that makes stress on banks to find valuable loan applicant, be observable. Kithinji (2010) believes basic source of credit risk is in low capacity of institution, wrong credit policies, low interest rate, weak management, improper regulation, low cash and property, government interference and low supervision of central bank.

There is plenty of research about credit risk of commercial bank that provided an overview of them following.

Tehrani and Falah Shams (2005) were seeking a model to design and explanation for credit risk of country banking system. They investigated models such as linear probability, logistic and artificial neural network to anticipate credit risk of bank’s customer. Results showed relationship between variables in credit risk anticipating model isn’t linear and exponential and sigmoid functions are proper model to forecasting credit risk. Based on this study higher efficiency relate to artificial neural network at first and then logistic regression. Razini et al (2007) investigated effect of concentration and credit risk on efficiency of banking industry in Iran.

For measurement purpose they used parametric method and commercial bank’s balance sheets data during 2001 to 2005 used. Result of this study showed based on efficiency estimation model is 34% and by merging inefficient bank with efficient bank, average of efficiency increase to 50%. Based on this model factors such as bank size (total property of bank) and centralization (showing competition in banking industry) have negative relationship with efficiency and have positive relationship with number of branches, educated human
resource and information technology (showing electronic banking) and ration of loan to capital and capital to property (determinate factors of credit risk estimation).

Felix and Claudine (2008) investigated relationship between bank’s efficiency and credit risk management. Efficiency indicators of banks from their viewpoint include: Return on assets (ROA) and Return on equity (ROE). Their study showed credit risk indicators have negative effect on bank’s efficiency. Kithinji (2010) investigated effect of credit risk on Kenya’s banks profitability during 2004 to 2008. His results showed significant part of profitability of commercial banks didn’t affect from level of credit and disabled loans. He suggested there are other factors beyond credit and disabled loans that affect on bank’s profitability.

Mirzaei et al (2011) investigated effective factors on credit risk of legal individual in banks. In this research based on Logistic regression an arbitrary sample compose of 455 legal companies that achieved loan from Bank e Melli Iran in Tehran branches investigated. Result show based on statistical indicators, function from view point of coefficient and severable, are significant and have high trust. Al-Khouri (2011) investigated effects of bank’s risk and commercial bank activity environment on efficiency of 43 banks of six countries that are member of Persian gulf corporation commission (GCC) during 1998 to 2008. He used linear regression to analyze data and results showed credit risk, risk of cash and asset risk are effective factor on performance. Kargi (2011) investigated effects of credit risk on profitability of Nigeria’s bank. He used data from 2004 to 2008. Used model in his study was linear regression and results showed credit risk management has important effect on profitability of commercial banks.

Fonso et al (2012) investigated performance of Nigeria’s bank from 2000 to 2010 and they showed credit risk indicators with three financial ratio and used linear regression to data analyze. Result showed credit risk and its indicators have significant effect on commercial bank’s performance. They suggested for improving performance, managers have to increase their credit performance. Ahmed Arif et al (2012) investigated effects of credit risk on return of equity of Pakistan banking system. They used three indicators and data of 20 accepted banks in Karachi stock exchange during 2004 to 2009. Results showed effect of credit risk on return of equity in Pakistan banking system is low.

In addition to mentioned authors there are others that studied on commercial banks credit risk, such as: Mohtashami and Salami (2006), Bagheri (2006), Fathi et al (2012), Epure and Lafuente (2012), Chen and Pan (2012).

**Goal and hypotheses**

Main goal of study is detection credit risk indicators and investigation effect of these factors on commercial bank’s return of equity in Iran. For achieving the goal one basic hypothesis defined as below:

**Main hypothesis**

indicators of credit risk have significant effect on shareholders’ value of commercial banks.

**METHODOLOGY**

This research try to answer the following question: whether indicators of credit risk affect commercial banks accepted in Tehran’s stock exchange or not? Then methodology of research is descriptive and correlation based because by this method the relationships between variables were investigated. Research is applicable and used after occurrence data. In most of completed studies about credit risk analyze, authors such as: Razini & Soori (2007), Ahmad & Arif (2007), Felix & Cladin (2008), Bin Nasir & Omran (2008), Al-khori (2011), Kargi (2011), kisinji (2010), Fonso et al (2012), Ahmad Arif et al (2012), Fathi et al (2012), Epiver & Lafaoint (2012) , Chen & Pan (2012) and … used linear regression. In this research to test basic hypothesis, regression model as below used:

\[
Y_{it} = \alpha_{it} + \sum_{i=1}^{n} \beta_{it} X_{it} + \epsilon_{it}
\]

**Variables of research**

Dependent variable (output variable)

In Equation (1), \( Y_{it} \) showing shareholders value in period \( t \) that is dependent variable and in done researches this variable measured with different indicators. Ahmad Arif et al (2012) suggest that proper indicator to measuring shareholders value are ROE and market return on shares (ROS). Fathi & Fooladi (2006) suggest, banks have to use management of credit risk because it’s true handling not only increases value adds of shareholders but increases trust of current shareholders to keeping their stocks and attracting new investors. Fathi et al (2012) suggest that ROE is best indicator for investigation shareholders value. Other authors such as Fonso et al (2012), Felix & Kilden (2008) and … suggests best indicators for bank’s performance are ROE and return of assets (ROA). In this study ROE (ratio of net profit before tax to equity) used to investigation shareholders value.
Dependent variables (input variables)

In Equation (1), \( X_{it} \) is dependent variable that showing indicators of credit risk in period \( t \). Indicators of credit risk in this research show as following:

- Noncurrent receivables (expired, outstanding and doubtful debts) ratio to total given loans \( (X_1) \).
- Base capital ratio to adjusted assets by risk (capital adequacy) \( (X_2) \).
- Total given loans and advances ratio to total deposits \( (X_3) \).
- Ratio of doubtful debts storage to total given loans \( (X_4) \).

In Equation (1) \( \alpha_i \) is quantity of constant and \( \varepsilon_{it} \) is regression error in period \( t \).

Domain of the study

Time domain of research is beginning financial year of 2005 to end of financial year 2010. This study includes all of Iranian commercial banks that accepted in Tehran stock exchange.

Statistical society and sampling

Based on main goal of research and following limitations of study, statistical society selected and sampling done.

Banks that accepted in Tehran stock exchange in study’s time domain and available annual and audited financial data of them in internet sites such as: research managing, Islamic study and development, central bank of Iran, stock exchange, official informative site of Tehran’s stock exchange and data bases such as Rah Avard Novin software.

Banks that were in stock exchange board to end of research time domain.

Banks that presented financial data for this research.

Statistical society of this research includes seven commercial banks accepted in TSE such as EN Bank, Parsian, Tejaratg, Sina, Saderat, Kar Afarin and Melat and based on mentioned condition and rare accepted bank based on used method, total counting way selected.

Data analyzing

To testing of research hypothesis and running regression based model, following statistical tests used:

- Durbin – Watson test: to test correlation existence between errors. If statistic of this test be between1.5 to 2.5, lack of correlation between errors will be confirmed and regression model can be used.
- Kolmogorov-Smirnov test: one of the defaults in running regression based models is normal distribution of variables that if this default isn’t confirmed, especially for independent variables, regression based model can’t be used. Significance level of this test must be higher than 5%.
- Significance of model test: significance of model will be investigated by ANOVA table and F statistics. Significance of coefficient test (relationship between each variable with independent variable): coefficient of regression based model and its significance, will investigated by student “t” statistics.
- Determination coefficient test: uses multiple correlation root \( (R^2) \) to determine independent variable to how level can explain changes of dependent variable.

Findings

Analyzing descriptive statistic variables

to summarize study at first descriptive statistics calculated. Table (1) shows minimum, maximum, mean and standard deviation of variables.

<table>
<thead>
<tr>
<th></th>
<th>Max</th>
<th>Mean</th>
<th>Std</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROE</td>
<td>1.3253</td>
<td>.293086</td>
<td>.089289</td>
<td>.0000</td>
</tr>
<tr>
<td>(X_1)</td>
<td>.9631</td>
<td>.104407</td>
<td>.1387253</td>
<td>.0094</td>
</tr>
<tr>
<td>(X_2)</td>
<td>.842757</td>
<td>.02032776</td>
<td>.0079060</td>
<td>.0019</td>
</tr>
<tr>
<td>(X_3)</td>
<td>.014286</td>
<td>.014286</td>
<td>.014286</td>
<td>.014286</td>
</tr>
</tbody>
</table>

Kolmogorov-Smirnov test

One of the tests before running regression based model to determination normal distribution is Kolmogorov-Smirnov test. Significance level for this test must be higher than 5%, especial when this level becomes less than 5% for dependent variable(s), mean can’t use of regression based models. Result of this test shown in table (2).
Test of main hypothesis of research

linear regression model as following used.

\[ H_0: \text{indicators of credit risk in this research don't affect on ROE.} \]

\[ H_1: \text{indicators of credit risk in this research affect on ROE.} \]

(2) \[ \text{ROE} = \alpha_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \varepsilon \]

Results of running above model showed in table (3, 4, 5).

Table 2. results of Kolmogorov-Smirnov test

<table>
<thead>
<tr>
<th></th>
<th>X_1</th>
<th>X_2</th>
<th>X_3</th>
<th>X_4</th>
<th>ROE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics</td>
<td>0.693</td>
<td>1.849</td>
<td>2.426</td>
<td>.788</td>
<td>1.248</td>
</tr>
<tr>
<td>Sig.</td>
<td>.724</td>
<td>.082</td>
<td>.060</td>
<td>.564</td>
<td>.089</td>
</tr>
</tbody>
</table>

Based on table (3) determination coefficient is 0.44 and explain that 44% of ROE's changes, describe by independent variable and 66% of changes relate to other factors that aren't achievable and controllable and need more exploration. Durbin - Watson statistics is 1.834 and it is close to 2 and shows there is no positive correlation between other remained and this is favorable.

Table 3. summarize of model

<table>
<thead>
<tr>
<th>Durbin-Watson</th>
<th>Std. Error of the Estimate</th>
<th>Adjusted R square</th>
<th>R square</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.834</td>
<td>.1677535</td>
<td>.379</td>
<td>.440</td>
<td>.663</td>
</tr>
</tbody>
</table>

Based on these results, significance level achieved from above regression model is 0.000 and “f” is 7.263 that show effect of independent variable on dependent and this effect is significant in 99% level. Then basic hypothesis confirmed and there for indicators of credit risk affect equity of shareholders (ROE).

Next outputs in table 5 known as coefficient table and show “t” statistic, level of significance, and coefficients of independent variable. These outputs show type of relationship between independent and dependent variables that is ROE indeed.

Table 4. ANOVA

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df.</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>.818</td>
<td>4</td>
<td>.204</td>
<td>7263. .000</td>
</tr>
<tr>
<td>Residual</td>
<td>1.041</td>
<td>37</td>
<td>.026</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>1.859</td>
<td>41</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Results show \( x_2 \) (Capital adequacy) in level of 99% and \( x_4 \) (ratio of doubtful debts storage to total loan) in level of 99% have significant relationship with ROE and based on sign of coefficient for these to variables that are negative, can say this relation is inverse. At the end summarized result of hypothesis test is as following:

\[ \text{ROE} = 0.438 - 0.455x_2 - 13.503x_4 \]

Limitations of the study

Like most research, this study has some limitations due to the limitations of the results obtained; the most important ones are as follows:

According to a survey banks are accepted in Tehran Stock Exchange, the generalization of the results to the stock of foreign banks will face some restrictions.

Results obtained in this study for the period 2004 to 2009 are selected based on examples has been studied. Which may alter the samples or intervals or method used, the results may change. Therefore, the generalization of the results of listed companies in Tehran Stock Exchange will be faced with some limitations.
In regard with macroeconomic variables (except inflation) and political factors have not been considered in this study and was out of control, these factors could also have influenced the results.

Banks examined in this study have a difference in terms of experience and research may therefore be influenced.

CONCLUSION

Goal of this study was detection indicators of credit risk and investigation its effect on equity of shareholders of commercial banks that accepted in Tehran stock exchange. Then 7 privat sector commercial banks to testing basic hypothesis of research, selected. Linear regression model used to test basic hypothesis. Results show significant negative effect of independent variable on capital adequacy in level of 95% and ratio of doubtful debts storage to total loan in level of 99% on shareholders’ value. Above ratios are important indicators of credit risk for commercial banks, because adequacy of capital is an indicator that emphasized in BAL 1, 2 commission and banks obligated to keep this ratio at least in 8%. On the other hand doubtful debts storage has direct relationship with current and incurred debts of banks. Calculation of doubtful debts storage based on instructions 1074 and 1077 of money and credit commission of central bank of Iran (2006) is as following:

Public storage: 1.5% of total give loan remainder mines remainder of loan used for that privat storage.

Private storage: calculated based on remainder of incurred receivables and proportional collateral coverage equal 10% for expired, 20% for outstanding, and 50% to 100% for doubtful debts.

It is clear that doubtful debts storage impose high cost to banks if measuring credit risk don’t be used and results of this study show it clearly. Then commercial banks to minimize this cost have to implement credit risk measurement system such as: credit ranking and credit scoring to customers to avoid of incurred demands and keep shareholders value.

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