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The Association Between Credit Risk and Liquidity Risk with Predictability of Profit of the Banks Listed in Tehran Stock Exchange

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ABSTRACT

The current study is to examine the association between credit risk and liquidity with profit forecast ability in the listed companies in Tehran stock exchange. The study is a kind of descriptive and practical research. All listed companies in Tehran stock exchange were selected as statistical population during 2007 to 2012. So, 11 financial and credit institution, and banks are the statistical samples of the research. Credit risk and liquidity are regarded as independent variable and short-term and long-term profit forecast is considered as dependent variables. Also, three control variables of earning per share, financial leverage and growth are used here. Hence, four hypotheses are provided and the related data are collected. To examine the research's hypotheses, Eviews 7 software is applied. Ordinary Least Squares (OLS) is used to approve/reject the hypotheses, and heteroscedasticity pre-tests and fixed effects is applied to perform these tests. The results demonstrate that there is no significant relation between credit risk and short-run/long-run profit forecast of the listed banks in Tehran stock exchange. There is also a significant association between liquidity risk and short-run/long-run profit forecast of the listed banks in Tehran stock exchange.

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INTRODUCTION

Prediction is a key element in economic decisions. Investors, creditors, management, and other entities in the economic decisions rely on predictions and expectations. Also, considering the company's annual budget, predicting production, the sales, and earnings per its share and budget control of mid-term reports and amount of fulfillment of the predictions play an impressive role on the stock price changes. Perhaps the most important factor to be sought influencing the stock price in earnings prediction per share. The most important source of information, for investors, creditors, and other users of information prepared by the company is to predict earnings provided in certain periods. In general, it is one of the main and important information concerning financial statements that would attract the attention of investors and other users of financial statements. Data provided by banks, including information related to earnings, is based on past events. However, users of financial statements need information about the bank's future. The earnings prediction, by management, provides information about the bank's future. One of the factors, should be considered in forecasting earnings, is risk banks. Two types of risk that could potentially affect the predictability of profits of banks are credit risk and liquidity risk. In this regard, Lee 2007 in research as entitled "A conservative accounting and managers' behavior in prediction of profit" found out that announcing statements about prediction of earnings and repeating them proportional to the conservative level are increased.

Kamran Ahmed 2010 did investigate factors affecting firms' earnings forecast errors by initial stock offerings in Dhaka Bangladesh stock market with customer satisfaction. His analysis suggests that there is an inverse relationship between the economic prosperity conditions and earnings forecast errors, a positive one between firm lifetime and earnings forecast errors profit. Also, Castro 2007 conducted a study entitled "Macroeconomic determinants of credit risk in the banking system: the GIPSI". The findings of this study indicate that all the political criteria can be performed to promote growth, employment, productivity and competitiveness and to reduce public and foreign debt, are essential for the stabilization of their economies. Paola et al 2012 a study entitled "Evaluation of credit risk and impact of the new capital treaty Basel on small and medium sized

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companies: an empirical analysis" showed that the probability of non-default risk in the next year is subject to increase in profitability, and liquidity, coverage, activity and reduction subject to the leverage. It is obvious that many factors may affect banks' earnings predictability, and we decided to test the effect of liquidity and credit risk on the banks' earnings predictability. In general, we seek to answer the following questions, whether there is a significant relationship between credit risk, liquidity and banks' earnings predictability listed in Tehran stock exchange. And whether the use of an appropriate model can lead to increased predictability of profitability of the banks? And whether the model for predicting the banks' earnings can be employed by potential and actual shareholders and investors to decide in the future?

Hypotheses of research:

- There is a significant association between credit risk and predictability of short-term profit of banks listed in Tehran Stock Exchange.
- There is a significant association between liquidity risk and predictability of short-term profit of banks listed in Tehran Stock Exchange.
- There is a significant association between credit risk and predictability of long-term profitability of banks listed in the stock exchange Tehran.
- There is a significant association between liquidity risk and predictability of long-term profitability of banks listed in the stock exchange Tehran.

The research statistical population and sample:

It comprise banks and financial & credit institutions listed in the Tehran Stock Exchange which are located in the list of banks and financial & credit institutions from 2007 to 2012. Selection measure of sample is purposive sampling and thus 11 banks and financial & credit institutions were selected.

Operational definition of variables:

Operational definition of predictability of short- and long-term profit:

Short-term profit predictability is the adjusted coefficient of the model (1) and predictability of long-term profits, including the coefficient of adjusted determination for each model (2) to (5).

$$E_{t+1}=\beta_0+\beta_1 E_t+\varepsilon_t$$

$$E_{t+2}=\beta_0+\beta_1 E_t+\varepsilon_t$$

$$E_{t+3}=\beta_0+\beta_1 E_t+\varepsilon_t$$

$$E_{t+4}=\beta_0+\beta_1 E_t+\varepsilon_t$$

$$E_{t+5}=\beta_0+\beta_1 E_t+\varepsilon_t$$

Et , Et+1 , Et+2 , Et+3 , Et+5 : they are in years of t, t+1, t+2, t+3, t+4 and t+5, respectively.

Operational definition of credit risk:

Common standards in the banking system are assessment of the credit risk situation, the ratio of allowance for doubtful accounts to total facilities. Facilities of the banks and active credit institutions are classified into four categories, in accordance with the instructions in Central Bank of the Islamic Republic of Iran, given their qualities, as follows:

1- Current class: the facilities are the payment of its principal and profit or repayment of installments at maturity and the maximal maturity delay would be of 2 months.

2- Over-due class: it is more than 2 months since due date of principle and profit of the facilities and/or interruption date of installments, but repayment delay is still not exceeded of 6 months.

3- Deferred class: it is the principal and profit of facilities that it has been more than 6 months and less than 18 months of due date and/or interruption date of the installments, and customer has not taken an action for reimbursement of credit institution's claims yet.

4- Doubtful class: it is principle and profit of the facilities with more than 18 months overdue, or the date of interruption of installments' payment of expired and customer has not taken an action for reimbursement of the debt.

Operational definition of liquidity risk:

In this research, in order to measure this variable, the ratio of cash holdings to total deposits will be used. Cash-to-deposits ratio indicates that the bank's policy in relation to opportunity cost reduction of the cash holding would be developed and applied properly or not. A high ratio indicates inefficient allocation of resources and a low ration is indicative of reaching the optimum level of cash.

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Operational definition of earnings per share

It is dividing the profit after tax deduction by total number of bank shares.

Operational definition of growth:

(This year asset – previous year asset) divided by previous year asset.

Operational definition of financial leverage:

Total liabilities divided by total assets.

The research regression model:

- First hypothesis regression model

$$\text{Predict short} - \text{term profits}_{it} = \gamma_0 + \gamma_1 \text{Credit Risk}_{it} + \gamma_2 \text{Growth}_{it} + \gamma_3 \text{EPS}_{it} + \gamma_4 \text{Leverage}_{it} + \varepsilon_{it}$$

- Second hypothesis regression model

$$\text{Predict short} - \text{term profits}_{it} = \gamma_0 + \gamma_1 \text{Liquidity Risk}_{it} + \gamma_2 \text{Growth}_{it} + \gamma_3 \text{EPS}_{it} + \gamma_4 \text{Leverage}_{it} + \varepsilon_{it}$$

- Third hypothesis regression model

$$\text{Predict Long} - \text{term profits}_{it} = \gamma_0 + \gamma_1 \text{Credit Risk}_{it} + \gamma_2 \text{Growth}_{it} + \gamma_3 \text{EPS}_{it} + \gamma_4 \text{Leverage}_{it} + \varepsilon_{it}$$

- Fourth hypothesis regression model

$$\text{Predict Long} - \text{term profits}_{it} = \gamma_0 + \gamma_1 \text{Liquidity Risk}_{it} + \gamma_2 \text{Growth}_{it} + \gamma_3 \text{EPS}_{it} + \gamma_4 \text{Leverage}_{it} + \varepsilon_{it}$$

Data analysis methods:

To estimate the efficiency of a regression model using panel data, among Common-effects, Fixed-effects and random-effects model it is chosen using appropriate tests. At first order, it determines whether a time series xt has a stationary process (accumulation rank of zero) or divergent (accumulation rank of 1), the Dickey-Fuller generalized test (ADF) was used. Like evaluating variables' statics, we need, here, to apply an appropriate tool for integrated data. We used modified Wald-statistic for assessing heteroscedasticity of group variance among remains of the fixed-effects regression model. The F and Hausman tests are used in selecting either the fixed-effects or random-effects. To explain the explicative variables' explanatory power, the adjusted determination coefficient (Adjusted R2) will be used, t-statistic to assess the significance of variables, and F-statistic to evaluate the overall adequacy of the model. Also, the statistical analysis will be done using EXCEL and EVIEWS 7 software.

Results:

Descriptive statistic:

Table 1: Central and dispersion indices of each variable in the research.

Variable name	Minimum	Maximum	Mean	Standard deviation
Predictability of long-term profit	0.074	0.374	0.141	0.379
Predictability of short-term profit	0.112	0.596	0.317	0.642
Credit risk	0.152	0.811	0.461	0.563
Liquidity risk	0.263	0.762	0.374	0.762
Earnings per share	163.22	3845.64	1592.48	1.028
Firm growth	0.076	0.652	0.319	0.422
Financial leverage	0.143	0.863	0.386	0.551

Examining the variance heteroscedasticity:

Table 2: Results of variance heteroscedasticity test using modified Wald-statistic.

Explanation	Value of chi-square statistic	Probability
Modified Wald statistic	- 8216.69	0.6705

* 5% error level

According to Table 2, due to insignificant of Chi square at error level of 5%, homogeneity of variance can be rejected and by contrast, homogeneity of variance was confirmed.

The F-statistic and Hausman test:

Table 3: Result of F- statistic test.

Explanation	Statistic value	Freedom degree	Probability
Cross-section F	1.946552	10	0.003*
Cross-section Chi-square	139.051675	10	0.005*

* 5% error level

Table 4: Results of Hausman test.

Explanation	Statistic value	Freedom degree	Probability
Cross-section F	7.802567	1	0.007*

* 5% error level

According to, Table 3 and 4, the results of two tests conducted (F and Hausman), in both tests the probability is less than 5% and therefore the fixed-effects method should be used in the relevant regression model.

First hypothesis test:

Table 5: First hypothesis regression test.

Variable name	Influence coefficient	Estimation deviation	t-statistic	Significance level
Fixed	0.418	0.229	2.147	0.007*
Credit risk	-0.253	0.596	-1.315	0.073
Earnings per share	0.115	0.418	2.306	0.001*
Firm growth	0.386	0.337	1.467	0.062
Financial leverage	-0.263	0.616	-1.675	0.048*

* 5% error level

Table 6: Explanative capability and total model significance.

ANOVA		Watson-Durbin	R^2	
Sig.	F		Determination coefficient	Adjusted R^2
0.000**	5.418	1.552	0.507	0.516

* 1% error level

According to Table 5, influence coefficient of credit-risk variable on the predictability of short-term profit is -0.253, which indicates the significant negative impact of credit risk on predictability of short-term profit. On the one side, considering a significance level of t-statistic for credit-risk variable onto short-term profit predictability to be 0.073, due to not less than 5% error level, H_0 cannot be rejected at the confidence level of 95%; and it could be stated that there is no significant association between credit risk and predictability of short-term profit of the banks listed in the stocks Tehran Stock Exchange.

Second hypothesis test:

Table 7: Second hypothesis regression test.

Variable name	Influence coefficient	Estimation deviation	t-statistic	Significance level
Fixed	0.415	0.643	2.276	0.007*
Credit risk	-0.225	0.334	-1.742	0.034*
Earnings per share	0.349	0.516	2.316	0.002*
Firm growth	0.114	0.248	1.596	0.059
Financial leverage	-0.209	0.306	-1.647	0.043*

* 5% error level

Table 8: Explanative capability and total model significance.

ANOVA		Watson-Durbin	R^2	
Sig.	F		Determination coefficient	Adjusted R^2
0.000**	5.335	1.749	0.457	0.465

** 1% error level

According to Table 7, influence coefficient of liquidity risk variable on the predictability of short-term profit is -0.225; this indicates an inverse and negative impact of the liquidity risk on predictability of short-term earnings. However, given the significant level of t-statistic for liquidity risk variable on the predictability of short-term profit to be 07,024, due to being less than 5% error level, H0 is rejected at confidence level 95%, and it

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could be stated that there is no association between liquidity risk and predictability of short-term profit of banks listed in the Tehran Stock Exchange. Empirical model can be written as follows:

$$\text{Predict short} - \text{term profits}_{it} = 0.415 - 0.225\ \text{Liquidity Risk}_{it} + 0.114\ \text{Growth}_{it} + 0.349\ \text{EPS}_{it} - 0.209\ \text{Leverage}_{it} + \varepsilon_{it}$$

Third hypothesis test:

Table 9: Third hypothesis regression test.

Variable name	Influence coefficient	Estimation deviation	t-statistic	Significance level
Fixed	0.166	0.517	2.031	0.012*
Credit risk	-0.041	0.346	-1.551	0.056*
Earnings per share	0.259	0.552	1.847	0.024*
Firm growth	0.496	0.219	2.114	0.006*
Financial leverage	-0.114	0.418	-1.264	0.078*

* 5% error level

Table 10: Explanative capability and total model significance.

ANOVA		Watson-Durbin	R^2	
Sig.	F		Determination coefficient	Adjusted R^2
0.000**	6.312	2.134	0.482	0.496

** 1% error level

According to Table 9, influence coefficient of credit risk variable on long-term predictability of long-term profit is -0.041, which is indicative of weak and negative effect of the credit risk on predictability of long-term earnings. However, given significance level of t-statistic for credit risk variable on predictability of long-term profit to be 0.056, due to not less than 5% error level, H0 cannot be rejected and it could be stated that there is no significant association between credit risk and predictability of long-term profit of the banks listed in Tehran Stock Exchange.

Fourth hypothesis test:

Table 11: Fourth hypothesis regression test.

Variable name	Influence coefficient	Estimation deviation	t-statistic	Significance level
Fixed	0.379	0.419	1.964	0.014*
Credit risk	-0.242	0.346	-2.114	0.009*
Earnings per share	0.351	0.579	1.625	0.048*
Firm growth	0.547	0.211	1.334	0.037*
Financial leverage	-0.113	0.352	-1.524	0.051*

* 5% error level

Table 12: explanative capability and total model significance

ANOVA		Watson-Durbin		
Sig.	F		Determination coefficient	Adjusted R^2
0.000**	6.044	1.727	0.617	0.624

** 1% error level

According to Table 11, influence coefficient of credit risk variable on long-term predictability of long-term profit is -0.242, which is indicative of weak and negative effect of the credit risk on predictability of long-term earnings. However, given significance level of t-statistic for credit risk variable on predictability of long-term profit to be 0.009, due to not less than 5% error level, H0 can be rejected and it could be stated that there is significant association between credit risk and predictability of long-term profit of the banks listed in Tehran Stock Exchange. Empirical model can be written as:

$$\text{Predict Long} - \text{term profits}_{it} = 0.379 - 0.242\ \text{Liquidity Risk}_{it} + 0.547\ \text{Growth}_{it} + 0.351\ \text{EPS}_{it} - 1.524\ \text{Leverage}_{it} + \varepsilon_{it}$$

Conclusions and Recommendations:

This study aimed to investigate the association between credit risk and liquidity with predictable profit of the banks listed in Tehran Stock Exchange. Thus, the statistical sample in this study is 11 credit and financial institutions and banks. It can be recommended to all investors and stakeholders based on the research results that when making their investment decisions, they would be better to take two factors into account, liquidity risk and credit risk of the banks and to consider that how much rate of this risk in the banks is, how far short- and long-term profit forecast in the banks could be challenged, based on such factors. Also, it can be concluded that the banks do pay adequate attention to their own liquidity risk factor in predicting short-term profit; and investors and

other stakeholders should consider this factor enough, when deciding. And the banks not attention to credit risk when predicting long-term profit and all investors and other stakeholders in their decision making can take this factor into consideration.

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