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Exogenous credit risk in Iranian banks

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A B S T R A C T

Examining the economic system shows that countries with an efficient model in allocating capital to different economic sectors often enjoy economic progress and, as a result, higher social welfare. Banks are one of the most important factors of economic progress, and on the other hand, any growth in the economy is associated with risks. In this research, the exogenous credit risk in Iranian banks and the factors affecting them have been evaluated. The results of this research indicated that profitability, capital turnover, assets and age of the bank are among the items related to credit risk in Iranian banks. Based on this, it can be concluded that larger banks with more experience have more credit risk; Because their ability to face this risk is greater.

Keywords: Credit Risk, Efficiency, Capital Turnover, Assets, San Bank, Tehran Stock Exchange.

INTRODUCTION

It should be noted that equipping and allocating resources for investment to carry out economic activities depends on the financial market; In the meantime, the bank credit market is also a part of these sources(Cui, Geobey, Weber, & Lin, 2018). In economics, paying attention to whether money supply is "endogenous" or "exogenous" in the national economy is considered an important analysis. Exiguousness of money supply means that the monetary authorities (central bank) can effectively determine the amount of money in the country. If the monetary authorities of a country are not able to effectively control the money supply, the monetary policy It will not be effective in reaching its final goals(Huang et al., 2020; Sieroń, 2019).

In Iran, the most important challenge to the development of the banking system has been the increasing trend of overdue claims. This issue has caused it to become a national challenge due to the fact that the monetary and financial market of the country is bank-oriented and banks have the majority of the country's liquidity(Salim, Arjomandi, & Dakpo, 2017; Zakernia & Zeynodini, 2019). It should be kept in mind that banks should try to grant their facilities to companies that, while enjoying low risk, can achieve returns commensurate with the interest of the granted facilities. The concentration of providing high-volume facilities to each group of borrowers (industry, trade, etc.) can be considered as one of the factors that increase credit risk. This risk occurs when the recipient of the facilities or obligations does not have the ability to pay the

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principal and sub-debts on the due date or settles them late, in which case the circulation of cash and the bank's liquidity are affected(Chikalipah, 2018; Swain, 2014).

In order to control the credit risk, things such as credit portfolio management, credit portfolio quality, determining the policy and limiting factors of credit risk, correct classification of facility assets, developing the optimal method of obtaining collateral and determining the appropriate storage method should be considered(Ghyasi, 2016; Khan, Qamar, Rasheed, Ali, & Munir, 2022).

In general, in various studies, different factors have been investigated as influencing factors on credit risk. In this research, factors such as efficiency, assets, capital turnover and age of the bank have been investigated as factors that can directly affect credit risk. Also, the factors of repayment history and the amount of collateral that affect the judgment of experts were investigated as indirect factors affecting credit risk.

On the other hand, several factors such as monetary and financial, political and structural variables affect the investment process and ultimately, the economic growth of each country(Magwedere & Marozva, 2022). Numerous researches that have been carried out in the field of investment theories and patterns by economic researchers and experts are generally related to advanced economies whose reliance on the market economy is one of its distinctive features(Umar, Ji, Mirza, & Naqvi, 2021). In risky monetary investments, risk is considered as one of the main elements, and the reason why many investors avoid these types of investments lies in this point.

In Iran, due to the economic structure of the country and for reasons such as the lack of development of capital markets and other non-banking and contractual networks, financing of the real sectors of the economy is the responsibility of the country's banking network. Unfortunately, this department has not been very successful in achieving its mission(Abolhasani, Shaygani, & Jamshidnezhad, 2021). Currently, the continuation of activities and survival of most of the country's banks is due to government support. High reserves of banks and lost facilities or arrears of banks indicate the lack of regularity of credit risk measurement and risk management systems in the banking network.

Among the effects and consequences of monetary activities of credit institutions, the emergence of past due installments and outstanding claims. The same issue that is one of the important concerns of banks and other non-bank credit institutions today. The existence of uncollectible claims or difficult to reach has a very negative effect on the cycle of resources and expenditures of branches, in such a way that, from an internal perspective, operational costs, work efficiency, profitability, the level of service to customers, classification of branches, salaries and benefits of employees and it strongly affects other quality indicators of branches. Also, from the external point of view, this issue will cause the slow circulation of liquidity in the country's economy, lack of timely and optimal allocation of resources to the production and industry network, lack of employment prosperity and ultimately economic stagnation, and the accumulation. this past due claims at the level of branches, concerns increase.

METHODOLOGY

Referring to the risk investment research of Li and Mei (2014), who investigated the factors affecting the probability of non-repayment of bank facilities. The research of Van Greuning and Bratanovic (2020), was a framework for classifying types of risk, which was also used in the statement of the problem and formulation of the research model.

In this research, by summarizing the research done in this regard, a wider model was created than the previous models and several factors were examined simultaneously. Based on the

aforementioned studies and the theoretical foundations of the current research, the conceptual model developed by the researcher was expressed as follows.

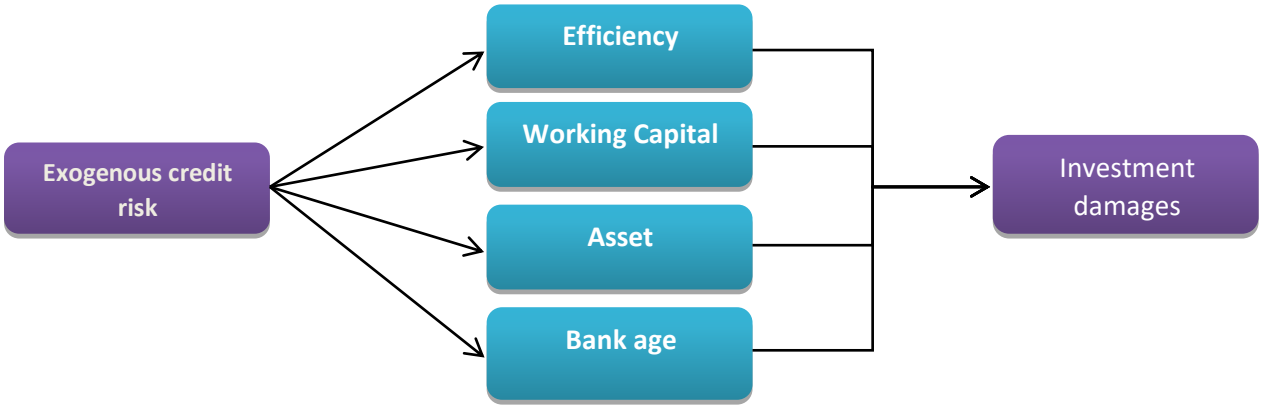

Chart 1. Model of research

The statistical population in this research included banks active in the Tehran Stock Exchange, which were studied using a census method. The number of banks in Tehran Stock Exchange was equal to 10 banks.

Table 1. List of banks under research

Row	Bank name
1	Bank Pasargad
2	Ansar Bank
3	Tejarat Bank
4	Middle East Bank
5	Sina Bank
6	Bank Saderat Iran
7	Bank Mellat
8	EN Bank
9	Parsian Bank
10	Bank Day

RESULTS

The statistical findings related to the research variables (descriptive findings), including the minimum, maximum, average and standard deviation of the variables are given in the table below.

Table 2. Mean and standard deviation of research variables

Variables	Mean	Std. Deviation	Min.	Max.
Exogenous credit risk	577775.88	1186365.75	20973.33	3855348.33
Efficiency	1071253.35	2521097.59	26939.83	8208344.67
Working Capital	453515.98	1000345.701	16384.17	3279895.5
Asset	14.3	1.95	12.03	18.32
Bank age	19.3	18.928	2.5	63

According to the above table, the average credit risk of banks is equal to 577775.88; The average efficiency is equal to 1071253.35; The average capital turnover is 453515.98, the average asset logarithm is 14.3 and the average age of banks is 19.3.

First hypothesis: there is a relationship between the yield and exogenous credit risk (monetary investment) of active banks in the Tehran Stock Exchange.

The first hypothesis of the research was related to the relationship between efficiency and exogenous credit risk (monetary investment) of active banks in Tehran Stock Exchange. In order to test the first hypothesis of the research and examine the relationship between profitability and credit risk of banks admitted to the Tehran Stock Exchange, a regression test was used.

Table 3. Regression model of predictability of credit risk through the Efficiency of the banks under research

Variable	R	R^2	Adj R^2	Durbin Watson
Efficiency	0.979	0.959	0.954	2.257

The results of the regression model show the ability to predict credit risk through the efficiency of banks; As seen in the table above, banks' efficiency is capable of predicting 95.9% of banks' credit risk according to R^2=0.959.

Table 4. Variance analysis of the role of Efficiency in predicting the credit risk of the researched banks

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.214	1	1.214	185.594	0.001
Residual	5.235	8	6.543		
Total	1.267	9			

The results of the variance analysis of the regression model related to the first hypothesis of the research according to Table 4-4 showed that according to the F value at the level of 185.594 and also the value of p=0.001, the efficiency of banks can significantly predict credit risk.

Table 5. The results of predicting banks' credit risk through banks' efficiency

Variable	B	Beta	t	Sig.
(Constant)	84196.315	-	0.95	0.3
Efficiency	0.461	0.979	13.623	0.001

Considering that the value of Beta = 0.979, t = 13.623 and p = 0.001, the efficiency of banks has a positive and significant relationship with their credit risk, in other words, between the efficiency and credit risk of banks admitted to the Tehran Stock Exchange. There is a significant relationship. The diagram below shows the linear diagram of the model.

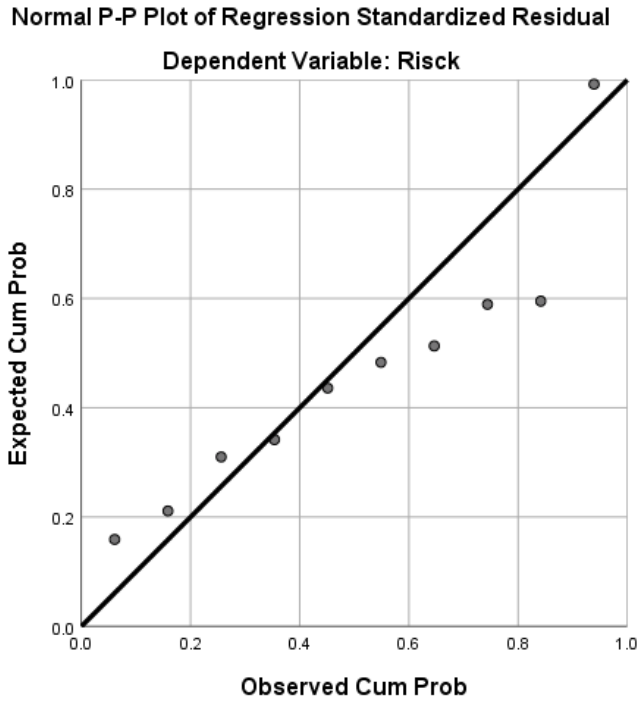

Chart 2. Efficiency and trend of banks credit risk in Tehran Stock Exchange

Second hypothesis: there is a relationship between capital circulation and exogenous credit risk (monetary investment) of active banks in Tehran Stock Exchange.

Table 6. Regression model of predictability of credit risk through the working capital of the banks under research

Variable	R	R^2	Adj R^2	Durbin Watson
Working Capital	0.991	0.983	0.98	2.168

The results of the regression model show the ability to predict credit risk through banks' working capital; As seen in the table above, banks' working capital is capable of predicting 98.3 percent of banks' credit risk according to R^2=0.983.

Table 7. Variance analysis of the role of working capital in predicting the credit risk of the researched banks

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1.245	1	1.245	452.459	0.001
Residual	1.201	8	1.751		
Total	1.267	9			

The results of the variance analysis of the regression model related to the first hypothesis of the research according to Table 7 showed that according to the F value at the level of 452.459 and the value of p=0.001, the working capital of banks can significantly predict credit risk.

Table 8. The results of predicting banks' credit risk through banks' working capital

Variable	B	Beta	t	Sig.
(Constant)	44618.757	-	0.768	0.4
Working Capital	1.176	0.991	21.271	0.001

Considering that the value of Beta = 0.991, t = 21.271 and p = 0.001, the working capital of banks has a positive and significant relationship with their credit risk, and in other words, there is a significant relationship between working capital and credit risk of banks. The diagram below shows the linear diagram of the model.

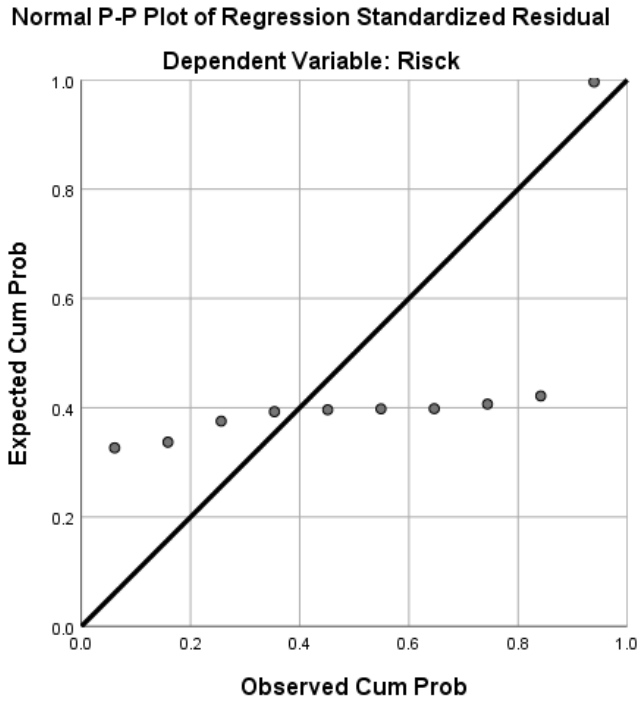

Chart 3. working capital and trend of banks credit risk in Tehran Stock Exchange

Third hypothesis: There is a relationship between assets and exogenous credit risk (monetary investment) of active banks in Tehran Stock Exchange.

Table 9. Regression model of predictability of credit risk through the asset of the banks under research

Variable	R	R^2	Adj R^2	Durbin Watson
Asset	0.82	0.673	0.632	2.098

The results of the regression model show the ability to predict credit risk through banks' assets; As seen in the table above, according to R^2=0.673, banks' assets are able to predict 67.3 percent of companies' credit risk.

Table 10. Variance analysis of the role of asset in predicting the credit risk of the researched banks

	Sum of Squares	df	Mean Square	F	Sig.
Regression	8.525	1	8.525	16.465	0.004
Residual	4.142	8	5.178		
Total	1.276	9			

The results of the variance analysis of the regression model related to the third hypothesis of the research according to Table 10 showed that according to the value of F at the level of 16.465 and also the value of p=0.004, the assets of banks can significantly predict credit risk.

Table 11. The results of predicting banks' credit risk through banks' asset

Variable	B	Beta	t	Sig.
(Constant)	-65988794.567	-	-1.7	0.07
Efficiency	498927.312	0.82	4.058	0.004

Considering that the value of Beta = 0.82, t = 4.058 and p = 0.004, banks' assets have a positive and significant relationship with their credit risk, and in other words, there is a significant relationship between banks' assets and credit risk. The diagram below shows the linear diagram of the model.

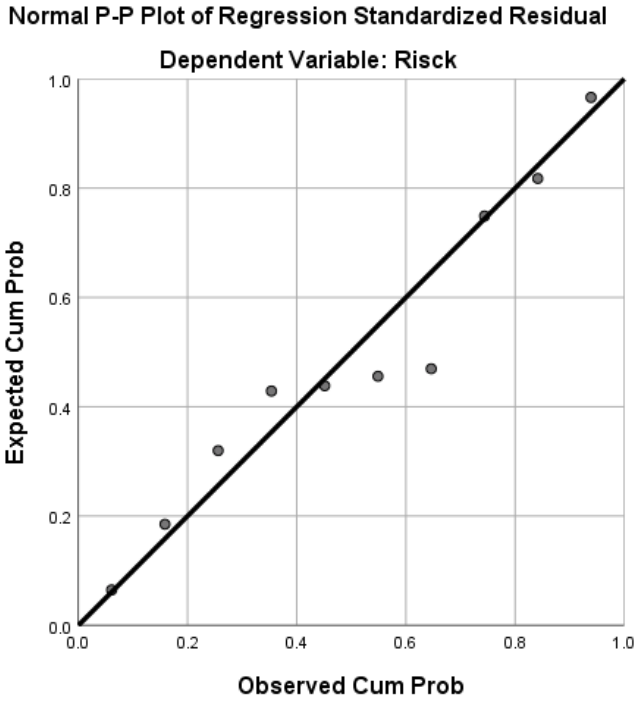

Chart 4. asset and trend of banks credit risk in Tehran Stock Exchange

Fourth hypothesis: There is a relationship between the age of the bank and the exogenous credit risk (monetary investment) of banks active in the Tehran Stock Exchange.

Table 12. Regression model of predictability of credit risk through the Bank age

Variable	R	R^2	Adj R^2	Durbin Watson
Asset	0.863	0.744	0.712	2.415

The results of the regression model show the ability to predict credit risk through the banks age; As seen in the above table, the banks age is able to predict 74.4 percent of the banks' credit risk according to R^2=0.744.

Table 13. Variance analysis of the role of bank age in predicting the credit risk of the researched banks

	Sum of Squares	df	Mean Square	F	Sig.
Regression	9.429	1	9.429	23.296	0.001
Residual	3.238	8	4.048		
Total	1.267	9			

The results of the variance analysis of the regression model related to the first hypothesis of the research according to Table No. 13-4 showed that according to the value of F = 23.296 and also the value of p=0.001, the banks age can significantly predict credit risk.

Table 14. The results of predicting banks' credit risk through banks age

Variable	B	Beta	t	Sig.
(Constant)	-465876.789	-	-1.577	0.1
Bank age	54075.268	0.863	4.827	0.001

Considering that the value of Beta = 0.863, t = 4.827 and p = 0.001, the age of banks has a favorable and significant relationship with their credit risk, in other words, between the age and credit risk of banks admitted to the Tehran Stock Exchange. There is a significant relationship. The diagram below shows the linear diagram of the model.

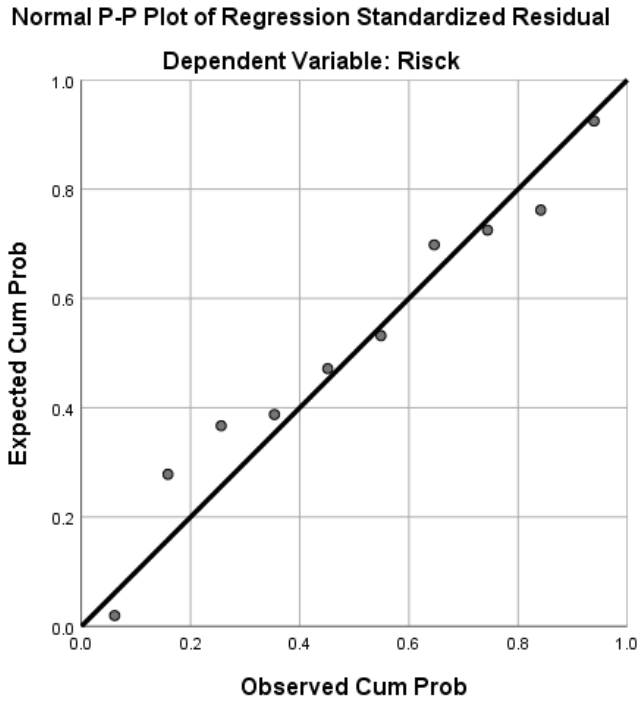

Chart 5. bank age and trend of banks credit risk in Tehran Stock Exchange

CONCLUSION

It seems that if banks have a high Asset, their credit risk will also be high, and in other words, whenever banks have a high Asset, their credit risk will be high. The activities of banks in the field of providing credit to economic enterprises as well as the relationship between credit risk and Asset indicate that these two indicators have a very high correlation with each other; So that more risk means more return and more return means more risk.

Working Capital significantly predicts 98.3 percent of banks' credit risk. Capital circulation is actually the bank's current assets that increase the bank's ability to face risk; Therefore, Working Capital has a high power in predicting the credit risk of banks. High Working Capital indicates the dynamism of a financial system, which improves the economic processes of that company.

The assets of banks play a very important role in explaining the performance and ability to carry out the main activities of companies. Providing financial facilities is considered one of the important activities of the banking system, this activity is in the light of the bank's economic power. Therefore, the bank's assets, as one of the main characteristics in determining the bank's strength, can cause more bank risk.

Experiences have shown that the longer the economic enterprises have been active, the more they will be able to operate, and with more risk, they can provide services and risk in their activities; As observations also show that banks with longer life provide more loans with more risks to customers.

In general, calculating the credit risk in Iranian banks is a difficult task, as there is a possibility of error in their calculation, and the government imposes mandatory credit risks on the banks, therefore, in collecting the data related to this index, it is necessary to be done with caution. It is also suggested that short-term and long-term time periods of banks' risk and returns should be examined in future research in order to analyze and compile more detailed reports.

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