

## Investigating the Effect of Financial Development on the Credit Risk of Banks (Case Study: Iran Mellat Bank)

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**Abstract:** The existence of an efficient financial system in economic activities, especially for the banking sector, can affect the process of the banking sector development. On the other hand, the absence of a developed financial market in the service of sustainable economic growth, particularly to fund the industrial plans is of the problems of our country's manufacturing and production sector. That is why study the effect of financial development on bank risk is necessary. This study examines the effect of credit risk in the Mellat Bank financial development over the period from 2009 to 2013. Results showed that increasing financial development index according to this relationship reduces the relative losses of loans and consequently reduces credit risk. With the increase in financial development index by one unit with the assumption of other factors being constant, loans relative losses will be decreased up to 0.45. As a result, reduces credit risk. Also, increasing trade openness index and interacting with other economies in the world credit risk could be reduced.

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**Key Words:** Financial, Effect, Credit Risk, development

### Introduction

Financial development is considered as one of the preconditions for growth and economic development. Studies demonstrate that in countries where the financial sector has less depth, financial resources are not efficiently allocated between the needs. These countries encounter the problem of the unavailability of appropriate financing instruments that in this case they do not collect adequate resources. Financial sector of the economy consists of three parts: money, insurance and capital market. Today country's financial sector is mainly separated into two groups of money and capital market. The purpose of this separation with the development financial markets which is one of the most important pillars of modern society is to assist economic and political stability, and assist public to have confidence in these markets and long-term stability of the financial system, to be maintained and financial system components can be reliable.

### Research Literature

#### Domestic studies

Armashi (2010) in his study discussed the relationship between credit risk of customers and some financial and population variables.

Ashraf Ahmadian (2011) in his study explores the challenges from the perspective of the banking system and economic entities.

ZarraNejad and Hoseinpoor (2012) in the period from 1971 to 2011 by using seven regression equation and Johansen's method investigate the effects of

financial markets on income inequality in Iran economy.

### Foreign Studies

Bunaya (2012) suggests that bad function is one of the most important factors that should be considered when analyzing the performance of Banks.

da Silva and colleagues (2013) have done a study under the title of "The role of banks in an economy under credit risk and liquidity shocks" in Brazil. The result of this study showed that credit risk is periodical and default risk depends on structural characteristics. Vitsonty (2014) evaluates the effect of financial development on the bank's risk in 7 countries in South East Asia 52 commercial banks during the years 1990 to 2012. The results of this study show that a higher degree of financial market development is less with the bank's capital position and is positively related with a higher degree of diversification of the bank's income.

### Research hypotheses:

#### Research main hypotheses:

Expansion of financial development reduces Mellat Bank credit risk.

#### Research secondary hypotheses:

- a. Increasing openness of the economy reduces Mellat Bank credit risk.
- b. Increasing economic growth reduces Mellat Bank credit risk.
- c. Increasing the exchange rate increases Mellat Bank credit risk.

### Research Model

To analyze the data, the model derived from the Vitsonty<sup>1</sup> (2014) model is as follows:

$$BCR = \alpha + \beta_1 FD + \beta_2 TRADE + \beta_3 GRO + \beta_4 ER + \varepsilon_t$$

In which BCR is credit risk indicator, FD is Financial Development index, TRADE is index of economic openness, GRO shows economic growth and real exchange rate is ER.

### Research Methodology

Based on the purpose, this study can be considered as an applied research. Based on methodology, this study can be considered as an inductive research. The present study based on research layout is a post-event survey.

### Statistical population

The scope of this study is the beginning of the year 1360 till the end of 1392. The Statistical population of this research has been consisted of Iran. And the desired case is Mellat Bank that their information may be available in the studied period.

### Hypotheses testing

#### 2 Johansen - Juselius Test

In the previous section it was shown that all variables at the steady confidence level of 95% are of first rate. Therefore, since all variables are I (1), to search for collective (long-term relationship) variables Johansen- Juselius method can be used.

In Johansen - Juselius co-integration maximum likelihood test in addition to the co-integration test among the variables of the model, the number of long-term relationships (r) if any, will be tested. In this step the optimal numbers of lags in the VAR model based on the number of interruptions, statistic of effect test  $\lambda_{Trace}$  or the statistic of the maximum amount test  $\lambda_{max}$  should be used to determine the co-integration vectors.

Summary of results for a confidence level of 95%, are summarized in the tables (4-4) and (4-5).

Table 4-4

Null hypothesis	Eigenvalue	$\lambda_{Trace}$ statistic	Critical value of 5%	Probability level
Zero co-integration vector	0.88	132.8	69.8	0.00
At least one co-integration vector	0.74	73.9	47.8	0.00
At least two co-integration vectors	0.55	36.7	29.7	0.00
At least three co-integration vectors	0.41	15.0	15.4	0.05
At least four co-integration vectors	0.01	0.49	3.8	0.48

Table 4-5

Null hypothesis	Eigenvalue	$\lambda_{max}$ statistic	Critical value of 5%	Probability level
Zero co-integration vector	0.88	58.9	33.8	0.00
At least one co-integration vector	0.74	37.1	27.5	0.00
At least two co-integration vectors	0.55	21.6	21.1	0.04
At least three co-integration vectors	0.41	14.5	14.2	0.04
At least four co-integration vectors	0.01	0.49	3.84	0.48

According to the critical values of 5%, 69/8, the zero co-integration vector null hypothesis is rejected and the hypothesis of more than one-integration vector will be accepted. In the second stage the statistic of effect test  $\lambda_{Trace}$  73.9 can be obtained that is still higher than critical value of 5%, 47.8. And again the at least one co-integration vector null hypothesis is rejected. In the third stage the value of test statistic of  $\lambda_{max}$  equal to 63/3 can be achieved that is more than critical value of 5%, 29.7. Therefore, the null hypothesis is rejected. In the fourth stage the statistic of effect test  $\lambda_{Trace}$  13.1 can be obtained that is still higher than critical value of 5%, 21.1. Therefore, the null hypothesis is not rejected and we will have three co-integrative vectors.

According to Johansen co-integration relationship, all variables according to the standard error (shown in the third row) and variable coefficients are statistically significant.

Increase in the exchange also increased loans relative losses rate. Because of increase in exchange rate, uncertainty in the community will increase. As a result, credit risk recovery is also reduced. By increasing the size of exchange rate up to one unit and considering other factors constant, Relative losses on loans increased up to 0.24.

#### The use of interest income of loans

Using the software Eviews based on the Bayesian -Shuarez criterion and for the state that does not have constrained intercept and trend.

Table 4-7: Determining the optimal lag

Bayesian -Shuarez criterion	Lag
35.1	0
35.5	1
31.3	2

Summary of results for a confidence level of 95%, are summarized in the tables (4-8) and (4-9).

**Table 4-8**

Null hypothesis	Eigenvalue	$\lambda_{Trace}$ statistic	Critical value of 5%	Probability level
Zero co-integration vector	0.79	109.1	69.8	0.00
At least one co-integration vector	0.66	65.8	47.8	0.00
At least two co-integration vectors	0.51	36.4	47.8	0.00
At least three co-integration vectors	0.44	16.8	15.4	0.03
At least four co-integration vectors	0.02	0.72	3.8	0.39

**Table 4-9**

Null hypothesis	Eigenvalue	$\lambda_{max}$ statistic	Critical value of 5%	Probability level
Zero co-integration vector	0.79	43.3	33.8	0.00
At least one co-integration vector	0.66	29.4	27.5	0.02
At least two co-integration vectors	0.51	19.5	21.1	0.08
At least three co-integration vectors	0.44	16.1	14.2	0.02
At least four co-integration vectors	0.02	0.72	3.84	0.39

According to the critical values of 5%, 69.8, the zero co-integration vector null hypothesis is rejected and the hypothesis of more than one-integration vector will be accepted. In the second stage the statistic of effect test  $\lambda_{Trace}$  65.8 can be obtained that is still higher than critical value of 5%, 47.8. And again the at least one co-integration vector null hypothesis is rejected. In the third stage the value of test statistic of  $\lambda_{Trace}$  equal to 36.4 can be achieved that is more than

critical value of 5%, 29.7. Therefore, the null hypothesis is rejected. In the fifth stage the statistic of effect test  $\lambda_{Trace}$  0.72 can be obtained that is still higher than critical value of 5%, 3.8. Therefore, the null hypothesis is not rejected and we will have four co-integrative vectors. Now if we repeat this operation to Eigenvalue test and maximum amount, two co-integrative vectors will be obtained.

**Table 4-10:**

Variables	<i>bcr1</i>	<i>ER</i>	<i>FD</i>	<i>GRO</i>	<i>TRADE</i>
Normal coefficients	1	0.15	-0.79	-0.61	-0.67
Standard error	-	0.01	0.25	0.23	0.11

### The use of equity to total assets

**Table 4-11:** Determining the optimal lag

Bayesian –Shuarez criterion	Lag
15.7	0
13.6	1
14.9	2

At this point according to the original equation, the constrained intercept model and without trend is estimated. To decide on the selection of one of the Johansson patterns (Johansson equation has four templates).

Summary of results for a confidence level of 95%, are summarized in the tables (4-12) and (4-13).

**Table 4-12**

Null hypothesis	Eigenvalue	$\lambda_{Trace}$ statistic	Critical value of 5%	Probability level
Zero co-integration vector	0.79	79.6	69.8	0.00
At least one co-integration vector	0.45	46.5	47.8	0.06
At least two co-integration vectors	0.42	29.3	29.7	0.05
At least three co-integration vectors	0.34	13.9	15.4	0.08
At least four co-integration vectors	0.06	1.89	3.8	0.16

**Table 4-13**

Null hypothesis	Eigenvalue	$\lambda_{max}$ statistic	Critical value of 5%	Probability level
Zero co-integration vector	0.69	33.06	33.8	0.06
At least one co-integration vector	0.45	17.6	27.5	0.56
At least two co-integration vectors	0.42	15.4	21.1	0.25
At least three co-integration vectors	0.34	12.04	14.2	0.10
At least four co-integration vectors	0.06	1.89	3.84	0.16

According to the critical values of 5%, 33.8, the zero co-integration vector null hypothesis is rejected and the hypothesis of more than one-integration vector will be accepted. In the second stage the statistic of effect test  $\lambda_{Trace}$  46.5 can be obtained that is lower than critical value of 5%, 47.8. And at least one co-

integration vector null hypothesis could not be rejected. So the null hypothesis is not rejected and we will have one co-integration vector. Now if we repeat this operation to test and maximum amount, we will not have any co-integrative vectors.

Table 4-14

Variables	<i>bcr1</i>	<i>ER</i>	<i>FD</i>	<i>GRO</i>	<i>TRADE</i>
Normal coefficients	1	-0.008	-0.10	-0.76	-0.45
Standard error	-	0.001	0.002	0.30	0.40

Increase the index of financial development according to this relationship leads to increased equity to total assets and thus reduces credit risk. By increasing the size of index of financial development up to one unit and considering other factors constant, equity compared to total assets is increased up to 0.10.

#### The results of the first research hypothesis

##### The main hypothesis

According to the results of tables (4-6), (4-10) and (4-14), increase in the financial development index based on this relationship decreased relative losses of loans and thus reduces credit risk. By increasing the size of financial development index up to one unit and considering other factors constant, relative losses on loans increased up to 0.45. And thus reduces credit risk.

So this hypothesis is confirmed.

##### The first secondary hypothesis:

According to the results of tables (4-6), (4-10) with increasing trade openness and interaction with other economies in the world, bank credit risk is reduced. Because of increases in trade openness, desire to export to the world will increase and producers of raw materials can easily purchase raw materials from other countries and thus desire to increase debt repayment and interest income on loans will increase.

So this hypothesis is confirmed.

##### The second secondary hypothesis:

According to the results of tables (4-6), (4-10) and (4-14) with economic growth rates, production activities in the community will flourish and as a result of loan interest income would be increases and banks credit risk is also reduced. By increasing the size of economic growth rate up to one unit and considering other factors constant, loan interest income decreased to 0.61.

So this hypothesis is also confirmed.

##### The third secondary hypothesis:

According to the results of tables (4-6), (4-10) and (4-14) increase in the exchange rate will increase relative losses of loans; because of increase in exchange rate, uncertainty in the community will increase. As a result, credit risk recovery is also

reduced. By increasing the size of exchange rate up to one unit and considering other factors constant, Relative losses on loans increased up to 0.24.

So this hypothesis is also confirmed.

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