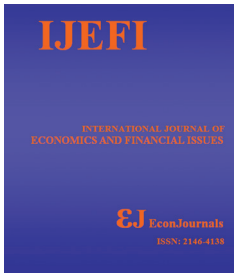

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Investigating Risk Effect and Profit Management on Bank Credit Risk

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ABSTRACT

The aim of this research is to investigate risk effect and profit management on bank credit risk. The research population are the accepted banks in Tehran stock exchange during one quinquennial from 2010 to 2014. Finally, 18 corporations information were gathered based on the research limitations by systematic deletion method. The research is an applicational one in term of its aim, is post eventual based on the historical information and its deductive methodology is apriority and correlative. The research includes four main hypotheses and two subordinate hypotheses. To investigate research hypotheses, linear regression and correlation are used. Moreover, Eviews software is used to analyze research data and hypotheses. After designing of the research hypotheses in division of each hypothesis, these conclusions have received. Bank risk and profit management have positive meaningful effect on credit risk. In addition there is a positive meaningful relationship between corporation risk and profit management. Although, there is no positive meaningful effect between bank credit and profit management on credit risk.

Keywords: Credit Risk, Profit Management, Commercial Banks Risks
JEL Classifications: C32, O13, O47

1. INTRODUCTION

Because of the asset importance and its dynamism from one point of view and its flexibility for the outside variables, which are caused because of social, political and economic situations, from another point of view, creation of a mechanism for resistance of this insurance institution is a financial markets duties. This mechanism structure at first, should own attractive ability of stagnant savings by financial policy. Secondly, this mechanism should ensure access efficiency of the stagnant sources to effective activities. Asset owners to invest on their financial sources should consider inflation, damages which are caused by foreign exchange liquidity, natural and marketing price, risks which are caused by operating of financial activities, credit of applicant asset, and his famousness in market by market share indicator. The accessibilities to the mentioned statements are time consuming and can impose costs of mistaken choices to real and legal individuals, so existence of a credit rating mechanism is necessary for applicant asset, (Sadraei, 2009). Credit rating mechanism indicates an important indicator for consistence of investment in market. Banks can perform profit management based on discretionary accrual item or based on their real activities for their credit rating increase to attract investment and financial resources with lower assets costs. Researches have been done based on relationships between profit management, credit risk and credit rating but they haven't considered idiosyncratic risk (unsystematic risk). Investors always are encountered by marketing and non-marketing risks. Non-marketing risk is really various and it is called corporation idiosyncratic risk, a corporation can increase its stock return by controlling this risk. So, corporations can manage their profit risk by controlling this risk (Lin and Cheng-An, 2015). The research main problem is that, whether corporation credit risk will be increased by idiosyncratic risk increase or not? Whether corporation idiosyncratic risk control can be caused increase in credit risk while corporation engages in profit management of discretionary accrual item or real activities or not? Based on the above mentioned statements the main problem is recognition of risk effects and profit management on credit risk in the accepted banks in Tehran stock exchange.

2. REVIEW OF RELATED LITERATURE

Lin and Cheng-An (2015), in their research, credit rating of family corporations investigated their idiosyncratic risk and profit management. Research findings indicated that idiosyncratic risk of one family corporation had meaningful relationship with its credit risk and idiosyncratic risk controlling of one family corporation in the corporations that had encountered by profit management of discretionary accrual item could cause higher credit risk. Finally, idiosyncratic risk controlling of one family corporation in the corporations that had encountered by profit management of real activities could cause higher credit risk.

Wang and Chunchi (2015), in their research investigated liquidity risk role and credit risk in relation with commercial activities and price fluctuations in stock exchange market. They found that liquidity had a positive role in relation with commercial activities and price fluctuations in stock exchange. Moreover, there were meaningful relationships between numbers of transactions, fluctuations in stock exchange, lack of liquidity and credit quality.

Castro (2013), investigated relationship analysis between high economic changes and banking credit risk in the special group of countries (GIPSI), this group included Greece, Ireland, Portugal, Spain and Italy. These countries had been encountered by insufficient financial and economic situations. Research findings expressed banking credit risk had been affected by high economic situation. While impure internal production, stock indicators and house price decreased, credit risk would increase. Moreover, increase of unemployment rate, interest rate and credit growth would be continued by credit risk increase. Finally, credit risk had been effected positively by real rate increase.

Shoorvarzi and Azadvar (2010), investigated the effects of banking special variables, banking industry special variables and high economic variables with banks credit risks from 2005 to 2011 in Tehran stock exchange. They found that there was a meaningful relationship between deferred demands ratio and inflation with banks credit risk.

Khosh and Shaheiki (2012), in their research "The Effect of Credit, Operational, and liquidity Risk on Efficiency of Iran Banking System," investigated this problem. Research findings showed two parametric and non-parametric methods in banks evaluating and rating and relative dominant of parametric method over non-parametric one. There was a meaningful relationship between credit, operational, and liquidity risk on efficiency of Iran banking system.

3. RESEARCH HYPOTHESES

First main hypothesis: Bank risk has a positive meaningful effect on credit risk.

Second main hypothesis: Profit management has a positive meaningful effect on credit risk.

First subordinate hypothesis: Profit management of discretionary accrual item has a positive meaningful effect on credit risk.

Second subordinate hypothesis: Profit management of real activities has a positive meaningful effect on credit risk.

Third main hypothesis: There is a positive meaningful relationship between corporation risk and profit management.

Fourth hypothesis: There is a positive meaningful relationship between bank risk and profit management on credit risk.

4. RESEARCH METHODOLOGY

The research population are the accepted banks in Tehran stock exchange during one quinquennial from 2010 to 2014. Finally, 18 corporations information were gathered based on the research limitations by systematic deletion method. The research is an applicational one in term of its aim, is post eventual based on the historical information and its deductive methodology is apriority and correlative. The research includes four main hypotheses and two subordinate hypotheses. To investigate research hypotheses, linear regression, correlation and paneling data are used. Moreover, Eviews software is used to analyze research data and hypotheses.

4.1. Research Variables Definitions

4.1.1. Credit risk

The expectancy of real and unreal loans payments are called credit risk (Sajadi and Fathi, 2011). In the research Merton model means credit rating indicator and in its lower level means less risk and better credit. In literature for credit risk idiom of distance to dishonor (DD) is used, it indicates numbers of standard deviations that has expectant value in usance from point of DD.

$$DD = \left[\frac{LNA - LNA_1 + \left(\mu - \frac{\sigma^2}{2} \right)(T)}{\sigma \sqrt{T}} \right]$$

$\geq Prob(default) = \phi(-DD)$

A: Values of assets market

L: Liabilities values

μ: Movement rate

α^2: Annual fluctuations of asset value

T: Time

Φ: Distribution of aggregating normal.

One of the formula indeterminate is corporation asset market value that can't be observed directly. What can be observed is assets bookkeeping value that can be different because of different reasons with market value. Stock market value can be observed for general stock corporations and is calculated by stock price multiply on the stock numbers of shareholders. Relationship between stock

value and assets value cane be explained in the usance in this way: While asset value is less than liability value, stock value will be zero and all assets will be given to the creditors. If asset value is more than nominal value of loan exchange without ticket, shareholders will receive remained value. Daily value of assets will be calculated by the following equation:

Liabilities value+market value of shareholders rights=Asset market value.

Liability value is bookkeeping value. To calculate logarithm changes annual variance of asset value and return variance of asset value, following formula should be used:

$$\sigma^2 = \frac{\sum_{t-1}^{n}(R_1 - \bar{R})2}{n-1}$$

To estimate expected change in asset value with use of asset value received amounts, following pricing model of investing assets can be used:

$$E(R_i)-R_f=\beta_i(E(R_m-R_f))$$

R_r indicates market rate without risk and R_m is market portfolio return. In the research partnership exchange profit rate of Central Bank (0/020) has been used as R_f, and total indicator of Tehran stock exchange has been use as R_m. Estimation of assets beta can be received by regression return of R_m, a representative in contrast of total indicator. Market risk expenditure has been considered by different expected return regression in contrast of total indicator. Asset expected return can be received by related beta coefficient clarification of each corporation assets and market risk expenditure. However, this amount is not mentioned run rate in the formula. Movement rate is introduced for logarithm returns, so movement rate is received by rerun logarithm of the expected assets.

4.1.2. Bank idiosyncratic risk

Bank idiosyncratic risk (non-systematic risk) in one of the risks that can be avoided by investing accurate management. While systematic factors are caused by market total situations and non-systematic factors are caused by special situations of a corporation, total risk of an asset is defined as an aggregation of asset market risk and special risk of a corporation (Sajadi and Fathi, 2011. p. 4). In the risk this risk is estimated by the following formula:

$$R_i=\alpha+\beta_i R_m+\varepsilon_i$$

R_i is i corporation stock return and Rm is market return, and bank idiosyncratic risk is calculated by the following formula:

$$IdoVo = Ln\left(\frac{1-R^2}{R^2}\right)$$

In the above formula R^2 is determination coefficient of the Quotation 1.

4.1.3. Profit management

Profit management is informative performance kind with natural aim to express corporation profit and to access considerable and desirable level. Jones and Sharma (2001. p. 21), exhibited a complete definition about profit management. They believed that profit management happened when managers mislead beneficiaries by financial reporting recognition and transaction structures about corporation economic operation or contracting conclusions of reported accounting amounts because they caused changes in financial reporting. In the research to investigate profit management in term of discretionary accrual item, at first following regression model should be calculated:

$$TA_{i,t}/TA_{i,t}=b_0(1/ASSET_{i,t-1})+b_1(\Delta REV_{i,t}/ASSET_{i,t-1})+b_2 (PPE_{i,t}/ASSET_{i,t-1})+b_3 ROA_{i,t-1}+\mu_{i,t} \quad (1)$$

TA_{it}: Total discretionary accrual item in t year which is calculated by profit difference before accidental item minus operational cash flow.

$ASSET_{it}$: Total assets in t year.

ΔREV_t: t year income minus $t-1$ year income.

PPE_t: Finances, machinery, impure facilities at the end of t year.

ROA: Previous duration assets return (assets return= pure profit ratio to assets aggregation).

b_0, b_1, b_2, b_3 are special corporation parameters which are calculated by the following formula:

$$NAD_{i,t}=b_0(1/ASSET_{i,t-1})+b_1([\Delta REV_{i,t}-\Delta REC_{i,t}]/ASSET_{i,t-1})+b_2 (PPE_{i,t}/ASSET_{i,t-1})+b_3 ROA_{i,t-1} \quad (2)$$

NDA_t: Discretionary non-accrual item in t year.

ΔREC_{it}: Change in pure of received accounts of i corporation between t and $t-1$ years.

Finally, following quotation is estimated:

$$REM_t=TA_t-NDA_t$$

REM_t: Members of discretionary accrual item in t year and profit management representative.

4.1.4. Real profit management

Because of corporation commercial transaction performing during year, management ability will be limited for changing and reporting of accrual profits. So, at the end of year, accessible aim profits can be done by discretionary accrual item. So, mangers can decrease related hazards by real activities changes (Aflatoni et al., 2013. p. 32).

In the research unusual cash flow variable introduced as profit management methods by real activities changes as follow:

4.1.5. Unusual operational cash flow

To calculate usual operational cash flows following model has been considered as remained model for unusual operational cash flows:

$$\frac{CFO_t}{TA_t}=\alpha_0\left(\frac{1}{TA_{t-1}}\right)+\alpha_1\left(\frac{S_t}{TA_{t-1}}\right)+\alpha_2\left(\frac{\Delta S_t}{TA_{t-1}}\right)+\varepsilon_t$$

CFO_t: Bank operational cash flow.

TA_{t-1}: Bank assets total aggregation at the end of $t-1$ year.

S: t Duration sale.

ΔS_t: Changes in bank sale.

ε_t: Remained model.

4.1.6. Bank size

Bank size, ability and capability of a corporation based on its sources and special activities mass are exploitative unit (Kamandloo, 2013). In the research bank size is calculated as follow:

Bank size=Natural logarithm of total asset

4.1.7. Asset return

One of the criterions to evaluate management ability of a corporation to access return in terms of existence sources is assets return (Bahramfar and Alam, 2005. p. 35).

Asset return=Division of total profit to total assets

4.1.8. Cash flows

Future operational cash flows are received by cycle statement of cash flow and is one of the efficient reporting for performance reflection of commercial unit and deliver financial statements to users for creation and use of cash flow. In the research cash flows are directly derivate from cycle statement of cash flow.

4.1.9. Growth situation

Is an affective power for creation of investors' motivations and rewards (Shoorvarzi and Azadvar, 2010). In the research growth situation is calculated as follow:

Growth situation=Division of market value to asset bookkeeping value

4.1.10. Financial leverage

Leverage means fixed costs in corporations' costs. It measures amount of total corporation liabilities. These ratios are calculated by comparison of fixed and profit costs (by profit and loss account statements), or relating of liabilities to shareholders' rights (by balance sheet). Mentioned ratios are corporation ability reflection to answer short term and long term commitment (Alinezhad et al., 2013. p. 6).

Financial leverage ratio=Ratio of total liability to total asset in the previous duration

4.1.11. Systematic risk

Is found in each update investment. Happening of these risks are out of the investors' abilities, so they can't be avoided (Sajadi and Fathi, 2011. p. 4).

$$\beta=\frac{COV(R_m,R_i)}{\sigma^2 R_m}$$

R_i: Corporation stock return.

R_m: Stock return of market indicator.

$\sigma^2 R_m$: R_m variance.

4.2. Research Analytic Methodology

In the research, following model is introduced to determine research hypotheses (Figure 1):

5. RESULTS

In this part related conclusions of the first, second and fourth hypothesis will be investigated. To be the practice model meaningful, statistical expectancy level, F, should be considered. It is less than 0.05, so the model is accepted statistically. High amount of F fisher (162.7) indicates that there is a powerful meaningful relationship among research variables. Determination coefficient amount 0.086 and adjusted determination coefficient 0.085 express high power of the descriptive model. Watson Durbin amount adjusts lack of correlation in the mentioned model because of the short duration, it is not necessary to investigate this statistic.

Then, based on the total model meaningfulness each variable should be analyzed. Table 1 represents coefficient, standard error, t statistic and P value for each variable. P column should be attended for the meaningfulness of each variable and comparison of P amount with α amount indicates each variable meaningfulness.

Model estimation:

$$TCRL_{it}=11.90+2.13IdoVo_{it}+65.18REM1_{it}+10.09REM2_{it}+3.15REM1_{it}*IdoVo_{i}-35.5REM2_{it}*IdoVo_{it}-0.0008Beta_{it}+0.161Grow_{it}-0.358Size_{it}+11.67ROA_{it}+6.84Lever_{it}-9.71DebtF_{it}+1.44EquiotF_{it}+\varepsilon_{it}$$

After model estimation, research model should be investigated:

First hypothesis: Bank risk has a positive meaningful effect on credit risk.

Table 1 represents bank risk coefficient amount (2.13) and positive relationship between bank risk with credit risk, so first hypothesis is accepted and received coefficient of P value is 0.015 and is <0.05. This amount has owned its credit statistically based on the gained coefficient with one unit increase in bank risk coefficient, credit risk 2.13% unit will increase.

Second hypothesis: Profit management has a positive meaningful effect on credit risk.

Figure 1: Research analytic methodology

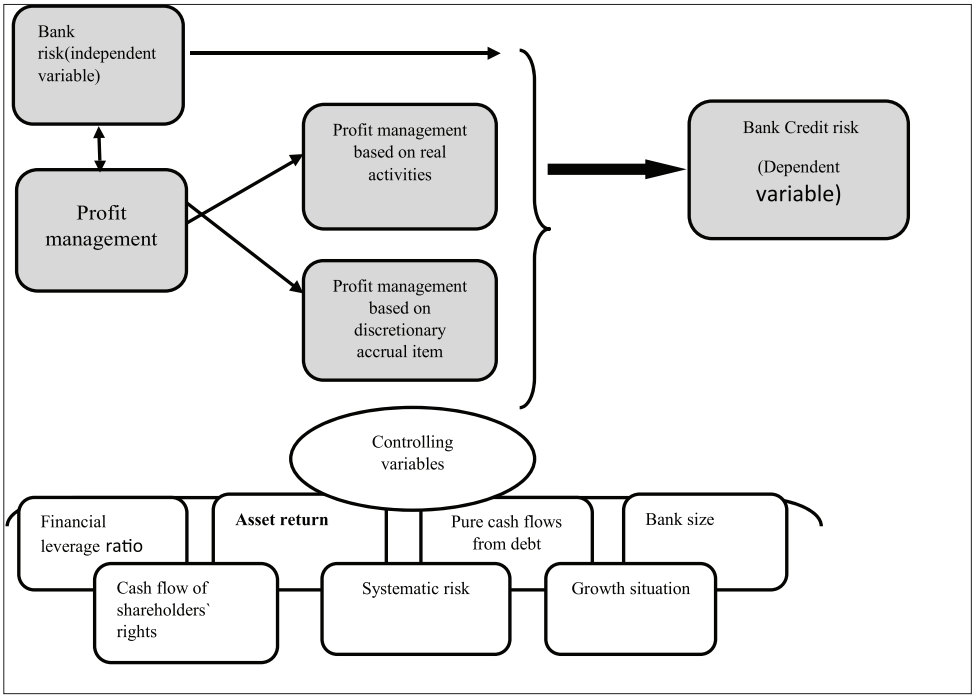

Table 1: Correlation coefficient estimation of the first, second and fourth models

Variable	Coefficients	t statistic	Expectancy
Pass cross origin	11.90	3.14	0.002
Risk	2.13	2.46	0.015
Profit management of discretionary accrual items	18.65	4.87	0.000
Real profit management	10.09	0.90	0.370
Risk transferring effect and profit management based on discretionary accrual items	3.15	0.623	0.534
Risk transferring effect and real profit management	−35.5	−2.59	0.011
Systematic risk	−0.0008	−0.019	0.984
Growth situation	0.161	2.54	0.012
Bank size	−0.358	−1.41	0.159
Asset return	11.67	2.90	0.004
Financial leverage	6.84	3.45	0.0009
Pure cash flows from liability	−9.71	−3.69	0.0004
Pure cash flows of financial securement activities of shareholders rights	1.44	0.79	0.426
Determination coefficient	0.086	Watson Durbin, 1.56	Expectancy level, F 0.000
Adjusted determination coefficient	0.085		

First subordinate hypothesis: Profit management of discretionary accrual item has a positive meaningful effect on credit risk.

Profit management of discretionary accrual items has a positive effect on credit risk. Improvement of this management kind will increase by effecting coefficient amount (65.18) and P value amount 0.000 and owns sufficient statistical amount. So, profit management of discretionary accrual items has a positive effect on credit risk. Based on the gained coefficient with one unit increase in bank discretionary accrual items, credit risk 65.18%unit will increase.

Second subordinate hypothesis: Profit management of real activities has a positive meaningful effect on credit risk.

Table 1 represents dependent profit management of real activities (10.09) and received P value is 0.37 and is more than 0.05. This amount has not owned its credit statistically so, profit management of real activities has no positive effect on credit risk.

The first subordinate hypothesis of the second main hypothesis is accepted while the second one is rejected. Totally, it can be said that profit management has a positive meaningful effect on credit risk and this hypothesis is accepted.

Above research hypotheses conclusions indicate that bank can perform profit management based on discretionary accrual items to increase their credit rating to attract investors and financial sources with lower asset costs. So, mangers tend to show profit exchange by discretionary accrual items exchange for profit management.

Fourth hypothesis: There is a positive meaningful relationship between bank risk and profit management on credit risk. Estimated coefficients for cooperation between risk and profit management

Table 2: Estimated coefficient model of the third hypothesis

Variable	Coefficients	t statistic	Expectancy
Pass cross origin	−0.142	−5.20	0.000
Risk	0.057	25.27	0.000
Systematic risk	0.0002	0.679	0.500
Growth situation	0.001	4.67	0.000
Bank size	−0.001	−0.54	0.584
Asset return	0.042	1.29	0.199
Financial leverage	0.033	2.08	0.040
Pure cash flow from liability	8.20	7.56	0.000
Pure cash flow from financial securement activities of shareholders' rights	−2.36	−1.81	0.73
Determination coefficient	0.78	Watson Durbin 1.87	Expectancy level, F 0.000
Adjusted determination coefficient	0.77		

based on the discretionary accrual items are 3.15 and −35.53 continuously. Received conclusions indicate that only profit management of discretionary accrual items in risk cooperation has a positive effect on credit risk. In otherwise, improvement of this management kind will increase credit risk that has effecting coefficient amount of 0.534, but doesn't have enough statistical credit. Then this hypothesis will not be accepted.

Model estimation:

$$REM1_{it}=0.142+0.057IdoVo_{it}+0.0002Beta_{it}+0.001Grow_{it}-0.001Size_{it}+0.042ROA_{it}+0.033Lever_{it}+8.20DebtF_{it}-2.36EquitF_{it}+\varepsilon_{it}$$

To be the practice model meaningful, statistical expectancy level, F, should be considered. It is <0.05, so the model is accepted statistically. High amount of F fisher (104.8) indicates that there is a powerful meaningful relationship among research variables. Determination coefficient amount 0.078 and adjusted determination coefficient 0.077 express high power of the descriptive model. Watson Durbin amount adjusts lack of correlation in the mentioned model because of the short duration, it is not necessary to investigate this statistic.

Then, based on the total model meaningfulness each variable should be analyzed. Table 2 represents coefficient, standard error, t statistic and P value for each variable. P column should be attended for the meaningfulness of each variable and comparison of p amount with α amount indicates each variable meaningfulness.

Third main hypothesis: There is a positive meaningful relationship between corporation risk and profit management.

Table 2 represents bank risk coefficient of corporation risk amount (0.057) and positive relationship between corporation risk with credit risk, so the third hypothesis is accepted and received coefficient of P-value is 0.000. This amount has owned its credit statistically based on the gained coefficient with one unit increase in corporation risk coefficient, credit risk 0.057% unit will increase.

Researchers have done several researches about relationship between profit management and credit rating but bank idiosyncratic risk (non-systematic risk) has not been considered. Investors are facing with marketing risks and non-marketing risks, however, non-marketing risks are various and are called bank idiosyncratic risk and a corporation can increase its stock return by this risk kind. So, banks can manage their profits by controlling this risk. Banks can control their mangers inclinations for profit management by their risk management.

6. CONCLUSIONS

This research is looking for the effect of bank risk and profit management on bank credit risk in the accepted banks in Tehran stock exchange. Based on the regression model following conclusions will be received:

1. Bank risk has a positive meaningful effect on credit risk.
2. Profit management has a positive meaningful effect on credit risk.
   - First subordinate hypothesis: Profit management of discretionary accrual item has a positive meaningful effect on credit risk.
   - Second subordinate hypothesis: Profit management of real activities has no positive meaningful effect on credit risk.
3. There is a positive meaningful relationship between bank risk and profit management.
4. There is no positive meaningful relationship between bank risk and profit management on credit risk.

Credit rating mechanism indicates an important indicator for consistence of investment in market. Banks can perform profit management based on discretionary accrual item or based on their real activities for their credit rating increase to attract investment and financial resources with lower assets costs. Researches have been done based on relationships between profit management, credit risk and credit rating but they haven't considered idiosyncratic risk (unsystematic risk). Investors always are encountered by marketing and non-marketing risks. Non-marketing risk is really various and it is called corporation idiosyncratic risk, a corporation can increase its stock return by controlling this risk. So, corporations can manage their profit risk by controlling this risk (Lin and Cheng-An, 2015. p. 872). Investors are facing with marketing risks and non-marketing risks, however, non-marketing risks are various and are called bank idiosyncratic risk and a corporation can increase its stock return by this risk kind. So, banks can manage their profits by controlling this risk. Banks can control their mangers inclinations for profit management by their risk management.

7. SUGGESTIONS

This research is looking for the effect of bank risk and profit management on bank credit risk in the accepted banks in Tehran stock exchange. Based on the regression model and the research main and subordinate hypotheses following suggestions should be considered:

1. Bank risk has a positive meaningful effect on credit risk. Based on received conclusions of first hypothesis there are some suggestions which attend involuntary commitment item factors to avoid managers' manipulations because involuntary commitment items are considered by management.
2. Profit management has a positive meaningful effect on credit risk. Based on received conclusions of the second hypothesis, involuntary commitment items are limited because of organizations' rules and other outside factors. Involuntary commitment items can be performed by management.

- Based on received conclusions of the first subordinate hypothesis which suggest factors related with internal corporation costs and incomes should be considered because these factors can play important roles for effecting on price and stock return.
- Based on the received conclusions of the second subordinate hypothesis, financial markets in developing countries are important because of financial credit securement of production projects and less substructure sources. Moreover, money market will be important twice time because of lack of asset market development in these countries.

3. There is a positive meaningful relationship between bank risk and profit management. Based on the received conclusions of the third hypothesis, while existence of financial verified risks in country banking system specialty operation credit risk will encounter banks with problems. In Iran traditionally asset market is covered by banking system that can be important by recognition of banking variables credit risks effect.
4. There is no positive meaningful relationship between bank risk and profit management on credit risk. Based on the received conclusions of the fourth hypothesis conclusions, total commitment items which a corporation uses for its business accounts are received accounts and documents, payment accounts and documents, pre-payment and parts of incomes and costs (however, increase or decrease in incomes and costs are results of recorded in assets and liabilities). Above factors aren't done by management, so they don't effect on price synchronism and should be considered.

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