

## RELATIONSHIP BETWEEN CAPITAL ADEQUACY RATIO WITH NET INCOME, OPERATING PROFIT AND RETURN ON BANK SHARES LISTED ON TEHRAN EXCHANGE

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Abstract: Banks basically due to the type of activity that they do have a lot of desire, to improve their business by utilizing from higher levers. The basel committee that has the responsibility to develop a healthy banking standards, has developed several provisions in the form of multiple principles for better leading of banks. The results of this study shows that according to approximate startup about the issue of capital adequacy ratio and declarations of basel Committee, the conducting investigations and determining the relationship type and correlation of various financial indicators, are necessary. So in this research the type and size of relationships between capital adequacy ratio, as the independent variable and profitability variables and stock returns-as dependent variables- were estimated in separate equations and using regression techniques.

Keywords: capital adequacy ratio, the bank's net profit, operating profit of banks, stock returns of banks, the basel Committee

### 1 Introduction

The profitability and stock returns, are known as two valid criteria for assessing the performance of companies. This article is also true about banks. Because as Bank's profitability is higher, indicates the health of the bank's operations and activities and level of profitability, reflects and reports of all activities and financial and managerial system and ... of banks. In addition, in the current competitive period in the banking system, these two indicators of profitability and return on equity can be considered as a parameter and index for stakeholders and an increase in the amount of them, encourages the shareholders and can also be effective even in the absorption of the deposit (as the main activity of bank in the profitability).

On the other hand, capital factor is considered as a factor affecting the performance and activities and profitability of bank. Capital is an important element of financial support in any bank, which enables banks to repay its debts when faced with economic difficulties. Therefore, in addition to playing an effective role in the financial stability of banks and risk-taking incentives, is also very effective in positive competition among banks. (Anvari Rostami, 2007)

Considering that ensuring the maintenance of funds and valid sources of capital reduce the risk of bank deposit, therefore, one of the main index for assessing banks' is capital adequacy ratio which was introduced for the first time by the basel Committee to World Banks in 1988. (Hajivali Zadeh, 2007)

In 1988, the basel Committee, introduced the appropriate minimum capital measurement system in a statement called number one statement of basel capital (or what is known as basel 1). Since then, this system not only widespread among the member countries, but also in other countries of the world was introduced and implemented and could create major developments in banking supervision methods and literature. In the late 1990s, the weaknesses of the first statement, the way was paved for the review and reconsideration of it and in June 1999 the first draft of the second capital statement known as basel number2 (or briefly basel 2), was released to be replaced instead of the previous statement at the end of 2006. (Pahlevanzadeh, 2009)

BAL Committee based on an advisory opinion and preliminary tests concluded that should determine standard ratio of capital to weighted assets according to risk in the level of 8% and ask the International Banks to achieve it. In this way judgment about capital adequacy of a bank that is done through investigating the ratio of capital to weighted assets according to risk and comparing it with determined ratio, was formed. It is evident that the banks that have adequate capital lower than prescribed ratios, will be to a decision according to banking supervisors discretionary and requirements of regulations in the country concerned. This decision includes restored base capital up to risks limitation of bank and it may be combined with the requirements and punitive measures (depending on the regulations of the country and bank type in terms of governmental and private and some other considerations). But anyway in evaluation of domestic and international markets the situation of desired bank is effective and bank cannot refrain negative consequences of insufficient capital (regardless of the type of collision monitoring device and the central bank). (Shiva, 2004).

So three variable factors of capital adequacy ratio, return on equity and profitability can be attributed as performance evaluation index of banks. Despite the importance of higher capital adequacy ratios and the role and impact of it in other accounting and financial ratios, unfortunately, there hasn't been any significant research associated with this variable and reviewing its correlation and relationship with other factors and macroeconomic variables and accounting indicators (particularly in our country). Therefore, in this research we seeks to examine the relationship between capital adequacy ratio and profitability (net profit and operating profit) and stock returns of accepted banks in the Tehran Stock Exchange.

### 2 Research hypotheses

First hypothesis: there is a significant relationship between capital adequacy ratio and net profit of accepted banks in Stock Exchange.

Second hypothesis: there is a significant relationship between capital adequacy ratio and operating profit of accepted banks in Stock Exchange.

Third hypothesis: there is a significant relationship between capital adequacy ratio and return on bank stocks of accepted banks in Stock Exchange.

### 3 Research method

The research method is correlation type, because it explores the relationship between independent and dependent variables. Also this research is classified in the category of applied researches in terms of purpose. Due to the limited community, statistical samples include all the banks of statistical population. Also main method of data collection tool in this study is based on library form. To investigate the significant or pointless relationship of variables and discover correlation coefficient the following authentic parametric and nonparametric tests will be used: Spearman correlation coefficient and regression. Also SPSS and Eviews software's are used to analysis statistical hypotheses.

**4 Theoretical foundations and research background**

**4.1 Theoretical Foundations**

**4.1.1 The general structure of basel 1**

In July 1988 the basel Committee published first statement concerning the capital arrangements. In basel 1 the major risk, is credit risk. In a statement, the credit risk, is defined as risk of non-performance by the other side. In fact the other types of risk such as investment risk, interest rate risk, exchange rate risk and the risk of focused activities of a bank is posed, but the main focus of the statement framework is on credit risk. Only in 1996, a new amendment was added to original statement to calculate market risk which was used without any significant change during the development of the next statement (BAL 2). In structure of the basel three main parts are designed that according to the Preliminary Statement includes Capital structure, classification of assets with determining the coefficients of risk and finally the part of determining the standard ratio of capital maintenance.

**4.2 The general structure and conceptual framework of basel 2**

Unlike the previous statement, the basel 2 has quite complicated structure. In fact, the arrangements laid down in the new statement has been expanded by evolution of standards used in the previous statement and has been rearranged within the framework of new pillars. In the statement structure 3 main pillars were anticipated including: 1- minimum required capital, 2- regulatory review process and 3- market discipline and are designed in a way that are communicating systematically and mutually reinforce each other. The three pillars of basel 2 can be investigated as follows: Pillar 1 or minimum capital requirements (as opposed to credit, market and operational risks) - Pillar 2, the supervisory review process - Pillar 3, market discipline.

**5 Research background**

Shultens and Jacob de (2009) in an article entitled "Relationship between the degree or type of ownership defaulted bank loans

and capital adequacy ratio" investigated relationship and intensity of degree and type of ownership relation (private, public, etc.) with two valid indicators in field of risk and bank hazards so capital adequacy ratio and default facilities. Statistical sample of research included 500 trading banks from 50 countries in the world (between 2005 and 2007). Research results show a significant relationship between capital adequacy ratio and default facilities with the type of bank ownership. While the percentage of bank ownership is more private; bank losses will be lower and a lower percentage of defaulting facilities and capital adequacy ratio will be in better situation (closer to the standard.

Babaian (2001) explored "the relationship between the changes of the items making up the balance sheet and changes in stock returns. The results of his research showed that there is not a significant relationship at 95% confidence level between rate changes of stock returns of listed companies in Tehran Stock Exchange for the period 1994 to 1995 and changes in balance sheet items. It should be noted that balance sheet items that were selected as the independent variable included: Changes in current assets, changes in long-term assets, current debt changes, changes in long-term debt and special value changes.

Mirmehrabi, (2002) in a thesis entitled "Investigation of the relationship between the increase in capital stock and stock returns of stock companies", considering the companies that had increased capital or not, tests assumptions and concludes that the capital increase is not a positive factor to increase stock returns and it is neutral.

**6 Data Analysis**

**The first hypothesis is defined as follows**

There is a significant relationship between capital adequacy ratio and net profit of banks listed on the Stock Exchange.

$$H_0 : \rho_{(y_1,x_1)}=0, \rho_{(y_1,x_1)} \neq 0 H_1 \tag{1}$$

Spearman nonparametric test statistic is used for doing this test that its results are shown in the table below.

Table 1. First hypothesis testing correlations

| Spearman nonparametric test |                         | X1    | Y1    |
|-----------------------------|-------------------------|-------|-------|
| $_1X$                       | correlation coefficient | 1000  | 0.795 |
|                             | confidence level        | 0     | 0.012 |
|                             | number of samples       | 54    | 54    |
| $_1Y$                       | correlation coefficient | 0.795 | 1000  |
|                             | confidence level        | 0.012 | 0     |
|                             | number of samples       | 54    | 54    |

Due to the smaller significance level of test from error of  $\alpha=0.05$  the null hypothesis is rejected. Therefore the first hypothesis is accepted, means:

With confidence of 95% we can say that there is a significant relationship between capital adequacy ratio and operating profit of accepted banks in the stock exchange.

Using linear regression to examine the relationship between capital adequacy ratio and net profit of banks:

The purpose of regression analysis is to find the logical relationship of the dependent variable based on independent variables that by using this relationship can offer solutions to improve variable assuming fixed conditions. (Ross and Zimmerman, 1986) This method defines for this variable that share of affecting dependent variable is separately with specified

significant coefficients. This model is a shortcut to guide managers for the allocation of costs and efforts to achieve the company's ultimate goal.

In regression models following assumptions are being tested against each other: In lieu of  $i$  a member of the set  $\{0, 1, 2, 3\}$ , we have:

$$H_0: b_i=0, H_1: b_i \neq 0 \tag{2}$$

This assumption means that the intercept coefficients and variables remains in the model or not. With zero coefficient for each of the variables, mentioned variables is omitted from the model and the concept of this issue is that no significant effect on the dependent variable and can it be ignored. Assuming there is a causal relationship between two quantitative variables and the amount of dependent variable is estimated by the

independent variable, the following simple regression model is used.

$$Y_1 = a + bX_1 \tag{3}$$

Where Y1 is net profit of banks listed on the stock exchange and X1 is the capital adequacy ratio. The first output of actually shows independent variable of model (capital adequacy ratio).

The second output (see chart below), respectively provides, correlation, coefficient of determination, adjusted coefficient of determination and the standard error of estimation.

If the sample size be small the adjusted coefficient of determination is appropriate for interpretation.

Table 2. Coefficients of the first hypothesis test

| Model | correlation coefficient | coefficient of determination | Adjusted coefficient of determination | standard error of estimates |
|-------|-------------------------|------------------------------|---------------------------------------|-----------------------------|
| 1     | 0.527                   | 0.277                        | 0.233                                 | 6.11370E11                  |

The third output of regression analysis of variance (ANOVA) is for certain existence of a linear relationship between two variables. That defines significant of whole model through F statistic.

There is not a linear relationship between two variables: H0 and H1.

Table (3) analysis of variance of first hypothesis test

| Model      | Total coefficient of determination | freedom degree | Average of determination coefficient | F test | confidence level |
|------------|------------------------------------|----------------|--------------------------------------|--------|------------------|
| regression | 2649E24                            | 1              | 2549E24                              | 5346   | 0.023            |
| Residual   | 1568E25                            | 52             | 5476E23                              |        |                  |
| Sum        | 1367E25                            | 53             |                                      |        |                  |

Since Sig =0.023 and is less than 0.05 the assumption of linear relationship between the two variables is confirmed.

Regression rows in the table represent the rate of dependent variable changes which is explained by the independent variable or variables. Residual row also indicates the amount of changes

of dependent variable which is defined by other factors (random). In the fourth output the regression equation is estimated.

Table 4. Coefficients of first hypothesis regression

| Model             | Non-Standardized coefficients |                                      | Standardized coefficients | T test | confidence level |
|-------------------|-------------------------------|--------------------------------------|---------------------------|--------|------------------|
|                   | line slope                    | Standard deviation of error standard | Beta                      |        |                  |
| Limitation1<br>X* | 9889E11                       | 2365E11                              | 0.0536                    | 4181   | 0.001            |
|                   | 3053E10                       | 9478E9                               |                           | 3221   | 0.023            |

$$-X10E11+3.053E9.889= Y \tag{4}$$

Since Sig (Constant) = 0.001 and is less than 0.05, so assumption of constant coefficient equality to zero is rejected. Also, since the Sig (x1) = 0.023 and is less than 0.05, so assumption of equation coefficient equality with zero is rejected.

There is a significant relationship between capital adequacy ratio and operating profit of banks listed on the Stock Exchange. In this section, as in the previous section, in order to test this hypothesis, the correlation coefficient was used.

$$H_0 : \rho_{(Y_2, X_1)} = 0, \rho_{(Y_2, X_1)} \neq 0 H_1 \tag{5}$$

**Second hypothesis is defined as follows**

Table 5. Correlation Coefficient of second hypothesis test

| Spearman nonparametric test |                         | X1    | Y1    |
|-----------------------------|-------------------------|-------|-------|
| iX                          | correlation coefficient | 1000  | 0.425 |
|                             | confidence level        | 0     | 0.019 |
|                             | number of samples       | 54    | 54    |
| iY                          | correlation coefficient | 0.425 | 1000  |
|                             | confidence level        | 0.019 | 0     |
|                             | number of samples       | 54    | 54    |

Due to the smaller significance level of test from error of  $\alpha=0.05$  the null hypothesis is rejected. Therefore the first hypothesis is accept means:

Using linear regression to examine the relationship between capital adequacy ratio and operating profit of banks listed on the Stock Exchange:

With confidence of 95% we can say that there is a significant relationship between capital adequacy ratio and operating profit of accepted banks in the stock exchange.

Assuming there is a causal relationship between two quantitative variables and the amount of dependent variable is estimated by

the independent variable, the following simple regression model is used.

$$Y_2 = a + bX_1 \quad (6)$$

Table 6. the coefficients of the second hypothesis test

| Model | correlation coefficient | coefficient of determination | Adjusted coefficient of determination | standard error of estimates |
|-------|-------------------------|------------------------------|---------------------------------------|-----------------------------|
| 1     | 0.399                   | 0.159                        | 0.123                                 | 778848E11                   |

The third output of regression analysis of variance (ANOVA) is for certain existence of a linear relationship between two variables. That defines significant of whole model through F statistic.

There is not a linear relationship between two variables: H0 and H1.

Table 7. variance analysis of second hypothesis test

| Model      | Total coefficient of determination | freedom degree | Average of determination coefficient | F test | confidence level |
|------------|------------------------------------|----------------|--------------------------------------|--------|------------------|
| regression | 2885E24                            | 1              | 2815E24                              | 3879   | 0.025            |
| Residual   | 1567E25                            | 52             | 7612E23                              |        |                  |
| Sum        | 1758E25                            | 53             |                                      |        |                  |

Since Sig =0.025 and is less than 0.05 the assumption of linear relationship between the two variables is confirmed.

or variables. Residual row also indicates the amount of changes of dependent variable which is defined by other factors (random).

Regression rows in the table represent the rate of dependent variable changes which is explained by the independent variable

In the fourth output the regression equation is estimated.

Table 8. Regression coefficients of first hypothesis

| Model             | Non-Standardized coefficients |                                      | Standardized coefficients | T test | confidence level |
|-------------------|-------------------------------|--------------------------------------|---------------------------|--------|------------------|
|                   | line slope                    | Standard deviation of error standard | Beta                      |        |                  |
| Limitation1<br>1X | 1238E12                       | 2754E11                              | 0.401                     | 4495   | 0.018            |
|                   | 2129E11                       | 8314E10                              |                           | 2561   | 0.025            |

$$X10E11+2.129E1.238=2Y$$

Since Sig (Constant) = 0.018 and is less than 0.05, so assumption of constant coefficient equality to zero is rejected. Also, since the Sig (x1) = 0.025 and is less than 0.05, so assumption of equation coefficient equality with zero is rejected.

There is a significant relationship capital adequacy ratio and stock returns of banks listed on the Stock Exchange.

$$H_0 : \rho_{(Y3,x1)} = 0 \quad \rho_{(Y3,x1)} \neq 0 \quad H_1 \quad (8)$$

In this section, as in the previous section, in order to test this hypothesis, the correlation coefficient was used.

### Third hypothesis is defined as follows

Table 9. Correlation coefficients of third hypothesis test

| Spearman nonparametric test |                         | X1    | Y1    |
|-----------------------------|-------------------------|-------|-------|
| 1X                          | correlation coefficient | 1000  | 0.512 |
|                             | confidence level        | 0     | 0.011 |
|                             | number of samples       | 54    | 54    |
| 1Y                          | correlation coefficient | 0.512 | 1000  |
|                             | confidence level        | 0.011 | 0     |
|                             | number of samples       | 54    | 54    |

Due to the smaller significance level of test from error of  $\alpha=0.05$  the null hypothesis is rejected. Therefore the first hypothesis is accept means:

With confidence of 95% we can say that there is a significant relationship capital adequacy ratio and stock returns of banks listed on the Stock Exchange.

Table (10) coefficients of third hypothesis test

| Model | correlation coefficient | coefficient of determination | Adjusted coefficient of determination | standard error of estimates |
|-------|-------------------------|------------------------------|---------------------------------------|-----------------------------|
| 1     | 0.645                   | 0.416                        | 0.395                                 | 1.58872                     |

The third output of regression analysis of variance (ANOVA) is for certain existence of a linear relationship between two variables. That defines significant of whole model through F statistic.

Table (11) variance analysis of third hypothesis test

| Model      | Total coefficient of determination | freedom degree | Average of determination coefficient | F test | confidence level |
|------------|------------------------------------|----------------|--------------------------------------|--------|------------------|
| regression | 70454                              | 1              |                                      |        |                  |
| Residual   | 43025                              | 52             | 70845                                | 27498  | 0.009            |
| Sum        | 113479                             | 53             | 3349                                 |        |                  |

Since Sig =0.009 and is less than 0.05 the assumption of linear relationship between the two variables is confirmed.

or variables. Residual row also indicates the amount of changes of dependent variable which is defined by other factors (random).

Regression rows in the table represent the rate of dependent variable changes which is explained by the independent variable

In the fourth output the regression equation is estimated.

Table (12) regression coefficients of third hypothesis

| Model          | Non-Standardized coefficients |                                      | Standardized coefficients | T test | confidence level |
|----------------|-------------------------------|--------------------------------------|---------------------------|--------|------------------|
|                | line slope                    | Standard deviation of error standard | Beta                      |        |                  |
| Limitation 1   | 2238E11                       | 2547E10                              | 0.315                     | 8126   | 0.004            |
| <sub>1</sub> X | 1999E10                       | 0.314E10                             |                           | 6366   | 0.009            |

$$1.999E2.238 =_3Y \tag{9}$$

Since Sig (Constant) = 0.004 and is less than 0.05, so assumption of constant coefficient equality to zero is rejected. Also, since the Sig (x1) = 0.009 and is less than 0.05, so assumption of equation coefficient equality with zero is rejected.

In new capital adequacy framework that was published in 2001, there have been three main pillars as follows: 1- minimum requirements of Standard capital adequacy. In this part capital adequacy requirements are calculated and measured through focusing on credit risk, market risk and operational risk. 2- Evaluation and monitoring that is focused on capital adequacy continuous assessment and evaluation process inside the bank or financial institution. It is expected from banks and other financial institutions to set their capital adequacy ratio in a higher range of defined lower limit, and at the same time, use the policies, guidelines and internal processes for continuous assessment of capital adequacy in a way that be coordinated with different levels of risk be compatible with business and functional strategies. 3- Effective use of the market as a lever to improve information disclosure and expand health and stability within the banking system and financial institutions. The aim is to create appropriate incentives for banks and financial institutions to establish the safety and stability of operation range and efficiency in activities. New framework provided by rules committee and procedures for banking regulation is designed to provide the field of improvement in way of risk type's reflection in terms of legal capital requirements and at the same time, to make the possibility of a proper strategy on financial innovation. (Omran & Ragab, 2004)

**7 Conclusion**

In the test of first hypothesis using Spearman nonparametric test was observed that there is a positive and significant correlation between capital adequacy ratio and net profit by confidence of 95%. Regression line equation is in the following form:

$$1.999E2.238 =_1Y \tag{10}$$

In which 1Y is net profit and 1X is capital adequacy ratio. The first hypothesis is confirmed in results.

In the second hypothesis test using the Spearman nonparametric test it was observed that there is a positive and significant correlation between capital adequacy ratio and operating profit by confidence of 95%. Regression line equation is in the following form:

$$X10E11+2.129E1.238=_2Y \tag{11}$$

In which 2Y is operating profit and 1X is capital adequacy ratio. The second hypothesis is confirmed in results.

In the third hypothesis testing using the Spearman nonparametric test was observed that there is a positive and significant correlation between capital adequacy ratio and operating profit by confidence of 95%. Regression line equation is in the following form:

$$1.999E2.238 =_3Y \tag{12}$$

In which 3 Y is stock returns and 1X is capital adequacy ratio. The third hypothesis is confirmed in results.

In general, there are three main approaches for the issue of capital adequacy: 1- Standard method, in this method the minimum ratio of capital to assets is 8% that its risk is calculated through dividing to capital (market risk + operational risk+ credit risk) as follows (fifty per cent of capital must be main or initial capital). Market Risk is usually calculated by statistical method and value method due to the risk that is listed in 1996 agreement and has not changed. Credit risk calculation has been also changed. Also operational risk was not in previous agreements that is added. 2- Internal ranking basic method, in this method banks and financial and credit institutions are ranked based on risk. Symptoms AAA, AA, A, A-, B BB, BB, etc., are used from lowest risk to highest risk. Capital adequacy ratio of banks and major financial institutions with first grade investment is more than 3 billion euros on average of 3 to 4%. In the US, there is only 20 banks and large financial institution in this category. But around the world there is 188 banks and large financial

institutions whom the majority are in Europe and Japan. 3- Advanced ranking method, in this method trickier criteria are determined for risk ratings. Mostly minimum capital adequacy ratio is 36% and the maximum is 46%. In fact, compliance with capital adequacy requirements of the basel committee, causes increased bank credit and leasing companies and ability of providing their financing with low rates.

Currently basel 2 is considered as the most comprehensive document agreed in the oversight of banks on sufficient capital in professional associations and international banking supervision. In this document the criteria for capital adequacy of banks, the methods for estimating credit risk, market risk, operational risk of banks, the requirements in evaluating adequacy of capital and regulations on the disclosure of relevant procedures, in three pillars of the statement is designed with administrative purposes. Privacy raised in the capital preliminary statement of the basel Committee is expanded in the field of weighted asset calculation methods of risk and has been flexible as much as possible. So in light of this flexibility and be with introduction of different approaches for calculating risk assets, banks are accepted in selecting the most appropriate option to achieve national supervision in each country as essential in carrying out its statement by the committee.

Therefore, although the listed factors cause disagreements in approach and run-time of statement in recent years, but all countries and banking supervision bodies welcome and their readiness to implement different pillars of statement shows the importance made by those organizations. Communities are responsible to provide standards for Islamic banks activities also by understanding the growing importance of the preparation in implementation of precautionary measures using approaches of statements and the regulations monitoring Islamic banks activities.

Range of statement in areas that raises advanced techniques in calculating intended risks, despite leading better cover of risks and hazards that threaten a bank, somewhat has also added to the complexity of the new statement. However attention to the basel Committee to present technical and regulational differences in banking and monitoring systems of different countries has caused the discretion of national regulatory authorities to be accepted in each country as essential in carrying out its statement by the Committee. So, although the mentioned factors caused controversy in approach and statement execution time in recent years, but all countries and banking supervision bodies welcome and their readiness to implement different pillars of statement shows the importance made by those organizations. Communities are responsible to provide standards for Islamic banks activities also by understanding the growing importance of the preparation in implementation of precautionary measures using approaches of statements and the regulations monitoring Islamic banks activities.

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