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# A Study of the Financial Soundness of Banks in the Framework of CAMEL model (Capital, Assets, Management, Earnings and Liquidity): The Case Study of Commercial and Non- Commercial Banks in Iran

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A B S T R A C T

The financial soundness of banks and credit financial institutions plays an important role in growth, development and stability of the countries' economy. Not only commercial banks but also financial institutions require regular review of financial soundness to ensure the private sector in the financial system of the country and protect the interests of depositors, lenders, shareholders and other beneficiaries. Proper and adequate capital is a requirement for protecting the soundness of the banking system. Every bank and credit institution should always maintain an appropriate ratio between capital and the risk existent in its assets to ensure stability and sustainability of its operations. The main function of the ratio is supporting the bank against unexpected losses and providing for the depositors and creditors. The main purpose of this investigation is to evaluate the financial soundness of commercial and non- commercial banks of Iran's banking network in the framework of CAMEL or capital, assets, management, earnings and liquidity. The research sample consists of 22 banks including 11 commercial banks and 11 non- commercial banks (specialized). To verify the hypotheses, logistic regression test (Prob. it) is used. The results of testing hypotheses indicate that there is a significant correlation between the components of CAMEL model, consisting of capital, assets quality, management quality of public and private commercial banks, and the index of capital adequacy ratio. In addition, there is a significant relationship between the components of CAMEL model, consisting of capital, assets quality, management quality and profitability of public and private non-commercial banks and credit institutions, and the index of capital adequacy ratio. The results show that there is no significant difference between financial soundness and the capital adequacy ratio in commercial and non- commercial banks.

***Keywords:*** CAMEL Models, Capital Adequacy Ratio (C.A.R.), Management Quality, Operational Assets Quality, Liquidity, Profitability.

## INTRODUCTION

In today's competitive environment that sustainability and survival of the organizations depend on the quality of the beneficiaries' decisions, performance evaluation has a significant

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importance and plays an important role in improving the performance of organizations. Performance evaluation must be so comprehensive that can make all aspects of the organizations activities relevant to their performance and can reflect the role of managers' decisions in achieving their goals and improving their performance. Given the key role of banks as one of the most important financial and economic fundaments in any society, the performance evaluation in this financial institution is very important. Banks ranking with regard to performance evaluation can provide all beneficiaries and decision-makers including borrowers, depositors, service users, suppliers, shareholders, directors and employees and … a clear and transparent view of the bank situation compared to the organizations with similar activities. This can be examined from different aspects. One dimension is the method and manner of resources optimal use in the direction of conducting essential activities and gaining maximum efficiency that is defined in the form of performance (ratio of outputs to inputs). In this method, the effectiveness of management decisions on the proper use of the resources and facilities of the organization is shown. Another dimension is that evaluation can be done through the determination of indicators in performance different domains and the comparison of banks in each of these indicators with the accepted standards. Proper and adequate capital is a requirement for protecting the soundness of the banking system. Every bank and credit institution should always maintain an appropriate ratio between capital and the risk existent in its assets to ensure stability and sustainability of its operations. The main function of the ratio is supporting the bank against unexpected losses and providing for the depositors and creditors. Due to the protection created by this ratio against the losses, protecting and maintaining sufficient capital that is commensurate with the risks is the main source of public confidence in any bank particularly and the banking system generally. Therefore, the Monetary and Banking Law also emphasized the necessity of this, and in Article 14 of this Act, the same ratio of capital to assets types is explicitly mentioned. In the present study, the soundness of commercial and non- commercial banks is evaluated in the framework of CAMEL.

## RESEARCH THEORETICAL BASES

Problems arising in the repayment of bank loans in the 1970s and 1980s revealed the importance of banks' capital adequacy in the exposure to risks arising from failure to fulfill the obligations by the borrowers. Therefore, to deal with this unpleasant experience, the amendment of regulations controlling the appropriate size of banks investment has been in the focus of banking supervision community attention. Understanding this need persuaded Switzerland Basel Banking Supervision and Regulation Committee to set appropriate standards of banks capital adequacy in their instruction, by considering precautionary regulations importance in terms of having adequate capital. That is why it has achieved an important place in the following years in banking and professional societies of the world.

In 1988, the Committee introduced the minimum appropriate capital measurement system in a statement known as the Basel Capital Statement Number 1. Afterwards, the system was widely introduced and implemented not only among member States but also in other countries of the world and it could make main changes in the methods and literature of banking supervision. In the late 1990s, as the weaknesses of the initial statement became obvious, it paved the way for review and revision in it. In June 1999, the first draft of the second statement of capital known as Basel Number 2 was released and at the end of 2006, it replaced the previous statement.

Capital adequacy ratio is one of the most important proportions in the measurement of performance soundness and financial stability of any financial institution, and especially banks. Regard to the features that the banks have and as they are obliged to refund the principal deposit

of the depositors, they should have adequate capital to cover risks arising from their activities and be careful not to transfer the damages to depositors. Therefore, banks should always have the minimum amount of desirable capital to cover their operational risks. According to the rules of Baal Committee (Basel), the minimum amount of required capital must be 12% of risk-weighted assets. Risk-weighted assets mean the risk of each asset according to the asset nature and the amount of the risk associated with it. For example, the risk of fund (cash), and bank account balances is zero at the central banks of each country, but the risk of granted facilities to private natural and legal persons is 100%. According to the rules of the Central Bank of the Islamic Republic of Iran, the minimum desired capital adequacy ratio for Iranian banks is equal to 8 percent(Tanaka, 2002; Weber, 2010).

## LITERATURE

Berger (1995) studied the relationship between capital adequacy and return on equity (ROE) from 1983 to 1989. He found an unusual positive causal relationship between these two that this relationship is attributed to the costs of bankruptcy.

Evan et al (2000) have studied a research entitled an investigation on macro-prudential indicators of the financial system soundness. They acknowledged that forward looking indicators such as capital adequacy, asset quality, soundness management, earnings and profitability, liquidity, sensitivity to market risk and market-based indicators such as market prices of financial instruments, and the credit rating are used as the indexes of private financial institutions soundness.

Saunders and Cornett (2004) found that the soundness of private financial institutions is a function of several factors such as asset quality, liquidity position, capital, management quality, market sensitivity and earnings. These factors are effective on different types of private financial institutions risks. If these factors are not managed through a continuous manner, they will have negative effects on the soundness of financial institutions.

Baral (2005), conducted a research entitled a study on the soundness of commercial banks in CAMEL framework. He found that different components of CAMEL index indicate that the financial soundness of specific contribution banks is not strong to manage eventual shocks in great scale to balance sheet, but their soundness is fair.

Bateni, Vakilifard, and Asghari (2014), on a study examined the relationship between capital adequacy ratio and financial variables at Iran banking system. They found that there is a significant correlation between the variables of profitability proportion, size, the ratio of deposits to loans, and ratio of credit risk and capital adequacy ratio.

Molavi and Jamalzade (2015), investigated the new approaches to the Bank's capital adequacy ratio (based on the second statement of the Basel Committee on Banking Supervision and Regulation). He stated that in the new comprehensive document governing criteria on maintaining the minimum capital adequacy of banks and implementing strategies have been designed in the form of a statement that the developer committee at the Bank for International Settlement (BIS) has called it the international convergence in capital measurement and governing standards. Methods for calculating the credit risk have been associated with major and complex changes that compared to the initial statement have been evolved. New methods for calculating operational risk in banks is introduced and the methods to reduce credit risk of the banks, unlike the limited space of its application in the first statement, are developed. Consequently, the banks are authorized to provide accurate assessments of the risks of failure to return the granted facilities to different customers. In order to have more practical and more appropriate framework compliance with the minimum regulatory capital criteria for banks

compared to the previous one, and to facilitate supervisory authorities on the supervision of banks, and also to improve the quality of supervisory standards on financial and management information disclosure of the banks, the second and third essentials are added to the new statement with the titles of the supervisory process review in the banks and market discipline, respectively. However, compared with the previous statement, the new statement's complexity is increased; the text is far more comprehensive and complete than the previous statement. In the new statement, supervisory authorities' solutions for controlling the banks against financial risks are implemented more accurately and elegantly. Using Basel second statement concepts in supervisory standards governing the activities of Islamic banks has led to making efforts to making these concepts applicable due to the risk characteristics related to the Islamic banks, and it is already ongoing.

## RESEARCH HYPOTHESES

In order to achieve the research objectives the hypotheses are formulated as follows:

**First hypothesis:** Commercial banks of Iran's banking network, using concurrent framework of CAMEL components, have the necessary degree of financial soundness and accuracy; in other words, there is a significant relationship between the components of CAMEL framework, including capital, asset quality, management quality, earnings and liquidity of commercial banks and capital adequacy ratio.

**Second hypothesis:** Non- commercial banks (specialized) of Iran's banking network, using concurrent framework of CAMEL components, have the necessary degree of financial soundness and accuracy; in other words, there is a significant relationship between the components of CAMEL framework, including capital, asset quality, management quality, earnings and liquidity of non-commercial banks and capital adequacy ratio.

**Third hypothesis:** commercial and non- commercial banks of Iran's banking network, using concurrent framework of CAMEL components, are significantly different in terms of financial soundness; in other words, financial soundness or capital adequacy ratio in commercial and non-commercial banks have a significant difference.

## METHODOLOGY

The research method is deductive - inductive. This means that the theoretical framework and the literature of the study are obtained from library studies of articles and sites deductively and collecting data to confirm or refute the hypotheses is done using inductive reasoning. The research is an applied study in terms of objective and in terms of data collection is descriptive, correlational one. This method is useful in studies that aim to explore the relationship between the variable. The study attempts to test the correlation between research variables. It is Ex post facto investigation because the previous data are used to test the hypotheses.

In this study, a logistic regression is used to test the hypotheses or the first and second statistical propositions. To test the third research proposition statistically, if the sample characteristic distribution follows normal distribution, independent two-sample average difference test is used and if the sample characteristic distribution is not normal, U Mann Whitney Test is used.

The study statistical population is all Iranian commercial and non- commercial banks and credit institutions, including 41 banks and credit institutions operating in Iran's financial market. Systematic Elimination method is used to select the study sample. So that if the information required for analysis is disclosed by banks the bank is selected as the sample, otherwise it is removed from the research sample. The sample is consisted of 22 banks, including 11 commercial banks, and 11 non-commercial banks (specialized).

Logistic Regression statistical model of the first research proposition for commercial banks:

$$Pr(CAR_{j,t}=1)=\{EXP(ß_1CR_{j,t}+ ß_2M_{j,t}+ ß_3NPLR_{j,t}+ ß_4LIQR_{j,t}+ ß_5PFTR_{j,t}+ ß_6AGE_{j,t}+ ß_7SIZE_{j,t}+\varepsilon_{j,t})/(1+ EXP(ß_1CR_{j,t}+ ß_2M_{j,t}+ ß_3NPLR_{j,t}+ ß_4LIQR_{j,t}+ ß_5PFTR_{j,t}+ ß_6AGE_{j,t}+ ß_7SIZE_{j,t}+\varepsilon_{j,t})\}$$

Logistic Regression statistical model of the second research proposition for non-commercial banks:

$$Pr(CAR_{j,t}=1)=\{EXP(ß_1CR_{j,t}+ ß_2M_{j,t}+ ß_3NPLR_{j,t}+ ß_4LIQR_{j,t}+ ß_5PFTR_{j,t}+ ß_6AGE_{j,t}+ ß_7SIZE_{j,t}+\varepsilon_{j,t})/(1+ EXP(ß_1CR_{j,t}+ ß_2M_{j,t}+ ß_3NPLR_{j,t}+ ß_4LIQR_{j,t}+ ß_5PFTR_{j,t}+ ß_6AGE_{j,t}+ ß_7SIZE_{j,t}+\varepsilon_{j,t})\}$$

Logistic Regression statistical model of the third research proposition for commercial and non-commercial banks:

$$Za=ta=\{E(CAR_{j,t1})-E(CAR_{j,t2})-\mu(CAR_{j,t1}-CAR_{j,t2})\}/sqrt(\sigma_1(n_{1-1})+\sigma_2(n_{2-1})/n_1+n_{2-2})$$

The dependent variable - Capital Adequacy Ratio ($CAR_{j,t}$): It is calculated through the ratio of base capital to risk-weighted assets. In accordance with the regulations of capital adequacy ratio of public and non- public banks in Iran banking network, the ratio should be at least 8 percent. Therefore, in this study capital adequacy ratio variable is a binary variable or zero and one variable. Banks whose capital adequacy ratio is at least 8 percent are given number one, and if the index is less than 8 percent, they are given zero.

Independent variable - Capital ($CR_{j,t}$): With regard to the fact that in monetary institutions capital is defined as a buffer or cushion and as a protection measure of depositor resources, so the more capital financial structure or capital structure of the banking unit have, the less financial risk it has. In this study, to measure the quantity of capital quality, ratio of capital to operational assets (including total facilities granted to public and non- public sectors segregated trade, services, exports, industry and agriculture) is used.

Independent variable - Management Quality ($M_{j,t}$): This variable is achieved by the calculation of the average maturity period of granted facilities (average collection period) to the average maturity period of durable deposits refund (average liabilities repayment period). The more this ratio has tendency to number one, the more desirable management quality of the banking unit is. The more the ratio goes far from number one in positive or negative direction, the more the management quality is reduced.

Independent variable - Operating Assets Quality ($NPLR_{j,t}$): This variable is obtained by the calculation of the ratio of NPL (Non-performing Loan) to the public and non- public sectors segregated trade, services, exports, industry and agriculture (total past due, overdue and doubtful accessible) to the average total performing and non-performing loan to public and non- public sectors segregated trade, services, exports, industry and agriculture during the period. The less this ratio is, the more desirable and the higher quality is the bank operational assets.

Independent variable - Liquidity ($LIQR_{j,t}$): The ratio is achieved by the computation of total cash assets and cash equivalents to total operational assets including facilities granted to public and non- public sectors segregated trade, services, exports, industry and agriculture.

Independent variable - Profitability ($PFTR_{j,t}$): This ratio is obtained by calculation of the ratio of total shared and non-shared revenues of the bank to total operational assets including are database of facilities, including facilities granted to public and non- public sectors segregated

trade, services, exports, industry and agriculture (facilities granted by the bank's resources and the depositors resources).

Control variable – Bank Age ($AGE_{j,t}$): It is calculated by the natural logarithm of the bank's activity period from the date of establishment issuance license to the desired period.

Control variable – Bank Size ($SIZE_{j,t}$): It is determined by calculating the natural logarithm of total assets (operating and non-operating) of the banks, at the end of each year.

## RESULTS

**$H_0$:** There is no significant relationship between CAMEL framework components consisting of capital, asset quality, management quality, earnings and liquidity of commercial banks, and capital adequacy ratio index.

**$H_1$:** There is a significant relationship between CAMEL framework components consisting of capital, asset quality, management quality, earnings and liquidity of commercial banks, and capital adequacy ratio index.

**Table (1)** M2comprehensive model of generalized logistic regression with all the independent and control variables

| Independent and control variables | Coefficients | Std. error | Wald statistic | df | P-value | Exp.(β) |
|---|---|---|---|---|---|---|
| Capital ratio | 134.125 | 91.947 | 2.128 | 1 | 0.0145 | 1.778 |
| Management quality | 40.232 | 22.543 | 3.185 | 1 | 0.047 | 2.97 |
| Operational asset quality | 7.232 | 12.767 | 0.363 | 1 | 0.0457 | 12.89 |
| Liquidity position | 143.569 | 89.213 | 2.59 | 1 | 0.108 | 2.246 |
| Profitability and performance | 15.271 | 18.867 | 0.655 | 1 | 0.418 | 428458 |
| Age of the subject | -3.788 | 2.412 | 2.466 | 1 | 0.0116 | 0.023 |
| Size of the subject | 1.154 | 0.881 | 1.717 | 1 | 0.019 | 3.172 |
| Regression equation fix | -29.786 | 20.702 | 2.07 | 1 | 0.015 | 0.001 |

The above table presents the results obtained from the solution of M2 Comprehensive model. Values given in this table from the right second column indicate respectively, values of $\beta_0$ to $\beta_7$, standard deviation and standard error (S.E), coefficients of the independent variables, Wald test statistic, degrees of freedom (df), significance level (P-Value), the point estimate of the odds ratio of the mentioned ratio.

**Table (2)** confidence interval for the M2 complex model coefficients of generalized logistic regression

| Independent and control variables | Confidence interval for 95% coefficients of generalized logistic regression 95% C.I. For EXP(βj) | |
|---|---|---|
| | Min of model coefficient | Max of model coefficient |
| Capital ratio | 0.000 | 3.279 |
| Management quality | 0.019 | 4.582 |
| Operational asset quality | 0.000 | 21.612 |
| Liquidity position | 0.000 | 1.948 |
| Profitability and performance | 0.000 | 4.199 |
| Age of the subject | 0.000 | 2.559 |
| Size of the subject | 0.564 | 17.832 |

### The first hypothesis test and statistical inferences

According to available data in tables (1) and (2) the research first proposition is examined at 95% confidence level using the odds ratio and confidence intervals (Exp (B)). The odds ratio is equal to:

$$\left(\frac{p}{1-p}\right)$$

And the confidence interval for βjs is:

$$\left[\beta_j - Z_{1-\alpha/2}SE(\beta_j), \beta_j + Z_{1-\alpha/2}SE(\beta_j)\right]$$

And confidence interval for the odds ratio is:

$$\left[Exp\beta_j - Z_{1-\alpha/2}SE(\beta_j), Exp\beta_j + Z_{1-\alpha/2}SE(\beta_j)\right]$$

Therefore, each of the independent variables that is placed in assigning state of number one to the dependent variable of financial stability index, at confidence interval of the odds ratio, has a significant relationship with the ratio of financial stability risk or adequacy ratio and it is set in the final equation to measure financial stability risk.

**Hypothesis number one:** public and non- public commercial banks and credit institutions, using concurrent framework of CAMEL components, have the necessary degree of financial soundness and accuracy; in other words, there is a significant relationship between the components of CAMEL framework, including capital, asset quality, management quality, earnings and liquidity of commercial banks and capital adequacy ratio.

As in the state of FSIjt = 1 (capital adequacy ratio is equal to or at least of the number 8 percent), for estimating the confidence interval, the coefficients exponential or Exp. (βj) applies to the independent and control variables of capital, management quality, operational assets, age of the subject and the size of the subject at 95% confidence interval 95% CI For EXP (βj). Therefore, the number one is placed in this interval and the hypothesis number one is proved with 95% confidence. There is no sufficient evidence indicating these variables to be ineffective on the volatility description of dependent variable (financial stability index or capital adequacy) of commercial banks and credit institution capital. However, liquidity and profitability variables have no impact on the dependent variable of financial stability index at the state of FSIjt = 1 to estimate the confidence interval. Therefore, public and non- public commercial banks in Iran, using concurrent framework of CAMEL components, with the exception of the capital and liquidity elements have the necessary degree of financial soundness and accuracy. In other words, there is a significant relationship between the components of CAMEL framework, including capital, asset quality, management quality of public and non- public commercial banks and capital adequacy ratio.

**$H_0$:** There is no significant relationship between CAMEL framework components consisting of capital, asset quality, management quality, earnings and liquidity of non-commercial banks, and capital adequacy ratio index.

**$H_1$:** There is a significant relationship between CAMEL framework components consisting of capital, asset quality, management quality, earnings and liquidity of non-commercial banks, and capital adequacy ratio index.

**Table (3)** M2comprehensive model of generalized logistic regression with all the independent and control variables

| Independent and control variables | Coefficients | Std. error | Wald statistic | df | P | Exp.(β) |
|---|---|---|---|---|---|---|
| Capital ratio | 12.129 | 7.481 | 2.628 | 1 | 0.01 | 185093 |
| Management quality | 42.678 | 19.811 | 4.641 | 1 | 0.03 | 3.425 |
| Operational asset quality | 13.314 | 13.097 | 3.034 | 1 | 0.03 | 605709 |
| Liquidity position | 172.788 | 138.333 | 2.56 | 1 | 0.2 | 1.088 |
| Profitability and performance | 30.629 | 14.664 | 4.363 | 1 | 0.03 | 2.004 |
| Age of the subject | 1.454 | 1.197 | 3.474 | 1 | 0.02 | 4.279 |
| Size of the subject | 0.014 | 0.667 | 0.000 | 1 | 0.9 | 1.014 |
| Regression equation fix | -18.404 | 16.176 | 1.294 | 1 | 0.2 | 0.000 |

Table (3) shows the results obtained from the output of SPSS software for M2 complex model. Values given in this table from the right second column indicate respectively, values of $\beta_0$ to $\beta_7$, standard deviation or standard error of individual regression relation coefficients (S.E), coefficients of the independent and control variables, including capital ratio, quality of management, quality of operational assets, status of liquidity, profitability and performance of monetary institutions and ultimately the age and size of the subject, Wald test statistic, degrees of freedom (df), significance level (P-Value), the point estimate of the odds ratio of the mentioned ratio.

**Table 4.** Confidence interval for the M2 complex model coefficients of generalized logistic regression

| Independent and control variables | Confidence interval for 95% coefficients of generalized logistic regression 95% C.I. For EXP(βj) | |
|---|---|---|
| | Min of model coefficient | Max of model coefficient |
| Capital ratio | 0.079 | 4.321.000 |
| Management quality | 2.969 | 24.97 |
| Operational asset quality | 0.000 | 8.512.000 |
| Liquidity position | 0.000 | 0.106 |
| Profitability and performance | 1.611 | 60.76 |
| Age of the subject | 0.409 | 4.72 |
| Size of the subject | 0.274 | 3.764 |

**The second hypothesis test and statistical inferences**

According to available data in tables (3) and (4) the research second proposition is examined at 95% confidence level using the odds ratio and confidence intervals (Exp. (B)). The odds ratio is equal to:

$$\left(\frac{p}{1-p}\right)$$

And the confidence interval for βjs is:

$$\left[\beta_j - Z_{1-\alpha/2}SE(\beta_j), \beta_j + Z_{1-\alpha/2}SE(\beta_j)\right]$$

And confidence interval for the odds ratio is:

$$\left[Exp\beta_j - Z_{1-\alpha/2}SE(\beta_j), Exp\beta_j + Z_{1-\alpha/2}SE(\beta_j)\right]$$

Therefore, each of the independent variables including capital, management, quality of assets, status of liquidity, profitability and performance, the age and size of the subject that is placed in assigning state of number one to the dependent variable of financial stability index(FSIjt=1), at confidence interval of the odds ratio 95% C.I. For EXP.(βj), has a significant relationship with the ratio of financial stability risk or adequacy ratio and it is set in the final equation to measure financial stability risk.

**Statistical analysis and model estimation for research hypothesis (2) based on the software output**

**Hypothesis number two:** public and non- public non-commercial banks and credit institutions, using concurrent framework of CAMEL components, have the necessary degree of financial soundness and accuracy; in other words, there is a significant relationship between the components of CAMEL framework, including capital, asset quality, management quality, earnings and liquidity of non-commercial banks and capital adequacy ratio.

As in the state of FSIjt = 1 (capital adequacy ratio is equal to or at least of the number 8 percent), for estimating the confidence interval, the coefficients exponential or Exp. (βj) applies

to the independent and control variables of capital, management quality, operational assets, age of the subject and the size of the subject at 95% confidence interval 95% CI For EXP (βj). Therefore, the number one is placed in this interval and the hypothesis number one is proved with 95% confidence. There is no sufficient evidence indicating these variables to be ineffective on the volatility description of dependent variable (financial stability index or capital adequacy) of commercial banks and credit institution capital. However, liquidity variable have no impact on the dependent variable of financial stability index at the state of FSIjt = 1 to estimate the confidence interval. Therefore, public and non- public non-commercial banks in Iran, using concurrent framework of CAMEL components, with the exception of the liquidity element have the necessary degree of financial soundness and accuracy. In other words, there is a significant relationship between the components of CAMEL framework, including capital, asset quality, management quality and profitability of public and non- public non-commercial banks and capital adequacy ratio.

**Statistical analysis of the research third proposition**

**$H_0$:** Financial soundness or capital adequacy ratio in commercial and non- commercial banks has no significant difference.

**$H_1$:** Financial soundness or capital adequacy ratio in commercial and non- commercial banks has a significant difference.

**Assumption number three:** commercial and non- commercial banks and credit institutions of Iran's banking network, using concurrent framework of CAMEL components, are significantly different in terms of financial soundness; in other words, financial soundness or capital adequacy ratio in commercial and non-commercial banks have a significant difference. To evaluate the third hypothesis of the study statistically, Two independent samples mean difference technique (T-Test) or analysis of variance (F Test) is used. However, it is similar in the case of "two independent samples mean comparison" and the statistics output of "two independent samples mean difference" and "ANOVA of single domain". Therefore, in this case, only the T-Test is used. Further, in order to test the homogeneity of two independent samples variance, Lavigne test with chi-square distribution and F Test statistic are also used. In order to increase the validity of the results and the analysis of the third hypothesis, in addition to the dependent variable of capital adequacy ratio, the mentioned tests will be reviewed for all the independent and control variables. However, the rule base of third proposition verifiability or non-verifiability at 95 percent confidence level is merely software output for the dependent variable (FSIjt ≡ CARjt).

**Table 5.** Two independent samples mean difference and 95% confidence interval test for all variables

| Variables | Variance | t | df | Prob. | Mean difference | Std. error | 95% confidence interval | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Min | Max |
| Capital adequacy ratio | Assumed | 0.000 | 86 | 1 | 0.000 | 0.078 | -0.173 | 0.173 |
| | Not assumed | 0.000 | 86 | 1 | 0.000 | 0.078 | -0.173 | 0.173 |
| Capital ratio | Assumed | 0.33 | 86 | 0.742 | 0.020309 | 0.6156 | -0.1020 | 0.1427 |
| | Not assumed | 0.33 | 84.8 | 0.742 | 0.020309 | 0.6156 | -0.1020 | 0.1427 |
| Management quality | Assumed | -1.792 | 86 | 0.077 | -0.05578 | 0.01311 | -0.1177 | 0.0061 |
| | Not assumed | -1.792 | 84.553 | 0.077 | -0.05578 | 0.01311 | -0.1177 | 0.0061 |
| Operational asset quality | Assumed | 0.888 | 86 | 0.377 | 0.041318 | 0.04656 | -0.0518 | 0.1344 |
| | Not assumed | 0.888 | 59.292 | 0.377 | 0.041318 | 0.04656 | -0.0518 | 0.1344 |
| Liquidity position | Assumed | -0.262 | 86 | 0.794 | -0.00124 | 0.0047 | -0.0107 | 0.0082 |
| | Not assumed | -0.262 | 73.608 | 0.794 | -0.00124 | 0.0047 | -0.0107 | 0.0082 |
| Profitability | Assumed | -1.201 | 86 | 0.233 | -0.178 | 0.1482 | -0.4745 | 0.1166 |
| | Not assumed | -1.201 | 59.115 | 0.233 | -0.178 | 0.1482 | -0.4745 | 0.1166 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Age of the subject | Assumed | -1.976 | 86 | 0.064 | -0.30902 | 0.1648 | -0.6368 | 0.0185 |
| | Not assumed | -1.976 | 81.959 | 0.064 | -0.30902 | 0.1648 | -0.6368 | 0.0185 |
| Size of the subject | Assumed | -2.718 | 86 | 0.008 | -0.86953 | 0.1399 | -1.5063 | -0.2328 |
| | Not assumed | -2.718 | 78.559 | 0.008 | -0.86953 | 0.1399 | -1.5063 | -0.2328 |

As shown in Table (5) the probability value for the dependent variable of financial stability index or capital adequacy ratio and all research independent variables, including capital, management quality, operational asset quality, liquidity position, profitability and performance, excluding two control variables of age and size of the subject is greater than 5% significance error level. That is to say, the calculated t value set forth in the above table is smaller (larger) than the critical value or value of t = ± 1.96. Therefore, at 5% error level or at 95% confidence interval there is no reason for accepting the research hypothesis (H1). Therefore, it can be concluded that commercial and non- commercial banks and credit institutions of Iran's banking network, using concurrent framework of CAMEL components, are significantly different in terms of financial soundness; in other words, financial soundness or capital adequacy ratio in commercial and non-commercial banks have a significant difference.

## CONCLUSION

Generally, a strong and healthy financial system is a prerequisite for sustainable economic growth of a given country. In order to survive negative shocks and maintain a good financial stability, it is vital to identify the determinants that mostly influence the overall performance and profitability of flour manufacturing companies. This paper empirically examined the relationship between the factors determining profitability of flour manufacturing companies in the study area for the period of 2012-2018 using the multiple regression analysis. Thus, panel data for six sampled flour manufacturing firms for seven years was used for the analysis purpose. For this purpose, firm size, leverage, liquidity, fixed asset turnover, operating expense and sales growth rate were selected as explanatory variables while ROA and ROE are taken as dependent variable. Before making regression analysis, diagnostic tests were made for the multiple linear regression models by using Eviews 10. Regression results on ROA and ROE were 74% and 80% (Adjusted R2) respectively where significant is at 5% levels ($P< 0.05$). The study also used an appropriate econometric methodology for the estimation of variables coefficient under fixed effect regression models and pooled regression.

Based on correlation analysis, firm size, liquidity, fixed asset turnover and sales growth rate were positively correlated with profitability (ROA & ROE). These correlations clearly shows that, as the firm size, liquidity, fixed asset turnover and sales growth rate, profitability also moves on the same direction. On the other hand, leverage and operating expense were negatively correlated with profitability (ROA & ROE). This clearly shows that, as the leverage and operating expense, profitability moves in opposite direction.

Based on the empirical findings, operating expense negatively and significantly affect profitability measured by ROA and ROE. While leverage insignificant impact on ROA and ROE. Moreover,

Firm size, liquidity and sales growth rate affect both ROA and ROE positively and significantly while fixed asset turnover has insignificant effect on both ROA and ROE. The following sections discussed about the final concluding remarks of the study.

Firm size has a positive and significant effect on profitability of flour manufacturing companies in Hosanna as measured by both ROA and ROE. The positive relationship between size and profitability implies that performance of large size flour manufacturing companies is better than small size flour manufacturing companies. This situation provides them an

opportunity to work in more profitable fields with little competition. Another major advantage that large-scale businesses have is that of economy of scale. Vendors and suppliers are much more likely to provide discounts to companies that purchase in large quantities. By taking advantage of the economic scale, large companies are able to reduce the cost of doing business and maximizing their profit margins. Furthermore, large firms are capable of decreasing transaction costs of issuing long-term debt at a favorable low rate of interest.

The effect of leverage on both ROA and ROE is insignificant with negatively related as measured by ROA and ROE which implies leverage is not considered as that much powerful explanatory variable to determine the profitability of flour manufacturing companies in Hossana town .

In this study, Liquidity (LIQ) has positively and significantly affected firm's financial profitability in both ROA and ROE. This shows that increase in Liquidity increases the profitability of flour manufacturing companies in Hosanna town. It implied that flour manufacturing companies with higher capacity to pay obligation generate more profit than lower capacity. Low liquidity level may lead to increasing financial costs and result in the inability to pay its obligations.

Fixed asset turnover is not considered as much powerful explanatory variables to define the performance of flour manufacturing companies in Hossana with insignificant positive relation with ROA and ROE.

The negative and significant impact of operating expense on both profitability measures (ROA and ROE) shows that decrease in operating expenses increases the profitability of flour factory in the study area. According to the studies of Sufian and Chong (2008), poor expense management are the main contributors for poor profitability. This implies that the poor operating expense management is one of the main contributors for poor performance of flour companies. It indicates that the higher the operating expense the lower the profitability of flour factory in the study area. This means that, the higher costs of operation negatively affect flour manufacturing firms profitability.

Sales growth rate has a positive and significant effect on profitability of flour manufacturing companies in Hosanna as measured by both ROA and ROE. The coefficient is positive so that there is a positive relationship between Sales Growth rates measured by ROA and ROE. The higher the Sales Growth Ratio the increasing profitability of flour manufacturing companies.

**Recommendations**

Based on the findings of this study and the conclusions drawn above, the following recommendations were made:

The results of significant and positive relationship between firm size and profitability in both return on asset and return on equity leads to increase in firms' profitability. The results showed that firm size was a major determinant of profitability. This study therefore suggests that firms' focus should be on increasing their size by boosting turnover and opening up new market for existing and new product. This simply suggests that firms need to expand in size to enhance their profit level. In summary, firms are able to enjoy large profit levels if they can increase in size and sales with a large reduction in production cost and debt ratio.

The study also found positive relationship between liquidity and firms' profitability. Great attention should be paid to liquidity. It indicated that whenever managers of the firm should ensure that their firms have adequate liquidity levels to ensure that the firm can meet any contingencies and to improve their firms' profitability. This implies that low liquidity level may lead to increasing financial costs and result in the incapacity to pay its obligations. Therefore,

the researcher recommend that the manager should ensure that their firms have adequate liquidity levels to ensure that the can meet any contingencies and to improve their firms' profitability.

The study found also that operating expense has a negative relationship with firms' profitability. Therefore, based on the result regarding the operating expense, the researcher recommended that firms should strive to reduce their operating expenses and implement efficient strategies that address operating cost. The operating costs of the business should be reduced as much as it can with production quality remaining the same.

The study also found positive relationship between sales growth rate and firms' profitability as measured by ROA and ROE at highly significant level. Therefore, the researcher recommended that the manager should have to consider not only sales growth but also how they utilize firms' asset efficiently to have an impact on firms' profitability. Cost of sale is also an important factor to be considered in enhancing or boosting the profitability of flour manufacturing. It is therefore necessary that the internal components of cost of sale such as material cost, labor cost and factory overhead should be reduced to the barest minimum.

Finally, management of flour manufacturing companies under this study can create value for the shareholders as well as to make the firms profitability by giving more consideration on the above recommendation: their firm size, to ensure that firms have adequate liquidity levels, efficiently use operating expense, efficiency of their asset utilization and the internal components of cost of sale and other internal and external factors.

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