

## **Assessment of the Impact of the Return on Assets on the Bank Reserves Listed in the Tehran Stock Exchange**

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**Abstract:** The aim of this study was to evaluate the return on assets of bank reserves listed in the Tehran Stock Exchange. Accordingly, based on the Kashyap and Stein models and Levinthal, “bank reserves” are defined as the dependent variable, rate of return on assets as the independent variable, facilities rate, bank size, growth opportunities and profit volatility as control variables. The population of this research consisted of commercial banks listed in the Tehran Stock Exchange and among which sixteen banks were selected as sample size using systematic elimination method. The results show the direct relationship between return on assets with bank reserves as a measure of deposits of different clients in banks as the dependent variable. In addition the interpretation of gradient in control variables of estimation relationship indicated that there was a reversed relationship between the facilities rate and the size of banks with bank reserves and also a direct relationship between growth opportunities and earnings volatility with bank reserves or customer’s deposits. Student-t test and Fisher test for the estimated coefficients and the total estimated relationship supported 95% of relationships between variables. The coefficient of determination showed that between 83/5-87/5 of changes among the independent variables and control was represented by the estimated relationship in the bank reserves and the estimated relationship between the variables had relatively full explanatory power.

**Key words:** Bank reserves, return on assets, facilities, bank size, growth opportunities, profit volatility

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### **INTRODUCTION**

Strengthened monetary and financial system is one of the pivotal issues in developing countries, including Iran. Since the 1980s, many Asian countries such as China, India and Iran have taken some measures in the field of economic liberalization such as reducing restrictions and requirements in the banking sector and credit allocation. As a result of remedial actions, taking some measures for corporate governance in these countries to meet for accountability and responsiveness was particularly important. In fact, to a large extent the fact that good corporate governance to strengthen the financial system and paving the way for achieving economic growth became apparent (Pashaiefam, 2011). According to the World Bank in 2011, Asian banks including Iran almost allocated half of their funds for import capital and after Barjam agreement it has been special significance. This requires that the efficiency of the banks as the main source of financing in developing countries such as Iran was especially important. This is particularly important due to the reduced policies of the government and in line with the policy of privatization of banks or the formation of new private banks on the one hand and economic conditions in the country after the

lifting of sanctions and affected by the development of domestic and foreign investment in economic development on the other hand. Affected by the policies of economic liberalization, development of foreign investment in Asian countries, including Iran will be realized which lead may investment in the foreign companies, multinational corporations or economic unions.

Performance in the banking system can be assessed from different angles. A number of studies have been carried out based on the evaluation of processes and review or audits and the procedures. The second category of these studies evaluated the quantitative performance of banks. Research based on performance quantitative assessment has been divided into criteria as profitability, efficiency, effectiveness, risk, productivity, liquidity and similar cases. The other division for quantitative assessment is based on an approach used in assessing the explained performance. In performance index, two or more inputs are combined to define the bank’s profitability and liquidity ratios and compare the performance of different banks or branches with each other or with their past expected performance. Based on econometric approach, a generally linear parametric is defined between the accounting or operational

performance metrics with other accounting variables. Based on mathematical modeling approach, they estimated the optimal situation and judged the estimates and the actual performance of banks (Levintal, 2015). Due to the special circumstances that prevailed in the banking system and their central role after the agreements for resolving of economic sanctions on the country, this study investigated the performance of banks listed in the Iran exchange with liquidity standard based on Levintal (2015) Model and an econometric approach. This study was conducted to answer to these basic questions: what is the effect of liquidity growth rate on reserves of banks listed in the Tehran Stock Exchange?

### **Theoretical principles of study**

**Bank deposits:** Saving is separated into both voluntary and compulsory in terms of willingness to do saving. Voluntary saving is defined as the personal act of households and individuals. The voluntary saving is the best way to finance because it indicates that society has not consumed its earnings based on the present and future preferences. In a developed country with relatively efficient financial markets, these savings flow to the securities market and the banking system and provide significant financial resources to expand the economic system (Behmand and Behmani, 1998). In compulsory savings resulting from group decisions or government, consumers are forced to ignore purchasing some goods. This is equivalent to compulsory saving. What is more emphasized is the inflation created by printing money which is more beneficial for the government. Money creation leads to inflation which in fact is realized by increasing aggregate demand and increased the profit and share of profits in national income. This means that inflation changes income distribution with low saving level for classes with high saving. Thus, the saving created in this way is often called compulsory saving (Tafazoli, 1997).

**Bank reserves:** Today one of the tasks for central banks is the implementation of monetary policy. Monetary policy objectives can be summarized as the measures set by the money (Central bank) for controlling of the economic activities and accelerating economic growth, full employment, stabilizing the general price level, balancing of external payments. For the implementation of monetary and credit policy, central banks and monetary authorities of countries utilize the leverage and the following tools (Noulas *et al.*, 2008):

- Deposits of legal reserves
- Facilitates of the re-discounting and its rate
- Open market operations

- Direct control of credit
- Determination of the liquidity ratio of banks

In the studies carried out by Keynes, Tobin and Baumol, distinction between demand and speculative trading is of particular importance. However, Friedman examined money demand in traditional microeconomic theories about the behavior of the consumer and manufacturer demand for production factors. Since, the deposit is in fact a form of saving and many effective variables in the demand for money actually influence on the volume of deposits and the fact that Friedman's theory of money demand has regarded the return of money as the other alternative for assets the study investigated the variables affecting the volume of deposits based on the above theory.

**Bank reserves ratio:** In many cases, banks are required to hold part of their deposits with the central bank. The ratio is called as legal reserve ratio and the blocked deposit with the central bank is also called legal deposit. The legal reserve of banks as one of the tools of monetary policy has many advantages compared to other instruments. For example the effect of legal reserve ratio changes of commercial and private banks is reflected in all the country's banks. Assets of a bank are the bank's cost of funds. Thus, asset management decision making in choosing between different types of investments and asset allocation can be categorized as the base for liquidity criteria (or return) in the banks. These assets are used in different areas to provide liquidity, generating income and raising funds to the market activity in the bank (Gertler and Kyotaky, 2010). In the West's economy, the banking system consisted of central bank and various deposit institutions. In this system, depository institutions hold two types of reserves (Branson, 1994) as follows.

**Legal Reserves (RR):** By law, depository companies are required to set aside their part of their deposits to the central bank. These reserves are firstly kept in the banks for the prevention of the potential influx of depositors to bank; yet with the possibility of insuring deposits, the requirement was dropped and today legal reserves are hold as instruments of monetary policy for the central bank.

**Excess Reserves (RE):** Deposit institutions prefer to hold extra reserves to make use of them if necessary. Decisions about the maintenance of excess reserves for a bank are similar to decisions to discretionary demand for money. Banks hold reserves in order to meet their demands for cash or payments to other banks. Therefore, the

choice of excess reserves rate over legal reserve depends on three factors. These three factors are uncertainty for the bank's net deposit flows, discount rates, market interest rates. The bank will hold more excess reserves. As the discount rate increases, excess reserves are increased, and while the market interest rates rises the amount of reserve is also reduced (Dornbusch and Fischer, 1995).

**Return on assets:** Return is defined as the benefit and profit from an investment. Investment is defined as allocation of funds for real assets such as land and house and financial assets including securities with proportional risk and the expected returns. Total return is the ratio of total income (losses) of investment in a given period by the number of ordinary capital for earning the income in the same period. Earning of an investment is gained in two ways (Ghajar *et al.*, 2011).

- Change in value and the original price of capital such as shares purchased
- Benefits of investment capitals as cash dividend.
- Investment return is included "quantitative" and "qualitative" returns which is described as follows:
- Quantitative return: earnings (e.g., EPS)
- Capital gains

**Qualitative return:** Company reputation (e.g., goodwill) On the other hand, returns can be divided in terms of time as follows:

- Past returns
- Future returns

The past return is measured by the group's return investment ratio and the ratio of "adjusted ROA is a good option. This ratio is calculated as follows (Ghajar *et al.*, 2011).

**The adjusted asset value/profit after tax:** In theory to calculate the future returns of investments, "profitability index" can be used. Factors affecting investments in future returns are shown in the Fig. 1. The graph shows that the "return" is one of the random variables of "value identification" which itself is a function of random variables. And this simple "dependence" word makes very difficult to determine the value. Until the 1940s, risk has been considered as a qualitative concept, yet from 1940s and especially with works by Markowitz in the 1950s, risk became a quantitative concept. The "variance" of cash flow was firstly introduced as an indicator of the risk in different economic conditions and later the "coefficient of variation as an indicator of relative risk was

reported. From the 1960s onwards  $\beta$  factor was considered as a risk concept.  $\beta$  is called coefficient of correlation between market efficiency and investment returns to the same market. Therefore, in order to achieve the main objective of the research the following main hypothesis has been proposed and tested:

- H: By increased the return on assets the bank reserves rate listed in the Tehran Stock Exchange are increased

**Literature review:** Ho and Zhu (2014), in a study entitled as the evaluation of the performance of Bank of Taiwan examined 41 Taiwan's banks for the effectiveness and efficiency. In this study they have used a two-stage data envelopment analysis model for the assessment. Firstly, the assets needed to generate income to evaluate the efficiency are examined. Santomero and Watson (1977) in a study entitled as determination of the optimal standard capital for banking industry showed that by imposing strict rules for the capital market, banks reduced their credit and as a result downfallen produced investments. They argued that from the perspective of society the optimal level of capital to the banking system should be determined through the point where the marginal returns of banks are exactly equal to marginal costs of bank capital. Reynolds *et al.* (2000), in a study entitled as bank financial structure in eight countries in East and Southeast Asia between 2007 and 2014 prior to the crisis concluded that profitability and loan priority of bank are directly related to the bank size but the bank's capital adequacy inversely associated with size has decreased.

Moga in a study entitled as banking crisis in Uganda: the role of new investment, after reviewing the performance of commercial banks during the crisis years of 2011-2012 showed that the new capital requirements have positive impact on the performance of commercial banks in an increased deposits, cash assets, paid in capital the original capital and total capital and net earnings and concluded that the lack of minimum capital in accounting for portfolio risk control of banks can be one of the major factors for the bank's bankrupt. Ho and Hsu (2010) in a study entitled as leverage, performance and capital adequacy ratio in the banking industry in Taiwan examined the relationship between the financial structure of corporates and venture capital strategies in the Taiwan banking industry and showed that the limits of capital adequacy ratio are under the influence of venture capital company's strategies and corporate performance is directly associated to the size and financial leverage and financial costs (Franklin and Kocakola, 2009) in a study as activity based costing and asset

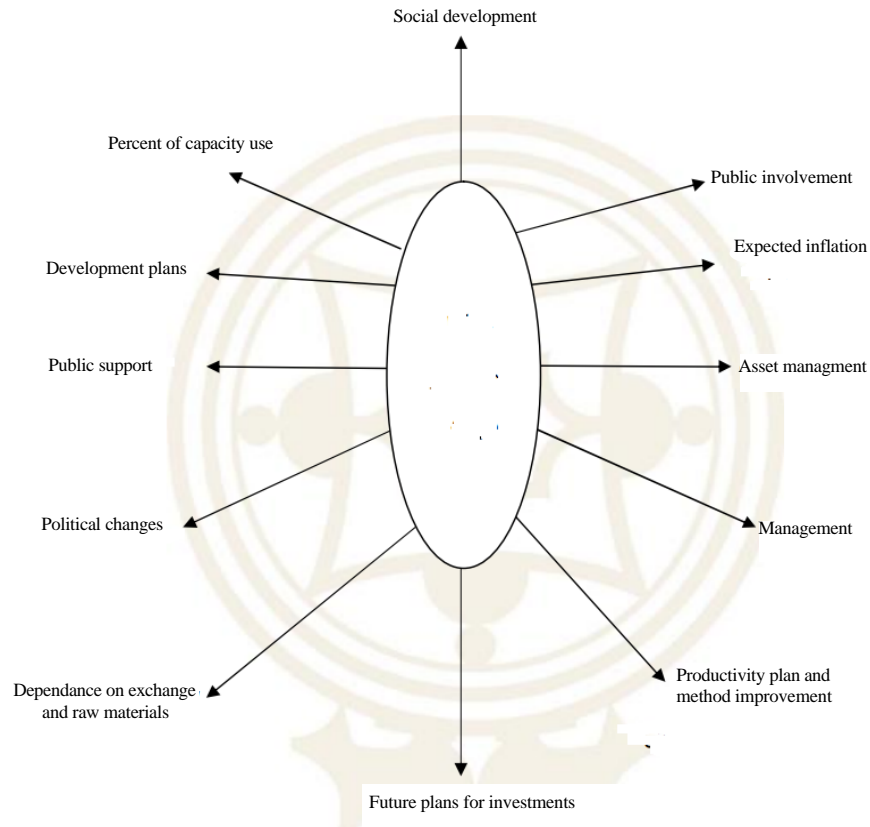


Fig. 1: Factors affecting performance (Ghajar *et al.*, 2011)

management in the banking industry examined the relationship of banking services in America as “the managed asset plan. Their results show that other factors must be considered as the main cost factors. As a result, the cost of providing services in the costing system should be allocated on the basis of other factors.

### MATERIALS AND METHODS

In order to collect data and theoretical background of the research, library research method has been used in this study. To illustrate some of the theoretical foundations of research and collecting and theoretical research, library website and publications, e-Books and study have been employed as a complementary tool in the study. In order to achieve the required data for the calculation and statistical analysis, inference in the form of answers to the research questions of the study, documents have been provided according to information by the firm. In this context, financial statements and explanatory notes and financial documents related to the measured variables in the surveyed companies have been

used. The population of this research consisted of commercial banks listed on the Tehran Stock Exchange and the sample size was chosen based on the systematic elimination method.

- The bank should be based in Iran and its equity and capital should belong to natural or legal investors in Iran
- It should be operated under the supervision and licensed by the Central Bank of Iran
- Its fiscal year should be ended in 29/12 and in the 5 year period it should have not changed its fiscal period ending in 29/12/2014
- Prior to 2009, it should become a member of Tehran Stock Exchange
- Their performance data about the variables should be calculated or accessible

Due to the paucity of studied banks and also the number of dependent and independent variables in the regression estimates and ultimately cost considerations based on very limited sampling, random sampling was not

used and therefore the sample size was consistent with statistical, i.e.,  $N = n$  and has been determined as 5 non-random sample of 16 banks.

**Evaluation of variables:** In this study based on similar or related literature, dependent, independent or control variables have been measured or calculated as the followings:

**Bank reserves:** According to empirical study by Levintal (2015), this variable as a dependent variable has been obtained from division of deposits of natural or legal customers with banks by the total assets of the bank as a relative quantity and is expressed by multiplying by the hundred. The deposits have been deposited in banks in a variety of loan, short term, long term and current accounts.

**Return on assets rate:** This variable is known as a measure of profitability and is considered as the first independent variables in this study. Return on assets or ROA is the total return on investment. Return on investment shows that each bank for total capital (total assets) at its disposal has created return or interest. This variable was known in the financial literature, based on Levintal (2015) has been defined by dividing the net profit or profit after tax by the bank's total assets at the end of the period and sometimes multiplied by hundred and is defined as a quantity.

**Facility:** Facility is the first control variable in research and represents the bank's expanding or contracting policy in the allocation of credits to customers or entities. This variable is obtained based on the research by Sohrevardi and Aiimie by dividing the total facilities granted by banks to natural or legal customers by the total deposits of customers during the fiscal year.

The increased rate has been regarded as expansionary policy or bold strategy in the granting facilities and its decreased rate represents a conservative policy or risk aversion of banks and restrictive practices in granting facilities to customers.

**Size:** Size has been defined as other control variable in different research based on number of employees, sale natural logarithms, turnover log the total assets logarithm or value logarithm. In this study, based on the research by Monsef and Mansouri (2009) the size of each bank has been calculated based on the natural logarithm of total assets at the end of the period.

**Growth opportunities:** Growth opportunities as a control variable provide increased prices of bank shares as opportunities for increased return on investment compared to other banks. Based on a survey by Kheirabadi (2014), growth opportunities are defined as the market value to book value per share at end period and in terms of order. Literature review shows that in fact in the companies with the index less than unity it means that its stock price has been increased.

**Earnings volatility:** Earnings volatility is considered as other control variable. Based on a survey by Kheirabadi (2014) it represents a change in earning per share compared to the past. For calculation the earning of per share during the period minus the bank's earning of per share in the prior period (change in earnings per share) is divided by earning per share in the previous period which usually is expressed as multiplied by a hundred as percent.

## RESULTS AND DISCUSSION

**Data analysis:** The relationship between dependent and independent variables was determined based on linear regression analysis of panel data in by EVIEWS Software ink and after the estimation of the regression equation parameters, its validation has been proved based on the coefficient of determination. Student's t and Fisher tests were used as the independent variables to determine the relationship between variables. Presuppositions have been evaluated based on the type of panel data.

**Determination of panel data analysis:** According to the model used in the study by Kashyap and Stein (2004) and adjusted variables by Levintal (2015) as well as restrictions on the sample size of Iranian Stock Exchange banks and the large number of variables in estimating equation the use of cross-sectional regression did not significantly contribute for each year. To specify that relationships estimation has been conducted between variables by using panel data or integration methods, Chow test with F-Limer criteria have been used and test results are summarized in Table 1.

F Limer statistics in Chow test and its corresponding meaningful level was calculated as 0/0135. The likelihood or significance level obtained in this test tends to be zero and is  $<5\%$ . Based on the significant level it can be stated that the test result was significant at 95% confidence level and it should be used for the estimation of the relationship between the variables based on linear regression estimation. After determining the constant intercept of the estimated regression equation the fixed or

Table 1: Summary of the chow test (F-Limmer)

Relationship estimation	F statistic	Significance level	Test result
Relationship between bank reserves and facilities	242/2901	0/0135	The appropriateness of use of panel data

Table 2: Assessment the choice of fixed or random effects (Hausman test)

Relationship estimation	Chi-two statistic	Significance level	Test result
Relationship between bank reserves and facilities	58/0125	0/0024	The appropriateness of use of panel data

Table 3: Parameters of the relationship between bank reserves and facilities

Description	Symbol	Parameters	SD	t-statistics	Significance level
Width from the origin	$\alpha$	12/742	3/796	3/406	0/001
Liquidity fluctuation	$\Delta$ Cash	0/051	0/041	2/257	0/016
Facilities	Facility	-0/197	0/405	-1/99	0/031
Size	Size	-4/170	1/425	-2/292	0/011
Growth opportunities	MB	3/200	0/246	2/225	0/017
Volatility earning	$\Delta$ Earn	0/093	0/051	1/810	0/045

Validation relationship; coefficient of determination: 0/875; Adjusted coefficient of determination: 0/835; Relationship generalizability; Fisher statistics: 6/937; Fisher significant level: 0/000

random effects methods should be selected based on the relationship between the variables. For this purpose, Hausman test was used in similar or related researches and the results of these tests are summarized in Table 2.

Square K statistics for Hausman test in regression estimation is 58/0125 and its corresponding significant level tends to be almost 0 and 0/0024, respectively. Considering the significance level of <5%, the result is significant at 95% confidence level. So in this study, 95% confidence level regression model using panel data analysis model to estimate the “fixed effects approach” is appropriate.

**The analysis of relationships between variables**

**The main hypothesis results:** The aim of research hypothesis is the relationship between the return on assets and bank reserves. Based on extensive testing and analysis, linear regression analysis using assumptions based composite panel data showed that the remaining variables had normal distribution, linear independence of the independent variables and errors in estimating the relationship was established as well as the stability between variances and the results of Chow and Hausman test. Thus, the relationship between variables was estimated using linear regression based on an analysis of panel data with fixed pattern and the results are summarized in Table 3.

The logical relationship between variables or research model has been defined based on Kashyap and Stein (2004) patterns and modified variables based on the Levintal (2015)’s research in a parametric linear relationship defined equation:

$$\text{Reservation} = 12/742 + 2/003 \text{ROAd} + 0/051/0 \\ \text{Cashit} + 0/803\beta \text{Capitalist} - 197/0 \text{Facility} + 4/170 \\ \text{Size} + 3/200 \text{Mb}_{it} + 0/093/0\beta \text{Earn}_{it} + \epsilon_{it}$$

Based on the mathematical relationship estimates the coefficient of this variable is calculated as

$\beta_2 = 0/051$ . “The positive estimated coefficient” for the volatile independent variable or return on assets suggests a “direct relationship” between return on the assets with bank reserves in random sample of firms. Based on the coefficient estimates with an increase of 1% in the profitability and return of assets in the banks surveyed, the bank’s deposits rate is also increased at a rate of 0/051. Thus, according to the analysis we can conclude that there is a direct relationship between the bank reserves with return on assets in the random sample. The coefficient of estimation is 0/875 and 0/835 in the adjusted condition and shows that the percentage of change between return on assets and bank reserves is expressed by the estimation relationship. Considering that the mentioned factor tends to be hundred, there was a relatively strong linear relationship between independent variables and the dependent variable of bank deposits, control of return on assets, fluctuating liquidity, capital adequacy ratio, facilities rates, bank size, growth opportunities and earning volatility the estimated relationship between the variables had relatively full explanatory power. To generalize estimation of random sample, Student’s t-test parameter with  $\beta_2$  criteria was used. Student’s t-test results are summarized in the above Table 3. Based on the t-statistic results the rate of return on assets variable was equal to 2/004 and 0/023. Since, the calculated significance level was 0/205, there was a significant linear relationship between return on assets and bank deposits among the banks listed in the Tehran Stock Exchange at 95%. So, one can say with 95% confidence that there is a direct linear relationship between return on assets and bank reserves in the exchange stock. The significance level in Fisher test corresponding to F statistic tends to be zero and is supported by Student’s t-test results. Based on interpretation and also validation on generalized correlation coefficient and Student’s t-test and Fisher’s based it can be concluded. “There is a direct relationship between the relatively strong return on assets and bank reserves in the study”.

Table 4: Parameters of the relationship between bank reserves and facility

Description	Symbol	Parameters	SD	t-values	Significance level	Relationship
Facilities	Facility	-0/197	0/405	-1/99	0/031	Reversed
Size	Size	-4/170	1/425	-2/292	0/011	Reversed
Growth opportunities	MB	3/200	0/246	2/225	0/017	Reversed
Volatility earning	$\Delta$ Earn	0/093	0/051	1/810	0/045	Direct

Validation relationship; Coefficient of determination: 0/875; Adjusted coefficient of direct; determination: 0/835; Relationship generalizability Fisher statistics: 6/937; Fisher significance level: 0/000

**The relationship between other variables and bank reserves:** This section outlines the relationship between the control variables and the dependent variable in the bank reserves of the research. The results are summarized in Table 4.

Based on Table 4, according to the negative coefficient of variables, the correlation between the facility rate and the size of banks with banking stocks has been reversed. "The positive estimated coefficient" suggests a "direct relationship" between growth opportunities with bank reserves. The significance level corresponding to the T statistics with control variables has been 0/031, 0/011, 0.017 and 0/045, respectively and in all cases was <5%. Thus, at 95%, the significant relationship between the dependent variable and bank reserves can be accepted.

The coefficient of estimation is 0/875 and 0/835 in the adjusted condition and shows that the percentage of change between cash flows and bank reserves is expressed by the estimation relationship. Considering that the mentioned factor tends to be hundred, there was a relatively strong linear relationship between dependent variables and the independent variable, control of return on assets, fluctuating liquidity, capital adequacy ratio, facilities rates, bank size, growth opportunities and earning volatility, the estimated relationship between the variables had relatively full explanatory power.

## CONCLUSION

The results showed that the rate of return on asset has a relatively strong positive effect in the reserves of banks listed on the Tehran Stock Exchange. Comparing our results with Kashyap and Stein (2004), Levintal (2015) shows that the results of these two studies were consistent and in both studies there were positive and significant relationship between the rate of return on assets as a measure of financial risk or financial structure and bank reserves or different rates on deposits to attract banking customers. The rate of bank reserves suggests that with increased efficiency of the management of banks to augment ROI and increased level of profitability of banks in relation to total assets and resources employed have also increased the level of bank reserves.

In addition, by comparing the bank it can be concluded that new private banks including Pasargad and Nowin Eghtesad had more return on assets and profitability in comparison with other banks and thus were more successful to increase the level of their bank reserves.

The summary of assumptions analysis, estimates and interpretation of complex linear regression analysis, validation and generalization of estimated relations showed that the return on assets (profitable banks) has a positive effect on bank reserves (amount of current deposits, short and long-term customers) in banks listed in the Tehran stock exchange,

The results showed that there was a direct association between the profitability of banks based on the measures of return on assets or Return on Assets (ROA) and bank reserves or attraction of customer's deposits. In other words, banks that had more profitably hold more bank reserves and attracted more customers to deposit in banks or short or long term accounts. Accordingly, despite the fact that in accordance with policies issued by the central bank, interest rates have been almost coordinated, clients had more tendency on the profitability of banks by their deposit.

The results showed that there is a direct relationship between the growth of liquidity in banks with attracting deposits of customers. Therefore, it is recommended to banking authorities for attraction of more financial resources through increased reserves or customer deposits so that they may implement it by optimal investment and optimal allocation and facilities for profitable purposes. Investment advisors are also recommended to analyze banks as measures of profitability, growth, liquidity and capital adequacy so as to provide optimal investment decision-making.

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