Investigating the effect of total capital ratio on bank liquidity of the banks listed in Tehran stock exchange

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Abstract
Today banking industry is considered as one of the most important sections in economy. Banks facilitate commerce and business by organizing receipts and payments, and provide the basis for economic growth by equipping large and small amounts of savings and leading them toward manufacturing corporations which in turn requires correctly managing liquidity. One of the most important challenges that the banks are faced with is that most of the resources of the banks is supplied from short term deposits, while bank facilities are used to invest in assets which have a low degree of liquidity. Due to the importance of this topic at present, the effect of total capital on the liquidity of banks listed in Tehran Stock Exchange has been investigated from 2010 to 2014. The statistic sample includes 18 commercial banks which were selected by systematic elimination. We used linear regression and correlation to investigate the research hypotheses. Required data was obtained from Bourse (exchange) official website as well as Rahavard-e-Novin software, and then initial processing was done through Microsoft Excel. For data analysis and hypothesis testing Eviews software was used. The experimental evidence from data indicates that the degree of total capital has a positive meaningful effect on liquidity of the banks listed in Tehran Stock Exchange.

Keywords: banking industry, bank, total capital, liquidity, Basel committee.
Introduction

Banking industry is a main and very important industry in the world and due to its effectiveness in managing the liquidity of a country, it is considered as one of the most important parts in financial system and an economic motive for every country. Banks as the most important financial must have a correct management on their liquidity in order to develop and expand their business and not to be faced with liquidity risk. Liquidity management is one of the biggest challenges that banking system is faced to. The main reason for this is that the majority of the banks resources are supplied from short term deposits. In addition, the bank facilities are used to invest in assets with a rather low liquidity degree. The main task of a bank is creating balance between short term financial commitments and long term investments and the lack of this balance leads the banks to be faced with liquidity risk. Liquidity risk results from the failure of banks to repay liabilities like deposits or supply fund for bank facilities on time. Liquidity management means that banks ensure to fulfill their contractual obligations completely. In fact, liquidity management is the ability of banks to manage their debts, in line with development of facilities portfolios, such that banks can compensate resource shortage as soon as possible and with reasonable cost. So liquidity analysis not only requires banks managers to evaluate their banks liquidity continuously, but also make them investigate how it is possible to supply liquidity requirements under different scenarios including unfavorable conditions (Basel committee, 2000).

Theoretical foundations

Today, if economy policy makers of a country want to use the world experience regarding banking challenges and risks, they have to improve their banking system health by applying certain principles. This in turn requires understanding banking operations and a long term insight in economy and its clarity and a wide range of studies. “Principles of effective bank control” have been designed by Basel committee to support a powerful, flexible, sensitive and stable financial sector based on the economic fundamentals of a country. These principles aim at creating a financial system which is appropriate for any market and maintains it stable and efficient under a wide range of situations and market conditions. All the banks of the world have to adapt their conditions and rules in accordance to these standards. One of these is keeping banks liquidity at a standard level that they can cover their customers’ needs and prevent probable financial crises to occur. Bank liquidity management involves predicting and fulfilling liquidity requirements with minimum cost (Arab Mazar and Ghanbari, 2006). In other words liquidity involves predicting bank liquidity requirements in order to respond to unexpected fluctuations of bank balance sheet as well as absorbing new resources to pay facilities and consequently making income. Therefore maintaining liquidity in a favorable level is a main task of banks and ignoring it will lead to liquidity risk. If a bank fails to fill the liquidity gap, it will be faced with liquidity problems and consequently other issues like High interest rate risk, reputation risk, and ….

Also, supplying appropriate and sufficient capital is a necessary condition to maintain a bank system healthy and every bank must create an appropriate ratio between its capital and the assets risk to assure stability of its activities. This ratio is called total capital ratio. Because of the
protect it makes against unexpected financial losses, maintaining adequate capital proportional to the risks will be the main resource for creditors and investors to trust the banks and since a part of each bank assets is its liquidity, ignoring to it would lead the banks to be faced with liquidity risk (regulations of total capital, money and credit council).

Due to the privatization process and since the banks are getting far from the secure environment of public ownership and being approved in securities and Stock Exchange organization, increased profitability has been considered as the most important motivation for the banks listed in stock exchange organization; because the main index of the price of bank stocks in securities and stock exchange organization and the shareholders’ expectations from the managers and the complex in which they have invested, is that the managers maximize their wealth by correctly managing liquidity. Total Capital ratio which is a key index in in analyzing the status of banks capital indicates to what extent the bank assets are invested in an appropriate basket and how their risk condition is. Therefore maintaining adequate capital and keeping the risks resulted from assets as low as possible to confront banks financial crises and assure stability of their activities is necessary and ignoring them will face the banks with liquidity risk. Since fulfilling shareholders’ expected profit and keeping the stock price of the banks in market requires much more serious attitude and actions regarding achievement of favorable liquidity indices, then this study aims at investigating the effect of total capital as one of the special and sensitive banking indices on the liquidity of the banks listed in Tehran stock exchange organization, so that its results provide useful information for policy makers regarding money and finance in the central bank as the institution codifying monetary and fiscal laws of the country, as well as banks managers and employees and financial analyzers and investors.

Literature review

Foreign literature

Muga (2002) in a study with the title “the effect of new capital requirements on banking industry in Uganda during critical period 1998-1999”, showed that new rules and requirements related to capital have a positive effect on the performance commercial banks at the time of increasing deposits, assets, banks capital, and net profit and concluded that not maintaining minimum adequate capital to control the risk of portfolios of banks assets can be a main factor in bankruptcy of the banks. Patrick Van (2012) in his article with the title “credit ranking and standardizing liquidity risk in Basel II” investigated the relationship between total capital and banks liquidity risk using the information related to active banks of seven countries including Canada, France, Italy, Japan, Sweden, Britain, and the USA during the years 1988 to 1995 and showed that there is a reverse relationship in total capital ratio and liquidity risk ratio of the studied banks. Cucinelli (2013) in a study titled “factors influencing liquidity risk of the commercial banks in European countries” investigated the relationship between liquidity with total capital, quality of assets, and privatization and tried to determine which variables influence two new indices of Basel committee that are liquidity coverage ratio and net stable funding ratio and are related to liquidity risk. The study emphasizes that the selected variables influence both indices of liquidity risk. The results of this study also indicate that if total capital ratio and
quality of assets decrease, banks liquidity will face with crisis and banks are exposed to liquidity risk.

Panigrahi (2014) investigated the relationship between total capital and working capital with liquidity, profitability, and the ability to pay debts. He refers to the fact that liquidity is the ability of bank to fulfill short term financial commitments, and a company which fails to fulfill its short term commitments; it takes one step toward bankruptcy. So the companies must keep an adequate level of working capital in order to fulfill its current commitments and keep its business operations. The results indicate that increasing capital specially working capital leads to increased liquidity and giving importance to liquidity leads the investors to trust in the company, and consequently leads to increased profitability and its success.

Romana and Sargu (2015) performed a study titled “investigating the effect of special bank factors on the liquidity of commercial banks” in the countries Bulgaria, Scheck Republic, Hungary, Latvia, Lithuania, Poland, and Romania during the period 2004-2011 and achieved favorable findings. They investigated the effect of the most important banking indices such as total capital ratio, profitability, and quality of assets and debts on liquidity of banks. The reason for choosing such indices was that at the occurrence of liquidity crisis, banks can control the situation and manage liquidity in a reasonable way through adapting necessary strategies by their managers. Their findings indicated that bank liquidity is directly related to total capital ratio and improvement of this ratio leads to increased liquidity index of banks.

**Domestic literature**

Heidari (2006) in a study titled “investigating the relationship between total capital ratio and financial variables in banking system of Iran” studied the relationship between total capital ratio, liquidity risk, credit risk, profitability ratio, and bank size in banking system of Iran during the years 2000 to 2005 and concluded that there is a meaningful reverse relationship between total capital ratio and financial variables, while the effect of the changes in credit risk ratio of banks on total capital ratio is less than the other financial variables.

Pedram et al (2008) in their article with the title “predicting bank liquidity flow to determine the liquidity gap in private banks” emphasize on the fact that when banks don’t have adequate liquidity, they are not able to supply required resources through transforming assets to cash with reasonable speed and cost and this will influence their profitability. Hence profitable banks prefer to increase their capital from their own accumulated profit rather than referring to capital markets. Souri and Vesal (2008) in their article with the name “new method of funding and liquidity management in banks” introduced common tools of liquidity management in traditional banks and investigated tools of liquidity management in Islamic banks. Mehrara and Mehranfar (2013) studied “bank performance and economic factors in risk management” in the period 2001 to 2009 according to the data collected from 15 public and private active banks in the country. For this purpose they considered total capital ratio as the index for inefficiency of managers and banking risk and the factors influencing it were classified to two groups, in-bank indices and economic factors. The results obtained from estimation of regression model through board data indicate that the ratios of liquidity, profitability, and operational inefficiency as well as economic
growth have positive effect and credit risk and inflation rate have negative effect on total capital ratio as the index for efficiency of bank risk management. Sepehr Doust et al (2013) in their study titled “investigating the factors influencing total capital ratio in banks of Iran” during the years 2006 to 2010 showed that there is a positive meaningful relationship between bank liquidity, rate of return on assets and total capital ratio, such that by increasing total capital ratio, banks tend to increase the risk of portfolios and keep assets which have higher risk and efficiency, and hence banks with higher income maintain more capital. The results showed that variables like liquidity and turn on assets rate have a positive meaningful effect and variables such as bank size, contribution of granted facilities, rate of efficiency of the rights of shareholders, loss reserve of the facilities, and financial leverage have a negative meaningful effect on total capital ratio, while meaningful relationship between contribution of deposits and total capital ratio was not confirmed. Vatanparast et al (2014) in their study, “investigating the relationship between bank ownership concentration, total capital, liquidity, and stability of capital in the banks listed in Tehran stock exchange” studied the effects of ownership concentration on banks risk taking. The reasons for choosing the banks listed in Tehran stock exchange was that these banks were more successful in performing standards of Basel Committee and creating a high level of control convergence. The results of this study indicated that increasing intensity of ownership leads to improved total capital and market disciplinary has a significant effect on total capital, liquidity, and capital stability through ownership concentration. Also in sample banks increasing total capital ratio leads to increased liquidity and improved capital stability. Bina (2015) in an article titled “necessity of increasing power of banks” studied the necessity for updating the banking regulations in Iran, adapting them with international standards as soon as possible specially regarding calculating total capital ratio. He refers to the fact that the regulations by Basel committee include three main bases that are capital requirements, control requirements- corporate governance as well as releasing information and other issues like liquidity; in capital requirements, total capital ratio represents the capability of banks to preserve capital and continue bank activities in normal and critical conditions. Presently, according to Basel II regulations this ratio is 8%, but in Basel III regulation whose implementation is obligatory for all banks from 2019, banks are obliged to save part of their profits which equals to 2.5% of bank capital, each year; hence the ratio is increased to 10.5% and if a bank fails to provide the required capital, distribution of profits among shareholders will be prevented. Because of the importance of the topic, this author investigates the relationship between total capital and liquidity and quality of bank assets. His findings show that increases total capital leads to increased bank liquidity; also the banks with high degree of non-current facilities (demands) have lower total capital as well as lower liquidity because of increased risky assets.

**Research hypothesis**

In line with the above theoretical foundations, the following hypothesis is presented:

“Total Capital ratio has a positive meaningful effect on liquidity of the banks listed in Tehran stock exchange”
Methodology

Statistical population and sample

Statistical population of this study includes those banks approved and listed in Tehran stock exchange during the years 2009 to 2014. Statistical sample includes a limited number of sections of population which are representative of the main features of population (Azar & Momeni, 2010). In order the sample to be an appropriate representative of the population, we used screening method (elimination method) for sampling. For this purpose, the following criteria were considered and the banks that qualified all conditions were selected as the sample and the rest were eliminated:

- The bank has been approved in stock exchange since 2009 and is active to the end of 2014.
- Financial year of the bank ends on 19th of March (the last day of Persian year) and its financial year has not been changed during 2009 to 2014.
- Considered banks have continuous activity during the period of research and their stocks have been transacted frequently.
- Financial data of the banks are available.

According to the above mentioned criteria 18 banks were selected as systematic sample of the research which are: Mellat, Saderat, Tejarat, Pasargad, Eqtesad-e-Novin, Sina, Karafarin, Ansar, Iran Zamin, Tat, Hekmat-e-Iranian, Sarmayeh, Saman, Shahr, Ghavamin, Gardeshgari, and Parsian.

So due to the 5-year period considered in the research, the number of observations is 90 year-companies.

Variables and calculation methods

A variable is a feature, situation or status which is transformable to quantity and the researcher is testing his/her hypotheses by manipulating, controlling, and observing it. According to their role in a study, variables are classified to three groups, independent variables, dependent variables, and control variables. Below, we explain how they are calculated.

Independent variable

- Total Capital ratio: total capital ratio is a ratio for measuring performance health and financial stability of any financial institution and bank, which is calculated by the following relation: (regulation of total capital, money and credit council)

\[ \text{Total Capital ratio} = \frac{\text{basic capital of bank}}{((\text{asset items above the line of balance sheet} \times \text{risk factor}) + (\text{items below the line of balance sheet} \times \text{coefficient of conversion factor} \times \text{risk factor}))} \]

Dependent variable

- Liquidity: liquidity for the bank i during the time t equals to the ratio of payed facilities to the total absorbed deposits and is calculated by the following equation:
Liquidity= total payed facilities/ total absorbed deposits

Control variable

- Bank size: the size of bank i during the time t is calculated through natural logarithm of total assets of each bank.
- Regression model of the research: in the present study the following regression model is used:

\[ \text{Liquidity}_{it} = \beta_0 + \beta_1 \text{TCR}_{it} + \beta_2 \text{ILTL}_{it} + \beta_3 \text{IED}_{it} + \beta_4 \text{ROAE}_{it} + \beta_5 \text{ROAA}_{it} + \beta_6 \text{Size}_{it} + \epsilon_{it} \]

Where
Liquidity is the liquidity
TCR: total capital ratio
ILTL: ratio of credits (demands) to total facilities
IED: ratio of payed profit to deposit
ROAE: return on average equity
ROAA: return on average assets
Size: size of bank

Results

Testing normality of distribution of dependent variables

Regarding the data related to liquidity as the dependent variable and using Eviews software, according to table 1, meaningfulness level of jarque-bera test for liquidity variable is higher than 5%. In other words liquidity variable is normally distributed.

The results of test of normality of dependent variable distribution

<table>
<thead>
<tr>
<th>variable</th>
<th>jarque-bera statistic</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>liquidity</td>
<td>4/725045</td>
<td>0.094182</td>
</tr>
</tbody>
</table>

Stationary (stability) test of variables

Before estimating the model, it is necessary to test the variables stationary. A variable is stable when its mean, variance, and Autocorrelation coefficients are fixed in time. Totally, if time origin of a variable changes and its mean, variance and co-variance don’t, then the variable is stable and otherwise it is unstable. In the present study Fisher’s ADF test was applied to test the stability of variables.
According to the above table the meaningfulness (significance level) of Unit root test is less than 0.05 in all variables except for “total capital ratio” which indicates that they are stable. So in order to prevent false regression, variables should first be converted to stable variables and then regression model is estimated. For this, we used co-integration method to test the stability of linear combination of variables.

In the present study, co-integration of variables was performed using Dickey-Fuller test to ensure that regression is not false. As it can be seen the meaningfulness level of unit root test of regression disturbance component is less than 0.05 indicating that it is stable. So regression can be estimated and the model can be estimated using the primary variables.

**Dickey-Fuller Co-integration test**

<table>
<thead>
<tr>
<th>Performed regression estimation</th>
<th>Error value</th>
<th>RESIDᵢₜ</th>
<th>Fisher’s ADF</th>
<th>Meaningfulness level</th>
<th>result</th>
</tr>
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<tr>
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<td>I(1)</td>
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</table>

**F Limer test and Hausman test**

F Limer test was used to determine the method of regression model. For the observation whose test probability is higher than 5%, we will use consolidated method and for the observations whose test probability is less than 5%, we will use board (panel) method to estimate the model. Panel method uses two models, random effects and fixed effects. In order to determine which model to be used, Hausman test is applied. Observations whose test probability is less than 5%, use fixed effects model and the observations with test probability higher than 5% use random effects to estimate the model. In the present study, probability of F Limer test of the model is less than 0.05; therefore panel method is used to estimate model. In addition, according to the main hypothesis model probability of Hausman test was less than 0.05 and fixed effects method was used.
### Linearity test

The linearity relationship between independent variables was tested using Pearson correlation coefficient. If this factor is close to zero, then it can be concluded that independent variables have linear independence from each other.

As it is seen in the following table, the correlation between variables which inter the study model simultaneously is poor or average and there is no strong correlation between them. So concurrent entrance of dependent variables in research model does not lead to intense linearity problem.

<table>
<thead>
<tr>
<th>Liquidity</th>
<th>Total capital ratio</th>
<th>Ratio of demands to facilities</th>
<th>Ratio of profit to deposit</th>
<th>Return on average equity</th>
<th>Return on average assets</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity</td>
<td>TCR</td>
<td>ILTL</td>
<td>IED</td>
<td>ROAE</td>
<td>ROAA</td>
<td>SIZE</td>
</tr>
<tr>
<td>Total capital</td>
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<tr>
<td>ILTL</td>
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<td>IED</td>
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<td>ROAE</td>
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<td>ROAA</td>
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<td>SIZE</td>
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</table>
Discussion and conclusion

After the occurrence of financial and credit crisis in the world which first began from banking sector of the USA, Basel committee in Swiss introduced a set of banking regulations aiming at preventing another crisis from occurring. These regulations which apply more strict rules regarding deposits in banks, preserving liquidity, and observing the standard level of total capital, try to apply various solutions to decrease banks risks. “Principles of effective banking supervision” which was codified and declared by Basel, was designed to support a powerful and flexible, sensitive, and stable financial sector according to economic infrastructures of each country. These principles aimed at creating a financial system which is fitted to any market and keeps it stable and efficient under a wide range of situations and market conditions. All the banks in world including our country are obliged to adapt their regulations with these standards. One of these standards is maintain banks liquidity at a standard level that they can cover and fulfill their customers’ needs and prevent potential financial crises from occurring.

Since in our country, several indices especially total capital have significant effect on the liquidity of banking industry and at the present are important challenges in this industry, the hypothesis related to it and its test was performed. The results obtained from testing this hypothesis show that the probability of t for variable factor of “total capital ratio” on liquidity is less than 5%; so estimated factor of this variable is statistically meaningful. According to t-value and p-value of this variable, the results indicate the meaningfulness of this factor at the error level of 5%. In other words it can be said that total capital ratio has a positive meaningful effect on the liquidity of the banks listed in Tehran stock exchange.

<table>
<thead>
<tr>
<th>Variable factor</th>
<th>Standard error</th>
<th>t-value</th>
<th>Meaningfulness level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total capital ratio (TCR)</td>
<td>0.774473</td>
<td>0.383332</td>
<td>2.020372</td>
</tr>
</tbody>
</table>

The present study was performed according to the theory presented by Angela Roman and Camelia Sargu in 2015 in Romania.

Roman and Sargu in a study titled “investigating the effect of special banking factors on liquidity of commercial banks” studied the effect of indices including total capital ratio, profitability, quality of assets and debts on liquidity of banks. Their findings indicated that there is a direct relationship between liquidity of the banks and total capital ratio, since keeping and preserving adequate capital in bank in order to confront potential risks and in sensitive conditions, leads depositors and creditors to trust in bank. Also since part of banks assets consists of their liquidity, ignoring it by banks leads them to be faced with liquidity risk.
Research recommendations

After the steps of a practical research was done, if the research has been performed in a systematic way, the author can express comments about the findings and results along with the study, and also present recommendations to improve and expand the future studies. So in the following recommendations will be presented according to the results of the preset study.

- According to the results of this study and effectiveness of total capital ratio on liquidity of bank, it is suggested that the banks decrease the risk of assets portfolios and preserve the assets with lower risk factor to improve total capital ratio. Also, since a main part of banks assets consists of payed facilities and since facilities flow as well as type of collaterals received for them have a significant effect on total capital and liquidity, it is essential that banks pay a particular attention to the type of these collaterals and in granting facilities, and they receive collaterals with lower risk, so that not repaying of facilities don’t disturb bank liquidity.

- Due to the effect of banking industry on economy of the country, it is recommended that in future studies the effect of expansion and contraction policies of central bank on banks liquidity be investigated.

- According to the requirements of Basel committee about observing the standard level of total capital of the banks and its effect on liquidity, it is suggested that in future studies the factors influencing risk of bank assets be considered.

- It is recommended that in future researches required grounds for implementing the requirements of Basel committee be investigated.
References


