The Simultaneous Effects of Liquidity Risk and Credit Risk on Banking Stability

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Abstract: The effect of banking risks on banking stability is one of the most important issues in financial field. Lack of attention to banking stability in recent years, which has led to the bankruptcy of many major financial institutions and companies including banks in the world, has become the issue of how to prevent crises and attracted the attention of financial researchers and experts, especially in the banking sector. Therefore, the importance of paying attention to credit risk and liquidity risk of banks is becoming more and more important. This study aimed to examine the simultaneous effects of liquidity and credit risk on the stability of the banking system. The statistical population of this study consisted of the accepted banks in Tehran Stock Exchange over the 7-year period from 2009 to 2015 and Generalized Method of Moments (GMM) was used. The results of the research show that liquidity risk and credit risk had a negative effect on banking stability in the study period. According to the results of the research, according to the results of the research and the specificity of the risk of each bank it is recommended to form a risk management unit and to evaluate continuously its effectiveness in order to identify and control the risk in the structure of the approvals and to facilitate effective risk monitoring.

Keywords: liquidity risk, credit risk, stability of the banking system
Introduction

Economic experience, especially since the past two decades, has proven that the economic stability of countries is due to their financial stability. Meanwhile, financial stability of banks as the core of monetary and financial activities is of great importance. Bank stability leads to the optimal allocation of scarce resources to economic activities. Banks, as one of the key pillars of the financial sector, are responsible for providing resources for the real sector of the economy. The optimal allocation of resources, in turn, leads to the optimization of savings and investment and consequently reduces the cost of financing. Economists believe that banking stability plays a key role in economic development and growth. According to them, the difference in the quantity and quality of services offered by banks can be a major part of the difference in the growth rate of financing costs between countries (Ghenimie et al., 2017). Activities of banks and, generally, the banking industry are undoubtedly one of the most important sectors of the economy in each country. The impact of banking risks on financial stability is one of the most important channels in the banking industry (Borio, 2009). The results of empirical studies at the macro level show that although the stability of the banking system, in particular, has no effect on economic growth in a mere neoclassical framework, a developed financial system based on the stability of the banking sector in practice can simultaneously reduce the cost of external borrowing costs and increase the efficiency of savers and also ensure that savings are allocated according to priority to projects with the highest returns. All of these potentially can affect business cycles. Reviewed empirical literature shows that in fact there is a causal relationship between the level of development of bank stability and the rate of capital formation or total productivity of production factors. In spite of this, a developed financial system based on the stability of the banking sector can reduce the level of savings in terms of ease of household access to consumer credits. However, the welfare implications are also evaluated positively, unless there is a meaningful gap between time discount rates of the society and the private sector. Therefore, one of the most important criteria for bank stability is the attention to banking risk. In most economies, banks are the center of the financial and payment system and play an important role in the process of saving funds, identifying investment opportunities, and diversifying risk. Hence, recognizing bank risks is important as an independent dimension of bank stability (Love & Zicchino, 2006). There has also been a lot of research on banking issues in Iran. However, no studies were found on the simultaneous effects of liquidity and credit risk on banking stability. In this regard, it is important to identify liquidity risk and credit risk affecting the stability of banks. That is because considering these factors and their impact on the performance of banks can help companies determine the desired stability. Therefore, this paper reviewing the theoretical foundations of related research attempted to analyze simultaneously the effects of liquidity risk and credit risk on bank stability with the Generalized Method of Moments (GMM).

1. Theoretical fundamentals of research

1.1. Credit risk and banking system stability

Banking crisis, which has severely affected industrialized countries and spread to most developing countries, began with the mortgage crisis in the United States in late 2006 and quickly surrounded American banking network and major credit institutions in Europe. The crisis influencing large financial institutions turned into a massive crisis in financial markets and led to a sharp decline in stock prices and stock exchanges fall. The risk of bankruptcy of some banks and
financial institutions, which is the natural consequence of this process, has led to anxiety and worry in the financial markets and a sharp decline in credit, a depression and an increase in unemployment. In such a situation, households are more concerned about the economic future and reduce their level of consumption, which leads to a drop in sales and a reduction in corporate profits providing ground for unemployment and reduced investment. In other words, this exacerbates the economic crisis. The most important indicator and criterion for any healthy economy is a developed and stable banking system. There is strong evidence that the economic depression occurring after a banking instability is longer and more difficult to get out of. The reason is simple. Exit from economic depression mechanisms, such as the implementation of monetary and fiscal policies, are less efficient in a situation where households and firms are incapable of receiving facilities from the banking system (Ghenimi et al., 2017). The occurrence of the financial crisis in 2008, which was the result of the growing banking instability and especially a dramatic increase in the provision of banking facilities to the private sector, has led to doubts in accepting previous research. Some experts believed that radical deregulation in financial markets based on the theory of financial market efficiency led to the instability crisis. This is because it increased the risk of systematic banking and ultimately led to a fall in the financial sector and a sharp decline in economic growth in all countries of the world (Imbierowicz & Rauch, 2014). Lindgren, Garcia and Saal (1996) stated that at least two-thirds of the IMF’s member countries experienced significant banking issues in the area of credit risk from 1980 to 1996. Although the risk phenomenon and the coping methods are considered to be important for all institutions and organizations in a comprehensive framework of risk management, this set of rules is vital for banks, credit institutions and insurance companies (Kabir et al., 2015). For this reason, global financial organizations such as IMFs, Bank for International Settlements, and some others have been collecting and formulating regulatory risk management methods, including three sets of regulations on risk management methods named Basel (I) discussing two main categories of capital adequacy and classification of bank assets in terms of their credit risk (Cornett et al., 2011). In terms of risk coverage, Basel (II) considered not only credit risk, but also market risk and operational risk, and focused on supervision especially internal banking supervision (Bonfim, 2009). Basel (III) in light of the recent crisis urged banks to double the capital as a precautionary reserve to cover potential losses, to cut off dividends and operating expenses in case of a decline in savings, and to restrict facilities as the economy flourishes. These regulations have been put at the disposal of developing countries and emerging economies in order to succeed in implementing the best global experiences, and avoid trial and error in these areas (Acharya et al., 2016). There is not much time passed since the implementation of capital adequacy regulations based on Basel committee guidelines (based on Basel I) in Iran. Its implementation has actually started in banks since 2003 (Fathe Sepideh, Ghaffari, 2015). Basel I guidelines are much simpler compared to the various and sometimes complex pillars of Basel II. Therefore, this has greatly contributed to its implementation in the form of relevant regulations, titled capital adequacy regulations in Iran. But the actual implementation of the statement in national banks needs to be based on rules on which the supervisory rules could be developed and implemented, and subsequently supervising the good performance. Among the risks that threaten banks and financial institutions, credit risk is one of the most important risks due to its centrality, volume of operations and especially its sensitivity (Khoshnood & Esfandiari, 2011). Credit risk is one of the oldest and greatest risks that exist in transactions and the risk of granted credit remaining unpaid is due to failure to pay off debts. Facilities whose principal is not generally repaid or is delayed are a source of credit risk for banks.
Liquidity risk is one of the most common risks faced by banks. The correct management of liquidity in order to prevent the loss of investment opportunities, the use of surplus liquidity amounts for investment, the granting of new facilities to increase returns, and readiness to deal with critical situations and deficit of cash resources are necessary. Liquidity risk is also the most important risk of the capital market and is the risk of liquidity shortages to cover current costs as well as demands of depositors in banks. This risk implies that banks have no cash resources or sufficient short-term cash assets to pay claims at due date of depositors and borrowers. This risk is caused by three factors: the inability to execute short-term financial commitments, the inability to provide short-term financing when needed, and the inability to provide short-term financing at affordable cost. In most of recent years, bankruptcy of banks has been due to insufficient attention to liquidity risk and resulted in the loss of confidence of depositor and investor owners in the ability of banks to repay their claims (Imbierowicz & Rauch, 2014). To properly manage liquidity, it is necessary to properly identify the appropriate tools and effective factors. One of the most important factors influencing banks’ liquidity is the position of assets and liabilities of banks. On the other hand, asset-liability management is one of the key factors in explaining financial sustainability of the banking and economy sectors. Asset-liability management is an attempt to adapt assets and liabilities with respect to their due time and sensitivity to interest rates. Fundamentally, liquidity risks and interest rates emanate from such incompatibilities (Ghenimi et al., 2017). In December 2006, Basel Committee on Banking Supervisory formed a Liquidity Working Group to examine liquidity monitoring procedures of member states. The task of this working group was to examine monitoring the liquidity of member states. The program included an examination of the type of approach and tools that were considered by the banking supervision authorities to assess liquidity risk and liquidity risk management caused by the development of markets (Iqbal, 2012). The turmoil that occurred in mid-2007 in the market has made the market liquidity particularly important for the banking sector. The attractiveness of liquidity for interbank and market structured products and the increased likelihood of transferring liabilities under the
balance sheet line to the top of the balance sheet led to serious liquidity shortages in some banks and the intervention of the central bank in other cases. These events emphasize the relationship between funding and market liquidity risk, the relationship between liquidity risk financing and credit risk, and the fact that liquidity is considered an important factor in the health of the banking sector (Cornett et al., 2011). In response to market events, the primary tasks of the working group were identified. The liquidity working group made preliminary observations on the weaknesses and strengths of liquidity risk management in difficult circumstances. These observations, along with the study of national liquidity management systems made up the main structure of the working group, which was submitted to Basel Committee on Banking Supervisory in December 2007. The liquidity working group also reviewed the report on “Effective Measures for Liquidity Risk in Banking Organizations” by Basel Committee on Banking Supervisory and as long as it was related to its work and at the request of Basel Committee on Banking Supervisory on updating appropriate procedures (for publication by the committee in the current year) identified the areas that needed to be updated and strengthened. In addition, the working group would keep on working on assessing the reasons and necessities for the diversity of liquidity monitoring systems at the national level. Considering the relevance and appropriateness of the time, Basel Committee on Banking Supervisory issued a report on important findings from the liquidity working group. This document highlights the developments in the financial markets influencing liquidity risk management and discusses national supervisory systems and their related components. It then identifies the preliminary observations of the current crisis conditions and further work of the liquidity working group. The negative balance of bank accounts such as Lehman Brothers, who bought a lot of housing mortgages, triggered the rush of depositors of these banks to receive their deposits and increased liquidity risk of banks. Many depositors were banks and other financial institutions whose failure to claim their claims from the banks meant a negative balance of their accounts. As a result, the liquidity of banks was spread from one bank to another. Finally, the effects of the crisis on the entire financial markets were observed. Insurance companies guaranteeing loans and securities were bankrupt due to the inability to pay a large financial facility and increased credit risk. Banks and international financial institutions such as British and European banks had invested heavily on mortgage-backed assets (proposed by Wall Street). This put many financial institutions in Europe at serious risk (Chava & Purnanandam, 2011).

1.3. Literature

Ghenimi et al. (2017) examined the role of credit risk and liquidity risk on bank stability. The case group consisted of 49 banks in MENA region over the years 2006-2012. Generalized method of moments (GMM) was used to analyze data. The findings showed that liquidity risk and its impact on bank stability and credit risk were separately significant. Mutual relationship also influenced the stability of banks and increased their interactions. Ghosh (2014) in a study entitled "Risk, Capital, and Financial Crisis" examined over 00 GCC member banks during the 1996-2011. In this research, the relationship between risk and capital was examined using 3SLS method and z-test. Findings showed banks generally increased capital in response to increased risk, and not vice versa. Secondly, the impact of legal constraints and the pressure of legal discipline in the bank's attitude towards risk and capital were very effective. In addition, Islamic banks Islamic banks have increased their capital over non-Islamic banks. The evidence also suggested the fact that banks were looking for huge revenues without diversifying their service products, which has led to increased risk.
Cohn and Scatigna (2016) in a paper titled "Banking and the Requirements of Basel Committee" examined the capital ratios of 94 banks in developing countries under the conditions of the global financial crisis. The research variables were the capital ratios and legal regulations of banks and approvals of Basel Committee. Panel data analysis was used during 2009-2012. The results of the research showed that the amount of paid facilities has increased and banks' earnings have decreased and resulted in reduced risk. The findings also found that banks with high capital ratios can increase their risk taking by increasing investment.

Iannotta, and Sironi (2013) in a study entitled "Ownership, Risk, and Performance Structure in Banking Industry in Europe" examined the risk of capital in 210 banks. The variables were risk, the concentration of ownership and different combinations of capital structure. Multivariate regression analysis was used during the period of 2001-2009. The results showed that the risk of default in state-owned banks was lower than that of commercial banks and the role of the ownership and capital structure of banks was effective in the risk of default.

Kilinc and Turhan (2012) explored the factors explaining the flexibility of the Turkish economy to the global crisis and finding monetary and financial responses to the global crisis. They showed that there was an effective communication between banks' risk taking and capital.

Barry et al. (2011) conducting a study on European banks showed that debt and equity structures and equity ownership represented different risk variables in European private banks.

Hasan and Dridi (2010) in a study entitled "Testing Committed Credit Lines" investigated the performance of banks' capital. The results showed that the profitability of Islamic banks were higher than the counterparts of conventional banks before the crisis. However, this difference gradually decreased. During the crisis it was observed that higher profitability before the crisis was not caused by more risk taking.

Kim and Santomero (1988) investigated the risk in banking and Basel bank committee regulations. They observed that risk-averse banks preferred lower levels of capital and there was a negative relationship between risk aversion and the amount of capital. The results also showed that the increase in the final cost of capital was associated with risk through a reduction in capital.

Fathe and Ghaffari (2015) investigated the effect of securities trading process on credit risk and stability of commercial banks in Iran. To analyze the data, a multivariate regression model was used. The ratio of converted assets to total assets as an index of securities trading process, the ratio of risk-weighted assets to total assets as a credit risk index, and z-rank as a bank stability index. The results indicated that securities trading process had no effect on the credit risk and the stability of Iranian commercial banks.

Khoshnood and Esfandiar (2014) considered the legal capital ratio as a new key variable in the mechanism of monetary transfer and risk. This was due to the fact that in recent years it had become more important in the international arena as the role of capital regulations in loan decisions highlighted and tremendous developments in capital agreements formed. In this study, the effect of capital adequacy on bank lending risk during the years 2007-2013 was examined in the form of a panel model for banking network in two groups of state-owned and private banks using seasonal banking data. The results, however, indicated the effectiveness of bank capital in terms of capital adequacy ratios in the lending risk of both groups, no results were found to confirm the role of bank capital in bank lending channel in terms of weakening the effect of monetary policy in either of the two groups.

Azari Panah and Shams (2012) investigated the relationship between default probability and capital structure. In this research, the relationship between capital structure components and default probability of companies accepted in Tehran Stock Exchange has been investigated. The results of this research indicated that there was a significant relationship between capital structure and the probability of a company's default.

Nourani et al (2011) investigated the relationship
between capital structure and return on capital. The results of estimating the model by regression models with panel data indicated that there was a positive relationship between financial leverage and return of capital. Analysis has also been developed to determine the relationship between asset returns and capital structure. The results also showed a positive relationship between debt ratio and profitability criteria. It is worth noting that profitability was defined as asset return and capital efficiency.

2. Method

This research is considered as an applied research. On the one hand, it was based on real information. On the other hand, this research was correlative and based on retrospective events since it can be used in the process of using information. In this study, the basis for testing hypotheses were provided by obtaining information on banks accepted in stock exchange in the past. Generalized Method of Moments (GMM) was used to test between independent and dependent variables. This study aimed to investigate the simultaneous effects of liquidity and credit risk on the stability of the banking system. The statistical population consisted of national banks and the sample consisted of banks accepted in Tehran Stock Exchange for the period of 7 years from 2009 to 2015.

2.1. Model and Variables

In order to investigate the simultaneous effects of liquidity and credit risk on the stability of the banking system, the generalized method of moments was used, where:

\[ Z - Score_{it} = \beta_0 + \beta_1 z - score_{it-1} + \beta_2 Liquidity Risk_{it} + \beta_3 Credit Risk_{it} + \beta_4 Liquidity Risk_{it} \times Credit Risk_{it} + \beta_5 Size_{it} + \beta_6 ROA_{it} + \beta_7 CAR_{it} + \beta_8 Loan growth_{it} + \beta_9 Efficiency_{it} + \beta_{t1} Income diversity_{it} + \beta_{t2} Inflation + \beta_{t3} GDP \]

Table 1: Model variables

<table>
<thead>
<tr>
<th>variable</th>
<th>type</th>
<th>measurement</th>
</tr>
</thead>
</table>
| Bank stability| Dependent | \( Z\)-score = \log(1 + Z) \)  
\( Z = (\text{CAR} + \text{RoA})/\text{SD(RoA)} \)  
\( \text{SD} = \text{Standard Deviation} \)  
\( \text{CAR} = \text{capital to asset ratio} \) |
| Liquidity Risk| Independent | \( \text{Liquidity Risk} = \log(\text{Current Asset} - \text{Liabilities}) \)  
\( \text{Current Asset} = \text{Sum of Total current assets of Bank i at the end of year t} \)  
\( \text{Liabilities} = \text{Sum of Total current debts of Bank i at the end of year t} \) |
| Credit Risk  | Independent | \( \text{Credit Risk} = \left( \frac{\text{CDB}}{\text{TL}} \right) \times 100 \)  
\( \text{CDB} = \text{The cost of Doubtful receivables IN Bank i at year t} \)  
\( \text{TL} = \text{Total lending facility of Bank i at year t} \) |
| size         | control | \( \text{Size} = \ln(\text{asset}) \) |
| ROA          | control | \( \text{ROA} = \frac{\text{EBIT}}{\text{Asset}} \)  
\( \text{EBIT} = \text{Profit before interest and taxes of the bank i at the end of year t} \)  
\( \text{Asset} = \text{Sum of Total assets of Bank i at the end of year t} \) |
| CAR          | control | \( \text{CAR} = \frac{\text{Capital}}{\text{Asset}} \)  
\( \text{Capital} = \text{capital of Bank i at the end of year t} \)  
\( \text{Asset} = \text{Sum of Total assets of Bank i at the end of year t} \) |
| Loan growth  | control | \( \text{Loan growth} \) |
3. Generalized Method of Moments (GMM)

In equations in which unobservable effects of each company and the existence of interruptions of the dependent variable in the explanatory variables are a fundamental problem, the Generalized Method of Moments (GMM) is used, which is based on dynamic panel models. To estimate the model by this method, it is necessary first to identify the variables used in the model. The GMM estimator compatibility depends on the reliability of the assumption of the lack of serial correlation of error sentences and tools, which can be tested by two tests specified by Arellano and Bond (1991). The former one is Sargan test that is pre-determined constraints and tests the validity of the tools. The latter is a statistic that tests the second-order serial correlation in first-order differential sentences. Not rejecting the zero hypotheses in both tests provides evidence of the assumption of lack of serial correlation and reliability of the tools. The GMM estimator is compatible if there is no second-order serial correlation in the error sentences from the first-order differential equation. As in the equation model the dependent variable appears with an interruption on the right side of the equation, a dynamic panel data model can be seen. The general form of a dynamic pattern in panel data is as follows:

\[ Y_{it} = \alpha Y_{i(t-1)} - \beta X_{it} + \mu_i + \varepsilon_{it} \]

where \( Y_{it} \) is the dependent variable, \( X_{it} \) is the vector of independent variables, also used as tool variables, \( \mu_i \) the error factors for sections, and \( \varepsilon_{it} \) is related to the i-th sections at time t. When in the panel data model the dependent variable appears on the right side, OLS estimators are not compatible (Arellano and Bond, 1991). Then, two-stage estimation procedure (2SLS) or Generalized Method of Moments (GMM) proposed by Arellano and Bond (1991) must be used. According to Matyas and Sevestre, the estimation of 2SLS may result in large variances for the coefficients due to the difficulty in selecting tools and the estimations may not be statistically significant. Therefore, the two-stage GMM method was proposed by Arellano and Bond. Arellano and Bond proposed the following differential equation:

\[ Y_{it} - Y_{i(t-1)} = \alpha(Y_{i(t-1)} - Y_{i(t-2)}) + \beta(X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{i(t-1)}) \]

In other words, the first step is to differentiate in order to eliminate the effects of the sections and in the second step, the residuals of the first step are used to balance the variance-covariance matrix. In other words, this method creates tool variables in order to have consistent and unbiased estimates (Baltagi, 2005). The GMM estimator compatibility depends on the validity of the assumption of the lack of serial correlation of error sentences and tools, which can be tested by two tests specified by Arellano and Bond (1991) and Arellano and Bond (1998). The former one is Sargan test that is pre-determined constraints and tests the validity of the tools. The Sargan test
statistic has a distribution with degrees of freedom equal to excessive number of constraints. The second is a serial correlation test that tests a second-order serial correlation in first-order differential error sentences. In this test, the GMM estimator is compatible when there is no second-order serial correlation in error sentences from the first-order differential equation. Not rejecting the zero hypotheses in both tests provides evidence of the assumption of lack of serial correlation and reliability of the tools. In this study, the Sargan test was used to test the compatibility of GMM.

4. Durability test

In regression based on time series variables, researchers usually observe a high R². However, there is no significant relationship between the variables. This problem arises from the fact that both time series variables indicate a strong tendency to time. Therefore, the high R² is due to the time variable rather than the real relationship between the variables. Thus, the study of real or constructive relationship between economic variables is of particular importance. The first step in determining the reliability of a variable is to look at the graph of its time series so that after analyzing the trend of time series, the necessary reliability tests can be performed. Unit root test is one of the most common tests that are used to determine the reliability of a time series process. For this purpose, Levin-Lin-Chu test was used.

<table>
<thead>
<tr>
<th>Variable</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levin-Lin-Chu</td>
<td>-3.91</td>
<td>0.000</td>
</tr>
<tr>
<td>Liquidity risk</td>
<td>-6.65</td>
<td>0.000</td>
</tr>
<tr>
<td>Bank stability</td>
<td>-7.29</td>
<td>0.000</td>
</tr>
<tr>
<td>Credit risk</td>
<td>-11.44</td>
<td>0.000</td>
</tr>
<tr>
<td>Cross risk effect</td>
<td>-11.50</td>
<td>0.000</td>
</tr>
<tr>
<td>Return rate</td>
<td>-4.46</td>
<td>0.000</td>
</tr>
<tr>
<td>Bank size</td>
<td>-7.60</td>
<td>0.000</td>
</tr>
<tr>
<td>Capital to asset ratio</td>
<td>-2.95</td>
<td>0.000</td>
</tr>
<tr>
<td>The growth rate of debt</td>
<td>-10.49</td>
<td>0.000</td>
</tr>
<tr>
<td>Performance</td>
<td>-4.69</td>
<td>0.000</td>
</tr>
<tr>
<td>Diversity</td>
<td>-6.04</td>
<td>0.000</td>
</tr>
<tr>
<td>Inflation</td>
<td>-3.87</td>
<td>0.000</td>
</tr>
<tr>
<td>Economic Growth Rate</td>
<td>-6.30</td>
<td>0.000</td>
</tr>
</tbody>
</table>

LLC tests are based on the assumption that the zero hypothesis is that there is a unit root. However, in Hadri test, the zero hypothesis is the lack of a unit root. Table 2 shows the values of each relevant test for the model variables. With respect to the values of Table 2, it is concluded that the relevant research data is significant in all independent and dependent variables. The results of tests indicated that variables were valid. This means that the mean and variance of variables over time and the covariance of variables in different years were constant. As a result, the data had no structural changes and the use of these variables in the model led to no false regression. This means that the zero hypothesis of lack of coexistence cannot be accepted. Therefore, variables are not faced with unit root problem and this showed the durability of variables. Thus, there was convergence between variables.

5. Cointegration test

Model estimation in nondurable mode of variables leads to a false regression in the model. To avoid reliance on false regression, there are methods of differentiation and cointegration test. However, when using the difference between variable in estimating model coefficients, valuable information on the level of variables is lost. Therefore, this method is not suitable for preventing
reliance on false regression. Cointegration test can be used to solve this problem. The concept of cointegration suggests a long-term equilibrium relationship that the economic system moves towards it over time. In case of nondurability of variables, if there is cointegration between variables, the results of model estimation will be reliable. In this paper, the method proposed by Cao was used to examine the cointegration test in the models used. This test was performed using the statistics from DF, ADF and unit root tests. In these statistics, the zero hypothesis was the lack of cointegration and the opposite hypothesis was the cointegration between the variables of the model. The results of Cao cointegration test using ADF statistics for the estimated model are presented in Table 3.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity risk</td>
<td>10.43</td>
<td>0.06</td>
<td>3.82</td>
<td>0.000</td>
</tr>
<tr>
<td>Credit risk</td>
<td>-95.56</td>
<td>4.03</td>
<td>-2.58</td>
<td>0.010</td>
</tr>
<tr>
<td>Cross risk effect</td>
<td>-902.91</td>
<td>22.62</td>
<td>-4.22</td>
<td>0.001</td>
</tr>
<tr>
<td>Bank size</td>
<td>2.12</td>
<td>331.63</td>
<td>-2.72</td>
<td>0.000</td>
</tr>
<tr>
<td>Return rate</td>
<td>31.82</td>
<td>1.33</td>
<td>1.53</td>
<td>0.110</td>
</tr>
<tr>
<td>Capital to asset ratio</td>
<td>3.37</td>
<td>28.92</td>
<td>1.100</td>
<td>0.270</td>
</tr>
</tbody>
</table>

The results of the above table indicate that the zero hypothesis is rejected at the 95% confidence level. Therefore, according to ADF statistics, cointegration exists in all models. Therefore, false regression problem will not exist in the estimated models.

6. **Experimental results analysis**

According to the research model, this study analyzed the effect of liquidity and credit risk as independent variables and bank size, the rate of return on equity ratio, debt growth rate, efficiency, diversification, inflation, and economic growth rate as control variables on the stability of the banking system. The results of the estimation are presented in Table 3. Since the generalized method of moments is one of the suitable estimation methods in panel data so that this method considers the dynamic modulation effects of the dependent variable and since if there is an endogenous problem between the variable or explanatory variables, this method can solve this defect by applying tool variables. In this method, in order to maintain the compatibility of estimated coefficients, it is necessary to use a two-stage method. First, the validity of the defined tool variables is tested and the Sargan test is used for this purpose. This test is based on chi-squared distribution and used to determine the validity of the tool variables defined in the model. Based on this test statistic, if the zero hypothesis is rejected, the tool variables defined for resolving the correlation between the fixed effects and the interrupted dependent variable are not valid and it is necessary to use more suitable instrument variables to resolve this correlation. In the next stage, the order of auto-correlation of disorder sentences is tested. If the auto-correlation of disorder sentences is second-order, then the first-order differentiation method is not a suitable method for eliminating the firm's fix and individual effects. The value of the Sargan test statistic with a probability value of 0.89 implies that zero hypothesis is not rejected and the tool variables defined in the model are valid. The value of this test statistic indicates that the tool variables defined in the model are not correlated with disorder sentences and therefore the defined tool variable is valid.
According to the results of Table 3, the t-value for liquidity risk variable as an independent variable was $t = 2.58$, which was at the probable level of 0.01. In other words, according to the critical level, $H_0$ is rejected and $H_1$ is accepted for liquidity risk variable. Therefore, with respect to the equation coefficient (10.36), it can be concluded that one percentage change in liquidity risk reduced the bank stability by 10.36%. The results of the research showed that liquidity risk had a significant and negative effect on bank stability. Therefore, increasing liquidity risk would lead to the exit of bank resources. The current state of competition between banks has led to the attraction of short-term and day-to-day deposits, which has influenced planning for granting long-term facilities to economic activists due to the lack of stability of these types of deposits in the balance sheet of banks. According to the results of Table 3, the t-value for the credit risk variable as an independent variable was $t = 4.22$, which is at the probable level of 0.00. In other words, given the critical level, $H_0$ is rejected and $H_1$ for the liquidity risk variable is accepted. Therefore, with respect to the equation coefficient of 95.56, it can be concluded that one percent change in credit risk caused a 95.56% decrease in the stability of the banking system. Since the banks do not validate their plans and their customers for optimal allocation of credits and increase of income, the lack of validation would lead to misleading of banks' facilities. Subsequently, banks' deferred claims would increase. Banks' cost would increase and earning would decrease. Despite these emphases, it seems that this issue has been neglected in the banking system of the country.

According to the latest statistics, only 5% of projects has been validated by counselors adopted by the association of credit counselors and bank investors. According to Table 3, the t-value for the variable of the cross-effect of credit risk and liquidity risk as an independent variable was $t = 2.77$, which was at a probable level of 0.00. In other words, given the critical level $H_0$ is rejected and $H_1$ is accepted for the cross variable of credit risk and liquidity risk. Therefore, with respect to the equation coefficient of 902.16, it can be concluded that a one-percent change in credit risk and liquidity risk would reduce the stability of the banking system by 902.16%. Considering the variable coefficient for variables among the control variables, the growth rate of debt ($t = 77.7$) and efficiency ($t = 89.2$) influenced the stability of the banking system. Since the results of the research showed that the growth rate of debt had a negative and significant effect on financial stability, the reason for this has been the worsening of bad economic conditions in the past years, the weak validation of banks, the lack of effective laws and regulations for granting and collecting claims, and escape routes for abusers and recipients of facilities. This increases the cost and the high rate of payment facilities and the instability to cover costs. The stability of banks increases as this ratio decreases. Since the results of the research showed that the efficiency had a positive and significant effect on the stability of the banks, balancing the cost of equipping resources with the income of granted facilities would increase the stability of the banks.

7. Conclusions and suggestions
There are diverse approaches to the functioning of banks in financial literature. In general, these theories are very useful for understanding the nature and role of banks in the stability of the banking system. Today, banks are pursuing a variety of programs to attract customers. What can help banks to achieve this is to achieve a stable balance in the atmosphere of risk. Different banks in different ways have tried to create advantage and maintain their own position in competition with other banks. Achieving stability indicators can be an important goal for banks to ensure customer satisfaction and ultimately earn money. This study aimed to identify the essential factors of banking stability in Iran's banking system in order to be able to equip the banks with competitive sources. For this reason, factors were analyzed following a deep examination of the literature. Finally, bank stability with credit and liquidity risks was identified through the generalized method of moments (GMM). Finally, it became clear that what financial elements had an impact on bank stability. The results of this study were consistent with the results of Ghosh (2014), Cohn and Scatigna (2016), Iannotta and Sironi (2013), Kilinc, and Turhan (2013), Barru et al. (2011), Hasan and Dridi (2010), Kim and Santomero (1988), Fathe and Ghaffari (2015). Therefore, given the results of the research and the specificity of the risk of each bank with regard to its conditions and in order to identify and control the risk in the structure of approvals and in order to facilitate effective risk monitoring, it is suggested to form a risk management unit and its effectiveness be continuously evaluated.

- The most important step in managing assets and liabilities is to allocate bank debt to income-generating assets so that the risk of non-repayment is minimized and to maintain sufficient cash assets in such a way that the risk of taking out deposits is minimized. The goal of keeping cash is to minimize the risk of taking out deposits and preventing banks facing the lack of cash reserves.
- Since credit risk increases as the volatile deposits increase, it is suggested that risk management be performed on the balance sheet. The risk of lack of repayment and the risk of taking out deposits are risks that are seen in the balance sheet.
- With accurate planning of bank lending, proper management and clever control of this process and obtaining feedback from its performance to correct potential errors should be performed. As a result, the bank should try to provide resources from secure sectors so as not to rush into a decision in a crisis. In order to achieve the objectives of credit management, it is necessary to have an appropriate information system and efficient internal control system for reporting.

In addition to limited access to resources, there was not enough opportunity to address all aspects and take into account all the factors affecting bank stability. Therefore, the following research is recommended to complete this research:

1. Considering the impact of the average financing rate, it is suggested that further studies should investigate new financing tools for national banking system.
2. Considering the impact of bank size, it is suggested that further studies should review and determine fixed prices of physical and virtual development of the bank and its effects on banks' income.
3. Considering the leverage, it is suggested that further studies should examine and provide methods for calculating fixed prices of deposits and facilities and its impact on the performance of banks.

References