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## Risk disclosure, stability and the economic consequences in the banking system

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### Abstract

Shareholders in the capital market always demand Reporting and disclosure and based on information that disclosure; they change their expectations of risk and returns. Disclosure has an economic consequence and the risk disclosure, in addition to economic consequences, has an effect on financial and banking stability. In this paper, we survey the risk disclosure of economic consequences and its effect on banking stability. We count the number of the risk disclosures in Iranian banks' financial statements by using the quantitative content analysis methodology and indexation of Iran's risk disclosure regulation. According to the estimation of panel data from 18 banks to period 2011-2016, we find that risk disclosure has a negative and significant relationship with stability and a positive and significant relationship with the cost of capital.

**Keywords:** Risk disclosure, Stability, Economics consequences, Content analysis, The Banking system.

## Introduction

The activities of financial and non-financial enterprises in the economic environment faced with uncertainty and risks consider the complexity of the economic environment and the diversity of operational activities. The Financial Stability Forum (2008) stated that one of the reasons for the financial crisis of 1997 to 2008 was the risk of computational errors by banks and financial institutions. In addition, financial crises sometimes occur due to the lack of transparency in financial reporting (Acharya et al. 2009). In other words, after the financial crisis 2007/8, the inadequacy in the establishment of corporate governance and the occurrence of the international financial crisis has been drawn the attention of supervisors towards the disclosure and monitoring of risk in the financial and credit institutions. Therefore, risk disclosure (relevant and reliable disclosure) identifies as one of the tools for controlling and monitoring banking stability and preventing the crisis.

Risk disclosure and reporting of risk information can be a threat or opportunity because it can reflect the state of corporate governance and good or bad management performance, which has effects on the future performance of the firm. Abraham & Shrivs (2014) state that limited disclosure or disclosure of error information will eventually lead to increase costs and information asymmetries, and will be a negative impact on shareholders expectations. Therefore, risk disclosure for banks have economic consequences and it is effective on the cost of financing. The important economic consequence of the risk disclosure is its effect on the cost of capital (Kelly and Ljungqvist, 2012; Kravet and Muslu, 2013; Campbell et al. 2014). Heinle and Smith (2017) Show that risk disclosure affects the reduction of capital costs due to reduced equity uncertainty. Studies also show that managers believe that risk disclosure has an effect on stability and has economics consequences for the firms in the capital market such as decreasing or increasing of cost of capital (The Institute of Chartered Accountants in England and Wales, ICAEW, 2011).

Disclosure in Emerging economies and developing countries are key factors in the growth of capital markets (Abraham et al., 2014). Despite investigations in the field of disclosure, the effect of the risk disclosure, its role in the capital market and its economic consequences are still not well known (Zhang and Zhang, 2014). Kravet and Muslu (2013) and Oliveira et al. (2011) state that during the last decades, despite the existence of empirical studies in the field of disclosure, few empirical studies addressed the risk disclosure and the least them focused on economic consequences and incentives for risk disclosure. Also, ICAEW (2011), PWC (2008), Ernest & Young Co. (2008) and

KPMG (2008, 2009) in separate reports have warned about the lack of risk information in the capital market and the need for transparency and disclosure in financial and non-financial institutions.

Then we survey the following question: What does risk disclosure affect bank stability and the cost of capital in the bank? We survey the economic consequence of mandatory risk disclosure focusing on bank stability.

A unique feature of this study is the introduction of risk disclosure in Iranian banking as a natural experiment to examine the effects of mandatory risk disclosure on bank stability and economics consequence. A growing body of literature focused on risk disclosure has empirically examined independently of each other (1) bank stability and (2) economics consequences of risk disclosure. These studies include investigating the relationship between the disclosure level and/or the information content of risk disclosure, but in this paper, we survey the effect of risk disclosure on the bank stability and effect of stability and risk disclosure on the cost of capital.

### **Theoretical background and models**

The experience of financial crises and the international financial crisis 2007/8 showed that the risk and instability in each country's economy are two related issues. The financial crises in different countries such as Japan (the 1990s), Mexico (1994) and the East Asian and South-East Asian economies (1997) show that financial sector can be prone to banking instability and crises. Underestimation of risk before the financial crisis 2007/8 has increased the demand for improved risk reporting (Singleton-Green and Hodgkinson 2011). Besides, after the financial crisis 2007/8, the international financial reporting board (IFRS), the financial accounting standards board (IFSB), the financial stability board (FSB), the Basel Committee on Banking Supervision (BSCB) and other regulatory bodies provided more guidelines and requirements for identifying the effects of risk on financial markets and presented desirable or undesirable disclosure outcomes. ICAEW (2011) with Referring to the growing demand for risk disclosure over the past 30 years argued that the emergence of financial crises was one of the reasons for the risk disclosure. Studies related to the risk disclosure in the banking system begun since 1998 by the BSCB and after the financial crisis 2007/8, identifying and understanding the risk in the banking system has become an important issue. Studies emphasize the role of transparency and information on the bank that should be disclosed under the financial statement, but with the emergence of various financial and banking crisis and its domino effect on the international financial and economic, risk

disclosure has become a vital issue.

Barth, Caprio and Levine (2004) analyzed of various features of the regulatory and supervisory regime, including bank transparency, for a sample of banking crises in 51 countries during the late 1980s and 1990 and show instability and crisis in banking can affect the financial crisis. Furthermore, Caprio and Klingebiel (2003) show while transparency is a variable that included information on several features relating to the market's ability to monitor banks, but lack of transparency in the banking system can be creation crisis in banking.

Llewellyn (2002) states often and based on research results, he has a belief that macroeconomic problems, including asset bubbles, are causing a financial crisis, but if we only look at the origin of the crisis in the macroeconomic instability is wrong. Macroeconomic imbalances and instability may be due to weaknesses in the banking system and banking crises that have not yet occurred and there is not still disclosure. The result of studies by Brealey (1999); Corsetti et al. (1998); and Lindgren et al. (1996) show that 'regulatory failures' include (1) weak internal risk analysis and management and control systems within banks, (2) inadequate of financial supervision, (3) weak incentives within the financial system generally and financial institutions, (4) inadequate information disclosure, and (5) inadequate corporate governance arrangements in both developed and less-developed countries causing a financial crisis. In other words, banking instability is one of the reasons for financial crises.

Bojinov (2014) classified the causes of banking crises into four main group includes international macro reasons, national macro reasons, causes the level of the banking sector and reasons in the bank. The analysis of these cases is significant for developing countries. At the level of a bank, the problems associated with liquidity deficit, lack of capital adequacy, increasing credit risk and increasing leverage causes a banking crisis. Besides, poor management practices and attracting more risk with the aim of achieving high returns from investment risky and fraud in the banking sector and increasing operational risk are another causing a banking Instability that usually it has not to disclose before the crisis.

Research shows that bank disclosure in the presence or absence of economic linkages between financial institutions, conducive to bank stability (König-Kersting et al., 2020). According to this research bank, depositors take information and linkages it into account and correctly identify when disclosure about one institution carries meaningful information for them. On the other

hand, non-disclosure especially the risk disclosure by firms that have a favorable market position can have negative consequences for them. This situation can have an effect on bank stability and send a negative message to the shareholders and creditors. In other words, the lack of disclosure, even if it does not seem to be instable, affects shareholders' expectations that it causes an increased risk of investment, information asymmetry, bank profitability, financial asset and liability structure and cost of capital. However, many reasons have explained the cause of the financial crisis and bank instability, but one of these reasons is the effect of disclosure on the bank stability that considered in this paper. We use a regression panel of Iranian banks and estimate a linear econometric model 1.

$$\begin{aligned}
 Z - score_{it} = & \alpha_0 + \alpha_1 Risk\ Disclosure_{it} + \alpha_2 Size_{it} + \alpha_3 Cost\ R_{it} + \alpha_4 DR_{it} \\
 & + \alpha_5 NPL_{it} + \alpha_6 ROE_{it} + \alpha_7 Invest_{it} + \alpha_8 Liquid_{it} \\
 & + \alpha_9 Loan_{it} + \alpha_{10} macro\ v_{.it} + \varepsilon_{it}
 \end{aligned} \tag{1}$$

The literature shows that increasing the quality of financial information reduces information asymmetries and hence lowers the cost of capital (Easley and O'Hara, 2004). Recently, risk disclosure affects a company's cost of capital, is one of the most interesting and important questions in accounting and finance literature. Policymakers and financial regulators frequently refer to the reduced cost of capital as a justification for improving disclosure quality, but showing that disclosure affects the cost of capital, and by how much, is still a challenging topic. When there is a shock in the stock market, corporate manager tends to publish information and transmit messages of transparency to control the negative impact of shock (Fiechter & Zhou, 2013). Fiechter & Zhou state that good message transfer will have a positive effect on stock prices and attract investors with the least cost of capital.

The value of a company establish based on shareholders decision and they need the information to price. Therefore, managers disclose voluntarily or mandatory information to influence the market. Gordon, Loeb, and Sohail (2010) State that based on signalling theory, company manager will be able to control the economic consequences by disclosure. Elshandidy et al. (2013) argue that under the company's good performance, the risk disclosure reduces the uncertainty of the cash flows and the economic environment, which affects the cost of capital and corporate financial stability.

Solomon et al. (2000) state that manager companies use risk disclosure to gain market confidence and reduce the cost of capital. General disclosure

reduces information asymmetric, inflowing improves risk estimation and reduces the cost of capital (Dobler, 2005). Risk disclosure is essential for transparency in the capital market (Deumes, 2008). Risk disclosure reveals the unknown dimensions of a company and increases market interpretation of risk and uncertainty. According to this information, stakeholders can change their expectations or, if the risk disclosure is not beneficially, will not change their expectations, but the subject matter is that disclosure has an economic consequence and has an impact on the cost of capital. We estimate a linear econometric model 2 for showing economics consequence.

$$\begin{aligned}
 COSE_{it} = & \alpha_0 + \alpha_1 Risk\ Disclosure_{it} + \alpha_2 Invest_{it} + \alpha_3 pastRet_{it} + \alpha_4 P/E_{it} \\
 & + \alpha_5 Tobin's\ q_{it} + \alpha_6 DPS_{it} + \alpha_7 beta_{it} + \alpha_8 logMV_{it} \\
 & + \alpha_9 Macro\ v_{it} + \varepsilon_{it}
 \end{aligned} \tag{2}$$

After the financial crisis, in response to extensive regulation, risk disclosure is increasing in credit and financial institution (Jizi and Dixon, 2017). Jizi and Dixon show, using a sample of commercial banks in the United States for the period 2009-2010, that risk disclosure provides useful information that affects shareholders' decisions. In addition, risk disclosure has an impact on stock prices and decline seasonal bank volatility. Increasing the risk disclosure increases the confidence of shareholders to the market. According to the literature, one of the economic consequences of risk disclosure is reducing the firm's cost of capital (Diamond and Verrecchia, 1991) because it influences information asymmetry. Previous empirical studies indicate a negative association between the level of firms disclosures and the cost of capital (Easley and O'Hara, 2004; Kelly and Ljungqvist, 2012; Lambert et al. 2000; Botosan and Plumlee, 2005; Kothari et al., 2009; Campbell et al., 2014; Puspitasari et al., 2020) and bank stability (Singleton-Green and Hodgkinson 2011; ICAEW, 2011; Reinhart, Carmen & Rogoff, 2009; Acharya et al., 2009; Financial Stability Forum, 2008; Caprio and Levine, 2004; Caprio and Klingebiel, 2003; Diamond & Rajan, 2001; Bordo et al., 2001; Brealey, 1999; Corsetti et al., 1998; Lindgren et al., 1996).

These results are understood as evidence of the usefulness of disclosure that if this were also true for the case of risk disclosure, we would expect increasing risk disclosure can affect the cost of capital and banking stability. Elshandidy and Shrives (2016) show that the market reacts to the risk disclosure implying the usefulness of the risk information. Furthermore, Hope et al. (2016) found that more specific risk disclosure lead investors to enhanced understanding of risk.

Increasing the level of transparency may reduce bank risk-taking and improve bank stability, but it may be ambiguous when an adverse shock has occurred and the bank is already in difficulty. In particular, market responses may aggravate the position of a bank, which is suffering from temporary and recoverable weakness, and these market responses could be more accentuated when more information is provided (Morris and Shin, 2002). However, transparency could help markets and depositors distinguish between those banks that are insolvent and those banks that are fundamentally sound. Accordingly, we estimate model 3.

$$COSE_{it} = \alpha_0 + \alpha_1 Risk\ Disclosure \times Z\_score_{it} + \alpha_2 Invest_{it} + \alpha_3 pastRet_{it} + \alpha_4 P/E_{it} + \alpha_5 Tobin's\ q_{it} + \alpha_6 DPS_{it} + \alpha_7 beta_{it} + \alpha_8 logMV_{it} + \alpha_9 Macro\ v_{it} + \varepsilon_{it} \tag{3}$$

## Data, Method and Interpretation of results

### 1.Content Analysis

A review of the risk disclosure literature shows that quantitative content analysis has been used in research to measure risk disclosure (see Al-Maghzom, 2016; Nejia Moumen et al. 2015; Abraham and Shrivs, 2014; Hassan et al., 2009; Bischof et al. 2009; Abraham and Cox, 2007; Linsley and Shrivs, 2006; Lajili and Zéghal, 2005; Li et al., 2019). For instance, Al-Maghzom (2016) based on Kamal Hassan's method (2009) identify 54 risk disclosure items that banks publish in their annual financial statements by using the content analysis method. Then these items classified into eight groups and calculated the risk disclosure index based on what is required in the standards and regulations for the disclosure and what the banks disclosed.

In this paper based on the guidelines and circulars of the central bank, regulation of securities markets and other requirements for risk disclosure in the annual report of the board of directors, we identify five categories for mandatory risk disclosure in banks that table 1 showed it.

Table 1. Legal requirements of Iran for risk disclosure index

| Title of Disclosure | Items of Disclosure                                    |
|---------------------|--|
| Credit Risk         | Policies and strategies for credit risk management     |
|                     | Scope and authority of granting facilities and credits |
|                     | Credit risk assessment and measurement method          |
|                     | Quantitative disclosure of credit risk                 |
|                     | Customer rating process                                |

|   |  |
|---|--|
|   | Credit risk reduction methods and tools for credit risk coverage and management include collateral   |
|   | The degree and condition of concentration of facilities and loans by different groups of customers, economic sectors, industries, geographical areas ,etc. |
|   | Criteria for acceptance of collateral for credit risk  |
|   | Disclosure of credit risk monitoring and controlling mechanism   |
|   | Amounts and how the management of non-performance loan and the amount of their provision   |
| <b>Liquidity Risk</b>                               | Policies and strategies for liquidity risk management  |
|   | The combination, amount and maturity of deposits and its allocation  |
|   | Combination, amount and maturity of facilities and other cash assets, particularly assets with high liquidity level  |
|   | Liquidity risk assessment and measurement method   |
|   | funding and allocating cash in the future period   |
|   | Funding and allocating foreign exchange in the future period   |
|   | Summary and limited schedule to address the liquidity crisis in the bank   |
| Liquidity management programs and its going concern |  |
| <b>Operational Risk</b>                             | Disclosure of the operational management programs and its going concern  |
|   | Strategy for preventive deliberately and in deliberately human errors  |
|   | Disclosure of the summary and limitation of the plan to deal with the operational crisis in the bank   |
|   | Operational risk assessment and measurement method   |
|   | Monitoring mechanisms and controlling operational risk   |
| <b>Market Risk</b>                                  | Policies and strategies for market risk management   |
|   | Market risk assessment and measurement method  |
|   | Items exposed to market risk by currency, stock, interest rate, etc.   |
|   | Currency position separation to each currency and total currencies   |
| <b>Capital Adequacy and Capital Structure</b>       | Capital adequacy and regulatory capital, including the risk-weight assets  |
|   | Minimum capital requirements, capital adequacy, Tier 1 and 2 capital, separately by type of risk (credit, operational and market)                          |

Then, we use quantitative content analysis to the extraction of risk disclosure items and count them from the bank's financial statement. This approach provides a measurement of risk disclosure from a simple count record of the existence items or the number of sentences about risk in the bank of the financial statement. To do this, we use the risk disclosure Index (see Nekhili et al., 2015; Abdallah, 2015; Al-Nasser et al., 2014; Hassan et al., 2009; Al-Razeen & Karabhari, 2004; Barako et al. 2006) based on Bank's regulations in the Iranian banking system. According to table 1 and disclosure items and based on model 4, we count the number of risk disclosure in the financial statements of banks from 2011 to 2016.

$$TD = \sum_{i=1}^n d_i \quad (4)$$



$d_i$  is a dummy variable that If risk disclosure is equal to one, otherwise zero for bank  $i$ ; TD is total risk disclosure for bank  $i$  in year  $t$ .

## 2. Data and summary of statistics

In this paper, we use data from 18 banks for estimate models in the period of 6 years over the period 2011- 2016. Bank stability measured by Z-score represents variable that proxy for Business Disruption and System Failures or banking stability. According to the approach proposed by Roy (1952), Blair and Heggstad (1978) this variable is inversely related to the probability of default. It is denoted as follows:

$$Z = (ROA+EA) / \sigma (ROA) \quad (5)$$

Where  $ROA$  is the rate of return on assets (ratio of pre-tax profit to total assets),  $EA$  is the ratio of equity to assets, and  $\sigma (ROA)$  is an estimate of the standard deviation of the rate of return on assets. A higher  $Z$  indicates that a bank is farther from insolvency. Since  $Z$  is highly skewed, we use its natural logarithm that is normally distributed.  $Z$ -score reflects the number of standard deviation units by which profitability would have to decline before bank capitalization is depleted (Roy, 1952).  $Z$ -score increases with higher profitability and capitalization levels but it decrease by unstable earnings in the higher standard deviation of return on assets. A higher  $Z$ -score implies that a bank is farther from default and hence more stable. A  $Z$ -score increase expresses in a decrease in banks' probability of bankruptcy. For reasons of asymmetry, we use the log of the  $Z$ -score as in Laeven and Levine (2009) and Houston, Lin, Lin, and Ma (2010).

The aim of this paper survey the reaction of investors to the risk disclosure by banks and their effect on the cost of capital in the capital market. Therefore, we use Abnormal Earnings Growth Models to calculate the cost of equity that it is the modified the Ohlson–Juettner Model with three hypotheses. These hypotheses include (1) Price equals the present value of expected dividends; (2) there is a fixed dividend payout concerning earnings. For simplicity, we examine the case of a full payout; (3) there is a constant perpetual earnings growth rate  $g_p = \gamma - 1$  (Dan Goda and Partha Mohanram, 2008). It is denoted as follows:

$$r_e = A + \sqrt{A^2 + \frac{eps_1}{p_0}(g_2 - (\gamma - 1))} \quad (6)$$

$$A \equiv \frac{1}{2} \left( (\gamma - 1) + \frac{dps_1}{p_0} \right) \quad \text{and} \quad g_2 = \frac{eps_2 - eps_1}{eps_1}$$

prior studies show that factors such as size, market beta, book-to-market ratio (Q Tobin), profitability, ownership structure affect risk disclosure (Linsley and Shrivess, 2006; Miihkinen, 2012; Campbell et al., 2014; Adelopo, 2017). Deposit ratio (DR) is the amount of liquid available for the bank that depositor finances them. High level of deposit ratio can increase firms risk and therefore the cost of capital (Botosan and Plumlee, 2005). Studies (Botosan, 1997; Botosan and Plumlee, 2002) show that the size of firms influences the cost of capital.) The larger firms benefit more from their disclosure policy compared to smaller firms (Diamond and Verrecchia, 1991). Embong et al. (2012) show that there is a significant negative relationship between disclosure and cost of equity capital for large firms and not significant for small firms. Besides, large firms have greater financing needs means that they want to provide data to reduce information asymmetry on perceived risk.

In Financial Stability Review (2016) show, that cost ratio in comparing with non-interest income has had a more stable situation in EU banks before and after the crisis. Also, several banks have implemented restructuring plans since the crisis, pointing to reduce operational costs and EU banks' cost ratio, on average, remains above pre-crisis levels. Drehmann and Juselius (2012) state that the cost ratio produces a very reliable early warning signal ahead of systemic banking crises. Profitability is a proxy for users of annual reports that they know about performance, return and risk that affects Stockholders' Expectations. Managers of the companies with better performance would be willing to disclose more information to signal good news to the market and attract more capital with the least cost (Konishi and Ali, 2007). Botosan and Plumlee (2005), explore the relationship between five measures of the cost of equity and firm risk. They use leverage, information risk, the market value of equity, book-to-price ratio, and earnings growth as the five measures for reducing the cost of equity and effect on it. Studies such as Ball and Brown (1968) and Beaver (1968) show that earnings yields indicate the required return for risk. Recently, Dubinsky and Johannes (2006) estimate that a stock price volatility of stock price and cost of capital is associated with uncertainty resolution around earnings announcements. It appears that expected earnings are at risk; investors anticipate risk by earnings announcements and the P/E ratio and changing their expectations of return and risk, which affects the company's cost of capital.

Gropp and Heider (2009) state the liability side, non-deposit funding alone, makes banks vulnerable to distress, but deposits are more stable funding in the banking system that decreases crisis. Berger and Humphrey (1992), Barr

and Siems (1994), Wheelock and Wilson (1994) focus on Nonperforming loans as the metrics to assess the vulnerability of the financial system over time. Therefore, Non-performing loans are one of the important elements affecting the balance sheet for the banks in measuring risks. Inflation is one of the Macroeconomic parameters that seem good predictors of crises (Demirgüç-Kunt and Detragiache, 2002). Kaufman (1996) said Macroeconomic stability may also be enhanced by introducing banking policies that reduce the adverse impact of macro problems on banks and thereby reduce the likelihood of the banks intensify the instability. Accordingly, we show the variables used to estimate the models in Table 2.

Table 2. Defining Model Variables

| Size                       | Size             | the logarithm of total asset  |
|----------------------------|------------------|---|
| <b>Liquid asset</b>        | <b>Liquid</b>    | the ratio of liquid assets include trading asset over total bank assets   |
| <b>Invest ratio</b>        | <b>Invest</b>    | total investment to a total asset in the bank   |
| <b>ROE</b>                 | <b>ROE</b>       | return of capital   |
| <b>Cost ratio</b>          | <b>CostR.</b>    | total operating costs (excluding bad and doubtful debt charges) to total income (the sum of net interest and non-interest income) |
| <b>Deposit ratio</b>       | <b>DR</b>        | the ratio of deposit over total bank assets   |
| <b>Non-Performing Loan</b> | <b>NPL</b>       | non-performing loans to total loans   |
| <b>Loan to asset</b>       | <b>Loan</b>      | total loan to total assets  |
| <b>Beta</b>                | <b>Beta</b>      | systematic risk of each bank's stocks   |
| <b>Tobin's q</b>           | <b>Tobin's q</b> | book value to market value  |
| <b>P/E</b>                 | <b>P/E</b>       | price to each per share   |
| <b>LogDPS</b>              | <b>LogDPS</b>    | logarithm dividend per share  |
| <b>Past Ret.</b>           | <b>Past Ret.</b> | earlier period returns of each bank   |
| <b>Log Market value</b>    | <b>logMV</b>     | the logarithm of market value   |

Table 3 shows the statistical characteristics of bank variables that we use in the model.

Table 3. Descriptive statistics

| Variables                        | Mean  | median | Std. Deviation |
|----------------------------------|-------|--------|----------------|
| <b>Risk Disclosure (RD)</b>      | 0.886 | 0.778  | 0.303          |
| <b>Size</b>                      | 5.119 | 5.181  | 0.782          |
| <b>Liquid asset (Liquid)</b>     | 0.235 | 0.226  | 0.116          |
| <b>Invest ratio (Invest)</b>     | 0.088 | 0.082  | 0.059          |
| <b>ROE</b>                       | 0.147 | 0.165  | 0.120          |
| <b>Cost ratio (CostR.)</b>       | 0.632 | 0.671  | 0.214          |
| <b>Deposit ratio (DR)</b>        | 0.765 | 0.790  | 0.143          |
| <b>Non-Performing Loan (NPL)</b> | 0.116 | 0.076  | 0.103          |

|                                 |         |        |        |
|---------------------------------|---------|--------|--------|
| <b>Loan to an asset (Loan)</b>  | 0.512   | 0.583  | 0.223  |
| <b>Beta</b>                     | 0.572   | 0.555  | 0.808  |
| <b>Tobin's q</b>                | 2.448   | 2.403  | 0.353  |
| <b>P/E</b>                      | 15.575  | 6.931  | 47.03  |
| <b>LogDPS</b>                   | 1.575   | 2.000  | 0.994  |
| <b>Past Ret.</b>                | -90.456 | -37.62 | 540.67 |
| <b>Log Market value (logMV)</b> | 12.426  | 13.052 | 3.051  |
| <b>GDP Growth</b>               | 0.015   | 0.013  | 0.061  |
| <b>Inflation</b>                | 0.533   | 2.100  | 4.157  |
| <b>Interest rate</b>            | 1.360   | 1.378  | 0.060  |
| <b>Spread rate</b>              | 0.085   | 0.096  | 0.058  |

Source: finding research.

All bank variables have been winsorized at the 1% and 99% percentiles to reduce the influence of outliers and potential data errors. The mean Risk Disclosure is equal to 88.6%. The mean of other variable is less one and the mean implied past return and logarithm market value and P/E ratio respectively are -90.45, 12.45 and 15.57 that those with the size are larger than other variables. It is necessary to test the unit root of all applied variables in estimations because unit root variables attitude quasi regression problem for both time series data and panel data. Therefore, Levin, Lin and Chu test, Im, Pesaran and Shin W-stat test and Fisher and Hadri test are used to study the common unit root of variables. Results represented in table (4).

Table 4. the result of unit root test of variables

| <b>Variables</b>                      | <b>Levin, and Lin Chu test,</b> | <b>Im, Pesaran and Shin w-stat test</b> | <b>ADF - Fisher Chi-square</b> | <b>PP -Fisher Chi-square</b> |
|---------------------------------------|---------------------------------|---|--------------------------------|------------------------------|
| <b>Risk Disclosure (L)</b>            | -14.664<br>(0.000)              | -6.890<br>(0.000)                       | 63.091<br>(0.000)              | 77.373<br>(0.000)            |
| <b>Z-score (FD)</b>                   | -41.883<br>(0.000)              | -8.796<br>(0.000)                       | 75.283<br>(0.000)              | 85.366<br>(0.000)            |
| <b>Size (L)</b>                       | -39.212<br>(0.000)              | -8.706<br>(0.000)                       | 82.707<br>(0.000)              | 141.986<br>(0.000)           |
| <b>Cost ratio (CostR.) (FD)</b>       | -20.100<br>(0.000)              | -7.767<br>(0.000)                       | 91.661<br>(0.000)              | 102.986<br>(0.000)           |
| <b>ROE (L)</b>                        | -15.333<br>(0.000)              | -2.481<br>(0.006)                       | 58.287<br>(0.010)              | 70.355<br>(0.000)            |
| <b>Deposit ratio (DR) (L)</b>         | -13.994<br>(0.000)              | -4.296<br>(0.000)                       | 86.291<br>(0.000)              | 142.310<br>(0.000)           |
| <b>Non-Performing Loan (NPL) (FD)</b> | -8.512<br>(0.000)               | -2.827<br>(0.000)                       | 51.209<br>(0.000)              | 54.797<br>(0.000)            |
| <b>Loan to asset (Loan) (L)</b>       | -67.117                         | 12.052                                  | 111.920                        | 162.101                      |
| <b>Invest ratio (Invest) (L)</b>      | -12.675                         | -4.158                                  | 82.968                         | 106.538                      |

|                                      |                    |                    |                    |                    |
|--------------------------------------|--------------------|--------------------|--------------------|--------------------|
|                                      | (0.000)            | (0.000)            | (0.000)            | (0.000)            |
| <b>Liquid asset (Liquid) (L)</b>     | -46.743<br>(0.000) | -9.993<br>(0.000)  | 105.253<br>(0.000) | 138.359<br>(0.000) |
| <b>Past Ret. (L)</b>                 | -15.693<br>(0.000) | -4.702<br>(0.000)  | 91.144<br>(0.000)  | 126.246<br>(0.000) |
| <b>P/E (FD)</b>                      | -9.668<br>(0.000)  | -2.954<br>(0.000)  | 55.622<br>(0.019)  | 62.792<br>(0.003)  |
| <b>Tobin's q (L)</b>                 | -59.050<br>(0.000) | -9.517<br>(0.000)  | 83.815<br>(0.000)  | 107.664<br>(0.000) |
| <b>Log DPS (FD)</b>                  | -8.550<br>(0.000)  | -3.732<br>(0.000)  | 40.337<br>(0.061)  | 43.625<br>(0.030)  |
| <b>Beta (FD)</b>                     | -16.790<br>(0.000) | -7.787<br>(0.000)  | 98.637<br>(0.000)  | 106.279<br>(0.000) |
| <b>Log Market value (logMV) (FD)</b> | -15.182<br>(0.000) | -6.034<br>(0.000)  | 69.263<br>(0.000)  | 75.809<br>(0.000)  |
| <b>Inflation (Inf.)</b>              | -35.237<br>(0.000) | -14.430<br>(0.000) | 161.123<br>(0.000) | 161.123<br>(0.000) |
| <b>GDP growth rate (FD)</b>          | -10.933<br>(0.000) | -4.699<br>(0.000)  | 74.527<br>(0.000)  | 124.210<br>(0.000) |
| <b>Interest rate (FD)</b>            | -6.669<br>(0.000)  | -2.805<br>(0.002)  | 50.618<br>(0.001)  | 50.619<br>(0.001)  |
| <b>Spread rate (FD)</b>              | -6.411<br>(0.000)  | -2.241<br>(0.012)  | 45.335<br>(0.005)  | 51.448<br>(0.000)  |

Source: finding research.

## Results and Estimations

Table 5 present the results of the estimation equation (1). The Colom 1 to 4 in this table shows estimating of panel data using Two-Stage Least Squares (2SLS). The model can explain 90 per cent variations independent variable. The amount of Durbin-Watson in the three-estimated show that the residuals are not correlated with each other and p-value less than 0.05. This result shows that the model is reliable for interpreting the results. In addition, we survey the effect of risk disclosure on banking stability during the boom (2011,2012 & 2014) and downturn (2013,2015 & 2016) economic period (Risk Disclosure×GDP.P). Therefore, we extract the business cycle of seasonal data of GDP in Iran from 1397 to 2016 using the GDP of Hodrick-Prescott filter, which revealed the effect of risk disclosure in this boom and downturn economic period on stability in the period (2011-2016) that we survey. The first estimation is the effect of risk disclosure on stability by considering the bank variables. The second estimation is the effect of risk disclosure on stability by considering the bank variables and macroeconomic variables (include GDP growth and inflation). The third estimation is the effect of the risk disclosure adjusted (Risk Disclosure×GDP.P) on the stability by

considering the bank variables and the macroeconomic variables and (include GDP growth, inflation and interest rate). In all three estimations of equation (1), risk disclosure has a negative and significant relationship with bank stability (significant at the 1% level). The coefficients of the risk disclosure in the first estimation are 0.04%, in the second estimation is 0.03% and in the third estimation with focused on Risk Disclosure×GDP.P is 42.6%. These coefficients show a negative and significant relationship with bank stability. These results indicate that more risk disclosure creates lower Z-score or stability. Lindgren et al. (1996), Corsetti et al. (1998); Brealey (1999), Caprio and Klingebiel (2003), ICAEW (2011), Mehran and Mollineaux (2012) and Kravet and Muslu (2013) claim that risk disclosure can effect on banking stability. ICAEW (2011) argued that the emergence of financial crises was one of the reasons for the risk disclosure. Instability and crisis in banking can affect the financial crisis that it occurs by a lack of transparency in the banking system. , risk reporting may be mandatory, but 'the quality of risk disclosures remains largely voluntary' (Kravet and Muslu, 2013). Brealey (1999), Corsetti et al. (1998) and Lindgren et al. (1996) stated that inadequate information disclosure or duplicate and useless information disclosure in both developed and less-developed countries causing a financial crisis. Mehran and Mollineaux (2012) also argued that transparency depends on the efforts of Information receiver for the collection of information to purposes of the interpretation and explanation of expectations from the information available for decision-making. The unresolved issue of transparency in banking is that the transparency of which bank has a boost or weakening effect on banking stability and performance. Therefore, there is a combination of cost and benefits transparency for the bank. In the third estimation, economic growth, inflation and interest rates have a positive and significant relationship with Z-score. In other words, in an inflationary economy such as Iran, which each year the banks contribute to the growth of liquidity and inflation, inflation and interest rates have a positive and significant effect on the bank stability. In Iran, banks hold a large number of fixed assets that, in the inflationary economy, the increase in the value of assets will cover risks and potential losses for banks. Also, considering the bank-centred nature of Iran's economy, liquidity and inflation growth have a positive effect on the bank balance sheet and stability. In addition, bank variables include size and deposit ratio have a positive and significant relationship with bank stability. In other words, the larger bank with high the volume of deposits to the total assets is more stable. Banks' funding in Iran do by deposits, and any bank with more deposited funds has more resources for intermediary operations, which helps banks to earn profit and has a positive effect on banking stability. Another banking variable includes NPL

ratio and investment ratio have a negative and significant relationship with Z-score. In other words, increasing credit risk and the risk of bank investments lead to a reduction in banking stability.

Table 5. Estimation of a regression model

| Variables                     | Z-score            |                     |                    |
|-------------------------------|--------------------|---------------------|--------------------|
|                               | (1)                | (2)                 | (3)                |
| <b>Risk Disclosure</b>        | -0.004<br>(-1.710) | -0.003<br>(-1.714)  | ---                |
| <b>Risk Disclosure×GDP.P</b>  | ---                | ---                 | -0.426<br>(-2.764) |
| <b>Size</b>                   | 0.031<br>(2.576)   | 0.031<br>(3.051)    | 0.051<br>(3.859)   |
| <b>Deposit ratio (DR)</b>     | 0.087<br>(4.890)   | 0.077<br>(4.774)    | 0.065<br>(3.292)   |
| <b>NPL</b>                    | -0.045<br>(-2.092) | -0.045<br>(-2.097)  | -0.080<br>(-2.953) |
| <b>Invest</b>                 | -0.063<br>(-2.834) | -0.053<br>(-2.678)  | -0.085<br>(-3.637) |
| <b>ROE</b>                    | -0.006<br>(-0.389) | -0.002<br>(-0.188)  | -0.023<br>(-1.238) |
| <b>Cost</b>                   | -0.022<br>(-0.985) | -0.020<br>(-0.990)  | -0.006<br>(-0.268) |
| <b>Liquid asset</b>           | 0.017<br>(1.077)   | ---                 | ---                |
| <b>Loan</b>                   | 0.009<br>(0.706)   | ---                 | ---                |
| <b>GDP Growth</b>             | ---                | -0.001<br>(-0.138)  | 0.098<br>(2.296)   |
| <b>Inflation</b>              | ---                | -0.0002<br>(-1.462) | 0.0003<br>(1.404)  |
| <b>Spread rate</b>            | ---                | ---                 | 0.149<br>(3.972)   |
| <b>R<sup>2</sup> Adjusted</b> | 0.959              | 0.966               | 0.953              |
| <b>Durbin-Watson</b>          | 2.444              | 2.401               | 2.563              |
| <b>Prob. J-statistic</b>      | 0.000              | 0.000               | 0.043              |

Source: finding research.

Table 6 present the results of the estimation equation (2). Column 1 to 4 shows the estimating of panel data using Two-Stage Least Squares (2SLS). In the equation (2), we survey the effect of risk disclosure on the cost of capital by considering capital market variables as control variables include P/E ratio, Log DPS, Beta, Tobin's q, past return, Log market value and investment ratio. The first estimation, we survey effect risk disclosure on the cost of capital by

considering capital market variables that in the second estimation we survey effect risk disclosure on the cost of capital by considering capital market variables and interest rate and spread rate. In the third and fourth estimations, we use Risk Disclosure $\times$ Size instead of Risk Disclosure. In other words, the larger banks disclose more information that we focused on this paper. In all of the estimation in equation (2), risk disclosure has a positive and significant relationship with the cost of capital (significant at the 1% level). The coefficients of the risk disclosure show a positive and significant relationship with the cost of capital in a bank. These results indicate that more risk disclosure creates the more cost of capital for the Iranian bank.

Linsley and Shrives (2006), Kothari et al. (2009), Johnson (2010), Mehran and Mollineaux (2012), Kravet and Muslu (2013), Kim et al. (2016), Jizi, and Dixon (2017) claim that risk disclosure can increase the cost of capital. Kothari et al. (2009) argued that the total the desirable of the risk disclosure had reduced the cost of capital, fluctuated stock returns, and the spread of analysts' forecasting expectations, but the undesirable risk disclosure had an adversary result. Investors-aware is alert of the useful and informative risk disclosure compared with the disclosure of duplicate risk information, lack of change in risk-based information in the annual financial statements and filling out compulsory information with the same values over the several years or periods. If there is unreliable information in the risk report, their expectations of the risk do not change, and consequently, due to the lack of adequate risk information, they increase the cost of capital (Johnson, 2010). Kravet, Muslu (2013) state that risk disclosure reveals unknown dimensions of a company and can increase market interpretation of risk and uncertainty. Kim et al. (2016) also argued that risk disclosure has affected shareholder's expectations of risk and has led to a change and increasing the cost of capital. In the second estimation, the interest rate has a positive and significant relationship with the cost of capital and in the fourth estimation interest rate has a positive and significant relationship with the cost of capital, but the spread rate has a negative and significant relationship with the cost of capital. According to the agency theory, increasing interest rates cause the stockholders to change their expectation from return and risk and it has a positive effect on the increase in the cost of the bank's capital. The spread rate is the difference between the bank's interest income from the bank's operational cost to total bank's interest income, which means increasing the profitability of the bank and having a positive effect on the shareholders' expectations and reducing the cost of the bank's capital. Also, P/E ratio, Log DPS, Beta and Log market value have a negative and significant relationship with the cost of capital and other variables have not a significant relationship with the cost of capital.



Table 6. Estimation of a regression model

| Variables                     | Cost of capital (RE) |                    |                    |                    |
|-------------------------------|----------------------|--------------------|--------------------|--------------------|
|                               | (1)                  | (2)                | (3)                | (4)                |
| <b>Risk Disclosure</b>        | 0.173<br>(4.725)     | 0.274<br>(3.476)   | ---                | ---                |
| <b>Size</b>                   | 0.144<br>(1.640)     | 0.176<br>(1.576)   | ---                | ---                |
| <b>Risk Disclosure×Size</b>   | ---                  | ---                | 0.034<br>(4.675)   | 0.065<br>(3.882)   |
| <b>P/E</b>                    | -0.001<br>(-2.295)   | -0.001<br>(-2.311) | -0.001<br>(-2.190) | -0.001<br>(-2.233) |
| <b>LogDPS</b>                 | -0.112<br>(-7.856)   | -0.133<br>(-7.964) | -0.118<br>(-8.509) | -0.131<br>(-6.834) |
| <b>Beta</b>                   | -0.029<br>(-1.902)   | -0.039<br>(-1.890) | -0.029<br>(-1.886) | -0.044<br>(-2.249) |
| <b>Tobin's q</b>              | 0.056<br>(0.535)     | 0.141<br>(1.226)   | 0.1001<br>(0.984)  | 0.167<br>(1.320)   |
| <b>Past Return</b>            | 0.000<br>(1.453)     | 0.000<br>(0.470)   | 0.000<br>(1.601)   | 0.000<br>(1.035)   |
| <b>LogMV</b>                  | -0.614<br>(-4.877)   | -0.457<br>(-2.577) | -0.501<br>(-5.093) | -0.463<br>(-2.698) |
| <b>Invest</b>                 | -0.074<br>(-0.288)   | -0.074<br>(-0.259) | -0.267<br>(-1.112) | -0.017<br>(-0.058) |
| <b>Interest rate</b>          | ---                  | 0.951<br>(1.954)   | ---                | 1.093<br>(2.074)   |
| <b>Spread rate</b>            | ---                  | -0.444<br>(-1.059) | ---                | -0.909<br>(-2.137) |
| <b>R<sup>2</sup> Adjusted</b> | 0.725                | 0.721              | 0.741              | 0.615              |
| <b>Durbin-Watson</b>          | 2.419                | 2.432              | 2.284              | 2.401              |
| <b>J-statistic</b>            | 0.000                | 0.000              | 0.000              | 0.000              |

Source: finding research.

Table 7 present the results of the estimation equation (3). Column 1 to 2 shows estimating of panel data using Two-Stage Least Squares (2SLS). Banks with more stable and disclosure affect the cost of capital. In this paper, we survey this issue under equation (3). The model can explain 33 and 54 per cent variations independent variable. The amount of Durbin-Watson in a three-estimated show that the residuals are not correlated with each other and p-value less than 0.05. This result shows that the model is reliable for interpreting the results. In the equation (3), we survey the effect of Risk Disclosure×Stability on the cost of capital by considering capital market variables as control variables include P/E ratio, Log DPS, Beta, Tobin's q, Log market value and investment ratio. The first estimation estimate an effect risk disclosure on the cost of the bank's capital without macroeconomic variables but the second estimation enter macroeconomic variables include GDP growth and inflation.

The result shows that risk disclosure has a positive and significant relationship with the cost of capital (significant at the 1% level). The coefficients of the risk disclosure in the first estimation are 44.5%, in the second estimation is 36.4%. These coefficients show a positive and significant relationship with the cost of capital in the bank. These results indicate that more Risk Disclosure×Stability create more cost of capital for an Iranian bank. The bank stable has regular flows for risk disclosure that impacts economic consequences in the bank. Bank disclosure with bank stability is as a supervisory tool in banking regulation and protective regulation (Avgouleas, 2009) that it affects the cost of capital. Jutasompakorn et al. (2014) stated that the existence of the stable in the banking system and the minimum useful information affects shareholder's expectations and the cost of capital. Elshandidy and Shrivies (2016) show that the market reacts to the risk disclosure implying the usefulness of the risk information and when the bank is stable, it is better to rely on its disclosed information. Other variables such as Log DPS, Beta and P/E ratio have a negative and significant effect on the cost of capital and inflation as a macroeconomic variable in the second estimation has a negative and significant effect on the cost of capital in the banking system.

Table 7. Estimation of a regression model

| Variables                     | RE × Z-score       |                    |
|-------------------------------|--------------------|--------------------|
|                               | (1)                | (2)                |
| <b>Risk Disclosure</b>        | 0.445<br>(1.893)   | 0.364<br>(1.695)   |
| <b>LogDPS</b>                 | -0.116<br>(-6.080) | -0.122<br>(-7.052) |
| <b>Beta</b>                   | -0.036<br>(-1.757) | -0.053<br>(-3.101) |
| <b>Tobin's q</b>              | -0.131<br>(-1.036) | 0.058<br>(0.550)   |
| <b>LogMV</b>                  | -0.168<br>(-1.552) | -0.106<br>(-1.121) |
| <b>P/E ratio</b>              | -0.001<br>(-2.698) | -0.001<br>(-2.463) |
| <b>Invest</b>                 | -0.186<br>(-0.743) | -0.109<br>(-0.532) |
| <b>GDP Growth</b>             | ---                | 0.010<br>(0.064)   |
| <b>Inflation</b>              | ---                | 0.011<br>(5.714)   |
| <b>R<sup>2</sup> Adjusted</b> | 0.333              | 0.540              |
| <b>Durbin-Watson</b>          | 2.205              | 2.203              |
| <b>J-statistic</b>            | 0.000              | 0.000              |

Source: finding research.

## Conclusion

Risk disclosure identifies as a picture of the future performance of the bank, which contains useful information and it affects the shareholders' expectations. According to the result of literature, risk disclosure has a positive impact on shareholders' expectations and it can influence the judgment and decision of shareholders from the risk and returns. Besides, Risk disclosure has the potential to affect information asymmetry and it's based on The capital theory risk disclosure conduct to attract financing at a minimum cost. In literature, it is argued that risk disclosure is effective for bank stability and economic consequences. In this paper, we survey the economic consequence of mandatory risk disclosure focusing on bank stability. A unique feature of this study is the introduction of risk disclosure in Iranian banking as a natural experiment to examine the effects of mandatory risk disclosure on bank stability and economics consequence. In developing countries like Iran, risk disclosure is not a common event, and managers tend to be non-disclosure with the aim of conservatism and information confidential. Therefore, the risk disclosure of banks in this business environment can be effective for banking stability and has economic consequences that the minimum disclosure can be causing a wave of uncertainty to the bank and increasing banking instability and financing costs for the bank. we investigate Iran's risk disclosure of regulation include The Central Bank of Iran requirements, the Commercial Code Amendment and the Securities Market Act for risk disclosure and make the risk disclosure Index for the banking system. According to the index and using quantitative content analysis, we count the number of the risk disclosures in Iranian's banks' financial statement. we survey, its effect on banking stability and the cost of capital for 18 banks to period 2011-2016 by using panel data 2SLS models regression. The results show that risk disclosure has a negative and significant relationship with stability and a positive and significant relationship with the cost of capital. Risk reporting may be mandatory, but the quality of risk disclosures remains largely voluntary. In a developing country, there are minimum and infancy regulation requirements for risk disclosure, and supervisors and regulators support a lack of risk disclosure to the prevention of financial crisis. Therefore, the minimum disclosures can affect the stability or collapse of bank stability and risk disclosure is important in the closed and monopolistic economic that are faced with a variety of risks and the conservatism and information confidentiality such as Iran as a developing country. These results indicate that more risk disclosure in an Iranian bank creates lower stability and higher cost of capital. Risk disclosure has a direct effect on shareholder's expectations of risk in an environment where there is a

lack of information and can change stability and create undesirable economic consequences for firms such as banking system that the results of the paper show those.

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