



## The Effect of Institutional Quality on the Relationship between Banking Stability and Marketization: The Case of Iran

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### Abstract

Banking system is considered as one of the most important economic sectors of every country. Because of the dependency between the performances of different sectors in economy, instability in banking sector will lead to disorder in all the other economic sectors. Marketization can influence banking stability. The primary objective of the present study is to investigate the relationship between marketization and banking stability in Iran. This study investigates the effect of institutional quality on the relationship between marketization and banking stability. Accordingly, the Generalized Method of Moments (GMM) and Panel Threshold Regression (PTR) techniques were used to estimate the models. The results of GMM indicated a decrease in banking stability after marketization. An improvement in institutional quality, however, could improve the relationship between marketization and banking stability. The results obtained by the PTR analysis revealed that institutional quality had a threshold value which could affect the relationship between marketization and banking stability and led to different relationships between marketization and banking stability under different regimes.

## 1. Introduction

Banking stability is considered as one of the most significant features of banking sector. Banking stability occurs when there is trust in bank performances and when shock is created, the bank duties are carried out without any problem (Mishkin, 1998). Many studies have examined factors affecting banking stability. Marketization is one of the factors which might affect banking stability. It can briefly be described as the creation of a new market-based economic system. It can cause a number of changes in state organizations and private sector mechanism (Hou & Wang, 2016). The relationship between marketization and banking stability is theoretically ambiguous. Some researchers, such as Allen and Gul (2011) believe that state-owned banks can benefit from such privileges as government support and accessibility to financial

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resources. This can improve their performances and increases banking stability. [Ishibashi and Matsumura \(2009\)](#) believe that private sector performance is more efficient than that of public sector. Empirically, however, many studies have revealed that marketization can have a negative effect on banking stability. [Bahmani and Mirhashemi \(2015\)](#) have stated that marketization of Iran's banking system has raised bank loans and bank facilities. [Zalbagi \(2014\)](#) has shown that an increase in the number of bank loans can have a negative effect on banking stability. [Poostinchi et al. \(2016\)](#) have also claimed that a decrease in concentration in the banking industry and moving away from state-owned banks can be accompanied with a decrease in banking stability. [Doll \(2010\)](#) found that highly concentrated banking systems are less likely to face crisis. [Anginer et al. \(2011\)](#) have also reported that an increase in concentration in the banking industry may lead to an increase in banking stability.

Institutional quality affects the relationship between marketization and banking stability. A few studies have placed emphasis on the role of institutional quality. [Barth et al. \(2009\)](#), for instance, have showed that institutional quality is positively correlated with banking stability. [Hou and Wang \(2016\)](#) have stated that despite the negative effects of marketization on banking stability, improvement in institutional quality can positively affect the relationship between the mentioned variables. Considering the fact that the previous studies in Iran have not paid enough attention to the important effect of institutional equality on the relationship between marketization and banking stability, the present study is an attempt to investigate this.

The rest of the paper is organized as follows. Theoretical framework concerning the effect of institutional quality on the relationship between marketization and banking stability presented in section 2. In section 3, we present the model. Section 4 is devoted to empirical findings. In section 5, we discuss our findings. Section 6 concludes.

## **2. Theoretical Framework**

This section illuminates on the theoretical framework of the relationship between banking stability and marketization and the impact of institutional quality on the relationship between banking stability and marketization.

### **2.1 Marketization and Banking Stability**

Banking system stability is one of the most important issues to which policy makers has devoted great attention in recent years. Many organizations such as the Bank for International Settlements (BIS) and the Financial Stability Institute (FSI) also been established in order to examine banking stability in different countries. Different definitions have been provided for the concept of "banking stability". [Alawode and Al-Sadek \(2008\)](#) have defined banking stability as banks' resistance to shocks and creation of disturbance in their performances. They also believe that banking stability exists when banks can properly do their duties even in the face of various shocks. They further think

that the prevalent definitions of banking stability have two points in common: first, they emphasize good performances of banks and second, they place stress on viability and resistance of banks in the face of different shocks. Marketization can impact banking stability (Hou & Wang, 2016). It can be defined as a process in which market mechanism has an important role in allocation of economic resources. Banking marketization is a more general concept than privatization. It concentrates more on preventing government intervention in bank's activities than on changing bank's ownership (Bahmani & Mirhashemi, 2015). Banking marketization serves as a more generalized and accurate concept which can help economists accurately measure the degree to which credit funds are raised and distributed by market mechanisms (Hou & Wang, 2016).

There are different viewpoints about the effect of marketization on banking stability. On the one hand, some researchers have stated that marketization decreases banking stability. On the other hand, some other researchers have reported a positive relationship between marketization and banking stability. Banking structure with less concentration and a larger number of private banks is more likely to face risk, financial crisis, and default on payment. Additionally, most state-owned banks are supported by government in facing crisis. Allen and Gall (2011) have reported that state-owned banks are under political pressure and their activities are for political purposes, and thus these banks set their business goals as their second priority and experience less stability than private-owned banks (Taqavi et al, 2013). Hu et al. (2004) have observed that private-owned banks in Taiwan face less loan loss provisions than state-owned banks. This can increase stability. When public sector's decision making is replaced with private sector, there will be ambiguous effects on banking stability. On the one hand, bank loans to private companies can raise and private companies which are not supported by government will be more vulnerable during financial crises and face some problems for repaying their loans. Consequently, banking stability counters a threat. On the other hand, when public sector's decision making is replaced with private sector and when marketization level increases, the system will observe some beneficial effects and banking stability increases (Hou & Wang, 2016). Marketization of banking system improves performance management in banks and decreases state-owned rents. Therefore, private banks can preserve more viability and maintain more stability during financial crises (Poostinchi et al., 2016).

## 2.2 Institutional Quality, Marketization and Banking Stability

No precise and clear definition has yet been provided for 'institutions'. However, the definition given by North (1996) seems to be as the most comprehensive and satisfactory one. According to North, institutions are constraints imposed by man which foster the interactive relationship between them. They are considered as the rules of the game also. Institutional framework refers to the way that the rules of the game are combined and

organized. Institutions decreases transaction cost and asymmetric information. Transaction cost has been considered as zero in neoclassical theory. North (1996) has believed that when transaction costs are considerable, invisible hands of free market stop moving (Zamanzadeh & Al-Husseini, 2016).

Borrowers typically have better information about repayment prospects than do banks, and they try to use this to their advantage and this, in turn, leads to adverse selection by banks. The main reason for it is the existence of borrowers who are unable to repay their loans and are generally the most resolute to get a loan. By improving institutional quality, transparency increases and asymmetric information decreases. When more attention is paid to the credit rights and to the rule of law in every country, the cost of contract execution decreases, and thus there will be a low probability of facing risk and an increase in banking system stability. Hou and Wang (2016) have pointed out that if institutional quality of a country become weak, transmission of state ownership to private ownership might not occur or if it does, it might cause a decrease in banking stability, because government intervention in the loan payment is not reduced, and thus state-owned banks becomes quasi state-owned banks through marketization. In such a situation, an improvement in institutional quality can lessen this negative effect.

### 3. The Model

According to the previous studies (Feng et al., 2012; and Hou & Wang, 2016) on the determinants of banking stability, we use the following econometric model. The model is:

$$lStability_{it} = \beta_0 + \beta_1 marketization_t + \beta_2 insq_t \cdot bankmarket_t + \beta_3 lloantoass_{i,t} + \beta_4 lrevmix_{i,t} + \beta_5 lStability_{i,t-1} + \epsilon_{it}$$

where  $i$  stands for bank and  $t$  for time.  $lStability_{it}$  is banking system stability,  $insq_t$  indicates institutional quality,  $lloantoass_{i,t}$  is the log of the loans to bank's assets ratio,  $lrevmix_{i,t}$  stands for mixed-income which is the log of the ratio of non-interest income<sup>1</sup> to bank's total income,  $insq_t \cdot bankmarket_t$  is obtained through multiplying institutional quality index by marketization index and is used to examine the effect of institutional quality on the relationship between marketization and banking stability.

$lStability_{it}$  - banking system stability- can be estimated for each bank through Log index of Z-Score, as proposed by Altman (1968). To calculate it, the following formula can be used:  $Z = \frac{k+\mu}{\delta}$ , where  $k$  stands for the ratio of equity to asset and  $\mu$  is the average return of assets (Khoshnoodi et al., 2012). Sum of interest and non-interest incomes<sup>2</sup> to asset have been used in the present

<sup>1</sup> Non-interest income is bank's income derived primarily from fees including deposit and transaction fees. Interest income includes commercial and personal loans, mortgages, construction loans and investment securities

<sup>2</sup> Considering banks' profits and losses, there are two types of income: interest income and non-interest income. Interest income includes profits generated through loans, direct investment, and deposits. Non-interest incomes include fee incomes, advice fees, and expert fees.

study to calculate  $\mu$ .  $\delta$  is the standard deviation of return of assets. To estimate  $\delta$ , standard deviations of interest and non-interest incomes have been used. If  $Z - Score \geq +2.60$ , it will be in the safe zone<sup>1</sup>, if  $1.1 < Z - Score < +2.60$ , banking stability will be in the grey zone<sup>2</sup>, and if  $Z - Score \leq 1.1$ , it will be in the danger zone.

Considering the lagged dependent variable as the explanatory variable, the model was estimated by difference GMM, which is based on the dynamic panel data model proposed by Arellano and Bond (1991). To investigate the effect of institutional quality on the relationship between marketization and banking stability, the aforementioned model was estimated once through multiplying institutional quality and marketization indices and once without multiplying them. Consequently, the four models were estimated as follows:

$$lStablity_{it} = \beta_0 + \beta_1 nonstate_t + \beta_2 lloantoass_{i,t} + \beta_3 lrevemix_{i,t} + \beta_4 lStablity_{i,t-1} + \epsilon_{it} \quad (1)$$

$$lStablity_{it} = \beta_0 + \beta_1 insq_t \cdot bankmarket_t + \beta_2 lloantoass_{i,t} + \beta_3 lrevemix_{i,t} + \beta_4 lStablity_{i,t-1} + \epsilon_{it} \quad (2)$$

$$lStablity_{it} = \beta_0 + \beta_1 deposit_t + \beta_2 lloantoass_{i,t} + \beta_3 lrevemix_{i,t} + \beta_4 lStablity_{i,t-1} + \epsilon_{it} \quad (3)$$

$$lStablity_{it} = \beta_0 + \beta_1 insq_t \cdot deposit_t + \beta_2 lloantoass_{i,t} + \beta_3 lrevemix_{i,t} + \beta_4 lStablity_{i,t-1} + \epsilon_{it} \quad (4)$$

Two indices are used for marketization: The first index is the loan for private sector to total bank loans ratio (*nonstate*<sub>*i*</sub>). The second index is the deposit of private banks to the total deposits (*deposit*<sub>*i*</sub>) of the banking system ratio. *insq*<sub>*i*</sub> - institutional quality- include the rule of law and regulatory quality<sup>3</sup>.

Model (1) examines the relationship between marketization, i.e. the ratio of loans to private sectors to all loans, and banking stability, and Model (2) examines the effect of institutional quality on the relationship between the marketization and banking stability. Model (3) examines the relationship between marketization, i.e. the ratio of deposits in private banks to total deposits in banking system, and banking stability. Finally, the effect of institutional quality on the relationship between the two variables is examined by Model (4).

Furthermore, the PTR model, proposed by Hansen (2000), was used to estimate the effect of the threshold value of institutional quality index on the relationship between marketization and banking stability. Model (5) examines the effect of threshold value of institutional quality on relationship between marketization.

<sup>1</sup> The bank is considered 'safe' based on the financial statistics.

<sup>2</sup> There is a high probability of the bank entering the danger zone within the next two years of operations.

<sup>3</sup> The institutional quality is measured by the World Bank and consists of six sub-indices: voice and accountability, government effectiveness, rule of law, regulatory quality, control of corruption, and political stability. At first, the models in the present sub-indices were estimated through all the six indicator and estimation results showed that research findings were sensitive to the selection of institutional quality index. So we just used the rule of law and regulatory quality sub-indices.

$$lStability_{it} = \mu_i + (\beta_1' marketization_t + \alpha_1' X_{i,t})I(insq_t \leq \gamma) + (\beta_2' bmarketization_t + \alpha_2' X_{i,t})I(insq_t > \gamma) + e_{it} \quad (5)$$

where  $X_{it}$  includes explanatory variables, such as the loans to bank assets ratio and mixed-incomes.  $\gamma$  is a threshold value of institutional quality.

## 4. Empirical Results

### 4.1 Data and Statistical Tests

In this paper, we use balanced panel data from 16 Iranian banks during 2001-2016. The banks are Mellat, Sepah, Saderat, Melli, Maskan, Tejarat, Keshavarzi, Post Bank, Refah, Saman, Sina, Toseie Saderat, Parsian, Karafarin, Eghtesad Novin, Sanat va Madan. Data concerning institutional quality was collected from WGI<sup>1</sup>.

In this paper we used the Pesaran's (2004) cross-sectional dependency test (so-called CD-test) to examine cross-sectional dependency or independency. The results have been depicted in Table 1.

**Table 1. The result of cross-sectional dependency test**

Variable	Test statistics	P-value
lloantoass <sub>i,t</sub>	1.37	0.16
lrevemix <sub>i,t</sub>	6.50	0.00
lStability <sub>it</sub>	6.70	0.00
lStability <sub>i,t-1</sub>	4.69	0.00

*Source: Research findings*

As table 1 shows, the null hypothesis of Pesaran CD-test has been rejected except for *lloantoass*. This can indicate that there has been cross-sectional dependency among all the investigated variables except for the ratio of loans to bank's assets.

Unit root tests used in case of the existence of cross-sectional dependency. Generally, unit root tests belong to two generations. The first generation studies (e.g. Levin & Lin, 1992; Harris & Tzavalis, 1999; and Im, Pesaran & Shin, 1997) examines stationarity in case of the existence of cross-sectional independency. The second generation studies (e.g. Moon & Perron, 2004; Pesaran, 2003; and Choi, 2002), however, examines stationarity in case of the existence of cross-sectional dependency (Hurlin & Mignon, 2007).

In this paper we used Im, Pesaran, and Shin (1997) unit root test for *lloantoass* (which is cross-sectionally independent) and Choi (2002) for other variables (which are cross-sectionally dependent). The result showed in table 2, 3. Based on Tables 2 and 3, all the variables have been stationary. In next step we use Johansen- Fisher panel cointegration test to check long-term relationship between variables. Maddala and Wu (1999) combined Fisher (1932) test and

<sup>1</sup> The Worldwide Governance Indicators.

Johansen tests. This test is called *Johansen-Fisher* Panel Cointegration Test (Kutlu, 2009). The result showed in table 4.

**Table 2. The results of Choi unit root test**

Variable	Test statistics	P-value
lStability <sub>it</sub>	12.95	0.00
nonstate <sub>t</sub>	7.15	0.00
insq1.nonstate <sub>t</sub>	6.09	0.00
insq2.nonstate <sub>t</sub>	3.54	0.01
deposit <sub>t</sub>	5.45	0.00
insq1. deposit <sub>t</sub>	3.40	0.00
insq2. deposit <sub>t</sub>	2.61	0.06
lrevemix <sub>i,t</sub>	2.19	0.01
lStability <sub>i,t-1</sub>	1.80	0.03

Source: Research findings

**Table 3. The result of Im, Pesaran and Shin unit root test**

Variable	Include individual intercept and trend	Include individual intercept
	Level	Level
lloantoass <sub>i,t</sub>	59.63 (0.00)	88.96 (0.00)

Source: Research findings

**Table 4. The result of Johansen- Fisher panel cointegration test**

Series	Fisher Stat	Prob.
lStability, nonstate, lrevemix, lloantoass	353.4	0.0000
lStability, nonstate. insq1, lrevemix, lloantoass	380.9	0.0000
lStability, nonstate. insq2, lrevemix, lloantoass	359.8	0.0000
lStability, deposit, lrevemix, lloantoass	483.4	0.0000
lStability, deposit. insq1, lrevemix, lloantoass	417.8	0.0000
lStability, deposit.insq2, lrevemix, lloantoass	467.8	0.0000

Source: Research findings

As Table 4 shows, the null hypothesis of *Johansen-Fisher* panel cointegration test has been rejected and there is long-term relationship between variables and thus model estimation can be done without any problem.

#### 4.2 The Estimation Results with GMM

In this study, the two-step GMM was used. The estimation results have been depicted in Tables 5-8.

**Table 5. The result of estimation of model (1): the GMM Method**

Variable	Coefficient	Std. Err.	P-value
intercept	0.83	0.087	0.00
lstability <sub>i,t-1</sub>	0.268	0.078	0.00
nonstate <sub>t</sub>	-0.037	0.011	0.00
lrevemix <sub>i,t</sub>	0.245	0.043	0.00
lloantoass <sub>i,t</sub>	-0.085	0.017	0.00
AR(1)			0.0492
AR(2)			0.5059
Sargan test			1.00
CD test of Pesaran			0.00

Source: Research findings

**Table 6. The result of estimation of model (2): the GMM Method**

Model with the rule of law index			
Variable	Coefficient	Std. Err.	P-value
intercept	0.964	0.097	0.00
lstability <sub>i,t-1</sub>	0.236	0.040	0.00
lnsq1.nonstate <sub>t</sub>	0.0197	0.006	0.00
lrevemix <sub>i,t</sub>	0.283	0.043	0.00
lloantoass <sub>i,t</sub>	-0.070	0.018	0.00
AR(1)			0.043
AR(2)			0.48
Sargan test			1.00
CD test of Pesaran			0.00
Model with the regulatory quality index			
Variable	Coefficient	Std. Err.	P-value
intercept	1.014	0.103	0.00
lstability <sub>i,t-1</sub>	0.21	0.047	0.00
lnsq <sub>2</sub> .nonstatet	0.043	0.023	0.068
lrevemix <sub>i,t</sub>	0.0283	0.039	0.00
lloantoass <sub>i,t</sub>	-0.066	0.019	0.001
AR(1)			0.098
AR(2)			0.505
Sargan test			1.00
CD test of Pesaran			0.00

Source: Research findings

**Table 7. The result of estimation of model (3): the GMM Method**

Variable	Coefficient	Std. Err.	P-value
intercept	0.882	0.101	0.00
lstability <sub>i,t-1</sub>	0.235	0.043	0.00
deposit <sub>t</sub>	-0.193	0.031	0.00
lrevemix <sub>i,t</sub>	0.284	0.038	0.00
lloantoass <sub>i,t</sub>	-0.078	0.021	0.00
AR(1)			0.0543
AR(2)			0.504
Sargan test			1.00
CD test of Pesaran			0.00

Source: Research findings



**Table 8. The result of estimation of model (4): GMM Method**

Model with the rule of law index			
Variable	Coefficient	Std. Err.	P-value
intercept	0.879	0.107	0.00
lstability <sub>i,t-1</sub>	0.263	0.043	0.00
insq. deposit <sub>t</sub>	0.121	0.020	0.00
lrevemix <sub>i,t</sub>	0.280	0.040	0.00
lloantoass <sub>i,t</sub>	-0.079	0.023	0.00
AR(1)			0.0546
AR(2)			0.468
Sargan test			1.00
CD test of Pesaran			0.00
Model with the regulatory quality index			
Variable	Coefficient	Std. Err.	P-value
intercept	1.06	0.00	0.038
lstability <sub>i,t-1</sub>	0.25	0.00	0.038
insq2. deposit <sub>t</sub>	0.113	0.00	0.020
lrevemix <sub>i,t</sub>	0.284	0.00	0.038
lloantoass <sub>i,t</sub>	-0.084	0.00	0.018
AR(1)			0.055
AR(2)			0.507
Sargan test			1.000
CD test of Pesaran			0.000

*Source: Research findings*

Estimation results for Models 1 and 3, with the two indices of institutional quality, revealed that coefficients for the two indices of marketization were negative and statistically significant. This can indicate that an increase in marketization can lead to a decrease in banking stability. The institutional quality index was multiplied by the two indices of marketization in Models 2 and 4 in order to investigate the effect of institutional quality on the relationship between marketization and banking stability. Estimation of the two models indicated that improvement in institutional quality led to the establishment of a positive relationship between marketization and banking stability. This can show the significant role of institutional quality on the relationship between marketization and banking stability. The results show that the loan to the bank asset ratio ( $lloantoass_{i,t}$ ) has had a significantly negative effect in all the four models. This is in line with the existing theoretical frameworks because, due to bank's uncertainty about loan repayment among customers, an increase in the ratio value of the aforementioned variables will threat banking stability. The result also show that mixed income ( $lrevemix_{i,t}$ ), has had a statistically significant positive effect on banking stability. This was expected because with an increase in the value of non-interest income to bank total income ratio, there will be a decrease in bank's interest income. As it was aforementioned, bank's interest income is generated through their investment and cooperation in

different projects while their non-interest incomes are generated through taking honorarium. As a result, interest income entails a higher level of risk than non-interest income. When interest income decreases, bank confronts a lower risk and banking stability increases. The lagged variable of banking stability has a significantly positive effect on banking stability. This can reveal the positive relationship between banking stability of each year with banking stability of the previous year.

Autocorrelation test needed to be run after model estimation. The null hypothesis for this test is that there is not autocorrelation. Autocorrelation tests (AR1 and AR2) for all the four models indicated the existence of first-order autocorrelation but nonexistence of second-order autocorrelation. Then, Sargan test needed to be run to investigate the validity of instrumental variables. Based on the results, it was accepted that the instrumental variables were valid, for the four model.

Then, the Pesaran's (2015) cross-sectional dependency test was run. The null hypothesis of this test suggested a weak dependency. The results obtained for the four models revealed no cross-sectional dependency among error terms.

#### 4.3 Estimating Threshold Value

Matlab<sup>1</sup> Software was used to estimate the threshold value of institutional quality index.

Threshold regressions for the two marketization indices was estimated separately for the two different models. First, the null hypothesis of the nonexistence of a threshold value, against the existence of a threshold value, for institutional quality index was tested and the null hypothesis of the nonexistence of a threshold value for the institutional quality index was rejected<sup>2</sup>. Therefore, institutional quality had a threshold value. After investigating the existence of threshold value for institutional quality index, model estimation was done. Based on the obtained results, with first marketization index (nonstate) and institutional quality (rule of law), the threshold value of institutional quality index was -1.32 and with a 95% confidence interval, the threshold value of institutional quality index was between -1.32 and -1.28. With institutional quality (regulatory quality), the threshold value of institutional quality index was -0.91 and with a 95% confidence interval, the threshold value of institutional quality index was between -1.26 and -0.76.

The threshold value for institutional quality, with second marketization index (*deposit*) and with institutional quality (rule of law) was -1.32 and with a

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<sup>1</sup> Matlab 2016a

<sup>2</sup> With first marketization index (nonstate) and institutional quality index (rule of law), the value of F-statistic was 22.12 and the p-value was 0.00 and with first marketization index (nonstate) and with institutional quality index (regulatory quality) the value of F-statistic was 22.12 and p-value 0.00. With second marketization index (deposit) and institutional quality index (rule of law), the value of F-statistic was 22.43 and the p-value was 0.00, and with second marketization index (deposit) and institutional quality (regulatory quality) the value of F-statistic was 22.43 and the p-value was 0.00.

95% confidence interval, the threshold value of index was between -1.32 and -1.28. With institutional quality (regulatory quality) the threshold value of institutional quality index was -0.91 and with a 95% confidence interval, the threshold value of institutional quality index was between -1.26 and -0.76. Tables 8 and 9 show the estimation results of the model obtained through the use of PTR analysis.

**Table 9. Estimation results of the model with the first marketization index: PTR analysis**

Model with the rule of law index				
Variable	Coefficient in first Regime $q(t) \leq -1/32$	Coefficient in second Regime $q(t) > -1/32$	T- statistic in first Regime $q(t) \leq -1/32$	T- statistic in second Regime $q(t) > -1/32$
nonstatet	-0.28	0.78	-0.97	6.86
lrevemixit	2.30	0.14	2.05	9.53
lloantoassit	-0.38	-0.10	-1.10	-0.29
Model with the regulatory quality index				
variable	Coefficient in first Regime $q(t) \leq -0.91$	Coefficient in second Regime $q(t) > -0.91$	T- statistic in first Regime $q(t) \leq -0.91$	T- statistic in second Regime $q(t) > -0.91$
nonstatet	-0.195	0.258	-2.354	2.91
lrevemixit	0.281	0.197	5.137	8.596
lloantoassit	-0.235	0.046-	4.522-	0.508-

Source: Research findings

As it can be observed in the model with the first marketization index (Table 9) and the rule of law index, if the value of institutional quality index is less than -1.32, the relationship between marketization and banking stability will be in the first regime and coefficient of  $nonstate_t$  will be -0.28 and statistically significant. Coefficient of  $lloantoass_{i,t}$  is not statistically significant and coefficient of the variable  $lrevemix_{i,t}$  is 2.30 and statistically significant. If the value of institutional quality index is higher than -1.32, the relationship between marketization and banking stability will be in the second regime and coefficient of  $nonstate_t$  will be 0.78 and statistically significant. Coefficient of  $lloantoass_{i,t}$  is not statistically significant and coefficient of  $lrevemix_{i,t}$  is 0.14 and statistically significant. This was expected because with an increase in non-interest income to the total income ratio, there will be a decrease in bank's interest income. Above the threshold level of institutional quality, the impact of the ratio of non-interest income to the bank's total income on banking stability becomes significant. If the relationship between marketization and banking stability will be in the second regime and if there is an increase in the institutional quality index, the relationship between marketization and banking stability will be positive.

In the model with the first marketization index (Table 9) and the regulatory quality index, if the value of institutional quality index is less than -0.91, the

relationship between marketization and banking stability will be in the first regime and coefficient of  $deposit_t$  will be -0.108 and statistically significant. Coefficient of  $lloantoass_{i,t}$  is -0.2307 and statistically significant and coefficient of  $lrevemix_{i,t}$  is 0.29 and statistically significant. If the value of institutional quality index is higher than -0.91, relationship between marketization and banking stability will be in the second regime and coefficient of  $deposit_t$  will be 0.07 and statistically significant. Coefficient of  $lloantoass_{i,t}$  is not statistically significant and coefficient of  $lrevemix_{i,t}$  is 0.193 and statistically significant.

In the model with the second index of marketization (Table 10) and the rule of law index, if the value of institutional quality index is less than -1.32, the relations will be in the first regime and the coefficient of  $deposit_t$  will be -0.35 and statistically significant. The coefficient of  $lrevemix_{i,t}$  is not significant and coefficient of  $lloantoass_{i,t}$  is -0.53 and statistically significant. If coefficient of institutional quality is higher than -1.32, the relations will be in the second regime and coefficient of  $deposit_t$  will be 0.14 and statistically significant. The coefficient of  $lrevemix_{i,t}$  is not statistically significant and coefficient of  $lloantoass_{i,t}$  is -1.18 and statistically significant. This is compatible with the existing theoretical frameworks because, due to bank's uncertainty about loan repayment among customers, an increase in the ratio value of the aforementioned variables will threaten banking stability.

**Table 10. Estimation results of the model with the second marketization index: PTR analysis**

Model with the rule of law index				
variable	Coefficient in	Coefficient in	T- statistic in	T- statistic in
	first Regime $q(t) \leq -1.32$	second Regime $q(t) > -1.32$	first Regime $q(t) \leq -1.32$	second Regime $q(t) > -1.32$
$deposit_t$	-0.35	0.14	-2.53	2.63
$lrevemix_{i,t}$	0.19	0.15	0.43	0.05
$lloantoass_{i,t}$	-1.18	-0.53	-2.67	-2.77
Model with the regulatory quality index				
variable	coefficient in	coefficient in	T- statistic in	T- statistic in
	first Regime $q(t) \leq -0.91$	second Regime $q(t) > -0.91$	first Regime $q(t) \leq -0.91$	second Regime $q(t) > -0.91$
$deposit_t$	0.108-	0.07	2.74-	3.60
$lrevemix_{i,t}$	0.29	0.19	5.93	7.87
$lloantoass_{i,t}$	-0.23	0.02	-3.98	0.28

Source: Research findings

As it can be seen in the model with the second marketization index (Table 10) and the regulatory quality index, if the value of institutional quality index is less than -0.91, the relationship between marketization and banking stability will be in the first regime and coefficient of  $nonstate_t$  will be -0.19 and statistically significant. Coefficient of  $lloantoass_{i,t}$  is -0.235 and statistically significant and coefficient of  $lrevemix_{i,t}$  is 0.281 and statistically significant, too. If the value of institutional quality index is higher than -0.91, the relationship between

marketization and banking stability will be in the second regime and coefficient of  $nonstate_t$  will be 0.25 and statistically significant. Coefficient of  $lloantoass_{i,t}$  is not statistically significant and coefficient of  $lrevemix_{i,t}$  is 0.19 and statistically significant.

Therefore, with an improvement in institutional quality the relationship between marketization and banking stability is in the second regime and marketization has a positive impact on banking stability. Meanwhile, above the threshold level of institutional quality, the negative impact of banking marketization on banking stability becomes smaller. Improving the institutional quality can reduce negative influence of marketization. Above the threshold level of institutional quality, the negative impact of banking marketization on banking stability becomes more limited. These findings suggest that improvement in institutional quality play an important role in the relationship between marketization and banking stability.

## 5. Discussion

Figure 1 represents the trend of banking stability, marketization, and institutional quality in Iran during 2001-2016.

The overall findings revealed that the average level of banking stability for Iran has been 0.64 over the years 2001-2016. This can indicate that banking stability in Iran is in the danger zone<sup>1</sup>.

The present study used two indices for measuring marketization. The first index is considered as the loan for private sector to total bank loans ratio ( $nonstate_t$ ). The second index is the deposit of private banks to the total deposits ( $deposit_t$ ) of the banking system ratio. The values of these indices are between 0 and 1. Marketization values near 1 can indicate a higher level of marketization. There has been an increase in these indices over the years 2001-2016 in Iran.

In this study, the rule of law and regulatory quality indices has been used for measuring institutional quality. Generally, the rule of law index is  $-2.5 \leq insq \leq +2.5$ , where -2.5 represent the lowest and +2.5 the highest value of institutional quality. The average level of institutional quality, when the rule of law index is considered, has been -1.42 for Iran. With regard to the results obtained through the use of the PTR model and the threshold value of -1.32 of institutional quality, Iran has been in the first regime and the relationship between marketization and banking stability has been negative. The average level of institutional quality, when the regulatory index is considered, has been -1.06 for Iran. With regard to the results obtained through the use of the PTR model and the threshold value of -0.91 of institutional quality, Iran has been in the first regime and the relationship between marketization and banking stability has been negative.

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<sup>1</sup> The score indicates a high probability of distress within this time period.

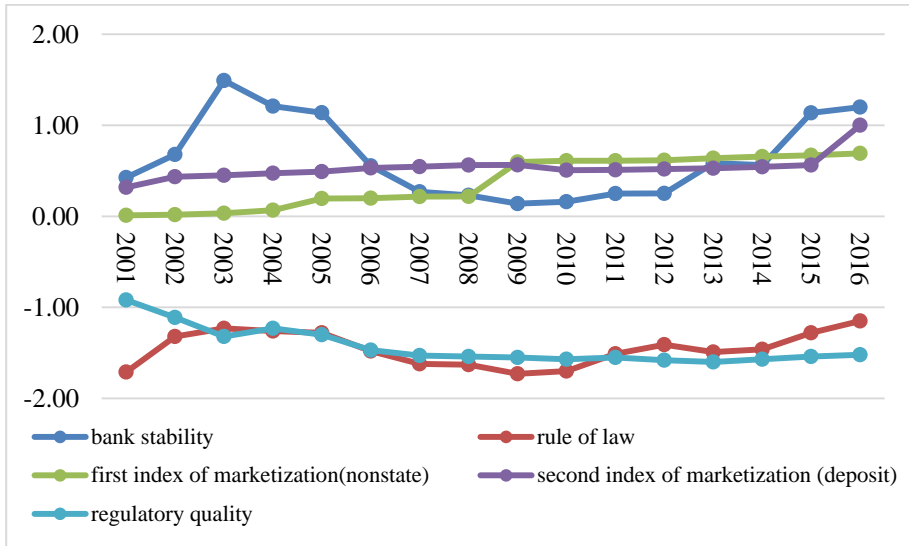


Figure 1. Banking stability, marketization, rule of law and regulatory quality

## 6. Concluding Remarks

The two indices of the loan for private sector to total bank loans ratio ( $nonstate_t$ ) and the deposit of private-owned banks to the total deposits ( $deposit_t$ ) of the banking system ratio were considered in the present study.

The results of first estimation, by using GMM, revealed the coefficient of marketization index ( $nonstate_t$ ) as -0.03 and the coefficient of marketization index ( $nonstate_t$ ) as -0.25. This can indicate that an increase in marketization will be accompanied with a decrease in banking stability in the banking industry. It can be concluded that an improvement in institutional quality has a positive effect on the relationship between marketization and banking stability. Accordingly, the coefficient of multiplying institutional quality and the first marketization index was 0.03 and it was 0.11 for multiplying institutional quality and the second marketization index.

The results, obtained by the PTR model, when the first marketization index was considered, indicated a threshold value of -1.32 for institutional quality, and in case of lower values of institutional quality, the relationship between the first marketization index and banking stability was established in the first regime and the coefficient of marketization index was -0.28. If the value of institutional quality index was higher than its threshold value, the relationship between the first marketization index and banking stability was established in the second regime and the coefficient of marketization index was 0.78. Additionally, the results of the PTR analysis, with second marketization index, indicated a threshold value of -1.32 for institutional quality, and in case of lower values, the relationship between the second marketization index and banking stability was established in the first regime and the coefficient of marketization

index was -0.35. In the cases that institutional quality had a higher value than its threshold, the relationship between the first marketization index and banking stability was established in the second regime and the coefficient of marketization index was 0.14.

Considering all the above, an important conclusion is that until institutional quality of the country improves, marketization have negative effects on economy, even if, theoretically, they are considered to have positive effects. Generally, it can be recommended that Iran's institutional quality be improved before making any economic decision. With regard to marketization in Iran, government extensive intervention in banks' activities can be considered as a major problem. Through marketization, Iranian state-owned banks become quasi state-owned banks. This shows that institutional quality in Iran is weak and transparency in banks' activities is low. Authorities should allow and encourage private commercial banks to expand their business liabilities and improve banking sector's efficiency at the same time.

## References

- Alawode, A., Al-Sadek, M. (2008). What is financial stability? *Financial Stability Paper Series, Central Bank of Bahrain*. 1- 26.
- Allen, F., & Gul, X. (2011). Corporate governance and intra-group transactions in European bank holding companies during the crisis, *Vol. 14. Global Banking, Financial Markets and Crises*.
- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance*, 23(4), 189–209.
- Anginer, D., Demirguc-Kunt, A., & Zhu, M. (2011). How does bank competition affect systemic stability? *Journal of Financial Intermediation*, 23, 1-26
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carol evidence and application to employment equation. *Review of Economic Studies*, 58, 117-142.
- Bahmani, M., & Mirhashemi, S. (2015). Investigating the effect of banking marketing on the transfer of monetary policy from the duct of lending. *Quarterly Journal of Applied Economics Theory*, 2, 119-142.
- Barth, J. R., Caprio, G., & Levine, R. (2009). Bank regulations are changing: For better or worse? *World Bank Policy Research Working Paper*, No 4646.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87, 115-143.
- Choi, I. (2002). Combination unit root test for cross-sectionally correlated panel. *Hong Kong University of Science and Technology*, 12.
- Feng, Y., Hasan, I., & Marton, K. (2012). Institutional development and bank stability: Evidence from transition countries. *Journal of Banking & Finance*, 39, 160-176.
- Doll, M. (2010). Bank concentration, competition, and financial stability. *Tilburg University*.
- Hansen, B. E. (2000). Sample splitting and threshold estimation. *Econometrica*, 68, 575–603.
- Harris, R., & Tzavalis, E. (1999). Inference for unit roots in dynamic panels where the time dimension is fixed. *Journal of Econometrics*, 91, 201-226.
- Hou, X., & Wang, Q. (2016). Institutional quality and banking marketization and bank stability: Evidence from China. *Economic System*, 40, 539-551.
- Hu, J., Li, Y., & Chiu, Y. (2004). Ownership and nonperforming loans: Evidence from Taiwan banks. *Developing Economies*, 42(3), 1-35.
- Hurlin, C., & Mignon, V. (2007). Second generation panel unit root test, *Halshs Archives*, 1-24.
- Im, K., Pesaran, M. H., & Shin, Y. (1997). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115, 53-74.
- Ishibashi, I., & Matsumura, T. (2009). Privatization and entries of foreign enterprises in a differentiated industry. *Japan Economics*, 98, 203-219.



- Jin, Y., Kanagratnam, K., Lobo, G., & Mathieu, R. (2017). Social capital and bank stability. *Journal of Financial Stability*, 32, 99–114.
- Khoshnoodi, A., Sabagh, M., Yavari, K., & Hosseininasab, E. (2012). Financial banking vulnerability assessment and its effective factors using the Z-Score index. *Journal of Economic Research and Policy*, 7, 79-100.
- Kutlu, V. (2009). Panel cointegration analysis to exchange rate determination: monetary model versus Taylor rule model. *Doctoral Dissertation, Bilkent University*.
- Levin, A., & Lin, C. (1992). Unit root test in panel data: Asymptotic and finite sample Properties. *University of California at San Diego, Discussion Paper* 92-93.
- Maddala, G. S. & Wu, S. H. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics (Special Issue)*, 0305-9049.
- Mishkin, F. (1998). International experiences with different monetary policy regimes. *Journal of Monetary Economics*, 43(3), 579-605.
- North, D. (1996). Institutions, organizations and market competition. *NBER Working Papers from National Bureau of Economic Research*, 6965.
- Moon, H., & Perron, B. (2004). Testing for a unit root in panels with dynamic factors. *Journal of Econometrics*, 122, 81-126.
- Pesaran, M. H. (2003). A simple panel unit root test in the presence of cross sectional dependence. *Mimeo, University of Southern California*.
- Pesaran, M. H. (2004). General diagnostic tests for cross-section dependence in panels. *Cambridge Working Papers in Economics*, 0435.
- Pesaran, M. H. (2015). Testing weak cross-sectional dependence in large panels. *Econometric Reviews*, 34(6-10), 1089-1117.
- Poostinchi, M., Tahsili, H., & Karimzadeh, M. (2016). Impact of competition in the banking industry on banking stability, *Economics*, 11, 123-145.
- Taqavi, M., Ahmadian, A., & Kianvan, M. (2013). An analysis of the effect of corporate governance on the stability of the banking system in developing countries. *Journal of Financial Analysis*, 19, 45-76.
- Zalbagi, H. (2014). Factors affecting stability in Iranian banking network. *Quarterly Journal of Monetary-Banking Research*, 20, 307-327.
- Zamanzadeh, H., & Al-Husseini, S. (2016). Iran's economy: In straits of development. Vol .1. Tehran, Iran: *Markaz Press* [In Persian].