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SECTION 31. Economic research, finance, innovation, risk management.

A SURVEY OF THE IMPACT OF DIVERSIFICATION ON FINANCIAL STABILITY OF BANKS

Abstract: Ownership structure in existing private banks in TSE can change diversification degree by changing management structure in market and by approving different rules of credit risk, can affect financial stability of bank. Despite the wide researches about the relationship between diversification degree and stability, most aspects of this relationship are not recognized due to various factors. Thus, investigation of the relationship between diversification degree and ownership structure and financial stability of banks listed on TSE is of great importance and this is one of the unknown aspects of this study. The study population of this research is existing banks in TSE during 2008-2014. The study method is descriptive-analytic and evaluation models and panel data are used. As the results of Hausman test and insignificance of statistics are used, random effects method is selected. F Limer's test shows the support of panel data method. The present study is composed of two main regression, the first is performed by herfindahl hirschman index in payment of loan and second is performed by coefficient of concentration 3 of first bank in deposits. The results showed that the higher the concentration of payment of loan market and as payment loans are in specific minority, the delayed payment of bank and financial instability of banks are increased. This means that the higher the competition in loans payment, the higher the clarity, the lower the financial instability. Also, the results show that concentration among the banks and exclusion among the banks has negative effect on financial stability of banks. Also, the results show that the higher the banks exclusive ownership in stock market, and the higher the sum of shareholders above 5%, the lower the financial instabilities and delayed payment.

Key words: Diversification degree, Ownership structure, financial stability, Banks listed on TSE.
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1- Introduction

Delayed payment as one of the credit risk and financial instability indices is one of the most important challenges of banks in the country. In recent years, despite giving deadline and installment and transferring non-current claims to the current title, delayed payments are increased. Due to various effective factors on delayed payment, the researches in this field are developed. In recent years, new literature is raised in the effect of concentration and competition on financial stability of banks. Competition is a positive force in most industries and is supported by authorities due to positive impact on efficiency of industry, production quality and innovation. This issue has been a challenging case in banking industry. The benefits of competition should cover instability risk of banks. In recent years, based on approving the law of establishment of non-state

banks in Iran, the number of banks is increased and concentration in banking is reduced considerably. In case of not considering its outcomes in financial stability of banks can have dangerous outcomes for bank system and entire economy.

On the other hand, ownership structure in existing private banks in TSE can change management structure and diversification in market and by approving different rules can affect credit risk and financial stability of bank. Thus, evaluation of diversification degree and ownership structure and financial stability of banks listed on TSE is of great importance and this is one of the unknown aspects of this study.

Despite the wide studies regarding the relationship between diversification and stability,

most aspects of this relationship are unknown due to various factors. Different theoretical and empirical studies have presented different results and theories in this regard. The dominant assumption among politicians and academic experts is the relationship between diversification and stability. This study attempts to evaluate the relationship between diversification and financial stability of Iranian banks and measures its direction and intensity. The validity of each of theories regarding the relationship between diversification and stability about Iranian banks is tested empirically and by panel data model, we investigate the relationship between non-current claims of Iranian banking system as financial instability index and macro-economic factors, systematic risk, Inverse Herfindahl-Hirschman Index as diversification degree and specific features of bank during 2008-2013.

2- Theoretical basics

2-1- Concentration and competition

Concentration is a condition in market in which the market is controlled by a few pioneer manufacturers active in the industry. The inclusion criteria are effective factors on market concentration and show the easy or difficult condition of entering a market. The higher the difficulty of entering an industry for new enterprises, the existing enterprises can take non-competitive behavior. In an exclusive market, concentration is high and in full competition market, concentration is reduced. Market concentration indicates the condition of number of enterprises and market distribution among existing enterprises in the market. The higher the unfair nature of enterprises, the higher the concentration and if all the conditions are fixed and number of enterprises are increased, the lower the concentration (Economic studies office, 2008). To judge about the competition and exclusion in market, a logical method is to consider the number of active enterprises in market and second the distribution method of market among them. The higher the dedicated section of market to a few enterprises, the closer the market structure to exclusion.

We should consider that concentration and competition are not equal exactly. According to the economists, reduced concentration can increase competition. Thus, concentration is a criterion to evaluate competition degree. Indeed, the difficulties of measuring exclusive power have obliged most researchers to consider the size and distribution of active enterprises in an industry and in literature, it is called "concentration. Structure–conduct–performance (SCP) approach of Mason (1939) and Bain (1951) predicts that when many enterprises exist in market, they are less concentrated and

competition is higher but none of them can be a reason to support the competition increase. Some empirical studies have defined a direct relationship between concentration and market power in banking industry. Others lead to uncertainties in general power of this relationship. In bank system of EU in 1990, the number of banks in Italy was reduced 20%. Despite the structure-performance index, inter-bank competition is improved considerably (Hamidi Sahne, Mehdi, 2008). Bakker, Jacob A. & Haaf, Katharina (2002) studied the relationship between competition and market structure in 23 industrial countries during 10 years. In their study, competition was measured by Panzar-Rosse model and concentration by HHI and CRk criteria in local, national and international markets. Their results supported the traditional view by which concentration could be problematic in competition conditions (Baker and Haff, 2002).

2-2 Review of Literature

Rishi Manrai, Rudra Rameshwar and Vinay Kumar Nangia (2014) in the study "Does Diversification Influence Systematic Risk and Corporate Performance? Applied Herfindahl Index as inverse diversification index and to estimate panel method, Eviews software was applied. The results of study showed that there was a significant association between some variables as diversification strategy, capital structure, systematic risk, company profitability, firm size and growth of great companies.

Yigit and Anil (2012) in a study "the effect of management and ownership structure on behavior diversification: a study regarding business of selected companies in stock market of Istanbul" stated that based on the studies regarding the relationship between ownership percentage in preference of various strategy in developed countries, we could say there was a negative association between diverse strategic behaviors and ownership percentage. This study applied agency theory and herfindahl hirschman index and it was evaluated whether there is an association between executive structures and diverse strategic preferences of 359 selected companies in Turkey during 2005-2009 or not. The results showed that the studies companies had diverse ownership percentage. The findings showed that considering ownership percentage was increased compared to business percentage in mentioned companies.

Ruiz-Mallorqui & Santana-Martin (2011) in a study analyzed the effect of control by major institutional owners (bank institutions and investment mutual fund) on company value. They considered the voting right of major institutional owners and other great shareholders. The results showed that when

major shareholder is a bank, there is a negative association between voting right of owner with company value. This relationship was positive for mutual fund. The results showed that other great shareholders when a major institutional owner controlled the company affected the company value.

3- Theoretical framework and study model

This study is applied in terms of purpose and descriptive-analytic in terms of study method. To collect data of review of literature, library method as books, journals, papers, thesis are used and to estimate model, panel data method is used.

Thesis is composed of two main regressions, the first is performed by herfindahl Hirschman index and the second is performed by concentration coefficient 3 of the first bank. The study method is panel data model.

1. $NPL_{i,t} = \beta_0 + \beta_1 NPL_{i,t-1} + \beta_2 HHI_t + \beta_3 HHI_t^2 + \beta_6 RInt_t + \beta_8 GDPG_t + \beta_4 ERR_t + \beta_5 CR_t + \beta_9 SIZE_{i,t} + \beta_{10} os_{i,t} + \varepsilon_{i,t}.$

2. $NPL_{i,t} = \beta_0 + \beta_1 NPL_{i,t-1} + \beta_2 CR3_t + \beta_3 CR3_t^2 + \beta_6 RInt_t + \beta_8 GDPG_t + \beta_4 ERR_t + \beta_5 CR_t + \beta_9 SIZE_{i,t} + \beta_{10} os_{i,t} + \varepsilon_{i,t}.$

In this study, the relationship between introduced variables is investigated by panel data regression.

Study variables

Dependent variable: Dependent variable of study is delayed payment to total loans as recognized as the financial stability criterion.

Explanatory variable: Explanatory or independent key variable in this study is market concentration criterion. These criteria include herfindahl Hirschman index for loan market and concentration ratio 3 of first bank of deposits as structural criteria of competition.

Another explanatory variable is ownership structure as considering total shareholders above 5%.

Control variables: Control variables include three general classifications as macro economy factors, systematic risk and specific features of each bank.

Macro-economic factors include interest rate, goods index growth and services as inflation index and actual GDP.

Systematic risk factors include country risk and exchange rate risk. Country risk is computed by international risk evaluation institutions as S&P, ECR, etc. Exchange rate risk is obtained by actual exchange rate changes.

Special features of bank include banks size as measured by assets share of each bank of total assets of bank system. In addition, dummy variable of bank ownership like Allen Berger et al., (2009) enters into model as control variable.

3-Model estimation

To show whether using panel data in model estimation is efficient or not, F Limer's is used and to define which method (fixed or random effects) is suitable for estimation (determining fixed or random nature of cross section units), Hausman test is used. The results of tests are shown in Table 1.

Table 1

Results of F-Limer test.

Supported method	Error level	Statistics
Panel data model	0.000	35.546

As shown, the results show rejecting H0. Thus, panel data model with fixed effects is supported. To select among panel data with fixed effects and random effects model, Hausman test is applied. The results of this test are shown in Table 2.

Table 2

Results of Hausman test.

Probability	Degree of freedom	Chi-square statistics	Test results
0.15	9	1.99	Random effects

As shown, the results show rejection of H0. Thus, panel data model with random effects is not rejected. Finally, based on F-Limer test results and Hausman test, the study model is estimated by panel

data model with fixed effects of equation 1. The results of test are shown in Table 3.

Based on the results of F-Limer test and Hausman and results of classic regression assumptions, Model (1) of study is estimated by panel data as fixed effects. The results of model estimation are shown in Table 5.

Table 3

Results of first hypothesis test by random effects method.

Impact type	Significance coefficient	T statistics	Coefficient	Variable	
Positive	0.0001	7.2543	0.453566	Intercept	C
Positive	0.0403	3.7464	0.0987	Delayed payment	$NPL_{i,t-1}$
Positive	0.0011	9.8654	0.9882	herfindahl index	HHI_t
Negative	0.0182	2.1345-	0.4567-	Total shareholders above 5%	Own
Positive	0.0261	2.7644	1.7678	Interest rate	$RInt_t$
Negative	0.0033	6.8654-	0.4566-	GDP	$GDPG_t$
Positive	0.0058	5.4366	2.0987	Exchange rate risk	ERR_t
Positive	0.00332	2.8755	0.56779	Country risk	CR_t
Negative	0.0043	9.8357-	1.07665-	Bank size	$SIZE_{i,t}$
Positive	0.0054	7.6543	2.7889	Ownership dummy variable	$os_{i,t}$

Durbin-Watson statistics :1.87   Coefficient of determination (R^2) 0.64   Adjusted R^2 : 0.72

Limer F= 32.841   Prob F :0.00

Source. Study findings

$NPL_{i,t} = \beta_0 + \beta_1 NPL_{i,t-1} + \beta_2 CR3_t + \beta_3 CR3_t^2 + \beta_6 RInt_t + \beta_8 GDPG_t + \beta_4 ERR_t + \beta_5 CR_t + \beta_9 SIZE_{i,t} + \beta_{10} os_{i,t} + \varepsilon_{i,t}.$

Based on coefficient of determination, the model has good fit and the applied variables show explanatory power of model as 72% and it is a good value as the applied method is panel data. Durbin-Watson show the lack of auto-correlation and it shows 1.87. F statistics in this fit rejects zero value of coefficients. The sign of coefficients is presented based on theoretical basics and as coefficients probability shows the effect of all applied variables in this study and their significance.

The results are separated as followings:

The results show that explanatory variable effect or key independent variable in this study is market concentration and these criteria include herfindahl hirschman index for loan market and the effect on financial instability index (delayed payment) is positive and significant. The results show that the higher the concentration of payment of loan market and the paid loans are on specific minority, delayed bank payment and financial instability of banks are increased. This means that the higher the competition in loan payment and the clarity is increased, the lower the financial instability.

Also, the results show that concentration among the ownership of banks and ownership exclusion among banks has negative effect on delayed payment. In other words, the higher the competition between the ownership of banks, this competition leads to the increase of financial instability of banks. The results show that the higher the exclusion of banks ownership in stock market and the total of

shareholders are above 5%, the lower the financial instabilities and delayed payment of bank.

The results show that the effect of macro-economic factors include interest rate and growth of goods price index and consuming services as inflation index has positive and significant effect on financial instability of banks and actual GDP rate has negative and significant effect on financial instability index of banks. This means that by increase of interest and inflation rate, risk is imposed on production and company bankruptcy is increased and delayed payment and financial instability are increased. But production increase can reduce production risk and delayed payments are reduced and financial instability is reduced.

The results show that systematic risk factors including country risk and exchange rate risk have positive and significant effect on financial instability. This means that country risk is computed by international risk evaluation institutions as S&P, ECR, etc. and exchange rate risk is obtained by actual exchange rate changes and production risk is increased and delayed payment and financial instability are increased. The results show that

specific features of bank including bank size have negative and significant effect on financial instability. These results show that increase of assets share of each bank of total assets of bank system can lead to optimism of customers and reduced credit risk and financial instability of banks.

In addition, the results show that dummy variable of bank ownership (private ownership zero and state one) has positive effect and it means that state banks can increase financial instability. The results show that private banks have low financial instability. This is due to supervisory policies of private banks.

Then, we estimate the second model.

$$NPL_{i,t} = \beta_0 + \beta_1 NPL_{i,t-1} + \beta_2 CR3_t + \beta_3 CR3_t^2 + \beta_6 RInt_t + \beta_8 GDPG_t + \beta_4 ERR_t + \beta_5 CR_t + \beta_9 SIZE_{i,t} + \beta_{10} os_{i,t} + \varepsilon_{i,t}.$$

The results of F-Limer tests (to define using panel or pooled data) and Hausman) to show using fixed or random effects in panel data) for model (2) are presented in Table 6.

Table 4

Results of F-Limer and Hausman test for model (2).

P-Value	Statistics value	Statistics	Test
0.0000	1.66567	F	**F limer**
0.1367	1.4768	χ^2	**Hausman**

Based on the results of F-limer test and p-value (0.0000), H0 hypothesis is rejected at confidence interval 95% and it shows that we can use panel data method. Based on the results of Hausman test and p-value (0.0367) as above 0.05, H0 of test is rejected at confidence interval 95% and H1 hypothesis is supported. Thus, it is required that the model is

estimated by random effects method. Based on the results of F-Limer and Hausman and results of statistical assumption test of classic regression, model 2 of study is estimated by panel data and random effects. The results of model estimation are shown in Table 8.

Table 5

Results of second hypothesis test by random effects method.

Effect	P-Value	T statistics	Coefficient	Variable	
Positive	0.0021	2.8592	0.6543	Intercept	Intercept
Positive	0.0039	2.7341	0.8634	Delayed payment	$NPL_{i,t-1}$

Negative	0.0041	2.1341-	0.4321-	Concentration percent of three first banks	$CR3_t$
Negative	0.0001	6.0421-	1.0564-	Total shareholders above 5%	Own
Positive	0.0013	4.2514	2.0642	Interest rate	$RInt_t$
Negative	0.0001	6.1201-	1.5763-	GDP	$GDPG_t$
Positive	0.0011	5.1201	3.0864	Exchange rate risk	ERR_t
Positive	0.0041	2.6041	1.2854	Country risk	CR_t
Negative	0.0034	3.6509-	1.0346-	Bank size	$SIZE_{i,t}$
Positive	0.0052	2.0611	3.2976	Ownership dummy variable	$os_{i,t}$
0.454	Coefficient of determination				
1.9651 (0.0000)	F **statistics** $_{(}P-Value_{)}$				

Source. Study findings

The results show that concentration among three first banks and exclusion among banks has negative effect on financial stability of banks. In other words, the higher the competition among banks, this competition leads to reduced financial instability of banks.

Also, the results show that concentration among banks ownership and ownership exclusion of banks has negative effect on delayed payment. In other words, the higher the competition between banks ownership, this competition leads to increased financial instability of banks. The results show that the higher the exclusion of banks ownership in stock market, the total shareholders above 5% are higher and the lower financial instabilities and delayed payments in bank.

The results show that the effect of macro-economic factors including interest rate and growth of price index of goods and services as inflation index have positive and significant effect on instability financial index of banks and actual GDP has negative and significant effect on financial instability of banks. It means that by increasing interest and inflation rate, risk is imposed on production and bankruptcy of company is increased and delayed payment and financial instability are increased. However, the increase of production can reduce production risk and finally delayed payments are reduced and financial instability is reduced.

Results show that systematic risk factors including country risk and exchange rate risk have positive and significant effect on financial instability. This means that country risk is computed by international risk evaluation institutions as S&P, ECR, etc. and exchange rate risk is obtained by actual exchange rate changes and causes that production risk is increased and finally delayed payment and financial instability are increased.

The results show that specific feature of a bank includes bank size and has negative and significant effect on financial instability. These results show that increase of share of assets of each bank of total assets of bank system can lead to optimism of customers and reduced credit risk and financial instability of banks. In addition, the results show that dummy variable of bank ownership type (private ownership zero and state one) has positive effect and it means that state banks can increase financial instability. The results show that private banks have low financial instability. This is due to supervisory policies of private banks.

5- Results and recommendations
The results of study show that the higher the payment concentration of loan market and paid loans are on specific minority, the delayed bank payment and financial instability are increased. It is recommended that policies in loans payment are competitive not renting and clarity in this regard exists. Based on the results of study, concentration among the banks and exclusion among the banks

have negative effect on financial stability of banks. It is recommended that to reduce financial instability of banks, it is recommended to reduce financial instability of banks and increase competition among banks and central bank to reduce exclusion can make efforts. Based on the results of study showing that concentration among the banks ownership and ownership exclusion among the banks have negative effect on delayed payment and it is recommended to reduce financial instability and consider percent of shareholders above 5%. Based on the results, we can say the effect of macro-economic factors including interest rate and growth of price of goods and services as inflation index have positive and significant effect on financial instability of banks, it is recommended that macro-economic policies are used to reduce interest rate and inflation to reduce

financial instability of banks. Based on the results of study in which actual GDP has negative and significant effect on financial instability of banks, economic-growth based policies are recommended. The results show that systematic risk factors including country risk and exchange rate risk have positive and significant effect on financial instability, it is proposed to use exchange policies to reduce volatilities to reduce financial instability. The results show that special feature of bank including bank size has negative and significant effect on financial instability. It is recommended that bank management policies are used to increase bank assets. The results show that dummy variable of bank ownership type (private ownership zero and state one) have positive effect and it is proposed that banking system of country moves to privatization.

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