

Investigating banks' financial structure on profitability and price volatility of banks' shares: Evidence from Tehran Stock Exchange

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ABSTRACT

This paper presents an empirical investigation to study the relationship between financial structure on profitability and price volatility of banks' shares, which are operating in Iran. The proposed study considers the information of 21 Iranian banks over the period 2006-2012. Using some regression techniques, the study has determined that there was a negative relationship between leverage and return on assets but there was not any meaningful relationship between leverage and price volatility when the level of significance is five percent. In addition, the study has determined that there was a positive relationship between equity ratio and return on assets and there was a positive relationship between equity ratio and price volatility when the level of significance was five percent.

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1. Introduction

During the past few years, there have been tremendous efforts on learning more about the factors influencing on banking industry (Boyd & De Nicolo, 2005; Padilla & Pagano, 2000; Rice & Strahan, 2010). Barth et al. (2014), for instance, applied new database on bank regulation and supervision in 107 countries to evaluate the relationship between specific regulatory and supervisory practices and banking-sector development, efficiency, and fragility. Beck et al. (2010) determined the winners and losers from bank deregulation in the United States in a comprehensive study. Beck et al. (2013) investigated the banks' stability among some US banks. Berger et al. (2009) studied the bank competition and financial stability in some US banks. Boyd and Runkle (1993) investigated the relationship between bank size and profitability in banking industry. Banking industry is always influenced by regulations in most countries around the world (Marcus, 1984). Carletti and Vives (2007) presented a comprehensive study on regulation and competition policy in the banking sector. Claessens and Laeven (2004) tried to determine important drivers on increasing competition in banking industry.

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Dick and Lehnert (2010) tried to find the effects of personal bankruptcy and its relationship with credit market competition. Filosa (2007) performed a stress testing of the stability of the Italian banking system using VAR technique. Houston et al. (2010) reported that stronger creditor rights tend to promote greater bank risk taking. Kallberg and Udell (2003) investigated the value of private sector business credit information sharing in US banking sector.

Pagano and Jappelli (1993) presented a model with adverse selection where information sharing between lenders arises endogenously. In their model, lenders' incentives to share data about borrowers were positively associated with the mobility and heterogeneity of borrowers, to the size of the credit market, and to advances in information technology. In addition, information sharing was believed to increase the volume of lending when adverse selection becomes severe that safe borrowers drop out of the market. According to Pereira and Zhang (2010), stock returns decrease with an increase in the volatility of liquidity.

Rajan and Zingales (1995) studied the determinants of capital structure choice by analyzing the financing decisions of public companies in the major industrialized countries. They reported that factors detected by previous studies as correlated in the cross-section with firm leverage in the United States, were correlated in other countries as well. Roden and Lewellen (1995) investigated the composition of the financing packages applied in a large sample of leveraged buyout transactions in order to test a set of hypotheses developed in the prior literature about the determinants of corporate capital structure decisions. They concentrated in the role of agency costs, bankruptcy risks, and tax considerations. They reported some evidence that all three had an effect, both on the degree of leverage employed in the transactions and on the attributes of the borrowings undertaken.

Tan et al. (2007) investigated the association between the intellectual capital (IC) of companies and their financial performance. They reported that IC and company performance were positively related; IC was correlated to future company performance; the rate of growth of a company's IC was positively associated with the company's performance. Turk Ariss (2010) studied how various degrees of market power affect bank efficiency and stability in the context of developing economies. It gave some insight on the competition-stability nexus by documenting and investigating the complex interactions between a tripod of variables that are central for regulators. They reported that an increase in the degree of market power leads to bigger bank stability and enhanced profit efficiency, despite significant cost efficiency losses.

2. The proposed study

The proposed study considers whether bank's structure could influence on profitability of banks as well as stock price or not. Therefore, there are two main hypotheses associated with the proposed study of this paper as follows,

1. There is a relationship between bank's structure and profitability of banks.
2. There is a relationship between bank's structure and banks' stock prices.

The proposed study also considers the following three sub-hypotheses,

1. There is a relationship between banks' profitability and debt ratio.
2. There is a relationship between banks' stock prices and debt ratio.
3. There is a relationship between banks' profitability and equity ratio.
4. There is a relationship between banks' stock prices and equity ratio.

The proposed study of this paper uses the models developed by Yeh et al. (2013) as follows,

$$ROA_{i,t} = \alpha_0 + \beta_1 LEV_{i,t} + \beta_2 GroVol_{i,t} + \beta_3 FSAct_{i,t} + \beta_4 Eff_{i,t} + \beta_5 CapExp_{i,t} + \beta_6 Tra_{i,t} + \beta_7 Size + \varepsilon_{i,t} \quad (1)$$

$$\Delta GP_{i,t} = \alpha_0 + \beta_1 LEV_{i,t} + \beta_2 GroVol_{i,t} + \beta_3 FSAct_{i,t} + \beta_4 Eff_{i,t} + \beta_5 CapExp_{i,t} + \beta_6 Tra_{i,t} + \beta_7 Size + \varepsilon_{i,t} \quad (2)$$

$$ROA_{i,t} = \alpha_0 + \beta_1 Equ_{i,t} + \beta_2 GroVol_{i,t} + \beta_3 FSAct_{i,t} + \beta_4 Eff_{i,t} + \beta_5 CapExp_{i,t} + \beta_6 Tra_{i,t} + \beta_7 Size + \varepsilon_{i,t} \quad (3)$$

$$\Delta GP_{i,t} = \alpha_0 + \beta_1 Equ_{i,t} + \beta_2 GroVol_{i,t} + \beta_3 FSAct_{i,t} + \beta_4 Eff_{i,t} + \beta_5 CapExp_{i,t} + \beta_6 Tra_{i,t} + \beta_7 Size + \varepsilon_{i,t} \quad (4)$$

where $ROA_{i,t}$, $\Delta GP_{i,t}$, $LEV_{i,t}$, $GroVol_{i,t}$, $FSAct_{i,t}$, $Eff_{i,t}$, $CapExp_{i,t}$, $Tra_{i,t}$ and $Size$ are return on assets, volatility of stock price, leverage ratio, volatility of stock return, investing activities, efficiency, capital expenditure, volume of financial activities and size of firm i at time t , respectively. The proposed study considers the information of 21 Iranian banks over the period 2006-2012 (Kothari, 2004). Table 1 shows details of the results of our survey.

Table 1

The results of some basic statistics

Variable	N	mean	Standard deviation	Min	Max	Skewness	Kurtosis
Profitability	147	0.2992	0.449	-0.0461	2.2181	2.594	6.5
Stock volatility	147	0.1758	0.7239	-0.9751	2.7653	1.691	3.262
Debt ratio	147	0.5412	0.2736	0.0408	1.7265	0.532	1.627
Equity ratio	147	0.7356	0.0569	0.5868	0.8516	0.038	-0.333
Stock price	147	-0.0209	0.7175	-1.8068	3.0124	0.465	1.98
Investment	147	0.8843	0.3208	0	1	-2.429	3.951
Efficiency	147	0.9171	0.4689	-2.2274	2.2736	-2.432	15.489
Capital expenditure	147	0.0987	0.4101	-1.951	0.9978	-1.923	9.721
Financial activities	147	0.0516	0.2134	0.0003	2.5972	11.774	141.279
Bank size	147	0.7742	0.0538	0.6801	0.9035	0.487	-0.438

The preliminary results of Table 1, indicate that the data were normally distributed. In addition, Table 2 shows details of the implementation of Kolmogorov-Smirnov test. Based on the results of Table 2, profitability and price volatility are normally distributed. We have also considered the correlation among different independent variables and have not found significant correlations.

Table 2

The results of Kolmogorov-Smirnov test

Variable	Number	KS	Sig.
Profitability	147	0.637	0.809
Price volatility	147	0.451	0.987

3. The results

In this section, we present details of the implementation of regression analysis on Eq. (1) to Eq. (4).

3.1. The relationship between debt and profitability

The first hypothesis of this survey investigates the relationship between debt and profitability. Table 3 demonstrates the results of Chow and Huasman. Based on the results of Table 3 we may use Panel data with fixed effect. Table 4 shows details of other necessary statistics.

Table 3

The summary of Chaw and Huasman tests

Test	Number	Statistics	Statistics value	Degree of freedom	Sig.
Chaw	147	F	2.2360	(20, 119)	0.0040
Hausman	147	Chi-Square	5.6860	7	0.0168

Table 4

The results of some statistics

Jarque-Bera		Breusch-Pagan		Durbin-Watson	Ramsey	
Chi-Square	P-value	F	P-value	D	F	P-value
1.8407	0.7541	1.5532	0.0244	2.23	0.1814	0.8343

As we can observe from the results of Table 4, all statistics are within the acceptable level and we may examine the first hypothesis based on the regression technique as follows,

$$ROA_{i,t} = -2.8988 - 0.1140LEV_{i,t} + 0.0626GroVol_{i,t} + 0.0225FSAct_{i,t} + 0.0241Eff_{i,t} + 0.0568CapExp_{i,t} + 0.0973Tra_{i,t} + 4.1438Size + \varepsilon_{i,t}$$

t-value	-5.1907	-2.1465	2.5685	0.3626	0.7072	0.9929	1.1245	5.8993
P-value	0.0000	0.0339	0.0114	0.7175	0.7808	0.3227	0.2630	0.0000

F-value = 5.3514 P-value = 0.0000 R² = 0.5483

As we can observe from the results of regression analysis, F-value is statistically significant and R-Square value is equal to 0.5483, which means the independent variables can predict approximately 55% of the changes of dependent variable. The sign of Leverage is $\beta = -2.1465$ with t-value = -2.1465 and P-value = 0.0339. Therefore, we can conclude that there was a negative relationship between leverage and return on assets when the level of significance is five percent and the first hypothesis of the survey is confirmed.

3.2. The relationship between price volatility and profitability

The second hypothesis of this survey investigates the relationship between price volatility and profitability. Table 5 shows the results of Chaw and Huasman.

Table 5

The summary of Chaw and Huasman tests

Test	Number	Statistics	Statistics value	Degree of freedom	Sig.
Chaw	147	F	1.2380	(20, 119)	0.0361
Hausman	147	Chi-Square	4.0770	7	0.0209

Based on the results of Table 5 we may use Panel data with fixed effect. Table 4 shows details of other necessary statistics.

Table 6

The results of some statistics

Jarque-Bera		Breusch-Pagan		Durbin-Watson	Ramsey	
Chi-Square	P-value	F	P-value	D	F	P-value
1.6289	0.3430	1.3412	0.0004	2.29	2.3838	0.0960

As we can observe from the results of Table 6, all statistics are within the acceptable level and we may examine the second hypothesis based on the regression technique as follows,

$$\Delta GP_{i,t} = -0.7011 - 0.1545LEV_{i,t} - 0.1524GroVol_{i,t} + 0.1209FSAct_{i,t} + 0.0272Eff_{i,t} + 0.0356CapExp_{i,t} + 0.055Tra_{i,t} + 1.0613Size + \varepsilon_{i,t}$$

t-value	-0.8940	-0.6672	-2.0507	0.62006	0.2269	0.2487	0.0216	1.1306
P-value	0.3731	0.5059	0.0425	0.5364	0.8208	0.8040	0.9827	0.2705

F-value = 4.502 P-value = 0.0000 R-Square = 0.5053

As we can observe from the results of regression analysis, F-value is statistically significant and R-Square value is equal to 0.5053, which means the independent variables can predict approximately 51% of the changes of dependent variable. The sign of Leverage is $\beta = -0.1545$ with t-value = -0.6672 and P-value = 0.5059. Therefore, we can conclude that there was not any meaningful relationship between leverage and price volatility when the level of significance is five percent and the second hypothesis of the survey was not confirmed.

3.3. The relationship between equity ratio and profitability

The third hypothesis of this survey investigates the relationship between equity and profitability. Table 7 shows the results of Chaw and Huasman.

Table 7

The summary of Chaw and Huasman tests

Test	Number	Statistics	Statistics value	Degree of freedom	Sig.
Chaw	147	F	1.9919	(20, 119)	0.0122
Hausman	147	Chi-Square	15.5260	7	0.0298

Based on the results of Table 7 we may use Panel data with fixed effect. Table 8 presents details of other necessary statistics.

Table 8

The results of some statistics

Jarque-Bera		Breusch-Pagan		Durbin-Watson		Ramsey	
Chi-Square	P-value	F	P-value	D	F	P-value	
1.3159	0.2254	1.3439	0.0342	2.23	0.6599	0.5185	

As we can observe from the results of Table 8, all statistics are within the acceptable level and we may examine the first hypothesis based on the regression technique as follows,

$$ROA_{i,t} = -2.4195 + 1.9179Equ_{i,t} + 0.0492GroVol_{i,t} + 0.0435FSAct_{i,t} + 0.0248Eff_{i,t} + 0.1166CapExp_{i,t} + 0.1522Tra_{i,t} + 1.5863Size + \varepsilon_{i,t}$$

$$t\text{-value} \quad -4.8023 \quad 1.5742 \quad 2.0937 \quad 0.7344 \quad 0.7431 \quad 2.0220 \quad 1.7742 \quad 1.2903$$

$$P\text{-value} \quad 0.0000 \quad 0.0181 \quad 0.0436 \quad 0.4641 \quad 0.4588 \quad 0.0454 \quad 0.0786 \quad 1.1994$$

$$F\text{-value} = 4.3349 \quad P\text{-value} = 0.0000 \quad R^2 = 0.4958$$

As we can observe from the results of regression analysis, F-value is statistically significant and R-Square value is equal to 0.4958, which means the independent variables can predict approximately 50% of the changes of dependent variable. The sign of Leverage is $\beta = 1.9179$ with t-value = 1.5742 and P-value = 0.0181. Therefore, we can conclude that there was a positive relationship between equity ratio and return on assets when the level of significance is five percent and the third hypothesis of the survey is confirmed.

3.4. The relationship between equity ratio and price volatility

The fourth hypothesis of this survey investigates the relationship between equity ratio and price volatility. Table 9 presents the results of Chaw and Huasman.

Table 9

The summary of Chaw and Huasman tests

Test	Number	Statistics	Statistics value	Degree of freedom	Sig.
Chaw	147	F	1.1535	(20, 119)	0.0070
Hausman	147	Chi-Square	3.9438	7	0.0062

Based on the results of Table 9 we may use Panel data with fixed effect. Table 10 presents details of other necessary statistics.

Table 10
The results of some statistics

Jarque-Bera		Breusch-Pagan		Durbin-Watson	Ramsey	
Chi-Square	P-value	F	P-value	D	F	P-value
5.3040	0.0705	1.3180	0.0461	2.31	2.9648	0.0549

As we can observe from the results of Table 10, all statistics are within the acceptable level and we may examine the first hypothesis based on the regression technique as follows,

$$\Delta GP_{i,t} = 2.5160 + 1.8748 Equ_{i,t} - 0.0935 GroVol_{i,t} - 0.0148 FSAct_{i,t} + 0.1191 Eff_{i,t} + 0.1416 CapExp_{i,t} + 0.0483 Tra_{i,t} - 1.3892 Size + \varepsilon_{i,t}$$

t-value	1.4522	1.5750	-1.5834	-0.1030	1.1748	0.9670	0.2483	-0.4457
P-value	1.1491	0.0063	0.1160	0.9181	0.2424	0.3355	0.8043	0.6566

F-value = 1.1089 P-value = 0.0000 R² = 0.3310

As we can observe from the results of regression analysis, F-value is statistically significant and R-Square value is equal to 1.1089, which means the independent variables can predict approximately 33% of the changes of dependent variable. The sign of leverage is $\beta = 1.8748$ with t-value = 1.5750 and P-value = 0.0063. Therefore, we can conclude that there was a positive relationship between equity ratio and price volatility when the level of significance is five percent and the fourth hypothesis of the survey is confirmed.

4. Conclusion

In this paper, we have presented an empirical investigation to study the relationship between financial structure on profitability and price volatility of banks' shares, which were operating in Iran. The proposed study considered the information of 21 Iranian banks over the period 2006-2012. Using some regression techniques, the study has determined that there was a negative relationship between leverage and return on assets but there was not any meaningful relationship between leverage and price volatility when the level of significance is five percent. In addition, the study has determined that there was a positive relationship between equity ratio and return on assets and there was a positive relationship between equity ratio and price volatility when the level of significance was five percent. The results of the survey are consistent with findings of Abor (2005), Cetorelli and Gambera (2001), Gan (2004), Niresh (2012), Niresh (2012) and Pereira and Zhang (2010).

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