Relationship Between Financial Performance Of Banks and Stock Revenues: Panel Data Analysis

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Abstract

This study aims to find whether there is a relationship between stock returns and financial ratios of banks traded in Borsa Istanbul. It is important to introduce this relationship for investors to make an investment decision and also to suggest which financial ratios are more important. For this purpose, quarterly financial ratio data of the selected banks and stock exchange data between 2002Q1-2013Q2 are analyzed by Panel Data Method. As a result of the analysis, all the ratios except for the profitability measuring data show significant results at 5 % significance level. A negative relationship is seen between the ratio of total credits and ratio of assets to total assets measuring the asset quality and the ratio of liquid assets to total assets measuring liquidity position.

1 Introduction

Banks are the fundamental component of the economy. Turkish Banking environment is a system operating in mixed economy based on the Central Bank of Turkish Republic. Banks build up the fundamentals of the Banking System in Turkey by putting the individual savings and leading them to required areas.

The relationship between the stock prices and the accounting income items are widely discussed in financial economics literature. Some of the studies about this relationship address the effects of corporation yields on stock prices. Some other group of studies evaluates the changes of stock prices as a predictor of the future yields. These studies revealed that stock prices give precious information about estimating future yields [1].

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The aim of this study is to give effective information to the investors investing in banks stocks in Borsa Istanbul to gain profit. For this purpose, the relationship between 10 bank stock returns and financial ratios of these banks in Borsa Istanbul XU100. In the first part of the study, the framework of the study is shaped and statistical data of the Turkish Banking System is analyzed. In the second part, domestic and foreign literature investigating the relationship between stock returns and financial ratios are included. In the third part, data set and model is explained. In the fourth part, empirical evidence is represented. In the fifth part of the study, empirical evidence is concluded in the direction of the results.

2 Overall Look of the Turkish Banking System and Financial Ratios

Structure of the banking sector having an extensive dominance in the financial sector can be seen in Table 1 until the end of 2013. By 2013 December, there are 45 banks operating in Turkish Economy. These banks have 11.021 branches providing 197.465 employees. Representing the 71% of the financial sector, deposit banks have the greatest part in the sector. Development Banks and Investment Banks create 29% of the sector. Among the deposit banks; 53 % are foreign invested, 34 % is private invested, 9 % is state banks and 3 % are the banks transferred to the Saving Deposits Insurance Fund.

Table 1: Structure of the banking sector

31.12.2013			
	No.of banks	**No.of Branches**	**No.of Employees**
Deposit Banks	32	10.981	192.219
State Banks	3	3.397	54.466
Private Banks	11	5.339	93.365
Saving Deposits Insurance Fund	1	1	229
Foreign Invested Banks	17	2.244	44.159
Development and Investment Banks	13	40	5.246
Total	45	11.021	197.465

Source: [2]

When we look at the number of branches, we can see that 99.63% are the branches of the deposit banks and only 0.36 % of the total is the branches of development and investment banks. In the deposit banks, 48.60 % of the branches are owned by private banks. Even there are 3 state owned banks, 30.93 % of the branches are the branches of state banks. The rest of 20.43 % is the branches of the foreign invested banks.

In terms of employee numbers, deposit banks are (97%) are again more widespread than development and investment banks (3%). Among the deposit banks, private banks have the largest part of the employees (48.57 %), state banks have the second (28.33%) and foreign invested banks have the least (22.36%) number of employees. Even the number of state banks is less than foreign invested banks; state banks have more branches and more employees than foreign invested banks.

Asset size of the banks in its group and in banking sector is given in Table 2.

Table 2: Asset, credit and deposit distribution of the banking sector

Banks	Share in group			Share in Sector		
	Total Assets	Total Credits	Total Deposit	Total Assets	Total Credits	Total Deposit
Deposit Banks	100,0	100,0	100,0	95,7	94,9	100,0
State Banks	30,9	29,3	34,3	29,5	27,8	34,3
Private Banks	53,1	54,6	50,7	50,8	51,8	50,7
Foreign Invested Banks	16,0	16,1	14,9	15,3	15,2	14,9
Development and Investment Banks	100,0	100,0	-	4,3	5,1	-

Source: [3]

As it can be seen in Table 3, 95.7% of the total assets are the assests of the deposit banks and 4.3% are the assets of development and investment banks. Among all the deposit banks, 30.9 % of the total assets belong to state banks and 53.1 % of the total assets belong to private banks. Foreign Invested Banks form 16 % of the total assets. In terms of credit extension, while 94.9 % of the total credits are provided by deposit banks, only 5.1 % of the total credits are provided by development and investment banks. In deposit banks, private banks have a ratio of 54.6 % and state banks have a ratio of 29.3 %. Foreign banks provide 16.1 % of the total credits. When we look at the deposit/share ratio, private banks have 50.7 % and state banks have 34.3 % of the total banks deposits. Deposit ratio of the foreign banks is 14.9 %.

When table 1 and table 2 are evaluated together, it can be concluded that the banking sector has an important part in the financial system. For this reason, operating results of the banking sector should be monitored regularly and closely.

12 of the 45 operating banks are traded in Borsa Istanbul. Two of them are state banks (Vakıflar and Halk), seven of them are private banks (Akbank, Şekerbank, Tekstil Bank, TEB, Garanti, İş Bank and Yapı Kredi), three of them are foreign invested banks (Denizbank, Finans Bank and Alternatif Bank) and two of them are development and investment bank (Türkiye Sınai Kalkınma and Türkiye Kalkınma).

Investors willing to make investment in banking sectors stocks can benefit from the financial tables of these banks. Balance sheet items and income table items can be evaluated for this purpose. One of the purposes of financial tables is to determine the value of a company. Financial tables derived from the balance sheet and income table can be classified and analyzed in five groups: liquidity ratio, financial structure or liability, operation or activity, profitability, stock market performance ratios.

3 Literature Review

The factors affecting the stock returns attracted the interest of many researchers in financial literature. At the same time, detecting these factors is also important for the investors investing in stock markets. Most of the studies to estimate the stock returns highly focus on the relationship between the fundamental financial tables and stock returns. Following section refers some of these studies.

[4] states that investors will not have information about the future values of stock returns by focusing on the past values of stock returns, according to efficient market hypothesis. This hypothesis that all the information which possibly affects the stock returns are reflected to the stock prices on advance. While there are many studies about the relationship between financial ratios and stock returns, limited number of studies are made for the developing economies

[5] investigated the dynamic relationship between stock returns, accountng profit and cash flows for 21 Finlander Companies between 1977-1984. A VEC(Vector Error Correction) model is build to analysis short term and long term relationships of the variables. A relationship from stock returns towards accounting profits is revealed a result. It is concluded in the study that stock returns can reveal some important information about the future returns of the Finlander companies.

[6] used the United States Banks data between 1982-1991 to make a cross section study of expectations and stock returns. It is concluded that the stock returns tend to increase when analysts have a growth expectations.

[7] analyzed the effects of banks characteristics, financial structure and some macroeconomic indicators on net interest margins and returns of the banks for the year from 1980 to 2000 in Tunisia Economy. It is found that banks characteristics affect the net interest margins and profits of the banks but financial structure and macroeconomic variables have no significant effect on it.

[8] investigated whether some financial ratios such as dividend income affects the stock returns by using OLS (Ordinary Least Squares) model between the period 1963-2000. Book value and operating value of the companies is found to have effects on stock returns in the least.

[9] made a time series analysis using the data of 53 banks in European Union Economy from 1991 to 2004. Relationship between stock returns and equity dividend rate, book value, book debts, cash flow, interest rate variables are tested and a strong relationship between cash flows and stock returns. It is also found that expected return shocks has less importance for small scale banks.

[10] explained the performance of Japanese stock returns in the light of some financial variable such as the ratio of net income to average assets, ratio of non-interest income to average assets, total risk, credit risk, liquidity, interest rate. How to maximize the stock returns even the volatility is at high levels.

[11] analyzed the profitability ratio of 28 Croatia Commercial Banks for 2003-2008 period by a dynamic panel data analysis. The variables are asset return ratio, credit growth volume, ratio of loan loss provisions to total credits, ratio of equity capital to total assets, ratio of charges and commissions to average assets, ratio of liquid assets to total assets, ratio of credits to deposits, ratio of fixed costs to average assets, ratio of net exchange rate difference to average assets. Extensive suggestions made for development of Croatia Banking System as the result of the study.

[12]built a multiple logit model to find whether the New Zealand Banks Financial data can reveal some information about the stock returns of these banks. Profit based and return based strategies used to make decision of investors strategy.

[13]examined the fundamental analysis data and stock returns data of Indian economy for the period 2001-2010. Results show a relationship between typical conditions of the companies and future stock returns.

[14] used Sri Lanka Commercial Bank data to determine the effects of capital ratio, activity mix, overhead expenses and liquidity on profitability of banks. Results of the study show

that capital ratio and liquidity have a positive effect on profitability of banks. But activity mix and overhead expenses have a negative effect on profitability of banks.

[15] built a time series analysis by using a panel data method to test the returns of Nigerian commercial banks. Investigated economic variables are capital adequacy ratio, asset quality, managerial competence, liquidity ratio, inflation and economic growth. Asset quality, managerial competence and economic growth act as fundamental variables in the study.

[16] investigated whether the sectoral differences of the industrial corporations cause any differences in some selected ratios in 2002. As a result of the multivariate analysis on variance method, it is found that sectoral differences have significant effect for 27 variables.

[17] examined the financial ratios related with stock returns in Istanbul Stock Exchange. Data set includes the variables such as stock returns, acid test ratio, cash flow, equity capital, ratio of gross returns on sales and net returns between the years 1995-1999 and 2003-1999. In the medium term, including 1995- 1999 period, a significant relationship is found between stock returns and acid test ratio, ratio of short term financial loans to sales, ratio of short term financial loans to total assets, return per share, ratio of net returns to sales, ratio of operational cash flow to equity, ratio of total cash flow to equity, ratio of net profit to equity. For the 2003-2006 period, a relationship is found between ratio of returns to interest, return per share, ratio of gross profit to sales, ratio of gross real operating profit to sales, ratio of net profit to sales, ratio of gross real operating profit to equity and stock returns.

[18] investigated the returns of publicly traded companies and selected financial indicators by portfolio method. Active turnover rate, ratio of equity to total assets, profit capital ratio, sales volume, asset growth and ratio of market value to book value data of 60 companies between 1997-2008 period. It is concluded in the study that active turnover rate, sales volume, asset growth and ratio of market value to book value data can be used to estimate stock returns

[19] analyzed the data of publicly traded companies stock returns by capital asset pricing model. Financial data of 82 companies from 1993 to 2007 traded in stock exchange market and treasury bill and treasury stock data are used in the study. Results show that capital asset pricing model can be useful tool in order to calculate the market risk premium.

[20] tested the relationship between the financial ratios and stock returns with ten models in both linear and non linear forms. 20 different financial ratios such as liquidity, efficient use of assets, financial structure, profitability and stock performance condition are discussed. Mostly non linear relationships are revealed from the results of the studies

[21] researched the specific macroeconomic determinants of Turkish Banks profitability between 2002-2010. A panel data anaylsis is made to reveal these determinants and it is concluded that asset volume and non interest incomes have positive and significant effect on stock returns besides credit portfolio volume and non-performing loans have negative and significant effect on stock returns. In addition, only one macroeconomic factor, real interest rates, have an effect on on stock returns

[22] tried to estimate the stock returns by using financial ratio data by a discriminant analysis for BIST 30 stocks. One and two year estimation models are build in the model. In one year estimation model operation turnover speed and leverage rate have effects on stock returns while in two years model operation turnover rate, leverage rate and liquidity data have effects on stock returns.

[23] investigated the stock returns of Istanbul Stock Exchange by means of net profit margin, real operating profit margin, asset turnover rate, turnover rate of equity. A significant relationship is detected between net profit margin and real operating profit.

[24] examined the performance of Turkish Banks from 1995 to 2009 by a panel data analysis. The data set consists of return on assets, net interest margin and equity efficiency. The result of the study shows that factors affecting the Banks performance are mostly the micro factors such as net interest margin, foreign banks, ratio of total credits to assets, size of assets.

[25] used the return on assets and profit capital data of 26 Turkish Banks to find the determinants of profitability of banks. It is found that the ratio of loan loss provision to gross credits, ratio of total expenditures to total revenues, Herfindahl–Hirschman index and inflation is negatively and significantly important on return on assets.

[26] investigated 73 manufacturing companies between 1990 and 2009 by a panel data analysis in their study titled role of financial ratios determining the stock prices. It is found that profitability ratio and financial leverage ratio significantly and positively affect stock returns. On the other hand, operating ratios have no significant effect on stock returns.

[27] analyzed Turkish Banks operating Ratios and profitability tendency. Return on assets, net profit margin, and return on equity and ratio of other operating charges to total assets are investigated for 2002-2012 period. Panel data analysis showed a significant relationship between these variables and banks profitability ratios.

[28] examined capital adequacy ratios of Turkish Banks using panel data from 2002 and 2012. A negative relationship is found between capital adequacy ratio, size, deposit ratio and credit ratio, and a positive relationship is found between economic growth and return on asset ratio.

[29] applied a canonical correlation analysis for deposit banks in Istanbul Stock Exchange using data set of 2011 to determine the movements of stock performance and financial ratios. It is concluded that investors should consider the ratio of net profit for the year to total assets and the ratio of market value to book value.

[30] used the Promethee method to analyze the performance of deposit banks and stock returns by using 10 different ratios for 2007-2011 periods. No significant relationship can be found between the financial performance and stock returns neither for individual banks nor for the sector.

[31] examined the effect of country risk on stock prices by using data set of 12 banks in Borsa Istanbul. The study includes the data from 2003 to 2012. Results of the study reveals that economic risk, political risk, financial risk and country risk have a negative effect on stock returns.

[32] tested the relationship between the financial ratios and financial value of the companies with the help of the acid test ratio, debt ratio, asset turnover rate, profitability ratio of the assets, and the ratio of market rate to book value, financial leverage ratio and net sales. 56 producing company between 2004 and 2011 in BIST are considered. The results shows that the most effective ratios are acid test ratio, asset turnover rate, ratio of market value to book value and financial leverage ratio.

This study introduces the panel data analysis for the banking sector into the literature. The following part emphasized the method and empirical results.

4 Methodology and Empirical Results

4.1 Data Set and Variables

This study includes 7 private deposit banks and 2 foreign banks located in Turkey and 1 Development and Investment Bank. These banks represent the 54.8 % of the total assets of the banking sector. Dependent variable is the stock returns of the banks. Financial ratios variables are the *ratio of credits to total assets* to define balance sheet structure, *ratio of total credits and debts to total assets and the ratio of total assets and debts to gross non-performing loans to* determine asset quality, *the ratio of liquid assets to total assets* to determine liquidity, *the ratio of net profit of the year to the total assets* to determine profitability, *the ratio of net interest income after provision to the total assets* to determine the income and expenditure structure. All the ratios and calculations are shown in table 3.

Table 3: Financial ratios

Calculation	Açıklama	Sembol
Credits / Total Assets	Balance sheet structure	bal
Total credits and debts / Total Assets	Asset quality	credit
Gross non-performing loans / total assets and debts	Asset quality	nplr
Liquid assets / Total Assets	Liquidity	liq
Net profit of the year Total Assets	Profitability	prof
Net interest Income after provision / Total Assets	Income and expenditure structure	int

The stock returns of the banking sector stocks and the above ratios are tested by a panel data analysis.

4.2 The Model

Panel data econometrics discusses both the time dimension and the cross section dimension of the model and provided better results than the traditional time series analysis. In this context the fundamental equation of the panel data model is as follows:

$$Y_{it} = \alpha + X'_{it}\beta + u_{it} \qquad \text{i=1,2.. ...,N and t=1,2,.....,T} \tag{1}$$

In this equation i defines the households, individuals, companies etc., t defines time. In the equation t subscript shows the cross section dimension, t subscript shows time dimension. α

α is a scalar, β is Kx1 and X'_{it} is the *it* th observation on K explanatory variables[33].

4.2.1 Panel unit root test

The first step of the time series analysis is the determination of the stability of the variables and integration levels. Levin, Lin and Chu test [34] and Im, Pesaran and Shin tests are the tests for panel root tests. Both of these tests null hypothesis is "*there is unit root in panel*

data"[35]. [34] assumes that the cross section units have a common unit root process, but [35] assumes that the cross section units have their own unit root process.

LLC (2002) estimates the following model for the unit root analysis [36].

$$\Delta y_{it} = \mu_i + \rho y_{it-1} + \sum_{j=1}^{k} \alpha_j \Delta y_{it-j} + \delta_{it} + \theta_t + \varepsilon_{it} \tag{3}$$

In equation 3, Δ is the first difference operator, k is the lag length, $\mu_{i\,unit}$ specific fixed effects and θ_t is the time effects. The null hypothesis is defined: $\rho=0$.If the null hypothesis is rejected, there is panel stationary. The main disadvantage of this method is the decreasing explanatory power if there is a trend in the series. For this reason, IPS (2003) is also used for the analysis. IPS (2003) can be defined as follows.

$$\Delta y_{it} = \mu_i + \rho_i y_{it-1} + \sum_{j=1}^{k} \alpha_j \Delta y_{it-j} + \delta_{it} + \theta_t + \varepsilon_{it} \tag{4}$$

The null hypothesis of IPS (2003) is: there is unit root for all the countries data ($\rho_1 = \rho_2 = \ldots \rho_i = 0$) and the alternative hypothesis is there is unit root for some countries data and none fort he rest ($\rho_i < 0$ for some i). According to these hypothesis, unit root tests can be seen in Table 4.

Both the Levin, Lin and Chu test and Im, Pesaran and Shin test all the variables are stationary at 5 % and 10 % level. Test results can be seen in Table 4.

Table 4: Panel unit root tests

	LLC	IPS
R	-16.78[0.0000]	-15.57 [0.0000]
bal	-2.00 [0.0225]	-2.97 [0.0014]
credit	-2.95 [0.0016]	-1.22 [0.1099]
nplr	-1.31 [0.0948]	-4.03 [0.0000]
liq	-2.61 [0.0045]	-3.47 [0.0003]
prof	-9.52 [0.0000]	-9.01 [0.0000]
int	-3.61 [0.0000]	-2.81[0.0002]
p-values are in parenthesis. Newey–West bandwidth selection with Bartlett kernel was used for the LLC test.		

4.2.2 Panel regression analysis

There are mainly three methods: pooled least squares method, constant effects method and random effects method.

Some tests should be performed in order to determine which model to select. The selection between pooled least squares method and constant effect model is made by F (Fisher Test), the selection between pooled least square and random effects model is made by LM (Lagrange Multiplayer) and Honda Tests, the selection between random effects model and constant effects model is made by Hausmann test. The selection of the tests can be summarized in Table 5.

Table 5: Specification tests

Test	Statistics	P Value	
F-Test			
Group	0.537	0.846	H_0 Accept
Time	11.747	0.000	H_0 Reject
Group and Time	9.943	0.000	H_0 Reject
LM Test			
Group	1.109	0.292	H_0 Accept
Time	476.93	0.000	H_0 Reject
Group and Time	478.04	0.000	H_0 Reject
Honda Test			
Group	-1.053	0.853	H_0 Accept
Time	21.838	0.000	H_0 Reject
Group and Time	14.697	0.000	H_0 Reject
Hausman Test	6.328	0.3874	H_0 Accept

When we analyze the table above, we conclude that random effect model should be used for further study. The last step for the model determination is the autocorrelation and heteroscedasticty tests. These tests can be seen in Table 6.

Table 6: Autocorrelation and heteroscedasticty test results

Heteroscedasticty Tests		
LMh_random	22.510	0.0073
LMh_fixed	22.423	0.0076
Autocorrelation Tests for Random Effects Model		
Lmmurho-stat	1.460	0.481
LMmuIrho-stat	0.811	0.367
LMrhoImu-stat	0.350	0.553

When we look at table 6, we can see that there is no autocorrelation problem in the data but there is heteroscedasticty in the data. In order to fix this problem Panel corrected standart Errors are used for the model. The estimated model is heteroskedasticity corrected one-way random effects model. A result of the model is given in the following section.

4.2.3 Empirical results

Results of model is estimated in this section and summarized in table 7.

Table 7: Panel regression results

Variable	Coeff.	Statistics	Prob.
BAL	0.043726	2.751.616	0.0062
CREDIT	-0.133543	-3.878.867	0.0001
INT	0.768886	3.451.229	0.0006
LIQ	-0.084556	-2.214.906	0.0273
NPLR	0.262091	2.313.341	0.0212
PROF	0.612007	1.407.820	0.1599
C	8.478.340	3.193.533	0.0015
R	0.086240		
Adj. R	0.073279		
F Tests	6.653723		

When we look at table 7, we can see that BAL (ratio of credits to total assets), CREDIT (total credits and debts to total assets), INT (ratio of net profit of the year to the total assets) and the constant term is significant at 1 % significance level. At 5 % significance level, in addition to these variables, LIQ (liquid assets to total assets), NPLR (debts to gross non-performing loans) are also significant. Only PROF (ratio of net profit of the year to the total assets) is no significance. All the variables other than CREDIT and LIQ variables have a positive relationship with stock returns. On the contrary, CREDIT and LIQ variables have a negative relationship with stock returns. R^2 value of the model is 0,073 which shows that there are some other variables affecting the stock returns. Overall F value of the model shows that the model is significant in general.

5 Results and Suggestions

The relationship between the stock returns and economic variables is widely discussed. Different studies investigating this relationship have given different results considering various countries and also for various time periods therefore this subjects is argued both in economics literature and financial literature.

In the study, the relationship between the stock returns and some financial variables of the banks traded in Borsa Istanbul between 2002-2013 is analyzed. A panel data analysis is made in order to reveal this relationship. Thereby, investors may use the results in the decision making process. The results of the study show significantly important results for all the variables and periods except for stock returns data and bank profitability data.

In the study, the results show that the variables indicating stock returns and balance sheet quality (credits/total assets), asset quality (total credits and assets /total assets and non performing loans /total assets and credits), income and expenditure structure (net profit of the year/total assets), liquidity (liquidity/ total assets) are statistically significant.

Secondly, a negative relationship is found between stock returns and total credits, credits/total assets and a positive relationship between the other variables.

Investors planning to make investment on banking sector may consider these results of the model.

The most important constraint of the study is data set. It is obvious that more effective results can be found with an extensive data set. However, studies can be made for different sectors and different ratios of the same sectors can be made. Moreover, data of different countries can be added to extent the study.

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