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PREDICTIVE POWER OF FINANCIAL RATIOS WITH REGARD TO THE TURKISH BANKING INDUSTRY: AN EMPIRICAL STUDY ON THE STOCK MARKET INDEX

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ABSTRACT

In this study, it is examined whether changes in the stock market index can be explained by the change in financial ratios. Financial statements of 11 conventional and 2 participation banks for a total of 13 banks (representing the essential part of the Turkish Banking Sector and constituting the BIST XBANK Stock Index) announced on a quarterly basis from 2002 to 2013 were extracted from the Public Disclosure Platform website. The contemporaneous financial statements were merged and by using this data, consolidated financial ratios were obtained. Based on empirical evidence, while an increase in debt-to- equity ratio affects the BIST XBANK Index negatively, shareholders' equity to total assets ratio has a positive impact on the growth of the Index. In addition, it is verified that shareholders' equity to total assets ratio and provisions/non-performing loans ratio have a causal relationship with the BIST XBANK Index.

Keywords: Financial performance, Financial analysis, Turkish banking industry, Bank stock index, Asset quality, Shareholder’s equity.

Contribution/ Originality

This study is one of very few studies which have investigated the relationship between the consolidated financial ratios generated from the consolidated financial statements of the publicly traded banks and the Stock Index to which they are involved. The empirical findings verified statistically significant relationship between the financial ratios (except for liquidity and profitability) and the Stock Index, although the banks involved in the analysis have different characteristics in terms of scope, size etc.

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1. INTRODUCTION

Beneficiaries of financial statements use financial ratios to a large extent in order to comment on the current financial situation and to make estimation on the future financial position of firms. Those who benefit from the financial statements can be basically classified into four categories which are company managers, creditors, shareholders (investors) and the government. These four use financial ratios for different purposes: company executives to measure the company's financial performance, creditors to see the capability of debt payment, the government to assess whether the firms contribute to economic efficiency and consequently shareholders to determine whether their investments are profitable or not. When investors decide to buy securities, they take macroeconomic or firm-specific variables into account. Changes in macroeconomic variables more or less affect the stock market in the same way. However the impact of macroeconomic variables on each security will not be alike. In other words, the stock market adapts to business cycle fluctuations in the economy. However, management risk and financial risk as the firm-specific factors or non-systematic risks vary depending on the firm’s structure and the aforementioned risks will be minimized by effective management. In this respect, the fundamental analysis which is used frequently to measure financial performance and risk has a significant influence on the formation of shareholder value. Brokerage firms and investment banks related to advisory issue benefit widely from ratio analysis. The study is organized as follows. In the second part of the paper, the literature examining the impact of financial information and ratios on stock returns is summarized. In the third part, detailed information about the data is given. Methodology is presented in the fourth part. In the fifth section, to determine if consolidated financial ratios of banks involved in the XBANK index has a material impact on the XBANK Stock Index, an econometric analysis is performed and VECM is formed. Finally in the last section, the findings obtained as a result of econometric analysis are assessed.

2. LITERATURE REVIEW

While taking investment decisions, financial analysis of a firm by using the ratio method would help us to make realistic estimations about the future performance of the company's stock prices. At the same time, in case of the firm’s worsening financial structure, using financial ratios to analyze the financial situation acts as an early warning signal (Ohlson James, 1980) .

There are several studies that have examined the relationship between financial information and earnings ratio. While a substantial number of the studies examined the relation between financial statement data and stock returns over time, others focused on whether the financial ratios generated from financial statement data can explain the stock performance of firms. When related literature is examined, besides financial ratios derived from only accounting records such as the liquidity, financial structure (leverage), turnover and profitability ratios, stock performance ratios generated from the combination of market-based and accounting-based financial information are also used to explain stock return. For the first time, Ball and Brown (1968) conducted a study on investigating the relationship between annual profit figures and stock prices of firms covering the period between 1957 and 1965 and thus the study is accepted as the outset of value relevance theory. Value relevance research examines the association between accounting amounts and equity market values (Barth Mary *et al.*, 2000). Value relevance theory is not only an instrument to estimate quality of accounting information, but also provides information to investors in valuing the firm and stock prices (Akarim *et al.*, 2012). Another important issue is that testing value relevance requires a market where investors are free in making their decisions and where investors' decisions affect prices. Otherwise, even if accounting numbers are of the highest quality and investors pay attention to them, accounting numbers will have no impact on stock returns (Klimczak Karol, 2009). By adapting correlation analysis, O'Connor (1973) determined 10 financial ratios which can represent 33 financial ratios extracted from the monthly financial statements announced to the public between 1950 and 1954. In the study, he examined if Ratio Analysis can explain and predict investors' stock returns or not. He investigated the relationship between stock returns and these selected financial ratios by using the linear multiple regression model. He also reached the outcome that the ratios called total liabilities/net worth, income available for common shareholders/net worth, cash flows to number of common stocks, current liabilities to inventory, and earnings per share/price per share affect the predictability and interpretation of stock returns significantly.

Peavy and David (1985) investigated the reasons for poor stock market performance during the period 1965-1981 in the S&P 400 market index. Their analysis reveals that a sizeable contraction in P/E ratios was mainly responsible for this poor stock market performance as the stock market rally that began in August 1982 resulted primarily because of a widespread expansion in P/E ratios. The model that they developed indicates that three primary factors, namely inflation, corporate debt ratios, and corporate profit margins influence P/E ratios.

Hull (1999) examined the impact of debt-to-equity ratio on stock value of 338 firms from various industries during 1970-1988 in USA. He investigated whether stock value is influenced by how a firm changes its leverage ratio in relationship to its industry leverage ratio norm. He found that announcement-period stock returns for firms moving "away from" industry debt-to-equity norms are significantly more negative than returns for firms moving "closer to" these norms.

Lewellen (2004) in his study examined whether market-based financial ratios D/Y, B/M and E/P can predict aggregate stock returns during the period 1946-2000. He adopted two types of stock returns depending on NYSE which are equal and value weighted NYSE returns. Test results reveal strong evidence that D/Y predicts both equal-and value-weighted NYSE returns from 1946– 2000. In the full sample and various subsamples, D/Y is typically significant at the 0.001 level, with many t-statistics greater than 3.0 or 4.0. The evidence for B/M and E/P ratios is somewhat weaker and, overall, they seem to have limited forecasting power.

Beccalli *et al.* (2006) conducted a survey on the relation between efficiency and stock performance in European Banking. The research sample comprises all banks publicly listed in France (Bourse de Paris), Germany (Deutsche Börse Group), Italy (Borsa Italiana Spa), Spain (Bolsa de Madrid) and UK (London Stock Exchange). Specifically, they examined if changes in stock performance can be explained by changes in operating efficiency, derived by SFA and DEA methods. According to the empirical results, changes in the prices of bank shares reflect percentage changes in cost efficiency, particularly those derived from DEA rather than SFA. Another important finding is that stocks of cost efficient banks tend to outperform their inefficient counterparts.

Hillestad (2007) discussed key figures that can shed light on developments in the market's valuation of the shares in his study. Developments in financial ratios are discussed on the basis of an internally developed data set. The data set is used for the accounts of the most traded 25 companies in the OBX index on the Oslo Stock Exchange for the period 1996Q4 to 2006Q1. The results show that developments in share prices on the Oslo Stock Exchange are related to developments in companies' operating profits, funding and market pricing (or the risk premium required by investors). He succeeded in verifying the relationships by using financial ratios.

Kheradyar and Lzani (2011) investigated the role of financial ratios as empirical predictors of stock return in separate and combined sets for the period January 2000 to December 2009 in Bursa Malaysia. They adopted the market based financial ratios as D/Y, B/M and E/P with reference to Lewellen (2004). According to the empirical results, similar to the findings of previous research in the developed market, Lewellen's financial ratios are able to predict future stock return in Bursa Malaysia as an emerging market. However, unlike Lewellen's finding, the predictive power of B/M is higher than that of other financial ratios. Consequently, the combination of the financial ratios enhances stock return predictability.

Büyükşalvarcı (2011) examined whether there is any relationship between stock returns and the ratios used in financial analysis for 2001 and 2008 for manufacturing industry firms. He adopted 17 financial ratios in the analysis and these ratios are divided into 5 groups. According to the empirical results, for the 2001 economic crisis period, 6 financial ratios and for the 2008 economic crisis, 4 financial ratios have a statistically significant relationship with stock returns.

Ongore Vincent and Gemechu Berhanu (2013) carried out a survey on identifying determinants of financial performance of Commercial Banks in Kenya. They examined the effects of bank specific factors and macroeconomic factors on the performance of commercial banks. They adapted three linear multiple regression models where they utilized *roe*, *roa*, *nim* (net interest margin) as dependent variables for each model. According to their findings, bank-specific factors including capital ratio, asset quality and management efficiency have a significant effect on the financial performance of commercial banks, while the macroeconomic variables GDP and inflation are found to be insignificant.

Suadiye (2013) conducted a study to ascertain the association between stock returns and annual earnings. She used the financial reporting data of 212 firms from BIST (formerly ISE) over the period 2005-2009. The empirical results of the regression model show a positive association between returns and annual earnings during the period.

3. DATA

In this study, the consolidated financial statements of 13 banks in total between the fourth quarter of 2002 and the third quarter of 2013 have been created by combining the financial statements of 11 conventional banks received from the Banking and Sector Info Menu and the Statistical Reports Menu on the web page of the Banks Association of Turkey with the financial statements of 2 participation banks received from the web page of the Participation Banks Association of Turkey. In this way, the consolidated financial ratios have been calculated through the consolidated financial statements of the given 13 banks included in the XBANK Index. Furthermore, the Stock Index Figures of XBANK have been derived daily from the Menu of Equity Market Data on the web page of Borsa Istanbul. In time-series analysis, the observation frequency or the length of the analysis period plays an important role in obtaining more reliable results from the research. However, as the banks publish their financial tables quarterly, XBANK Stock Index figures have been prepared in accordance with the publication dates of the financial statements.

Table-1. Description of Variables

Category	Variable	Description	Type of Variable	Period
Yield	xbank	XBANK Stock Index	Dependent	2002/04-2013/03
Profitability	roe	Return on Equity	Independent	2002/04-2013/03
Profitability	roa	Return on Assets	Independent	2002/04-2013/03
Liquidity	cr	Current Ratio	Independent	2002/04-2013/03
Capital Adequacy	car	Capital Asset Ratio	Independent	2002/04-2013/03
Asset Quality	lar	Total Loans/Total Asset	Independent	2002/04-2013/03
Asset Quality	nplr	Provisions/Non-Performing Loans	Independent	2002/04-2013/03
Asset Quality	ldr	Total Loans/Total Deposits	Independent	2002/04-2013/03
Leverage	levr	Debt-to-Equity Ratio	Independent	2002/04-2013/03

In Table 1 above, the ratios used in the financial analysis have been evaluated in five categories. In this study, 44 observations made in the 2002Q4-2013Q3 period have been used for each data item. The XBANK Stock Index has been accepted as the dependent variable while the financial ratios have been recognized as the independent variable.

3.1. Categories of Financial Ratios Used in Financial Analysis

3.1.1. Profitability

The return on equity ratio or *roe* is a profitability ratio that measures the ability of a bank to generate profits from its shareholders' investments. *Roe* is more than a measure of profit; it is a measure of efficiency. A rising *roe* suggests that a bank is increasing its ability to generate profit without needing as much capital. It also indicates how well a company's management is deploying the shareholders' capital. In other words, the higher the *roe,* the better. *Roe* can be formulated as:

$$Return\ on\ Equity = \frac{Net\ Income}{Shareholder's\ Equity}$$

Return on total assets or the return on assets ratio, is a profitability ratio that measures the net income produced by total assets during a period of time. The difference between return on equity and return on assets can be recognized in the denominators of the formulas. For return on assets, the denominator is average total assets and for the return on equity formula, the denominator is average stockholders' equity (www.financeformulas.net/Return-on-Equity.html). The formula for return on assets is:

$$Return\ on\ Assets = \frac{Net\ Income}{Total\ Assets}$$

3.1.2. Liquidity

The current ratio is a liquidity ratio that measures a firm's ability to pay off its short-term liabilities with its current assets. The current ratio is calculated by dividing current assets by current liabilities. Current assets like cash, cash equivalents, and marketable securities can easily be converted into cash in the short term. This means that companies with larger amounts of current assets will more easily be able to pay off current liabilities when they become due. Current ratio, also known as liquidity ratio, can be formulated as:

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities}$$

3.1.3. Capital Adequacy

Bank capital to assets is the ratio of bank capital and reserves to total assets. Capital and reserves include funds contributed by owners, retained earnings, general and special reserves, provisions, and valuation adjustments. Capital includes tier 1 capital (paid-up shares and common stock), which is a common feature in all countries' banking systems, and total regulatory capital, which includes several specified types of subordinated debt instruments that need not be repaid if the funds are required to maintain minimum capital levels (these comprise tier 2 and tier 3 capital). Total assets include all non-financial and financial assets (data.worldbank.org/indicator/FB.BNK.CAPA.ZS).

3.1.4. Asset Quality

The asset quality of a bank is a unique factor that could affect all aspects of a bank's performance and a substantial decline in asset quality will not only erode the profitability but could ultimately lead to the insolvency of the bank. Therefore, banks with better asset quality enjoy better credit standings while banks with low asset quality, owing to higher non performing loans, have high risk with comparatively higher probability of default (Mirza and Hervé, 2010).

3.1.5. Leverage

The debt to equity ratio shows the percentage of bank financing that comes from deposits, borrowed funds and other liabilities. A higher debt to equity ratio means that more deposits or funds are used instead of shareholders' capital. Industries differ from each other in terms of debt to equity ratio benchmarks, as financial intermediaries tend to use more debt financing than the non-financial sector. Stock returns are a first order determinant of debt ratios, in that they are perhaps the only well understood influence of debt ratio dynamics, and that many previously used proxies seem to have helped explain capital structure dynamics primarily (Welch, 2004).

4. METHODOLOGY

In the study, financial ratios *roe, roa, cr, car, lar, nplr, ldr* and *levr* have been examined to determine whether they have material impact on the XBANK Stock Index. The relation between the above mentioned financial ratios and the XBANK Stock Index has been explored within the context of bivariate and multivariate statistical analysis so as to apply predictive regression.

In order to find the relationship between financial ratios and Stock Index, the variables subject to analysis should be stationary as a spurious regression equation can be generated if regressed for a non-stationary series (Engle and Granger, 1987). A stationary time series means that the variance and average values should stay constant in time and the covariance of the variables in the two lagged time periods is not time dependent but is due to the lag between the variables (Gujarati Domadar, 1995). In order to determine the stationarity, a unit root test is performed. One of the most commonly used methods for the unit root test is the Augmented Dickey and Fuller Test which was developed by Dickey and Fuller (1979). The Dickey-Fuller test is based on the test which shows whether there is a unit root in the observed series or not. According to the results of the unit root test, if the original conditions of the time series are not stationary, their first difference is taken and the series becomes stationary.

In order to reveal the long-term relationship between the variables, a co-integration test is performed. For this purpose, the Johansen-Juselius cointegration test which was developed by Johansen and Katarina (1990) has been carried out. In this test, in order to determine the existence of a cointegration relationship, the eigen value of the variables is utilized which is based on the likelihood ratio of the Johansen trace statistics test. At the same time, the Johansen-Juselius Cointegration Test is performed to determine lag length for the Vector Auto Regression model.

If a cointegration relationship between the variables exists, there can be at least a one-way causality relationship between the variables. A causality test has been carried out in order to determine the causality relationship between the cointegrated variables. The first study of the causality relationship in the finance literature was conducted by Granger (1969). The Granger causality test investigates the relationship between two variables to determine its direction. If the dependent variable is estimated better with the previous values of the independent variable rather than the present value of the independent variable, it is concluded that the independent variable is the cause of the dependent variable (Charemza and Deadman, 1992).

Finally, if a cointegration relationship between the variables is verified, the Vector Error Correction Model (VECM) is established.

5. ASSESSMENT OF EMPIRICAL RESULTS

The algorithms of the variables used in the analysis have been extracted to ensure the normal distribution. Then, the Augmented Dickey Fuller Test has been applied in order to determine whether the variables are stationary or not. The results of the Unit Root Test regarding the variables have been determined as constant (intercept) in test equation.

Table-2. Augmented Dickey Fuller Unit Root Test Results

Variables	T-statistics	Prob.	Variables	T-statistics	Prob.
Log xbank	-2.409787	0.1451	ΔLog xbank	-5.557942	0.0000
Log roe	-4.223035	0.0020	ΔLog roe	-5.438790	0.0001
Log roa	-4.703116	0.0005	ΔLog roa	-5.801546	0.0000
Log cr	-2.395787	0.1489	ΔLog cr	-7.126141	0.0000
Log car	-2.564029	0.1084	ΔLog car	-3.092301	0.0352
Log lar	-2.095313	0.2475	ΔLog lar	-4.047158	0.0030
Log nplr	-1.113586	0.7017	ΔLog nplr	-3.805999	0.0057
Log ldr	-2.682266	0.0857	ΔLog ldr	-2.703453	0.0821
Log levr	-2.550354	-0.1121	ΔLog levr	-3.110847	0.0341

In Table 2, according to the Augmented Dickey-Fuller Unit Root Test results, since all the variables to which the logarithm is applied are not stationary at the level, their first differences have been taken and thus all the variables have been made stationary.

After the variables have been made stationary, the relationship level between each independent variable and the dependent variable has been determined via regression analysis in order to reveal whether the independent variable discloses the dependent variable or not.

Table-3. Explanatory Variables Regressed Bivariately Against Δlogxbank

Variables	Coefficient	Std. Error	T-Statistic	R-Squared	Expected Sign
ΔLog roe	-0.05534	0.130447	-0.42422	0.00437	+
ΔLog roa	-0.02396	0.127551	-0.18784	0.00086	+
ΔLog cr	-0.01016	0.08342	-0.12176	0.000361	+/-
ΔLog car	1.771687	0.922952	1.919588	0.082462**	+
ΔLog lar	1.589752	0.872684	1.821681	0.074879**	+
ΔLog nplr	3.989515	1.435237	2.779691	0.158572*	+/-
ΔLog ldr	0.508863	0.398707	1.276283	0.038211	+
ΔLog levr	-1.47445	0.823409	-1.79067	0.072534**	-

The * indicates significance at %1 and ** at %10

In Table 3, Δ*Logcar,* Δ*Loglar,* Δ*Lognplr and* Δ*Loglevr* amongst the independent variables which have 43 observed values are the explanatory series at the significance levels of 1% and 10% in the regression analysis implemented by applying the least squares method. Unlike the non-financial sector enterprises, banks shall be obliged to calculate, achieve, perpetuate and report capital adequacy ratio, which shall not be less than eight percent, within the framework of the regulation to be issued by Banking Regulation and Supervision Agency (Turkish Banking Law No. 5411 Article 45, 2006). The formula concerning calculation of the ratio is disclosed in Regulation on Measurement and Evaluation of Capital Adequacy of Banks. According to the Regulation, Capital adequacy standard ratio is calculated as "the equity / sum as a basis for credit risk + sum as a basis for capital risk + sum as a basis for operational risk" (Turkish Banking Law No.5411). In the formula, if we consider the credit risk in terms of standard capital adequacy ratio, an upswing in loan portfolio will cause an increase in the credit risk and this will lower the ratio. So the more a bank wishes to grant loan, the more it must hold equity. In this respect, the expected sign of Δ*Log car* should be positive and correspondingly the coefficient of Δ*Log levr* should be negative.

After determining the significant variables in the simple regression analysis, the Johansen co-integration test has been applied in order to determine the cointegration relationship or the long-run relationship between the given variables.

Table-4. Bivariate Cointegration Test

Pairwise	Pairwise	Eigenvalue	Trace Statistics	Critical Value (%5)	Conclusion
Logxbank Log car	r=0*	0.39835	31.88131	20.26184	Cointegration exists
	r<=1*	0.236249	11.05006	9.164546	Cointegration exists
Logxbank Log car lar	r=0*	0.489207	33.24885	20.26184	Cointegration exists
	r<=1	0.129909	5.705462	9.164546	Cointegration exists
Logxbank Log nplr	r=0*	0.314384	19.20814	15.49471	Cointegration exists
	r<=1	0.087032	3.733212	3.841466	Cointegration exists
Logxbank Log levr	r=0*	0.407264	31.47712	20.26184	Cointegration
	r<=1*	0.217083	10.03385	9.164546	exists

In Table 4, the existence of a co-integration relationship between the dependent variable *logxbank* and each independent variable has been tested. In the Johansen cointegration test, the eigen values of the variables are used. This test is based on the "Likelihood Ratio" which is also called the "trace statistics". In this table, the r co-integration vector has been used so that the null or alternative hypothesis has been tested. The null hypothesis refers to the absence of a cointegration relationship. If the trace statistics for variables is higher than the critical value, the null hypothesis is rejected or refused while the alternative hypothesis is accepted and thus, the existence of a cointegration relationship is verified. According to the test results in the table, the fact that there is at least one cointegration vector for all the variables has been confirmed at significance level of 5%.

Table-5. Pairwise Granger Causality Test

Pairwise	N	F-Statistic	Prob.	Hypothesis
ΔLogcar-ΔLogxbank	39	2.88751	0.0391	Reject H_0
ΔLogxbank-ΔLogcar	39	1.31429	0.2872	Accept H_0
ΔLoglar- ΔLogxbank	39	1.09263	0.378	Accept H_0
ΔLogxbank -ΔLoglar	39	3.05833	0.0316	Reject H_0
ΔLognplr –ΔLogxbank	39	4.60055	0.0051	Reject H_0
ΔLogxbank-ΔLognplr	39	0.76714	0.5551	Accept H_0
ΔLoglevr- ΔLogxbank	39	2.84223	0.0413	Reject H_0
ΔLogxbank-ΔLoglevr	39	1.8795	0.1399	Accept H_0

In Table 5, Pairwise Granger Causality Test results indicate the presence and direction of the causality between the dependent variable Δ*Logxbank* series and the independent variables. It is inferred from this table that a causal relationship exists in the event that the null hypothesis is rejected. In addition, the test results show that the independent variables apart from the Δ*Loglar* series are the Granger Cause of the independent variable Δ*Logxbank.*

After elimination of the variables which are proved to be insignificant, the dynamic model of the BIST XBANK Index is presented in the equation below:

$$\Delta Logxbank = \beta_0 + \beta_1 \Delta Logcar + \beta_2 \Delta Loglar + \beta_3 \Delta Lognplr + \beta_4 \Delta Loglevr + e \quad (1)$$

After testing cointegration and the causal relationship of each independent variable with dependent variables, the existence of a cointegration relationship of all the independent variables with the dependent variable has been verified by performing the Johansen Cointegration Test. Following the verification of cointegration relationship, the Vector Error Correction Model (VECM) has been created.

Table-6. Multivariate Cointegration Test

Hypothesis	**Eigenvalue**	**Trace Statistic**	**Critical Value (%5)**
r = 0*	0.891047	216.3828	79.34145
r<= 1*	0.797416	129.9263	55.24578
r<= 2*	0.576269	67.65883	35.0109
r<= 3*	0.458932	34.17122	18.39771
r<= 4*	0.230469	10.21701	3.841466
Hypothesis	**Eigenvalue**	**Max-Eigen Statistic**	**Critical Value (%5)**
r = 0*	0.891047	86.45657	37.16359
r<= 1*	0.797416	62.26743	30.81507
r<= 2*	0.576269	33.48761	24.25202
r<= 3*	0.458932	23.95421	17.14769
r<= 4*	0.230469	10.21701	3.841466

Vectors: Logcar, Loglar, Lognplr, Loglevr

In Table 6, 5 cointegration vectors exist at significance level of 5% owing to the fact that the values of trace and max-eigen statistics are higher than the critical values. Cointegration equations have been obtained by identifying the appropriate lag length as 4.

According to the Johansen Cointegration Test Results, the Vector Error Correction Model (VECM) can be created in the next phase, since the existence of at least one cointegration vector has previously been verified.

Table-7. Vector Error Correction Model

Error Correction:	**ΔLogxbank**	**ΔLognplr**	**ΔLoglar**	**ΔLogcar**	**ΔLoglevr**
Coint Eq1	0.436621	0.103566	0.037481	0.011263	-0.018096
	(0.25444)	(0.01614)	(0.03577)	(0.03153)	(0.0355)
	[1.71600]	[6.41681]	[1.04774]	[0.35724]	[-0.50977]

Note: Standard errors in ( ) & t-statistics in [ ]

When all the coefficients are interpreted in the equation of the Vector Error Correction Model, it is inferred that while Δ*Loglevr* affects Δ*Logxbank* negatively, it positively affects Δ*Logcar,* Δ*Loglar* and Δ*Lognplr* as well. Δ*Lognplr* has the highest coefficient of independent variable and the strongest relationship with the dependent variable in the equation of this model.

Table-8. Variance Decomposition of Δ*Logxbank*

Period	S.E.	ΔLogxbank	ΔLognplr	ΔLoglar	ΔLogcar	ΔLoglevr
1	0.133538	100	0	0	0	0
2	0.18284	66.15288	29.14241	0.166133	3.843627	0.694947
3	0.216117	58.67283	22.89401	0.279372	3.38681	14.76697
4	0.222295	56.20593	21.69467	0.267002	3.568399	18.264

In Table 8, according to the results of Variance Decomposition of Δ*Logxbank*, while 100 percent of the □*logxbank* series is described by itself in the first term, 66.15 percent by itself, 29.14 percent by □*lognplr*, 16.61 percent by □*loglar*, 3.84 percent by □*logcar*, 0.69 percent is described by Δ*Loglevr* at the end of the second period. At the end of the fourth term, 56.20 percent is described by itself while 21.69 percent by □*lognplr*, 0.26 percent by □*loglar*, 3.56 percent by □*logcar*, finally 16.40 percent is described by Δ*Loglevr.*

Table-9. VEC Granger Causality/Block Exogeneity Wald Test Dependent Variable: ΔLogxbank

Independent Variables	Chi-sq	Prob.	Hypothesis Test
ΔLoglevr	10.87568	0.0539	Accept H_0
ΔLogcar	12.29957	0.0309	Reject H_0
ΔLoglar	4.62204	0.4637	Accept H_0
ΔLognplr	11.44431	0.0432	Reject H_0

Dependent Variable: ΔLoglevr

Independent Variables	Chi-sq	Prob.	Hypothesis Test
ΔLogxbank	2.350856	0.7988	Accept H_0
ΔLogcar	8.005206	0.1559	Accept H_0
ΔLoglar	2.847435	0.7235	Accept H_0
ΔLognplr	1.426009	0.9214	Accept H_0

Dependent Variable: ΔLogcar

Independent Variables	Chi-sq	Prob.	Hypothesis Test
ΔLogxbank	1.666162	0.8931	Accept H_0
ΔLoglevr	6.829774	0.2336	Accept H_0
ΔLoglar	2.542333	0.7701	Accept H_0
ΔLognplr	0.926082	0.9683	Accept H_0

Dependent Variable: ΔLoglar

Independent Variables	Chi-sq	Prob.	Hypothesis Test
ΔLogxbank	18.02444	0.0029	Accept H_0
ΔLoglevr	4.97677	0.4187	Accept H_0
ΔLoglar	5.0275	0.4125	Accept H_0
ΔLognplr	11.69207	0.0393	Accept H_0

Dependent Variable: ΔLognplr

Independent Variables	Chi-sq	Prob.	Hypothesis Test
ΔLogxbank	7.72478	0.1721	Accept H_0
ΔLoglevr	24.61853	0.0002	Reject H_0
ΔLogcar	20.40261	0.001	Reject H_0
ΔLoglar	6.880626	0.2297	Accept H_0

In Table 9, according to the VEC Granger Causality/ Block Exogeneity Wald Test Results, in the event that the null hypothesis which indicates the absence of a causal relationship is accepted, the test has reached the conclusion that the independent variables Δ*Loglar* and Δ*Loglevr* are not Granger Cause of Δ*Logxbank*. On the other hand; in the event that the null hypothesis which indicates the absence of a causal relationship is rejected or the alternative hypothesis is accepted, the test has reached the conclusion that the independent variables Δ*Lognplr* and Δ*Logcar* are Granger Cause of Δ*Logxbank*.

Table-10. VEC Granger Causality Matrix

Variables	ΔLogxbank*	ΔLoglevr*	ΔLogcar*	ΔLoglar*	ΔLognplr*
ΔLogxbank		-	-	+	-
ΔLoglevr	-		-	-	+
ΔLogcar	+	-		-	+
ΔLoglar	-	-	-		-
ΔLognplr	+	-	-	-	

*indicates dependent variables and "+" sign symbolizes existing causal relation where "-" sign represents non-causality.

Besides, one can understand from the above VEC Granger Causality Matrix Diagram that the Δ*Logxbank* series is Granger Cause of the Δ*Loglar* series. Similarly, according to the VEC Granger Causality/Block Exogeneity Wald Test Results, another series in which the causal relationship exists is the Δ*Lognplr* series. Accordingly, Δ*Loglevr* and Δ*Logcar* are the Granger Cause of Δ*Lognplr* at the significance levels of 5%.

6. CONCLUSION

In this paper, it is examined whether the change in the ratios used in the financial analysis of the Turkish Banking Sector for the quarterly periods of 2002 and 2013 explains the change in the BIST XBANK Index or not. The 8 unit ratios, in 5 categories are used as an independent variable in the study.

All the variables used in the analysis function with a normal distribution by means of taking the logarithm of them. As the variables are not stationary at the level in compliance with Augmented-Dickey-Fuller Unit Root Test results, these variables are made stationary by taking their first difference. In addition, the simple regression analysis has been conducted in order to test whether each independent variable can explain the dependent variable separately. According to the results of the regression analysis, the change in profitability and liquidity ratios has not been found significant in explaining the change in the BIST XBANK Index. Moreover, although there is a statistically positive and significant relationship between the change in the reserve ratio of the non-performing loans which is used to measure the quality of assets together with the loans-to-assets ratio and the change in the BIST XBANK Index, no significant relationship has been found between the change in the loan to deposit rate and the change in the BIST XBANK Index. Furthermore, while there is a statistically positive and significant relationship related to capital adequacy between the change in the capital to asset ratio and the change in the BIST XBANK Index, a significant but negative relationship is determined between the change in the debt to equity ratio (financial leverage) and the change in the BIST XBANK Index.

In the studies regarding the debt to equity ratio, it is concluded that the change in the leverage ratio is one of the most important factors which explain the change in the price to earnings ratio and the dividend yields (O'Connor, 1973; Peavy and David, 1985) and these studies reveal that the leverage ratios and the performance of the dividend yields of the companies which diverge from the average leverage ratio in the same sector are lower in comparison with the ratios and the performance of the companies which converge to the average leverage ratio of the sector (Hull, 1999). In addition, by applying the pairwise cointegration test to the independent variables which have been found significant to explain the dependent variable, it is determined that there is a long run relationship between all the independent variables and the BIST XBANK Index.

According to the Pairwise Granger Casualty test results, it is found that all the independent variables except for the loan to deposit exchange ratio are the cause of BIST XBANK Index at the significance levels of 5%.

The Vector Error Correction Model is created by reason of the fact that there has been at least one unit cointegration vector confirmed by Multivariate Cointegration Test Results. The VECM equation has shown that all the independent variables apart from the leverage ratio have a positive relationship with the BIST XBANK Index. In the VECM equation obtained at the fourth lag time, it is seen that the only variable which has the strongest relationship with the BIST XBANK Index is the provisions for the non-performing loans ratio.

The VEC Granger Causality / Block Exogeneity Wald Test Results have revealed that the capital to assets ratio and the provisions for the non-performing loans ratio are the cause of the BIST XBANK Index.

REFERENCES

Akarim, D. Yasemin, C. Sibel and Z. Emin, 2012. The causality relationship between accounting earnings and stock returns in the light of value relevance theory. Journal of Money, Investment and. Banking, 5(25): 194-198.

Ball, R. and P. Brown, 1968. An empirical evaluation of accounting income numbers. Journal of Accounting Research, 6(2): 159-178.

Barth Mary, E., H. Beaver William and R. Landsman Wayne, 2000. The relevance of the value relevance literature for financial accounting standard setting: Another view. Journal of Accounting and Economics Rochester Conference

Beccalli, E., C. Barbara and G. Claudia, 2006. Efficiency and stock performance in European banking. Journal of Business Finance & Accounting, 33(1&2): 245–262.

Büyükşalvarcı, A., 2011. Finansal analizde kullanılan oranlar ve hisse senedi getirileri Arasındaki ilişki: Ekonomik Kriz Dönemleri İçin İMKB İmalat Sanayi Şirketleri Üzerine Ampirik Bir Uygulama Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi, Cilt: 25, Sayı:1.

Charemza, W.W. and D.F. Deadman, 1992. New directions in econometric practice. England: Edward Elgar.

Dickey, D.A. and W.A. Fuller, 1979. Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366): 427–431.

Engle, R.F. and C.W.J. Granger, 1987. Co-integration and error correction: Representation, estimation, and testing. Econometrica, 55(2): 251-276.

Granger, C.W.J., 1969. Investigating causal relations by econometric models and cross-spectral methods. Econometrica, 37(3): 424–438.

Gujarati Domadar, N., 1995. Basic econometrics. 3rd Edn., USA: MC-Graw-Hill Inc. pp: 712.

Hillestad, O.-C., 2007. An analysis of financial ratios for the Oslo stock exchange. Economic Bulletin, 78: 115-131.

Hull, R.M., 1999. Leverage ratios, industry norms, and stock price reaction: An empirical investigation of stock-for-debt transactions. Financial Management, 28(2): 32-45.

Johansen, S. and J. Katarina, 1990. Maximum likelihood estimation and inference on cointegratıon with applications to the demand for money. Oxford Bulletin of Economics and Statistics, 52(2): 169-210.

Kheradyar, S. and I. Lzani, 2011. Financial ratios as empirical predictors of stock return. International Conference on Sociality and Economics Development IPEDR. ACSIT Press. Singapore, 10.

Klimczak Karol, M., 2009. Testing value relevance of accounting earnings in emerging markets Kozminski University Working Paper No. 1-2007.

Lewellen, J., 2004. Predicting returns with financial ratios. Journal of Financial Economics, 74(2004): 209–235.

Mirza, N. and A. Hervé, 2010. Size value and asset quality rremium in European banking stocks. Paris: Dauphine University. pp: 1-32.

O'Connor, M., 1973. On the usefulness of financial ratios to investors in common stock. The Accounting Review, 48(2): 339-352.

Ohlson James, A., 1980. Financial ratios and probabilistic prediction of bankruptcy. Journal of Accounting Research, 18(1): 109-131.

Ongore Vincent, O. and K. Gemechu Berhanu, 2013. Determinants of financial performance of commercial banks in Kenya. International Journal of Economics and Financial Issues, 3(1): 237-252.

Peavy, J.W. and G.A. David, 1985. How inflation, risk and corporate profitability affect common stock returns. Financial Analysts Journal, 41(5): 59-65.

Suadiye, G., 2013. Testing the relation between earnings and returns in ISE. International Journal of Economic and Administrative Studies, 10(5): 172-182.

Turkish Banking Law No.5411, Regulation on measurement and evaluation of capital adequacy of banks article 31/s, 2006.

Turkish Banking Law No. 5411 Article 45, 2006.

Welch, I., 2004. Capital structure and stock returns. Journal of Political Economy, 112(1): 106-131.

BIBLIOGRAPHY

Retrieved 09.01.2015, from data. worldbank.org/indicator/FB.BNK.CAPA.ZS.

Retrieved 07.01.2015, from http://www.financeformulas.net/Return-on-Equity.html