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GAYRİMENKUL YATIRIM ORTAKLIKLARININ KARLILIĞI ÜZERİNDE ETKİLİ OLAN FİNANSAL ORANLAR

FINANCIAL RATIOS AFFECTING PROFITABILITY OF REAL ESTATE INVESTMENT TRUSTS

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Abstract

The purpose of this study is to forecast financial ratios that are related with the profitability of real estate investment trusts in Turkey. In order to get this purpose, Panel Data Analysis is used for the years between 2014-2019 with the yearly data of 32 real estate investment trusts in Turkey. In the analysis, return on asset and return on equity are used as dependent variables and real estate investment ratio, equity ratio, long term debt ratio, price earning ratio, market value/book value ratio and earnings per share value are used as independent variables. At the end of the panel data analysis, it is concluded that both return on asset and return on equity have negative relationship with the long term debt ratio, but both of the dependent variables have no relationship with the rest of the ratios used in the analysis as independent variables.

Keywords: Real estate, profitability, financial ratios
JEL Codes: G32, R30, R39

Öz

Bu çalışmanın amacı, Türkiye'de faaliyette bulunan Gayrimenkul Yatırım Ortaklıklarının karlılığı üzerinde etkili olan finansal oranları belirlemektir. Bu amaca yönelik olarak, Türkiye'deki 32 gayrimenkul yatırım ortaklığının yıllık verileri ile 2014-2019 döneminde Panel Veri Analizi yapılmaktadır. Analizde, aktif karlılık oranı ve öz sermaye karlılık oranı bağımlı değişken olarak kullanılırken, gayrimenkul yatırım oranı, öz sermaye oranı, uzun vadeli borç oranı, fiyat/kazanç oranı, piyasa değeri/defter değeri oranı ve hisse başına kazanç tutarı bağımsız değişken olarak kullanılmaktadır. Yapılan panel data analizi sonucunda, uzun vadeli borç oranının, hem aktif karlılık oranı hem de öz sermaye karlılık oranı üzerinde ters yönlü bir etkiye sahip olduğu, buna karşın analizde kullanılan diğer bağımsız değişkenlerin, hem aktif karlılık oranı hem de öz sermaye karlılık oranı üzerinde bir etkiye sahip olmadıkları sonucuna ulaşılmıştır.

Anahtar Kelimeler: Gayrimenkul, karlılık, finansal oranlar
JEL Kodları: G32, R30, R39

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1. INTRODUCTION

In recent years, Turkey has seen a significant improvement in the real estate sector. While the real estate sector is gradually gaining international features, regular markets are formed for residential and commercial properties. Consequently, investments of domestic and foreign actors in the real estate sector have expanded. In this context, real estate investment has become one of the most important sectors in Turkey and especially in Istanbul as foreign direct investment. In order to develop an institutional structure of the real estate sector in Turkey, arrival of the long-term funds to the sector is an important need. The main reason for the expected rapid development of future real estate market is the thought that the economy of Turkey will have stable increase in the future.

In general, Real Estate Investment Trusts (REIT) are the institutions that hold, operate or finance real estates in their portfolios. Although they are subject to different establishment conditions and legislative provisions in each country, their main purpose is to bring small saving owners together and invest in large real estate projects. In this way, they also find solutions to the financing problem for large projects that contributes to the whole economy. Since in today's economy, where globalization is continuing rapidly, one of the most important problems for individuals and institutions to realize new ideas are the lack of financial funds, it can be said that real estate investment trusts have a crucial role to solve this problem.

Because of the intensive relation to many sectors, construction sector in which real estate investment trusts operate is backbone of the economy in the countries. It supports economic development by increasing new jobs which results in decrease of unemployment and increase of production in the country. Therefore, it can be thought that doing research about the real estate investment trusts like in this article is beneficial for development of the sector by guiding investors and executives.

The aim of this article is to determine financial ratios related with the profitability of real estate investment trusts in Turkey. In order to accomplish this, panel data analysis method is applied by using financial ratios of 32 real estate investment trusts during the yearly period of 2014-2019. In the analysis, return on asset and return on equity as dependent variables stand for profitability. In addition, real estate investment ratio, equity ratio, long term debt ratio, price earning ratio, market value/book value ratio and earnings per share value are utilized for independent variables.

2. LITERATURE REVIEW

Some studies related with the subject of this article were summarized based on their analysis methods, used data and conclusion.

Kırdök, F. E. (2012) worked out a study to determine relationship between macroeconomic factors and return on real estate investment trusts (REIT) in Turkey. In the Study, Unrestricted vector autoregressive method, variance decomposition and generalized impulse response techniques were use to estimate the relation by using Market returns, industrial production, inflation, unexpected inflation, overnight interest rate, term premium, and default risk premium as macroeconomic variables during the January 2000 – December 2011 period as well as for the sub period excluding the 2000-2001 crisis. At the end of the analysis, it is concluded that macroeconomic variables explain almost half of the total variation in REIT returns for the whole sample period. Besides, industrial production, inflation, market returns and term structure macroeconomic factors were found to be important variables to explain the variability of REIT returns.

Labrahmı (2020) performed an analysis to determine the effect of hedonic house price index (HHPI), new house price index (NHPI) and existing house price index (EHPI) on the house price index in Turkey. In the analysis, descriptive and regression analysis were applied as methods. The results of the study indicated that NHPI had a positive and significant effect, EHPI had a positive and significant effect, but HHPI had no significant effect on house price index in Turkey.

Fuerst and Matysiak (2011), in their study, aimed to determine the variables related with the return of real estate funds during the 7-year period. The weighted underlying direct property returns in each country and sector as well as fund size, investment style gearing and the distribution yield were the Influential factors used in the analysis. Moreover, they analyze the relation of no listed real estate funds with the performance of the whole economy and that of competing asset classes and find that lagged Gross Domestic Product (GDP) growth and stock market returns as well as contemporaneous government bond rates were significant and positive predictors of annual fund performance.

Hepsen, Berberoglu and Aydin (2017), in their study, aimed to determine factors related with the problems of REITs sector in Turkey. By using financial data of the REITs and performing analysis, it is concluded that it will be important the REITs, in the sub-group especially in terms of the score distribution, to diversify their portfolio by extending their asset investments to stabilize dividend payments and to take steps on institutionalization so that they are equivalent to REITs in the super group.

3. METHODOLOGY AND DATA

In this study, it is aimed to determine the financial ratios related to the profitability of real estate investment trusts in Turkey. Based on the panel data method, in the analysis, Breusch-Pagan/Lagrange-Multiplier (BPG-LM) test, Hausman test, Levene, Brown and Forsythe Heteroskedasite Test, Durbin-Watson and Baltagi- Wu Autocorrelation Test and Random Effect Estimator Model are used.

The mixed data followed by the same section unit over time is called panel data, and the estimation of the economic effects using section series with time dimensions is also called panel data analysis (Göral, 2015: 106).

There are several benefits to using panel data. For example, It is possible to increase the panel data and analysis data and to analyze the movements of change with this increasing data and to provide the opportunity to examine complex models easily (Akel, Torun ve Aksoy, 2016: 8).

Again, the importance of panel data analysis is that the analysis can be used for different times, not for a single time point, It can be expressed as the fact that the analysis performed for different times can be done with a single analysis. As a result, it provides time and cost advantage. (Aktaş ve Avcı, 2017: 887).

The panel data ensures that several cross-sectional observations such as family, country, and company are expressed over time. Also, the panel enables the development of data estimation methods, and a much richer environment in terms of theoretical results (Acaravcı, Kandır ve Zelka, 2015: 177).

The widespread usage of Panel Data method is based on two main factors. Firstly, Panel Data is used to obtain information about the change in micro level in the research units, and this change occurs due to the influence of other factors in the research. Therefore, the use of panel data makes possible to examine powers over a period of time rather than at a single point in time. Secondly, Panel Data relates to the cost of data collection. This means that, a panel data analysis covering five different time points involves lower costs than a study involving five horizontal cross section studies separately. Creating panel data requires less time as well as less cost than consecutively drawing a new random sample for consecutive cross section data (Taş, 2012: 39).

The panel data method can be shown as follows: (Kaygın, 2013: 66)

$Y_{it}=\beta_{0it}+\beta_{1it}X_{1it}+\beta_{2it}X_{2it}+\ldots+\beta_{kit}X_{kit}+u_{it}$ Or $Y_{it}=\beta_{0it}+\sum_{k=1}^{k}\beta_{kit}X_{kit}+u_{it}$ İ= 1,……, N t=1, …….,T

In the equation above, i; household, person, company, city etc. and t indicates the time. With another explanation; i indicates horizontal cross section size and t indicates the time dimension, β_{0it} indicates constant term, β_{kit} indicates kx1 dimensional parameters vector, x_{kit} indicates i unit value of explanatory variable k in time t, Y_{it} indicates dependent variable of i unit in time t. Variables in panel data methods are allowed to take value for each unit at any time. Before estimating with the model, some assumptions are made based on the value of variables depending on unit and time. These assumptions are fixed-effect method assumption and random-effect method assumption. In both of these methods, U_{it} errors are assumed to be distributed independently of normal for all time periods and for all units [$N(0,\sigma^2{}_u)$].

In the adaptation of both time and cross-sectional data, three different prediction method models are used in the prediction stage of pooled regression. These models are; Classic, Fixed Effect and Random Effect Models. The difference in these models emerges due to fixed terms. In the classical method, while the same constant term is involved for the elements of pooled regression, in the fixed-effects method, there are separate fixed terms for each section. However, the slope coefficients are the same. In the random effects method, the differences of the units are included in the error term (Burhan, 2012: 33-34).

Without taking account of panel data features, the classic pooled method assumes that the error term is similar, distributed independently and does not correlate with independent variables. In contrast, while fixed effect model assumes that the specific firm effect which was not included in the regression and could not be observed

correlated with the independent variables, the random effect model assumes that this fixed effect does not correlate with independent variables. In order to choose the appropriate model, Breusch-Pagan/Lagrange-Multiplier and Hausman tests are carried out. First, Breusch-Pagan/Lagrange-Multiplier test is performed to determine whether the model is a classic model. If the classic model is not suitable, the Hausman test determines which of the fixed and random effects methods should be used.

In panel data analysis, the suitability of three methods can be tested with Breusch-Pagan Lagrange Multiplier test. Breusch-Pagan (1980) developed the Lagrange Multiplier (LM) test based on the remnants of the pooled least squares method to test whether the pooled least squares method is suitable against the random effects method. In this test, the hypothesis (H_0 :$\sigma_\mu^2 = 0$) that the variance of random cross-section effects is zero is tested.

Breusch-Pagan LM test statistics are listed below (Tatoğlu, 2016: 178);

$$\text{LM} = \frac{NT}{2(T-1)}\left[\frac{\sum_{i=1}^{N}(\sum_{t=1}^{T} u_{it})^2}{\sum_{i=1}^{N}\sum_{t=1}^{T} u_{it}^2} - 1\right]^2$$

If H_0hypothesis can not be denied, cross-sectional effects are present and therefore the conformity of the classical method is accepted. In contrast, if H_0 hypothesis is rejected, it is understood that the classical method is not suitable and either fixed effect model or random effect model should be used. In order to determine which model is appropriate, Hausman test is applied.

The Hausman (1978) test is based on the idea that the difference between two consistent estimators tends to zero. One of the estimators, say θˆ 1, is consistent under the null of correct specification, but inconsistent under the alternative. The other estimator, say θˆ 2, is consistent under both the null and the alternative hypotheses. Under the alternative hypothesis of misspecification, θˆ 1 will no longer be consistent, but θˆ 2 will remain so. In this case the difference vector Δ θˆ 2 θˆ 1 will have a nonzero probability limit, which will cause the test statistic to ultimately reject the null of correct specification (Creel, 2003: 2).

Levene, Brown and Forsythe Heteroskedastic test examines the power and significance level of the Brown-Forsythe's (1974) homogeneity test and is utilized to determine if two or more population variances are equal. For each situation that is set up, two simulations are run. While one simulation estimates the significance level, the other estimates the power.

Brown and Forsythe (1974) present robust version of Levene's (1960) test of homogeneity and this test does not assume that all populations are normally distributed and is recommended when the normality assumption is not viable.

Levene (1974) suggested resistant heteroskedastic test for the random effect estimator model when normal distribution does not actualize (Tatoğlu, 2016: 235).

The PDW statistic suggested by Bhargava et al. (1982) is the ratio of the sum of squared differences and the sum of squared residuals. Instead of the ratio (which complicates the theoretical analysis) our variant of the Durbin-Watson test is based on the linear combination of the numerator and denominator (Born, Breitung, 2010: 6-7):

In this analysis, which was carried out by using the panel data method, dependent and independent variables consist of financial ratios of the 32 real estate investment companies in Turkey for the period of 2014-2019. These variables are as in Table -1 below.

Table 1: Variables In The Panel Data Analysis

Dependent Variables	**Independent Variables**
Return on Asset (ROA)	Real Estate Investment Ratio (REIR)
Return on Equity (ROE)	Equity Ratio (ER)
	Long Term Debt Ratio (LTDR)
	Price Earning Ratio (PER)
	Market Value / Book Value Ratio (MVBVR)
	Earning Per Share Value (EPSV)

The data used in the analysis was prepared by using balance sheet and income statements of the real estate investment trusts.

4. ANALYSIS

In the analysis, by using Stata 12 statistics program, Levin, Lin & Chu panel unit root test, Breusch-Pagan Lagrange Multiplier Test, Hausman test, Levene, Brown and Forsythe Heteroskedastic Test and Durbin-Watson and Baltagi- Wu Autocorrelation Test are applied and then Random Effect Estimator Model is utilized. While, the dependent variables used in the analysis consist of return on asset and return on equity, the independent variables consist of real estate investment ratio, equity ratio, long term debt ratio, price earning ratio, market value/book value ratio and earnings per share value.

In order to determine if there is multiple linear connection between independent variables, the correlation test results take place in table -2 below. Since all of the correlation coefficient values are less than critical value of 0.70, it is understood that there is no multiple linear connection problem between independent variables.

Table 2: Correlation Results

Variables	**REIR**	**ER**	**LTDR**	**PER**	**MVBVR**	**EPSV**
REIR	1.000					
ER	-.011	1.000				
LTDR	.0268	.1592	1.000			
PER	.1634	-.037	.0987	1.000		
MVBVR	.0380	-.1797	-.0052	-.0483	1.000	
EPSV	.0520	-.0521	-.2113	-.0271	.1037	1.000

In the Table -2 above, REIR stands for real estate investment rate, ER stands for equity ratio, LTDR stands for long term debt ratio, PER stands for price earning ratio, MVBVR stands for market value/book value ratio and EPSV stands for earning per share value.

Descriptive statistics of minimum, maximum, mean and standard deviation values of the independent variables used in the analysis take place in the Table -3 below.

Table 3: Descriptive Statistics

Dependent and Independent Variables	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Dev.**
ROA	180	.0758	.1520	-.3314	.7805
ROE	180	.0718	.2820	-1.9102	.8016

REIR	180	.5750	.3287	0	.9836
ER	180	.6785	.2469	-.0104	.9979
LTDR	180	.1465	.1594	0	.6543
PER	180	8.8393	62.8807	-179.1508	765.7157
MVBVR	180	.7009	.6911	0	4.1754
EPSV	180	1.1884	3.9719	-3.61	36.5771

Levin, Lin & Chu (LLC) Unit Root Test was applied to determine if the variables used in the analysis are stationary. Results of the unit root test in Table -4 show that except ER and MVBVR variables, all the other variables are stationary at the level. It is also seen that ER and MVBVR variables are stationary in the first difference.

Table 4: Levin, Lin & Chu Unit Root Test

	Levin, Lin & Chu Unit Root Test		
Variables		**Level**	**First Difference**
ROA	Adjusted t value p-value	-11.3570 0.0000*	
ROE	Adjusted t value p-value	-43.6434 0.0000*	
REIR	Adjusted t value p-value	-3.7113 0.0001*	
ER	Adjusted t value p-value	18.1983 1.0000	-34.0399 0.0000*
LTDR	Adjusted t value p-value	-12.9227 0.0000*	
PER	Adjusted t value p-value	-17.2700 0.0000*	
MVBVR	Adjusted t value p-value	2.9344 0.9983	-25.9917 0.0000*
EPSV	Adjusted t value p-value	-84.1081 0.0000*	

* Significant at %99 level.

In order to determine which of the three model that are Classic, Random Effect and Fixed Effect model is appropriate to use in the panel data analysis, Breusch-Pegan/Lagrange-Multiplier Test was applied and the results are in the Table -5 below. Since the probability value of zero (.0000) is less than 0.05, H_0hypothesis is rejected and it is understood that classic model is not suitable for the analysis which means either random effect or fixed effect model is appropriate to use.

Table 5: Breusch-Pagan Lagrange Multiplier Test

ROA Model			**ROE Model**		
Variables	**Var**	**sd = sqrt(Var)**	**Variables**	**Var**	**sd = sqrt(Var)**
roa	.9999	.9999	**roe**	1.0000	1
e	.4478	.6691	**e**	.6127	.7828
u	.3620	.6017	**u**	.2617	.5116
Test: Var(u) = 0			**Test: Var(u)** = 0		

Chi-square (01) = 63.92	**Chi-square (01)** = 24.70
Prob(Chi-square) = .0000	**Prob(Chi-square)** = .0000

After Breusch-Pegan/Lagrange-Multiplier Test, Hausman Test was utilized to determine which panel data model is suitable for the data of analysis. Since for both models, probability values respectively 0.8105 and 0.2337 are greater than 0.05, H_0hypothesis is rejected and it is concluded that Random effect model is appropriate to use in the analysis.

Table 6: Hausman Test

ROA Model	ROE Model
chi2(6) = 2.99	chi2(6) = 8.06
Prob>chi2 = 0.8105	Prob>chi2 = 0.2337

After choosing the proper model, the first necessary analysis is to test if the model has heteroskedastic. For this purpose, Levene, Brown and Forsythe Heteroskedastic Test are applied for the random effect model. The obtained results by performing the test take place in the Table -7 below. As they are seen in the Table, all of the probability values are less than 0.05 and so it is understood that random effect model has heteroskedastic for both model below.

Table 7: Levene, Brown and Forsythe Heteroskedastic Test

ROA Model	ROE Model
W0 = 4.6970034 df(29, 150) Pr > F = 0.00000000	W0 = 4.6970034 df(29, 150) Pr > F = 0.00000000
W50 = 2.4768148 df(29, 150) Pr > F = 0.00020841	W50 = 2.4768148 df(29, 150) Pr > F = 0.00020841
W10 = 4.6970034 df(29, 150) Pr > F = 0.00000000	W10 = 4.6970034 df(29, 150) Pr > F = 0.00000000

The second necessary analysis is to test if the models have autocorrelation. In order to perform this, Durbin-Watson and Baltagi- Wu Autocorrelation Test is applied. After doing the test, Durbin-Watson and Baltagi-Wu LBI values were obtained for both models as in the Table -8 below. If these values are less than 2, this means that the models have autocorrelation, and so it can be concluded that both model have autocorrelation.

Table 8: Durbin-Watson and Baltagi- Wu Autocorrelation Test

ROA Model	ROE Model
Durbin-Watson = 1.3788358	Durbin-Watson = 1.7707377
Baltagi-Wu LBI = 1.8220052	Baltagi-Wu LBI = 2.0572216

After completing the tests above, it is concluded that the proper random effect model for this analysis has both heteroskedastic and autocorrelation. By taking into account this situation, the proper random effect estimator was used and the obtained results for both models are shown in the Table -9 below.

Table 9: Random Effect Estimator

	ROA Model			ROE Model		
Variables	**Coefficient**	**Robust Standard Error**	**P-Value**	**Coefficient**	**Robust Standard Error**	**P-Value**
REIR	.0882	.0972	0.364	.0390	.0709	0.582
ER	.0356	.0635	0.575	-.0173	.1129	0.878
LTDR	-.1998	.0689	0.004	-.2039	.0804	0.010

PER	.0063	.0226	0.778	.0152	.0242	0.529
MVBVR	-.0345	.0385	0.370	-.0892	.0695	0.200
EPSV	.4953	.3617	0.171	.4014	.3178	0.207
Constant	-.0003	.1141	0.998	.0000	.1066	0.999
Wald chi2(6) = 15.27				**Wald chi2(6)** = 9.35		
Prob > F = 0.0183				**Prob > F** = 0.1549		

In the Table -9 above, REIR stands for real estate investment rate, ER stands for equity ratio, LTDR stands for long term debt ratio, PER stands for price earning ratio, MVBVR stands for market value/book value ratio and EPSV stands for earning per share value.

Based on the Table- 9, it can be said the followings about the relation between dependent variables which indicate profitability of the real estate investment trusts and the independent variables.

- There is a negative relationship between return on asset and long term debt ratio. Therefore, 1 unit increase in the long term debt ratio (LTDR) results in 0.1998 decrease in the return on asset ratio. Similarly, there is a negative relationship between return on equity and long term debt ratio and, so 1 unit increase in the long term debt ratio (LTDR) results in 0.2039 decrease in the return on equity ratio.
- Rests of the independent variables which consist of financial ratios have no significant relationship with the profitability ratios of return on asset and return on equity.

5. Results

In this article, it is aimed to search financial ratios that have relation with the profitability of real estate investment trusts. While return on asset and return on equity ratios were used as dependent variables, real estate investment ratio, equity ratio, long term debt ratio, price earning ratio, market value/book value ratio and earnings per share value were used as independent variables. The analysis was performed during the term of 2014-2019 by using panel data method. At the end of the analysis, it is determined that only one independent variable, namely, long term debt ratio has relation with the both profitability ratios.

The long term debt ratio (ltdr) has negative relation with the return on asset and return on equity, and so 1 unit increase in the long term debt results in -.1998 unit decrease of return on asset ratio. Similarly, 1 unit increase in the long term debt results in -.2039 unit decrease of return on equity ratio. This outcome is very coherent with the financial theory saying that increasing long term debt in the companies implies that the company is loosing strength, and so share price of the company decreases which is results in profitability decrease.

It is also found that rest of the independent variables which are real estate investment ratio, equity ratio, price earning ratio, market value/book value ratio and earnings per share value have no significant relation with the return on asset and return on equity.

Although earning per share value (epsv) has no significant relation with the return on asset and return on equity, it has positive relation with both of the profitability ratios and its significant value is very close to the %90 significance level. Its effect on the return on asset and return on equity is also positive and very high becoming compatible with the financial theory which is that if the earning per share increases, profitability of the company also increases.

I hope this article contributes development of real estate investment trusts in Turkey and foreign countries by supporting investors, executives and also researchers.

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