INTERNATIONAL REAL ESTATE REVIEW

2021 Vol. 24 No. 3: pp. 469 – 499

The Factors Affecting the Market Value/Book Value and Profitability of REITs in Turkey

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Increasing income level and the desire to live a more comfortable life in countries with an increasing population are constantly driving the demand for real estate. Real estate investment trusts (REITs) are capital market institutions that can invest in real estate, real estate-based capital market instruments, real estate projects, real estate-based rights and capital market instruments. In addition, they establish partnerships to realize specific projects, engage in other permitted activities, and are organized by the Capital Market Law in Turkey. In this study, the fixed-effects panel data regression model is used to determine the financial indicators that affect the market value and profitability of the Turkey REITs that are traded in the Borsa İstanbul REITs Index. The study covers 21 REIT companies. The data set is in the period between 2010:Q1 to 2019:Q4 in the analyses. The results show that return on assets (ROA), return on equity (ROE), asset turnover, leverage, equity multiplier and current asset turnover are effective on the market to book ratio (MBR). The ratios that affect the ROA are MBR, ROE, acid-test, leverage, equity multiplier, EBITDA/sales and current asset turnover. Moreover, the ratios that affect the ROE are the ROA, MBR, acid-test, asset turnover, leverage, and equity multiplier.

Keywords

REITs, Market to Book Value, Profitability, Panel Data Analysis, Borsa Istanbul

1. Introduction

Real estate investment trusts (REITs) are defined in Turkey by the "Communiqué on Principles Regarding Real Estate Investment Trusts" of the Capital Markets Legislation as follows (Capital Markets Board of Turkey, 2014):

"Real estate investment trusts are a capital market institution established to issue its shares in order to operate the portfolio that consists of real estate, real estate projects, rights based on real estate, infrastructure investments and services, capital market instruments, Takasbank[1] money market, and reverse repo transactions, time deposits or participation accounts in Turkish Lira, time and demand deposits in foreign currency or particular current and participation accounts and affiliates and other assets and rights to be determined by the Board, and can engage in other activities permitted within limits specified in the law."

REITs were established in 1995 after the legal regulations were determined by the Capital Markets Board of Turkey (CMBT). In Turkey, REITs traded on the Istanbul Stock Exchange stock companies and institutions are exempt from taxes. The real estate market in Turkey has grown very rapidly, and in the last few years, shown remarkable performance. In parallel to the increasing demand for quality office and retail spaces, the new mortgage system and falling interest rates have been the main catalysts in the remarkable recovery of the real estate market. As an advantageous tool that provides ease of access to the enormous profits of the real estate portfolio, Turkey REITs (T-REITs) have gained an important role in the Turkish real estate market. As a result, T-REITs have attracted the attention of both domestic and foreign investors (European Public Real Estate Association, 2015).

REITs are invested in many different types of real estate, including offices, apartments, warehouses, retail centres, medical facilities, data centres, base stations, infrastructure and hotels. Most REITs focus on a specific type of real estate, but some may have more than one property type in their portfolio. Essentially, there are two main types of REITs: equity REITs and mortgage REITs. The former own and operate income-generating real estate and generate income mainly through rent. The latter lend directly to real estate owners and operators or indirectly by purchasing mortgages or mortgage-backed securities and earning revenue from their interest (Li and Orzano, 2020).

[1] Takasbank is authorized to provide cash and securities settlement transactions as the central clearing and settlement institution to BIST equities, debt securities, foreign securities, derivatives and precious metals markets. Securities delivery/receipt as well as cash obligations of BIST members arising from the buy-sell transactions in the related markets are executed via Takasbank (Takasbank, 2021).

REITs are generally closed-end investment companies that manage real estate portfolios, real estate-based projects and real estate-based capital market instruments. By acting as a financial intermediary, they transfer funds collected from investors to facilitate the flow of funds to the real estate sector, an element of the economic system (Corgel et al., 1995). In addition to being an important investment tool in bringing corporate capital to the real estate sector with financial difficulties and developing large and high-quality projects, REITs are also very useful in eliminating the liquidity problem, which is the most fundamental problem faced by real estate investments. In addition, the savings of individual and institutional investors brought together in a common pool and profitable sizeable real estate projects can be realized. The main objective of REITs in Turkey is to create a living source of financing for the real estate sector (Önder, Taş & Hepsen, 2014).

With the development of REITs, qualifications have increased in qualifying for the sector due to enhanced macroeconomic conditions and incentives for large scale development of state policies for the real estate sector in Turkey. In addition, real estate, the development and financialization of its relationship with banking, capital markets, and the insurance industry are other factors that contribute to the development of REITs (Yılmaz and İçten, 2018).

Considering the subject from a historical perspective and at a global scale, REITs were first established in the United States by Congress in 1960. Members of the Congress used the investment fund industry, which was a significant success at that time, to attract capital to the real estate sector. Capital REITs were designed as an "investment fund" for real estate. Those who had insufficient means to purchase individual property could still participate in the real estate market by purchasing capital REIT shares (Beals and Singh, 2002). In 1992, REITs were introduced to the Turkish legal system after making arrangements with the Capital Markets Board. As such, Capital Market Law No. 3794 was amended and came into force in 1992. A provision was added as follows: "Investment trusts are joint-stock companies established to operate portfolios of capital market instruments, real estate, gold and other precious metals" (Capital Markets Board of Turkey, 1992). This was followed by a communiqué that entered into force in 1995 which provided the conditions for establishing REITs, the areas in which they will operate, and the principles regarding the public offering of their shares. Following this communiqué, the first two companies to establish REITs in Turkey are Alarko Gayrimenkul Yatırım Ortaklığı (Alarko GYO), which was established in 1996 and began to trade in the Istanbul Stock Exchange in 1997, and Vakıf Gayrimenkul Yatırım Ortaklığı (Vakıf GYO) which was established in 1997 (Özcan, 2018).

The inherent heterogeneity and nature of real estate, such as the skills required for developing and managing real estate, as well as the mandatory yet significant illiquid investments with corresponding risk, have traditionally prevented small investors from accessing the benefits of large-scale, income-

generating real estate. In order to encourage small investors to participate in real estate investments previously available only to corporations or wealthy individuals, US Congress passed the REIT Act in 1960, which allowed investors to invest in REITs through public trading. Essentially, REITs were designed as structured investment vehicles to do for real estate investors what mutual funds do for investors in securities. REITs offer liquidity, limited liability and professional management advantages to investors without having to bear double taxation (Park, 2016).

The promotion of REITs was based on the fundamental desire to help present the advantages and benefits of investing directly in real estate to potential investors. Those who do not have the significant capital required for real estate investment would have the opportunity to buy REIT shares with the funds that they use to make small investments. This revolution in the real estate sector created the opportunity for all investor categories to invest in real estate (Dabara et al., 2018).

According to the Global Real Estate Market report of the European Public Real Estate Association for the fourth quarter of 2019, the total estimated commercial real estate value in emerging markets which covers 24 countries was 8.7 trillion USD. The total real estate sector listed in emerging markets is 1 trillion USD. Mexico has the largest REIT market among them, with an estimated value of 15.3 billion USD in terms of retail (European Public Real Estate Association, 2020).

The value of commercial real estate in the global markets is estimated at 31.6 USD, and the total listed real estate industry is worth 4.1 trillion USD. Therefore, the total index market value is 2.6 trillion USD, which represents 65% of the total market value of the real estate industry listed worldwide (European Public Real Estate Association, 2020).

When the indicators are examined based on Turkey, the free float rate of 33 REITs traded in the BIST as of 2019:Q4 is 53% and the actual free float is 36% (GYODER, 2020). The total market value is 27.78 billion[2] Turkish lira (TRY). In 2019, the total transaction volume was 70.44 billion TRY. The highest foreign investments in REITs were made by those with an address in the USA (1.04 billion TRY). Following in second place is the United Kingdom (727.74 million TRY), then the Netherlands (287.20 million TRY), Italy (135.85 million TRY) and Bahrain (127.02 million TRY) (GYODER, 2020). The total asset value of REITs traded in Turkey reached about 12.97 billion Euros[3] as of December 31, 2019 (European Public Real Estate Association, 2020). The return on assets (ROA) of the sector has been at the lowest level since 2011,

[2] On average approximately 5.7 TRY = 1 USD in 2019:Q4 - https://www.x-rates.com/average/?from=USD&to=TRY&amount=1&year=2019

[3] On average approximately 6.4 TRY = 1 EURO in 2019:Q4 - https://www.x-rates.com/average/?from=EUR&to=TRY&amount=1&year=2019

with 6% in 2018 (European Public Real Estate Association, 2020). Period profit has increased steadily from 2011 to 2018, at approximately 5.2 million TRY. However, in dollar terms, there was a decrease of 381.24 million USD in 2019 compared to 2014 (GYODER, 2020).

Real estate investment projects in Turkey in recent years have increased in speed and accelerated in pace. As such, the real estate sector is becoming more competitive every day. A REIT is a company or joint venture that brings together the capital of many investors to purchase (or finance) various real estate assets, so funding can be provided to large-scale real estate projects, such as business centres or shopping malls. Otherwise, companies have to bear a significant financial burden in order to realize such large projects. This often means financing through credit, which is an interest burden for companies with insufficient equity. However, such projects can finance through funds collected from the public in return for real estate investment partnership shares. In this way, the financial burden of the company is significantly reduced.

Furthermore, from the perspective of the investors, they have the right to take a share from the real estate portfolio earnings of REITs. In this way, investors have the opportunity to take advantage of many of the benefits of homeownership with less trouble. Investors also have a much more liquid investment than direct real estate investment. This study, which focuses on Turkey and the Istanbul Stock Exchange and the transactions that affect financial ratios and profitability indicators of the REIT market value, examines 21 sector companies and a time panel regression analysis is performed by using quarterly data between 2010 and 2019.

Considering the positive effects of REITs on the economy, especially in developing countries, it is essential to periodically analyze and identify the factors that affect their performance. At the same time, from the point of view of investors, understanding the factors that affect market prices and profitability is very important for good investment planning. Therefore, it is essential to examine the real estate investments, which have shown a significant increase in recent years in Turkey, in these contexts. This study aims to determine the factors that affect the profitability and market to book value (also a measure of market value) in real estate investment partnerships based on current data and thus reveal results that help real estate investment company managers, investors, and policymakers make decisions. This study differs from other studies in the literature mainly in three aspects. First, the market to book ratio (MBR), which is an indicator of market value, risk and the potential of future market value increase of a firm is used. Second, this study uses relatively more current data. On the other hand, the profitability or market value and the factors that effectively impact these two variables are also investigated. Finally, only publicly traded companies are taken into account.

2. Literature Review

Studies in the literature on real estate investment partnerships from both national and international perspectives have approached the subject from different angles. For example, Kuhle et al. (1986) and Olanrele et al. (2018) focus on the stock performance of REITs. Ott et al. (2005) examine the financing, investment and investment performance of REITs while Hung and Glascock (2008) focus on returns and Chung et al. (2011) on stock price movements, Newell and Lee (2012) on the effect of corporate social responsibility and financial factors on the performance of REITs, Lee et al. (2013) on the sentiment and "noise" effects, Zarebski and Dimovski (2012) on capital structure, Fang et al. (2019) on stock performance and macroeconomic factors. Busato et al. (2019) examine the cost of equity capital estimates, and Shen et al. (2020) focus on the beta anomaly in REITs.

Kuhle et al. (1986) analyze REIT share performance which is measured through a comparative analysis with the Standard and Poor's Index. The research results show that significantly higher returns have been realized over the ten years of the examined thirteen-year period. They conclude that REIT shares performed significantly below or above the Standard and Poor's 300 Index. However, the findings support the conclusion that REIT shares are priced effectively.

Ott et al. (2005) examine the financing, investment and investment performances in the REIT sector for 1981–1999. Their analysis examines the old REIT (1981–1992) and the new REIT (1993–1999) periods and identifies significant differences. In the new REIT era, the sector has experienced rapid growth primarily from firm-level investments. Firm-level investments are primarily financed by equity and long-term debt, with little reliance on retained earnings. They find that REITs earn more than their capital costs and most of the value-added investments are made by new companies in the new REIT period.

Hung and Glascock (2008) research the momentum returns of REITs in different market conditions. As a result, they find that the acceleration returns of REITs are higher in upward market conditions. They also conclude that "dividend/price ratios in winning REITs are higher than those of losers, and momentum returns are positively associated with the difference between winners and losers' dividend/price ratios" (Hung and Glascock, 2008).

Chung et al. (2011) analyze the simultaneous movements of REIT stock prices from 1997 to 2007. They state that "theory suggests that stock prices should be largely independent of market changes; and, at the very least, REITs should have a low covariance with other assets, including other REIT stocks". Despite this theoretical argument, Chung et al. (2011) find that in the securities REIT market, simultaneous movements are relatively high, especially among more larger and liquid REITs. They also conclude that REIT stock price

synchronization is negatively associated with hedge fund ownership but positively associated with pension funds and insurance company ownership. Evidence also shows that "synchronicity is highest among industrial and regional mall REITs and lower among apartment, health care and mixed-property REITs" (Chung et al., 2011).

Newell and Lee (2012) examine the impact of corporate social responsibility and financial factors on the performance of REITs in Australia. Their empirical results show that "the environmental, social and corporate governance dimensions of CSR are not currently separately priced by A-REIT investors" (Newell and Lee, 2012). The performance of most REITs stem from financial factors. Corporate governance is considered to be the most effective factor of CSR on REIT performance.

Zarebski and Dimovski (2012) investigate the determinants of the capital structure in the REIT sector during the global financial crisis in Australia and find that the REIT size, profitability, fixed assets, operating risk and growth opportunities influence the degree of leverage.

Islamoglu et al. (2015) investigate the financial performance of REITs in Turkey, measured by using the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) method. According to the empirical results, the most productive REITs for 2011Q1-2014Q3 are Avrasya, Akmerkez, Sinpaş, Kiler and İş, Idealist, Atakule, Alarko, Nurol whereas Vakıf has the worst financial performance during the entire period.

Erdogan et al. (2016) examine the financial performance of twelve REITs traded on Borsa Istanbul (BIST) from 2011-2015 by using four financial indicators. First, they obtain the weights of the criteria related to the financial ratios by using Chang's extent analysis method on the fuzzy analytic hierarchy process. The final ranking of these REIT firms is determined by both TOPSIS and Vise Kriterijumska Optimizacija I Kompromisno Resenje (VIKOR). In addition, the ranking performance of TOPSIS and VIKOR is interpreted.

Olanrele et al. (2018) examine the performance of REITs in Nigeria and the impact of the operating environment on REITs. They show that the REITs are underperforming. The contributors are political risk, infrastructure, and security risk which have negative impacts on the development of the REIT market. They propose "transparency in political leadership and African market, infrastructure development and social security for the growth of the REIT regime on the continent" (Olanrele et al., 2018).

Fang et al. (2019) investigate the impact of macroeconomic factors on the REIT index of China, Singapore and Japan, and first look at the long-term relationships between the REIT index and the interest and inflation rates, and stock index for China and Singapore. Then, they examine the long and short-

term elasticities of the macroeconomic variables in the REIT index. In the last stage, they use a Granger causality test to determine the one-way relationship between Japan and Singapore where changes in inflation rate cause REIT index changes, and stock index movements in Singapore cause REIT index changes.

Beracha et al. (2019) examine the impact of REIT efficiency on operational performance, risk, and stock returns. They measure operational efficiency at the REIT level as the ratio of operational expenses to income. A higher operational efficiency rate means a less efficient REIT. Using an example of US equity REITs in the modern REIT era, they find that the operational performance of REITs, measured by the ROA and funds from operations as adjusted and return on equity (ROE) and funds from operations on equity, is negatively and significantly correlated with previous periods. The results also show that more efficient REITs are exposed to fewer market and credit risks. They also find evidence that the cross-sectional stock returns of REITs is partially explained by using operational efficiency ratios. A portfolio of high-yielding REITs earns on average higher cumulative stock returns than low cumulative stock returns.

Shen et al. (2020) investigate the validity of beta anomaly in the REIT market. They analyze the low-minus-high beta and beta-counter-bet strategies in the REIT market. They find that high beta REITs provide significantly lower risk-adjusted returns than low beta REITs. In addition, they find that institutional investors with a significant amount of REITs in their portfolios prefer high beta REITs.

Furthermore, most of the important existing studies on REITs in Turkey focus on performance measurement (Aytekin and Kahraman, 2015; Özcan and Gurol, 2018; Türkmen, 2011; Islamoglu et al., 2015; Erdogan et al., 2016; Yetgin and İçten, 2018; Çelik and Manan, 2018; Gülyüz, 2019). When they examine the factors that affect profitability and market value in Turkey, they find that the manufacturing, tourism and banking sectors are in general the most influential. Studies that investigate the factors that affect the profitability and market value of REITs in Turkey however appear to be less common and neglected in the existing literature. When related existing studies are examined, it is found that they provide similar results.

Some of the studies done in recent years on the relationship between financial ratios and profitability and market value of REITs in Turkey are discussed as follows.

Demireli et al. (2014) investigate the effects of the financial ratios of the REIT sector and five other sectors on the ROA, ROE, MBR and (total financial liabilities + market value)/total assets ratios. According to their research results, there are significantly negative relationships among the ROA and financial

leverage and current ratios, and a significantly positive relationship between current asset and asset size ratio.

Şahin (2014) examines the relationships among the return of REIT stocks and asset size, market value to book value ratio (MV/BV) and price to earning (P/E) ratios by using a multiple regression analysis. The research results show a significant relationship between stock return and portfolio size and P/E, but no significant relationship with MV/BV.

Ünaldı (2018) examines the effect of 15 financial ratios on the MV/BV value in REIT companies traded on BIST. Significantly positive relationships are found among the MV/BV and total assets/equity, fixed assets/equity, and ROE.

Çelik and Arslanlı (2020) investigate the effect of financial ratios on ROA and market values with the panel data analysis method. They find significantly negative relationships among long-term debts/total assets, ROE, current ratio and market value; significantly positive relationship between total assets and market value; and significantly positive relationships among return on stocks, current ratio, ROE and ROA.

Some of the studies conducted with an international perspective and addresses company financial ratios are as follows.

Asiri and Hameed (2014) measure how financial ratios explain for the value of firms in the Bahrain Stock Exchange. The results show that the ROA is the determinant factor in explaining for the market value, followed by financial leverage and beta. In addition, the findings reveal that the size of the firm also has a significant effect on the market value. Binti Mohamad and Bin Zolkifli (2014) use net asset value (NAV) and returns as the proxy for REIT performance while risk, dividend yield, net income and size represent the determinant variables. They use correlations and multiple regression analyses and the results provide evidence about the relationships among the NAV and return and risk, dividend yield, net income, and the size of REITs. Sha (2017) finds that stock returns, MBR and gross domestic product have a significant effect on the stock prices of REIT companies in Indonesia. Marsha and Murtaqi (2017) examine the effect of financial ratios (ROA, current ratio and acid test ratio) on firm value in the food and beverage industry in Indonesia during t 2010-2014. They find that all three financial ratios have a significant effect on firm value. ROA and current ratio have a positive relationship with firm value, while acid test ratio has a negative relationship. Jakpar et al. (2018) determine that the most critical factor that affects the ROA of REIT companies in Malaysia is the stock return (positive). Ma'in et al. (2018) examine the effect of macroeconomic factors and firm characteristics, including inflation and interest rate, gross domestic product (GDP), dividend yield and market capitalization, on the performance of REITs. Their results show that there are relationships among the NAV and inflation rate, GDP and market value.

Inflation and market capitalization have a negative impact on NAV. However, GDP shows a positive effect on NAV. Market capitalization may be relevant for small and medium-sized REITs compared to large firms. Khan and Siddiqui (2019) find positive relationships among the NAV of the company and the stock return, net income, total assets and stock market index, and a negative relationship between the interest rate in 21 REIT companies traded in the stock markets of Pakistan, Malaysia, Thailand, Singapore and Hong Kong.

As a result of the literature review, it is evident that the internal factors that affect the market value and profitability of REITs have not been adequately examined in the literature. In some of the studies on REITs, REIT companies are handled individually, while in others, REIT sectors and indices are both taken into account. The findings in the literature generally have consensus. However, different variables are used, such as macro and micro-level economic indicators, the current situation in the real estate sector, investor preferences, return levels of real estate, and alternative investment instruments. There are also differences in data collection and analysis methods, selected calculation methods, assumptions made, etc. All of these contribute to reaching different results.

3. Methodology and Findings

The Capital Markets Board shows that there are 35 T-REITs (Capital Markets Board of Turkey, 2020). According to data from GYODER, a real estate platform in Turkey, and the Merkezi Kayıt Kuruluşu (MKK), which is the Central Securities Depository of the Turkish capital markets, the number of T-REITs operating in the BIST is 33 as of 2019:Q4. In this study, financial ratios obtained from the financial statements of 21 T-REITs based on transactions in Borsa Istanbul are used. The study covers the period between 2010:Q1 and 2019:Q4. The variables used are shown in Table 1. In this study, the MBR is used as an indicator of the market value of the company because this ratio is also a risk and an indicator of future market value (the potential for market value to rise), as stated in Fama and French (1992), and a stock performance indicator. Therefore, this study not only to aims to determine the factors that affect the firm profitability and firm value but also the factors that affect the risk, performance, and future market value of the firm.

The companies that are constantly traded during the research period, which have data that can be accessed, and a transaction volume that is high which would not cause inconsistencies and deviations in the analysis are included. In this context, 21 companies are taken as basis. An ordinary least squares (OLS) panel regression analysis is also performed in this study.

Table 1 Financial Ratios

Independent variable	*Symbol*
Acid-test ratio	C1
Current ratio	C2
Equity multiplier (total assets / equity)	C3
Financial leverage	C4
Long term debt/assets	C5
Current asset turnover	C6
Asset turnover	C7
Return on equity	C8
Return on assets	C9
EBITDA / Sales	C10
Market / Book Value (MBV)	C11
Dependent Variable	***Symbol***
Market / Book Value (MBV)	C11
Return on equity	C8
Return on assets	C9

Note: EBITDA denotes Earnings Before Interest, Taxes, Depreciation, and Amortization

3.1 Panel Regression Analysis

In the econometric analysis part of this study, three models are created for predictive purposes. The models in question have been implemented to estimate the financial ratios that affect T-REIT market values and profitability indicators. These estimates are made by using quarterly data between 2010 and 2019. The data of the 21 T-REITs are used in the analyses. Three different models are analyzed, where the MBV, ROA and ROE are used as the dependent variables separately for the T-REITs. As a result, the econometric models are as follows:

$$Model\ 1:\ C11_{it} = \beta_0 + \beta_1 C8 + \beta_2 C9 + \beta_3 C6 + \beta_4 C5 + \beta_5 C2 + \beta_6 C1 + \beta_7 C7 + \beta_8 C4 + \beta_9 C3 + \beta_{10} C10 + \text{э}_{it} \quad (1)$$

$$Model\ 2:\ C9_{it} = \beta_0 + \beta_1 C11 + \beta_2 C8 + \beta_3 C6 + \beta_4 C5 + \beta_5 C2 + \beta_6 C1 + \beta_7 C7 + \beta_8 C4 + \beta_9 C3 + \text{э}_{it} \quad (2)$$

$$Model\ 3:\ C8_{it} = \beta_0 + \beta_1 C11 + \beta_2 C9 + \beta_3 C6 + \beta_4 C5 + \beta_5 C2 + \beta_6 C1 + \beta_7 C7 + \beta_8 C4 + \beta_9 C3 + \text{э}_{it} \quad (3)$$

In this study, descriptive statistics of the variables are primarily included. For example, in the descriptive statistics, the average, median, standard deviation, and maximum and minimum values of the variables are used and the number of observations are provided. The purpose of providing descriptive statistical information is to provide a general idea of all the variables used in this study.

Table 2 Descriptive Statistics

	C11	C9	C8	C1	C2	C4	C6	C5	C7	C3	C10
Mean	1.12	5.97	4.19	24.63	27.44	32.09	2.16	32.09	0.89	3.52	-52.83
Median	0.65	4.68	6.55	0.92	1.91	32.91	0.42	32.91	0.07	1.48	28.40
Maximum	49.96	123.40	187.50	864.47	864.70	106.36	163.97	106.37	160.26	474.67	168.93
Minimum	-9.06	-83.82	-723.45	0.00	0.00	0.00	0.00	0.00	0.00	-96.08	-40584
Std. Dev.	2.27	13.55	44.98	91.17	94.35	26.60	12.89	26.60	9.35	23.01	1422.10
Observations	840	840	840	840	840	840	840	840	840	840	840

Table 3 Correlation Results

	C6	C7	C1	C8	C9	C5	C11	C3	C4	C10	C2
C6	1.000	0.808	-0.001	0.000	-0.021	-0.094	0.071	-0.015	-0.094	0.008	0.000
C7	**0.808**	1.000	0.009	0.002	-0.008	-0.074	0.071	-0.009	-0.074	0.004	0.007
C1	-0.001	0.009	1.000	0.014	0.005	-0.307	-0.030	-0.029	-0.307	0.010	**0.975**
C8	0.000	0.002	0.014	1.000	0.543	-0.298	-0.127	-0.226	-0.298	0.023	0.012
C9	-0.021	-0.008	0.005	0.543	1.000	-0.295	0.028	-0.087	-0.295	0.044	-0.004
C5	-0.094	-0.074	-0.307	-0.298	-0.295	1.000	0.121	0.228	1.000	-0.041	-0.315
C11	0.071	0.071	-0.030	-0.127	0.028	0.121	1.000	0.828	0.121	-0.013	-0.029
C3	-0.015	-0.009	-0.029	-0.226	-0.087	0.228	**0.828**	1.000	0.228	-0.013	-0.030
C4	-0.094	-0.074	-0.307	-0.298	-0.295	**1.000**	0.121	0.228	1.000	-0.041	-0.315
C10	0.008	0.004	0.010	0.023	0.044	-0.041	-0.013	-0.013	-0.041	1.000	0.004
C2	0.000	0.007	0.975	0.012	-0.004	-0.315	-0.029	-0.030	-0.315	0.004	1.000

Note: Bolded numbers indicate significance at the 5% level.

In the panel regression analyses, the correlations between the independent variables should be small so that there is no multicollinearity problem. However, when the results of the correlation analysis are examined in Table 3, it is seen that there is a high correlation between MBR and equity multiplier, current ratio and acid-test ratio, financial leverage and long term debt/assets and also between current asset turnover and asset turnover.

On the other hand, the variance inflation factor (VIF) values in Table 4 show that the correlation between MBR and equity multiplier, current asset turnover and asset turnover are at an acceptable level (VIF *(approx. 3.50)* < *10*). However, the correlation value between the current and acid-test ratios, and between C4 and C5 are not acceptable (VIF > *10*). Therefore, the variables with the highest VIF value are excluded from the analysis in the next stage; they are C2 and C5.

Table 4 Variance Inflation Factor Values

Variable	Coefficient Variance	VIF
C6	2.00E-28	2.924539
C7	3.77E-28	2.909066
C1	2.78E-29	20.42089
C8	8.49E-30	1.515335
C9	9.31E-29	1.508603
C5	1.42E-21	88348035
C11	7.43E-27	3.387658
C3	7.54E-29	3.524918
C4	1.42E-21	88347480
C10	5.64E-33	1.006028
C2	2.61E-29	20.51906
C	5.01E-26	NA

Notes: C5 has the highest VIF value among C4 and C5 ,and C2 with the highest VIF value among C1 and C2, are excluded from the analysis. In short, the highlighted gray area shows the variables that are excluded from the analyses.

In the study, unit root tests are first carried out. For this purpose, Im, Pesaran and Shin (IPS), augmented-Dickey-Fuller (ADF) and Phillips-Perron (PP) Fisher tests are used. The IPS panel unit root test allows the coefficients to be heterogeneous by removing the basic assumption of the Low Load Cycle (LLC) test that the autoregressive coefficient of the cross-section units must be homogeneous (Baltagi, 2005: 242). In the IPS unit root test, the heterogeneous coefficient y_{it-1} is taken into account. The testing is followed by considering the mean of the unit root test statistic of the series belonging to all units (Tatoğlu, 2013:212). The hypotheses for the IPS panel unit root test are as follows;

$H0$: $\rho = 0$ (not all series are stationary and all series contain a unit root), and

$H1$: $\rho < 0$ (all series are stationary and contain the unit root of some units)

The studies conducted by Fuller (1976) and Dickey and Fuller (1979) are the first to identify stationarity in time series. On the other hand, it is generally acknowledged that the mean and covariance of the error terms of the series are zero, and the variance is constant in the models with no intercept and trend, with intercept and trend, and only the intercept established by the DF unit root test. However, there may be problems such as serial correlation or time varying variance in the error terms. For this reason, the aim is to eliminate these problems by including 59 lagged values of the dependent variable in the ADF model (Sevüktekin and Çınar, 2017:336). After establishing the hypotheses, H_0 and H_1, which propose that the series has and does not have a unit root respectively, the obtained tau (τ) statistic is compared with the table values developed in MacKinnon (1991, 1996) with Monte Carlo simulation experiments. As a result, if H_0 is rejected, then the series is stationary. However, if H_0 cannot be rejected, then the series is not stationary.

Maddala and Wu (1999) and Choi (2001) develop a non-parametric test that combines the p-values of test statistics obtained from individual unit root tests. These null and alternative hypotheses of the two unit root tests are the same as those of the IPS panel unit root test. Maddala and Wu (1999) suggest that a Fisher test statistic should be used in Equation (8), which means that averaging the ADF test statistics is not the most effective way to evaluate stationarity (Bozoklu and Yılancı, 2011).

$$P = -2\sum_{i=1}^{N}\log(\pi_i) \tag{4}$$

where π_i is the *–p* value of *ith* test statistic. This test statistic conforms to the chi-square distribution with *2N* degrees of freedom. In this test, the models used for the individual unit root tests can have different lag lengths. In addition, there is no need for a balanced panel to apply this unit root test. Another advantage of the panel unit root test in Maddala and Wu (1999) (MW) is that unit root tests other than ADF can be used for individual unit root testing. The disadvantage is that Monte Carlo simulations obtain the –p values.

With a large "N", Choi (2001) proposes a test statistic, which is also based on the Fisher test statistic and expressed in Equation (9):

$$P_m = -\frac{\sum_{i=1}^{N}\log(\pi_i) + N}{\sqrt{N}} \tag{5}$$

Under the assumption of cross-sectional independence, P_m converges towards the normal distribution. Thus, the test in Choi (2001) has similar advantages and disadvantages as the MW test.

The test results found with the fixed and fixed-trend models are shown in Table 5. The results show that the series are stationary in level values. These unit root tests are first-generation unit root tests and do not consider cross-sectional dependence.

Table 5 Unit Root Test Results

Ratio	*Model*	*Statistics / Probability*	*IPS*	*ADF*	*PP*
C7	*Intercept*	*Stat.*	-689.763	133.802	197.370
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-556.116	108.546	429.609
		p	0.0000	0.0000	0.0000
C1	*Intercept*	*Stat.*	-428.720	114.396	153.631
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-442.253	116.276	416.394
		p	0.0000	0.0000	0.0000
C5	*Intercept*	*Stat.*	-270.068	869.619	153.803
		p	0.0035	0.0001	0.0000
	Intercept & Trend	*Stat.*	-203.334	700.780	253.250
		p	0.0210	0.0042	0.0000
C2	*Intercept*	*Stat.*	-504.708	108.878	158.112
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-598.863	124.122	435.803
		p	0.0000	0.0000	0.0000
C6	*Intercept*	*Stat.*	-411.515	117.232	188.616
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-371.679	106.708	201.442
		p	0.0001	0.0000	0.0000
C10	*Intercept*	*Stat.*	-587.083	116.927	235.526
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-694.287	124.654	270.685
		p	0.0000	0.0000	0.0000
C4	*Intercept*	*Stat.*	-270.108	869.644	153.798
		p	0.0035	0.0001	0.0000
	Intercept & Trend	*Stat.*	-203.324	700.728	253.138
		p	0.0210	0.0042	0.0000
C3	*Intercept*	*Stat.*	-325.515	105.140	216.237
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-297.631	924.476	400.312
		p	0.0015	0.0000	0.0000
C11	*Intercept*	*Stat.*	-526.860	109.493	142.507
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-532.991	117.830	170.200
		p	0.0000	0.0000	0.0000
C8	*Intercept*	*Stat.*	-494.510	929.871	108.858
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-353.603	763.700	795.297
		p	0.0002	0.0009	0.0004
C7	*Intercept*	*Stat.*	-541.586	100.430	110.185
		p	0.0000	0.0000	0.0000
	Intercept & Trend	*Stat.*	-325.226	661.947	822.715
		p	0.0006	0.0057	0.0001

However, more reliable results can be obtained using second-generation unit root tests for cross-sectional dependence between series. Therefore, whether there is cross-section dependence between the series should be tested first. The *Breusch-Pagan* (Bruesch and Pagan, 1979) *Lagrange multiplier (LM), Pesaran scaled LM* and *Pesaran cross section dependence (CD)* tests are conducted in order to test cross-sectional dependency. Of these tests, *Breusch-Pagan LM* and *Pesaran scaled LM* can be used when $T > N$ and *Pesaran CD* when $T > N$ or $N > T$. Considering the results in Table 6, H_0, which proposes that there is no cross-sectional dependency in the error terms, is rejected since the probability value for all three tests is less than *0.05*.

Table 6 Cross-Section Dependency

Test	Stat.	d.f.	Prob.
Breusch-Pagan LM	792.6767	210	0.0000
Pesaran scaled LM	28.43171		0.0000
Pesaran CD	5.509028		0.0000

Note: d.f. denotes degrees of freedom

Unit root tests were initially based on the assumption that there is cross-section independence between units. Such tests were called "first-generation panel unit root tests". However, O'Connell (1998) shows that ignoring the possible dependence between units can cause severe bias in first-generation panel unit root tests. Therefore, researchers have developed new tests that do not change according to cross-section dependence in the next period, which are called "second generation unit root tests". Pesaran (2006) proposes a CIPS test based on a single standard factor specification for a cross-correlation structure. The CIPS test performed very well as a result of the simulation performed under the assumption of a single common factor and the known autocorrelation order of the residuals (Cerasa, 2008).

A natural test of the null $H_0 : \beta_i = 0$ for all i, against the heterogeneous alternative $H_1 : \beta_1 < 0, \ldots, \beta_{No} < 0, N_0 \leq N$ in the entire panel data set, is given by the average of the individual CADF statistics (Cerasa, 2008):

$$CIPS(N,T) = N^{-1}\sum_{i=1}^{N} t_i\,(N,T) \qquad (6)$$

The distribution of this test is non-standard, and even asymptotical. Cerasa (2008) lists the 1%, 5% and 10% critical values for different combinations of *N* and *T*. In the case of serial correlation of the individual-specific error terms, the testing procedure can be easily extended by adding a suitable number of lagged values of $\bar{z}_t$ and Δz_{it} in the CADF regression [1] without any changes in the distribution of the statistic (Cerasa, 2008).

Since cross-section dependency is found in the error terms, unit root testing is carried out again with the CIPS test, one of the second-generation unit root tests. As a result of the analysis performed with the intercept term model, the

unit root is determined at the level values of the C3, C4, C5, C6 and C8 series, where it is observed that they become stationary when the first difference is taken.

Before establishing the model for predictive purposes in the panel data analysis, it is important to determine the type of model that is applicable to the data sets. Cross-section dependency is also essential at this point. For example, suppose cross-sectional dependency between series is found and there is a variance problem with the variance, instead of traditional random or fixed-effects. In that case, a different panel regression model should be predicted by considering the cross-sectional dependency and changing variance. In cross-section dependence, estimators lose efficiency (Türkseven & Kutlar, 2019:7).

The changing variance problem usually occurs when estimations are made with cross-section data. OLS estimators lose their effectiveness in the event of heteroskedasticity, and the *t* and *F* tests give deviating results (Türkseven and Kutlar, 2019:7). For this, heteroskedasticity testing is applied to the regular series before panel data analysis. In Table 7, the null hypothesis that "residuals are homoscedastic" is rejected because the probability value is less than 0.05. In other words, there is a problem of changing variance.

Table 7 Heteroskedasticity

Null hypothesis: Residuals are homoskedastic			
	Value	**df**	**Probability**
Likelihood ratio	1982.432	21	0.0000

3.2 Model Selection

In the next stage of the study, analyses are made regarding the regression model that is preferred. For this purpose, the *F test* is performed first. Then, the pooled Model - Fixed Effects Model is tested with the test in which the results are given in Table 8. According to Table 8, H_0 (which states that the pooled model is the most appropriate) is rejected because the probability is less than *0.05*. This result shows that there are unit and time effects in the model and the fixed effects model is the most appropriate.

In the second stage of the model selection, the pooled-random effect models are compared by using the Breusch-Pagan LM test and the most suitable model is determined. In Table 8, the probability value is less than *0.05*. For this reason, H_0 which proposes that the model is suitable for pooling is rejected. As a result, we determine that the random-effects model is the most appropriate.

In the third stage, a comparison of the fixed effects model - random-effects model is done with the Hausman test. According to Table 8, H_0, which states that the model is suitable for random effects, is rejected because the probability

value is less than *0.05*. As a result, we conclude that the fixed-effects model is the most appropriate.

Table 8 Model Selection

Test	Stat.	Prob.
F Test	15.251050	0.0000
Breusch-Pagan	941.7571	0.0000
Hausman Test	22.465000	0.0041

The Durbin-Watson (DW) value, one of the statistics used to determine the autocorrelation, is expected to be around *2*. However, the DW value of the first model is 0.73. Therefore, the DW test statistic is in the region of instability. This result shows that there is an autocorrelation problem in the model.

In some cases, correlations between residues can be seen in econometric models. Although such models seem to be independent, the error terms are dependent on each other because they are affected by similar factors. In such cases, the system can be solved as a whole by using unrelated regression models (SURs). Thus, there is no loss of efficiency (Tatoğlu, 2012:142; Türkseven & Kutlar, 2019:6). According to the *SUR* models, equations do not create a system of simultaneous equations. The relationship of the equations to each other is only because of the error terms. These models are used together with the generalized least squares technique. SUR models give more robust results in the case of heteroskedasticity and allow autocorrelation. In addition, the SUR model has some advantages in panel data analysis. For example, the error term represents all unexplained relationships in the model. Therefore, it assumes that an external factor affecting one province also affects other provinces. It is a type of model that allows systems of equations to be related to each other (Etkin, 2010: 47; Türkseven and Kutlar, 2019:6).

Table 9 contains the last estimation results for Model 1. In the model, the *Cross-Section SUR weights* and *Cross-section SUR (PCSE) standard errors & covariance* algorithms, which provides the use of a resistive estimator that corrects standard errors and *AR(1)* process are used because the *DW* test statistic is in the region of instability and also cross-section dependency and changing variance are detected in the first model. According to Table 9, the Panel EGLS Cross-Section SUR method results are found to be meaningful. The R^2 value is approximately *0.9254*. In other words, the financial ratios in the model can explain for about *92.54%* of the market changes to the MBR. In addition, since the *F-statistic* value is *328.46* and the *p-value* is less than *0.01* significance level, it can be concluded that the R^2 value is significant. Therefore, the null hypothesis that there is no relationship between the MBR and the financial structure ratios is rejected. However, the alternative hypothesis which suggests a significant relationship is accepted. In the last model established in this study, the DW value is approximately *1.93* and there is no autocorrelation.

Table 9 shows the results of the analysis. The equity multiplier (C3), leverage (C4), asset turnover (C7), ROE (C8), and ROA (C9), are effective at the *1%* significance level, and current asset turnover (C6) is effective at the 5*%* significance level on the MBR in the T-REIT sector. While the ROA affects the MBR negatively, the others affect it positively. This means that as the profit from assets increases, the company's risk level decreases, but its market value and future growth potential decreases. However, as the ROE increases, the MBR also increases. A study carried out by Koç et al. (2020) finds that the MBR has a significantly negative relationship with the ROA and a positively significant relationship with the ROE in the BIST 30 index companies. On the other hand, it is thought the dividend policies, large-scale investments in REITs and risk factor affect the negative relationship between the ROA and MBR. The reason is when MBR is evaluated as a measure of risk, the negative relationship between MBR and profitability becomes meaningful.

The positive relationship between leverage ratio and MBR is remarkable. This relationship shows that investors are aware that REITs need a high level of financing to realize their long-term and large-scale investment projects. For this reason, they think that more significant investments can be made through long-term borrowing, and as such, they increase the MBR value by investing in stocks. Furthermore, the increase in profitability with the equity multiplier increases the MBR, thus indicating that those who invest in REITs expect the companies to undertake new projects in return for their borrowing and that the market value of the companies will increase with the market value new projects. However, the positive relationship between the leverage ratio and MBR shows that REITs benefit from the leverage effect and use more debt than equity. This situation also positively affects the ROE (Ayrancı and Gürel, 2020).

Çelik and Manan (2018) find a positive relationship between the MBR and ROA in their study on REITs. Ünaldı (2018) finds a positive and significant relationship between the MBV ratio and the ROE in REITs. On the other hand, Çelik and Arslanlı (2020), unlike most of the other studies in the literature, fail to find a statistically significant effect of the ROA of firms and ROE on market value. They explain the inability to do so as follows; "*This result can be said that the contribution of forward-looking expectations to the formation of stock market prices of REIT companies that make long-term investments is higher than the profitability ratios. In other words, those who invest in real estate and real estate-based rights mostly have expectations for an increase in the value of their stocks in the long run"* (Çelik and Arslanlı, 2020). In our study, we determine that profitability ratios have significant effects on market value.

Ayrancı and Gürel (2020) state that the asset turnover rate does not significantly affect the MBR. However, they find that an increase in the equity multiplier, ROA and equity increases the MBV ratio. In this study, while asset turnover rate, equity multiplier and ROE have a positive effect on the MBR, it is observed that the ROA has a negative effect. On the other hand, Ayrıçay and

Türk (2014) find a negative relationship between asset turnover and financial leverage ratios and firm value. Asiri and Hameed (2014) determine that the ROA and financial leverage positively affect the firm value in the banking sector. On the other hand, the ROA negatively affects the firm value in the insurance sector, while financial leverage positively affects it. Against this context, our findings have similar and different aspects with relevant studies in the literature.

Table 9 *Model 1* Fixed Effects Model Panel Regression Results. Dependent Variable: C11 *(MBR)*

Variable	Coefficient	Std. Error	t-Statistic
C9	-0.006257	0.000630	-9.934884*
C8	0.003586	0.000354	10.13161*
C6	0.005281	0.002715	1.944761**
C1	-5.89E-05	6.36E-05	-0.925800
C7	0.029307	0.003599	8.142136*
C4	0.002594	0.000619	4.191043*
C3	0.043774	0.000991	44.16173*
C10	2.13E-06	8.62E-06	0.247460
Constant	1.125195	0.014770	76.17984
AR(1)	0.579056	0.025905	22.35342
Weighted Statistics			
R-squared	0.925390	Mean dependent var	1.567331
Adjusted R-squared	0.922573	S.D. dependent var	3.836219
S.E. of regression	0.980755	Sum squared resid	738.7240
F-statistic	328.4657	Durbin-Watson stat	1.932976
Prob(F-statistic)	0.000000		

Notes: S.E. denotes standard error, S.D. denotes standard deviation.
*Significance at 1% level; **Significance at 5% level

All steps performed before the Model 1 estimation are also performed for Models 2 and 3 (cross-section dependency, second-generation unit root tests, heteroskedasticity, model selection) as shown in Appendixes 1 and 2.

In the next stage of the study, factors affecting profitability rates in REITs was investigated. For this purpose, ROA and ROE ratios are used as dependent variables. The panel regression analysis results, in which *ROA* is included as the dependent variable, are shown in Table 10. According to Table 10, the R^2 value is approximately 0.93. This result means that the financial ratios included in the model established to determine the return on REIT assets can explain *93%* of the ROA. In addition, since the *F-statistic* value is *356.02* and the *p-value* is less than 1% significant, it is concluded that the R^2 value is significant. Therefore, the null hypothesis that there is no relationship between the ROA and the financial structure ratios is rejected. However, the alternative hypothesis which suggests a significant relationship is accepted.

According to the results of the analysis, the ratios that affect the *ROA* in REITs at a significance level of *1%* are *acid-test (C2-positive), equity multiplier (C3-positive), leverage (C4-negative), current asset turnover (C6-positive), ROE (C8-positive), EBITDA/Sales (C10-positive), and MBR (C11-negative).*The negative effect of financial leverage on the ROA shows that more financial borrowing does not increase the ROA; on the contrary, it negatively affects it. Therefore, REITs' use of capital market instruments instead of external borrowing may have a more positive impact on their profitability. Thus, it will contribute to the solution of the liquidity problem experienced in the sector and the spread of the capital based on real estate (Çelik and Arslanlı, 2020). Çelik and Arslanlı (2020) find a significant relationships among the ROA and current ratio, return on the stock, and equity and MBV (negative) ratios. Demireli et al. (2014) find significantly negative relationships among the ROA, financial leverage ratio, and current ratio in REITs. Çakır and Küçükkaplan (2012) determined that there is a significant negative relationship between current ratio and short-term financial leverage ratio and ROA. Karadeniz and İskenderoğlu (2011) determine that there is a significantly negative relationship between total leverage and ROA in tourism companies that trade on Borsa İstanbul.

Table 10 *Model 2* Fixed Effects Model Panel Regression Results. Dependent Variable: C9 (*ROA)*

Variable	Coefficient	Std. Error	t-Statistic
C11	-0.409673	0.083080	-4.931042*
C8	0.035267	0.002643	13.34130*
C6	0.015505	0.021467	0.722281*
C1	0.010397	0.003322	3.129658*
C7	0.028396	0.020655	1.374760
C4	-0.036779	0.005789	-6.352710*
C3	0.021262	0.003867	5.498200*
C10	0.000168	5.81E-05	2.899524*
Constant	6.304578	0.461998	13.64634
AR(1)	0.745888	0.022885	32.59303
Weighted Statistics			
R-squared	0.930764	Mean dependent var	1.842959
Adjusted R-squared	0.928150	S.D. dependent var	4.512253
S.E. of regression	1.001744	Sum squared resid	770.6818
F-statistic	356.0186	Durbin-Watson stat	1.941042
Prob(F-statistic)	0.000000		

Notes: S.E. denotes standard error, S.D. denotes standard deviation.
*Significance at 1% level; **Significance at 5% level

In the next stage of the study, the analyses are repeated by using the ROE as the dependent variable. The panel regression analysis results in which the *ROE* is included as the dependent variable are shown in Table 11. The table show that the R^2 value is approximately *0.09*, which means that the financial ratios included in the model established to determine the determinants of ROE in REITs can explain for *9%* of the equity profitability. In addition, since the *F-*

statistic value is less than *8.577* and the *p-value* is less than 5% significant, it can be concluded that the R^2 value is significant.

According to the analysis results, the ratios that affect the equity profitability in REITs at a significance level of *1%* are the *acid-test (C1-negative), equity multiplier (C3- negative), leverage (C4-negative), asset turnover (C7-negative), ROA (C9-positive),* and *MBR (C11-positive).* Uluyol et al. (2014) find a positive and significant relationship between the financial leverage ratio of companies operating in the construction industry and ROE, while significantly negative relationships are found for the other industries. Okuyan (2013) also finds a negative relationship between the debt ratio and total assets and profitability ratio in enterprises operating in the industrial sector in Turkey.

Table 11 *Model 3* Fixed Effects Model Panel Regression Results. Dependent Variable: C8 (ROE)

Variable	Coefficient	Std. Error	t-Statistic
C9	1.659011	0.014772	112.3110*
C11	2.211436	0.224695	9.841965*
C6	-0.013397	0.017722	-0.755968
C1	-0.008794	0.002912	-3.019507*
C7	-0.041699	0.021764	-1.915934**
C4	-0.020306	0.007611	-2.667930*
C3	-0.369969	0.022233	-16.64036*
C10	5.32E-06	2.94E-05	0.180984
Constant	-8.457725	0.353506	-23.92526
AR(1)	0.635350	0.029701	21.39145
Weighted Statistics			
R-squared	0.984954	Mean dependent var	1.457859
Adjusted R-squared	0.984386	S.D. dependent var	9.329103
S.E. of regression	0.933376	Sum squared resid	669.0749
F-statistic	1733.660	Durbin-Watson stat	2.022043
Prob(F-statistic)	0.000000		

Notes: S.E. denotes standard error, S.D. denotes standard deviation.
*Significance at 1% level; **Significance at 5% level

4. Discussion and Conclusion

One of the long-term investment tools in the real estate sector is REITs. REITs are an attractive investment tool that generates income in an environment where interest rates are low. REITs are also an alternative way of investing in real estate without owning them. The said investment realized by purchasing real estate directly or indirectly by granting loans and purchasing pre-existing mortgage agreements through REITs. REITs can be an excellent way of adding revenue and growth to a portfolio without excessive risk. REITs offer investors the convenience and advantages of investing in publicly traded stocks, as well as the benefits of real estate investment. REITs also offer investors advantages

such as tax exemption, high dividend yield, access to commercial real estate, competitive market performance, transparency, liquidity, inflation protection and portfolio diversification.

Today, companies aim to maximize their net present value for their stakeholders rather than profit. The decisions taken by the company managers affect the profitability and risk level of the company. Therefore, the focal point of financial decisions is the decisions and activities that affect the market value of the firm (Karadeniz and İskenderoğlu, 2011:66). In other words, the financial aim of firms is to maximize the welfare of their shareholders by increasing the market value of their stocks. The maximization of firm value is defined as all the decisions that managers must take to increase the overall long-run market value of the firm.

Historically, financial ratios have been a practical and straightforward means for financial analyses and a planning tool. Since their emergence in the mid-nineteenth century, they have been used consistently by analysts who need business information. Financial ratios are used by internal and external stakeholders of enterprises in economic decision-making processes such as investment and performance evaluations. There are many financial ratios with benefits that vary depending on the decision-maker. These financial ratios can be classified as liquidity, operational, profitability, debt, market and profitability ratios. These are indicators of the overall efficiency of the firm. The financial ratios used in the analysis in this study are included under the classifications mentioned here. For example, ROA and ROE are profitability ratios, while MBR is the market ratio. ROA is calculated by dividing net profit after taxes by total assets. This ratio measures the operating efficiency of the company based on its profits from its total assets. The ROE is calculated by dividing net income after taxes by total equity. This ratio measures the rate of return of shareholders on their investment in the company.

Valuation approaches differ according to the field of application, objectives and methodologies used. For example, firm value means book value for accountants, while economists are concerned with fair value (real value). On the other hand, shareholders evaluate firms according to the benefits they provide and focus on the market value resulting from the actual financial conversion or sale of securities (Abuzayed et al., 2009). In this study, the MBR is an indicator of the stock market performance and market value of REIT companies. In this way, the market valuation of companies is measured.

REITs essentially need long-term foreign resources to carry out various real estate investment activities such as for residence, business and shopping centres and hotels. Suppose REITs obtain the funds that they need from financing institutions to realize the various projects that they have developed. In that case, they incur high financing costs and reduce their ROA and ROE. On the other hand, REIT companies, which can provide financing resources by offering their

shares to the public within the scope of capital market legislation, can realize various projects with this method, bearing relatively lower financing costs (Şarkaya, 2007: 175-190).

Considering the strong growth and enhanced transparency in the real estate market, the REIT portfolios in Turkey began to have more precedence. In this study, the internal factors that affect the market value and profitability of T-REITs from 2010 to 2020 (2019:Q4) examined are market value measured by MBR value and profitability measured by ROA and ROE. The results of the panel data analysis based on the three models used show that the ROA, ROE, asset turnover, leverage, equity multiplier and current asset turnover are effective on the MBR in REITs. The ratios that affect the ROA are MBR, ROE, acid-test, leverage, equity multiplier, EBITDA/sales and current asset turnover. Moreover, the ratios that affect the ROE are ROA, MBR, acid-test, asset turnover, leverage and equity multiplier.

Although the results are generally similar to the findings of previous studies in the literature, there are also differences. The differences are the analysis period, sample, variables, and method used. In future studies, the findings of this study can be further used within the context of different econometric models and different financial ratios. In addition, the study can be extended in the context of macroeconomic factors. Furthermore, comparative analyses can be carried out in the context of developing countries. Finally, efforts can be made to measure the effect of dividend policies.

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Appendix 1: Dependent Variable - ROA

Table A-1 Cross-Section Dependency Test

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	636.7350	210	0.0000
Pesaran scaled LM	20.82254		0.0000
Pesaran CD	2.625591		0.0086

Table A-2 Heterokedasticity Test

Null hypothesis: Residuals are homoskedastic			
	Value	**df**	**Probability**
Likelihood ratio	566.6774	21	0.0000

Table A-3 Model Selection

Cross-section F	20.409811	0.0000
Breusch-Pagan	636.7350	0.0000
Cross-section random	43.052071	0.0000

Appendix 2: Dependent Variable - ROE

Table B-1 Cross-Section Dependency

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	796.1918	210	0.0000
Pesaran scaled LM	28.60323		0.0000
Pesaran CD	1.922325		0.0546

Table B-2 Heterokedasticity Test

Null hypothesis: Residuals are homoskedastic			
	Value	**df**	**Probability**
Likelihood ratio	1907.272	21	0.0000

Table B-3 Model Selection

Cross-section F	6.282603	0.0000
Breusch-Pagan	796.1918	0.0000
Cross-section random	47.110188	0.0000