

THE EXCHANGE RATE EFFECT ON HOUSING PRICE INDEX AND REIT INDEX RETURN RATES

DÖVİZ KURLARININ KONUT SATIř FİYAT VE GYO ENDEKS GETİRİ ORANLARINA ETKİSİ

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Abstract

Real estate is an important investment instrument, and homeownership has always been considered as a valuable investment tool in Turkey. Real Estate Investment Trusts (REITs) are one of the first real estate investment instruments that the Capital Market Board of Turkey (SPK) legally regulated. The exchange rate is an important factor that affects many industries including real estate, especially in emerging economies. This macroeconomic economic factor became more important for Turkish housing and real estate industries after the law issued in 2013 that enabled foreigners to purchase housing units in Turkey. The aim of this research is to examine the effect of exchange rates (USD/TL) on the return rates of REIT and housing sales price indices by using time series analysis covering the monthly period of January 2004-December 2016. VAR econometric model is used to test the effect of the exchange rates on the return rates of both indices, and Augmented Dickey-Fuller and Granger Causality Tests were also employed. The results of the study exhibited that while REIT index return rate is affected by exchange rates, there is no statistically significant effect of exchange rates on housing sales price return rates. This result may affect the perception of the investors about considering housing as an investment tool in Turkey and open a new discussion for alternative future retirement plans that may combine different real estate-based investment instruments.

Keywords: REIT Index, Housing Prices, VAR model, exchange rates, returns

JEL Codes: C22, L85, R31, E44, F31

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Öz

Gayrimenkul önemli bir yatırım enstrümanı olup Türkiye’de konut sahipliği değerli bir yatırım aracı olarak kabul edilmektedir. Öte yandan Gayrimenkul Yatırım Ortaklıkları (GYO) Sermaye Piyasaları Kurulu (SPK) tarafından yasal düzenlemesi yapılan en eski gayrimenkul yatırım araçlarından biridir. Döviz kurları özellikle gelişmekte olan ekonomilerde birçok endüstriyi etkilediği gibi gayrimenkul sektörü açısından da önemli bir faktördür. Bu makroekonomik faktör, Türkiye’de 2013 yılında çıkarılan ve yabancıya konut satışına izin veren yasayla Türk konut ve gayrimenkul sektörü açısından daha da önemli hale gelmiştir. Bu çerçevede bu çalışmada USD/TL döviz kurunun GYO ve konut fiyat endeks getiri oranlarına etkileri Ocak 2004 – Aralık 2016 yıllarına ait aylık zaman serileri kullanılarak ve Vektör Otoregresyon (VAR) modeliyle incelenmiş ve Augmented Dickey-Fuller ve Granger Nedensellik Testleri uygulanmıştır. Çalışmanın sonucunda döviz kurlarının GYO endeks getiri oranına etki ettiği, konut fiyat endeks getiri oranının ise döviz kurlarından etkilenmediği tespit edilmiştir. Bu sonuç, Türkiye’deki konutun bir yatırım aracı olduğu algısını etkileyebilir ve farklı gayrimenkul yatırım araçlarını içeren alternatif bir emeklilik yatırımı konusunda yeni bir tartışma başlatabilir.

Anahtar Kelimeler: GYO Endeksi, Konut Fiyatları, VAR modeli, döviz kurları, getiriler

JEL Kodları: C22, L85, R31, E44, F31

Introduction

Real estate is an important investment instrument, and homeownership has always been considered as a valuable investment tool in Turkey. In the last decades, millions of housing units were constructed and sold. Moreover, real estate investment trusts (REITs) are one of the earliest investment vehicles that the Capital Market Board of Turkey (SPK) issued regulations about the real estate industry and investing in REITs increased gradually since then. Despite the rapid development of the real estate industry in Turkey in the last decade, academic researches about Real Estate Investment Trusts (REITs) in Turkey are very limited. In order to have an idea about the real estate capital markets in Turkey, analyzing the REITs from different perspectives are essential.

According to the HSBC Future of Retirement Turkey Report (2015:13), 81% and 79% of the people who are both retired and working perceive the real estate investments as creating an income for their retirement ages respectively. The exchange rate is an important factor that affects many industries including real estate, especially in emerging economies. This macroeconomic economic factor became more important for Turkish housing and real estate industries after the law issued in 2013 that enabled foreigners to purchase a house in Turkey.

The aim of this research is to examine the effect of exchange rates (USD/TL) on the return rates of REIT and housing sales price indices by using time series analysis covering the monthly period of January 2004-December 2016. Vector Auto Regression (VAR) econometric model is used to test the effect of the exchange rates on the return rates of both indices, and Augmented Dickey-Fuller and Granger Causality Tests were also employed. The results of the study exhibited that while the REIT index return rate is affected by exchange rates, the housing sales price return rates do not. This result may affect the perception of the investors about considering housing as an investment tool in Turkey and open a new discussion for alternative future retirement plans that may combine different real estate-based investment instruments.

Literature Review

The exchange rates are important factors for evaluating the current conditions and the future projections of the real estate industry, especially in the countries which aim to attract foreign investors. The changes in the exchange rates affect the sales prices in foreign currencies, and that may result in an increase or decrease in the sales transactions to foreigners. In addition, the sales prices of the real estate units are also affected by the volatility of the exchange rates due to the costs of some construction material and equipment imported. In the common literature, the effects of many macroeconomic and industry-specific variables on REIT and housing sales price indices were analyzed, but the studies on exchange rate effects became very limited. As far as investigated, no studies were found that have focused on the effects of the exchange rates on the REIT index in Turkey.

REIT Index

Simpson et al. (2007: 528) studied the response of equity REIT returns against the increase and decrease of inflation. The results of the study exhibited both increases and decreases in inflation affect equity REIT returns in an upward direction. Another study about the effects of monetary policies and inflation was made by Glascock et al. (2002:301-317). A vector error correction model was employed in order to test the relationships among REIT returns, real activity, monetary policy and inflation. In contrast to Simpson et al. (2007: 528), a negative relationship between REIT returns and inflation was found due to the manifestation of the effects of changes in monetary policies. Ewing and Payne (2005: 299) focused on the response of REIT returns to the unexpected shocks in real output growth, inflation, and monetary policy. They concluded that a monetary policy shock, inflation and unexpected changes in economic growth has a negative effect on real estate investment returns. Hardin et al (2012: 262) examined the relationship between REIT dividend yield and expected inflation. The results exhibited a positive relationship between inflation and dividend yield. Swanson et al. (2002) investigated the relationship between interest rates and daily REIT returns, and their results indicated that REIT returns are affected by interest rates. Allen et al. (2000: 147-151) studied the REIT characteristics and the sensitivity of REIT returns and they found robust signs to suggest that long or short-term interest rate changes affect REIT returns. He et al. (2003: 6-19) analyzed 7 different interest rate proxies to determine the effects of interest rate proxies on equity and mortgage REITs. Their results exhibited that mortgage REITs were sensitive to all 7 interest rate proxies. Chang and Chen (2014: 156-157) studied the effects of contagion in global REITs returns and their results supported the presence of contagion in global REITs markets during the global financial crisis. Wang et al. (1995: 88-89) examined the microstructure of the REIT market and its correlation with stock returns. They concluded that the ownership structure affects the value of the firm. The institutional investor rate is relatively less in REIT stocks, and the more the institutional investors' rate in REIT stocks increases, the more their returns exceed the returns of other stocks. The study of Chan et al. (1998: 372) exhibited that the rate of institutional investors investing in REITs increased compared to the stock exchange after 1990. Chun et al. (2004: 295) analyzed how the real estate market takes place in institutional investor's portfolio and concluded that the real estate market is predictable about the same as in stock returns, and the rate of loss in a long term is small for real estate stocks but couldn't

find an answer why the institutional investors hold only between 2-3 percent of their assets in real estate. Wiley and Zumpano (2008: 193-199) empirically tested how the REITs end of the month effect is affected by the level of institutional investments, and their results exhibited that institutional investors affect the turn-of-the – month returns but is not the only reason for that calendar anomaly. Chung et al. (2012: 208-209) explored the influence of institutional ownership on improving the firm efficiency of equity REITs. Their results exhibited that corporate governance and efficiency may be enhanced by institutional ownership.

Ngo (2017: 249-257) investigated the impact of exchange rates on the returns of REITs in the US. Her analysis exhibited different outcomes according to the type of REITs. While the returns of mortgage and hybrid REITs were not affected, an impact on equity REITs was found.

In Turkey, Kirdok (2012: 94-98) examined the dynamic relationship between the returns of REITs and macroeconomic variables including inflation, interest rate, industrial production, default risk premium. She used the vector autoregressive model for her analysis and the results of her study exhibited that the REIT returns are not significantly affected by shocks to inflation and industrial production. According to the results of the study Onder (2010: 923-930) made, the relationship between returns on real estate and both anticipated and unanticipated inflation is insignificant, but there is a different relationship between real returns and changes in inflationary expectations in low – and high-income regions.

Housing Price Index

Padilla (2005: 45-46) investigated the impacts of oil prices, exchange rates, interest rates and employment levels on house prices and rents in Calgary, Canada. The results exhibited an effect of all the variables on housing prices. Grum and Govekar (2016: 600-603) investigated the effects of the unemployment rate, the stock exchange index, GDP and industrial production on property prices in Slovenia, Greece, France, Poland and Norway. Their results exhibited different results in different countries. The unemployment rate and stock exchange index were determined the main parameters that affect the unit square meter price of residential units. Adminis and Zvanitajs (2011: 519-524) described the factors that influence the real estate market prices. They suggested that mortgage lending, employment and unemployment, inhabitant's income, demographic situation and government decisions are important parameters for real estate market prices. The impacts of home loan rates, inflation and employment on the value of new homes in Greece were analyzed by Apergis (2003: 71-72) by using the error correction vector autoregressive model. The results of the study exhibited that the housing loan rate is the most influential factor for determining new house prices followed by inflation and employment. Feng et al (2010: 1090-1091) searched the relationship between macroeconomic factors including GDP, population, income per capita, fixed asset investment, consumer price index, loans of financial institutions, average construction costs and housing stocks and the housing market cycle in China and concluded that the house prices are determined by GDP, and in the long run, they exhibited a balanced relationship between macroeconomic factors and house prices. Li and Chen (2015: 598) investigated the dynamic interaction between the macroeconomic environment of China and the real estate market. Their empirical results show that long-run interest and

employments, as well as money supply are the main factors affecting the real estate market followed by inflation and economic growth rates. Pillaiyan (2015: 122-130) studied the effects of GDP, bank lending rate, consumer feelings business environment, money supply, quantities of approved loans, stock market and inflation, on the house prices in Malaysia. Inflation, stock market, money supply and the number of approved home loans were found the most important factors. Brooks and Tsolacos (1999: 10-15) used the VAR model to analyze the effect of macroeconomic factors on the UK real estate returns, and their results exhibited that unexpected inflation and the interest rate affect the property market. Ong (2013: 428) analyzed the relationship between GDP, population, inflation rate, costs of construction, interest rate and real property gains tax and the residential unit prices in Malaysia, and his results exhibited that housing prices are mostly affected by GDP, population and real property gains tax. Xiao (2015: 17) used the VAR model to examine the macroeconomic parameters that have an impact on the real estate prices in China. The findings of the study exhibited that real estate prices are mostly influenced by money supply, expected prices of real estate, real estate development investment and household income. Pashardes and Savva (2009: 18-23) examined the effects of GDP per capita, unemployment, inflation rates, interest rates, population, number of expatriates, tourist numbers, the index of the Cyprus Stock Exchange, the Euro/British Pound exchange rate and the cost of materials and labor in construction on house prices in Cyprus. Their results exhibited that the island's population, materials and labor costs, economic growth and the pound-euro exchange rate affect the housing prices. Panagiotizis and Printzis (2015: 15-16) examined the housing price index and its macroeconomic elements. Home loans and retail trade are found the major determinants of variation of the housing price index. Zheyu (2015: 4) analyzed the macroeconomic factors affecting the housing price index in China. His findings exhibited that housing prices are positively affected by financial mortgages. On the other hand, land supply, the vacancy ratio of houses, the area of units sold have adverse effects on housing prices. Galati et al (2011: 20) studied the macro and microeconomic factors of house prices in the Netherlands. Their results exhibited that construction date, the level of education, the income level of the residents, mortgage types and rates, long term interest rates, location, urbanization level, financing conditions and income expectations are important determinants of housing prices.

Ucal and Gokkent (2009: 9) analyzed the macroeconomic variables that influence the real estate markets in Turkey by using the VAR model. The results of the study indicated that home ownership is a hedging tool against inflation. Badurlar (2008: 235) analyzed the dynamic effects of GDP, exchange rates, short term interest rates and money supply on the housing prices in Turkey. The results of the study exhibited that while there exists a two-directional causality between house prices and interest rates and exchange rates, GDP and money supply affect the house prices in one direction.

Table 1. The Summary Table for Literature Review

Independent Variables	Dependent Variables	
	REIT Index	Housing Price Index
Inflation	✓	✓
Oil Prices		✓
Exchange Rates	✓	✓

Interest Rates	✓	✓
Housing Loan Interest Rates		✓
Money Supply	✓	✓
GDP		ü
Monetary Policy	✓	
Real Output Growth	✓	
Contagion in Financial Crisis	✓	
Ownership Structure	✓	
Default Risk Premium	✓	
Unemployment Rate		✓
Inhabitants' Income		✓
Demographic Situation		✓
Economic Growth		✓
Number of Residential Loans		✓
Population		✓
Real Property Gains Tax		✓
Cost of Construction		✓
Household Income		✓
Real Estate Development Investment		✓
Number of Expatriates		✓
Tourist Numbers		✓
Construction date		✓
Level of Education		✓
Location		✓
Urbanization Level		✓
Financial Conditions		✓
Income Expectations		✓

Table 1. shows the summary of the literature review about the factors affecting the returns of REIT and housing price indices. Since there is very limited research on effects of the exchange rates on the returns of both indices, and there is no study found in the literature that investigated the exchange rate effects on REIT index return rates in Turkey, this study brings an important contribution to literature.

REITs and Housing Industry in Turkey

The real estate industry in Turkey started growing rapidly after the economic crisis in 2001. An increase in demand for both commercial markets including high-quality office and retail spaces, an increase in housing units and periodic decreasing interest rates have been the main facilitators for the remarkable development of the real estate industry. In 2013, the government issued a new law that enabled foreign country citizens to purchase housing units in Turkey. Since then, the appetite of foreigners increased in the Turkish residential market. Table 2 shows the total housing units sold, mortgaged housing sales and foreigner purchases since 2013.

Table 2. Total Housing Unit Sales in Turkey Since 2013

Years	Total Housing Units Sold	Total Housing Units Sold (with Mortgage Loan)	Percentage of Mortgaged Sales	Total Housing Units Sold to Foreigners
2013	1.157.190	460112	39,76%	12.181
2014	1.165.381	389.689	33,44%	18.959
2015	1.289.320	434.388	33,69%	22.991
2016	1.341.453	449.508	33,51%	18.391
2017	1.409.314	473.099	33,57%	22.428
2018 (10 months)	1.148.927	264.348	23,01%	30.712

Reference: www.tuik.gov.tr, Last Accessed on January 27, 2019

REITs in Turkey aim to generate new financing options for the sector. In order to support the development of the real estate sector in Turkey, authorities have provided flexibility in managing their portfolios and some important tax incentives for REITs, such as corporate tax exemption. According to the Capital Market Board of Turkey (SPK) monthly statistics bulletin, as of September 2018, the total market value of 33 REICs in Turkey is around 3.4 billion USD.

Table 3. Market Value of REITs in Turkey

Year	Number of REITs	Market Value	
		Thousand TRY	Million \$
2011/12	23	11.708.492	6.224
2012/12	25	15.781.822	8.857
2013/12	30	18.632.452	8.730
2014/12	31	21.981.323	9.462
2015/12	31	21.279.729	7.279
2016/12	31	24.961.535	7.080
2017/12	31	26.924.062	7.125
2018/03	33	26.512.729	6.702
2018/06	33	22.729.756	4.975
2018/09	33	20.304.110	3.383

Reference: www.spk.gov.tr, Last Accessed on January 27, 2019

Collected Data

This study covers the period between 2004 and 2016 monthly data of our dependent variables; the return rates of REIT and housing price indices were calculated from the monthly index value changes obtained from Istanbul Stock Exchange (Borsa Istanbul) web site and REIDIN (Real Estate Market Information Center) index. The exchange rates were collected from the Central Bank of Turkey Republic database.

Table 4. The Collected Data

Variables	Data Source	Period
REIT Index Return Rates	Istanbul Stock Exchange (Borsa Istanbul)	Jan 2004-Dec2016
Housing Sales Price Index Return Rates	REIDIN	Jan 2004-Dec2016
Exchange Rates (USD/TL)	Central Bank Republic of Turkey	Jan 2004-Dec2016

Research Methodology

A time series is defined as the sequence of mathematical data collected at a regular interval in sequential order. In time series, there is no upper or lower limit of time that must be included. Time series analysis is a good tool to find out the changes of a given asset, security or economic variable over time. (Tsay, 2010:1)

The theory and practice of asset valuation over time is the main focus area of financial time series analysis. This series analysis is distinguished from other time series analysis by uncertainty. For instance, asset volatility has many definitions and it is not directly observable for stock return series. In financial time series analysis, due to their focus on uncertainty, statistical theory and methods are important. (Tsay, 2010). In this study, time series analysis is used.

In order to use a time series analysis, it is essential to test its stationary to check if its mean and variance vary systematically over time. (Gujarati, 2004: 26)

Stationary Test (Augmented-Dickey Fuller Test)

Mean, variance, autocorrelation, etc. are important basic statistical properties. A series is defined as stationary time series when these properties are all constant over time. The reason for trying to stationarize a time series is the aim of getting significant sample statistics including means, variances, and correlations with other variables. If the series is stationary, then these future descriptive statistics are useful. In order to receive consistent, reliable results, it is important to transform the non-stationary data into stationary data.

It may sometimes be possible to stationarize series with stable long-run trends by de-trending (by fitting a trend line and subtracting it out prior to fitting a model, perhaps in conjunction with logging or deflating.) Such a series is called trend-stationary. However, sometimes de-trending is not enough

to convert such series to stationary series, in that case transforming it into a series of period-to-period and/or season-to-season differences becomes essential. If a time series has a unit root, the first differences of such time series are stationary. Therefore, taking the first differences of the time series is the solution. Difference stationary series is defined as when the mean, variance, and autocorrelations of the original series are not constant in time, even after detrending. When it is hard to distinguish the trend-stationary from difference-stationary series, then, a unit root test is applied to find out the answer. (Gujarati, 2004: 814)

Unit root tests are used to test if differencing is required in a time series. There are many unit root tests which are structured on different assumptions and different results. Among these tests, the Augmented Dickey-Fuller (ADF) test is one of the most well-known and widely used tests. The regression model of the test is shown below:

$$y'_t = \phi y_{t-1} + \beta_1(y'_{t-1}) + \beta_2(y'_{t-2}) + \dots + \beta_k(y'_{t-k}),$$

where;

y'_t the first-differenced series,

$$y'_t = y_t - y_{t-1}$$

k: the number of lags to include in the regression (often set to be about 3).

If the original series, y_t needs differencing, then the coefficient ϕ should be approximately zero. If y_t is already stationary, then $\phi < 0$.

David Dickey and Wayne Fuller developed the Dickey-Fuller test in 1979 in order to test the null hypothesis of the existence of a unit root in an autoregressive model. Augmented Dickey-Fuller (ADF) test is used for a larger and more complicated set of time series models. In the ADF test, the alternative hypothesis is different depending on which version of the test is used, but is usually stationarity or trend-stationarity. The ADF statistic used in the test is a negative number. The more negative it is, the stronger the rejection of the hypothesis that there is a unit root at some level of confidence. (Nipax, 2017)

Vector Autoregression (VAR) Model

Vector autoregression (VAR) models were introduced by Christopher Sims in 1980 to model the relations and joint dynamics among a set of macroeconomic parameters. (Gujarati, 2004: 848)

The vector autoregression (VAR) model is an important multivariate time series analysis method which is a very widely used, successful, flexible, and user-friendly model. The VAR model is also used for forecasting and policy analysis.

A VAR model is defined as a composition of a system of regressions in which the dependent variables are stated as functions of their own and each other's lagged values. Its estimation is conducted

by making a separate regression for each variable, regressing it on lags of itself and all other variables. The nature of the model requires that all the variables are needed to be stationary. (Kirdok, 2012: 61)

The vector autoregressive model of order 1, denoted as VAR (1), is as follows:

$$x_{t,1} = \alpha_1 + \phi_{11}x_{t-1,1} + \phi_{12}x_{t-1,2} + \phi_{13}x_{t-1,3} + w_{t,1}$$

$$x_{t,2} = \alpha_2 + \phi_{21}x_{t-1,1} + \phi_{22}x_{t-1,2} + \phi_{23}x_{t-1,3} + w_{t,2}$$

$$x_{t,3} = \alpha_3 + \phi_{31}x_{t-1,1} + \phi_{32}x_{t-1,2} + \phi_{33}x_{t-1,3} + w_{t,3}$$

Each variable is a linear function of the lag 1 values for all variables in the set.

In the past literature, there are many researches that used VAR model. Kim et al (2007) and Kirdok (2012) examined the real estate return behaviors, equity markets and related macroeconomic variables by using VAR model. Ewing and Payne (2005) used VAR model for identifying the reaction of REIT returns to unanticipated changes in selected macroeconomic factors. Another study that VAR is used was made by Hardin et al (2012) who investigated the relationship between REIT dividend yield and expected inflation.

In the lights of the past studies made, VAR model is selected in order to determine the variables that affect the returns of the dependent variables. Augmented Dickey-Fuller test, Granger Causality test and Impulse Response function were also employed for stationary and causality tests.

Granger Causality Test

The Granger causality test is used the ability of a time series in forecasting another one. Multivariate Granger causality analysis is usually performed by fitting a vector autoregressive model (VAR) to the time series. VAR Granger causality is used to examine the causal relationship among the variables.

Impulse Response Function

The impulse response function is used to investigate the effects of sudden shock of an independent variable on the dependent variable. The impact on the endogenous variables and the current value of future values when a one-time shock is added to the disturbance term is described by impulse response function. In the VAR model, the impulse response functions are also analyzed.

Results and Discussions

Figure 1, 2 and 3 shows the REIT and Housing Sales Price indices and exchange rates movements over the research period (January 2004, December 2016). As shown in Figure 1, while the housing sales price index return rates are more stable over time, the REIT return rates are highly volatile.

Figure 1. Housing Sales Price Index Return Rates vs REIT Index Return Rates

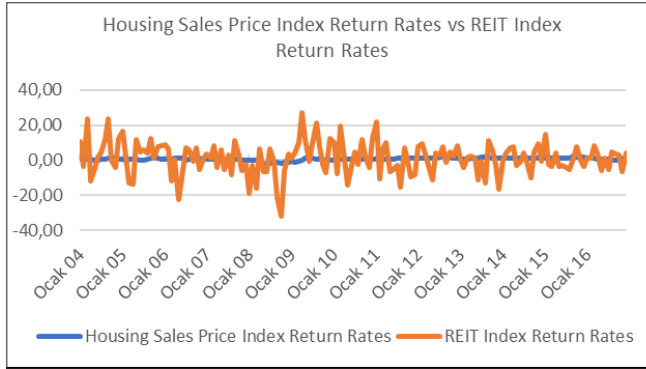


Figure 2. Exchange Rates (USD/TL) vs REIT Index Return Rates

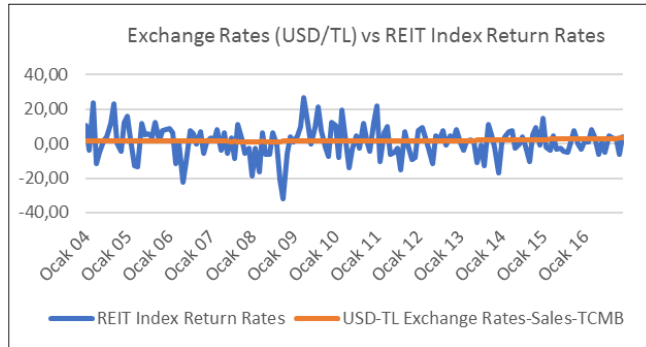


Figure 3. Exchange Rates (USD/TL) vs Housing Sales Price Index Return Rates

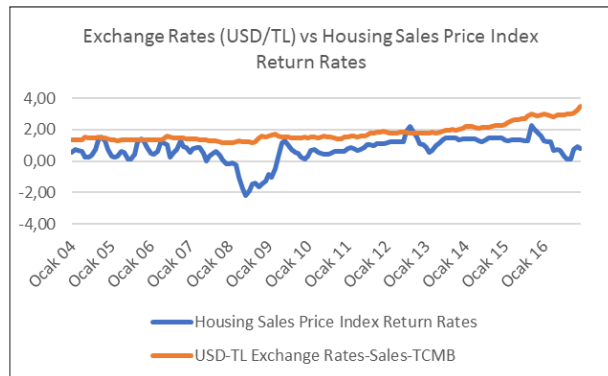


Table 5. REIT Index Returns vs Housing Sales Price Index Return Rates
(Yearly Average of the Changes in Monthly Indices)

Date	Housing Sales Price Index Return Rates	REIT Index Return Rates
2004	0,76	5,20
2005	0,63	4,05
2006	0,79	-1,06
2007	0,44	0,83
2008	-1,22	-7,80
2009	0,29	7,89
2010	0,55	2,48
2011	0,92	-1,07
2012	1,40	2,88
2013	1,19	-2,13
2014	1,40	1,80
2015	1,52	0,23
2016	0,74	1,04
Average	0,72	1,10

Reference: BIST and REIDIN Databases, 2016

When considering the yearly average returns, the REIT index returns overperform the housing sales price index returns. For long term investments, real estate capital market instruments perform better than the single direct housing investments in terms of average returns, on the other hand, the REIT index is very volatile and may not be considered for investors who are seeking less risky investment tools.

ADF Stationary Test Results

In the times series, the return rates of REIT and housing sales price indices, as well as the exchange rate were tested by the Augmented Dickey-Fuller test and while REIT index returns, and exchange rates were found stationary, the housing sales price index return rates were found stationary after first differencing.

Table 6. ADF Test Results

Null Hypothesis: The return rates of REIT Index has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic – based on AIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-10.71331	0.0000
Test critical values: 1% level	-3.472813	

5% level	-2.880088
10% level	-2.576739

Null Hypothesis: Housing Sales Price Return Rates has a unit root

Exogenous: Constant

Lag Length: 4 (Automatic – based on AIC, maxlag=13)

	t-Statistic	Prob.*
<u>Augmented Dickey-Fuller test statistic</u>	<u>-2.441687</u>	<u>0.1322</u>
Test critical values:		
1% level	-3.473967	
5% level	-2.880591	
10% level	-2.577008	

Null Hypothesis: D (Housing Sales Price Return Rates) has a unit root

Exogenous: None

Lag Length: 3 (Automatic – based on AIC, maxlag=13)

	t-Statistic	Prob.*
<u>Augmented Dickey-Fuller test statistic</u>	<u>-6.350863</u>	<u>0.0000</u>
Test critical values:		
1% level	-2.580366	
5% level	-1.942952	
10% level	-1.615307	

Null Hypothesis: Exchange Rate (USD/TL) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic – based on AIC, maxlag=13)

	t-Statistic	Prob.*
<u>Augmented Dickey-Fuller test statistic</u>	<u>-6.417042</u>	<u>0.0000</u>
Test critical values:		
1% level	-3.473382	
5% level	-2.880336	

10% level

-2.576871

Granger Causality Test Results

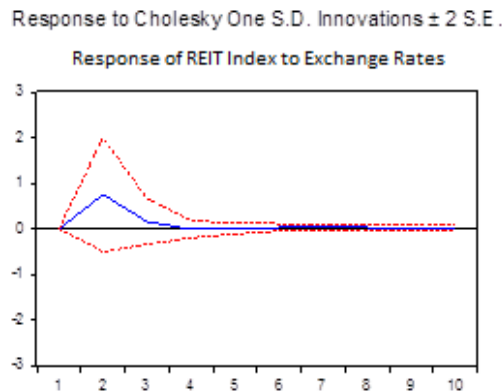
According to the Granger Causality test results, while the return rates of the REIT index are affected by exchange rates, the housing price index return rates are not affected. The duration of the effect of the shocks in exchange rates on REIT index returns is 4 months, which means the impact of the exchange rates on REIT index return rates gives a positive reaction and diminishes in 4 months.

Table 7. Granger Causality Test Results

Independent Variable	Dependent Variables	Chi-sq	df	Prob.
Exchange Rate (USD/TL)	REIT Index Return Rates	2.763920	1	0.0964
	Housing Price Index Return Rates	0.049664	1	0.8236

Ngo (2017) claimed that she published the first study that investigated the effects of exchange rates on REIT returns. Her analysis had exhibited the opposite results for different types of REITs. The results of the analysis of this research, which exhibited the existence of the influence of exchange rates on REIT index returns are important to make a contribution to the literature by investigating the effects of exchange rates in Turkey for the first time.

Although the results of the study made by Padilla (2005) for Canada, the research of Pashardes and Savva (2009) for Cyprus and Badurlar (2008) for Turkey exhibited that the exchange rate affects the housing prices, the analysis of this provided an opposite result. The reason for a different result may be because of the investigation period or the investigated country real estate dynamics.

Figure 4. Impulse Response Reactions of REIT Index

Conclusions

The real estate industry is one of the promising and rapidly developing industries in Turkey. The Capital Market Board of Turkey (SPK) has been working on increasing the interest in real estate capital market instruments since the regulations were issued in 1995. The REITs have been the earliest real estate investment instruments that are operating under the Istanbul Stock Exchange (Borsa Istanbul). It is essential to evaluate the factors affecting the returns of REITs for making decisions about future real estate investments. Investing in housing has always been an important way of investment for Turkish citizens, especially for retirement years. In that context, investigating the factors affecting the housing price index return rates may bring an important contribution to the housing sector as well as an insight for long-term investment approaches.

Exchange rates, especially in developing countries affect many industries. Turkish economy with a current account deficit is also affected by exchange rate fluctuations. Investigating the effects of the exchange rates on the real estate industry, one of the pioneer industries of the Turkish economy, would contribute both for local and international investors. As far as investigated, no studies were found that have focused on the effects of the exchange rates on REIT index in Turkey, in that context, this study will also contribute to the literature in this area.

The results of the analysis of this study exhibited that the exchange rates affect the return rates of the REIT index, but there is no statistically significant effect of exchange rates on housing price index return rates. These results may open important discussions for Turkish real estate investment projections. First, it is very clear that the market value of REITs has been decreasing as the Turkish Lira is losing value against USD. Moreover, the results of the analysis demonstrate that the return rates of REITs are also affected by exchange rate volatilities. While considering making an investment on REITs, it is critical to take into consideration the exchange rate effects.

The exchange rate changes may affect the construction prices, and that may be reflected to the unit sales prices, but from a long-run investment perspective, according to the results of the analysis that covered 156 monthly return data, the exchange rate does not affect the return rates of the housing sales price index. This result may be interpreted as; the increase in foreign investments in the Turkish housing industry is not because the return rates of the housing price index are attractive, but because the purchasing power of the foreigners increased due to the decrease in the value of the properties in Turkey in USD currency. That value decrease in units increased the total units sold to foreigners. The number of the total units sold has also increased in the last few years not because of the attractive short renting payback period but due to the short-term return expectations of the local investors based on the value increase of the housing units. From a social perspective, the long-term investment approach to the housing industry may be re-considered, replaced or combined with pension funds, and direct real estate investments on housing industry shall be re-evaluated with investing in real estate capital market instruments in the condition of decreasing the volatility of REITs and including new instruments. By taking into consideration the people's ongoing interest in investing in the housing industry, a new Real Estate Based Pension System may also be introduced by providing a new investment pool based on direct real estate investments and real estate capital market instruments.

In this research, the effects of the USD/TL exchange rate on returns were investigated. In future studies, other currency exchange rates may also be included in the analysis. Since the law that enables the foreigners to purchase residential units passed in the parliament in 2013, in order to figure out if foreign purchases have an effect on the results, the research period may be divided into two and pre and post-law period results may be compared. It is also important to note the decrease in mortgaged housing sales units in the last few years is an important factor in housing investments. That may also be investigated together with the home loan interest rates. Further studies may also divide the analysis into two by considering the effects of the 2008 global financial crisis.

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