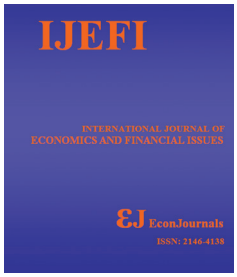

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Bounds Testing Approaches to Housing Demand in Turkey: Is There a Real Estate Bubble?

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ABSTRACT

In this study, housing demand in Turkey was examined with bounds testing approaches for the period of 1964-2014. The total square meters of houses sold was taken as housing demand. The explanatory variables of the study are the real price of one square meter of housing, real income level, and urban population. Firstly, stationary properties of the series were checked by unit root tests, then co-integration was investigated. Lastly, we ran the autoregressive lag model process. We found that Turkey is more sensitive to income level and there is positive relationship between prices and housing demand. This might be accounted for by the fact that houses are kinds of investment goods in Turkey.

Keywords: Housing Demand, Real Estate Bubble, Bounds Testing Approach
JEL Classifications: D12, D22, J11

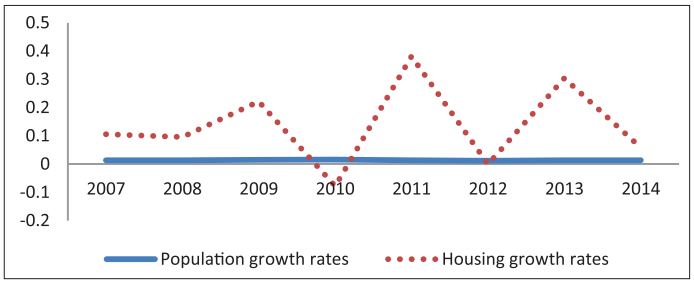
1. INTRODUCTION

Housing is a consumer good that constitutes a significant portion of spending. At the same time, housing is considered as investment goods as well as consumer goods in some countries. The effects of the housing demand's determinants might be changed if housing is considered as consumer or investment goods. The most effective determinants of housing demand can be seen as demographic and economic factors. In details, housing prices and consumer income levels are the most important economic factors for housing demand while population growth rates and birthrates reflect demographic specialties of housing demanders. In particular, the effects of housing prices on housing demand can change, depending on whether housing is a consumer or investment goods. Demand theory postulates the negative relationship between prices and quantities of housing in demand. That is to say, when prices rise, the demand for housing declines. However, if housing is considered as an investment good, an expected increase in housing prices will enable consumers (investors) to buy more houses. If the investors are optimistic about the future, they can buy more houses speculatively, as the people do in herd-like fashion even when prices keep going up. John Maynard Keynes stated this phenomenon in his General Theory as "animal spirit." Increasing housing prices will be further accelerated by investors' decisions, then housing suppliers will respond by producing more houses. This process will eventually produce a housing bubble. When excess production is realized by economic actors in the sector, Kindleberger's "Manias, Panics and Crashes" process will finally start, as experienced in the great depression (1929) and subprime mortgage crisis (2008).

In the Graph 1, Turkey's housing growth rates and population growth rates are shown between 2007 and 2014. For many years, the housing growth rates exceeded population growth rates. The positive gap between housing growth and population growth rates could lead to a housing bubble in Turkey.

In this study, housing demand in Turkey was analyzed with autoregressive distributed lag models (ARDL) between the years 1964 and 2014 to find the relationships between houses and the prices. We organize the article as follows: First, a quick literature survey is presented then data and a model introduced. Lastly, we discuss the results.

Graph 1: The gap between housing growth rates and population growth rates



2. LITERATURE REVIEW

The study of housing demand is an interesting topic that occupies a large place in economic literature, especially in the US. Most of these studies tried to explain housing demand with economic and demographic factors. Studies that have been published on different countries can be separated into two groups. In the first group, housing demand was tried to explain by residential properties with the provincial scale. Some of these studies are Chen and Jin (2014), and Han (2010) for Shanghai (China), Ahmad et al. (2013) for Delhi (India), Tiwari et al. (1999) for Bombay (India), Dusansky et al. (2012) for San Francisco and Atlanta (USA), Dusansky and Koç (2007) for Florida (USA), Hanushek and Quigley (1980) for Phoenix and Pittsburgh (USA), Garcia and Raya (2011) for Barcelona (Spain), and Tiwari (2000) for Tokyo (Japan). In the second group, the housing demand was analyzed. In the second group, houses were considered as consumer goods and demand for housing was analyzed in the country scale not provincial. These studies are Ahmad (2015) for Bangladesh, Wang and Zhang (2014) for China, Bajari et al. (2013), Lee and Kong (1977), Carliner (1973) and Kartman (1972) for USA, Garcia and Hernandez (2008) and Fernández-Kranz and Hon (2006) for Spain, Lewis-Bynoe et al. (2008) for Barbados, Börsch-Supan et al. (2001) for Germany and Japan, Lee et al. (2001) for Austria, Kenny (1999) for Ireland, Malpezzi (1999) for developing countries, Tiwari and Parikh (1998) for India, Ermisch et al. (1996) For UK, and Fulpen (1988) for Netherlands.

According to the literature, the most important factor that affects housing demand is income level. The coefficients of the income level that the logarithm were taken from are generally higher than 1, which means consumers are more sensitive in case of changing income level. The price elasticity of housing was generally found between −1 and 0. In some studies, such as Dusansky et al. (2012), Garcia and Hernandez (2008), Dusansky and Koç (2007), Flavin and Yamashita (2002) and La Grange and Pretorius (2000), the price elasticity of housing demand was found to be positive. In other words, houses were acknowledged as investment goods for some consumers. That means increases in prices of housing motivate investors to buy more houses.

Some of the studies that have examined the Turkey's housing markets are: Lebe and Aktaş (2014) for the period of 1970-2011, Bekmez and Özpolat (2013a) for 1986 to 2009, Bekmez and Özpolat (2013b) for 2002 to 2012, Öztürk and Fitöz (2009) for the years of 1968-2006, Halıcıoğlu (2007) for 1964 and 2004, Durkaya and Yamak (2004) for the period of 1964-1997 and Solak and Kabadayı (2016).

The most effective factor driving housing demand in Turkey was found to be income levels, as in international studies. In addition, price elasticity was found inelastic analogously. But the studies by Bekmez and Özpolat (2013a) and Öztürk and Fitöz (2009) found in Turkey that positive relationships between inflation rates taken to represent price levels and quantities of housing demand.

In the next section, the housing demand in Turkey was analyzed by a bound testing approach, then we compared the findings with the literature.

3. DATA SET AND MODEL

In this study, the housing demand model has been inspired by scholarly works and the model is presented in Equation 1:

$$\ln HD=\alpha_0+\alpha_1 \ln HP+\alpha_2 \ln GDP+\alpha_3 UR+\varepsilon_t \quad (1)$$

The independent variable of the model was represented by HD, which is the total square-meters of houses sold between the years 1964 and 2014. The explanatory variables are HP (the real price of one square-meter of the houses). For the HD variables, buildings permits in terms of square-meter values were used. We calculated HP by dividing the total monetary amount of housing to the total square-meters of housing. GDP (real income level per capita) and UR (increase in urban population). In order to get the elasticity relationships between variables, the natural logarithm of the data was calculated. α_0 is constant term, α_1, α_2 and α_3 are the coefficients, which will be calculated and ε_t is the error term. All series were taken from Turkish Statistical Institute (TUİK).

If the consumers want to buy houses with a consuming intent, theoretically there should be a negative correlation between prices and housing demand. If they behave like investors, increase in housing prices will make the buyers happier and they may want to buy more. So, there might be positive correlation between the price level and demand for housing. In addition, the coefficients of income level and urban population are expected to be positive, as in the theory.

First, we checked the stationary properties of the variables with the augmented Dickey Fuller and Phillips-Perron tests and the results are given at Table 1.

According both unit root tests, we found that some of variables are stationary in levels, while some of them are in the first different.

Bounds testing approach (ARDL models) gives us the ability to seek co-integration in the long run and to make a regression between variables even if the series are I(0) (stationary in level) or I(1) (stationary in the first difference). In order to check whether series are moving together or not in the long-run that means co-integrated or not, we looked for the equations that did not have serial correlation in both equations with "unrestricted intercept and trend" and "unrestricted intercept and no trend."

Serial correlations were tested by the Breusch-Godfrey LM test. We searched appropriate lag length by considering Akaike and Schwarz information criteria. We specified the co-integration with Wald Tests. Some statistics were obtained from the equations with "unrestricted intercept and trend" and "unrestricted intercept and no trend," then these statistics were compared with the critical values that were taken from Pesaran et al. (2001). The findings are given at Tables 2 and 3.

As results, we decided that series in our model are co-integrated in long-run. Then, we looked for the long-term coefficients by checking appropriate lag length according to Akaike information criteria. We got the ARDL (2,0,0,1) model, and the long-term coefficients were calculated and given in Table 4.

The income elasticity of housing demand was found to be greater than 1 and statistically significant that means housing demand and at the same time construction industry are more sensitive to income fluctuations in Turkey. So, income levels are the most effective factors for housing demand as parallel with literature works.

In another way, the co-efficient of housing price were found to be positive and statistically significant in Turkey, as in Bekmez and Özpolat (2013a) and Öztürk and Fitöz (2009). Housing might be seen as protection tools against inflation and a safe investment choice. Therefore, a positive relationship between demand and prices for housing in Turkey is not surprising. This finding is also consistent with Dusansky et al. (2012), Garcia and Hernandez (2008), Dusansky and Koç (2007), Flavin and Yamashita (2002), La Grange and Pretorius (2000) articles.

The findings of the study contradict partially with our different study's findings, Solak and Kabadayı (2016), that we have examined Turkey's housing demand with panel data analysis in a relatively short time interval. Long-term relations of Turkish investors' behaviors can be captured better in this article because of using a longer time series.

Increasing prices of housing will be accelerated by investors' decisions, then housing suppliers will be pleased to produce more houses. This process will eventually end with housing bubbles.

Table 1: Unit root tests

Variables	t statistic			
	ADF		PP	
	Constant	Constant and trend	Constant	Constant and trend
HD	−2.340	−4.530[A]	−2.210	−4.430[A]
HP	−1.141	−2.783	−0.826	−2.748
GDP	−1.962	−3.414[C]	−2.137	−3.437[C]
UR	−1.231	−2.353	−4.249[A]	−5.835[A]
ΔHD	−7855[A]	−7.670[A]	−7.994[A]	−7.794[A]
ΔHP	−6.759[A]	−6.688[A]	−7.975[A]	−7.862[A]
ΔGDP	−7.278[A]	−7.448[A]	−7.278[A]	−7.446[A]
ΔUR	−2.646[C]	−2.600	−15.285[A]	−14.893[A]

Notes: Δ is first difference operator. A and C are levels of significance at 10%, 5% and 1% levels of significance. Schwarz info criteria are selected to determine optimal lags. ADF: Augmented Dickey Fuller, PP: Phillips-Perron

Table 2: The t and F statistic

Unrestricted intercept and trend	Unrestricted intercept and no trend
t_v=−2.253	t_{ii}=−3.007
F_{iv}=3.067	F_{iii}=2.955
F_v=3.475	

4. CONCLUSION

In this study, housing demand in Turkey was examined by bounds testing approaches between the years 1964 and 2014. Stationary properties of the series show that possible shocks in the economy have permanent effects on the series and long-term relationships between series were found by co-integration tests.

The findings of the study express that housing demand in Turkey is more sensitive to income level. When the Turkish economy is in a recovery phase, housing demand will increase more than income level, but it will have same reaction negatively when the economy is in recession. The other results of the study show that there is positive relationship between prices and housing demand. This might be accounted for by the fact that houses are kinds of investment goods in Turkey. The motivation behind the house consumption can be to hedge against depreciation of Turkish lira. Also, houses might be considered as portfolio choices by investors. If an increasing trend in house price entices house investors to buy more houses, there will be another reason to increase house prices because of higher demand as secondary effects. This perpetuating trend can feed a real estate bubble in Turkey in the future.

If a real estate bubble occurs in an economy, the actual prices in real estate will eventually be realized by the economic actors as in 2008 global financial crisis. This realization of the real estate prices may lead to a questioning of the liability adequacies in the financial markets. So, the banking and financial corporations may call the loans back, and soon afterward financial durability of the debtors might be weakening by the changes in financial structure. Finally, a new financial crisis can be occurred again.

Market regulators must be vigilant against possible risks arising from the real estate market. Furthermore, regulatory policies in a financial market should be taken into account by decision makers.

Table 3: The critical values for t and F statistics

Unrestricted intercept and unrestricted trend				Unrestricted intercept and no trend			
Level of significant	10%	5%	1%	Level of significant	10%	5%	1%
t_v	−3.13/−3.84	−3.41/−4.16	−3.96/−4−73	t_{iii}	−2.57/−2.91	−2.86/3.78	−3.43/−4.37
F_{iv}	2.97/3.74	3.38/4.23	4.30/5.23	F_{iii}	2.72/3.77	3.23/5.61	4.29/5.61
F_v	3.47/4.45	4.01/5.07	5.17/6.36				

F_{iii}: Unrestricted intercept and no trend. F_{iv}: Unrestricted intercept and trend. F_v: Unrestricted intercept and restricted trend. Source: Pesaran et al. (2001)

Table 4: Long-term co-efficient

Variables	Co-efficient	Standard deviations	t statistics
Constant	−9.755	3.970	−2.443
HP	0.608	0.305	1.993
GDP	1.528	0.366	4.174
UR	0.262	0.164	1.597

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