Main determinants of house prices: Effects of construction cost and house sales to foreigners

Konut fiyatlarının temel belirleyicileri: İnşaat maliyeti ve yabancıya konut satışının etkileri

Ufuk Alkan[1] iD

[1] Assist. Prof. Dr., Marmara University, Faculty of Financial Sciences, İstanbul, Turkey, ualkan@marmara.edu.tr

ORCID: 0000-0002-0586-8146

Abstract

Housing prices have increased worldwide with the increase in commodity prices. They have become a primary investment tool most consumers prefer, especially to protect themselves from inflation. One of the main questions is which macroeconomic factors affect the housing price index, especially the increase in the number of houses sold to foreigners and the increase in construction costs. The study will answer whether the increase in housing costs or the increase in sales to foreigners causes an increase in housing prices. The variables in the study consist of macroeconomic variables that were mostly included in previous studies. Data from January 2015 to March 2022 consisted of 87-period data. Time series analysis has been tried to be explained with the help of the ARDL model by performing a boundary test. In the model, all variables were significant, but a long-term relationship was found, not a short-term one. Tests have demonstrated the model's accuracy for deviation from basic assumptions and structural break tests. Taking the logarithms of the variables in the model makes it possible to interpret them flexibly. In this context, contrary to expectations, it was determined that house sales to foreigners decreased the house price index, and the biggest reason for the increase in house prices was the cost increases that took place worldwide. Other variables that increase and decrease the housing price index are interpreted, and suggestions are made to solve the housing problem. It is considered that the model gives an idea to understand the increase in housing prices, but other social factors should also be considered for housing demand.

Keywords: Housing Price Index, Construction Cost Index, Foreign Housing Sales, ARDL, Turkey

Jel Codes: E31, R22, C22

Öz

Tüm dünyada emtia fiyatlarındaki artışla birlikte yükselen konut fiyatları, çoğu tüketicinin özellikle enflasyondan korunmak için tercih ettiği birincil yatırım aracı haline gelmiştir. Konut fiyat endeksini özellikle yabancılara satılan konut sayısındaki artış mı yoksa inşaat maliyetlerinin artması mı, hangi makroekonomik faktörün daha çok etkilediği öne çıkan sorulardan biridir. Çalışmada konut fiyatlarındaki artışın konut maliyetlerinin artmasından mı yoksa yabancılara yapılan satışların artmasından mı kaynaklandığı sorusuna cevap verilecektir. Çalışmadaki değişkenler literatürdeki çalışmalarda yer alan makroekonomik değişkenlerden oluşmaktadır. Çalışmada Ocak 2015-Mart 2022 verileri kullanılmış olup, 87 dönem verisinden oluşmaktadır. ARDL modeli yardımıyla zaman serisi analizi sınır testi yapılarak açıklanmaya çalışılmıştır. Modelde tüm değişkenler anlamlı olmakla birlikte kısa vadeli değil uzun vadeli bir ilişki tespit edilmiştir. Modelin doğruluğu, temel varsayımlardan sapma testleri ve yapısal kırılma testleri ile kanıtlanmıştır. Modeldeki değişkenlerin logaritmaları alınarak esneklik açısından yorumlanması mümkündür. Bu kapsamda, beklentilerin aksine yabancılara yapılan konut satışlarının konut fiyat endeksini düşürdüğü, konut fiyatlarındaki artışın en büyük nedeninin ise tüm dünyada yaşanan maliyet artışları olduğu belirlenmiştir. Konut fiyat endeksini artıran ve azaltan diğer değişkenler yorumlanarak konut sorununun çözümüne yönelik önerilerde bulunulmuştur. Modelin konut fiyatlarındaki artışı anlamak için fikir verdiği ancak konut talebi için diğer sosyal faktörlerin de dikkate alınması gerektiği düşünülmektedir.

Anahtar Kelimeler: Konut Fiyat Endeksi, İnşaat Maliyet Endeksi, Yabancı Konut Satışları, ARDL, Türkiye

Jel Kodları: E31, R22, C22

Introduction

Apart from having an important role in the economic performance of the countries, the housing market is also an indicator of individual welfare. Research shows the housing sector is one of the effective ways to stimulate consumption and production activities in other sectors of the economy. However, owning a home is one of the biggest investments a household can make and one of the biggest items of consumers' wealth. For these reasons, the housing market is integral to the country's economy.

Housing demand is a phenomenon directly related to economic conditions. Especially in countries and regions with high demand and price increases, the demand for investment housing is a common situation with speculative expectations. Turkey is a good example of this situation. When examined about the subject of the study, it is thought that the demand for housing is based on international migration, and housing prices are constantly increasing due to the increase in labour and raw material costs. So the question to be asked here is this question. The reason for house price increases may be due to rising foreign demand or the increase in costs. First of all, let's look at the first question; The increase in the number of foreigners residing in Turkey in recent years is quite remarkable. The COVID-19 epidemic in 2020 caused a slowdown in international human mobility. However, while the number of foreigners residing in Turkey was 593,151 in 2017, with the change in the law regarding the acquisition of citizenship by foreigners from Turkey, especially refugees from Iraq, Turkmenistan, Syria, Iran and Afghanistan, the number of foreigners residing in Turkey has increased. The number of foreign citizens residing in Turkey in 2021 is 1,792,036. The reasons why these countries prefer Turkey in the first place for immigration can be shown as geographical proximity and cultural, social and economic similarities. Puy, Ari, and Shi (2020) stated foreign buyers make their housing requests outside their own country based on the concept of "home abroad bias" in regions where many people from their own countries reside. Beneath this is the psychology of reducing a little of the difficulties of living in a foreign country. Of course, the situation that emerges here reminds us to question a theory in classical economic theory. Does this increase in demand cause an increase in prices? This theory will be investigated in the empirical analysis of the study.

Tai, Hu, Chao, and Wang (2017), the increase in the demand for housing from foreign buyers causes housing prices to rise and increases the value of the houses in the long run. Likewise, exchange rate changes can indirectly and directly affect housing prices. This effect occurs in the direction of the increase in housing prices by directly affecting the cost of imported construction materials with the increase in the exchange rate. Asal (2017) argues that, as in Sweden, the exchange rate plays an important role in the purchase of housing by foreign investors. The reason for this is that the increase in the exchange rate, depending on the decrease in the value of the domestic currency, makes the value of goods and services in that country cheaper for foreign buyers and increases competitiveness by attracting foreign buyers to the country. Therefore, it is argued that only buyers who can pay in foreign currency can purchase housing.

Coming to the second question, what is the effect of costs on the increase in housing prices in Turkey in recent years? Costs in the housing sector consist of materials, labour, technology and land. Anari and Kolari (2002) see housing as both a consumption good and an investment tool. Considering housing as a consumer good, it increases construction costs through material supply and worker salaries. This increases the renovation costs of both newly built and old houses, causing prices to rise. However, it is expected to protect against inflation and provide real returns when considered an investment tool. Building material prices directly affect housing production and housing cost. These prices directly impact people's ability to have solid housing that fits their budget. The increase in the prices of building materials, which are especially difficult to reach, will be directly reflected in housing prices. Ultimately, individuals in need of housing will be the last to be affected.

New construction technologies are an element that reduces construction costs. Many jobs previously done with human power can be done faster and cheaper with machines. Public authorities can also take decisions to reduce or increase construction costs. For example, while they can increase costs by setting minimum construction standards, they can reduce costs by reducing taxes on the purchase and sale of housing or construction materials (Büyükduman, 2014: 82).

Especially in big cities, finding land becomes a problem due to land scarcity and land costs are reflected in construction costs by 50-70%. Another negative aspect of the land problem is the demolition of buildings that have not completed their economic life in the city due to the lack of cheap land and the construction of new ones. It can be said that this situation is a loss of wealth in terms of the country's economy (Biçerli, 1986: 64).

Housing prices have been on the rise in recent years, not only in Turkey but worldwide, with the increase in commodity prices. As a result, it has become a primary investment tool most consumers prefer, especially to protect themselves from inflation. Therefore, one of the leading questions is determining which macroeconomic factors affect the housing price index, especially whether the houses sold to foreigners contribute to this increase. Therefore, this study will answer whether the increase in housing costs or the increase in sales to foreigners causes an increase in housing prices.

Key factors determining housing price

Housing is an environment that is both demanded and supplied to meet the housing needs of individuals. Every individual, whether they own a house or enjoy the right to use it, has a demand for a house in which they would like to live. Like other goods and services, housing demand is affected by many factors (Durkaya, 2002:10). However, looking at the housing market analysis only from the demand side leaves the analysis incomplete. Housing supply is as important as housing demand in housing market analysis. However, there has not been much study on housing supply in the literature. The sources of housing supply are tried to be explained in an economy with two approaches. The first is the production of new housing, and the second is the renovation works made in the existing housing stock, that is, the additions to the existing stock (Dipasquale, 1999: 9).

Housing demand is determined by factors such as prices, income, internal or external migration, credit conditions, monetary aggregates, social needs, population and urbanization. However, housing supply is based on construction costs, capital costs, land production and incentive mechanisms.

In Table 1 below, the main factors determining housing prices are summarized by the literature:

Table 1: Key Determinants of Housing Prices

Factor	Relationship	Conclusion	Studies Revealing This
Migration	The increase in immigration rates creates the need for additional housing to the existing housing volume.	In direct proportion to the increasing demand, there is an increase in housing sales and prices.	Degen and Fischer (2010); Saiz (2007)
Construction Costs	The housing supply is affected by the materials, raw materials, and technology required for housing production.	The rise in input costs in housing production reduces the housing supply and increases housing prices.	Cakir (2014); Öztürk and Fitöz (2009)
Population	The increase in population is a factor that leads to urbanization and the need for additional housing.	Population growth indirectly increases the rate of urbanization, increasing housing sales and prices.	Ermish (1990); Halicioglu (2005),
Income	Housing demand, whether for consumption or investment purposes, is shaped not by the current income level of the household but by the income they expect to obtain throughout their lives.	As the long-run average income increases, the income elasticity of housing increases and housing demand and prices increase.	Kartman (1972); Hausman and Wise (1980)
Loan Terms (Demand Side)	The decrease in long-term housing interest rates leads to an increase in housing loans called mortgages.	Loans that provide low-interest and flexible payment facilities, especially for the middle-income group, increase the demand for housing significantly, and an increase in housing prices occurs.	Gelfand (1966); Durkaya (2002)
Loan Terms (Supply Side)	If the interest burden of the loans used in housing finance increases, production costs will increase, and the housing supply will be affected.	In economies where financing problems are experienced, housing supply elasticity will be lower, and there will be a decrease in housing supply.	Bolat (2020); Gozubuyuk and Bay (2020)
Monetary Aggregates	It is expected that the expanding liquidity in the economy will also affect the housing demand by lowering the interest rates and increasing the loan amount.	With the increase in M2 money supply, the volume of housing loans increases, and housing demand and prices increase.	Öztürk and Fitöz (2009) Uysal and Yigit (2016)
Social Demand	Owning a house is considered a kind of social security tool. It has the feature of being an inheritance, an investment tool and even a property that can be shown as collateral to financial institutions when necessary.	Socially, the demand for housing leads to the purchase of housing more than the needs of individuals, and housing demand and prices increases.	Stale (2001); Bolat (2020)

As can be seen from Table 1, which summarizes the main determinants of housing prices, migration, population, income, monetary aggregates, and social demand, have a demand-side effect on housing

prices. The variable of construction costs is expressed as a supply-side determinant of housing prices in the literature. However, credit conditions impact both demand-side and supply-side housing prices.

The recent history of the housing market in Turkey in the context of cost and sales to foreigners

In recent years, the housing market in Turkey has displayed a very strong performance. During this period, house sales reached historically high levels while house prices and construction costs continued to increase. The rapid transformation process experienced in the housing sector causes concerns that speculative bubbles that will occur due to rising prices in the housing sector, which pose a systemic risk by its nature, may cause regressions and collapses in the sector from time to time. In addition, of course, this development also necessitates monitoring market indicators more closely.

The development of the indicators regarding the housing sector announced by TURKSTAT between 2015-2022 shows that the sector generally followed a balanced growth performance after a moderate slowdown in some years. As can be seen especially in Table 2, the stagnation observed in the sector in 2018 and 2019 is thought to have caused excess supply. However, the latest data announced for 2020 and beyond point out that the economic activity in the sector has started to increase again in line with the general economic developments. As a matter of fact, in the first half of 2022, house sales increased by 31.4% compared to the same period of the previous year. In this period, the rapid increase in housing sales is believed to have been due to the historically low borrowing costs against inflation and the recent increase in foreign demand for Turkey.

High prices in the housing market always reflect strong demand and limited supply conditions. In case of weak demand in the market, prices do not rise regardless of the supply level. If the supply is not limited, the prices cannot be above the production costs, regardless of the demand level (Gyourko, 2009: 10). As can be seen in Table 2, the Housing Price Index (2017=100), which is calculated to monitor the quality-adjusted price changes of houses in Turkey, has been increasing continuously in recent years. Especially after 2018, an increasing increase is observed in this index. In June 2022, it increased by 89.9 per cent compared to the previous year and was realized as 469.8.

As noted earlier, construction costs were one of the main determinants of housing prices. In Table 2, the construction cost index, which was 100.60 in 2015, reached 593.87 in 2022, increasing approximately six times. Especially after 2021, the excessive increase in the exchange rate in Turkey significantly impacts construction costs. Since Turkey is a country that procures most of its construction materials from abroad, the increase in the exchange rate increases the import costs. As a result, this situation creates an upward effect on the general level of prices. Therefore, whether the increase in the construction cost is mostly due to imported materials or the cost of labour is answered by the fact that it is due to materials.

Table 2: Housing Statistics in Turkey (2015-2022)

Year	Housing Sales		Housing Price Index 2017=100		Construction Cost Index		Sales to Foreigners		
	Total	Change	Total	Change	Total	Change	Total	Change	Share in Total Housing Sales
2015	1,289,320	10.6%	84.5	15.6%	100.60	-	22,830	20.4%	1.8%
2016	1,341,453	4.0%	94.8	12.2%	118.90	18.2%	18,189	-20.3%	1.4%
2017	1.409.314	5.1%	103.4	9.1%	138.14	16.2%	22,234	22.2%	1.6%
2018	1,375,398	-2.4%	108.0	4.4%	173.57	25.6%	39,663	78.4%	2.9%
2019	1,348,729	-1.9%	118.8	10.0%	192.25	10.8%	45,483	14.7%	3.4%
2020	1,499,316	11.2%	154.9	30.4%	240.35	25.0%	40,812	-10.3%	2.7%
2021	1,491,856	-0.5%	247.4	59.7%	403.16	67.7%	58,576	43.5%	3.9%
2022/6	726,398	31.4% *	469.9	89.9%	593.87	47.3%	35,383	72.7%*	4.9%

* Calculated based on the January-June total of the previous year.

Source: TUIK (2022). https://www.tuik.gov.tr/, (Access date: 25.06.2022)

In addition to its strong growth potential, Turkey has a young and dynamic population, and the interest of non-residents is increasing. While more than 30 million tourists visit Turkey, which is one of the few holiday centres in the world, it is seen that this development positively affects the demand of non-residents for real estate. In addition, it is known that the transactions carried out for investment purposes and housing acquisition are also effective in the increasing interest of non-residents. In

particular, Istanbul is the European city where the real estate market will develop the most in the upcoming period.

Housing sales to foreigners in Turkey have been increasing rapidly in recent years. While the number of residences sold to foreigners was approximately 22 thousand in 2015, this number reached approximately 58 thousand in 2021. While the share of house sales to foreigners in total house sales in 2015 was 1.8%, this rate reached 3.9% in 2021. In the January-June period, house sales to foreigners increased by 72.7% compared to the same period of the previous year and amounted to 35.383. Likewise, the share of house sales to foreigners reached its highest rate, at 4.9%. According to the data of TURKSTAT covering the period of 2015-2022, Iraqis are among the foreigners who buy the most housing in Turkey. Iran follows Iraqi citizens. Among the citizens of other countries who purchase the most housing from Turkey, those coming from Russia, Saudi Arabia, Kuwait and Afghanistan come to the fore, respectively. Although the preferences of those who buy housing vary according to the country, the right of citizenship comes first. Because for citizenship by investment, at least 400 thousand dollars should be invested in real estate in Turkey, and this property should not be sold for three years. The reason foreigners want to be citizens of the Republic of Turkey is explained by the fact that most of the countries neighbouring Turkey are currently facing the problems of war and political conflict. For this reason, Turkey is seen as a safe harbour by the citizens of this country. In addition to those who own real estate to obtain citizenship in the Republic of Turkey, some foreigners buy real estate for different reasons, such as investment, short-term vacation, or retirement.

Literature study

There is a comprehensive research on the factors that determine house prices worldwide. For example, Hanushek and Quigley (1980) investigated the response of housing demand to price changes in housing markets in their study focusing on 799 households in Pittsburgh and 586 households in Phoenix in the USA. As a result of the analysis, the estimated price elasticity of housing demand in the long run, according to the simple adjusted model, was calculated as -0.64 in Pittsburgh and -0.45 in Phoenix.

Tsatsaronis and Zhu (2004) analysed housing price determinants in 17 industrialized countries using SVAR, with quarterly data covering the period 1970:1-2002:4. According to the results of the study. Although there are differences in national markets, the main determinant of housing prices is inflation. They also drew attention to the relationship between inflation, interest rate and house prices. They stated that the sharp fall in house prices after a long period of high inflation would cause an imbalance in the relationship between house prices and other variables.

In his study, Saiz (2007) focused on the effect of immigration on house prices in explaining house prices in the USA. What is meant by immigration here is the immigration of foreigners to the USA. The EKK method was used in the analysis, and it determined that migration increased the demand for housing and housing rents in the short term. It was concluded that a migration flow of 1% of a city's population is associated with approximately 1% increases in average rent and housing values.

Goodhart and Hofman (2008) evaluate the links between money, credit, house prices and economic activities in industrialized countries. The analysis was estimated using the VaR (Value at Risk) method using quarterly data for 17 industrialized countries covering 1970-2006. The analysis found a bidirectional causality relationship between house prices, monetary variables and macroeconomics. In particular, the link between house prices and monetary aggregates was stronger in a subsample between 1985-2006.

Gonzalez and Ortega (2013) researched house prices and construction activities in Spain from 2000-2010. They used regression analysis and sensitivity analysis. The findings show that Spain's great wave of immigration in the 2000s had a major impact on the housing market, both on prices and housing quantities. Overall, it was concluded that immigration is responsible for about a quarter of the increase in housing prices and about half of the increase in housing stock.

Lebe and Akbaş (2014) analyzed the short- and long-term effects of housing demand in Turkey using annual data for 1970-2011, using the co-integration and vector error correction model. As a result of the analysis, per capita income, marital status and industrialization positively affect Turkey's housing demand. Still, housing prices, interest rates and employment in the agricultural sector negatively affect the housing demand.

In his study, Aung (2015) investigated the factors affecting the cost of housing rent and housing sales in the USA in the period of 2005-2010 with the help of ordinary least regression analysis. The study analysed the effect of the increase in the ratio of foreign nationals to the total population, which is the main explanatory variable, on the housing rent and sales prices. The study results reveal that an increase

in the number of foreign birth shares by 1 point increases the rental price of housing by 1.103 points and the housing prices by 2.111 points. This result shows that the ratio of the foreign population to the total population is an important factor in the increase in housing demand for the period examined in the USA.

Zandi, Mahadevan, Supramaniam, Aslam, and Theng (2015) are to investigate the economic factors affecting residential property prices in a particular state of Malaysia called "Penang". The study covers 2007-2014, and a bivariate regression analysis model was used. According to the analysis and calculations, it has been determined that the main factor affecting property prices in Penang is the loan interest rate, and the second most influential factor is GDP. However, the multivariate regression model found a positive correlation between house prices and the national income variable. On the other hand, Zandi et al. (2015) found that the rate is not correlated with the housing price inflation rate to the housing prices.

Kashnitsky and Gunko (2016) analyzed the effect of immigrants' housing demands on housing prices in a particular region in Moscow. Poisson regression models, analysis of variance and spatial hierarchical decomposition methods were used in the analysis. The findings show that some areas attract immigrants of certain socio-economic statuses. In addition, the results revealed that internal migration is not a determining factor in housing prices, but foreign immigrants are an important factor affecting housing prices. In other words, foreign immigrants in Moscow are an important determinant of housing demand for the period studied.

Barbu, Vuta, Străchinaru, and Cioaca (2017), in their study of 21 representative countries for the period of 2007-2014, tried to explain the development of the housing price index measured by the housing price index with the relationship between the immigrant flow and other macroeconomic variables. In the model using panel data analysis, it has been determined that there is a positive correlation between the housing price index change and the flow of immigrants, the market capitalization share of the gross domestic product and the economy's growth rate. The study shows that for a one per cent increase in immigration as measured by migrant flow, the house price likewise changes by 0.045%.

Li, Razali, Fereidouni, and Adnan (2018) examined the relationship between China's housing price index and macroeconomic variables. Three big cities were included in the study, in which panel data analysis was used, and the analysis was made with the data of the 2003:1- 2014:3 period. According to the findings, it has been determined that the main determinants of housing prices are GDP, disposable income, money supply and interest rates. It is concluded that GDP and housing prices positively interact in the long run. In contrast, disposable income positively affects housing prices with a 3-month delay, and these two variables act together. In addition, it has been determined that land supply hurts housing prices, while housing loans increase both prices and sales figures.

Bayır, Güvenoğlu, and Şahin-Kutlu (2019) studies on the determinants of housing prices in the Turkish economy, in which ARDL analysis and boundary test are preferred as empirical analysis methods, cover the period of 2011-2018, and quarterly data are used. According to the results of the boundary test, there is a co-integration relationship between the variables. However, in the long run, economic growth, money supply and dollar rate positively affect housing prices; inflation has a negative effect.

İslamoğlu and Nazlıoğlu (2019) aimed to analyze the effect of the inflation rate on housing prices. The empirical model developed in this framework was estimated using the panel data method for Istanbul, Ankara and Izmir from the 1st quarter of 2010–the 4th quarter of 2017. The findings show that housing prices have unit elasticity concerning the inflation rate. In addition, it has been concluded that the elasticity of housing prices according to housing demand and population is 0.06 and 1.97, respectively. These findings show that macroeconomic factors are important elements of house prices in Turkey.

Puy et al. (2020) evaluate the static and dynamic effects of foreign demand shocks on housing prices in the USA between 1996 and 2017 with panel regressions. The study results show that house prices increased disproportionately more in US neighbourhoods with a high population density from the crisis country, indicating a strong and exogenous shift in foreign demand after an extreme political crisis abroad.

Güler and Gökçe (2020) investigated the Relationship between Housing Sales to Foreigners and the Housing Bubble with GSADF Tests in Turkey, Istanbul, and Antalya. As a result of the study, rational housing bubble formation was observed in Turkey between the periods 2014.11-2016.11 and 2018.04-2019.01, in Istanbul between the periods 2013.03-2013.12, 2014.04-2016.12 and 2018.01-2019.08, in Antalya between the periods 2018.08-2018.11. The common point of the bubbles is that they peaked in 2018 after the legal regulations that made it easier for foreigners to acquire housing. The findings show a strong relationship between housing sales to foreigners and the housing bubble.

Çetin (2021) investigated the factors affecting house prices in Turkey and the long-term causality relationship between these factors. The data is monthly and covers the period 2012:12-2020:08. According to ARDL co-integration test results, the consumer price index and industrial production index decrease housing prices. However, housing loan interest rates and construction materials increase the wholesale price index. One-way causality was determined from the wholesale price index of construction materials and the consumer price index to the housing price index. Two-way Granger causality was found between industrial production and housing price indexes.

Yanar and Demir (2022) examined the effect of exchange rates on house sales to foreigners. The study used monthly house sales data for foreigners covering the 2015-2021 period. According to the results of the analysis, it has been determined that there is a long-term co-integration relationship between house sales to foreigners, the real effective exchange rate and the house price index. Therefore, it is concluded that a 1% decrease in the real effective exchange rate (depreciation of TL) increased foreign house sales by 3.43%.

Empirical analysis

Variables

Real interest rate: One of the most important variables determining housing demand is the loan conditions and interest rates. Loans that provide flexible payment facilities, especially for the middle-income group, affect the housing demand significantly (Gelfand, 1966: 464-467). The interest rate affects the housing market through macroeconomic variables such as savings, investment, production and national income. While the high-interest rate increases the households' savings, it decreases the investment housing demand (Durkaya, 2002: 29). In our study, real interest rate, the difference between the weighted average cost of funding and annual inflation, was used to represent the interest rate. As the real interest rate increases, housing prices are expected to increase through the demand channel, and therefore the housing price index will increase.

Industrial Production Index: While the economic and social attractiveness of the cities is the leading factor pushing the rural population out of the countryside, it includes the migration process in terms of workforce, job opportunities due to industrialization, employment status and organized working environment. Employers make choices by evaluating the increasing diversity of jobs in cities. There may be positive interactions between urbanization and development if the population coming to the city is not unemployed or secretly unemployed and can work in the industry or services sector. However, at this point, expected income increases may increase the demand for housing. A demand that may arise in terms of rental or property housing demand may present itself as a slum in a city where the unemployed or those working in temporary jobs are concentrated (Keleş, 1997: 23; Durkaya and Yamak, 2004: 80). For this reason, in our study, the effect of those employed in the industry and service sector was gathered under the title of industrialization, and its effect on housing demand was investigated. In order to examine the effect of the industrialization rate, the industrial production index was used. In addition to that, it is also used as a GDP indicator in many studies (Karamelikli,2016; Çetin, 2021, Yıldırım and İvrendi 2017; Afşar, 2018).

House Price Index: Monthly House Price Index (KPI) data are announced by the Central Bank of Turkey in Turkey. The Housing Price Index uses the stratified median price method to measure changes in the housing market. Data are compiled from valuation reports prepared by real estate appraisal companies. In the Housing Price Index, the location of the house (city, district, neighbourhood, street, etc.), gross and net m2 area, year of construction, quality, site safety and elevator etc. observable features such as House Price Index are calculated by the chain Laspeyres method (TC Central Bank. 2016). In studies on the housing price index, the above variable is used as an independent variable, in line with our model.

Number of Flats with a Certificate of Occupancy: It, also commonly known as "occupation", is the permit obtained for the use of the relevant areas of a completed building when the parts that can be used in whole or in part are completed. If we need to analyse the housing demand from the supply side, it has been added to the model to determine how much supply has occurred during the research period and its possible effect on the housing price. In the literature, this variable has been included in many studies to monitor the supply-side effects (Islamoğlu and Nazlıoğlu, 2019; Tekinel and Güvercin, 2000; Yıldırım, 2013).

Construction Cost Index: Under the construction cost index, there are two items: materials and workers. The cost increase can be directly or indirectly reflected in the housing prices according to the demand elasticity. Therefore, it is included in the model to determine how sensitive the increase in housing prices is to the increase in construction costs. In many previous studies, it has been included in the models

because it directly affects housing prices (Coşkun, Seven, Ertuğrul, and Alp, 2017; Gomez-Gonzalez, Gamboa, Hirs, and Pinchao, 2018; Baykal, Dikme, and Karacan, 2018).

Number of Houses Sold to Foreigners: It is frequently discussed in public opinion that the main reason for the increase in housing prices today is that foreigners buy housing by obtaining citizenship. Sales to foreigners will affect the housing prices on the supply side and cause the prices to change. Therefore, it would be realistic to consider this variable together with the real effective exchange rate. Because in periods when the foreign currency gains value, the value of the houses in a foreign currency will decrease, affecting the demand of foreigners. It was not used in previous studies and was added to our model as an independent variable.

Real Effective Exchange Rate: The nominal effective exchange rate is the weighted average value of the Turkish lira according to the currencies of the countries with a significant share in Turkey's foreign trade. Weights are determined using bilateral trade flows. The real effective exchange rate is obtained by adjusting for the relative price effects of the nominal effective exchange rate. In previous studies, it has been seen that volatility in the exchange rate causes fragility in housing prices, but it is important in terms of the recent increase in housing costs and foreigners' demand for housing by changing their foreign currency (Çetin, 2021; Karadaş and Salihoğlu, 2020; Özaktaş, 2019).

Manufacturing Industry Capacity Utilization Rate: It is defined as the ratio of the actual product amount to the maximum production that can be physically produced in a certain period, applied by the central bank to the manufacturing companies every month. The capacity utilization rate; this variable is important in explaining how housing prices affect the saturation point of the manufacturing industry in the economy. Many studies have used the capacity utilisation rate to determine the housing price index (Akkaya, 2018; Ay, 2019). This ratio also gives information about the course of industrial production. If there is an increasing trend at this rate, we get the signal of an increase in industrial production, and if the opposite is the case, a decrease in industrial sector production. Since the Capacity Utilization Rate reflects the industry's production level, it also provides information on demand and investment levels. The fact that the demand is above the capacity means that capacity utilization should be increased with new investments. Therefore, it was included in the model to examine the effects of inflation.

Data set

The variables in the study consist of macroeconomic variables that were mostly included in previous studies. Data from January 2015 to March 2022 consisted of 87-period data. The data in the study are publicly available data from the CBRT and TSI and do not require ethics committee approval. The variables subject to analysis are shown in Table 3. The logarithm of the real interest rate could not be taken from the variables mentioned above, except that the logarithms of all variables were included in the model.

In econometric analysis, various co-integration tests are used to examine the long-term relationship between the series. Conventional OLS, Engle-Granger (1987), Johansen (1988), and ARDL co-integration tests are the most used examples. The ARDL co-integration test is used from these analyses for series with different degrees of integration. The ARDL (Autoregressive Distributed Lag) test will examine the long-term relationships between the variables.

Table 3: Variables Used in the Study

Variable Name	Definition	Source
LNHPI	Housing Price Index	CBRT
LNCOO	Number of Flats with a Certificate of Occupancy	TSI
REALINT	Difference between WACOF and annual inflation	CBRT
LNREER	Real Effective Exchange Rate	CBRT
LNHSF	Number of Houses Sold to Foreigners	TSI
LNMICUR	Manufacturing Industry Capacity Utilization Rate	CBRT
LNCCI	Construction Cost Index	TSI
LNIPI	Industrial Production Index	CBRT

In order to carry out the analysis in question, the following model, consisting of one dependent variable and seven independent variables, was established.

$$LNHPI_t = B_0 + B_1 LNCOO_t + B_2 REALINT_t + B_3 LNREER_t + B_4 LNHSF_t + B_5 LNMICUR_t + B_6 LNCCI_t + B_7 LNIPI_t \quad (1)$$

Analysis

Descriptive statistics

The descriptive statistics of the data used in the study are given in Table 4. In this analysis, where we worked with 87 data and eight variables, the study was completed using 896 data. It is seen that some of the mentioned data are normally distributed, and some are not. Since logarithmic expressions are used, the differences between the minimum and maximum values have decreased. The highest difference interval was realized in real interest; the highest value was 47.14, and the lowest was -0.83.

Table 4: Descriptive Statistics

	LNHPI	LNMICUR	LNCCI	LNREER	LNIPI	LNCOO	LNHSF	REALINT
Average	4.75	4.33	5.12	4.36	4.72	10.99	7.88	0.690575
Median	4.68	4.34	5.15	4.34	4.73	10.97	7.73	-0.83
Maximum	5.85	4.38	6.28	4.68	5.10	11.67	8.97	47.14
Minimum	4.30	4.12	4.57	3.86	4.35	10.22	6.67	-8.14
St. Deviation	0.32	0.04	0.41	0.20	0.14	0.25	0.53	8.41
Jarque-Bera	30.37	799.36	6.28	4.58	0.10	3.78	3.27	1353.16
Possibility	0	0	0.04	0.10	0.94	0.15	0.19	0
Total	413.86	377.04	445.86	380.06	411.37	956.18	685.77	60.08
Observation	87	87	87	87	87	87	87	87

Unit root test

The unit root test results of the variables are shared in Table 5, and it has been observed that some data become stationary at the level, and some of them become stationary when their differences are taken. In this case, the most appropriate estimator determination method was determined as ARDL.

Table 5: Unit Root Tests

Variables	ADF Unit Root Test		KPSS Unit Root Test	
	Fixed	Fixed and Trending	Fixed	Fixed and Trending
LNHPI	2.61	2.64	0.07***	0.06***
DLNHPI	-1.58	-3.21*	0.41**	0.25
LNCOO	-5***	-5.37***	0.57***	0.08***
DLNCOO	-13.14***	-13.14***	0.29***	0.10***
REALINT	-23.9***	-23.97***	0.25***	0.06***
DREALINT	-8.53***	-8.47***	0.03***	0.04***
LNREER	-0.57	-0.47	1.14	0.77
DLNREER	-7.55***	-7.50***	0.06***	0.05***
LNHSF	-2.84*	-3.69***	0.74	0.09***
DLNHSF	-7.35***	-7.32***	0.08***	0.04***
LNMICUR	-2.90**	-4.08***	0.50*	0.12*
DLNMICUR	-7.70***	-7.66***	0.06***	0.05***
LNCCI	1.80	-1.30	1.20	0.10*
DLNCCI	-7.04***	-7.33	0.35*	0.08***
LNIPI	-5.34***	-6.39***	0.79	0.09***
DLNIPI	-.12.89***	-12.82***	0.23***	0.16*
Critical values	1%: -3.51 5%: -2.90 %10 : -2.58	1%: -4.07 5%: -3.46 %10: -3.16	1%: 0.73 5%: 0.46 %10: 0.34	1%: 0.21 5%: 0.11 %10: 0.11

***,** and * denote significance at 1%, 5% and 10% significance levels, respectively.

Bound test

The most common method used to test the concept of co-integration, which states that there is a stationary combination of at least two different series, I(0), is the tests developed by Engle-Granger and Johansen. In these co-integration tests, it is known that the series whose co-integration relationship is investigated should be stationary in the same order. This requirement is provided by Pesaran and Smith (1998), and Pesaran, Shin, and Smith (2001) bring a different conception to the co-integration analysis developed by the boundary test approach, allowing the condition in question to be stretched. In cases where the unrestricted error correction model is used in ARDL analysis, it has been observed that it has more specific and desirable statistical properties than the Engle-Granger test. As a result, it gave more reliable results in small samples compared to the Johansen and Engle-Granger tests. (Narayan and Narayan, 2005: 429).

Although the ARDL method is based on the standard least squares regression method, it allows using lagged values of the independent and dependent variables. In the ARDL-Bounds test approach, the equation in question is converted to an error correction model suitable for the ARDL approach to determine whether there is co-integration between the variables. Then, it is estimated with the least squares (Least squares) estimator and based on this model, and it is possible to perform a bounds test based on F or Wald statistics. Starting from equation (1), the ARDL-Boundary test equation created to determine the co-integration relationship between the variables in the model is as follows:

$$\Delta LNHPI = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta LNCCI_{t-1} + \sum_{i=1}^{n} \alpha_{2i} \Delta NCOO_{t-1} + \sum_{i=1}^{p} \alpha_{3i} \Delta LNNEGINT_{t-1} + \sum_{i=1}^{r} \alpha_{4i} \Delta LNREER_{t-1}$$
$$+ \sum_{i=1}^{s} \alpha_{5i} \Delta LNHSF_{t-1} + \sum_{i=1}^{t} \alpha_{6i} \Delta LNMICUR_{t-1} + \sum_{i=1}^{u} \alpha_{7i} \Delta LNIPI_{t-1} + B_1 LNCCI_{t-1}$$
$$+ B_2 LNCOO_{t-1} + B_3 LNNEGINT_{t-1} + B_4 LNREER_{t-1} + B_5 LNHSF_{t-1} + B_6 LNMICUR_{t-1}$$
$$+ B_7 LNIPI_{t-1} + e_t$$

$$(2)$$

the coefficients in equation (2) α show the short-term effects, and the B coefficients show the long-term dynamics. For the estimation to meet the stability conditions, first of all, the optimal lag lengths (m, n,

p, r, s, t, u) of the variables in equation (2) should be determined with the help of information criteria. Then, starting from the model estimated with the appropriate delay, the bounds test approach can be started. The null hypothesis (H$_0$), which states that there is no long-term relationship between the variables in the boundary test, is tested with the F-test. The null hypothesis is tested by placing a zero constraint on the coefficients of the lagged variables in equation (2). Accordingly, the null hypothesis for the F- test in this study will be (H$_0$: B$_1$=B$_2$=B$_3$=B$_4$=B$_5$=B$_6$=B$_7$=0). The F-statistic obtained by the bounds test Pesaran et al. (2001) with the critical values found for different confidence intervals by the model's constant and trend inclusion status and the number of independent variables (k) in the model. For some cases, the standard F-test used to test the null hypothesis has a non-standard distribution. In this context, the critical values that should be compared with the test statistics were determined by Pesaran et al. (2001) (Pamuk and Bektaş, 2014). Suppose the calculated F-statistic is greater than the critical upper bound. In that case, the null hypothesis is rejected, indicating a long-term relationship between the level values of the variables. If the calculated F-statistic is less than the critical lower bound, the null hypothesis will not be rejected. Suppose the F-statistic is between the critical lower and upper limit values. In that case, no decision can be made about co-integration, and in this case, other co-integration tests should be looked at (Çağlayan, 2006).

After determining a long-term relationship between the level values of the variables with the bound test, the long-term relationship between the variables is examined with the ARDL method. In this study, the ARDL model to be estimated to examine the long-run relationship between the variables is shown in equation (3):

$$\Delta HPI = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \Delta LNCCI_{t-1} + \sum_{i=1}^{n} \alpha_{2i} \Delta LNCOO_{t-1} + \sum_{i=1}^{p} \alpha_{3i} \Delta LNNEGINT_{t-1} +$$
$$\sum_{i=1}^{r} \alpha_{4i} \Delta LNREER_{t-1} + \sum_{i=1}^{s} \alpha_{5i} \Delta LNHSF_{t-1} + \sum_{i=1}^{t} \alpha_{6i} \Delta LNMICUR_{t-1} + \sum_{i=1}^{u} \alpha_{7i} \Delta LNIPI_{t-1} + e_t \quad (3)$$

The co-integration status was checked with the ARDL bounds test since the F statistic is greater than I(0) and I(1). The H$_0$ hypothesis that there is no co-integration was rejected, and it was concluded that there was co-integration.

Table 6: Bound Test Result

Test Statistics	Value	K
F-Statistics	4.99	7
Critical value bounds		
Level	I (0)	I (1)
1%	2.73	3.9

ARDL test and long-term coefficients

The lag numbers of the series used in the study were determined automatically. The maximum lag length was selected with the Akaike Information Criteria, one of the information criteria. The estimators obtained in the model established with unlimited fixed and unlimited trends were found to be significant. However, when the short-term relationship was examined, it was found to be significant at 0.12. Still, since the coefficient was positive, it could not be interpreted that it would converge to the long-term value. The results for the ARDL (4, 4, 2, 3, 1, 2, 3, 4) model are given below.

Table 7: ARDL Test and Long-Term Coefficients

Unbounded Fixed and Unbounded Trends				
Variable	**Coefficient**	**Standard error**	**t-statistics**	**Possibility**
ECM	0.12	0.01	7.20	0.00
LNHPI = 3.7120- 0.2211*LNCOO + 0.0143*REALINT- 0.7682*LNREER				
-0.1648*LNHSF + 1.0131*LNMICUR + 0.3377*LNCCI + 0.4288*LNIPI				
Dependent Variable LNHPI				
Long Run Coefficients				
Variable	**Coefficient**	**Standard error**	**t-statistics**	**Possibility**
LNCOO	-0.221***	0.05805	-3.808893	0.0004
REALINT	0.0143***	0.003348	4.282909	0.0001
LNREER	-0.768***	0.233567	-3.288918	0.0018
LNHSF	-0.165***	0.032031	-5.143713	0.0000
LNMICUR	1.0131**	0.426954	2.372811	0.0214
LNCCI	0.3377***	0.097957	3.447385	0.0011
LNIPI	0.4288*	0.219172	1.956566	0.0558
C	3.712**	1.447969	2.563608	0.0133
R2=0.9676 $\bar{R}^2 = 0.9558$F=9323 [0.0000]				
Breusch-Godfrey Serial Correlation LM Test				
F-statistic = 0.18 [0.8301]				
Breusch-Pagan-Godfrey Variance Test				
F-statistic =1.36 [0.1625]				
Ramsey Reset Test				
F-statistic =1.69 [0.1994]				
Durbin Watson 1.86				

***,** and * denote significance at 1%, 5% and 10% significance levels, respectively.

When the model results were examined, it was seen that all variables were significant. Deviations from the basic econometric assumptions were examined, and the results are in Table 7. According to the result of the F test, which tests the significance of the whole model, the model is significant. When the signs of the individual variables are examined, they are compatible with economic theory and our expectations. According to the Breusch-Godfrey Serial Correlation LM Test and Durbin Watson coefficient, there is no autocorrelation problem. According to the Breusch-Pagan-Godfrey Variance Test results, there is no variance problem, and there is homoskedasticity. It has been examined whether there is a specification problem with the Ramsey reset test, and it has been seen that there is no problem. Finally, according to the normality test results, it is interpreted that it is normally distributed.
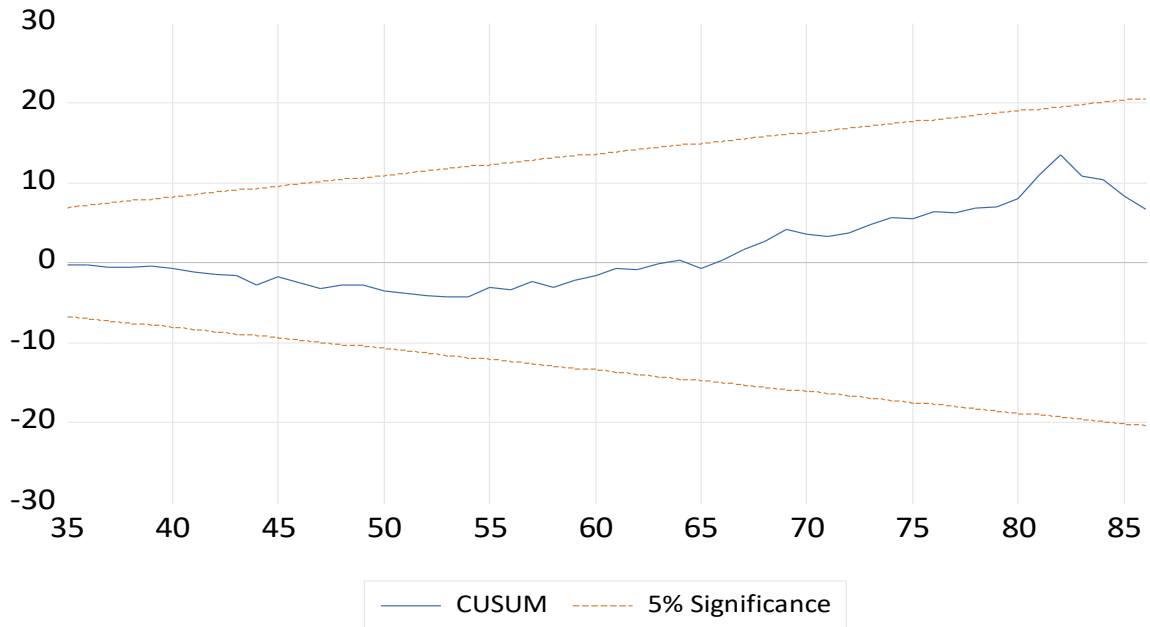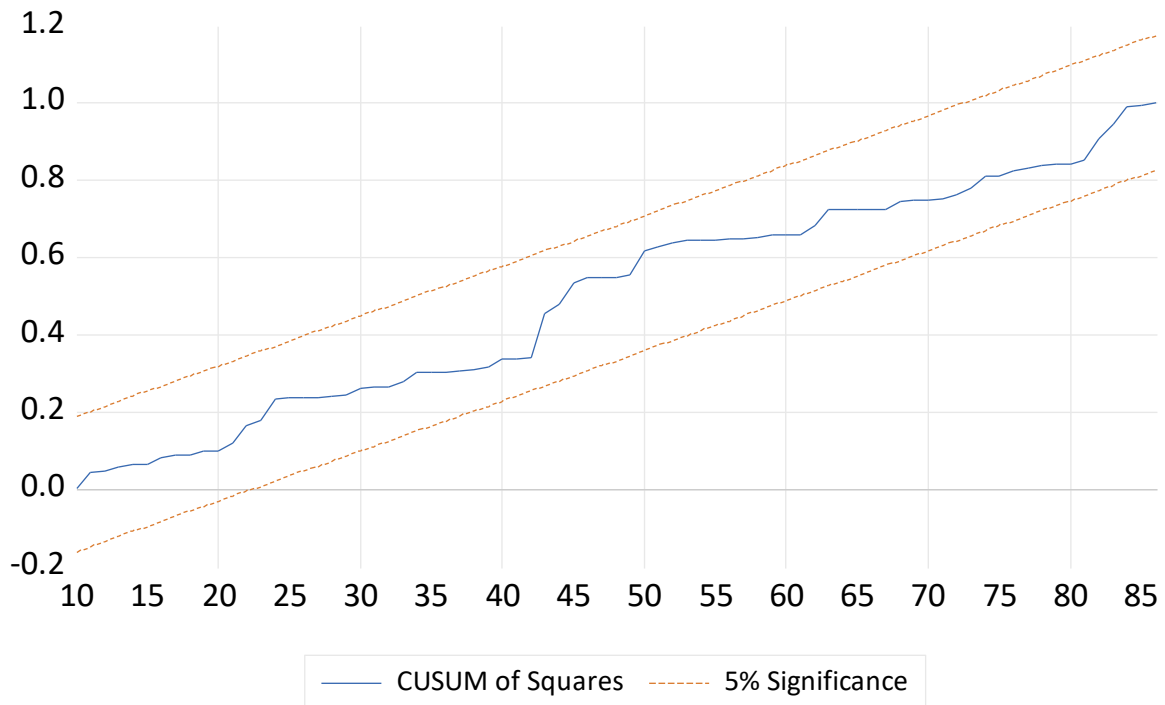
Chart 1: CUSUM Test

Chart 2: CUSUMQ Test

Cusum and Cusumq test statistics remain within critical limits at the 5% significance level. In this case, it can be interpreted that there is no structural break and the model results are correct.

When the other empirical results are examined, it is seen that the 1% increase in the number of flats with a certificate of occupancy decreases the housing price index by 0.22%. Therefore, the said variable is included in the model to determine the effect of supply-side effects on the housing price index. As the number of flats with a certificate of occupancy increases, more residences will be available for habitation. The availability of more housing, that is, the increase in supply, will reduce prices. Therefore, increasing the number of houses is necessary to reduce the price index.

It is seen that the 1% increase in the real effective exchange rate decreases the housing prices by 0.77%. On the other hand, as the real effective exchange rate increases, that is, as the foreign currency depreciates, the housing price index decreases. Therefore, foreigners, whose currencies are appreciated, will cause an increase in housing prices in terms of demand as the real effective exchange rate decreases. In addition, the value of housing prices will increase in terms of cost. Therefore, this relationship is negative.

It is seen that the 1% increase in the number of residences sold to foreigners decreases the housing price index by 0.17%. In some studies on this subject, it is stated that the prices will increase as the number of houses built for foreigners increases, while it has been determined that it hurts the housing price index in our model. The fact that the residences sold to foreigners are not distributed homogeneously regionally, and the average number of sales in Turkey is very low can be counted among the reasons for these. It should also be noted that the coefficient in our model is very low, which has a common negative effect.

It is seen that the 1% increase in the capacity utilization rate increases the housing price index by 1.01%. Since the Capacity Utilization Rate is a signal of the production level in the manufacturing industry. The fact that the demand is above the capacity means that capacity utilization should be increased with new investments. Therefore, it was included in the model to examine the effects of inflation. Too much increase in the capacity utilization rate causes an increase in inflation through the overexpansion of the economy, so the cost of housing will also increase.

It is seen that the 1% increase in the construction cost index increases the housing price index by 0.34%. The cost increase can be directly or indirectly reflected in the housing prices according to the demand elasticity. It is included in the model to determine how sensitive the increase in housing prices is to the increase in construction costs. We know that the increase in the cost of housing creates a restrictive factor for households whose income is increasing relatively less and suppresses the demand. Therefore, it is possible to say that the decrease in demand has a decreasing effect on the housing price index.

It is seen that the 1% increase in the industrial production index increases the housing price index by 0.43%. In order to examine the effect of the industrialization rate, the industrial production index was used. In addition, it is also used as a GDP indicator in this study. The increase in the industrial production index will increase housing prices with the inflation-based effect. On the other hand, it will cause an increase in the per capita income due to the increase in the national income and will cause the housing price index to increase due to the demand.

Conclusion and evaluation

Man has three basic needs: food, drink and shelter. In this respect, housing is a vital element that meets the need for shelter. Housing is also important for economic development and welfare. People want to own housing for investment purposes to secure themselves and their future. From the point of view of economic development, housing contributes to the economy from macroeconomic aspects such as production, investment and employment and increases the level of economic welfare.

When the studies in the literature are examined, it has been determined that there is a very high increase in private final consumption expenditures, especially due to the increase in the housing price index. For this reason, it would be appropriate for economic policymakers to prevent the formation of housing price bubbles with various measures in countries where housing prices have increased at a high rate. Otherwise, a large decrease in housing consumption may cause deeper economic contractions.

So what are the reasons for the increase in these housing prices? Although many reasons have been investigated in the studies in the literature, two important questions have been tried to be answered in the said study. Firstly, the question of whether the housing price index will change as the number of houses sold to foreigners increases, that is, is the change in the number of houses sold to foreigners an important factor that changes housing prices, has been trying to be answered. Considering the model results, the number of houses sold to foreigners significantly affects the house price index. The second problem is whether the main dynamic of the housing price increase is the housing sales to foreigners or the increase in construction costs, and it is seen that the construction costs increase the housing prices. Still, the prices decrease as the number of houses sold to foreigners increases. Does the sale of housing to foreigners increase the prices? The residences demanded by foreigners are already very high-value residences. As a result of our observations, it is evaluated that foreign purchases are very small and constitute %3 of the total residences sold. In addition, contractors and homeowners are trying to sell their houses by entering into price competition in the current period. Considering that the costs will increase even more in the next period, especially in high-priced houses, they reduce the prices of the current period and cause the prices to decrease by making sales.

Other empirical results are as follows. It was determined that a 1% increase in the number of flats with a building usage certificate decreased the housing price index by 0.22%. It was observed that housing prices decreased by 0.77% when the real effective exchange rate increased by 1%. A 1 per cent increase in the number of houses sold to foreigners was found to decrease the housing price index by 0.17 per cent. It was determined that a 1% increase in the capacity utilization rate increased the housing price

index by 1.01%. A 1% increase in the construction cost index causes an increase of 0.34% in the housing price index. An increase in the industrial production index by 1% increases the housing price index by 0.43%. Since logarithmic functions are used in the model, the coefficients directly give flexibility. However, it is possible to say that as the real interest rate increases, the housing price index also increases.

It should not be forgotten that the problem of finding housing and settling, that is, housing, has not only an economic dimension but also a social dimension, and social unrest will occur when people do not meet their needs. In this context, while the increase in the housing supply will be effective in terms of supply, the decrease in housing prices and the increase in the people's real income will effectively solve the problem in terms of demand. In the study, in which the reasons for the increase in the housing price index are examined, the increase in the number of flats with a certificate of occupancy and the decrease in the real effective exchange rate will decrease the housing prices and make it easier to reach the housing. Likewise, an absolute increase in the real interest rate and an increase in the construction cost index will increase the housing price index, making it difficult to find a house. It is evaluated that decision-makers can quickly find a solution to the housing problem in terms of supply and demand by influencing these variables.

Peer-review:

Externally peer-reviewed

Conflict of interests:

The author has no conflict of interest to declare.

Grant Support:

The author declared that this study had received no financial support.

References

Afşar, A. (2018). Türkiye'de konut fiyatlarını belirleyici ekonomik faktörlerin analizi. 1. Baskı içinde L. Aytemiz and E. Karayılmazlar (Eds.), *Sosyal, beşeri ve idari bilimler'de akademik araştırmalar*-5 (ss. 129-146). Ankara: Gece Kitaplığı.

Akkaya, M., 2018. Hedonik konut fiyat endeksini etkileyen faktörlerin analizi. *Dokuz Eylül Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 33(2), 435-454.

Anari, A., Kolari, J. W., 2002. House prices and inflation, *Real Estate Economics*. 30(1), 67-84.

Asal, M., 2017. Long-run drivers and short-term dynamics of Swedish real house prices. *International Journal of Housing Markets and Analysis*. 11(1), 45-72.

Aung, T. K., 2015. The effects of ımmigration on housing market in the United States. Undergraduate Thesis Paper (Unpublished Master Thesis).

Ay, B., 2019. İmalat sanayi kapasite kullanım oranı ve reel kesim güven endeksi arasındaki ilişki: türkiye için ampirik bir çalışma. *The Journal of Social Science*. 3(5), 377-389.

Barbu, T. C., Vuta, M., Străchinaru, A. I., Cioaca, S. I., 2017. An assessment of the ımmigration ımpact on the ınternational housing price. *Amfiteatru Economic*, 19(46), 682-695.

Bayır, M., Güvenoğlu, H., Şahin-Kutlu, Ş., 2019. Konut fiyatlarının belirleyicileri üzerine ampirik bir analiz. *II. International Conference on Emprical Economics and Social Science*. Bandırma-Turkey.

Baykal, T., Dikme, H., Karacan, R., 2018. Kamu konut politikaları açısından Türkiye'de konut maliyetleri ve konut arzı arasındaki ilişkinin nedensellik analizi. *Social Sciences Research Journal*, 7(2), 161-171.

Biçerli, M. K., 1986. Türkiye'de konut sorunu ve bu sorunun çözümüne yönelik politikalar. *Yayınlanmamış Yüksek Lisans Tezi*. Anadolu Üniversitesi Sosyal Bilimler Enstitüsü. Eskişehir.

Bolat, M., 2020. Türkiye'de konut arz ve talep uyumsuzluğunu azaltacak çözümler. *International Marmara Social Sciences Congress (Autumn 2020) Abstracts and Proceedings Book*, Kocaeli.

Büyükduman, A., 2014. *Bir kent efsanesi konut balonu kent ekonomisi ne diyor?*. İstanbul: Scala Yayıncılık.

Coşkun, Y., Seven, Ü., Ertuğrul, H. M., Alp, A., 2017. Housing price dynamics and bubble risk: The case of Turkey. *Housing Studies*. 35(1), 50-86.

Çağlayan, E., 2006. Enflasyon, faiz oranı ve büyümenin yurtiçi tasarruflar üzerindeki etkileri. *Marmara Üniversitesi İİBF Dergisi*, 21(1), 423-438.

Çakır, E., 2014. Konut yatırımları ve konut talebini belirleyen faktörler: Ordu il merkezi hanehalkı araştırması. *Yayınlanmamış Yüksek Lisans Tezi*. Ordu Üniversitesi Sosyal Bilimler Enstitüsü. Ordu

Çetin, A. C., 2021. Türkiye'de konut fiyatlarına etki eden faktörlerin analizi . *Mehmet Akif Ersoy Üniversitesi Uygulamalı Bilimler Dergisi*. 5(1), 1-30.

Degen, K., Fischer, A. M., 2010. Immigration and Swiss house prices. *CEPR Discussion Paper*. No.DP7583.

Dipasquale, D., 1999. Why don't we know more about housing supply?. *Journal of Real Estate Finance and Economics*. 18(1), 9–23.

Durkaya, M., 2002. Türkiye'de konut piyasasının talep yönlü analizi, *Yayınlanmamış Doktora Tezi*. Karadeniz Teknik Üniversitesi Sosyal Bilimler Enstitüsü. Trabzon.

Durkaya, M., Yamak, R., 2004. Türkiye'de konut piyasasının talep yönlü analizi. *İktisat İşletme ve Finans Dergisi*, 19(217), 75-83.

Engle, R. F., Granger, C. W. J., 1987. Cointegration and error correction: representation, estimation and testing. *Econometrica*, 55(2), 251–276.

Ermisch, J. F., 1990. The background: Housing trends and ıssues arising from them. Housing and the National Economy, J. F. Ermish (Ed.), Aldershot: Avebury Gower for the National Institute of Economic and Social Research.

Gelfand, J.E., 1966. The credit elasticity of lower-middle ıncome housing demand. *Land Economics*. 42(4), 464-472.

Gomez-Gonzalez, J.E., Gamboa, J., Hirs, J., Pinchao, A., 2018. When bubble meets bubble: Contagion in OECD countries. *The Journal of Real Estate Finance and Economics*. 56(2) 546–566 .

Gonzalez, L., Ortega, F., 2013. Immigration and housing booms: evidence from Spain. *Journal of Regional Science*, 53(1), 37-59.

Goodhart, C., Hoffman, B., 2008. House prices, money, credit and the macroeconomy. *European Central Bank Working Paper Series*. No.888, 1-43.

Gözübüyük, S., Koy, A., 2020. Türkiye'de konut üretiminin belirleyicileri: Ekonomik büyüme ve konut faiz oranı. *Bankacılık ve Sermaye Piyasası Araştırmaları Dergisi*. 4 (9), 1-10.

Güler, İ., Gökçe, A., 2020. Yabancılara konut satışı ile konut balonu ilişkisinin GSADF sınamaları ile araştırılması: Türkiye geneli ve İstanbul, Antalya illeri örneği. *Third Sector Social Economic Review*. 55(2), 989-1007.

Gyourko, J., 2009. The supply side of housing markets. *NBER Reporters*. No.2, 10-12.

Halıcıoglu, F., 2007. The demand for new housing in Turkey: An application of ARDL model. *Global Business and Economics Review*. 9(1), 62-74

Hanushek, E. A., Quigley, J., 1980. What is the price elasticity of housing demand?. *The Review of Economics and Statistics*. 62(3), 449-454.

Hausman, J. A., David, A. W., 1980. Discontinuous budget constraints and estimation: The demand for housing. *The Review of Economic Studies*. 47(1), 75-96.

İslamoğlu, B., Nazlıoğlu, Ş., 2019. Enflasyon ve konut fiyatları: İstanbul, Ankara ve İzmir için panel veri analizi. *Siyaset, Ekonomi ve Yönetim Araştırmaları Dergisi*. 7(1), 93-99 .

Johansen, S., 1988. Statistical analysis of co-integration vectors. *Journal of Economic Dynamics and Control*, 12(2-3), 231-254.

Karadaş, H. A., Salihoğlu, E., 2020. Seçili makroekonomik değişkenlerin konut fiyatlarına etkisi: Türkiye

örneği. *Ekonomik ve Sosyal Araştırmalar Dergisi*. 16(1), 63-80.

Karamelikli, H. (2016). Linear and nonlinear dynamics of housing price in Turkey. *Ekonomia*, 46, 81-9

Kartman, A. E., 1972. New evidence on the demand for housing. *Southern Economic Journal*, 38(4), 525–530.

Kashnitsky, I., Gunko, M., 2016. Spatial variation of in-migration to Moscow: Testing the effect of housing market. *Cities*. 59, 30-39.

Keleş, R., 1997. *Kentleşme politikası*, İmge Kitabevi Yayınları. No: 4. Ankara.

Lebe, F., Akbaş, Y., 2014. Türkiye'nin konut talebinin analizi: 1970-2011. *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*. 28(1), 57-83

Li, Z, Razali, M. N., Fereidouni, H. G., Adnan, Y. M., 2018. Macro-economic index effect on house prices in China. *International Journal of Housing Markets and Analysis*. 11(3), 453-475.

Narayan, P. K., Narayan, S., 2005. Estimating income and price elasticities of imports for Fiji in a co-integration framework, *Economic Modelling*. 22(3), 423-438.

Özaktaş, F. D., 2019. Yabancılara konut satışı ve reel efektif döviz kuru: Türkiye örneği ampirik çalışma. *Ekonomik ve Sosyal Araştırmalar Dergisi*, 15(1), 131-147.

Pamuk, M., Bektaş, H., 2014. Türkiye'de eğitim harcamaları ve ekonomik büyüme arasındaki ilişki: ARDL sınır testi yaklaşımı. *Siyaset, Ekonomi ve Yönetim Araştırmaları Dergisi*. 2(2), 77-90.

Pesaran, M. H., Smith, R., 1998. Structural analysis of cointegrating VARs. *Journal of Economic Surveys*. 12(5), 471-505

Pesaran, M. H., Shin, Y., Smith, R. J., 2001. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*. 16(3), 289-326.

Puy, D., Ari, A., Shi, Y., 2020. Foreign demand and local house prices: Evidence from the US. *Imf Working Papers*. 20(43).

Saiz, A., 2007. Immigration and housing rents in American cities. *Journal of Urban Economics*. 61(2), 345-371.

Tai, M. Y., Hu, S. W., Chao, C. C., Wang, V., 2017. Foreign buyers and housing price dynamics. *International Review of Economics and Finance*. 52, 368-379.

T.C. Merkez Bankası, 2016. Türkiye konut fiyat endeksi'nin kalite değişimi etkisinden arındırılması: Hedonik konut fiyat endeksi. TCMB Ekonomi Notları.

Tekinel, O., Güvercin, Ö., 2000. Türkiye'de konut sorununun nedenleri ekonomik ve sosyal boyutu. *Fen ve Mühendislik Dergisi*, 3(2), 7-17.

Tsatsaronis, K., and Zhu, H., 2004. What drives housing price dynamics: cross-country evidence. *BIS Quarterly Review*, March.

Uysal, D., Yiğit, M., 2016. Türkiye'de konut talebinin belirleyicileri (1970-2015): Ampirik bir çalışma. *Sosyal Bilimler Meslek Yüksekokulu Dergisi*. 19(1), 185-209.

Yanar, R., Demir, C. Ş., 2022. Döviz kurundaki değişimlerin yabancı konut talebine etkileri: Türkiye örneği. *İşletme Ekonomi ve Yönetim Araştırmaları Dergisi*. 5 (2), 295-310.

Yıldırım, F., 2013. Türkiye'de ikamet amaçlı konut pazarının makroekonomik değişkenler ile ilişkisi. *Social Sciences Research Journal*, 2(1), 12-18.

Yıldırım, M. O. and İvrendi, M. (2017). House prices and the macroeconomic environment in Turkey: The examination of a dynamic relationship. *Economic Annals*, 62(215), 81-110.

Zandi, G., Mahadevan, A., Supramaniam, L., Aslam, A., Theng, L. K., 2015. The economical factors affecting residential property price: The case of Penang island. *International Journal of Economics and Finance*. 7(12), 200-210.