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Assessing the Existence of Housing Bubbles in Istanbul, Ankara and Izmir: A GSADF Method Analysis of New and Old Housing Prices[1]

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Abstract

Need for shelter is the main requirement for people. The majority of shelter needs is fulfilled through the acquisition of estates. Housing prices may have been overpriced for a variety of causes at various times. A bubble asset is created when house prices deviate from basic values. The existence of property market bubbles has recently received a lot of attention. House prices in three provinces (Istanbul, Ankara, and Izmir) were investigated in this study between April 2010 and October 2022 to assess whether there is a housing bubble. In order to see the difference more easily, both new (YKFE) and old (YOKFE) housing prices were examined. In the study, the generalized sup augmented Dickey-Fuller (GSADF) method was preferred because it performed better in the presence of more than one balloon. According to the findings, price bubbles were detected in the real estate markets of Ankara, Istanbul and Izmir. As a different finding, no positive price bubble was detected in Ankara and Istanbul in 2019. Unlike other provinces, downward pricing is observed especially in old housing prices in İzmir in 2012. However, a price bubble is seen in İzmir in 2019. In addition, it can be seen that the negative pricing effect of the Covid-19 period was not seen in İzmir.

Keywords: *GSADF, Real Estate, Price Bubbles*

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İstanbul, Ankara ve İzmir'de Konut Balonlarının Varlığının Değerlendirilmesi: Yeni ve Eski Konut Fiyatlarının GSADF Yöntemiyle Analizi

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Öz

Barınma ihtiyacı insanların birincil ihtiyaçlarındandır. Barınma ihtiyacının karşılanması çoğunlukla konut satın alımı ile gerçekleşir. Çeşitli dönemlerde birbirinden farklı nedenlerden dolayı konut fiyatları olması gerektiği değerden yüksek değerlenmiş olabilir. Konut fiyatlarının temel değerlerden sapması balon varlığı oluşturmaktadır. Emlak piyasası balonlarının varlığı son zamanlarda çok fazla ilgi görmektedir. Bu araştırmada, konut piyasasında balon olup olmadığını belirlemek için Nisan 2010 ile Ekim 2022 arasında üç ilde (İstanbul, Ankara ve İzmir) konut fiyatlarına bakılmıştır. Farkın daha kolay görülebilmesi için hem yeni (YKFE) hem de eski (YOKFE) konut fiyatları incelenmiştir. Araştırmada birden çok balon varlığında daha iyi performans göstermesinden dolayı genelleştirilmiş eküs genişletilmiş Dickey Fuller (GSADF) yöntemi tercih edilmiştir. Bulgulara göre Ankara, İstanbul ve İzmir emlak piyasalarında fiyat balonları tespit edilmiştir. Farklı bir bulgu olarak 2019'da Ankara ve İstanbul'da olumlu bir fiyat balonu tespit edilmemiştir. Diğer illerden farklı olarak İzmir'de, 2012'de özellikle eski konut fiyatlarında aşağı yönlü fiyatlamalar gözlenmektedir. Bununla birlikte, İzmir'de ise 2019'da bir fiyat balonu görülmektedir. Ayrıca, Covid-19 döneminin olumsuz fiyatlama etkisinin İzmir'de görülmediği de gözlenmektedir.

Anahtar Kelimeler: *GSADF, Konut Piyasası, Fiyat Balonu*

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Introduction

The law of supply and demand also applies to the housing market. Prices decrease when there is a surplus of housing compared to the demand for it, whereas they increase when there is a deficit. The housing market is made more complicated by the fact that there are several factors that impact both the supply and demand of housing and that the supply is unable to react rapidly to changes in demand since building homes takes time (Erdem, 2019, p.14).

Real estate values may be influenced by several economical components. The status of the economy, interest rates, supply and demand, and population are the significant components of estate values. Real estate is subject to the basic economic tenet of supply and demand. When there is a high demand for homes in a certain area but a small supply, prices usually increase. On the other side, when there are too many homes and not enough buyers, prices tend to decline. Residential real estate provides the owner with a place to live and has an inherent reservation value that is based on the discounted value of the anticipated service flows. These traits make it unlikely that nominal housing values will decline as drastically as stock and commercial property prices (Coskun, 2016, p.208).

Real estate values can be influenced by the status of the economy. The four stages of cyclical changes in home prices are recovery, supply, overturning, and collapse. These stages largely coincide with the expansion and recession phases of the nation's overall economy. A robust economy with low unemployment and growing salaries may entice more individuals to buy homes, driving up prices. A sluggish economy with high unemployment and stagnating income, on the other hand, may result in fewer people being able to afford to buy homes, causing prices to decline (Erdem, 2019, p.15).

Another key aspect that might influence real estate values is interest rates. The terms and interest rates of loans are one of the most crucial factors that affect home demand. Flexible payment options for loans, particularly for the middle-income group, greatly boost demand for housing (Gelfand, 1966, p.466). When interest rates are low, borrowing money to buy a property is often less expensive, which can increase demand and drive up prices. When interest rates are high, borrowing money becomes more expensive, which reduces demand and causes prices to decline.

All commodities and services are in greater demand as a result of population growth. Additionally, it significantly alters the need for homes. Population changes have a crucial role in economic activity because they have an impact on consumer demand for products and services as well as the labor market (Lebe and Aktas, 2014, p.63).

Housing markets have both an economic and a social and cultural impact. This demonstrates that housing markets and development have a strong association. Because of this, laws governing the housing market try to influence not only the economics but also crucial aspects of development including poverty, education, and crime through altering the sociocultural fabric. This is because people who buy both assets and housing services are impacted by growing home prices. Housing costs have an impact on macroeconomic factors, which alters the economy as a whole (Uysal and Yigit, 2016, p.189).

Supply and demand, the status of the economy, interest rates, and the location and kind of property are all variables that might influence real estate values. Pricing might also be impacted by housing supply. Prices rise as a result of an inadequate supply in response to rising demand. Conversely, housing prices drop when demand is far lower than supply. For instance, Ireland saw the construction of 700,000 new dwellings between 1996 and 2006. There was a significant excess supply in the market during the collapse of the real estate market.

Housing prices have decreased as a result of excessive supply. Understanding these characteristics can allow you to make better educated decisions when purchasing or selling real estate (Akkılıc et. al, 2021, p.49).

Housing is a significant aspect of the building business since it may be utilized as an investment tool as well as a place to live. Many experts and organizations have examined the significance and function of housing investments and the building sector in the economy. When the literature on the housing sector is evaluated, the determinants of housing demand are income and income structure, loan interest rates and loan conditions, monetary aggregates, social demand, and demographic variables (Oztürk and Fitöz, 2009, p.22). Price volatility is observed in various periods depending on these factors. This study was conducted in the cities of Ankara, Izmir, and Istanbul to determine the existence of a housing bubble. To show the contrast clearly, new house prices and old house prices were investigated separately. The pandemic era, which is the time frame for which the data is utilized, as well as the examination of both new and old housing prices combined give this study a special place in the literature.

Price Bubbles

Financialization in global economies is progressing at a rapid pace. The likelihood of speculation and price bubbles grows as economic activities become more financialized. Financial markets get the majority of investments and savings funds. Price changes in some financial instruments, indices, and exchange rates occur as a natural result of these transactions. When the price of an item, such as a stock or a commodity, becomes artificially inflated and unsustainable, this is referred to as a price bubble. This can occur for a number of causes, including excessive speculation, excessively optimistic market expectations, or a lack of knowledge of the asset's fundamental worth (Cakar, 2022, p.107).

Financial instability, according to Minsky (1982, p.13), is characterized by a failure to meet commitments resulting from debt arrangements. Whether the cash flows from revenues satisfy the contracts for payments is the main sign of how fragile the financial system is. The Minsk hypothesis of financial instability states that entropy is prone to affect financial markets. The financial industry is expanding in countries that are economically developing. Financial instability arises as a result of corporations making riskier and more rewarding investments as the sector expands (Minsky, 1982, p. 24). The expansion of the financial industry may lead to more speculation and the exposure of the idea of excessive trading. Excessive trading is the practice of purchasing goods or financial assets only for the purpose of speculation and not for personal consumption (Kindleberger, 1978, p.17). Profit-makers who are watching this process make purchases with their own money or by borrowing money, which creates price bubbles.

The constant and systematic price disparities between the perceived value and the actual worth of financial assets are referred to as the financial bubble. It is important to take into account how bubbles affect financial markets and how closely they are related to financial crises. They must be able to be located and studied in order to be useful, particularly to investors and market regulators. The psychological and emotional drivers of price bubbles include rumors, irrational investors, overconfidence, incorrect informational weighting, herd behavior, overreaction, investor emotions, and feedback behavior (Anavatan and Kayacan, 2018, p.125).

Behavioral economics is primarily concerned with cognitive mistakes. According to Shiller (2015, p.32), unreasonable exuberance is to blame for the sharp price increases. Investor fervor spreads by psychological contagion, and investors convince themselves to believe illogical narratives. Investors continue to invest despite their lack of confidence in their assets for just cognitive reasons (Shiller, 2015, p.32). When a price bubble arises, it might attract an increasing number of investors seeking for a rapid profit. As more individuals buy into the bubble, the asset's price rises higher, producing a feedback cycle that drives up the price even further.

This can go on for a while, but ultimately the bubble will burst and the asset's price will plummet, leaving investors with large losses. Similarly, to how the feedback mechanism pushed up prices, fear pushes down prices this time (Fırat and Kurtoğlu, 2015, p.93).

The price bubble production process is dominated by the pleasure principle. Only the positive aspects of the financial asset are highlighted; the negative aspects are ignored and unrelated. The thrill of the reward overpowers the investment's danger and subconsciously throws it aside. When the bubble pops, reality as we perceive it becomes apparent. This does not, however, mean that the person has achieved the integrated level of consciousness. A new disconnected mental state frequently develops. There is no longer any enthusiasm; instead, there is resentment and blame, and no one is willing to take responsibility. People view and experience the bad aspects of life as victims. A clue that the truth is not acknowledged is this mental condition. Integration occurs when responsibility is embraced and pain is experienced. Without entering an integrated state, it is impossible to learn from mistakes and to stop bubble from repeating themselves (Aren, 2019, p.14).

It is a proven fact that changes in asset prices have a substantial impact on aspects of the real economy, such as inflation and production. With the housing crisis of 2007 and the resulting unfavorable environment extending to international financial markets, this debate over how asset prices affect actual economic activity has come to the forefront once more (Darıcı, 2018, p.221). Price bubbles may be disastrous for both individual investors and the economy as a whole. Price bubbles may cause a misallocation of resources in the economy as a whole, as money and investment flow into the inflated asset rather than being invested in more productive sections of the economy. The big fall that follows the systematic and ongoing rise in asset values sparks a crisis in the market that has serious implications for both domestic and foreign investors' economies. In light of their connection to financial crises as well as their implications for investors and market regulators, it is crucial to identify and assess financial market bubbles (Kılıc, 2020, p.13). The central banks shouldn't react to fluctuations in asset values, according to the strategy that highlights the ambiguity surrounding the macroeconomic significance of asset prices (Darıcı, 2018, p.222). According to Posen (2006, p.1), fiscal policies should be developed to prevent the emergence of bubbles rather than monetary policy in order to prevent central banks from intervening in asset price bubbles.

A property price bubble arises when the price of real estate gets inflated as a result of oversupply, speculation, and insufficient supply. This can result in a situation in which property prices become unsustainable and finally burst, triggering a significant drop in values and perhaps contributing to an economic slump. The banking system started to become corrupt after the home price bubble crashed in 2007. The danger of mortgage loan default increased as a result of the decline in housing values, which kept the value of many subprime borrowers' homes below the mortgage debt (Öztürk and Gövdere, 2010, p.382).

Asset inflation is the rise in asset prices compared to those of goods and services. The fact that assets benefit people in an economy where there is asset inflation makes households want to become wealthier. As a result, additional assets are purchased, driving up asset prices even further. With this anticipation, asset prices begin to inflate if the price growth is constant (Bolat and Senol, 2020, p.219). Financial liberalization, credit growth brought on by an increase in the money supply, or unduly bullish investor expectations are factors that lead to price bubbles in the financial markets. To avert a property price bubble, governments and financial institutions must actively monitor the housing market and put in place safeguards to prevent excessive speculation and unsustainable price increases. This might involve raising loan rates, limiting lending, and restricting the supply of accessible real estate. Financial crises or actual sector crises may arise as a result of asset price bubbles over time (Yurtoğlu, 2022, p.425).

One of the most well-known examples of a price bubble happened during the Dutch Golden Age, when the price of tulip bulbs in the Netherlands skyrocketed before crashing in 1637. This episode, known as "tulip mania," is often regarded as the first documented speculative bubble in history. Europeans met the tulip through the Ottomans. It was brought to Europe by persons seen and recognized by diplomats or commerce in the Ottoman Empire. According to legend, Suleiman the Magnificent delivered tulip bulbs to the Dutch monarch (Oran, 2011, p.156). During the Tulip Frenzy Bubble in the Netherlands, one tulip bulb was sold for 10,000 Guilders. At the time, a decent house in the Netherlands could be purchased for this money (Mete et al., 2019, p.108). Because of the comfort era, speculative movements began to emerge in the markets, and the prices of tulip bulbs, which represent riches, luxury, success, and prestige, began to rise. With rising prices and rising demand, a specialized industry for tulip bulbs has formed. People have begun to mortgage their homes in exchange for a single tulip bulb (Altınırmak and Eyuboglu, 2016, p.68).

The dot-com bubble of the late 1990s, when the value of many internet-based enterprises surged before collapsing in the early 2000s, is another well-known example of a price bubble. This bubble was driven by widespread speculation and a misunderstanding of the possible hazards of investing in these firms. With the advancement of technology in the 1990s, internet networks began to emerge, and the number of personal computers rose. As a result, financial markets have begun to migrate to the internet environment, and market efficiency has grown. As a result, firms such as IBM, AT&T, and Microsoft began to acquire value, and investors who recognized this began to engage in speculative movements, raising prices. Excessive speculation and excessive investments by investors in technology businesses have caused the NASDAQ Securities Index, often known as the technology stock market, to surge in value. On March 9, 2000, the index set a new high with a score of 5,046.86 (Altınırmak and Eyuboglu, 2016, p.74).

In the 1980s, Japan's economy served as an example for both industrialized and developing countries. The international success of Japanese corporations has had a tremendous influence on the financial system. Japan has one of the greatest savings rates in the world, and the cash earned from these saves might be translated into successful investments by Japanese enterprises. The Japanese stock market also reached exceptionally high heights during this era, indicating a healthy economy. Real estate and stock values soared dramatically in the late 1980s. In the first half of the 1980s, land values roughly doubled, and in the second half, they quadrupled (Erdönmez, 2005, p.66). However, in the early 1990s, the Japanese economy slowed, and real estate values began to fall. The Japanese real estate market had collapsed by the end of the 1990s, resulting in a lengthy period of economic stagnation in the country. The Japanese financial system's good position was reversed in the mid-1990s. The Japanese financial system entered a financial crisis following the collapse of the active-bubble economy in the early 1990s. The profitability of Japanese enterprises plummeted during this period. The bubble in Japanese stock and land prices burst, causing asset values to plummet dramatically. Residential land prices fell to 50% of the ceiling value in the first part of the 1990s (Erdönmez, 2005, p.67). The Japanese real estate market has a long and turbulent history, with periods of spectacular boom and precipitous depression.

A real estate price bubble occurs when the values of real estate properties, such as homes and flats, increase dramatically and then fall precipitously. This sort of bubble can have serious ramifications for the economy and for people who own or are wanting to buy real estate. Florida is the geographical region with the hottest climate, and it is situated on the country's southern shores. The middle class in America, like the affluent, liked to spend their vacations in Florida, especially with the surge in vehicle ownership in the 1920s. As a result, Florida's tourist sector started to grow. As automobile ownership expanded, so did the number of tourists visit Florida. The fast growth in the tourist sector has also had an impact on the region's real estate market. Housing investments have expanded quickly. Because demand could not match surplus supply, the first home price

bubble arose in the United States (Erdem, 2019, p.5). Similarly, a house price bubble was witnessed in the United States after nearly 90 years as a result of a number of variables, driven by low interest rates. This bubble was caused by a number of factors, including easy access to credit, lax lending restrictions, and the idea that property values would continue to rise indefinitely. This was owing, in part, to the subprime mortgage crisis, in which many consumers who had taken out low-interest mortgages found themselves unable to keep up with payments as interest rates began to climb. As a result, real estate values fell precipitously, with far-reaching ramifications for the economy. The mortgage system is described as a financial asset system in which the house sought to be acquired through any loan is pledged against the loan obligation to the financial institution. The most significant aspect of the mortgage system is that the financial institution that provides the loan in exchange for the mortgage subsequently displays this debt as the underlying asset and produces various forms of securities. The growth in the number of mortgage loans issued to different risk categories, notably the easy granting of risky mortgage loans, enhanced asset prices and produced an upside market as a consequence of the consumer's sustained buy and loan demand. Despite the low grades in their credit registries, banking institutions continued to lend to high-risk home loan consumers. As a result of the consumer's continuous purchase and loan demand, the growth in the number of mortgage loans issued to different risk categories, particularly the easy granting of risky mortgage loans, raised asset prices and generated an upside market (Atasever, 2016, p.62). Following the onset of the home price decline in 2007, numerous investment banks either filed bankruptcy or were forced to combine with other banks during 2008. Bank of America acquires Countrywide Finance, the nation's largest mortgage lender. JP Morgan Chase purchased Bear Stearns, the largest investment bank in the United States, when it was on the verge of bankruptcy. This occurrence demonstrates that the global financial crisis has begun, and that the crisis has spread from the housing market to the capital markets. In the years preceding up to the 2008 global financial crisis, the housing market underwent a massive price bubble. People were able to acquire mortgages with little to no money down in many circumstances, and property values climbed significantly (Atasever, 2016, p.62).

Literature Review

Reviewing the literature reveals that research on the housing industry focus primarily on establishing the relationships between macro indicators and house prices. On the other hand, several researches have looked at the possibility of home price bubbles.

An overview of research using worldwide information is provided below.

The SADF test and monthly data for the years 1994 to 2012 were used by Gomez et al. (2013) to assess the Colombian housing bubble. A house price bubble has been confirmed by evidence. Balcilar et al. (2014) analyzed the house price bubble in the USA using data from the years 1830 to 2013. For the USA, price bubbles were seen in the years 1879–1880, 1956–1957, and 2004–2006. In a different 2014 research, Oliveira and Almeida (2014) employed the GSADF test to examine a Brazilian housing bubble using monthly data from 2008 to 2013. Real estate bubble symptoms are being seen in Sao Paulo and Rio de Janeiro, the two biggest cities in Brazil.

According to Engsted et al. (2015), the GSADF test was used to examine the housing bubble in OECD nations including Belgium, Germany, Canada, Switzerland, Denmark, Australia, Spain, Finland, France, United Kingdom, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Sweden, and the USA. Between 1970 and 2013, quarterly data on the home price index from 18 different nations were utilized in the study. Housing price bubbles have been identified in Australia, Belgium, Canada, Switzerland, Denmark, Spain, Finland, France, United Kingdom, Ireland, Japan, Netherlands, Norway, New Zealand, Sweden, and the USA.

Escobari and Jafarinejad (2016) studied the housing bubble in the United States. The GSADF test was used in the study to investigate house prices from 1980.01 to 2013.09 that had been adjusted for inflation. The results showed that there were four speculative bubbles: August–November 1990, February–April 1993, October–April 1996, and November–June 2003. In another study on the USA, Shi (2017) examined the house price bubble in the United States using data from 21 areas from 1978 to 2015. There was a house price bubble in 1980 and again in 2000.

Asal (2019) study examines the presence of a housing bubble in Sweden utilizing a variety of methods and frameworks, such as affordability indicators, asset-pricing approaches, cointegration techniques, and the univariate right-tailed unit root test process. Beginning in 2004, the authors discover evidence for rational housing bubbles with explosive behavioral components. The essay explores the changing supply and demand dynamics that have led to the current spike in home prices, concluding that the Swedish housing market has been overpriced since 2013, even after accounting for a generous risk premium. The article also includes economic research that use a VECM model to assess the long-term link between housing prices and their fundamentals, such as real disposable income, real after-tax mortgage rates, unemployment rate, real exchange rate, and housing stock. The research reveals that real disposable income is an essential variable in explaining long-run real housing prices, and that the real effective exchange rate is one of the most significant variables driving the long-run increase in real housing prices. The article covers a study on the Swedish housing market that discovered a positive relationship between housing stock and actual home prices. Long-run predictors of real property prices highlighted in the study include real disposable income, real after-tax mortgage rates, and rents. The findings of the univariate right-tailed unit root test demonstrate the presence of a home price bubble after 2004. The research finds that there is evidence of a housing bubble in Sweden, but determining the amount of the mismatch is difficult owing to a variety of market conditions.

Ahmed et al. (2021) research covers that used the GSADF test to examine house price bubbles in Pakistan from 1972 to 2018. On an annual, quarterly, and monthly basis, the analysis reveals evidence of many instances of housing market bubbles. The research mainly emphasizes the need of affordable housing and flexible home finance options for poor households in Pakistan. Monthly data revealed more bubble episodes than yearly or quarterly data; in each case, it revealed two periods of bubble events. Ahmed et al. (2021) mention that in the short run, the findings of the housing price dynamics show a larger return with a high risk.

Tomal's (2021) analysis uses log price-to-rent ratios in Polish provincial cities to determine whether there has been a recent price bubble in Poland's major property markets. The study examines the housing market in Polish provincial capitals from 2006q3 to 2020q1, employing a novel method for detecting housing bubbles and downward trends. The analysis concludes that a negative price bubble occurred in 2011, but there has been a growing amount of the non-fundamental component since the beginning of 2013, with dramatic movements observable in the first quarters of 2014.

Numerous findings have been reached from studies on the price bubble in Turkey's real estate industry. A price bubble was detected by Iskenderoglu and Akdag (2019), Mandacı and Caglı (2018) and Erdem (2019) study. Both Coskun and Jadevicius's (2017) and Afşar and Dogan's (2018) studies came up with opposing conclusions. Studies on the housing price bubble in Turkey might be examined in two separate paragraphs depending on their conclusions.

Coşkun and Jadevicius (2017) conducted research on the housing bubble in Ankara, Istanbul, and Izmir. The data used is from 2010 January to 2014 December. The findings demonstrate that there was no real estate price

bubble in Turkey. In order to evaluate the Turkish housing bubble, Afşar and Dogan (2018) utilized the real house price index and the actual rent price index as a baseline. The findings demonstrate that between 2010 and 2017, there was no price bubble in Turkey's property sector or rental pricing.

Mandacı and Caglı (2018) use the GSADF and BSADF techniques to examine if there were any housing market bubbles in Turkey between 2010 and 2017 (in 23 Regions, excluding Istanbul, Ankara, and Izmir). In the study, housing bubbles were discovered in 14 other areas in addition to Turkey as a whole, including Istanbul, Ankara, and Izmir. Iskenderoglu and Akdag (2019) investigated if there is a housing bubble in Turkey overall, in the provinces of Ankara, Istanbul, and Izmir, using the GSADF test. The researchers utilized the Real Hedonic Housing Price Index monthly data collection, which spans the years 2010–2018. The areas of Istanbul and Izmir in Turkey are now witnessing a housing bubble, according to the findings of the SADF and GSADF tests. Erdem (2019) employed the SADF and GSADF techniques in the study to look at two samples—the entire country of Turkey and Istanbul—to determine if there was a housing bubble in Turkey between 2010 and 2018. It was discovered that the housing bubble existed in Turkey between 2014 and 2016 and in Istanbul between 2013 and 2017.

Data and Method

In order to determine if there is a housing market bubble, the research looked at house prices for three provinces (Istanbul, Ankara and Izmir) between April, 2010 and October, 2022. GSADF analyses on both new (YKFE) and old (YOKFE) home prices were performed to make it easier to see the difference. YKFE is the price index calculated using the hedonic regression method for houses whose construction year is in the last two years (current year and previous year). YOKFE is the price index calculated using the hedonic regression method for houses whose construction date is before the last two years.

It is well recognized that when a time series exhibits cyclic collapse behavior, standard methods are ineffective for identifying bubbles (Evans, 1991, p.922). The SADF test is advised by Phillips et al. (2011, p.32) for the identification of balloon presence. Passing ordered right-tailed unit root tests-related recursive regressions is a requirement for SADF testing. Sequential tests are used to determine the unit root behaviuor's high volatility. The SADF approach works well to identify a single bubble when it is present in the sample. The time series might, however, contain a number of bubbles if the sampling period is lengthy. In their investigation, Phillips et al. (2013, p.38) discovered that the SADF approach loses its ability to evaluate bubbles and is unable to account for their existence when the time series comprises more than one bubble phase. Similar to the SADF test, the GSADF test also depends on recursive right-handed ADF tests, but in reality it employs adjustable window sizes. The GSADF test, which performs better, has been advised by researchers (Phillips et al., 2013, p.38). The SADF and GSADF models are shown below.

$$SADF(r_0) = \mathrm{sup}_{r2\in[r0,1]}\{ADF_{r2}\}$$

$$GSADF(r_0) = \mathrm{sup}_{r2\in[r0,1],\, r1\in[0,r2-r0]}\{ADF_{r1}^{r2}\}$$

Due to the nature of the study, informed consent or ethics committee approval was not required.

Findings

The GSADF test was used in the study to look at the possibility of a housing market price bubble. At the threshold of 5% significance, the existence of price bubbles between April, 2010 and October, 2022 was determined.

Table 1
Provinces GSADF Statistics

	T-Statistic	Probability
Istanbul New	26.61364*	0.000
Istanbul Old	25.64834*	0.000
Izmir New	27.12072*	0.000
Izmir Old	24.08448*	0.000
Ankara New	25.37815*	0.000
Ankara Old	25.54510*	0.000

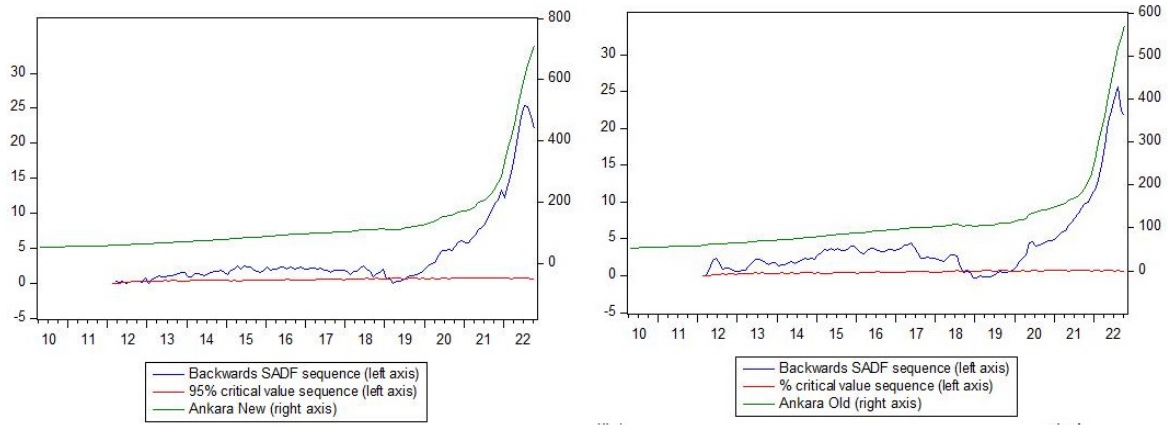

Figure 1. Ankara GSADF

Turkey's capital city of Ankara's real estate market has long been the subject of debate and investigation. With the exception of 2019, statistical analysis show that Ankara's real estate prices have been in a bubble for a while. This indicates that property values have been gradually increasing throughout the city, far above their true value, resulting in a bubble that might one day burst. Many investors and prospective homeowners are concerned about this trend because they worry that they could be buying houses that are expensive and might later lose value. However, an unprecedented decline in prices was recorded in older homes in 2019, which surprised many. Covid-19 affections and shifts in customer behavior are just two reasons for the abrupt decline in prices.

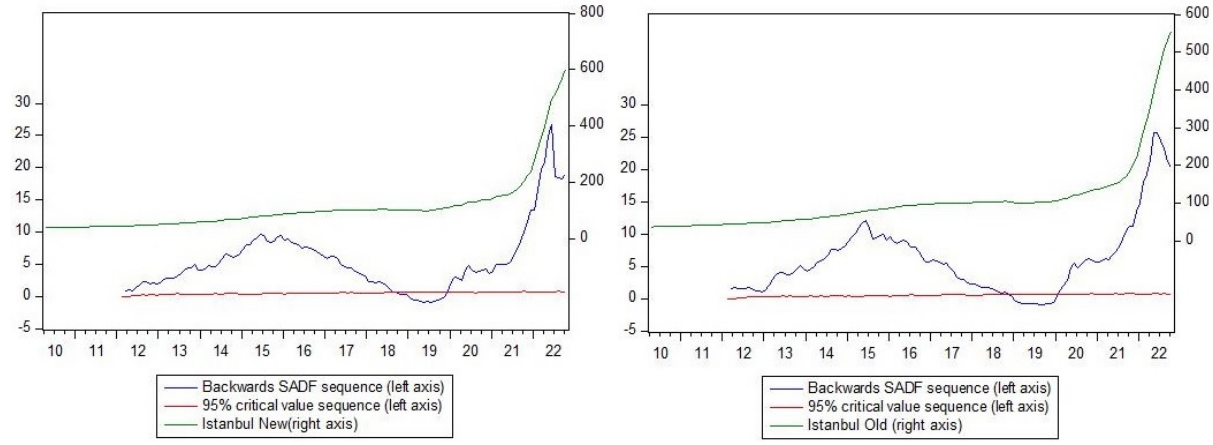

Figure 2. Istanbul GSADF

Due to the similarity in price bubbles between the real estate markets in Istanbul and Ankara, both cities have frequently been contrasted. Property values have fluctuated in both cities recently, with certain periods being characterized by a notable gain in prices followed by a subsequent decline. While there have been similarities in the pricing patterns between these two cities, there have also been disparities in how each city's real estate markets have fared. For instance, the real estate market in Ankara declined less in 2019 than it did in Istanbul.

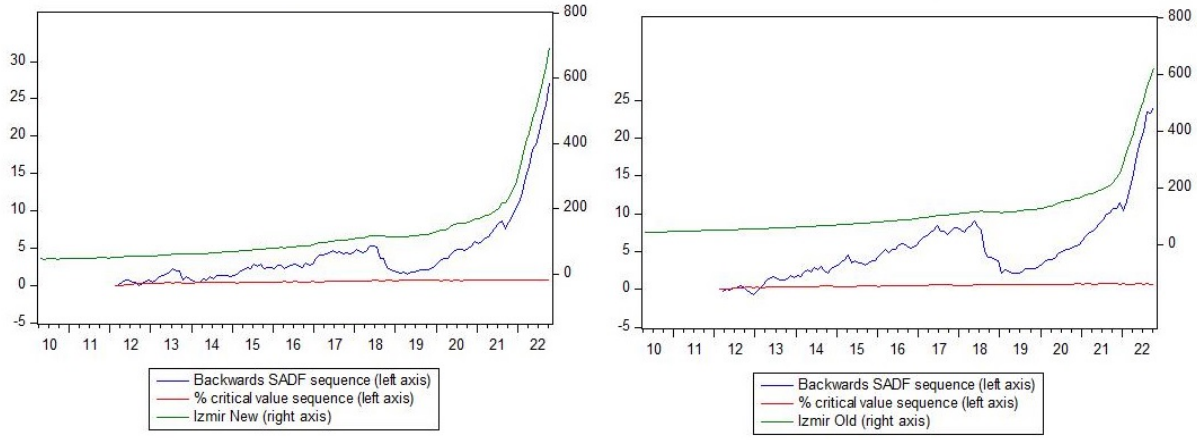

Figure 3. Izmir GSADF

Izmir real estate values were not greatly impacted by the 2019 era, in contrast to Ankara and Istanbul. In this instance, it demonstrates the unique peculiarities of the Izmir housing market. The price bubble is still present in 2019. The prices of older houses in particular varied negatively in 2012.

Conclusion

Up until the early 1980's, gold and real estate were regarded as the safest and most reliable investment options in Turkey. Both have at the very least, remained stable in value during periods of persistent national currency depreciation, dropping real wages, and extremely erratic interest rates. Although it has no worth, it will continue to serve the entire family as long as it is not destroyed, providing for a basic requirement like shelter (Lebe and Aktas, 2014, p.58).

Housing is a tradable commodity. Due to the rise in household value, it is now a property for investment. One of the movers in the building sector is the development of housing. Housing investments that cater for people's fundamental requirements are growing alongside the industries that supply this sector with input. Spending in housing has a significant multiplier effect. White goods, furniture, and home textiles are all in higher demand as a result of rising housing sector spending (Bolat and Senol, 2020, p.217). Many industries are impacted by price distortions in the housing market. Price bubbles in the housing industry therefore have an impact on both the banking and real industries. As a result, the relevant authorities should take economic steps by recognizing price bubbles.

According to the research, there are price bubbles in Ankara, Istanbul, and Izmir real estate markets. Parallel to this study, positive price bubbles are seen in other studies on Turkey (Mandacı and Caglı, 2018; Erdem, 2019). For 2019, there was no evidence of a positive price bubble in Ankara and Istanbul. In contrast, a price bubble was noticed in Izmir in 2019. According to Mandacı and Caglı (2018), the increase in exorbitant housing prices in Izmir as compared to Ankara and Istanbul is the result of net internal migration from Istanbul to Izmir over the past three years (2014–16) and the relocation of major corporations' headquarters

to Izmir. As anticipated, the Covid-19 period's negative pricing impact was not shown in Izmir in this study, which came after the Mandaci and Cagli (2018) research. In Izmir 2012, however, negative pricing is noticed, particularly in elderly house values.

This study differs in terms of its conclusions since it examines both new and old house values and incorporates information from the pandemic era in its data.

Many homes and structures were damaged or destroyed during the earthquake in Turkey in 2023, which would cause a lack of available housing. This may result in heightened demand for still-standing houses and prices. Additionally, the recent influx of Syrian refugees following the earthquake will raise housing demand. Therefore, substantial price breaks could be seen, particularly in the provinces in the eastern section, with the new data to be utilized in future research.

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Genişletilmiş Özet

Amaç

Çeşitli dönemlerde birbirinden farklı nedenlerden dolayı konut fiyatları olması gerektiği değerden yüksek değerlenmiş olabilir. Konut fiyatlarının temel değerlerden sapması balon varlığı oluşturmaktadır. Emlak piyasası balonlarının varlığı son zamanlarda çok fazla ilgi görmektedir. Bu araştırmada, konut piyasasında balon olup olmadığını belirlemek için Nisan 2010 ile Ekim 2022 arasında üç ilde (İstanbul, Ankara ve İzmir) konut fiyatlarına bakılmıştır. Farkın daha kolay görülebilmesi için hem yeni (YKFE) hem de eski (YOKFE) konut fiyatları incelenmiştir.

Tasarım ve Yöntem

Araştırmada, konut piyasasında balon olup olmadığını belirlemek için Nisan 2010 ile Ekim 2022 arasında üç ilde (İstanbul, Ankara ve İzmir) konut fiyatlarına bakılmıştır. GSADF, hem yeni (YKFE) hem de eski (YOKFE) üzerinden analiz ile ev fiyatları arasındaki farkı daha kolay görebilmek için uygulanmıştır. YKFE, inşaat yılı son iki yılda (cari yıl ve önceki yıl) olan konutlar için hedonik regresyon yöntemi kullanılarak hesaplanan fiyat endeksidir. YOKFE, yapım tarihi son iki yıldan daha eski olan konutlar için hedonik regresyon yöntemi kullanılarak hesaplanan fiyat endeksidir.

Bir zaman serisi döngüsel çöküş davranışı gösterdiğinde, standart yöntemlerin balonları tanımlamada etkisiz olduğu iyi bilinmektedir (Evans, 1991). SADF testi, Phillips ve arkadaşları tarafından tavsiye edilmektedir. (2011) balon varlığının tanımlanması için. SADF testi için sıralı sağ taraflı birim kök testleri ile ilgili özyinelemeli regresyonları geçmek bir gerekliliktir. Birim kök davranışının yüksek oynaklığını belirlemek için ardışık testler kullanılır. SADF yaklaşımı, numunede mevcut olduğunda tek bir balonu tanımlamak için iyi çalışır. Bununla birlikte, örnekleme periyodu uzunsa, zaman serisi birkaç baloncuk içerebilir.

Araştırmalarında, Phillips ve ark. (2013), SADF yaklaşımının balonları değerlendirme yeteneğini kaybettiğini ve zaman serileri birden fazla balon aşaması içerdiğinde bunların varlığını açıklayamadığını keşfetti. SADF testine benzer şekilde, GSADF testi de yinelemeli sağ elli ADF testlerine bağlıdır, ancak gerçekte ayarlanabilir pencere boyutları kullanır. Daha iyi performans gösteren GSADF testi araştırmacılar tarafından önerilmiştir (Phillips ve diğerleri, 2013). GSADF ve SADF modelleri aşağıda gösterilmiştir.

$$GSADF(r_0) = \sup_{r2\in[r0,1],\, r1\in[0,r2-r0]} \{ADF_{r1}^{r2}\}$$

$$SADF(r_0) = \sup_{r2\in[r0,1],} \{ADF_{r2}\}$$

Bulgular

Çalışmada, bir konut piyasası fiyat balonu olasılığına bakmak için GSADF testi kullanılmıştır. %5 anlamlılık eşiğinde, Nisan 2010 ile Ekim 2022 arasında fiyat balonlarının varlığı belirlendi.

2019 hariç, istatistik Ankara'da emlak fiyatlarının balon içinde olduğunu gösteriyor. 2019'da daha uzun bir süre için, eski konutlarda olağanüstü bir değer düşüşü kaydedildi.

2019 hariç, İstanbul emlak piyasasında Ankara'dakine benzer fiyat balonları var. Fiyatlar 2019'da olumsuz bir şekilde farklılaştı.

Ankara ve İstanbul'un aksine, İzmir emlak değerleri 2019 döneminden önemli ölçüde etkilenmedi. 2019'da fiyat balonu devam ediyor. Buna karşılık, özellikle yaşlı konut değerleri 2012'de olumsuz bir şekilde farklılaştı.

Sınırlılıklar

Araştırmada emlak piyasasında talebin en yoğun yaşandığı üç il kullanılmıştır. Piyasada tüm illerin konut fiyatlarına ulaşılamadığından ve çalışmaya dahil edilemediğinden çalışmanın sınırlılığı oluşmaktadır.

Öneriler (Teorik, Uygulama ve Sosyal)

1980'lerin başına kadar altın ve gayrimenkul, Türkiye'de en güvenli ve güvenilir yatırım seçenekleri olarak görülüyordu. Her ikisi de, en azından, sürekli ulusal para biriminin değer kaybettiği, reel ücretlerin düştüğü ve son derece düzensiz faiz oranlarının olduğu dönemlerde değerinde sabit kaldı. Hiçbir değeri olmamasına rağmen, barınma gibi temel bir ihtiyacı karşılayarak, yok edilmediği sürece tüm aileye hizmet etmeye devam edecektir (Lebe ve Aktaş, 2014).

Konut ticari bir metadır. Hanehalkı değerinin artması nedeniyle, şimdi yatırım için bir mülktür. İnşaat sektöründeki hareketliliklerden biri de konut geliştirmedir. İnsanların temel ihtiyaçlarını karşılayan konut yatırımları, bu sektöre girdi sağlayan sektörlerle birlikte büyümektedir. Konut harcamalarının önemli bir çarpan etkisi vardır. Artan konut sektörü harcamalarının bir sonucu olarak beyaz eşya, mobilya ve ev tekstili daha yüksek talep görmektedir (Bolat ve Şenol, 2020). Birçok sektör, konut piyasasındaki fiyat bozulmalarından etkilenmektedir. Konut sektöründeki fiyat balonları bu nedenle hem bankacılığı hem de reel sektörü etkiliyor. Dolayısıyla ilgili mercilerin fiyat balonlarını fark ederek ekonomik adımlar atması gerekiyor.

Araştırmaya göre Ankara, İstanbul ve İzmir emlak piyasalarında fiyat balonları var. 2019 için Ankara ve İstanbul'da pozitif bir fiyat balonu olduğuna dair bir kanıt yoktu. Buna karşılık İzmir'de 2019'da bir fiyat balonu fark edildi. İzmir'de Covid-19 döneminin olumsuz fiyatlama etkisi pek görülmedi. İzmir 2012'de ise özellikle yaşlı konut değerlerinde negatif fiyatlama dikkat çekiyor.

Özgün Değer

Çalışma günümüzde Türkiye'de aşırı artan konut fiyatları üzerindeki balon etkisinin araştırılmasını konu etmektedir. Bu alanda uluslararası birçok çalışmaya rastlanırken, Covid-19 sürecini de göz önünde bulundurarak Ankara, İstanbul ve İzmir konut piyasası analiz edilmektedir.

Araştırmacı Katkısı: Veclal GÜNDÜZ (%25), Erdem ÖNCÜ (%25), Şükrü UMARBEYLİ (%25), Korkmaz ERGUN (%25).