

Analysis of Factors Affecting Housing Prices in The Yenimahalle District of Ankara

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ABSTRACT

This study examines the determinants of housing prices in Ankara's Yenimahalle district using a hedonic pricing model. It utilizes a 2024 dataset comprising valuation reports, deed records, and tax assessments for residential properties. A semi-logarithmic regression analysis was conducted to identify key factors influencing a property's current market value. The independent variables covered a wide spectrum, including physical characteristics like area and room count, structural attributes such as building quality, and transactional details like the report date.

The resulting model demonstrated high explanatory power and yielded several key insights. The main findings indicate that smaller apartments command significantly lower values, while units located in mid-to-high-rise buildings are priced at a premium. Furthermore, low construction quality was found to have a statistically significant negative effect on property value. In contrast, the recency of the appraisal report demonstrated a positive impact, pointing to the crucial influence of market dynamics and appreciation over time.

In conclusion, the analysis confirms that physical size, floor level, building height, construction quality, and transaction timing are the most decisive factors in Yenimahalle's housing price formation. These results offer actionable guidance for valuation professionals, developers, and potential buyers, clarifying the key attributes that drive property values.

Keywords: Components of Housing Prices In Yenimahalle, Hedonic Pricing Model, Factors Affecting Housing Prices, Housing Market, Housing Market Dynamics, Housing Demand Trends, Housing Valuation.

Ankara İli Yenimahalle İlçesi Konut Fiyatlarını Etkileyen Faktörlerin Analizi

ÖZ

Bu çalışma, Ankara'nın Yenimahalle ilçesindeki konut fiyatlarının belirleyicilerini bir hedonik fiyatlama modeli kullanarak incelemektedir. 2024 yılına ait değerlendirme raporları, tapu sicil kayıtları ve belediye emlak vergi değerlerinden oluşan bir veri seti kullanılmıştır. Konutların cari piyasa değerini etkileyen temel unsurları belirlemek amacıyla yarı-logaritmik bir regresyon analizi gerçekleştirilmiştir. Bağımsız değişkenler; alan, oda sayısı, asansör, ısıtma, otopark, bina kalitesi ve bulunduğu kat gibi fiziksel özelliklerin yanı sıra yapısal nitelikleri, tapu türü, projeye uygunluk ve rapor tarihi gibi unsurları kapsayan geniş bir yelpazeye sahiptir.

Model yüksek bir açıklayıcılık gücü sergilemiştir. Bulgularda; küçük metrekareli dairelerin anlamlı ölçüde daha düşük değerlendirildiğini, orta ve yüksek katlı binalarda yer alan konutların ise daha yüksek fiyatlandığı görülmektedir. Ancak, düşük inşaat kalitesinin konut değeri üzerinde istatistiksel olarak anlamlı bir şekilde olumsuz bir etkiye sahip olduğu tespit edilmiştir. Buna karşın değerlendirme rapor tarihlerinin görece yeni olması konut değerini artırıcı bir etki göstermiştir.

Sonuç olarak analiz; fiziksel büyüklük, kat seviyesi, bina yüksekliği, inşaat kalitesi ve işlem zamanlamasının Yenimahalle'de konut fiyatlarının oluşumunda en belirleyici unsurlar olduğunu ortaya koymaktadır. Elde edilen bulgular, değerlendirme uzmanları, taşınmaz geliştiricileri, alıcılar gibi sektör paydaşları için yol gösterici niteliktedir.

Anahtar Kelimeler: Yenimahalle Konut Fiyat Bileşenleri, Hedonik Fiyat Modeli, Konutta Fiyata Etki Eden Faktörler, Konut Piyasası, Konut Piyasası Dinamikleri, Konut Talep Eğilimleri, Konut Değerleme.

1. Introduction

The concept of real estate encompasses land with or without structures and is divided into many subcategories, including residential, commercial, industrial, agricultural, mixed-use, and special-purpose

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properties (Geltner and Miller, 2018; DiPasquale and Wheaton, 1996; Güler and Yalçın, 2023). Housing affects people's quality of life and social status by meeting not only shelter needs but also privacy and security needs (Girouard and Blöndal, 2001). At the same time, equitable policies and projects are of paramount importance for ensuring access to housing for disadvantaged social groups. The diversity of factors determining values in the real estate market complicates pricing mechanisms and, due to the nature of the sector, presents certain challenges. The most basic explanation of the concept of price is the monetary equivalent paid to access a good or service (Deligöz and Üstünkardeşler, 2021: 31).

Housing prices are a very important indicator of macroeconomic stability and household welfare in both developed and developing economies (Çetin, 2021). Fluctuations in housing prices can have significant consequences not only for those investing in the real estate market but also for the economy as a whole, from consumer spending to the banking sector, aggregate demand, and price stability. As seen during the 2008 global economic crisis, excessive appreciation or rapid depreciation in the housing market can lead to widespread social and economic problems. In Turkey, the volatile trend in housing prices in recent years has been decisive for social welfare, wealth distribution, and economic balance. Rapid price increases boost investment demand but make it difficult for low- and middle-income groups to access housing. Real estate, which is of great importance in both our personal and social lives, refers to immovable assets such as land and buildings. Housing, which is included in this real estate, not only meets people's basic need for shelter but also stands out as an investment vehicle (Kain and Quigley, 1970).

Housing is also attractive as an investment vehicle and shapes demand based on capital gain expectations. Price increases accelerate particularly during periods of limited supply, strengthening the link between the financial sector and the housing market (Kim & Park, 2005; Çetin, 2012). However, supply-demand imbalances and price volatility are common in the market, negatively affecting both social welfare and economic stability. In Turkey, rapid population growth, urbanization, credit access conditions, government incentives, and urban transformation movements increase the need for a multidimensional analysis of today's housing market.

The determination of housing prices is closely tied to a number of economic variables; among the most significant factors are national income, exchange rates, interest rates, credit supply, inflation, and construction costs (Englund and Ioannides, 1997; Badurlar, 2008; Goodhart and Hoffman, 2008; Karadaş and Salihoglu, 2020). International literature indicates that while rising income levels drive up housing prices, demand and price growth tend to decelerate when interest rates rise. Similarly, in Turkey, research has shown that changes in national income and interest rates are directly reflected in both prices and housing demand (Durkaya and Yamak, 2004). In such dynamic markets, fair value assessment is effectively utilized to reflect competitive pricing. This approach is particularly relevant for analyzing specific areas like Yenimahalle. Furthermore, to accurately determine the real value of a property, the concept of market sales value must first be clearly understood (Bover & Velilla, 2002).

Over the past 15 years, upward price trends have become more pronounced during periods of low interest rates and stable exchange rates, while both sales and the rate of price increases have declined in years marked by interest rate and exchange rate shocks (Eğilmez, 2019). The impact of credit and money supply policies on market fluctuations has been proven by various empirical studies (Goodhart and Hoffman, 2008). Furthermore, regulatory frameworks that periodically shape the sector. Such as the requirement for lease agreements in Turkish Lira, the deposit system, and rent increase caps significantly influence both investment and consumer behavior (Gökyayla, 2013).

Factors affecting housing prices are not limited to macroeconomic indicators alone. In the hedonic pricing approach, building type, size, number of rooms and bathrooms, amenities (e.g., pool, parking, natural gas), and environmental factors are also key determinants (Selim, 2008; Kördiş et al., 2014; Daşkıran, 2015; Çiçek & Hatırlı, 2016). Macro-level supply-demand shocks (such as interest rates, exchange rates, and costs) affect the general price level, while structural and demographic variables at the neighborhood or building level reveal local differences. Recently, rising construction costs and economic uncertainties have reduced investor interest in the market, while criteria such as institutional trust and future expectations have gained importance in decision-making processes (Reidin, 2019).

During the 2012-2015 period, low interest rates and a stable exchange rate environment generally led to an increase in housing prices in Turkey. However, starting in 2015, the market stagnated alongside

increases in foreign exchange rates, interest rates, and inflation; this period saw an excess supply and a contraction in demand (Egilmez, 2019). Efforts are being made to revitalize the market through incentive packages implemented by the government (interest rate reductions, tax advantages, financing models), with elements such as inflation control and construction cost management coming to the fore for price stability.

The formation of housing prices is driven by a synthesis of intrinsic, extrinsic, and demographic factors (Straszheim, 1973; Smith et al., 2018). While physical attributes such as size, age, architectural features, and amenities (e.g., social facilities, elevators, and parking) directly determine value, new constructions typically command premium prices; conversely, older buildings and those designated for urban transformation are sold at relatively lower rates. Notably, while the total sales price of larger units increases, the price per square meter may occasionally exhibit a downward trend.

Environmental conditions are just as important as physical characteristics. Proximity to the metro, public transportation, and main transportation routes, social and cultural opportunities, parks, and access to educational institutions support the value of housing. In particular, central locations and developed infrastructure areas positively affect local market demand and price levels (TÜİK, 2024; Gündüz, 2001). Demographic variables also affect housing prices. The age structure, income level, education level, and occupational distribution of the population differentiate preferences and prices both socially and spatially. In large and rapidly developing areas such as the Yenimahalle district of Ankara, the fact that the majority of the population is of working age and has high education and employment potential shapes prices and supply-demand dynamics (TÜİK, 2024).

The hedonic price model originates from the attribute-based consumption approach, which argues that the utility of goods stems not from the goods themselves but from the bundle of characteristics that constitute them, and it is shaped particularly within the framework of contributions by Lancaster and Rosen (Rosen, 1974). According to this approach, the market price of heterogeneous goods such as housing emerges as the sum of the implicit prices attributed to each of the physical, locational, and environmental attributes; thus, the observed sales price of housing functions as a composite price signal that allows for the decomposition of the marginal contributions of these attributes. The hedonic model is therefore widely used in the housing market to estimate the separate and relative effects of numerous characteristics on price, such as floor area, number of rooms, building age, access to the city center and transportation, neighborhood socioeconomic profile, and environmental attributes.

This study aims to determine the factors affecting housing prices in the Yenimahalle district within the framework of the hedonic price model (hedonic pricing method). Due to the heterogeneous structure of the housing market, the effects of the physical, legal, structural, and amenity characteristics of real estate on the current valuation will be revealed in order to examine price changes. The hedonic price approach suggests that the market value of a product is determined as a component of the characteristics that constitute that product. In this context, the value of housing is determined by physical and structural characteristics such as size, number of floors, construction quality, floor level, location, number of bathrooms and living rooms, as well as qualitative variables such as legal status and project compliance. The heterogeneity observed in housing leads buyers to pay different prices and shows that these variables have a significant impact on housing value. Within this framework, our hypothesis is as follows: H1: At least one of the independent variables in the model statistically significantly affects the dependent variable, which is the residential property price. This hypothesis expresses the expectation that at least one of the explanatory variables will have a significant effect on residential property prices and is a fundamental step in testing the validity of the model.

The study will examine the profiles of home buyers and sellers, the physical and legal characteristics of real estate, the state of amenities, and the effects of structural qualities on housing prices using statistical methods. This will reveal the price formation mechanism in the market. The findings will contribute to facilitate informed decision-making for stakeholders, primarily real estate developers, real estate agents, and individuals seeking housing, understand market dynamics and improve their decision-making processes.

Yenimahalle, an important industrial and commercial hub of Ankara, also includes large industrial zones such as OSTİM and İOSB (T.C. Ankara Governorate, 2024). While offering extensive opportunities

in services and public sector employment, shopping centers and various businesses support the economic life of the district.

When examining the residential fabric, large-scale housing projects, apartment buildings, and modern residential complexes that have become widespread in recent years stand out. Institutions such as TOKİ and Emlak Konut play an active role in renewing the housing stock (TOKİ, 2023). As of 2024, there are approximately 2,250,000 homes in Ankara, while in Yenimahalle there are approximately 245,000 housing units. In 2024, 134,046 housing units were sold in Ankara, while 17,820 housing units were transacted in Yenimahalle (TÜİK, 2024).

Neighborhoods such as Batkent, Çayyolu, and Demetevler stand out for their planned settlements, social amenities, and level of prosperity, while the district's strong transportation network and safe and diverse housing options support quality of life. Yenimahalle is Ankara's third most populous district after Çankaya and Keçiören. Although its housing stock is not as dense as Çankaya's, it has a balanced and sustainable development trajectory thanks to planned urbanization and collective housing projects.

2. Method and Empirical Approach

The primary objective of this study is to empirically identify the factors determining the current market value of residential properties that changed hands in the Yenimahalle district of Ankara province in 2024 within the framework of the hedonic price model. The study analyzes the extent and direction of divergence between current values reported by Capital Markets Board (CMB)-licensed real estate appraisal organizations; sales values declared in transactions and recorded in the land registry; and property tax values registered with municipalities. This study investigates the extent to which the structural, locational, and environmental characteristics of the properties influence this divergence. In this context, the study aims to measure the difference between the "registered value" and the "market-determined value" in the housing market using a hedonic pricing approach and to systematically explain the determinants underlying this difference.

Within this framework, data has been compiled for a total of 864 properties located in 50 of the 55 neighborhoods listed in Table 1, for which both the real estate tax value and the purchase-sale value registered in the land registry, as well as the fair market value determined by the appraisal report, are available for the same property (with the same ID number) that is subject to purchase and sale. For each property, the actual purchase-sale value recorded in the land registry records of the General Directorate of Land Registry and Cadastre, the appraisal value reported by SPK-licensed firms, and the market value used as the basis for property tax in the records of the Yenimahalle Municipality were matched using the same ID number, resulting in a total of

2,592 monetary observations were obtained. In addition, 88 structural and market characteristics related to the housing units included in the analysis were examined. Thus, a comprehensive sample frame consisting of a total of 2,680 variables was created. For each variable, the variable's definition, measurement unit, data source, period covered, method of inclusion in the model (continuous or categorical), and expected direction of effect based on economic theory and previous empirical findings were determined. Categorical variables were included in the model as dummy variables, with one category in each variable group excluded as the reference class. This prevented the dummy variable trap problem. Furthermore, missing, erroneous, or outlier observation values were identified in the compiled data set and excluded from the analysis. Consequently, a cleaned and filtered final data set was used to achieve more reliable and valid results in the modeling process. The research focuses on the following fundamental question within this framework: What are the factors determining the current market value of residential properties subject to sale and purchase in Yenimahalle district, and how are the relative effects of these factors on value structured? Following this main question, the effects of the physical characteristics, legal status, and equipment qualities of the residential property, as well as current market conditions, on the current market value of the residential property are analyzed in detail within the scope of sub-research questions.

Table 1. Number of Residential Properties Included in the Sample Framework by Neighborhood in Yenimahalle District

NEIGHBORHOOD NAME	HOUSING UNIT COUNT	NEIGHBORHOOD NAME	HOUSING UNIT COUNT	NEIGHBORHOOD NAME	NUMBER OF HOUSES
AŞAŞI YAHYALAR NEIGHBORHOOD	6	GÜZELYAKA NEIGHBORHOOD	11	ÖZEVLER NEIGHBORHOOD	9
ATA NEIGHBORHOOD	41	İŞİNLAR NEIGHBORHOOD	6	ÖZGÜR NEIGHBORHOOD	11
Hunters Neighborhood	7	First Settlement Neighborhood	2	Cotton Neighborhood	22
WEST SITE NEIGHBORHOOD	10	İnönü Neighborhood	18	Ragıp Tüzün Neighborhood	4
Burç Neighborhood	14	İvedikköy Neighborhood	11	SUSUZ NEIGHBORHOOD	60
Market Neighborhood	10	İvedikköy-İmar Neighborhood	20	SUSUZ-İMAR NEIGHBORHOOD	30
Çayyolu Neighborhood	3	KALETEPE NEIGHBORHOOD	11	Tepaalti Neighborhood	3
ÇERÇİDERESİ NEIGHBORHOOD	18	KARACAKAYA NEIGHBORHOOD	8	Varlık Neighborhood	5
CISDEMTEPE NEIGHBORHOOD	21	KARDELEN NEIGHBORHOOD	11	Yahyalar Neighborhood	2
DEMET NEIGHBORHOOD	20	KARŞIYAKA NEIGHBORHOOD	6	Yakacak-İmar Neighborhood	16
Demetgül Neighborhood	20	KAYALAR NEIGHBORHOOD	8	NEW WEST NEIGHBORHOOD	5
DEMETLALE NEIGHBORHOOD	22	KENTKOOP NEIGHBORHOOD	12	Yenicah Neighborhood	5
ERGAZİ URBANIZATION NEIGHBORHOOD	73	MACUN-1 NEIGHBORHOOD	26	Green Houses Neighborhood	12
Ergazi Neighborhood	5	Mehmet Akif Ersoy Neighborhood	15	Upper Yahyalar Neighborhood	6
ESENTEPE NEIGHBORHOOD	7	Memlik Urban Development Neighborhood	4	NEST NEIGHBORHOOD	149
Gazi Neighborhood	11	Forest Farm Neighborhood	36	NEST-1 NEIGHBORHOOD	6
Güven tepesi Neighborhood	11	OSTİM NEIGHBORHOOD	15		

Source: TAKBİS (Land Registry and Cadastre Information System), Municipalities, and Real Estate Valuation Report Data Compiled by the Researcher.

The originality of the study stems from the fact that the registered sale value in the land registry for the same property, the market value used as the basis for property tax, and the current value determined by Capital Markets Board (CMB) licensed valuation reports are matched and analyzed together within the same data set using a common ID number. In this respect, the study addresses different monetary indicators related to residential property valuation within a holistic framework and adopts an analytical approach that has been relatively limited in the literature. Furthermore, thanks to its extensive set of variables, it allows residential property value to be assessed not only based on physical characteristics but also within the framework of legal attributes and market perception elements.

In examining the factors affecting housing value, the semi-logarithmic hedonic price regression is more suitable for modeling non-linear relationships in the literature for the hedonic price model (Selim, 2008; Daşkıran, 2015). In this study, data obtained by considering the physical, legal, equipment, and location characteristics of the homes subject to sale and purchase were analyzed using the frequently preferred Hedonic Price Model (HFM). Furthermore, the semi-logarithmic model allows for a more consistent and effective interpretation of proportional changes in the price variable (Kördiş et al., 2014). The properties included in the study were selected from apartment buildings, gated communities, and detached houses;

data analyses were performed using SPSS 26.0 software. Within this framework, the variables affecting the purchase-sale decision and their effects on value were evaluated by separating the physical, legal, equipment, and location characteristics of the housing. The Hedonic Price Model (HFM) was used to identify the variables affecting prices, and the factors influencing the purchase-sale decision and their impact on value were analyzed. The properties included in the study were selected from apartment buildings, gated communities, and detached houses, and data analyses were performed using SPSS 26.0 software.

In the valuation process, the current market value of the property is treated as the dependent variable. The current market value is determined based on the property's current physical condition and market conditions, taking into account the prices of similar properties. While structures outside the boundaries specified in the zoning plan and permit are not taken into account in the legal value, they are considered in the valuation of the current market value as it reflects the real perception of the market (Deligöz, 2025). This study aims to identify the determinants that affect the current market value of residential properties in Yenimahalle.

The closed form of the model created is given below.

$$Ln = Y_i = \beta_i X(i) + \varepsilon_i \quad i=1,2,\dots,N$$

In the defined model, the dependent (explained) variable; Dependent variable; The variable $Y_i = Ln$ [Current Situation Valuation 2024 (TL)] is defined, and each of the 864 residences is modeled with the 88 components listed below as independent variables.

The independent (explanatory) variables X included in the model are also coded in sequence. These codes are explained below.

Variables related to the buyer are F1–F3; these indicate whether the buyer is male (F1), female (F2), or a legal entity (F3).

The seller variables are in the range F4–F6 and are defined as the seller's gender or legal status (male, female, legal entity).

The floor level of the immovable property is classified as F7–F12; basement, ground floor, 1–5, 6–10, 11–20, and 21 and above.

F13 indicates the land area or main property area, while F14–F15 indicates the construction type (reinforced concrete or masonry/brick structure).

Usable area variables are defined between F16–F23, starting from 0–50 m² and ranging up to 351 m² and above.

Project suitability is addressed in F24–F26 as suitable, unsuitable, or partially suitable (with differences from the actual situation).

Variables related to expert opinion are coded as "saleable," "unsaleable," and "difficult to sell" in F27–F29, respectively.

Land type variables F30–F31 indicate the land type of the independent unit or main property. Acquisition type F32–F33 is defined as purchase or purchase with a mortgage.

Title deed types are listed between F34–F38; these include condominium ownership, floor ownership, land allocation, structure on land, or unspecified.

Variables related to the physical facilities in the building are defined as security (F39), parking (F40), swimming pool (F41), and elevator (F42).

Variables related to the heating system are between F43–F50 and include different alternatives such as central heating, combi boiler, stove, air conditioning, and electric systems.

The workmanship and material quality of the building is represented by levels F51–F54 (luxury, good, medium, low).

The F55–F61 variables for the year of construction of the dwelling are classified into seven periods, starting from 1970 and earlier and extending to 2021 and later.

The interior features are determined by the number of living rooms (F62–F64), bedrooms (F65–F70), kitchens (F71–F73), bathrooms/toilets (F74–F77), and balconies (F78–F81).

F82 indicates the monthly rent value, while F83–F85 indicate the sales status (first sale, second-hand, unspecified).

Finally, variables related to the report date are located between F86–F88; they are classified into three separate time periods: before March 11, 2020, the period between March 11, 2020, and May 5, 2023 (the Covid-19 process), and after May 5, 2023.

3. Descript and Statistics Related to the Data Set

Regarding residential property purchase and sale transactions conducted in the Yenimahalle District of Ankara Province; descriptive statistics showing the structural and legal characteristics of the properties, the equipment features of the residences, their construction quality, the characteristics of the buyers and seller, the structural and legal adequacy of the properties, their social amenities, and the financing processes.

The residential property purchase and sale transactions examined in Yenimahalle district reveal a comprehensive distribution regarding the structural characteristics of the properties. According to this, the vast majority of residential property buyers are men (66%); the proportion of female buyers is 26%, while the share of legal entities is 8%. A similar distribution is observed among sellers, with 62% of sellers being men, 28% women, and 10% legal entities. When examining the floors on which the properties are located, transactions are predominantly concentrated in properties on floors 1–5 (54%); this is followed by ground floors (20%) and basement floors (8%). The share of high-rise properties (21st floor and above) is quite limited (1%).

In terms of building type, the vast majority of residential properties are reinforced concrete frame structures (80%), while masonry/brick structures account for 20%. When evaluating the current size of the residential properties, the most common group is properties ranging from 111 to 150 m² (34%), followed by properties ranging from 91 to 110 m² (22%) and 151 to 200 m² (18%). In terms of project suitability, 82% of the residences are considered suitable for the project, 16% are partially suitable, and 2% are unsuitable. According to expert opinion, almost all of the residences are marketable (98%), and the proportion of residences considered unsellable or difficult to sell is quite low (2%).

In the assessment of floor type, 99% of the residences are independent units, while 1% are part of the main property. When examining the acquisition status, it is seen that the majority of transactions were mortgage purchases (74%), while direct purchases accounted for 26%. In terms of the legal nature of the housing, there is a relatively balanced distribution between condominium and leasehold properties. In terms of physical infrastructure features, 75% of the housing lacks security services, while 78% has parking. Facilities such as swimming pools (5%) and elevators (28%) are limited.

In terms of heating systems, the vast majority of homes use a combination boiler/natural gas system (69%), while the share of alternatives such as central heating systems and stoves remains quite low. When assessing building quality, 63% of homes are classified as medium quality, 35% as low quality, and only 2% as high quality. The distribution by year of construction shows that a significant portion of the housing stock was built between 2011 and 2020 (40%), while the proportion of dwellings built in 1970 or earlier is 18%. When examining interior features, it is seen that almost all dwellings have a single living room (98%), three rooms (62%), one kitchen (99%), and one or two bathrooms/toilets. In terms of the number of balconies, dwellings with two balconies (57%) stand out.

The high preference for mortgage-backed purchases indicates that credit usage is widespread in home buying and that individuals require significant financial support. The similarity in the ratios of condominium ownership and condominium easement in the land registry reveals that the legal status of buildings is at different stages. Furthermore, modern 3+1 apartments with one bathroom and one kitchen stand out in the district; the high rates of project and expertise compliance indicate that the housing stock is within the legal framework and marketable. In the buying and selling of housing in Yenimahalle District, it is seen that men are predominantly involved, purchasing modern, medium-sized, 3+1, combi-heated, and elevator-free apartments, with housing suitable for the needs of the middle class mostly standing out.

4. Findings

In this study, the validity of the hedonic price model established to analyze the factors affecting housing prices in Yenimahalle district was examined using various statistical tests. To assess the normality of the data set, skewness and kurtosis coefficients were analyzed along with a Q-Q plot graph.

Table 3. Normality Test Results

	Skewness	Kurtosis
Current Situation Assessment	.964	1.006

Source: TAKBİS (Land Registry and Cadastre Information System), Municipalities, and Real Estate Appraisal Report Data Produced by the Researcher.

In this study, the distribution characteristics of the dataset used to determine the variables affecting housing values were examined. Skewness and kurtosis values were used to assess the normality of the data. The skewness value indicates the symmetry of the distribution, while the kurtosis indicates the concentration of extreme values.

As shown in Table 3, the skewness was found to be 0.964 and the kurtosis was found to be 1.006 for the Current Situation Valuation (December 2024) variable. The skewness value falling within the range of -2.5 to +2.5 indicates that the distribution generally has a symmetric structure. Therefore, the normality assumption for parametric analyses (e.g., OLS regression) to be used within the hedonic price model is largely satisfied.

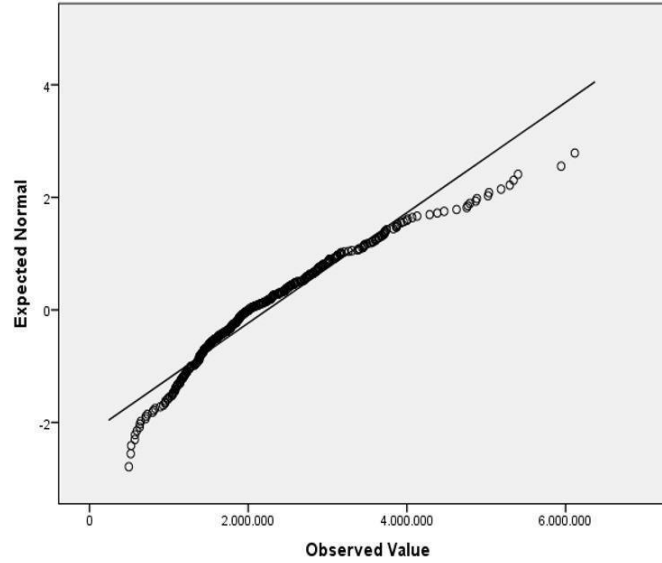


Figure 1. Normal Q-Q Plot of Current Situation Valuation Value.

Source: TAKBİS (Land Registry and Cadastre Information System), Municipalities, and Real Estate Appraisal Report Data Produced by the Researcher.

When examining the Q-Q plot in Figure 1, which shows the suitability of the residuals obtained from the linear model to the normal distribution, it is seen that the regression residuals for the relevant variable largely meet the normal distribution assumption. The fact that the points on the graph are arranged quite close to the diagonal line supports the idea that the residuals are generally normally distributed. However, while a high degree of fit is observed, especially in the central regions, slight deviations are noticeable at the extreme values. In particular, while the points show a high degree of fit with the linear line in the central regions, slight deviations are observed at the extreme points. When evaluated together with the skewness and kurtosis values (skewness ≈ 0.96 ; kurtosis ≈ 1.01), this Q-Q plot suggests that the data is generally quite close to a normal distribution but not exactly normal. However, the fact that the deviations are mostly concentrated in the extreme values does not seriously affect the applicability of parametric analyses (e.g., OLS regression). Therefore, it can be said that the normality assumption is largely satisfied for the "Current Status Valuation Value" variable.

The dependent variable of the model is defined as the logarithmic transformation (Ln) of the current valuation value calculated based on the year 2024. The explanatory variables included in the model were selected from a broad data set and include the gender and qualification information of the buyer and seller, the physical characteristics of the property, the structural quality level, the type of heating system, the type of title deed, the degree of compliance with the project, the expert opinion, and the report date. However, prior to establishing the model, all variables were tested for significance, and only the 13 variables found to be statistically significant were included in the analysis. Among these variables, the key factors with a decisive impact on property value include net area (m²), buyer's commercial identity, total number of floors, building quality class, number of rooms/living rooms/bathrooms, and compliance with

the project. The error term (ϵ) in the model represents uncontrollable variables, It represents the effects of measurement errors and other factors not included in the model.

Correlation analysis was performed to determine the direction and strength of the linear relationship between the variables, and the correlation coefficients obtained showed that there were significant relationships between the relevant variable pairs (Field, 2018; Gürbüz & Şahin, 2018).

Table 4. Correlation Analysis Results Between Research Variables

	1	2	3	4	5	6	7	8	9	10	11
1.Basement Floors	1	0.276	0.007	0.164	-0.175	0.023	-0.240	-0.017	0.146	-0.055	-0.20
2.6-10. Floor	0.276	1	-0.126	0.044	-0.046	-0.182	0.098	-0.062	-0.070	-0.107	-0.209
4.Available Area (0-50 m ²)	0.164	0.044	0.178	1	-0.114	-0.081	0.128	-0.004	0.062	-0.195	0.215
9.Construction Quality (3rd Class Quality-Poor)	0.146	0.070	-0.081	0.062	0.210	-0.024	0.143	-0.054	1	0.054	-0.024
6.Currentut Area (71-90 m ²)	0.023	0.182	-0.086	-0.081	-0.146	1	-0.158	0.047	-0.024	0.056	0.124
3.11.-20th Floor	0.007	0.126	-1	0.178	-0.146	-0.086	-0.099	-0.251	-0.081	-0.057	-0.001
8.Currentut Area (111-150 m ²)	-0.017	0.062	-0.251	-0.004	0.119	0.047	-0.036	1	-0.054	0.041	-0.052
10.Report Date (11 March 2020 Before)	-0.055	0.107	-0.057	-0.195	0.121	0.056	-0.006	0.041	0.054	1	-0.115
5.Curre ntut Area (51-70 m ²)	-0.175	0.046	-0.146	-0.114	1	-0.146	0.222	0.1195	0.210	0.121	0.069
11.Report Date (5 May 2023 and After)	-0.206	0.209	-0.001	0.215	0.069	0.124	0.172	-0.052	-0.024	-0.115	1
7.Currentut Area (91-110 m ²)	-0.240	0.098	-0.099	0.128	0.222	-0.158	1	-0.036	0.143	-0.006	0.172

Source: TAKBİS (Land Registry and Cadastre Information System), Municipalities, and Real Estate Appraisal Report Data Produced by the Researcher.

The levels of connection between the explanatory variables in the model were evaluated using correlation coefficients. It was determined that the relationships between variables remained below the 0.70 threshold. This finding confirmed that the problem of multiple linear regression did not pose a risk in the model.

The correlation coefficients obtained in the study were examined to assess the levels of relationship between the independent variables; it was determined that the relationships between the independent variables generally remained below 0.70 and therefore did not cause multicollinearity. Table 4 shows that there is a weak positive relationship between Basement Floors and Floors 6-10 ($r=0.276$), meaning that these variables tend to move together. There is also an expected positive relationship between Current Area (51-70 m²) and Current Area (91-110 m²) ($r=-0.240$). In contrast, there is a negative correlation between Floors 11-20 and Current Area (111-150 m²) ($r=-0.251$), suggesting that medium-sized apartments are generally less preferred in high-rise buildings. Furthermore, the negative relationships between Basement Floors and Current Area (91-110 m²) ($r=-0.240$) and Basement Floors and Report Date (2023 and Later) ($r=-0.206$) indicate that basement-level residences have a negative impact on market value in terms of both area and reporting periods. This confirms that the model is statistically sound and that there is no strong correlation between the independent variables.

Multicollinearity is a significant problem frequently encountered in multiple regression analyses and requires careful attention. The variance inflation factor (VIF) is used as the basic indicator of this problem, and when the VIF value is 10 or above ($VIF \geq 10$), a serious multicollinearity problem is considered to exist (Adeboye et al., 2014; Albayrak, 2005: 110). Multicollinearity stems from strong relationships between independent variables and negatively impacts the predictive power of the model (Hair et al., 2019).

Table 5. VIF and Tolerance Values of Variables in the Regression Model

Variable	VIF	Tolerance
Basement Floors	1.342	0.745
6th-10th Floors	1,276	0.784
Current Area (91-110 m ²)	1,261	0.793
Current Area (0-50 m ²)	1,240	0.806
Report Date (May 5, 2023 and After)	1,235	0.810
Current Area (51-70 m ²)	1,213	0.824
11th-20th Floors	1,194	0.837
Building Quality (3rd Class Quality - Poor)	1,162	0.860
Current Area (71-90 m ²)	1.132	0.883
Current Area (111-150 m ²)	1,121	0.892
Report Date (Before March 11, 2020)	1.080	0.926

References: TAKBİS (Land Registry and Cadastre Information System), Municipalities, and Real Estate Appraisal Report Data were produced by the researcher.

To determine whether there was multicollinearity among the independent variables, Variance Inflation Factor (VIF) values were calculated and examined to reveal potential relationships between the variables. It is generally accepted in the literature that a variable's VIF value exceeding 10 indicates a serious level of multicollinearity (Kutner et al., 2004; Hair et al., 2019). The results obtained in this study show that the VIF values for all independent variables remained below 2, indicating that multicollinearity does not pose a serious problem in the model.

Multiple linear regression analysis was applied to identify the factors affecting the current value of residences in the Yenimahalle district, and the results obtained are presented in Table 6.

Table 6. Regression Analysis Results for Variables Affecting Housing Value in Yenimahalle District

	Beta	Std. Error	β	T	p	R	R ²	F	p
Model Statistics						0.782	0.611	9.740	.000
Report Date (May 5, 2023 and After)	902751.69	296108.23	0.136	3.049	0.002				
11.and 20. floors	435141,512	143180.9	0.129	3.039	0.000				
6th and 10th floors	343094.11	102215.91	0.138	3.357	0.001				
Residential Building Quality (Class 3Quality-Poor)	- 348,263.473	100,162.97	- 0.160	- 3,480	0.001				
Report Date (11March 2020 Previous)	- 362,921.714	87,736.514	- 0.170	- 4.140	0.000				
Current Area (111-150 sq. ft.)	-585,107.387	128,56824	-0.270	-4,550	0.000				
Basement Floors	-640,451.83	228,733.38	-0.130	-2,800	0.010				
Current Area (71-90m²)	-966,212.564	222,889.99	-0.220	-4,340	0.000				
Current Area (91-110 sq. ft)	-1079230.88	160,175.56	-0.410	-6,740	0.000				
Current Area (51-70m²)	-1466321.22	227,686.94	-0.330	-6,440	0.000				
Current Area (0-50 sq. ft.)	-1785909.42	249,687.80	-0.470	-7.150	0.001				

Source: TAKBİS (Land Registry and Cadastre Information System), Municipalities, and Real Estate Appraisal Report Data Produced by the Researcher.

The results of the regression analysis conducted in the study present important findings regarding the explanatory power of the model on the dependent variable and its relationships with various independent variables. When examining the basic statistical values indicating the overall success of the model, Table 6 shows that the correlation coefficient (R) is 0.782 and the coefficient of determination (R²) is 0.611. According to these results, the independent variables used by the model can explain approximately 61% of the total variance of the dependent variable, indicating that the model has a high explanatory power.

When delving into the details based on the analyzed variables, it is observed that the value of residential properties located on the basement floor is statistically significantly lower (Beta = -640451; $\beta = -0.130$; $p = .010$). This indicates that buyers do not prefer basement apartments, which negatively affects their market value. Similarly, the total area of the residence is also a decisive factor in its value; it has been determined that the value of apartments with smaller floor areas (0-50 m², 51-70 m², 71-90 m², 91-110 m², 111-150 m²) decreases significantly. The greatest negative impact is seen in homes measuring 0-50 m² (Beta = -1.785.909; $\beta = -1.470$; $p < .001$), and it has been determined that this negative impact decreases as the home size increases. Based on this, it is understood that larger apartments are valued higher by the market, while smaller apartments have a significant disadvantage.

Another important finding is the effect of the floor level on the value of the property. According to the regression results, apartments located on the 6th-10th floors and 11th-20th floors were found to be traded at higher values in the markets compared to apartments located on other floors. In particular, the coefficient obtained for the 6th-10th floors (Beta = 343.094; $\beta = 0.138$, $p = .001$) and the value found for the 1st-20th floors (Beta = 435.141; $p = .003$) indicate that apartments on the middle and upper floors are preferred more by investors and buyers. This trend indicates that apartments located on the middle floors have an advantage in the real estate market.

The role of building quality in residential property value was also revealed in the analysis. The value of third-class quality homes, i.e., those built to low standards, decreases significantly (Beta = -348.263; $\beta = -0.163$; $p = .001$). This indicates that as construction quality increases, housing value rises, while low-quality buildings experience a significant loss in value.

Additionally, the appraisal report date emerges as a critical factor influencing housing valuation. It was determined that properties with reports issued prior to March 11, 2020, were associated with lower valuations (Beta = -362,921; $p < .001$). Conversely, reports issued on or after May 5, 2023—corresponding to the post-pandemic period—exhibited a statistically significant and positive contribution to property value (Beta = 902,751; $\beta = 0.136$; $p = .002$). Contemporary appraisal reports more accurately reflect prevailing market conditions, thereby effectively capturing the real value appreciation in the sector.

5. Discussion and Conclusion

In this study, a comprehensive analysis was conducted within the framework of the hedonic price model to determine the factors affecting housing value in the Yenimahalle district of Ankara. The study tested the effects of various variables, such as the physical characteristics of the property, number of floors, construction quality, area size, buyer-seller type, and appraisal report date, on housing prices using a multiple linear regression model. According to the regression analysis findings, the explanatory power of the model is quite high ($R^2 = 0.611$). This indicates that the variables included in the model can explain 61% of the variance in housing prices.

The F-test result was also found to be significant ($F = 9.736$; $p < 0.001$), and it was concluded that the model is generally reliable and statistically significant. One of the most striking findings is that as the size of the housing unit decreases, its value drops significantly. In particular, it was found that homes between 0–50 m² were valued significantly lower than the reference category (Beta = -1.785.909; $\beta = -1.470$; $p < 0.001$). This result indicates that demand for small square meter housing in the market is limited and that home buyers prefer medium-sized housing. This finding is consistent with descriptive statistics showing that the most preferred housing in the area distribution analysis is in the 111–150 m² range.

In terms of floor level, it has been observed that apartments located on the 6th–10th and 11th–20th floors command higher prices. This situation is interpreted as mid-level apartments being in higher demand due to both their scenic advantages and the likelihood of being situated within modern buildings. However, findings also support that apartments located on the ground and basement floors are priced lower (especially for basement floors: Beta = -640.451; $\beta = -0.130$; $p = 0.010$). This situation shows that physical conditions such as access problems, light levels, and humidity can be decisive for residential property value. The literature also emphasizes that high-rise and new buildings are mostly priced higher (Malpezzi, 2003; Cheshire & Sheppard, 1995). In basements and ground floors, physical disadvantages such as light, access, and humidity play a role in lowering prices. Similar analyses conducted by Alkan (2015) specifically for

Ankara also found that the effect of each variable differs across different market segments, but fundamental physical factors universally affect prices.

In terms of building quality, it was determined that the value of housing in third-class (low-quality) buildings decreased significantly ($B = -348.263$; $\beta = -.163$; $p = .001$). This situation reveals that users attach great importance to building quality in their housing preferences and that low-quality buildings are at a disadvantage in the market. This finding is consistent with the observation in descriptive analyses that 63% of buildings are of medium quality. Another important finding is the relationship between the date of the appraisal report and the residential property value. March 11, 2020 (Covid-19) In reports prepared prior to May 5, 2023 (Covid-19), housing values were lower ($Beta = -362.921$; $\beta = -0.170$; $p < 0.001$), while reports dated after May 5, 2023 showed an increase in housing values. ($Beta = 902.751$; $\beta = 0.136$; $p = .002$). This situation reflects the impact of rising housing prices, inflation rates, and supply-demand imbalances on the market in recent years. The finding that the appraisal report date significantly affects prices reflects the increase in housing prices and the supply-demand imbalance in the market in Turkey in recent years. Furthermore, the significance of the report date variable indicates that current appraisals provide values closer to market reality.

Micro-level analyses conducted in areas such as Yenimahalle, which are undergoing urban transformation and have high population density, are of great importance in understanding local dynamics and developing effective policies. The literature indicates that the housing market is spatially segmented (e.g., Yenimahalle and Çankaya districts) and that each segment exhibits its own unique dynamics. This shows that price formation in the housing market is multidimensional and sensitive to local conditions. Furthermore, the findings obtained in this study are consistent with many studies in the literature. For example, studies such as Malpezzi (2003) and Cheshire & Sheppard (1995) also emphasize the impact of housing size, floor level, and building quality on prices. However, the contribution of this study is that it provides a detailed hedonic analysis at the district level and sheds light on the local dynamics of the housing market.

As a result, the main factors negatively affecting residential property values in Yenimahalle district include basement floors, small apartments, and low construction quality, while apartments on middle and upper floors and high construction quality emerged as the most prominent factors positively affecting and increasing the market value of residential properties.

These findings serve as a guide for both real estate professionals and investors in their evaluation and decision-making processes. This analysis, conducted in a developing area such as Yenimahalle in terms of urban transformation and population density, provides insights for policies to be implemented in similar neighborhoods.

Careful management of interest rates for sustainability and stability in the housing market; widespread adoption of public-private financing models; structural measures against rising construction costs; and production based on accurate analysis of regional needs are required. This will prevent excessive price volatility and provide both social and economic benefits.

Arařtırmacıların Katkı Oran Beyanı / Contribution of Authors

Yazarların alıřmadaki katkı oranları Orhan DELİGÖZ %50/ Ender GÜLER %50 řeklinde dir.
The authors' contribution rates in the study are Orhan DELİGÖZ %50/ Ender GÜLER %50 form.

ıkar atıřması Beyanı / Conflict of Interest

alıřmada herhangi bir kurum veya kiři ile ıkar atıřması bulunmamaktadır.
There is no conflict of interest with any institution or person in the study.

İntihal Politikası Beyanı / Plagiarism Policy

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Bu alıřmada Yükseköğretim Kurumları Bilimsel Arařtırma ve Yayın Etięi Yönergesi kapsamında belirtilen kurallara uyulmuřtur.
In this study, the rules specified within the scope of the Higher Education Institutions Scientific Research and Publication Ethics Directive were followed.

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