PRICE BEHAVIOUR IN REAL ESTATE SECTOR

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Price Behaviours in Real Estate Sector
Emlak Piyasası Fiyat Davranışları

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Tez Danışmanının Adı Soyadı (İMZASI) :
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Jüri Üyelerinin Adı Soyadı (İMZASI) :
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Jüri Üyelerinin Adı Soyadı (İMZASI) :
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Tezin Onaylandığı Tarih :
.....

Toplam Sayfa Sayısı:

Anahtar Kelimeler (Türkçe)
1) Emlak
2) Fiyat
3) İstanbul
4) Çoklu Regresyon

Anahtar Kelimeler (İngilizce)
1) Real Estate
2) Price
3) İstanbul
4) Multiple Regression

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Abstract:

The aim of this study is to determine the most used Real Estate Valuation Methods in Istanbul Real Estate Sector and determine the value of the Real Estates according to these methods and see if the price determination is made efficiently and effectively in Istanbul Real Estate Sector. The scope of this study is to determine the most effective factors on the value of the real estates. and As the result of the study usable area of the real estate, construction quality of the real estate, number of the rooms in the real estate, age of the real estate, car garage opportunity of the real estate.

Özet :

Bu çalışma ile Emlak Fiyatlarını etkileyen temel değişkenler tespit edilip, bu değişkenlere göre İstanbul İlinde şeçilen bölgelerde bu değişkenlere dayalı bir fiyat incelemesi uygulama çalışması yapılmıştır. Çalışmada kullanılabilir emlak alanı, emalk yapı malzemesi kalitesi, emlakta yer alan oda sayısı, emlağın yaşı, emlakta garaj bulunma durumu değişkenlerine gore fiyat analizi gerçekleştirilmiştir.

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ABSTRACT

1. INTRODUCTION

Istanbul is the biggest city in Turkey both for population and economic activity. The city generates nearly 45% of the GDP of Turkey and city accommodates 69% of foreign investments to Turkey. The city has a population of 9,198,809 at year 2003. The expected population of the city at year 2030 is 15.800,000. The city generates more than 40 billion dollars by service industry per year. This economic and population existence, as a result generates a strong demand for the real estate.

1.1 Definition Of The Problem

The demographic dynamics in Turkey struggle the population of Istanbul increase heavily recent years as seen on Table 1.

Table 1: Istanbul Population Trend

Years	Population
2000 Realized	8.8 million
2003 Realized	9.6 million
2030 Expectation	15.8 million
2050 Expectation	17.8 million

Source: United Nations Development Program 2002 and DİE Turkish Population Stats

The supply and production of the real estate in recent decades could not reach the population growth. A real estate gap occurred in Istanbul as seen on Table 2.

Table 2: Legal Real Estate Gap in Istanbul

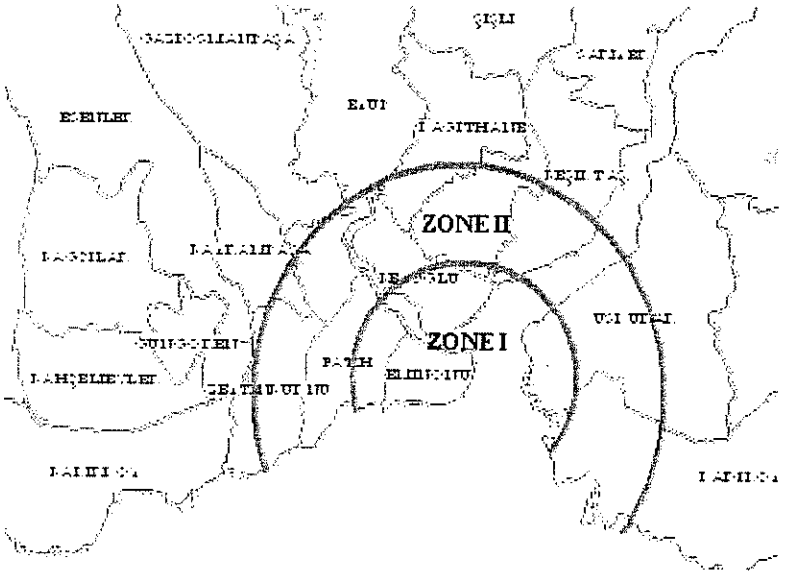
	2000	2010
Real Estate Demand	2.542.651	3.299.004
Legally Authorized Real Estate Supply	1.518.441	2.118.538
Legal Real Estate Gap	-1.024.210	-1.180.466

Source: 2000-2010 Turkey Real Estate Demand, May 2002, TC Konut Müsteşarlığı

This growth structure increased number of illegal real estates with low construction quality, fluctuations on real estate prices, real estate price dissimilarities between different regions in İstanbul (Giritlioğlu, 1996).

Differentiation in demographics, social and cultural factors causes 70.8% of Istanbul population to change their location in the city (Dökmeci and others, 1994). This increases liquidity, number of occurred transactions in real estate sector and increases ratio of real estate investments in total investments.

Figure 1: Zoning, two highly concentrated real estate zones in Istanbul.



In Istanbul 60% of the real estates have more than 20 years age which completed their economical life, 55% of them are illegally build. 40% of real estates which have more than 20 years age need amendments and modifications. As a result of this, the city also expands to new zone areas, outside of ZONE II (Figure 1) which increases demand on new zoning areas and reduces demand on older parts of the city or converts the residential real estates to commercial real estates on older parts especially ZONE I of Figure 1.

This reality also increases demand to newly built real estates in ZONE I and ZONE II. The price gap between older and younger real estates can easily be seen with a glance to the dataset at Appendix A.

High inflation rates before year 2000, insufficient pension/retirement funds or social support opportunities at older ages also have increased investments on real estate sector. Real estate investors increased their demand to real estate to protect their wealth and to obtain a comfort with the lack of social security. In developed countries 25% of total investments are made on real estate but in Istanbul this proportion increases up to nearly 40% because of such factors.

1.2 Definition Of The Thesis Subject

The scope of this study is, defining the factors that affect real estate prices, collecting a data of real estate prices and features from appraisal companies by a survey method and analyze this data with the help of multivariate regression analysis method. For this aim central legal build up areas in Istanbul are chosen from ZONE I and ZONE II of Figure 1 and counties Beşiktaş, Beyoğlu, Kadıköy and Şişli are determined for analysis. A dataset of environmental and physical features of the real estates within these areas are obtained from appraisal companies (Appendix-B).

Previous studies and real estate finance literature states that the price of the real estate is mainly determined by two groups of factors. First is the environmental factors surround the real estate and second physical conditions of the real estate. To focus on the effects of second group factors, a subset of data is generated from dissimilar environment within the same legistlative borders. For this reason real estates are grouped as sub locations.

Macro economical variables specific to Turkey are not included into the study. Because all of the real estates have the same macro economic conditions and determining macro economic variable effects on real estate is out of the scope of this study.

Residential real estates are preferred in the study, because of lack ness of the data on other types of real estates and difficulty of grouping similar real estates according to their environmental variables.

1.3 Content and Subject Of The Study

Determining "Price Behaviors in The Real Estate Sector", sales price of the real estates are assumed as dependent variables and physical conditions of the real estate are taken as dependent variables. Independent variables are determined by both literature study on real estate finance and by survey results to appraisers in appraisal companies.

Study has 5 chapters. Introduction, literature review and conclusions are included in the study. In the introduction part overall perspective of demographic and physical structure of the city related to the real estate sector, definition of the problem, definition of the thesis subject, content and the subject of the study are given.

In the second chapter a literature review of the study of the real estate finance is given, to define the theoretical background of the thesis with different studies.

Hypothesis is explained in the third chapter of the study with its details.

Chapter 4 explains study results of the thesis for sub locations and study results for Istanbul overall. The effects of different price determinants for different sub locations are explained with the constraints of the study.

Chapter 5 is the conclusion of the thesis for the real estate pricing behaviors in Istanbul Real Estate Market.

2. LITERATURE ON REAL ESTATE FINANCE

2.1 What is Real Estate Market Analysis?

Real estate market analysis is conclusion of investigating and reporting a high number of factors that determine a demand decision for real estates, supply decision of real estate and the geographic frontiers of real estate market area (Thrall, 2002).

Real estate finance differs from other finance subjects by some specific reasons, these reasons struggle economists to give special interest on Real Estate Finance. The specific reasons that differentiate real estate finance from other financial instruments are:

- Demand and supply is determined on a particular real estate
- Real Estate exists on a specific location, can not be carried.
- Real estate is non tangible

On the demand side, these factors should be taken into accounts which are different than most other financial instruments:

- Population/ households, demographic characters
- Income, affordability, purchasing power
- Employment for regional industries, occupation
- Migration and commuting patterns

On the supply side, these factors should be taken into account:

- Inventory of existing space, units
- Vacancy rates and character of existing property inventory
- Recent absorption of space including types of tenants or buyers
- Projects currently under construction and proposed
- Market rents/sale prices and how they differ by location and quality
- Features, functions and advantages of existing and proposed projects
- Terms and concessions

Also real estates have the following different benefit roles dissimilar to other financial instruments.

- Real estates keeps humans, a good for necessarity.
- Real estates are producible goods in the market.
- Real estates are consumable goods in the market.

- Real estates are investment instruments
- Real estates are a kind of social protection for older owners if they do not have any insurance/retirement or pension funds.
- Real estates are a kind of cultural values in the society.

2.2 Measurements of the Performance of a Real Estate

The essential performance measurements of the Real Estate helps to understand how an income-producing real estate performs at a static time, only one time period.

2.2.1 Net Income Return on Real Estate

Net income return on real estate indicates the relationship between net income and invested capital on real estate.

$$\text{Net Income ROI} = \frac{\text{Gross Income - Operating expenses - Interest - Depreciation}}{\text{Owner's Equity}}$$

2.2.2 Cash Return on Real Estate

Cash return on real estate is the ratio between the remaining cash after the debt service and invested capital, or owners equity. Different from ROI that cash return on investment exludes noncash generating accounts like depreciation expense, but includes nonincome portion of loan payments that are made to principal loan balances.

$$\text{Cash ROI} = \frac{\text{Remaining Cash After Debt Service}}{\text{Cash Investment}}$$

2.2.3 Total Return on Real Estate

The total return on investment has similarities with Cash ROI but in this measurement of performance, the accounted part of the return is not cash, the reduction in principal.

$$\text{Total ROI} = \frac{\text{Remaining Cash After Debt Service + Principal Reduction}}{\text{Cash Investment}}$$

2.2.4 Net Operating Income on Real Estate

Net operating income is remaining income after all operating expenses are paid. This is also amount of income available to service the debt of the property.

Net Operating Income = Gross Income – Total Operating Expenses

2.2.5 Capitalization Ratio on Real Estate

Capitalization ratio is a ratio between net operating income and sale price. This is a relevant measurement, rates can change from market to market.

Capitalization Ratio = (Net Operating Income) / (Sales Price)

2.2.6 Debt Service Coverage Ratio(DSCR) on Real Estate

Debt service coverage ratio measures the relationship between available cash after operating expenses paid and the cash required to make debt payments

Debt Service Coverage Ratio = Net Operating Income/ (Principal + Interest)

2.2.7 Turnover Ratio on Real Estate

Operating efficiency ratio measures the operating expenses of a real estate investment according to its area.

Operating efficiency Ratio = Total Operating Expenses / Area of the Real Estate

2.2.8 Gross Rent Multiplier on Real Estate

Gross rent multiplier measures the relation between the total purchase price of a property and its gross scheduled income.

Gross Rent Multiplier = Purchase Price / Gross Scheduled Income

2.2.9 Operating Ratio on Real Estate

Operating ratio is ratio between total operating expenses and gross income.

Operating Ratio = Total Operating Expenses / Gross Income

2.2.10 Break-even Ratio on Real Estate

Break even ratio measures relationship between total cash in and total cash out.

Break-even Ratio = (Total Operating Expenses + Debt Service) / Gross Income

2.3 Basic Real Estate Investment Analysis Methods

Most of the studies on Real Estate are obtained from sources from American Researches and studies and normal , as we know that Real Estate Pricing differs from country to

country, however applications, methodology and modeling are quantitative factors and their studies are helpful to use (Berges, 2004).

2.3.1 Future Value Analysis Method

Future value analysis determined the value of the real estate investment for multiple periods of time with using a compounding technique.

$$\text{Future Value} = (i+1)^n \text{Present Value}$$

2.3.2 Present Value Analysis Method

The same formula applies to Present Value Analysis Method as Future Value Analysis Method. The discount rate is used to determine the value of the real estate from the future value of a real estate.

$$\text{Present Value} = \frac{\text{Future Value}}{(i+1)^n}$$

2.3.3 Net Present Value Analysis Method

In net present value analysis the cost of the investment is known by the appraiser. Present Value is used to discount the value of asset back at a pre determined rate of return. If the present value is bigger than the cost than, positive net present value occurs, this means a profitable investment.

Net Present Value = Present Value – Cost

2.3.4 Internal Rate of Return Method

Internal rate of return measures the yield or rate of return on an investment rather than its present value. Present value is assumed to be initial cost of the real estate.

2.4 Real Estate Pricing Principles

2.4.1 Principles That Widely Effect Real Estate Price

Following principles have a wide effect on the market value of the real estate.

2.4.1.1 Progression Principle

Borukhov, Ginsberg and Werchzberger(1978) in their study showed that market value of the real estate increases with the existence of similar higher quality real estates in similar location. Arbitrage opportunities exist for real estate investors by buying cheaper real estates in such locations.

2.4.1.2 Regression Principle

Again from the study of Borukhov, Ginsberg and Werchzberger(1978) market value of the real estate decreases with the existence of similar lower quality real estates in similar location as opposed to progression principle. This principle reduces the effects of contribution principle. The cost of a new improvement may not increase the value of the real estate.

Also Rabiega, Lin Robinson (1984) in their study at Portland showed that when a poorer group of people, different ethnical group of people or poor quality real estates surrounds the location, the prices of the real estates drops dramatically.

2.4.1.3 Conformity Principle

Appreciation value of a real estate is similar to the neighboring real estates. This principle limits valuation increases from the real estate specific factors like construction quality, real estate age, utility features, garage opportunity and etc (Li and Brown, 1980)...

2.4.1.4 Substitution Principle

The market value of a real estate is affected by the existence of substitutable similar real estate. This principle limits the value of a real estate with the other similar real estate existence in the same location. Lower-priced real estate tends to be demanded first among substitutable real estates.

2.4.1.5 Change Principle

Changes on environment affects the price of the real estate such as, character of the city, location or neighborhood, natural events in the location (ie earthquakes), local economical and demographical trends, physical age and condition of the real estate.

Murdock, Singh and Thrayer(1993) showed that the effect of earthquake has a negative effect on real estate prices. This effect is less in bigger cities like San Francisco, but have a 2% direct negative effect on real estate prices.

2.4.1.6 Anticipation Principle

Expectations of the actors/investors in real estate sector as with other financial markets have an effect on the future value of the real estate. This principle can be in two categories:

a) Commercial Real Estates: Valuation is net present value calculation of the future cash flows.
b) Residential Real Estates: Valuation is the value of the future benefit obtained from the real estate.

2.4.1.7 Contribution Principle

An improvement on the real estate increases the value of the real estate as a factor of current demand and supply functions. Real Estate value increments are controlled by increasing returns and diminishing returns.

2.4.1.8 Plottage Principle

Consistency on the ownership of the real estate increases the value of the real estate. Real estate value tended to increase with the combination of adjacent lots to a single zoning and single ownership.

2.4.1.9 The Highest and The Best Usage Principle

The usage aim of the real estate increases the value of the real estate; good utilization of the real estate increases its value. Legal, physical and economic benefits of ownership, plus social commitments to a community at a large increases the value of the real estate.

2.4.1.10 Competition Principle

A different opportunity for profitable investment leads to competition which increases the value of the real estate with the increasing demand on to the real estate.

2.4.2 Real Estate Pricing Factors

Real estate valuation categorizes the factors that effect real estate value into two groups.

2.4.2.1 Pricing Factors Specific To The Real Estate

Real estate specific features concerned with the real estate are stated as physical features, utility obtained from real estate, shortage or surplus in the market and negotiable character of the real estate.

2.4.2.1.1 Physical Factors On Real Estate Pricing

Construction quality, workmanship in some cases, age, usable area, utilities used, overall view of the real estates are mostly common physical features.

2.4.2.1.2 Utility Factor On Real Estate Pricing

Benefit obtained by the owner of the real estate or benefit for the potential buyer of the real estate.

2.4.2.1.3 Shortage/Surplus Factor In The Real Estate Market

As main demand and supply affect on prices the demand bigger than the supply increases the value of the real estate and real estate surplus in the market decreases the value of the real estate.

2.4.2.1.4 Negotiable Characteristic Of The Real Estate

In some cases real estates can not be conveyed to other parties, these real estates have no market value.

2.4.2.2 Environmental Factors On Real Estate Pricing

Environmental features are concerned with economical conditions in location, social and cultural features, legislative features and location, population, nature events, security, distance to social and commercial areas, public services, marketability, features.

2.4.2.2.1 Economical Factors On Real Estate Pricing

Interest rates, rental returns of real estates, mortgage credits rates, legislative influence and macro economical variables of the country are most common economical features that have affect on real estate value.

2.4.2.2.2 Social and Cultural Factors On Real Estate Pricing

Demographics, traffic in the location, noise, urban planning and architectural design of the location has affect on pricing real estates.

2.4.2.2.3 Legislative Factors On Real Estate Pricing

Land registry regulations, city plan, ownership rights related to real estate, municipal decisions on land zone and public investments on neighboring locations has affects on real estate prices.

2.4.2.2.4 Population Factor On Real Estate Pricing

Recent or future population of the location has affect on real estate value. Mostly residential real estate buyers are not interested in future level of the population, buyers for investment purposes, choose a higher level of population in the location. Higher population increases demand and provides transactions.

2.4.2.2.5 Natural Event Factor On Real Estate Pricing

Resistance of the real estate to nature events, public intervention opportunities after a nature event, geographic features of the real estate location has affect on real estate value.

2.4.2.2.6 Security Factor On Real Estate Pricing

Adequate security possibility increases the price of the real estate.

2.4.2.2.7 Distance To Social and Commercial Areas

Distance to social areas, hospitals, commercial areas, shopping centers, airports, schools or an official building has an effect on real estate values.

2.4.2.2.8 Marketability as a Factor On Real Estate Prices

Marketability has a direct effect on the price of the real estate. Especially for mortgaged real estates, banking sector tries to calculate marketing period of the real estate.

2.4.3 The Common Methods Used in Istanbul Real Estate Sector

International academic literature on real estate and survey used in this study showed that three traditional common methods are widely used by real estate appraisers in Turkey and at international real estate community. Turkish studies (Alp. 2000; Kavrakoğlu. 1983) in real estate also use these methods extensively.

These traditional methods are : Sales Comparison, Income and Cost Approach Methods(Alp, 2000).

2.4.3.1. Comparison Method

Most widely used method in valuation is the sales comparison method in determining the value of the real estate. The basic assumption for comparison method is "the value of the real estate is related with the sold price of the similar real estate instruments in the similar region". Price differences are coming from the location of the real asset within the region, age of the real asset, quality of the construction of the real asset, the date of the previous sales in the region and neighborhood real estate properties, location of the real estate, overall condition of the real estate, functional utility features of the real estate.

This method follows a 4 stage:

- Collecting the market price data for the most similar real estate that can be comparable.
- With the price data making pricing adjustments according to the features of the real estates or like making time adjustments on price.
- Use several estimates of the real estate price values to arrive at an estimate oof market value.
- Present the results for reviewing.

This method is widely used method by the real estate sector professionals. by the Turkish Court Experts and real estate buyers but I have not seen any professional comparison analysis with developed tables and comparison software for making such estimation. The strong point is this relies on an accurate data for recent developments and conditions and seen as a reliable method for unprofessional real estate buyers like family house buyers.

2.4.3.2 The Investment/Income Capitalization Method

The income generation of the real estate is taken for calculation of the real estate valuation. The present value of the future income stream is derived from the cost of the ownership of the real estate. Especially used by the commercial real estate valuation if there is an opportunity of estimating net income from the real estate. Land usage time period is accepted as infinitive. building usage time period is determined by the economical value of the real estate.

2.4.3.3. Cost (Replacement Cost) Method

Net cash flows for developing real estate and amortizations of such costs are tried to be estimated. Amortization is reduced from replacement value of the real estate and value of a compared land value is added to this difference. This method approximately calculates the upper level of the cost of the real estate. This method is mainly used for insurance of the real estate and depreciation purposes.

Commercial Centers, shopping centers, manufacturing plants, hotels and in such real estates where it is difficult to determine net income are valued with this method.

2.5 Environmental Determinants of Real Estate Price

Real estate prices are both determined by environmental variables and physical variable related to that real estate (Huh and Kwak, 1997).

Environmental variables change at every different sub location in the city and have different effects on real estate prices city (Huh and Kwak, 1997). For a metropolitan area like Istanbul grouping the dataset according to sub locations in the city eliminates the different effects of environmental variables on different location. For this reason our dataset is grouped according to their sub locations to terminate the effects of the environment. These groups separately analyzed by multivariate regression analysis with different sub locations. Every variable has different effect on different sub locations on real estate prices and these effects can be determined by multivariate regression analysis.

2.5.1 Distance Effect To City Center

Distance of the real estate to the commercial areas has an affect on the real estate price. Five studies (Daniere, 1994; Curto, Bravi and Fregonora, 1993; Mozolin, 1994; Beckman, 1969; Solow, 1972) stated that when distance increases to central commercial areas, distance has negative effect on real estate prices. As opposed to these studies more detailed studies of (Li and Brown, 1980; Curto, Bravi and Fregonora, 1993; Freeman, 1993) stated that easy transportation is more important than distance from commercial or central areas.

Some researchers refused the effect of distance to commercial areas, but accepted that easy and effective transportation opportunity from real estate to commercial area has positive effect on the price of the real estate. Wilkinson (1971), refused the effect of transportation on real estate prices, but later Wilkinson (1974) resulted that for far away locations transportation opportunities and distance to city center has effect on real estate prices.

Some studies (Alonso, 1964; Brigham, 1965; Lane, 1970; Muth, 1969; Wabe, 1971) stated that real estate distance from the city center affects the price of the real estate. These studies have been made on single centered cities; Istanbul is a multi centered city. For this fact with the help of the research of Li and Brown (1980), it is seen that transportation availabilities to central business area is more important variable on real estate valuation.

2.5.2 Natural Events

Nature has effect on the price of the real estates. From a native observation in Istanbul real estates near to Bosphorus have much prices than other real estates and real estates who has a view to the Bosphorus have bigger prices than their neighbor real estates.

Harmful natural events like earthquakes, tsunami and etc... are have effect on real estate prices (Barka and Er, 2002).

For Istanbul, studies like Barka and Er (2002) stated that earthquake risk is mostly defined by of construction quality of real estates by appraisers and academicians studies. On the study of Erdik (2001) age of building is an important factor rather than the earthquake effect on prices.

In addition to these studies Murdoch, Sing and Thayer (1993) showed that metropolitan cities earthquake risk does not have a meaningful effect on real estate prices. Murdoch, Sing and Thayer (1993), concluded that San Francisco earthquake only affected 2% on real estate prices, other factors has major influence on real estate prices.

3. Hypothesis and Research Method

3.1 Hypothesis

First it is tried to determine the key factors that affect the price and value of the real estate in world real estate academic literature and in Istanbul. The factors that affect real estate are obtained from a literature review of the real estate finance. For the factors that affect Istanbul Real Estate prices, interviews and surveys with appraisers at appraisal companies are used (Appendix B). With the studies on the real estate finance and interviews with the appraisers it is seen that valuation of the real estate is affected by both the environmental variables and common physical conditions specific to the real estate.

As stated from literature review of the study dataset is divided into sub locations to eliminate the effect of environmental variables on locations.

On this study we assume that with similar environmental variables we can determine the effects of physical conditions of the real estate on the price of the real estate. It is also assumed that these physical conditions of the real estates have different weights on the value of the property and these weights can be obtained from statistical analysis.

3.2 Research Method

3.2.1 Data Collection

Planned zones in Istanbul are taken as the dataset source of the real estate prices. In this dataset, data is diversified to group common environmental features for real estates. The real estates in each subset also have similarities in physical conditions. Streets with higher real estate transactions and their neighboring streets are determined for subsets.

All data is obtained from occurred transactions of appraisal companies by surveys. As we learned from previous studies on literature review on real estate to endure homogeneity, wooden-based real estates, parts of big buildings with single ownership, real estates with highest and lowest features, real estates sold by public organizations, real estates owned publicly (schools, museums, religious buildings, police stations, sold offices owned by municipals etc) are not taken for calculations.

Data is obtained from locations Beyoğlu, Beşiktaş, Kadıköy and Şişli. These towns are near towns to Istanbul Historical Center, and biggest commercial area Eminönü For this reason distance from city center is not taken as a variable that affect the value of the real estate.

The studies on literature review show us that our chosen locations for our study have no transportation and distance problems. The distance is not taken as a determinant of real estate price.

This study has taken neighboring towns to city commercial center Eminönü. As seen from Figure 1, chosen towns are in a 15-30 km diameter of Eminönü. Further away towns and their sub locations are not taken because of different transportation structure and their closeness to alternative work and commercial areas. These sub locations have similar transportation opportunities to the city center. So, the distance effect to the city center on real estates in these sub locations are terminated.

These chosen towns have showed a big improvement last decades and their expansion growth is slowed. For this stability on population and newly constructed buildings these towns are taken for analysis.

In this study, it is not tried to determine a variable that can define and measure the effect of an expected earthquake risk in Istanbul on real estate prices. Literature study showed us that in Istanbul earthquake does not have an important role on real estate prices. In the concept of this study we cannot find a specific variable for earthquake effect on real estate prices.

New Turkish Lira is used for the price information unit in the study. New Turkish Lira has experienced enough periods for stability and opposed to previous studies on Istanbul Real Estate Sector, the occurred real estate price units with United States Dollar or European Currency are converted to New Turkish Lira with sale occurrence date effective currency parity.

3.2.2 Multivariate Regression Method

Richardson, Vipond and Furbey (1974) mentions that data should be obtained from occurred sale prices. data has to be obtained directly related streets and criteria of the buyers of the real estate has to be evaluated and pricing research is better with multiple regression analysis method, with this scope occurred prices are obtained form the dataset.

By the scope of this study physical features of real estates are taken as dependent variables that has effect on real estate prices form the literature review. .

Goodman (1978) mentioned that the age of the real estate negatively affects the price of the real estate. Age variable of real estates are taken as a dependent variable for real estates pricing analysis.

Utilities of the real estate have a positive effect on the price behavior of the real estate. More beneficial utilities to the potential buyers increase the value of the real estate. and bid offers to the real estate (Türel, 1981).

Sales price of the real estate is taken as dependent variable. Other variables are used as independent variables. These variables are:

1-) Usable area of the real estate: The total usable and beneficial area of the real estate to the buyer. Area unit is meter squares. Increase in the usable area in the real estate increases the benefit and price of the real estate. The highest and best usage principle of conforms that usable area increases the price of the real estate.

2-) Age of the real estate: Time difference of building year and latest sale year of the real estate. Age unit is taken as years. Price and age of the real estate are negatively correlated (Goodman, 1978).

3-) Functional Utilities in real estate: Beneficial and functional utilities in real estate increase the value of the real estate. Türel (1981) concluded that elevator utility has a positive effect on the price of real estates in Ankara.

4-) Construction Quality of the real estate: Adequate quality of the construction has positive effect on the real estate price. Academic studies (Li and Brown, 1980; Borukhov, Ginsberg and Werzeberger, 1978; Ball, 1973; Kain and Quigley, 1970) concluded that construction quality has positive effect on real estate prices.

5-) Number of rooms in real estate: The survey results showed that appraisers in Istanbul and residential real estate buyers give importance on the room number of the real estate.

6-) Car parking opportunity: Garage opportunity of a real estate has a positive effect on the value of the real estate.

These variables are also seen as the most effective factors on real estate prices on the study of Kain and Quiqley (1970). The data is not analysed on time series basis, cross section data is used for the study.

4. RESEARCH RESULTS

In this chapter the results of the surveys and multivariate regression analysis results are evaluated. The groups of sub datasets are examined by the variables of the multivariate regression analysis. SPSS statistics software version 10 is used for the estimations.

4.1 Results for Beşiktaş

Town Features: 190.081 population according to 2000 census of population, 11.000 km^2 land area.

Two different sub locations are examined for Beşiktaş, they have differences on descriptive statistics of the both sub locations. Most important features that affect price in Beşiktaş are area of the building, age of the building and construction quality of the building. Garage property seems to be less important at Levent/Etiler/Bebek sub location

but in Barbaros/Bamumcu sub location it is seen that real estates with a garage opportunity are preferred by potential buyers. One reason of this is more commercial areas and heavy traffic of that sub location increases the demand for a free garage opportunity. Levent/Etiler/Bebek sub location is newly built according to other sub location for this reason. garage and parking needs are maintained to visitors or residential of that region. Also overall price level of this sub location is higher than the Barbaros/Balmumcu sublocation.

Construction quality of Barbaros/Balmumcu sub location is lower. which also satisfies the studies and principles that states construction quality has an effect on prices.

4.1.1 Results for Levent/Etiler/Bebek Sublocation

Descriptive Statistics :

Average Real Estate Price is (YTL)	: 392.147
Unit Price per m^2 (YTL)	: 2543.10
Average Real Estate Area m^2	: 154.2
Average Number of Rooms	: 4.94
Average Age of Real Estates (years)	: 11.14

The overall price level of the real estate in this sub location is higher than from Barbaros/Balmumcu sub location. Also unit price per m^2 is higher too. Average ages of the buildings in Levent/Etiler/Bebek is less than from Barbaros/Balmumcu. It is obvious with these data that the standarts of the real estates at Levent/Etiler/Bebek is higher than from Barbaros/Balmumcu. Construction quality. garage opportunity effects on real estate price is less important than Barbaros/Balmumcu sub location. When we look at the environmental features of in Levent/Etiler/Bebek sub location a higher income population, newly build real estates, more recreational areas around increases the value of the real estates in in Levent/Etiler/Bebek. Within this sub location model has a performance of 66% determining the factors that effect real estate prices. Utility opportunity has a 61% share on real estate price determination while we accept 100% of price is determined by physical factors with 95% confidence level.

Table 3: Regression Results for Levent/Etiler/Bebek

Dependent variable: BESIKTAS_SALE_PRICE

R-squared	= ,66312
Adjusted R-squared	= ,81432
standart Error	= 1630,856211
F	= 131,213
Signif F	= ,0000

********** variables in the equation **********

Variable	B	SE B	Beta	T	Sig T
BESIKTAS_AREA	9,365498	4,026158	,254698	3,176	,0039
BESIKTAS_AGE	59,187947	3,417100	,194440	4,982	,0001
BESIKTAS_UTILITY	519,286409	31,154632	,167296	4,378	,0018
BESIKTAS_CONS_QUALITY	254,276549	12,457596	,550507	8,365	,0000
C	-912,265494	102,523214		-4,128	,0088

4.1.2 Results for Balmumcu/Barbaros Sublocation

Descriptive Statistics:

Average Real Estate Price is (YTL)	: 208.855
Unit Price per m^2 (YTL)	: 1639. 36
Average Real Estate Area m^2	: 127.4
Average Number of Rooms	: 4.31
Average Age of Real Estates (years)	: 15.44

Garage opportunity is more important at Barbaros/Balmumcu than in Levent / Etiler / Bebek. The main reason for this result is the commercial real estate demand and supply is higher in this area and their need for garage is higher than other parts of Besiktas. Building qualities are less important but numbers of the rooms for real estates are getting important in this sub location than utility usage and construction quality. Within this sub location model has a performance of 61% determining the factors that effect real estate

prices. Garage opportunity has a 59% share on real estate price determination while we accept 100% of price is determined by physical factors with 95% confidence level.

Table 4: Regression Results for Barbaros / Balmumcu

Dependent variable: BESIKTAS2_SALE_PRICE

R-squared	= ,61284
Adjusted R-squared	= ,782840
Standart Error	= 1412,46824
F	= 142,48975
Signif F	= ,0000

********** Variables in the equation **********

Variable	B	SE B	Beta	T	Sig T
BESIKTAS2_GARAGE	956,264097	256,458623	,342765	4,465	,0034
BESIKTAS2_CONS_QUALITY	477,569376	75,145632	,438756	5,654	,0000
C	-932,476246	886,145896		-,953	,0095

4.2 Results for Beyoğlu

Town Features : 231.900 population according to 2000 census of population, 11,000 km² land area.

Descriptive Statistics:

Average Real Estate Price is (YTL)	: 140.481
Unit Price per m² (YTL)	: 1271.89
Average Real Estate Area m²	: 110.45
Average Number of Rooms	: 3.63
Average Age of Real Estates (years)	: 29.9

Construction quality is the main determinant of the price and real estate preference at Beyoğlu with the help of results on Table 5. Signif T < 0.05. Beyoğlu has the lowest prices for real estates in our study. This mainly happens from environmental features of Beyoğlu, where population quality affects real estate prices. Transportation and distance to commercial areas are very near at Beyoğlu but this advantageous factor does not help to increase the price of real estates in Beyoğlu. Also Beyoglu has the biggest age real

estates within the location examined in this study. Construction quality has a 41% share on real estate price determination while we accept 100% of price is determined by physical factors with 95% confidence level.

Table 5: Regression Results for Beyoğlu

Dependent Variable: BEYOGLU_SALE_PRICE

R-squared	= ,43276
Adjusted R-squared	= ,65784
Standart Error	= 786,148756
F	= 4,463987
Signif F	= ,0027

********** Variables in the equation **********

Variable	B	SE B	Beta	T	Sig T
BEYOGLU_AGE	35,128740	9,005321	,028743	4,243	,0062
BEYOGLU_UTILITY	412,275097	324,564205	,187452	2,436	,0091
BEYOGLU_CONS_QUALITY	674,745296	287,546892	,619867	5,231	,0016
C	-123,432597	720,256315		-,128	,0077

4.3 Results for Kadıköy

Town Features: 663.299 according to 2000 census of population, 33 km² land area.

Descriptive Statistics:

Average Real Estate Price is (YTL)	: 280.890
Unit Price per m² (YTL)	: 1750. 65
Average Real Estate Area m²	:160. 54
Average Number of Rooms	: 5.35
Average Age of Real Estates (years)	: 16.07

The most effective price determinants are (with Signif T $\leq$ 0.05) are garage opportunity and area of the real estate. Kadıköy sub location has the highest average room number among the locations in the study. This determined that more rooms are preferable in this region and this location the most highest real estate areas. This satisfies that mostly residential real estate number is higher in this region. Within this sub location model has

a performance of 57% determining the factors that effect real estate prices. Garage opportunity has a 35% share on real estate price determination while we accept 100% of price is determined by physical factors with 95% confidence level.

Table 6: Regression Results for Kadıköy.

Dependent Variable: KADIKOY_SALE_PRICE

R-squared	= ,57653
Adjusted R-squared	= ,75929
Standart Error	= 1875,65398
F	= 62,35472
Signif F	= ,00000

********** Variables in the equation **********

Variable	B	SE B	Beta	T	Sig T
KADIKOY_AREA	39,548943	4,458632	,726134	5,454	,0001
KADIKOY_ROOM_NO	-295,126794	372,523654	-,165050	-,421	,0054
KADIKOY_GARAGE	876,276543	416,235698	,386187	3,654	,0064
C	-2512,387645	856,256389		-1,896	,0078

4.4 Results for Şişli

Town Features: 270,674 populations according to 2000 census of population. 25 km² land area.

From the dataset we obtained that this region has the highest frequency in older buildings especially sub location Nişantaşı/Teşvikiye/Maçka. For this sub location construction quality, real estate age and garage are the highest determinants of real estate prices in general.

4.4.1 Results for Nişantaşı/Teşvikiye/Maçka Sublocation

Descriptive Statistics:

Average Real Estate Price is (YTL)	: 300.195
Unit Price per m² (YTL)	: 2209. 42
Average Real Estate Area m²	:135.87
Average Number of Rooms	: 3.92
Average Age of Real Estates (years)	: 24.51

Garage opportunity is important for both Nişantaşı/Teşvikiye/Maçka and Mecidiyeköy sub locations, but for Mecidiyeköy garage opportunity is less important. Construction Quality is more important in Mecidiyekoy than for Nişantaşı/Teşvikiye/Maçka sub location. As we look at the price of the real estates the newly build and especially buildings with steel construction have higher sale prices. Also at Mecidiyeköy Region most of the real estates have their own garage. Average age of the buildings are higher in Nişantaşı/Teşvikiye/Maçka than Mecidiyekoy, but real estate price is higher for both unique price of real estate and unit price per m^2. This should be explained with the environmental factor differences between Mecidiyekoy and Nişantaşı/Teşvikiye/Maçka. Creational areas, hospital, school, social level and etc... has more impact on prices than the age of the buildings in and Nişantaşı/Teşvikiye/Maçka. Garage opportunity has a 39.1% share on real estate price determination while we accept 100% of price is determined by physical factors with 95% confidence level.

Table 7: Regression Results for Nişantaşı/Teşvikiye/Maçka

Dependent Variable: SISLI_SALE_PRICE

R-squared	= ,47643
Adjusted R-squared	= ,69023
standart Error	= 987,354673
F	= 73,36543
Signif F	= ,0000

********** Variables in the equation **********

Variable	B	SE B	Beta	T	Sig T
SISLI_AREA	20,376590	3,776201	,165439	5,271	,0001
SISLI_AGE	21,127538	4,684179	,376490	3,175	,0049
SISLI_GARAGE	714,349865	152,253698	,376549	5,140	,0001
SISLI_CONS_QUALITY	96,387197	36,024156	,287643	3,175	,0045
C	65,476292	380,456321		,176	,0091

4.4.2 Results for Mecidiyeköy Sublocation

Descriptive Statistics:

Average Real Estate Price is (YTL)	: 194.000
Unit Price per m^2 (YTL)	: 1454, 92
Average Real Estate Area m^2	:133.34
Average Number of Rooms	: 4.06
Average Age of Real Estates (years)	: 15.25

In Mecidiyeköy the area of the real estate is more important than the other locations. This can satisfy us that mainly commercial real estates are demanded in Mecidiyekoy sub location in which commercial units need better and wider office opportunities. Also from native look to this region most of the offices are combination of different real estates, and a handicap for better office environment. This necessarily pushes office supply to the Maslak region where construction quality is higher than this sub location. Real Estate area has a 39% share on real estate price determination while we accept 100% of price is determined by physical factors with 95% confidence level.

Table 8: Regression Results for Mecidiyeköy.

Dependent Variable: SISLI2_SALE_PRICE

R-squared	= ,44538
Adjusted R-squared	= ,44310
standart Error	= 1346,53302
F	= 753,53660
Signif F	= ,0000

********** Variables in the equation **********

Variable	B	SE	Beta	T	Sig T
SISLI2_AREA	12,631254	4,409563	,332117	11,324	,0000
SISLI2_ROOM_NO	-215,123648	75,145632	-,075889	-2,723	,0065
SISLI2_AGE	32,613244	4,137294	,153458	7,574	,0000
SISLI2_GARAGE	394,153486	76,475632	,151262	6,413	,0000
SISLI2_UTILITY	235,425315	40,215634	,096719	4,669	,0000
SISLI2_CONS_QUALITY	253,056412	16,215445	,363010	14,957	,0000
C	-1234,401253	132,125478		-8,067	,0000

5. CONCLUSION

Analysis of real estate prices according to environmental factors and physical features of real estate is one of the major studies in real estate pricing. This study is an academic research area from the first study of Alonso (1964) on this subject. Istanbul as the biggest city of Turkey is examined within the borders of this study.

In this study, variables that affect real estate prices are determined and analyzed on selected sub locations of Istanbul. The results are evaluated in the scope of the study. 532 real estates are analyzed in the study.

Sales price is taken as a dependent variable in the study. Sales price is defined with independent variables like area of the real estate, room number of the real estate, age of

the real estate, garage opportunity of the real estate, utility opportunities of the real estate and construction quality of the real estate with a multivariate regression analysis. The independent variables that satisfy signif T $\leq$ 0.05 and R^2 values are determined. The effect of every variable on real estate price are explained.

In the study high R^2 values are obtained for sub locations like Kadikoy(0.57653) Barbaros / Balmumcu (0.61284) and Levent/Etiler/Bebek (0.66312). Sub locations Mecidiyekoy(0.44538), Nişantaşı/Teşvikiye/Maçka (0.47643) and Beyoğlu (0.43276) showed poorer R^2 values.

In the study we determined that environmental factors have a high effect on the price behaviors on different sub locations of Istanbul. Legistlative differences, social-demographic differences and density of recreational areas has effect on prices compared with different sub locations. For this reason unit price per m^2 (YTL) changes from 1271.89 for Beyoğlu to 2543.10 for Levent/Etiler/Bebek sub location.

The independent variables, area of the real estate, age of the real estate, room number of the real estate, garage opportunity of real estate and utility opportunity of real estate satisfies are determined as the independent variables that satisfy signif < 0.05 value. These independent variables differ for different sub locations in the city. These results shows that different physical factors of the real estate has different importance on different sub locations of the city.

The results of this study can be used to determine future investment decisions at different sub locations in the city. The results are also helpful for real estate investors/appraisers to determine important factors for different sub locations. Investors can increase preferability of their real estate projects with the results obtained in this study. This study can be used as a base for academics on their future analysis to determine strong and weaknesses factors on real estate preferences.

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APPENDIX A

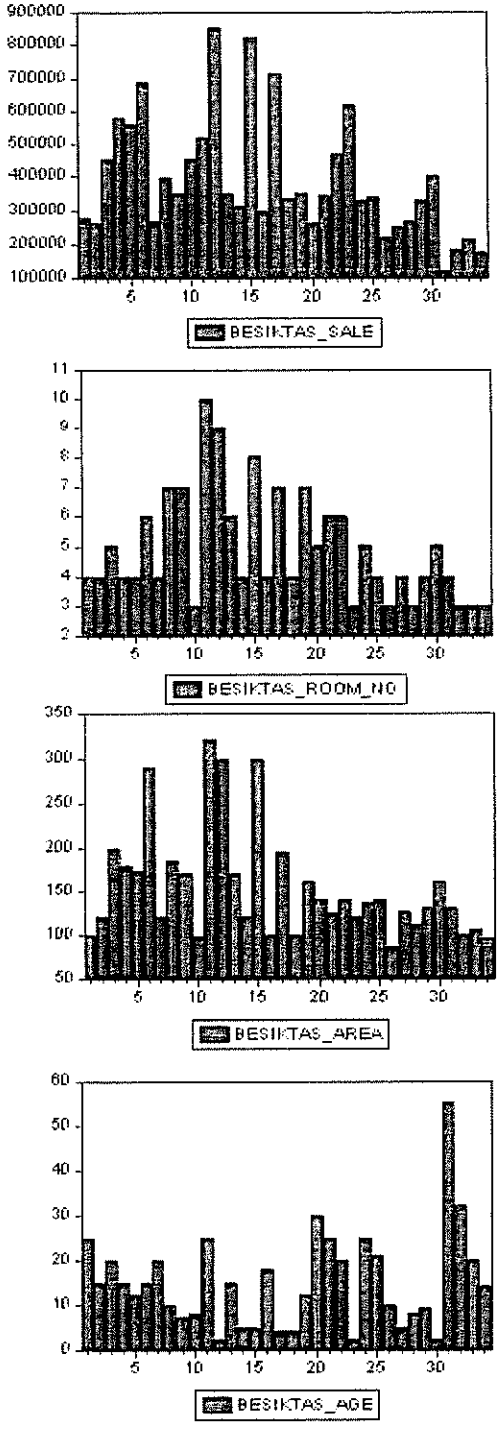
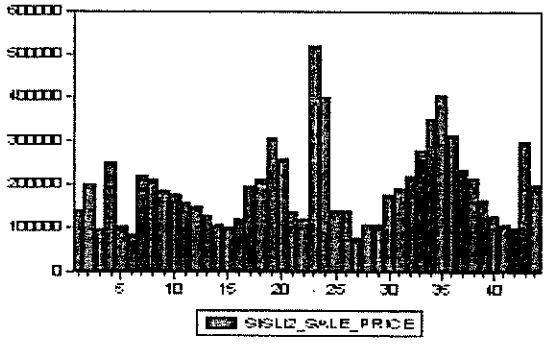
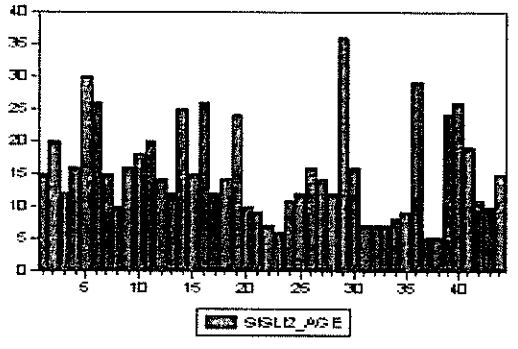
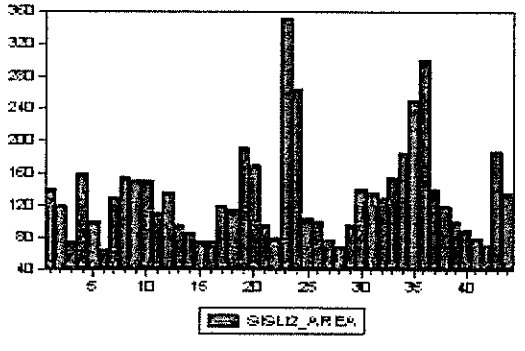


Figure 2: Beşiktaş data sub location distribution







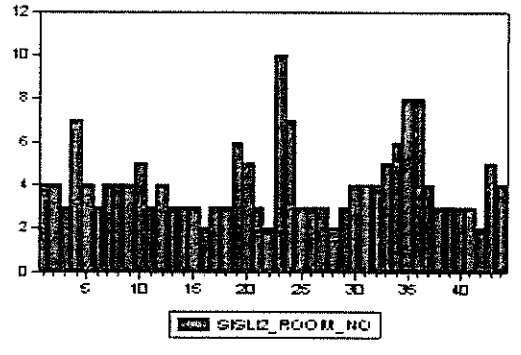
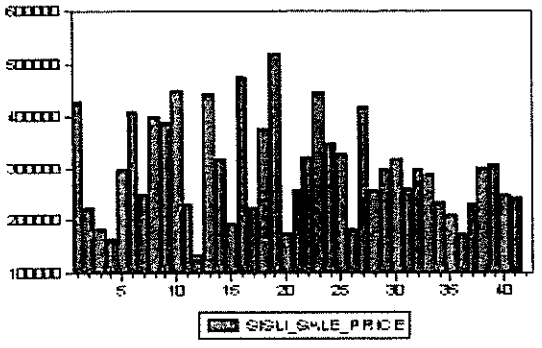
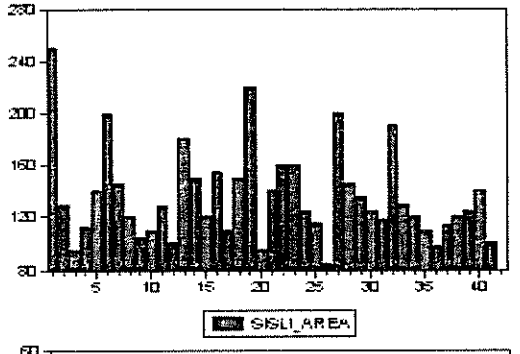
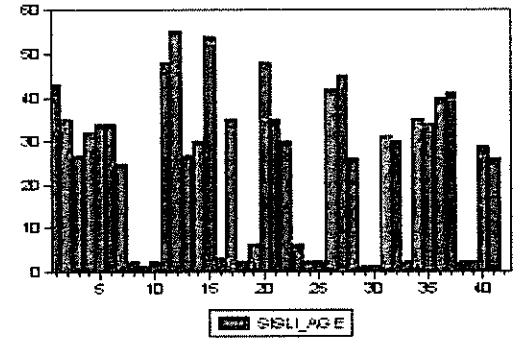


Figure 3: Şişli / Mecidiyeköy sub location data distribution







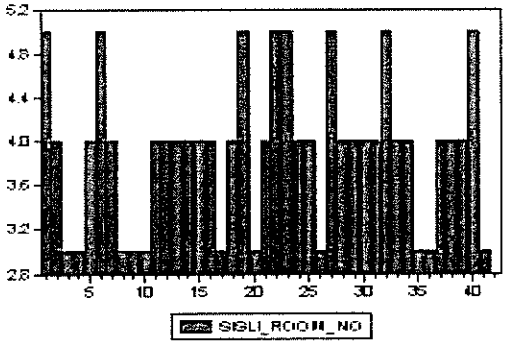


Figure 4: Şişli Nişantaşı/Teşvikiye/Maçka sub location data distribution

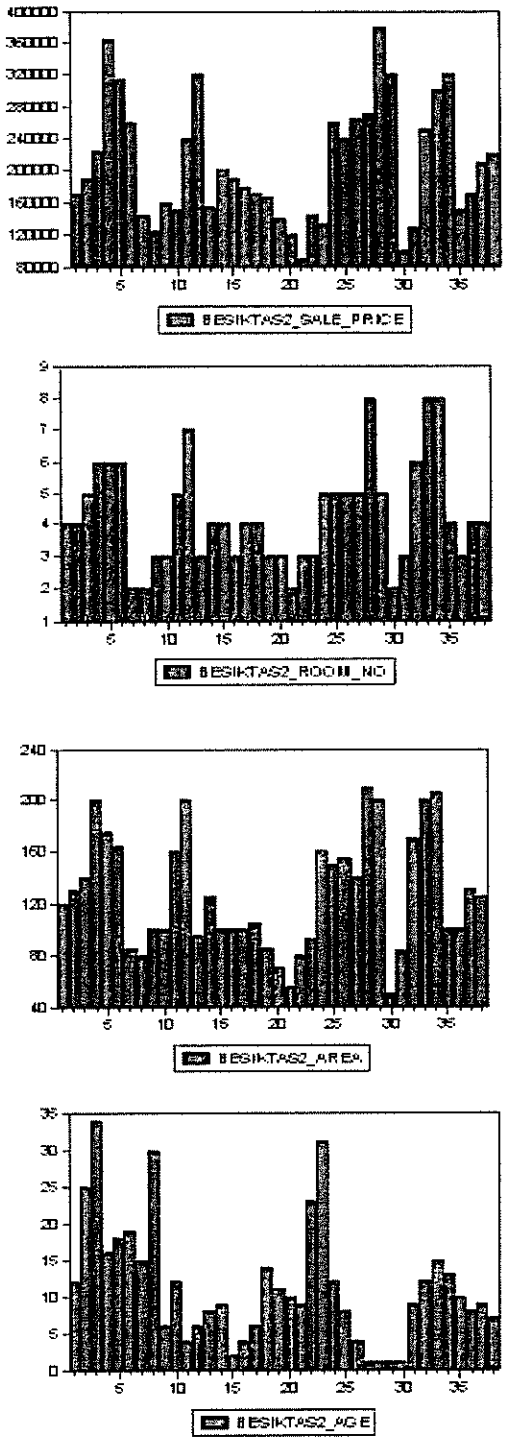


Figure 5: Beşiktaş Balmumcu/Barbaros sub location data distribution

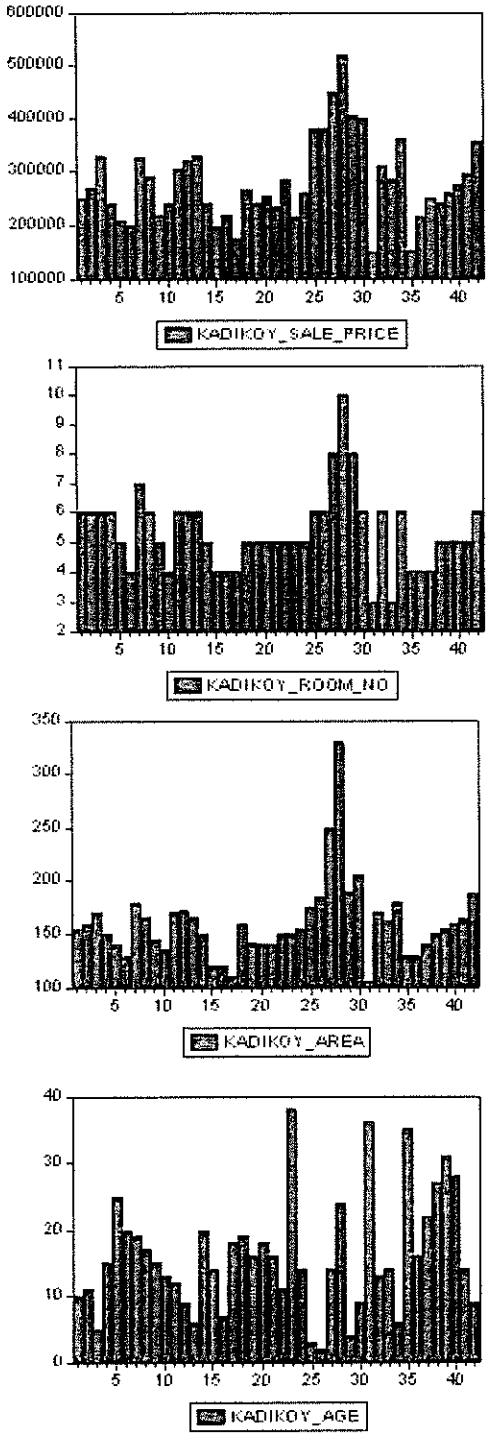
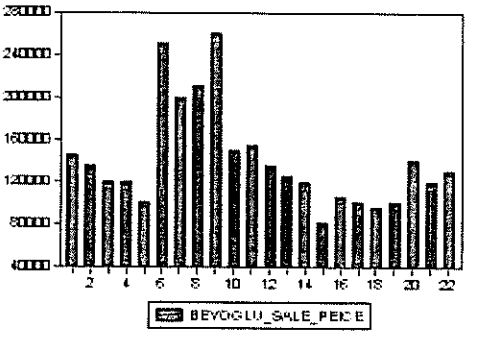
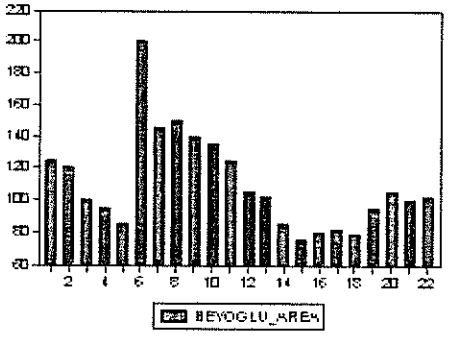
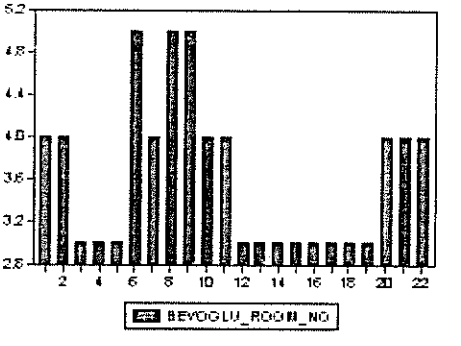


Figure 5: Kadıköy data distribution







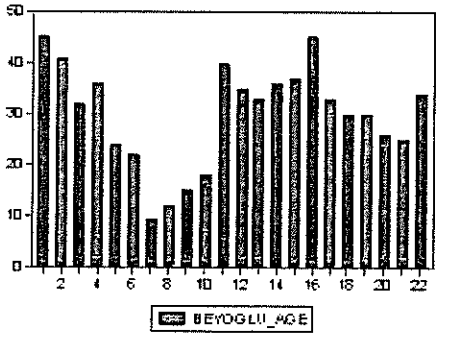


Figure 5: Beyoğlu data distribution

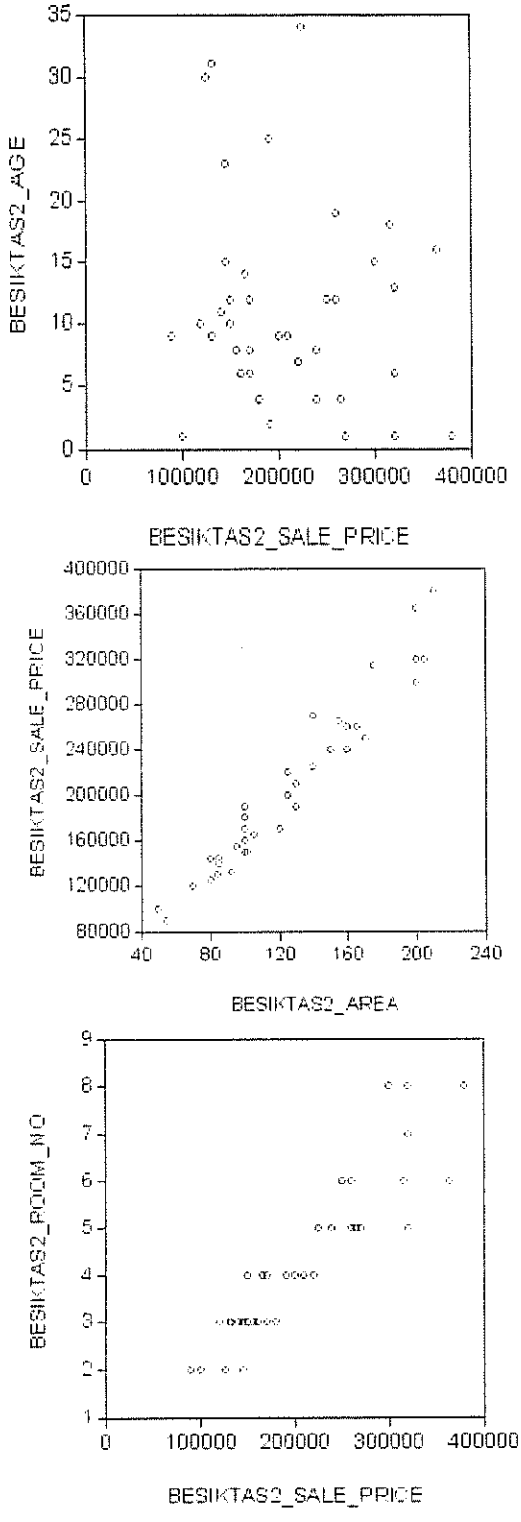


Figure 6: Scatter of Beşiktaş Balmumcu/Barbaros sub location

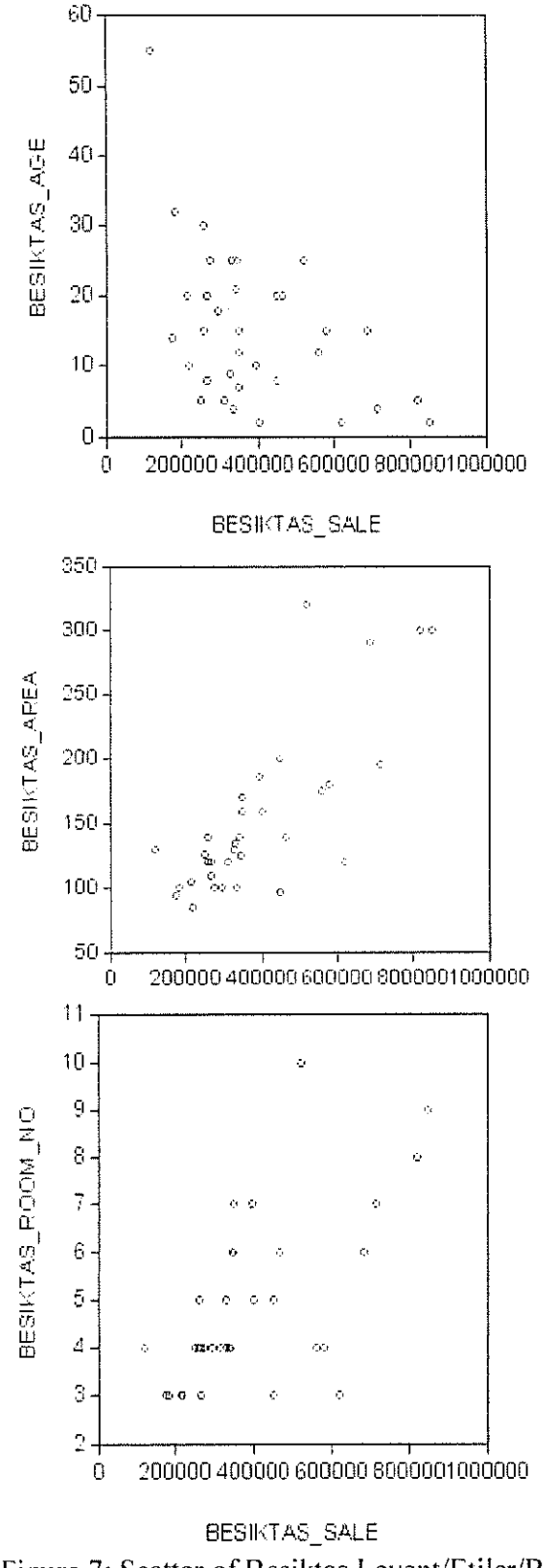


Figure 7: Scatter of Beşiktaş Levent/Etiler/Bebek sub location

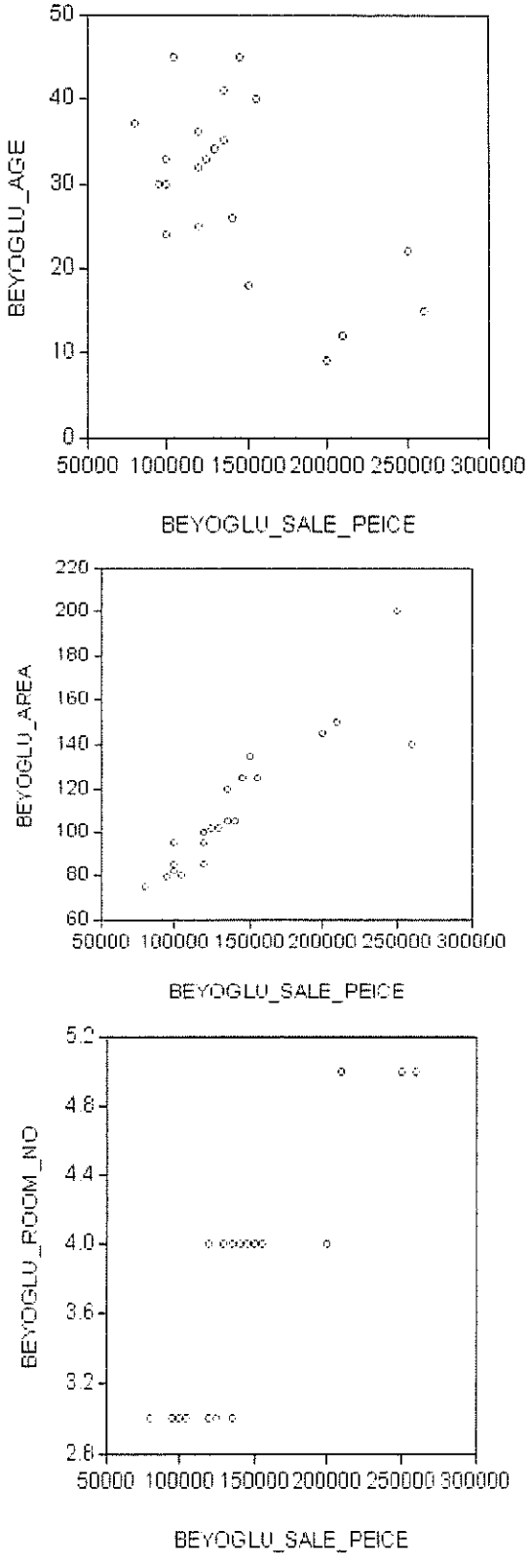
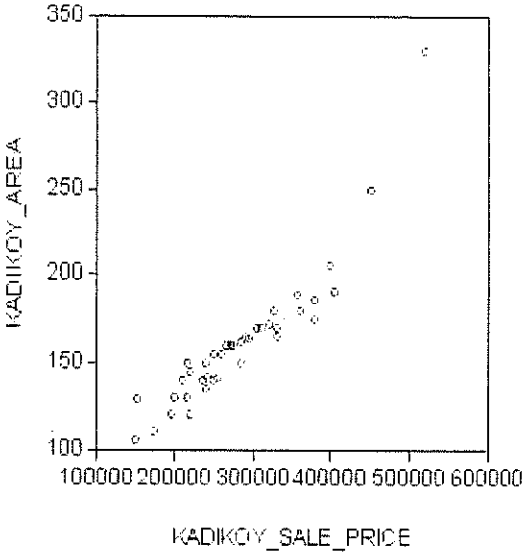
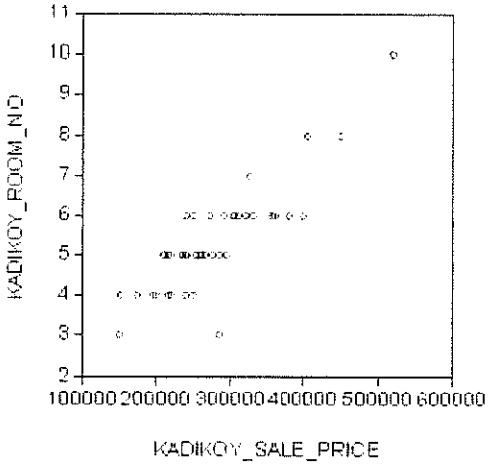


Figure 8: Scatter of Beyoglu sub location





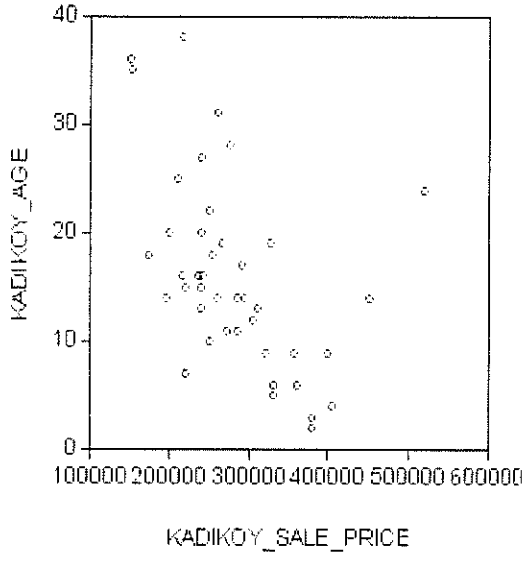


Figure 9: Scatter of Kadıköy sub location

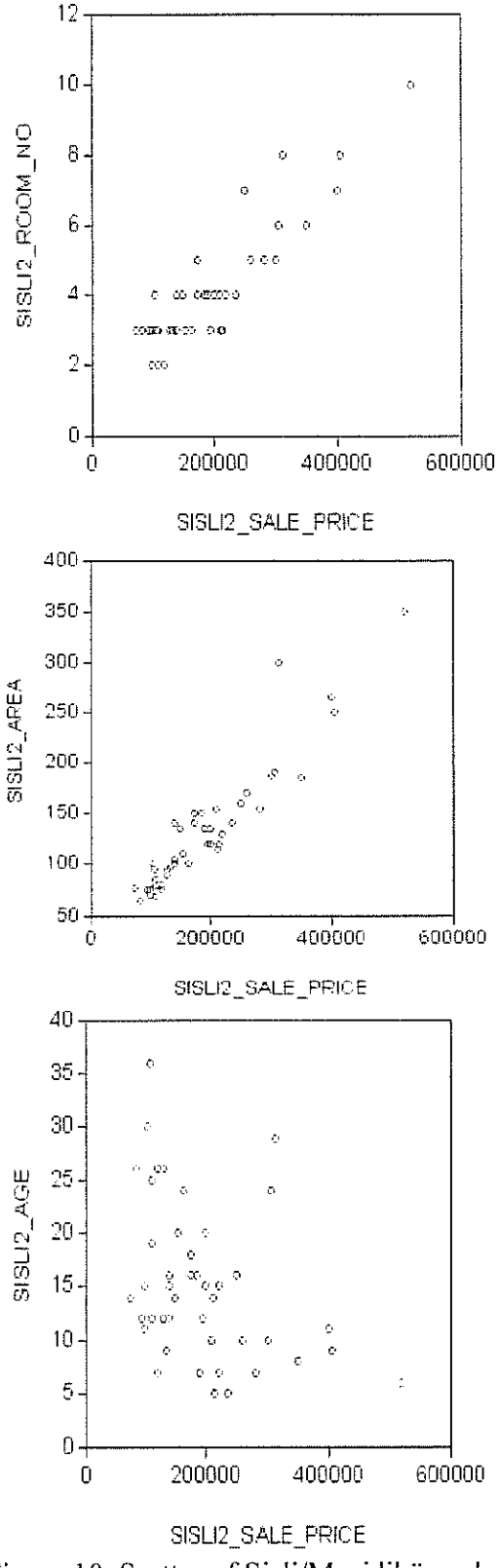


Figure 10: Scatter of Şişli/Mecidiköy sub location

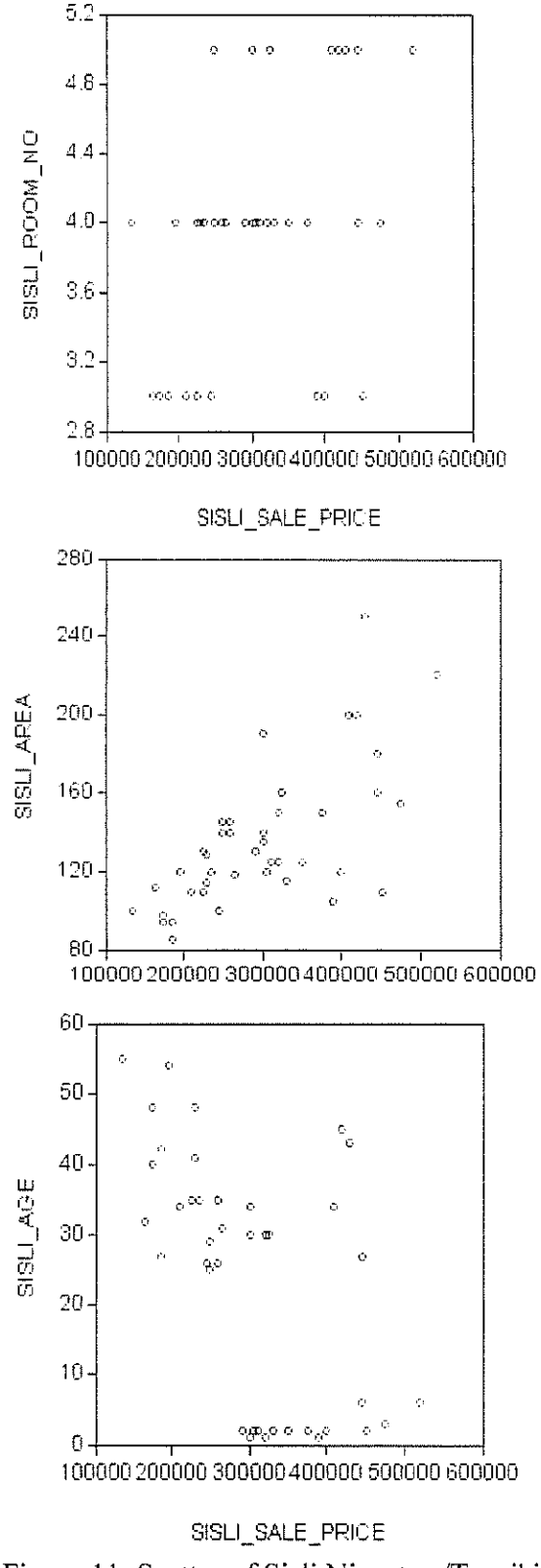


Figure 11: Scatter of Şişli Nişantaşı/Teşvikiye sub location

APPENDIX B

Data Supplier Appraisal Companies:

Re/max:

International Appraisal Company partnered by US and Canada Investors, founded in 1973 at Denver, Colorado, United States. Operates at 54 countries with nearly 6000 offices with a capacity of over than 2000000 real estate sales annually.

Century 21:

International Appraisal Company partnered by US Investors, founded in 1971 at New Jersey, United States. Operates at 96 countries with nearly 7500 offices.

Eskidji:

Turkish Appraisal Company partnered by Turkish Investor, founded in 1997 at Dolapdere, Istanbul. Operates at Turkey with nearly 160 offices.

Turyap:

Turkish Appraisal Company partnered by Turkish Investor, founded in 1985 at Istanbul. Operates at Turkey with more than 310 offices.