External Factors, Housing Values and Rents: Evidence from Survey Data

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Abstract:

This study uses a rich survey data to analyze housing values and rents in Istanbul, Turkey. In addition to variables related to location, household characteristics, and the physical characteristics of the property, the data involves a number of "qualitative" questions related to a set of external factors, such as the satisfaction level of the occupants with green area, parks, recreational facilities, transportation, distance to work, and noise. The paper identifies and compares the set of external factors that have a significant impact on property values and rents.

Introduction

When valuing residential property, one must consider the effects of the external factors as well as the characteristics of the property itself. Typically, these external factors are grouped together under a "location" variable. The principal reason for this practice is that the available data sets, such as the Multiple Listing Data sets, usually do not provide information on individual external factors. The other reason is that most of these external factors, such as noise, view, greenery, and accessability, are difficult to measure. The current study overcomes this problem by generating the data through an extensive survey.

The survey was conducted in Istanbul, Turkey and includes questions about the occupants' level of satisfaction / dissatisfaction with a number of external factors as well as questions about the physical, locational, and household characteristics of the property. The external factors included greenery, nearby parks, noise, recreational facilities, access to shopping centers, transportation facilities, distance to work, road conditions, distance to the street, and site conditions. The purpose of the project is to identify and compare the set of external factors have an impact on property values and rents.

A number of earlier studies examined the role of individual external factors on housing prices. Hughes and Sirmans (1992, 1993) looked at the impact of different traffic levels within a neighborhood and compared the negative effects of excessive traffic (smoke, noise, danger, dust) with the positive effects of better access. Their study, based on 288 MLS residential sales within the Baton Rouge, Lousiana, metropolitian area, suggests a downward adjustment in the price of 11.49% for high traffic. The study by Li and Brown (1980) included data on air pollution, visual quality, noise and proximity to the ocean, rivers, recreational areas, schools, expressway interchanges, industry and commercial establishments. Using 781 MLS sales of single-family houses in 15 suburban towns located in the southeast sector of Boston in 1971, they concluded that while air pollution does not have a significant impact, visual quality has a positive impact and noise has a negative impact on property values. Proximity to the ocean, rivers, recreational areas, expressway interchanges, industrial and commercial establishments are highly valued while closeness to schools do not seem to matter. Correll, Lillydahl and Singell (1978) and a recent study by Lee and Linneman (1998) derived high amenity values for the greenbelts of Boulder, Colorado and Seoul, Korea, respectively. Similarly, Benson, Hansen, Schwartz and Smersh (1998) investigated the impact of a variety of views including ocean, lake and mountain, in Bellingham, Washington, and obtained a high willingness to pay for the view amenity. Another line of research attempted to determine whether proximity to power lines has an impact on the value of residential properties and found mixed results (Fisher and Lusht, 1995; Hamilton, Schwann and Carruthers, 1995; Colwell, 1990; and Furby, Gregory, Slovic and Fischhoff, 1988). A few studies established the negative effects of proximity to toxic waste sites on housing values (e.g., Kohlhase, 1991; Michaels and Smith, 1990). Dubin and Sung (1987) supplemented the 1978 Baltimore MLS data with geographic coordinates, census, and school data to estimate the rent gradient as a function of employment accessibility and neighborhood characteristics (crime, education, income, racial composition, and school quality). They found that the CBD (Central Business District) fails to exert a dominant influence on the rent gradient. They argued that the reason for the lack of significant relationship between housing prices and distance from the CBD in many empirical studies is because households value access to places other than the CBD, and that this is particularly true for cities with a

polycentric structure. A recent study by Colwell, Dehring and Lash (1999) reported that the establishment of group homes for mentally ill in neighborhoods of DuPage County, Illinois, led to a significant decline in property values.[1]

The contribution of this paper to the existing empirical literature on external factors is three-fold. One is that our data includes a much larger set of external factors than any of the previous studies. The other is that we overcome the measurement problem associated with the qualitative nature of most external factors by directly asking the occupants about their evaluation of these external factors. The third is that our data enables us to study how external factors affect rents as well as property values and compare the two effects.

The survey data included more than hundred questions. We find that the variables that have an influence on property values are similar to the variables that have an impact on rents. However, while some districts of Istanbul have higher rents, a different set of districts have higher values, thus indicating differing rent-to-value ratios across districts. This result will be discussed in more detail later in the paper. For the external factors, the property values are affected by respondents' satisfaction level with the green area, recreational facilities, view, shopping facilities, noise in the building and neighborhood relationships. The external factors that have an impact on rents are very similar. The only change is that the satisfaction level with the noise in the building is replaced with the satisfaction level with the transportation. In fact, the satisfaction level with transportation has proven to be very important for rent. It enjoys one of the largest coefficients and the rent diminishes monotonically as the level of satisfaction with transportation declines.

The next section of the paper provides a brief information about Istanbul. Section III & IV discusses the data and the methodology. Section V presents the results, and Section VI concludes.

II. A Tale of Two Continents

[1] There is also a theoretical literature on external factors. This literature has focused on the effectiveness of different government policies and liability rules to induce efficient level of external factors. Special attention is devoted to the problems of pollution (e.g., Benchekroun and van-Long, 1998), clean up of the contaminated properties and Superfund Act (e.g., Segerson, 1994 and Garber and Hammitt, 1998), and traffic congestion (Arnott, 1998). This literature is only tangentially relevant to the current paper, and thus will not be discussed in detail.

Istanbul embraces two continents, one arm reaching out to Asia, the other to Europe. The two parts are divided by the Bosphorus Straits. With a population of more than ten million, Istanbul is the largest city and the center of financial, commercial and industrial activity in Turkey. The city has attracted massive migration from other parts of the country. The population increased from little over one million in 1950 to more than ten million in 1997. This rapid increase in population has transformed Istanbul from a monocentric city to a polycentric one, creating multiple business centers (Dokmeci and Berkoz, 1994).

The provision of housing services and infrastructure in the city has not kept pace with the rapid population expansion. This has made some of the beneficial external factors, such as green area, recreational facilities and clean drinking water, more scarce while increasing the magnitude of some of the detrimental external factors, such as noise, traffic, pollution, and commuting time. Furthermore, the explosive growth of population led to the emergence of "Gecekondu"s (squatter settlements) in the periphery of the city. These squatter establishments are built illegally, mostly on public land.

Along with the population growth, real estate prices have enjoyed enormous appreciation rates in Istanbul. This was caused primarily by the fact that the supply of housing did not keep up with the demand generated by massive migration. The demand for real estate was further spurred by the chronic high rates of inflation, because real estate is viewed as one of the few inflation-resistant forms of investments. Finally, due to lack of a mortgage lending market, home ownership typically requires 100% down payment. This in turn generates non-pecuniary benefits (e.g., symbol of wealth or social status) for home ownership, which may further increase the demand for home-ownership.

However, not all parts of the city enjoyed high rates of appreciation in property values and rents. The European side of the city has the majority of the industrial and commercial establishments. It is also the older, historical part of the city. Many districts on the European side have become less attractive for residential purposes through years due to the deterioration of its neighborhoods and lack of sufficient rehabilitation plans. The Asian side, on the other hand, has enjoyed tremendous growth. In spite of longer commuting distance and time to the job (most jobs are on the European side), the Asian side is preferred by most households as a residential place because of better urban planning, more modern residential settlements, less noise and pollution, and the availability of amenities.[2] The attractiveness of the Asian districts was also elevated by the construction of peripheral highways and two bridges over the Bosphorus Strait that connect the two continents.

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[2] A more detailed analysis of the residential preferences across districts of Istanbul can be found in Dokmeci, Yurekli, Cagdas and Levent (1996).

III. Data

The data was generated through a survey performed in July-August 1992 of 1126 households. The respondents were chosen randomly using the stratified sampling approach. The stratification was done with respect to the districts involved in the survey. The sample size of each stratum (district) was proportional to the population in that district. Simple random sampling was performed in each stratum and samples were taken independently in each stratum. The purpose of stratified sampling is to ensure representation of each district in the sample and to reduce sampling variation due to possible "dominance" of some districts in the sample.[3] Randomly selected families were visited and surveyed face-to-face by the surveyors (surveyors were mostly graduate students at the Istanbul Technical University).[4]

[3] For more information on Stratified Sampling and other sampling techniques, see Levy and Lemeshow (1991) and Fowler (1993).

[4] Face-to-face interviews eliminate the commonly experienced problem of sampling bias associated with low response rates of mail-in surveys.

There are some advantages to using a survey data to measure the role of external factors.[5] Consider, for instance, the role of accessibility. Typically, accessibility is measured as the distance to the CBD. However, Istanbul, as many other big cities, has multiple CBDs, and this raises the issue of which CBD should be relevant for a given property. Furthermore, distance in mileage may be a misleading measurement of accessibility since it does not consider the traffic patterns and the time it takes to reach the CBD of interest. Moreover, for most occupants, access to their employment site is more important than access to a CBD. It may, therefore, be more appropriate to use the occupant's evaluation of the property's accessibility than the mileage to a particular CBD. Another reason for using occupants' evaluation of external factors is that many of the external factors, such as the view of the property, the greenery around it, the noise in and around the building are difficult to quantify. The drawback of the survey approach, of course, is that the evaluation of an external factor for the same property may vary from one respondent to another. Thus, a given respondent's assessment may not reflect the average view in the market.

The questionnaire used in the survey involved more than 100 questions. A list of the variables and a summary statistics are provided in Table 1 of the appendix. The variables in the data may be divided into broad categories as follows.

Regional variables are subdivided into two major areas: The first, Asia, is a dummy variable that captures whether the property is in the Asian or European part of the city. Around 32.5% of the respondents reside in the Asian part while the remaining 67.5% reside in the European part. The second is a set of dummy variables that capture the district of Istanbul in which the property is located. The city is divided into 19 districts, 13 of which are in the European side and 6 in the Asian side.

Type and Physical Characteristics include a dummy variable for the type of the property (Apartment, Single Family Home or Squatter); dummy variables for garage, swimming pool, fire stairs, elevator, satellite receiver, quality of the drinking water, sewage, balcony, quality of construction, age of the property, and availability of 24-hour hot water; and continuous variables for living area in square meters, and number of rooms. Almost 66% of the respondents lived in apartment or condominium units and 24% lived in squatters. The remaining 10% lived in single family homes.

Historical issues include two items. One is a dummy variable reflecting the existence of documentation, whether the property has a legal title and/or construction permit. There is a large number of buildings in Istanbul and other major cities of Turkey that were built without a land title (they are built illegally, usually on public land), or that have a title but were built without a construction permit. Majority

[5] For one of the earliest use of survey data in housing markets, see Straszheim (1973). Recent examples include Elder, Zumpano and Baryla (1999) and Okoruwa & Jud (1995).

of the properties in our sample, 68.9%, had both a legal title and construction permit, 5.3 % of them had a title but not a construction permit, 6.7 % had neither a legal title nor a construction permit, and the remaining 19.1% had temporary certificates which would be exchanged for a regular title once the area is subdivided and cleared for development. The other historical variable is a dummy variable to define who built the property, a private builder, the government, a cooperative association, or the owner himself or herself). It also includes a continuous variable regarding the number of years the occupant has lived in the current property.

Occupant variables include whether the occupant is a tenant, or owner, or lived rent-free in the unit (either because the unit was owned by the government and the respondent was a government employee or because the unit belonged to a close family member); the age of the head of the household; and income, occupation and education levels of the household members. Most respondents (64%) owned the unit they lived in, 31% were renting, and the remaining 5% lived in a rent-free unit. More than half of the households surveyed (52.9%) had a monthly income of less than 3 Million TL (TL=Turkish Lira),[6] 34.2% had an income of 3-5 Million TL, 8.5% had an income of 5-10 Million TL, 2.8% had 10-15 Million TL, 1.3% had 15-20 Million TL, and the remaining 0.3% had an income exceeding 20 Million TL.

External Factors gauge occupant's satisfaction regarding amenities, including green area, view, site improvements (landscaping, grading, pavement, sidewalks, etc.), recreational facilities, accessibility to work and shopping facilities, conditions of the road, neighborhood relationships, quality of the drinking water, and noise. Respondents' satisfaction level with these external factors was measured by their choice among the responses: "Very Happy," "Happy," "Unhappy," and "Very Unhappy." These choices were entered as dummy variables.

[6] Income figures are after-tax. At the time the survey was conducted, the exchange rate was $1≈6950 Turkish Liras.

The two dependent variables, Value and Rent of the property, are based on the respondents' answers to the following questions in the survey: "If you were to sell this property today, how much would you ask for it?" and "If you were to rent this property today, what rent would you ask for it?"[7] The evaluation of the rents and values in Istanbul by the occupants is quite reliable for two reasons. One is that, due to high density of development, there are frequent rental and sales transactions in most neighborhoods, thus making it easier for residents to know the recent sale prices and rents of comparable properties in the neighborhood. The other is that since nearly 66% of the units surveyed were apartment or condominium units and 24% were squatter units, there is little adjustment to make to comparable transactions[8], thus the rents and sales prices of comparable units in the area are very informative. The alternative would be to use the price and rent figures from the sale and lease contracts. The respondents' evaluation of the current price and rent is a more accurate measure of the market value and rent in Istanbul than the contract price and rent figures, because contract figures are grossly under-reported in order to reduce the tax liability.

[7] The occupants' responses to these questions may capture their asking (listing) prices and rents for the property, rather than their reservation prices or rents. Even if so, it has been well established in the literature that there is a very strong correlation between listing price and selling price. An analysis of the relationship can be found in Yavas and Yang (1995).

[8] Squatter units, similar to apartment units, show less variation, thus require fewer adjustments, than single family homes.

IV. Methodology

The survey includes more than hundred questions, and some of the questions have multiple discrete answers that were entered as dummy variables. At the end, total number of variables exceeded 200. Given such a rather large number of variables in the data, including all of the variables in the regression analysis would be unwise due to multicollinearity problems and insufficient degrees of freedom.

Theoretically, we should hypothesize which variables should be important for rents and prices and include only those variables in the analysis. However, ex-ante each of the variables in the survey is potentially important (that is why they were included in the survey in the first place). Unfortunately, there is no agreement in the empirical literature regarding which variables should be included in a hedonic regression. As Leamer (1983) argues, most regression results should be viewed with scepticism because of the common practice that the author(s) estimate many equations but represent only the one(s) with best results. In order to avoid such a bias, we have decided to choose an objective method to select the variables to be included in our analysis. The method we used is a SAS procedure known as "Best Subset" which selects those independent variables that, in combination, produce the most explanatory power. Since each variable in the data set was a potentially important variable, there was no theoretical reason to include or exclude any of the variables. Thus, the mechanical nature of Best Subset as a selection mechanism is theoretically as prudent as any other selection method. Remaining after the Best Subset screening procedure were 30 independent variables for the price model and 34 independent variables for the rent model. Using these variables, the following hedonic models are

$$V = b_0 + b_1 X_1 + b_2 X_2 + e$$

$$R = a_0 + a_1 Y_1 + a_2 Y_2 + m$$

employed to estimate property values and rents:
where $\boldsymbol{V}$ is the vector of value assessments by respondents, $\boldsymbol{R}$ is the vector of rent assessments by respondents, $\boldsymbol{X_1}$ and $\boldsymbol{Y_1}$ are the vectors of variables for physical, regional, historical, type and occupant related characteristics, $\boldsymbol{X_2}$ and $\boldsymbol{Y_2}$ are the vectors of external factors, $\boldsymbol{a_i}$ and $\boldsymbol{\beta_i}$, i=1,2, are the vectors of coefficients, and $\boldsymbol{e}$ and $\boldsymbol{\mu}$ are the error terms.

V. Results

We first present the results of estimating equations (1) and (2) separately. We then compare the results of the two equations and discuss the similarities and differences between the sets of factors that have an influence on value estimates and those that have an influence on rent estimates.

Va. Value Estimates

The results for the value model are presented in Table 2. The Best Subset procedure in SAS picked the variables in Table 2 as the optimal combination to explain variation in the value. Deleting observations with missing values reduced the sample size to 795. Overall R^2 is .26 and adjusted R^2 is

.24.[9]

The coefficient of the ASIA variable indicates that although properties located in the Asian side of the city attract higher values, the difference is not statistically significant. This result is in line with the theoretical prediction: if other factors are controlled for, then the "name" of the continent itself should not make a difference. This insignificance result, considering the fact that properties on the Asian side generally sell for more than the properties on the European side, also indicates that the model does a good job of capturing the factors that cause the price differences between the two sides of the city.

[9] For hedonic models that cover a wide geographical area, this level of R^2 statistics is considered to be fairly high.

The next nine variables, Fatih through Uskudar, are the districts of the city that passed the screening process of the "best subset" method. Only Kagithane, Pendik and Sariyer districts have significant coefficients at 10% level. As expected, Sariyer district, located along the picturesque Bosphorus strait, has the largest coefficient. As Sariyer, Kagithane had higher values while Pendik had lower values than other districts. Note that the coefficient of a district in Table 2 captures the incremental value of that district vis-à-vis the districts that did not make the cut for the Best Subset.[10]

Of the Type and Physical Characteristics, whether the property was an apartment unit or a single family home (vs. a squatter), whether the property had a garage, and the size of living area are the only variables that made the cut for the Best Subset. Of these, the living area and garage had a significant and positive impact on the value while the impact of the property type was insignificant. Although single family homes should typically be preferred to condominium units, they are also viewed as less safe and more costly to enjoy certain conveniences (such as central heating and 24-hour hot water). The value of a squatter should be lower. However, the main source of inferior values for squatters is the fact that they lack title and construction permit, and the impact of these two variables are captured in Historical variables below.

Among the Historical variables, whether the property had both title and construction permit produced a positive and significant impact. The only other historical variable that made it to the best subset, whether the unit was built by a builder (vs. by the government, by a cooperative association, or by the owner himself/herself) had a positive but insignificant influence.

All but two of the Occupant- related variables, whether the occupant was a rent paying tenant (vs. an owner-occupant or a tenant living rent-free in a family owned or government owned unit) and the income level of the household, failed to make the cut for the Best Subset list. The coefficient of the tenant variable indicates that the occupant's valuation of the property did not depend on whether the occupant was a rent-paying tenant or not. This is an interesting result because it points out that the respondent's expectation with respect to the market value of the property was not affected by whether the respondent owned the property or not. This defies the commonly held belief that an owner has a psychological attachment to his or her property and tends to overestimate its market value. The level of the Family Income was universally significant. Five dummy variables defined income classes below 20 Million Turkish Liras (the omitted variable was family income in excess of 20 Million) having coefficients tightly grouped in the range of -839.67 to -942.80. Generally, but not monotonically, the value estimate rose with the occupant's income.

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[10] Although there are multiple districts that could not make it to the Best Subset, the fact that they all failed to make it indicates that none of them had a significantly different impact than any of the others.

We now turn to consider the principal focus of this study, the role of external factors in the determination of value and rent. The Best Subset method identified the satisfaction level of occupants with following external factors as being important for value assessments: green area, recreational facilities, noise in the building, neighborhood relationships, view, and shopping facilities. Those who were very happy with the green area around the property assigned a significantly higher value. On the other hand, those who were unhappy with the view had a lower value estimate, though the coefficient was barely statistically significant at 10% level. The only other statistically significant external factor had an unexpected sign: the occupants who were unhappy with the neighborhood relationships ascribed a higher value to the property. This is in contrast to those who were happy with their neighborhood relationships and yet did not associate it with a significantly higher value. Although having very close relationships with the neighbors is still an essential element of the Turkish culture in rural areas, it has diminished significantly in big cities. One possible reason for this unexpected impact of the neighborhood relationships variable is that the variable is correlated with some missing variables that the model failed to capture. Another possibility is the common observation that closer neighborhood relations also tend to lead to more disputes with neighbors.

Vb. Rent Estimates

The rent equation was also estimated using the Best Subset approach. The results are displayed in Table 3. Deleting observations with missing values again yielded a sample size of 795. Compared to the value estimates, a slightly larger number of variables were identified as being statistically significant and a bigger R^2 of .444 was obtained. Although rents on the Asian part are estimated to be lower than the European part, the difference between the two sides of the city is once again not significant. What is interesting is that there is a weak match between the districts that attract higher values and districts that attract higher rents. Of the 9 districts that made it to the value equation and 10 districts that made it to the rent equation, only 7 of them were the same. More importantly, compared to 3 significant districts in the value estimates, 8 districts had a significant impact on rents. This implies that rents were more elastic to the district of the property than values. There were only two districts that were significant in both equations, and these two variables had an opposing effect on rents and values. In other words, many districts had different appeals to renters versus homebuyers.

The mismatch of the coefficients for values and rents across districts may seem to contradict the argument that real estate investors will bid up / down properties in each district until rent-to-value ratios are equalized across districts. However, real estate investment involves two major sources of return, rental income and appreciation, and the expected appreciation makes up a larger part of the expected return to real estate investments in Istanbul. Furthermore, expected rates of appreciation vary significantly among the districts of Istanbul. As a result, for a given rental income from the property,

investors are willing to bid the price up to different levels in different districts depending on the expected appreciation rates in those districts.[11]

[11] Rent-to-value ratio can also differ across properties within the same market because rent is determined by the current conditions of a property while value depends on investors' present value of expected future returns from the property. Consider a property that was recently built using low quality materials. Since it is new, it may attract high rents in the current period, but its value will be adversely affected by future expected deterioration in its conditions. On the other hand, a run down property in a prime location may have low rents but high value.

As in the case of value estimation, the living area of the property has a significant positive impact on rents. Similarly, the presence of a garage increased rents. Two historical variables made the Best Subset list; i) the rents were higher for properties that had both a title and construction permit, and ii) properties built by a cooperative enjoyed higher rents than those built by a builder, and properties built by a builder attracted a higher rent than those that were built by the government or by the owner himself/herself.[12]

The rent equation has the same Occupant- related variables as the value equation; the ownership type and income level. Two ownership-related variables made the Best Subset list: Whether the occupant was the owner, and whether the occupant lived free in a unit owned by his/her family. The former had a significant positive impact on rent while the latter's impact was not significant. The level of household income was the most consistently significant variable. Each level of income came out significant in both value and rent regressions. As the level of the household income increased, the rent estimates increased almost monotonically. The only exception is that those households with an income in the maximum range (more than 20 Million Turkish Liras) assigned a lower rent than households in any other income class.

A comparison of the value and rent estimates indicates that the set of external factors that made it to the Best Subset are very similar for the two equations. As in the case of value estimates, if an occupant was very happy with the surrounding green area, this increased the rents significantly. However, a very satisfactory view of the property had a negative and significant impact on the rent. Also significant was the satisfaction level with neighborhood relationships. As in the case of value estimates, occupants who were unhappy with the neighborhood relationships ascribed a higher rent to the property. Unlike the value regression, if the occupant was happy with the accessibility to shopping facilities, this had a significant impact on his/her assessment of the rent. Satisfaction level with the recreational facilities became significant, too. The tenant assigned a lower rent to the property if s/he was unhappy with the recreational facilities. The noise in the building dropped out of the best subset, and it was replaced by the satisfaction level with the transportation. This variable has proven to be very

[12] The properties built by the government are viewed by respondents as being inferior in their assessment of both rents and value. This is due to a widespread problem where contractors breach the contract by applying quality standards lower than those stipulated in the contract and manage to avoid being prosecuted by bribing the government inspectors.

important for rent. Not only it enjoyed one of the largest coefficients, every level of satisfaction (very happy, happy, and unhappy) was significant and the rent diminished monotonically as the level of satisfaction with transportation declined. This may have to do with the fact that availability of mortgage financing is extremely limited, thus an average household has to save for many years before they can afford to purchase a home. As a result, owner-occupants are more likely to be older and retired than tenant-occupants, and therefore less likely to be commuting to work. Consequently, owner-occupants are unlikely to be sensitive about transportation advantages of a property as tenant-occupants would be.

VI. Conclusion

The purpose of this study was to utilize a rich survey data set to identify the set of external factors that affect property values and rents. The respondents' level of satisfaction with the green area, view, access to recreational facilities, neighborhood relationships, and access to shopping facilities played a role for both property values and rents. Property values were also affected by the noise in the building while rents were critically influenced by the respondents' level of satisfaction with transportation.

In addition to external factors, the data included a large number of variables relating to physical, locational, historical, and household characteristics of the property. As should be expected, the subset of these variables which proved to be important for property values were very similar to the subset of variables that were important for rents. One exception is that some districts had higher rents while a different set of districts had higher values, thus indicating differing rent-to-value ratios across districts.

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Table 1: Summary Statistics

VARIABLE	MEAN	STD. DEV.	MIN.	MAX.	LABEL
VAR1-A	147.77	228.35	20,000.0	1,000,000.0	PRICE YOU WOULD ASK (000 TL)
VAR1-B	77.88	85.95	100.0	5000.0	RENT YOU WOULD CHARGE (000 TL)
VAR2	.....	.....	1.0	19.0	DISTRICTS
VAR3	1.05	.93	1.0	3.0	ROAD CONDITIONS
VAR4	1.91	.69	1.0	5.0	ROAD COVER
VAR5	2.20	.72	1.0	5.0	TYPE OF HOUSING (CONDO, SINGLE-FAMILY,..)
VAR6	4.79	2.20	.0	8.0	HOW LONG HAVE YOU LIVED IN THIS HOUSE
VAR7	90.63	67.88	30.0	550.0	SURFACE AREA (M2)
VAR8	2.45	.89	1.0	10.0	NUMBER OF ROOMS
VAR9	.89	.92	.0	5.0	NUMBER OF BALCONY
VAR10	4.43	2.03	1.0	20.0	# OF PEOPLE IN THIS HOUSE
VAR11	1.95	1.38	1.0	5.0	OWNERSHIP
VAR12	.91	.92	.0	6.0	HOW MANY HOUSES DO YOU OWN
VAR13	.85	.72	.0	4.0	LOCATION OF HOMES
					SATISFACTION LEVEL
VAR14	2.13	.72	1.0	4.0	W/ DISTRICT
VAR15	2.20	.75	1.0	4.0	W/ TRANSPORTATION
VAR16	2.11	.89	1.0	4.0	W/ DISTANCE TO WORKPLACE
VAR17	2.28	.75	1.0	4.0	W/ HOUSING SIZE
VAR18	2.26	.81	1.0	4.0	W/ NUMBER OF ROOMS, LIVING
VAR19	1.92	1.14	1.0	4.0	W/ BALCONY AND TERRACE
VAR20	2.38	.82	1.0	4.0	W/ QUALITY OF CONSTRUCTION
VAR21	2.49	.92	1.0	4.0	W/ SITE IMPROVEMENTS
VAR22	2.78	.97	1.0	4.0	W/ GREEN AREAS
VAR23	2.84	.97	1.0	4.0	W/ NEARBY RECREATIONAL FACILITIES
VAR24	2.33	.79	1.0	4.0	W/ DRINKING WATER
VAR25	2.16	.76	1.0	4.0	W/ SEWAGE SYSTEM
VAR26	2.03	1.01	1.0	4.0	W/ CONDITION OF THE ROOF
VAR27	2.13	.84	1.0	4.0	W/ NEARBY NOISE
VAR28	1.96	.72	1.0	4.0	W/ NEIGHBORHOOD RELATIONS
VAR29	2.51	.91	1.0	4.0	W/ VIEW
VAR30	2.13	.82	1.0	4.0	W/ DISTANCE TO STREET
VAR31	2.08	.77	1.0	4.0	W/ SHOPPING FACILITIES
VAR32	2.27	.53	1.0	4.0	OVERALL LEVEL OF SATISFACTION
VAR33	1.76	1.21	1.0	4.0	LEGAL STATUS (TITLE, PERMIT, ..)
VAR34	2.73	.50	1.0	4.0	TYPE OF CONSTRUCTION
VAR35	2.00	.81	1.0	3.0	AGE OF THE BUILDING (<10, 11-20, >20)
VAR36	2.93	1.22	1.0	4.0	WHO BUILT THE PROPERTY?
VAR37	2.63	.81	1.0	4.0	TYPE OF HEATING
VAR38	2.81	1.14	1.0	5.0	WC AND BATH
					EQUIPMENT IN THE BATHROOM
VAR39	.43	.50	.0	1.0	CLOSET
VAR40	.38	.56	.0	1.0	BATH TAB
VAR41	.15	.36	.0	1.0	SHOWER
VAR42	.07	.38	.0	1.0	SHOWER CABIN
VAR43	.14	.35	.0	1.0	THERMOSIFON
VAR44	.50	.50	.0	1.0	CHAUFBAIN
VAR45	.45	.50	.0	1.0	WASHING MACHINE
VAR46	.40	.49	.0	1.0	AUTOMATIC WASHING MACHINE
VAR47	.03	.16	.0	1.0	DRYER
VAR48	.35	.48	.0	1.0	WC STYLE (WESTERN)
VAR49	.75	.44	.0	1.0	WC STYLE (TURKISH)
VAR50	.58	.49	.0	1.0	WASH BASIN IN THE BATHROOM
VAR51	1.01	.24	.0	1.0	SEPARATE KITCHEN
					EQUIPMENT IN THE KITCHEN
VAR52	.94	.25	.0	1.0	KITCHEN TABLE
VAR53	.82	.38	.0	1.0	WASH BASIN
VAR54	.86	.35	.0	1.0	RUNNING WATER
VAR55	.85	.36	.0	1.0	SEWAGE
VAR56	.68	.47	.0	1.0	STOVE
VAR57	.71	.45	.0	1.0	OVEN
VAR58	.93	.25	.0	1.0	REFRIGERATOR

VAR59	.14	.35	.0	1.0DISH WASHER
VAR60	.01	.10	.0	1.0GARBAGE DISPOSER
				DO YOU HAVE THE FOLLOWING?
VAR61	.01	.12	.0	1.0CLOSED GARAGE
VAR62	.12	.33	.0	1.0OPEN GARAGE
VAR63	.04	.20	.0	1.0SATELLITE RECEIVER
VAR64	.00	.03	.0	1.0SWIMMING POOL
VAR65	.03	.17	.0	1.0FIRE STAIRS
VAR66	.11	.38	.0	1.0ELEVATOR
VAR67	.12	.33	.0	1.0HOT WATER
VAR68	1.29	.45	.0	1.0DO YOU WANT A NEW HOME?
VAR69	5.78	7.50	1.0	19.0WHICH DISTRICT WOULD YOU WANT TO MOVE
VAR70	2.75	3.72	.0	18.0WHICH DISTRICT WOULD YOU...-REASON 1
VAR71	.79	2.48	.0	18.0WHICH DISTRICT WOULD YOU...-REASON 2
VAR72	.13	1.08	.0	18.0WHICH DISTRICT WOULD YOU...-REASON 3
VAR73	.68	.80	1.0	5.0WHY DO YOU WANT A NEW HOME?
				WHAT WOULD YOU CHANGE ABOUT HOUSE
VAR74	.19	.39	.0	1.0TRANSPORTATION
VAR75	.17	.38	.0	1.0DISTANCE TO YOUR JOB
VAR76	.30	.46	.0	1.0 SIZE
VAR77	.29	.45	.0	1.0NUMBER OF ROOMS AND BATH
VAR78	.25	.43	.0	1.0BALCONIES
VAR79	.31	.46	.0	1.0QUALITY OF THE CONSTRUCTION
VAR80	.38	.48	.0	1.0SITE IMPROVEMENTS
VAR81	.44	.50	.0	1.0GREEN AREAS
VAR82	.45	.50	.0	1.0RECREATIONAL FACILITIES
VAR83	.23	.42	.0	1.0WATER
VAR84	.16	.36	.0	1.0SANITARY SYSTEM
VAR85	.17	.38	.0	1.0ROOF
VAR86	.20	.40	.0	1.0 NOISE
VAR87	.10	.31	.0	1.0NEIGHBORHOOD RELATIONSHIPS
VAR88	.38	.49	.0	1.0 VIEW
VAR89	.15	.36	.0	1.0DISTANCE TO THE STREET
VAR90	.16	.37	.0	1.0SHOPPING FACILITIES
VAR91	1.93	.49	1.0	4.0HOW WOULD YOU FINANCE A NEW HOUSE
VAR92	.64	1.20	1.0	14.0REASONS FOR NOT OWNING A HOUSE 1
VAR93	.03	.50	1.0	14.0REASONS FOR NOT OWNING A HOUSE 2
VAR94	.00	.06	1.0	14.0REASONS FOR NOT OWNING A HOUSE 3
				WHICH OF THE FOLLOWING DO YOU OWN?
VAR95	.89	.32	.0	1.0 COLOR TV
VAR96	.31	.46	.0	1.0 VCR
VAR97	.09	.29	.0	1.0CD PLAYER
VAR98	.05	.21	.0	1.0 PC
VAR99	.65	.48	.0	1.0TELEPHONE
VAR100	.02	.13	.0	1.0PAGER
VAR101	.29	.55	.0	1.0 CAR
VAR102	45.28	13.99	18.0	87.0 AGE OF THE HOUSEHOLD HEAD
VAR103	20.73	12.54	1.0	67.0YEARS YOU HAVE BEEN MARRIED
VAR104	2.40	1.80	1.0	10.0EDUCATION OF THE HEAD
VAR105	1.50	1.64	1.0	10.0EDUCATION OF THE SPOUSE
VAR106	1.57	1.84	1.0	10.0EDUCATION OF THE 1. CHILD
VAR107	1.20	3.34	1.0	10.0EDUCATION OF THE 2. CHILD
VAR108	.88	5.24	1.0	10.0EDUCATION OF THE 3. CHILD
VAR109	.51	6.60	1.0	10.0EDUCATION OF THE 4. CHILD
VAR110	.45	6.59	1.0	10.0EDUCATION OF THE 5. CHILD
VAR111	.44	6.59	1.0	10.0EDUCATION OF THE 6. CHILD
VAR112	6.76	3.46	1.0	12.0OCCUPATION OF THE HEAD
VAR113	1.44	1.84	1.0	12.0OCCUPATION OF THE SPOUSE
VAR114	3.05	3.59	1.0	12.0OCCUPATION OF THE 1. CHILD
VAR115	2.17	4.25	1.0	12.0OCCUP ATION OF THE 2. CHILD
VAR116	1.48	5.67	1.0	12.0OCCUPATION OF THE 3. CHILD
VAR117	.63	6.68	1.0	12.0OCCUPATION OF THE 4.CHILD
VAR118	.48	6.61	1.0	12.0OCCUPATION OF THE 5. CHILD
VAR119	.45	6.59	1.0	12.0OCCUPATION OF THE 6. CHILD
VAR120	1.66	.88	1.0	6.0TOTAL HOUSEHOLD INCOME

Table 2: DEPENDENT VARIABLE = VALUE

F Value	9.117
Prob.>F	0.0001
R-square	0.263
Adj R-sq	0.235
N	795

Variable	**Parameter Estimate**	**Standard Error**	**Prob > |T|**
INTERCEPT	853.80	168.89	0.0001
ASIA	28.70	34.95	0.4118
FATIH*	20.21	37.15	0.5866
G.O.PASA*	-2.70	31.61	0.9319
KADIKOY*	-37.98	46.52	0.4146
KAGITHANE*	103.60	39.12	0.0083
KARTAL*	-65.87	46.19	0.1543
PENDIK*	-119.54	66.75	0.0737
SARIYER*	256.40	56.79	0.0001
SISLI*	59.71	38.11	0.1176
USKUDAR*	20.86	39.08	0.5936
APARTMENT	-31.73	23.84	0.1836
SINGLE FAMILY HOME	40.99	35.88	0.2536
LIVING AREA (m^2)	1.88	0.28	0.0001
GARAGE	112.63	27.50	0.0001
TITLE & CONST. PERMIT	38.83	19.73	0.0494
BUILT BY A BUILDER	28.90	20.47	0.1585
TENANT	16.20	17.18	0.3458
FAMILY INCOME < 3M**	-942.80	161.46	0.0001
FAMILY INCOME ? [3M,5M]	-937.50	160.96	0.0001
FAMILY INCOME ? [5M,9M]	-839.67	162.29	0.0001
FAMILY INCOME ? [9M,14M]	-904.74	165.56	0.0001
FAMILY INCOME ? [15M,20M]	-896.64	170.70	0.0001
GREEN AREA/VERY HAPPY	237.47	55.74	0.0001
RECREATIONAL FACILITIES/VERY HAPPY	-108.77	79.89	0.1738
NOISE IN THE BUILDING/UNHAPPY	-24.77	18.54	0.1820
NEIGHBOR. RELATIONS/HAPPY	21.86	22.82	0.3384
NEIGHBOR. RELATIONS/UNHAPPY	50.00	29.74	0.0931
VIEW/VERY HAPPY	-59.09	44.96	0.1892
VIEW/UNHAPPY	-27.92	16.99	0.1007
SHOPPING FACILITIES/HAPPY	23.37	18.12	0.1976

* A district of Istanbul

** Income in millions of Turkish Lira (the exchange rate at the time was $1? 6950 Turkish Liras)

Table 3: DEPENDENT VARIABLE = RENT

F Value	17.897
Prob.>F	0.0001
R-square	0.4443
Adj R-sq	0.4195
N	795

Variable	Parameter Estimate	Standard Error	Prob > |T|
INTERCEPT	-217.11	55.98	0.0001
ASIA	-5.52	8.82	0.53
BAKIRKOY*	14.19	8.26	0.08
BESIKTAS*	98.32	15.08	0.0001
BEYKOZ*	83.53	41.47	0.044
FATIH*	30.07	12.77	0.018
KAGITHANE*	36.97	12.67	0.0036
KARTAL*	-9.49	12.75	0.457
PENDIK*	43.71	19.62	0.0262
SARIYER*	24.40	18.07	0.1774
SISLI*	48.91	12.53	0.0001
USKUDAR*	26.33	11.03	0.0173
LIVING AREA - M2	0.52	0.091	0.0001
GARAGE	57.45	8.66	0.0001
TITLE & CONST. PERMIT	20.43	6.20	0.001
BUILT BY A COOPERATIVE	59.59	11.44	0.0001
BUILT BY A BUILDER	23.38	6.16	0.0002
OWNER	12.76	5.51	0.0209
TENANT - RENT FREE	13.38	12.25	0.2749
FAMILY INCOME < 3M**	156.20	52.03	0.0028
FAMILY INCOME ? [3M,5M]	164.82	51.81	0.0015
FAMILY INCOME ? [5M,9M]	196.45	52.13	0.0002
FAMILY INCOME ? [9M,14M]	241.57	53.37	0.0001
FAMILY INCOME ? [15M,20M]	233.21	54.71	0.0001
TRANSPORTATION/VERY HAPPY	61.96	15.43	0.0001
TRANSPORTATION/HAPPY	18.88	11.76	0.109
TRANSPORTATION/UNHAPPY	15.33	12.30	0.2131
GREEN AREA/VERY HAPPY	86.04	18.05	0.0001
RECREATIONAL FACILITIES/VERY HAPPY	-34.58	25.87	0.1817
RECREATIONAL FACILITIES/UNHAPPY	-10.83	5.63	0.0547
NEIGHBOR. RELATIONS/UNHAPPY	12.49	7.44	0.0937
VIEW/VERY HAPPY	-38.34	14.35	0.0077
VIEW/UNHAPPY	6.75	5.40	0.2115
SHOPPING FACILITIES/HAPPY	14.88	8.92	0.0958
SHOPPING FACILITIES/UNHAPPY	12.20	10.41	0.2415

[*] A district of Istanbul
[**] Income in millions of Turkish Lira (the exchange rate at the time was $1? 6950 Turkish Liras)