ANALYSIS OF HOUSING PRICES IN THE METROPOLITAN AREA OF ISTANBUL

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Abstract
The purpose of this paper is to explore the spatial distribution of housing prices in the Metropolitan Area of Istanbul, the largest city of Turkey and the most important socio-economic centre with a long historical background. After 1980s, multi-center development of the city played an important role for distribution of population, jobs and housing prices at the city level. By examining certain cases that were developed over time in different parts of the city, the factors affecting the housing prices were investigated. The samples were taken from three different zones: The core area, the intermediate zone, and the periphery. Housing prices were taken from real estate agents and presented with computer based techniques and with other variables collectively. Regression analysis was used for the investigation. Housing prices were considered as dependent variables while road area ratio, distance to the sea shore, distance to the center, floor area ratio, the size of the floor area of the houses and access-integration value as space-syntax indices were measured as independent variables. The results of the analysis indicated that the most important factor affecting the housing prices is the size of the floor area. The second and third most effective factors are the road surface ratio and the floor area ratio consecutively. The distance to the sea shore is fourth most important factor particularly for cities surrounded by a sea; such as Istanbul. The access-integration values as space-syntax indices are not found significant. The other factor distance to the center included in the analysis is not found significant, either. Results of this study can be useful for the investors, urban planners and the policy makers. Time series analysis is suggested for further research.

Introduction
Urban form is a mixture of different elements that take place or is affected by various issues. The physical, social, cultural, economic, technological and political conditions are some of these factors. At times, developments of one or more of these conditions have large impact on city structure. Istanbul, the capital of three empires, possessing many historical and natural amenities, is an important city now as it was in the past periods. Surrounded by the physical, social, cultural, economic and technological improvements it has a different urban structure than other cities and constitutes as an important

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laboratory for urban studies. Nowadays, the physical and social transformations cause a number of economic changes in the cities for which Istanbul is a good example. Apart from the properties that the city has; there are other facts contributing to the city development policy. Istanbul displays different urban form characteristics by the transformation in different stages in time. Also, Istanbul's structure changes with the shifting preferences of the varying users of the city.

Furthermore, the study of the changing spatial pattern related to housing prices was created to generate background data on a variety of Istanbul’s urban forms that would be helpful for the future trends. The purpose of this study is to inform the various urban structure properties and the differentiation between these structures in Istanbul by the means of visual and also quantitative analysis related to housing prices. The method used to make this analysis is the multiple regression analysis by taking the housing price as the dependent variable and the road area ratio, distance to the sea shore, distance to the center, floor area ratio, the size of the floor area of the houses and access-integration value as space-syntax indices as the independent variables. The other method to get the access-integration value is the computer program Ajax generalized space-syntax.

There are several studies which investigate the changing housing prices in different countries in different regions. For instance, they generally try to explain the relations between housing prices and some other variables like, accessibility, information technology and density. As Song and Knaap (2004), in their study which is measuring urban form, tried to do this study related to Portland example and with some quantitative measures. They chose the different neighborhoods units for their analysis and the variables were the street design and circulation system, density, land use mix, accessibility, pedestrian access. In their other study, New urbanism and housing values: a disaggregated (2003), they try to explain the relation between the new urbanism trend and the housing values by using the GIS techniques.

Moreover, there is another study done by Asami, Kubat and İstek (2001). To characterize the street networks in the traditional Turkish urban form, they use the question "what is the true nature of traditional street networks in Turkish cities?" and test different quantitative methods of urban morphological analysis. Accordingly, traditional Turkish street networks are characterized by discriminant functions of several space-syntax-related indices, as well as by image-analysis and graph-theoretical indices. In this study, a set of space-syntactic indices is found to be powerful enough to distinguish the traditional street network among others, particularly axial ringiness, implying that the formation of large blocks is a typical feature. The relative abundance of closed-end edges is found to be another important feature of the traditional street network.

A comprehensive study by Mikelbank (2004) presents a large typology of US suburban places analyzing data collected on 3567 non-central city, incorporated, metropolitan places in the United States along the dimensions of population, place, economy and government. Specifically, a hierarchical clustering procedure, combined with discriminant analysis, identifies 10 distinct types of suburbs in the data. Level, composition and combinations of wealth, employment and race drive the distinctions among suburban clusters, many of which do not fit their traditional characterization of suburbia.

Asabere (1990) with the study ‘the value of a neighborhood street with reference to cul-de-sac’ focuses on an amenity variable that relates to an aspect of the street layout of the neighborhood. The article provides empirical evidence from Halifax, Nova Scotia, confirming the
view that the type of the neighborhood street can affect house values. The study identifies two categories of streets—the cul-de-sac and the grid—and measures their impacts on house value. The hypothesis that the cul-de-sac would attract premium values was supported by the study. In this study, the cul-de-sac generated a 29 percent price premium over the grid street pattern. Specifically, the study which measures the impact of the cul-de-sac street design on house value provides a link between the urban design and real estate. Asabare believes that an understanding of the link between urban design and real estate is important for several reasons.

There are several more studies related to the variables that are used also in this study. The important point is to the combination of the variables are different and as a result there is not a study done yet that tries to put the changing house prices as an economic issue with the other variables gained by using the space syntax and other computer based methods in the regression analysis. So, organization of the paper will be as follows. The second section explains the background information about Istanbul, the analysis done with the different samples from the different districts of Istanbul is given in the third section. Final section is devoted a conclusion and further research.

Background

The settlements in Istanbul, always an important port city during the history, started by Halic and continued to sprawl. Directly related to this situation, seashores still have the rich socio-economic and urban structure. Different socio-cultural groups that lived in the area also caused the city to have rich urban structural elements.

The city itself has transformations related to different topics like natural disasters, technological developments or changing preferences. All these changing circumstances cause different density values within the city. Especially, construction of the bridge which connects the Asian and the European sides and following construction of new roads caused urban sprawl to the boundaries. The increase in accessibility effect the location of the new residential settlements and also the location of the firms.

Dokmeci and Berkoz (1993) stated that “Istanbul was a vigorous, core-dominated metropolis until well into the 1950s, with a very limited suburban development in the periphery. With this expanded use of the automobile and the construction of the bridges over the Bosphorus, however, the suburbs, in typical fashion, were pushed further out. At the same time, peripheral growth accelerated as squatter settlements increased due to rural migration”.

Various explanations for multi-nucleation in Istanbul can be made:

1- Firms established themselves in the first ring, in search of lower land and/or transport costs. These firms tend to have international and national relationships, and their ties to the old centre weakened.

2- After World War II, construction of national highways with Marshall Aid gradually created a new centre in counter balance to the older centre, whose transport links were completely dependent on the city’s port. This new centre developed at the intersection of the radial and peripheral highways, which has easy access to both airport and to national highways.

3- As one of the results of the economic restructuring of Istanbul after the 1970s, firms required larger spaces. New firms not find sufficient room to locate in the old centre since land parcels were too small and the height of buildings was restricted due to density
regulations in the conservation area of the old central business district. The new centre provided large parcels for the modern large office building and parking lots.

After the 1980s, as a result of increased international relationships, demand for office space for new office buildings increased and the new centre continued to develop along the highways." (Dokmeci & Berkoz, 1993).

In addition to these, the increasing migration also change the structure of the city. So, Istanbul 's not a stable city that has some transformations in the past periods, and it is a dynamic city which the development of the city not finished yet according to the social, economic, cultural and technological improvements.

Analysis

Investigation of the housing prices in the metropolitan area of Istanbul by comparing different districts with different historical backgrounds and different development strategies and also to state the significant relations between the housing prices and the other variables is the aim of this study. The method used in the study is the multiple regression analysis just to be able to compare different kinds of data that comes from different kinds of variables. For comparability purposes, multiple regression analysis has been applied to 32 areas and shown on the map of the districts of Istanbul (figure 1).

There are seven titles that can be the different variables of the study can be summarized.

1. housing price (per squaremter)
2. floor area ratio/building density
3. road surface ratio
4. the area of the house
5. distance to the seshore
6. distance to center
7. accesibility
Density, which is a changing criteria according to the settlement’s type and historical background, gives clues about the settlement units. Tsai (2005), takes density as one of the four factors that effects urban form. Also, Song and Knaap (2003), use the building and population density as one of the measures of urban form. In addition to these, urban form can be seperated into three parts and one of them is density (Anderson et al., 1996). Related to these ideas, the building density as being one of the important issues for the environment of the housing groups, that is becomes one of the variables of the housing price studies. Nowadays, with the new trends changing building densities end up with the changing housing values.

As the street pattern shows difference in Istanbul, it is one of the variables of this study as changing the road surface ratio. In the 19th century the fire was the reason of the change in the street pattern (Çelik, 1996), but after this the new design trends are effective. As Lillebye (1996) stated the roads are investigated as a part of urban form within the new transportation alternatives after Second World War. As it is issued in the introduction part, there are several studies that changing road system are effective on the housing prices. That is why the road surface ratio was selected one of the independent variables.

According to the changing needs and also to the changing trends, the squaremeter of the house is one of the parameters that is effective on the housing price. In addition to this, as Istanbul being a seashore city and also a big and old city, the distances from the sea because of the view affect and also the distances to the centre are needed variables for this kind of study. Besides, as being old and big, the term accessibility gains power in the city Istanbul. As a result of this, the value obtained by some spacesyntax based are used for other independent variable in the study.

The socio-economic and the dependent variable of this study is the housing price per squaremeter. In Istanbul, increasing population has some effects on the social structure and also the preferences of the user and this is followed by the new housing trends. The relation between the urban design and housing price is studied by Vandell and Lane (1989), and Asabere (1989) by dealing with the relation between the historical urban form and housing prices.

All these studies support the variables that are used in this study to evaluate the housing prices analysis of different urban forms (Figure 2) from different districts of Istanbul. The regression analysis is done by using all of these different variables. The dependent variable: housing price (per squaremeter) and independent variables: building density, road surface ratio, distance to seashore, distance to center, housing squaremeter and the access-integration value.

In this regression analysis, housing price (per squaremeter) is the dependent variable, and road surface ratio, building density, distance to seashore, housing squaremeter, distance to the center and the access-integration value are the independent variables. According to the analysis, housing squaremeter has the highest impact on the housing price, there is a strong positive relation between the housing price and the area of the house. Second is the road surface ratio and third one is the building density. The fourth is the distance to the seashore. Different than the relation of housing price with the road surface ratio and the squaremeter of the house, the relation between the housing price and distance to the seashore and building density is negative. In addition, there is no relation between the distance to the seashore and the access-integration value between the housing prices (Table 1).
So, if the square meter of the house increases than the price of that house increases. Moreover, the housing price per square meter increases if the road surface area increases. On the other hand, the housing price increases with the decreasing building density and the decreasing distance to the seashore.

According to the analysis,

1. If the square meter of the house increases, the price of the house will increase,

2. If the road surface ratio within the area increases, the price of the house will increase,

Figure 1: Urban forms from different districts of Istanbul
3. If the building density decreases, the price of the house will increase,

4. If the distance to the seashore decreases, the price of the house will increase in the city Istanbul.

Table 1:
Factors effecting the housing prices

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (constant)</td>
<td>-118,389</td>
<td>90,059</td>
<td>-1,315</td>
<td>.202</td>
</tr>
<tr>
<td>Road</td>
<td>726,985</td>
<td>191,191</td>
<td>.379</td>
<td>3,802</td>
</tr>
<tr>
<td>Building</td>
<td>-352,073</td>
<td>129,549</td>
<td>-.323</td>
<td>-2,718</td>
</tr>
<tr>
<td>Sea</td>
<td>-1,59E-02</td>
<td>.007</td>
<td>-.216</td>
<td>-2,243</td>
</tr>
<tr>
<td>m²</td>
<td>2,688</td>
<td>.365</td>
<td>.766</td>
<td>7,311</td>
</tr>
<tr>
<td>Access</td>
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<td>37,406</td>
<td>-.108</td>
<td>-1,147</td>
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<tr>
<td>Center</td>
<td>-4,09E-03</td>
<td>.002</td>
<td>-.196</td>
<td>-1,654</td>
</tr>
</tbody>
</table>

The results are not very different than Istanbul’s today condition, like the old structure of the city which is close to the central area as the building densities and also the population densities are high and in these areas there are small urban blocks that are separated by narrow streets from each other are the main characteristics. Within these characteristics, the potential factor of the view is still have the positive effect on the housing prices. According to the analysis result, the housing prices of the buildings near or close to the seashore are higher. This situation can be expressed as Istanbul’s sea-based economic development and also the effect of view factor (Benson, 1998).

On the other hand, the decreasing building densities, increasing road surface areas have the effect on housing prices per squaremeter. This result again can be explained with the new housing units with low density, large green areas, comfortable and high technology which are especially located in the edge of the city or in the peripheries of the city where the empty urban land is located. The high living standarts with the help of the low building densities, large car roads and pedestrian roads are giving a push to the housing prices. Not the todays situation only, but also the new trends will also be effective on this issue much more day by day. In the future, high density development of sub-centers and housing complexes might change this trend. Up to that, this will effect land value development as well as new urban structures in the periphery.

In general, the different situation of the early and the new settlement types and also the effects of the changing housing trends and changing urban form characteristics can be easily seen within the result of this study. Related to this, may be the other important point is the Istanbul as a city itself. The results are the clues of the city’s recent development. Although there is a chaotic situation in the central part of the city, the sea view factor is important even if the house is located just in the center or somewhere else. On the other hand, the...
increasing housing squaremeter is important on the price, and this can be explained by the cultural behaviours and may be the need for show off as a prestige element. The general tendency is to have more area in the house that is needed.

The other findings of the study, lightens the situation which is going on by the out skirts of the city Istanbul. The empty and low price land, make developers to have some housing projects located in these areas which are far away the centre. To have the attraction they are trying to serve more and more qualities and also amenities to the customers. So, this is ending in the high-tech or luxury housing complexes having the individual house within the green environment and social activities. In these complexes, where the every kinds of qualities are maximum, then the prices of the houses are high. With this reality, it is obvious that the increasing house prices are related to the building density and the road surface ratios within the metropolitan area of Istanbul.

Conclusion

In this study the multiple regression analysis is used as a method for different locational districts of Istanbul. With different locational and historical properties thirty-two different areas are chosen in the Istanbul metropolitan region to evaluate the analysis of different urban forms by taking the housing price (per square meter) as the dependent variable, and road surface ratio, building density, distance to seashore, distance to centre, house square meter and access-integration value as independent variables.

As a result of the analysis, it can be stated as the square meter of the house, the density of the buildings located in the area, the distance to the seashore and the road surface ratios have some effects on the housing prices but the distance to the centre and also the value of access-integration have no effects on housing prices. The general result of the study can also be stated as Istanbul is still a dynamic city. The past and also the new trends have the effects on different urban forms from the different part of the metropolitan area of the city. As having different quantitative and qualitative data from these different random selected samples, the outcomes could be easily stated.

The early settlement areas located around the Halic area are the highest areas in both population and building density. The urban block which are smaller in these areas change according to the distance to the centre which means the metropolitan region that develops in the periphery of the city (Özçevik, 2004). According to the economic and technological developments and easy access to the long distances cause city sprawl. Although the central districts and seashores have higher building density as a result of traditional urban development than the periphery, this situation might change in the future due to recent high density urban developments in the periphery. All physical, social, economic, cultural and technological developments cause urban form transformations. From now on, the new trends will be effective in every stage of the city structure.

As a conclusion, the urban form of Istanbul differs within the different time periods and according to the transformation, related to different topics caused different urban characteristics. As a result of the changing urban forms and trends, the housing prices differ a lot within the metropolitan area. The interesting point is it will go on to change. So, it is helpful to take the results especially by the urban designers, urban planners, architects, decision makers and investors, as a database in order to adjust their environment and make the right decision and also to be able to find the exact solutions to the potential problems of the city.
For further research, it is suggested to increase the number of case studies and the social, cultural variables can be added to enhance the study. Moreover, more space syntax indices related to the analysis can be used to have the economic based issue related to other kinds of successful methods.

References


