SPATIAL ANALYSIS OF 2000-2018 RESIDENTIAL PRICES IN ISTANBUL

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ABSTRACT

The purpose of this article is to examine the spatial distribution of housing prices for neighbourhoods in Istanbul and to compare their growth rates over the previous two decades. The results of the study reveal that while traditionally expensive housing in coastal areas has remained the same in terms of value, its quantity has undergone a significant increase. There has also been a decentralization of high property values towards the periphery of the city. This is a result of economic development, the attraction of a fashionable suburban life-style, the formation of new sub-centers, the development of transportation systems, and the effects of globalization due to foreign investments. However, these changes have also meant that the disparity between housing for lower and higher income brackets is becoming more marked. Furthermore, the results illustrate that increased numbers of planned neighborhoods, the restructuring of squatter areas, and the revitalization of inner-city neighborhoods have helped to raise housing prices at the metropolitan level.

Keywords: *House Price, Growth, Suburbanization, Reconstructing,*

1.   INTRODUCTION

During the last two decades, the urban structure of Istanbul has undergone a dramatic period of transformation, restoration and adjustment. This has occurred under the influence of changing global forces and reflects the needs that have arisen due to population increases, economic development, and the city's strategic location. Especially since 2002, government's neo-liberal policies regarding construction density and land use have tremendously altered the profile of Istanbul (Geymen and Baz 2008; Ozkan and Turk 2016;). Also, in recent decades, neo-liberal governance has come to dominate US and UK cities (Wilson 2004). This is a matter of concern as many of the affected areas had previously been preserved without major changes for centuries in Istanbul (Kuban 2010), and this new situation has resulted in dramatic shifts in land values and housing prices. Moreover, during the last half-century, Istanbul's urban structure has undergone a transformation from monocentric to polycentric (Dokmeci and Berkoz 1994), and has also witnessed a rapid population growth. Together these have led to different neighborhood patterns with varying housing prices throughout their development. These patterns are distributed across a large spectrum according to their location, their cultural, socioeconomic, and historical backgrounds (Karaman 2008; Oruc et al. 2017; Keskin and Watkins 2017). In this regard, the results for Istanbul are in-line with similar trends observed in other countries (Knox 1991; Ding and Knaap 2002; Han 2004). In addition, during the last two decades, the development of better transportation networks has contributed to increased housing prices, as illustrated in Istanbul by Beyazıt (2015), again matching findings from other countries in studies by Ryan (1999), So et al. (1997), Du and Mulley (2007), Mathur and Ferrell (2013), and Dai et al. (2016).

The present article investigates the spatial variation of housing prices for neighborhoods in Istanbul and compares their growth rates with those of housing prices over the previous two decades in the hope that it will make the prediction of future developments more accurate by hoping the release of socio-economic data at the neighborhood level by the government.

The price of housing is of major social and economic significance. Not only is adequate and affordable housing a crucial element in determining quality of life, but the production of housing is a major generator of economic activity (Scanlon et al. 2015). At the same time, home-ownership provides an opportunity for investment and can be a potential source of wealth (Turner and Luea 2009; Hamnett, et al. 1991). Thus, it should be possible to illustrate the results of economic development and changes in life-styles through a detailed spatial examination of distinct housing sub-markets within Istanbul over time.

There have been several studies into the spatial distribution of Istanbul housing prices. One of these, by Dokmeci et al. (2003), analyzed housing values and rents for the European and Asian sides of Istanbul separately. In addition to variables related with the location and physical characteristic of the properties, the data included a number of qualitative questions regarding a set of external factors such as satisfaction with green areas, views, transportation, and shopping facilities. According to the results of this study, while the level of satisfaction with green areas has a significant effect on both property values and rents, satisfaction with access to transportation and shopping facilities have significant effects on rents only. These results are supported by a large amount of literature in the US (Anderson and West 2006) and in Europe (Liebet et al. 2018).

Another study by Onder et al. (2004) examined the impact of earthquake risk on the Istanbul housing market by investigating the spatial distribution of, and changes in average Istanbul house prices between 1995 and 2000. According to their results, the level of earthquake risk significantly affects changes in house prices. Similarly, Fekrazad (2019) in California and Willis and Asgary (1997) in Tehran, Iran showed decreasing impact of earthquake risk on housing prices.

A more comprehensive hedonic house price analysis is given in Istanbul by Ozus et al. (2007) at the metropolitan and district levels. At the metropolitan level, the most important factors affecting prices are sub-markets, floor areas, and sea views. At the district level, housing prices

vary according to locational, socioeconomic, and property characteristics. The higher-income sub-markets have a higher number of coefficients of determination and more significant variables than those of lower income brackets. Furthermore, the results suggest that planned districts have higher housing prices; thus, restructuring squatter areas and revitalizing inner city zones not only provide benefits to individuals but also higher tax revenues to the city. A more general survey of hedonic price indexes for residential housing is given by Hill (2013) and the importance of location is investigated by Ottensman et al. (2008). Moreover, Keskin (2008) explored the factors that affect housing prices in Istanbul by using a hedonic price model with respect to property, socioeconomic, and neighborhood quality characteristics together with location factors at the metropolitan level. Later, the impact of neighborhood and socio-economic characteristics on housing was investigated in a more comprehensive way in three rapidly growing United States metropolitan areas between 1980-2010 (Foote and Walter 2017).

Koramaz and Dokmeci (2012) investigated housing prices by taking into consideration distances to the city center, sub-centers, transportation arteries, and coastal areas in addition to general housing and neighborhood characteristics. This investigation was conducted in two stages: first they conducted a multiple regression analysis, and then used an interpolation technique to predict the spatial pattern of housing prices on a continuous surface. Their results with respect to the impact of sub-centers were supported by Moudon and Hess (2000).

In another study (Alkay 2008), sub-market existence was tested in order to ascertain average household income of neighborhoods within the Istanbul housing market. The findings of the study show that the Istanbul market has a segmented structure in terms of average household incomes, with housing price structures that vary across each segment. Moreover, the preservation of historical centers has led to gentrification and price increases, as in the neighborhoods of Fener and Balat, which have Greek and Jewish backgrounds, respectively (Gur 2015). With respect to this trend, it is possible to give some examples from Chicago (Noonan 2007) and Baton Rouge, Louisiana (Zahirovic-Herbert and Chatterjee 2012).

While these studies give a general idea of the characteristics of the city's housing sub- markets, the spatial distribution of housing prices has undergone a significant alteration due to recent government reconstructing policies. For instance, between 2004-2008, 11,543 units were demolished and rebuilt (Kuyucu and Unsal 2010). These policies are intended to redevelop squatter areas and increase the density of existing urban structures, encourage economic development, produce new transportation arteries, and allow the expansion of the city through the development of new housing projects in the periphery to accommodate the ongoing and rapid population growth. However, such a wide-ranging scope has left a need for new studies of the results these policies may produce.

The present study investigates the current spatial distribution of housing prices for neighborhoods in Istanbul and compares the results with housing price data from 2000. The organization of the article is as follows; a brief descriptive analysis of the city's population and urban growth pattern, together with that of the development of new transportation arteries, is given in the second section. In the third section, the existing distribution of housing prices is outlined, and in the fourth section these results are compared with the price data from 2000. The final section is devoted to a brief review of the principal findings and suggestions for further research.

2. BACKGROUND

Istanbul, is the largest economic, educational, and touristic center of Turkey. It has a strategic location with unique natural, cultural, and historical features, and has more recently experienced major increases in population, largely due to a high rate of internal migration (Yazgi, et al. 2014). Over the last two decades, this migration rate has been one of the results of government polices to close down state-owned factories and relax restrictions on the import of agricultural products, thereby causing unemployment in rural areas (Yazgi, et al. 2014). Between 2000 and 2018 the

population of Istanbul increased from 8,803,468 to 15,029,231, fueling the demand for housing and raising property values. Especially, the growth of squatter areas was remarkable, for instance, during this period, the population of Esenyurt increased from 373,017 to 954,579 (https://biruni.tuik.gov.tr/nufusmenuapp/menu.zul).

Moreover, the government's innovative policies for the redevelopment of squatter areas through the fulfilling rent gap in these areas by increasing the residential density provided benefits to both investors and the residents. A thorough analysis is given by Porter (2010). However, residential density increase without taking into consideration road capacity in the surrounding areas resulted in unsolvable traffic congestion problems now. In addition, Istanbul underwent a suburbanization movement in the 1980s (Terzi and Bolen 2009) as in the case of Spanish urban sprawl (Gomez-Antonio 2016). This trend led to the decline of the historical central business district (CBD) of Istanbul together with its surrounding neighborhoods, and it was not until the late 1990s, that this area began to recover with the help of revitalization projects (Dokmeci et al. 2007; Ozus and Dokmeci 2005; Dokmeci and Ciraci 1999). With respect to some other countries, a survey of urban revitalization is given by Grodach and Loukaitou-Sideris (2007) in the US. The survey data indicate that although most agencies are guided by a varied set of goals, entrepreneurial objectives continue to guide the development and support of cultural activities in most cities.

At the same time, there was a spatial transformation of Istanbul from a monocentric pattern to one which is polycentric (Dokmeci and Berkoz 2000) as in the case of rapidly growing cities in China (Qin and Han 2013), in US (Martin 2004) and European countries (Natalia and Heinrichs 2020). This change in pattern followed the growth of the city, and the development of better communication systems allowed new sub-centers of large urban housing projects to be built at the periphery, resulting in higher land and property values (Ozus et al., 2011) which were also observed in other countries (Szumilo et al.2017). In addition, the exchange value of inner city areas also increased because of the effects of the previously mentioned revitalization projects in the CBD (Ergun 2006; Dincer 2011). More recently, the high land values and an increase in the potential for unearned income in these areas has made urban renewal a much more attractive option (Türkün, 2014). At the beginning of the 2000s, government policies focused on concentrating activity in the real estate and construction sectors (Alkay et al. 2018; Kuyucu 2014; Ozdemir 2011). This resulted in a booming housing market that continued to be driven by measures such as innovative laws for redevelopment of squatter areas to fulfill the rent gap and the opportunities which had for public and private sectors were rapidly exploited (Guzey 2016). As a result of the significant rise in the property values within these restructured neighborhoods, they have since become exclusive to middle or higher income groups.

Thus, long-established social disparities have been further aggravated by the deterioration of conditions for the working poor and improvements in the wealth of the newly rich, especially those associated with the partisan economy; and again, this shares a pattern similar to those of other developing countries (Richardson and Bae 2006). This situation is also reflected in the spatial distribution of housing prices and shows the wide disparity between rich and poor neighborhoods, which is also an increasing trend in the USA (Dong 2018).

3. SPATIAL DISTRIBUTION OF HOUSING PRICES IN 2018

The real estate market in Istanbul is very heterogeneous. This is because of its long history, numerous coastal amenities, multiculturalism, dynamic topography, and a wide-gap in the income distribution of its population. For instance, while Gini inequality index increased from 0.367 to 0.444 between 2014 and 2018 in Istanbul, it only increased to 0.391 to 0.408 in Turkey (Clark 2020).

For the analysis, 838 neighborhoods (out of a total of 955) which have housing sale advertisements were taken into consideration. Asking prices were taken from the Hurriyet Advertisement Agency for the month of October 2018, which is considered an active perriod

(Hurriyet Emlak, 2018). The median price in each neighborhood is calculated and given in Figure 1. The results indicated five highest median housing price areas. The Bosphorus, and especially the Bebek neighborhood, has the highest median housing price ($9090/m^2) (Figure 4-1a). This was also the case in previous studies (Onder et al. 2004) (Figure 2). There are several factors which can be said to account for this: its location near the Levent section of the new major CBD, its splendid Bosphorus views, and its high-value residences including historic palaces (Mirkataouli et al. 2018). Bebek is also the location of a world- f a m o u s university. Globalization is a well-established cause for increased property prices (Keyder 1999), and in the case of Istanbul, demand from oil-rich Arab countries over the previous two decades has resulted in astronomical prices being demanded for hill-side mansions and shoreline palaces (Gall 2019). Similar patterns for housing prices can also be observed for other Bosphorus neighborhoods such as Yeniköy ($6836/m2) (Figure 4-1b), Tarabya ($4592/m2) (Figure 4-1c), and Kireçburnu ($4040/m2).
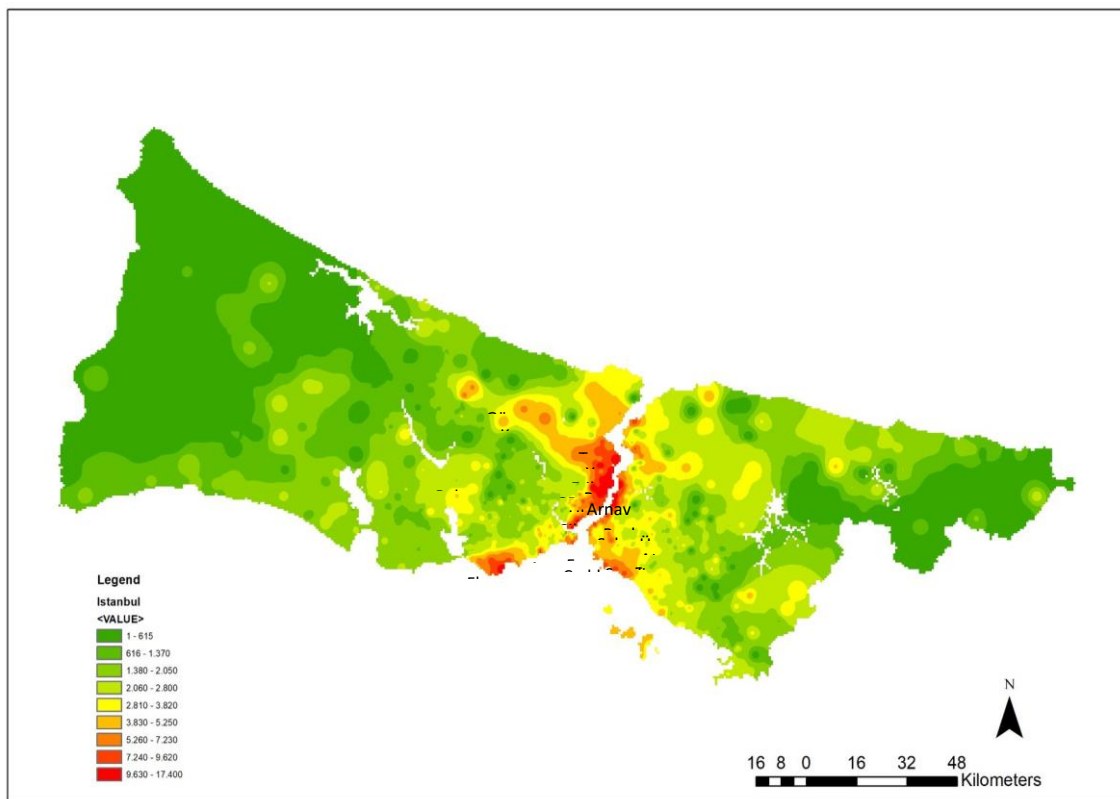

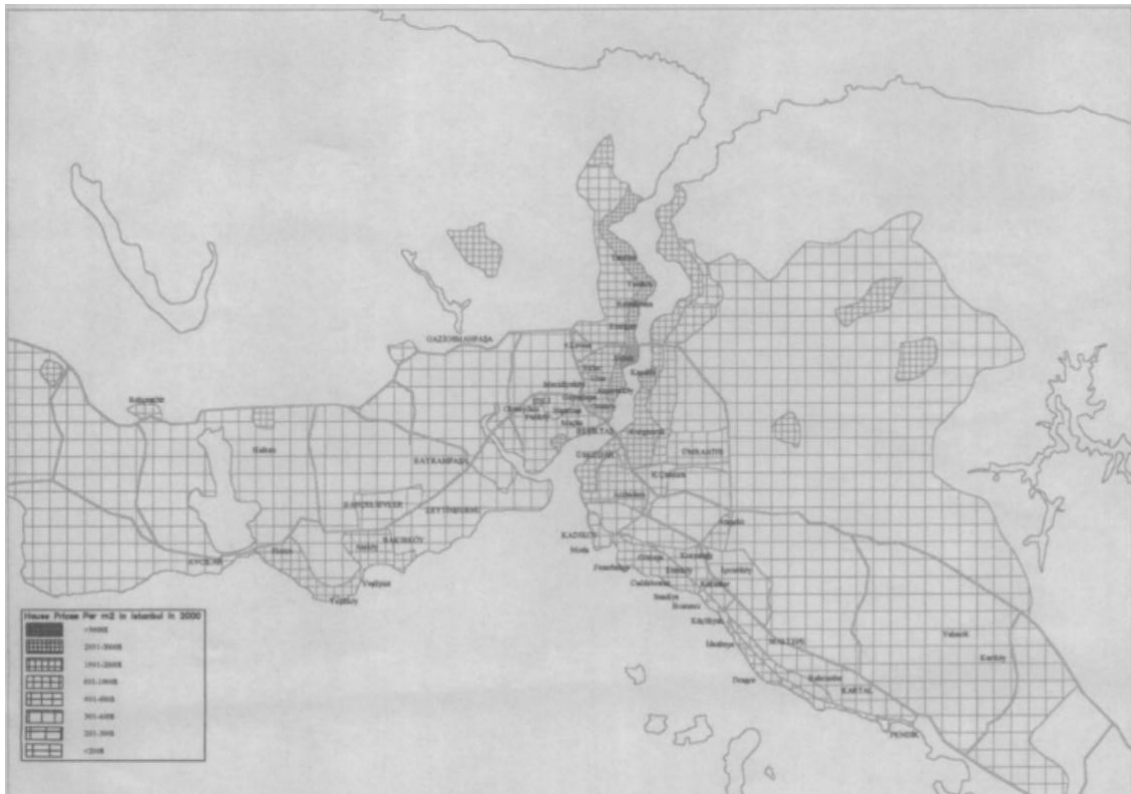
Figure 1: Spatial Distribution of Housing Prices in 2018

Figure 2. Unit House Price in Istanbul (Onder et al, 2004)

The second highest median housing price is that of the Baltalimanı neighborhood ($8641/m2). This is located on the Bosphorus shore in the Beşiktaş district and has very similar conditions to Bebek. The following highest median housing prices are those of the neighborhoods of Etiler ($7189/m2) (Figure 4-2a) and Ulus ($6538/m2) (Figure 4-2b). Both are in the Beşiktaş district and are close to the Levent section of the major Levent-Maslak (Figure 4-2c) CBD axis of Istanbul as explained by Muth (1975). Etiler was first built as a summer residence area for upper-income government personnel. The houses were detached and had gardens, and some also had Bosphorus views. More recently, many have been transformed into businesses, coffee shops, and restaurants as a result of the post- modern movement which is associated with higher income, more free time for shopping, eating and entertainment (Ayatac and Dokmeci 2017). The Ulus neighborhood was developed later on the hillside next to Etiler, and the properties there have wider views of the Bosphorus.

The fourth highest median housing price is that of the Yeşilköy neighborhood ($6111/m2) (Figure 4-3a). This area consists of detached houses with gardens and historical mansions that date back to the Ottoman period. Enjoying the coastal amenities of the Sea of Marmara, it used to be a summer resort neighborhood for upper-income Ottoman families and ethnic minority businessmen. The impact of coastal amenities on housing prices is already illustrated by Ozus et al. (2007) in Istanbul, also by Bourassa et al. (2005) among many others. After the construction of Atatürk Airport, high level airline personnel kept housing prices buoyant, but now many Yeşilköy homes are for sale because of the relocation of the airport to the north of the city. The housing prices of the nearby Florya ($5138/m2) (Figure 4-3b), and Yeşilyurt ($4290/m2) (Figure 4-3c) neighborhoods reveal a similar growth pattern.

The more recent development of the Ataköy district was influenced by these upper income neighborhoods ($6105/m2) (Figure 4-4a) and they also played a part in the development of other modern areas such as Bahçeşehir (Figure 4-4b) and the Göktürk gated community (Figure 4-4c).

The fifth highest median price is that of the Fenerbahçe neighborhood ($5704/m2) (Figure 4-6a), located on the Asian side of the city. This area also enjoys the amenities of the Marmara Sea coast. It was originally a summer home location for noble Byzantine and later Ottoman families. Levantine mansions were constructed in this area in the nineteenth century, and its development continued with modern housing for the wealthy. The neighboring districts of Caddebostan ($ 5237/m2) (Figure 4-6b) and Suadiye ($5069/m2) (Figure 4-6c) have similar characteristics and high housing prices. This is in parallel with the findings of previous studies (Ozus, et al. 2007; Koramaz and Dokmeci 2012; Jim and Chen 2009).

Furthermore, revitalization projects in historical districts can also result in higher property values. Examples of this include the neighborhoods of Gümüşsuyu ($4706/m2) (Figure 4-5a) and Cihangir ($3703/m2) (Figure 4-5b) in the Beyoğlu district. Their high housing costs are due to their strategic location in the center of the city, their beautiful historical buildings, their Bosphorus views, and their proximity to İstiklal Street, the most important shopping and entertainment area of Istanbul (Dokmeci et al. 2007). This trend has already been thoroughly illustrated in previous studies of the Istanbul property market (Yetiskul and Demirel 2018; Ozus and Dokmeci 2005; Dokmeci and Cıracı 1999), and there are similar examples from other cities such as Cairo (Fahmi and Sutton 2010) and Oakland, California (Fauria and Mathur 2012). The neighborhoods of Arnavutköy ($3873/m2) (Figure 4-5c) and Kuruçeşme ($3968/m2) in the Beşiktaş district also possess beautiful historical buildings and Bosphorus views, and illustrate a similar pattern of housing price increases.

On the Asian side, the neighborhoods of Beylerbeyi ($3029/m2), Burhaniye ($3183/m2), and Salacak ($3472/m2) in the Uskudar district share the distinction of having historical backgrounds and a Bosphorus views. In addition, they have experienced revitalization, a transformation of functions, and gentrification, resulting in higher property values than other (less attractive) neighborhoods in their vicinity. There are also suburban and/or countryside high-priced housing developments (See, Figure 1). Although there were few gated communities in the north of the city in 2000 (Baycan-Levent and Gulumser 2007) (See Figure 2), the number of expensive housing neighborhoods in the countryside had increased by 2018. Gated towns in Cairo Region can be given as an example from other developing countries (Ghonimi et al. 2011). As has occurred in some developed countries, Istanbul now has large, luxury farm houses, especially around the forested areas to the west and north of the city, and these have been either renovated or new-built to meet the demands of higher income groups to escape from the traffic and environmental problems within the metropolis (Tyrvainen and Miettinen 2000). Thus, a general evaluation of the spatial distribution of housing prices reveals that while housing prices increased in the periphery due to the flight of upper income earners from the center, the highest housing prices continues to be focused on the districts with Bosphorus and/or Marmara Sea shores. It can also be observed that the gap between upper and lower housing prices has widened, illustrating that high population growth leads to increased housing prices and higher living costs, which in-turn makes it difficult for many to afford to live in such cities. In addition, large cities require large infrastructure investments that are often beyond the capacity of developing countries (Richardson and Bae 2006). Moreover, recent experiences have also proved that it is very difficult or if not possible to deal with pandemic cases in such large cities in both develop and developing countries (Haag and McGeehan 2020). Thus, a balanced population distribution throughout the country is considered to be both more beneficial and more egalitarian in such cases.

4. COMPARISON OF THE GROWTH PATTERNS OF HOUSING PRICES IN ISTANBUL BETWEEN 2000-2018

A comparison of the spatial distribution of median housing prices in 2018 to housing prices in 2000 for the selected neighborhoods, obtained from data from a previous study by Onder et al. (2004), is given in Table-1 and Figure-3.

Table 1: 2000-2018 Housing Prices in Istanbul

Districts	Neighborhoods	2000	2018	Price Change %
Bahçeşehir	Bahçeşehir	789	808	102.41
Bahçelievler	Bahçelievler	698	1238	177.36
Bakırköy	Ataköy	625	6105	976.80
	Bakırköy(merkez)	388	1255	323.45
	Florya	910	5138	564.62
	Yeşilköy	997	6111	612.94
Beşiktaş	Akatlar	1347	5497	408.09
	Arnavutköy	1300	3873	297.92
	Balmumcu	1120	3267	291.70
	Bebek	4064	9090	223.67
	Etiler	1034	7189	695.26
	Gayrettepe	723	2006	277.46
	Maçka	1591	2661	167.25
	Ortaköy	429	2581	601.63
	Ulus	1538	6538	425.10
	Levent	1236	2983	241.34
Kadıköy	Bostancı	501	1480	295.41
	Caddebostan	764	5237	685.47
	Caferağa(moda)	541	2518	465.43
	Erenköy	521	2674	513.24
	Fenerbahçe	651	5704	876.19
	Göztepe	393	2211	562.60
	İçerenköy	295	1172	397.29
	Kozyatağı	420	1413	336.43
	Koşuyolu	614	2561	417.10
	Merdivenköy	343	1150	335.28
	Osmanağa(merkez)	289	1645	569.20
	Suadiye	660	5069	768.03
Kartal	Kordonboyu	945	2116	223.92
	Yakacık	142	700	492.96
Küçükçekmece	Halkalı	335	998	297.91
Maltepe	Küçükyalı	296	750	253.38
Şişli	Harbiye	979	5446	556.28

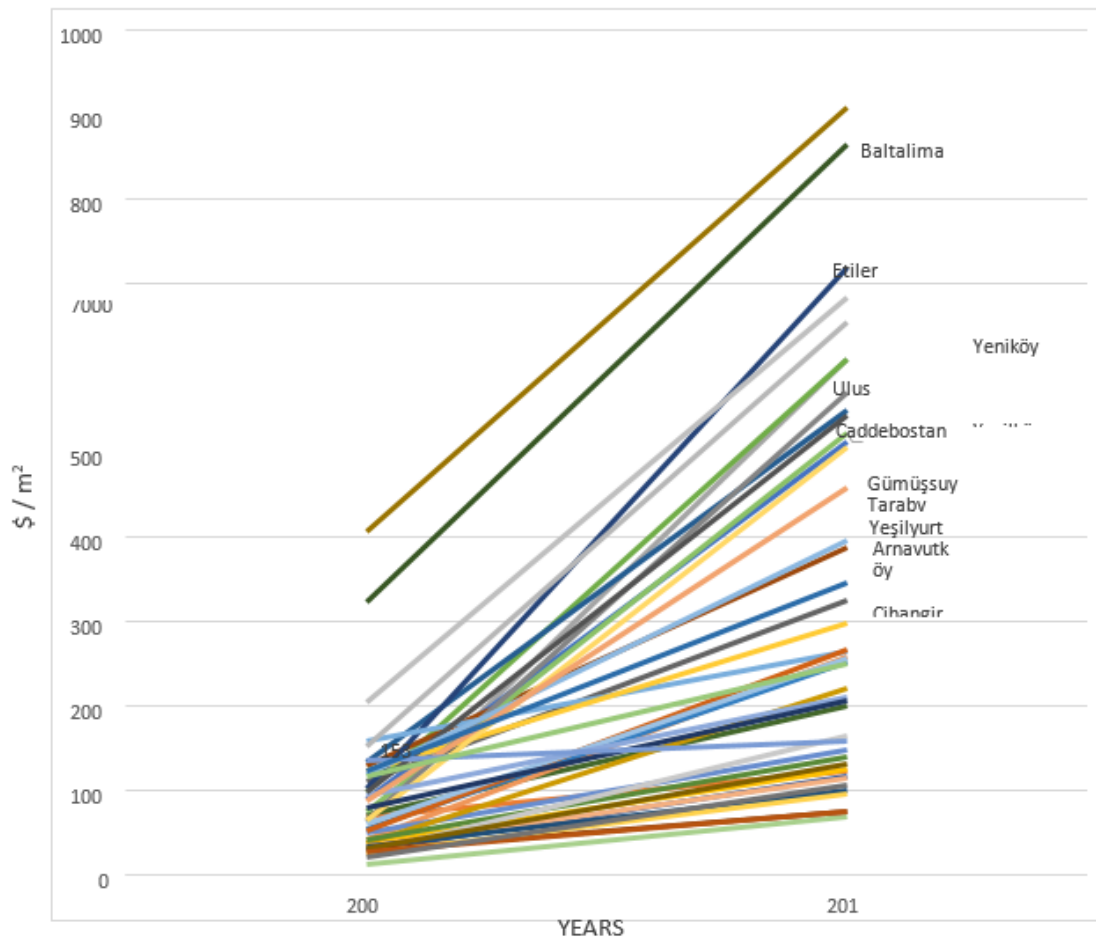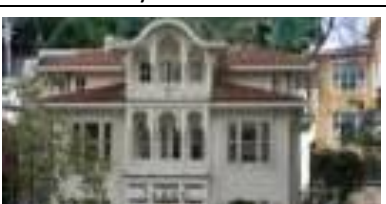|	Feriköy	325	1311	403.38
	Şişli(merkez)	796	2065	259.42
Sarıyer	Baltalimanı	3238	8641	266.86
	Emirgan	1206	3968	329.02
	Tarabya	881	4592	521.23
	Yeniköy	2045	6836	334.28
Üsküdar	Bağlarbaşı	258	970	375.97
	Kuzguncuk	1370	1589	115.99
	Küçük Çamlıca	1166	2497	214.15
	Salacak	1240	3472	280.00
Pendik	Batı Pendik	281	751	267.26
Ümraniye	Şerifali	209	1077	515.31

Figure 3: 2000-2018 House Prices in Istanbul ($/m²)

	A	B	C
1	Bebek	Yenikoy	Tarabya
2	Etiler	Ulus	Maslak (CBD)
3	Yeşilköy	Florya	Yeşilyurt
4	Ataköy	Bahçeşehir	Göktürk
5	Gümüşsuyu	Cihangir	Arnavutköy
6	Fenerbahçe	Caddebostan	Suadiye

Figure 4: Some of the neighborhoods with high housing prices in Istanbul

The spatial distribution of the growth patterns for housing prices differs somewhat from the current spatial distribution of housing prices. For instance, the Atakoy neighborhood in the Bakırkoy district does not have the highest median housing price ($6105/m2), despite its

recording the highest price increase (by a factor of 9.76) between 2000 and 2018 (See Table 1). This result is due to the lower prices in 2000 ($625/m2).

In accordance with modern urban planning principles, Atakoy was designed with large green areas by the French urban designer Prost and was built in the 1960s. Previous studies have pointed to the satisfaction of residents with regard to the conditions within this neighborhood (Bardo and Dokmeci 1992). The construction of shopping malls, sport and cultural facilities, hospitals, theaters, and modern housing projects have also increased its attractiveness. Such large, modern settlements have stimulated the growth of other modern developments in surrounding areas, with high-quality housing projects such as Bahcesehir forming a cluster of residential settlements to the west of the Ataköy neighborhood.

Furthermore, in the Kadikoy district on the Asian side, Fenerbahçe has the second highest growth pattern for house price increases (by a factor of 8.76) Although it was seventh in the median housing price ranking in 2018 (See Table-1). According to previous studies, Fenerbahçe is considered to be the most preferred district in Istanbul (Dokmeci and Berkoz 2000), and its growth trend has continued into the present; for instance, the ratio of families who moved to Kadıköy (14.78%) was the highest among all districts in 2018 (Hurriyet News, July 6, 2018). The reason for this ranking improvement is caused by the availability of recreational areas, the luxury housing stock, and the increased quality of life.

The third highest growth pattern for house price increases is that of the Suadiye neighborhood (by a factor of 7.68) of the Kadıkoy district (see Table-1). It is similar to Fenerbahce in terms of its housing quality, the location of high value residences, and the availability of seashore amenities. In addition, one of Istanbul's most famous retail areas, Bağdat Street, passes through this neighborhood, thereby increasing the attractiveness of the area as it is already illustrated in the case of London (Law 2017).

The fourth highest growth pattern for house price increases was seen in the Etiler neighborhood (by a factor of 6.95) in the Besiktas district. Its higher quality of living and above-mentioned proximity to the Levent section of the major CBD have contributed to its ongoing attractiveness.

The fifth highest growth pattern for house price increases was in the Caddebostan neighborhood (by a factor of 6.85) in the Kadikoy district. This neighborhood is located near Fenerbahce and hence has similar conditions, continually attracting upper-income residents.

The sixth highest growth pattern for house price increases occurred in the Yesilkoy neighborhood (by a factor of 6.12) of the Bakırkoy district. While similar in location and income level to Atakoy, it has historical mansions which attract slightly higher income residents, in contrast to Atakoy's more modern housing.

Interestingly, the growth patterns for house price increases in squatter areas such as the Umraniye district (a factor of 5.15) (see Table-1) have shown growth values quite close to those of well-to-do neighborhoods such as Erenkoy (a factor of 5.13) in the Kadıkoy district and Tarabya (a factor of 5.21) in the Sarıyer district. Umraniye's strategic location at the intersection of several major highways, and the restructuring of its existing urban structure with major office buildings, shopping malls, and modern residential buildings have improved the quality of life within the district (Senturk and Dokmeci 2010; Topcu 2014). Although some squatter areas have received improved housing and living conditions due to such restructuring projects, many have not and are still waiting for investment. Thus, changes in housing prices can serve as a measure of changing neighborhood dynamics; moreover, housing prices can be used to identify the impact of strategies intended to produce neighborhood redevelopment.

5. CONCLUSIONS

Over the last two decades, population growth due to government free trade and neo-liberal policies which encourage rural-to-urban migration, economic development, and globalization have fueled the demand for housing and led to rising property values in Istanbul. Differences in the level and the rate of change of prices between neighborhoods are due to their historical,

socioeconomic and cultural differences, as well as the effects of the city's multi-center development, its dynamic topography, the availability of its coastal amenities, and the unbalanced provision of its transportation systems (Bayezit 2015). The present study investigates the current distribution of median housing prices for neighborhoods in Istanbul. These prices were then compared with those of the same neighborhoods in the year 2000.

The review of the spatial distribution of housing prices reveals that geographically, the most expensive locations are found along the Bosphorus and Marmara Sea coasts and are associated with existing upper-income neighborhoods, shopping facilities, and traditional housing. Moreover, the impact of the traditional Istanbul center on housing prices weakened while that of the newly emerged centers increased. This shows that there is a link between the spatial dynamics of housing prices and the city's transition and functional development. Istanbul's transition from a monocentric to a polycentric pattern, a better quality of life, and increasing income per capita from $10,235 to $16,264 between 2004 and 2018 (World Bank 2018) has led to multiple driving forces for property values such as rising mobility and increasing accessibility, as well as the decentralization of jobs, services, and a significant population increase.

One of the outcomes is that Beyoğlu (the old CBD) has become less dominant in Istanbul's spatial organization, while the new CBD (Levent-Maslak) has emerged. This switch suggests that an urban center with emerging functions exerts an increasing influence on the spatial pattern of housing prices, while an old center with traditional buildings and functions sees its influence decline. The overall trend of this development is increasing polycentricity and thus the decentralization of high housing prices.

In addition, there is a great discrepancy between high- and low-income housing prices, and this has widened over the last two decades due to increases in the mal-distribution of income throughout the metropolitan area. Meanwhile, a new trend has appeared to the west, north and east of the city; large luxurious farmhouses have been developed or existing ones restored as escapes for upper-income citizens from the traffic and environmental problems of the metropolitan area, and recently from the pandemic. Furthermore, squatter areas at strategic locations with easy access to transportation are terries and job opportunities have proved to have a potential for restructuring. This has led to higher housing prices and shows the need for catalytic investments to improve squatter areas that do not have the same conditions.

The investigation of the growth pattern of housing prices over the last two decades reveals that locations with coastal amenities and green areas have a greater tendency to increase their property values than other areas. These findings add to the existing understanding of the internal structure of Istanbul. The results of this study can be useful for the municipal governments, and urban to planners by providing sound background to make efficient decisions for construction densities and land use allocations, to fulfill the rent gap to make more profitable decisions for the investors and the residences. However, while this study describes the location and growth patterns of sub-markets, their interaction is important for their further development; therefore, further research might do well to determine the hierarchical linkages between sub-markets. In addition, since the socio-economic data of the neighborhoods was not available, the statistical analysis could not be done to get more comprehensive results for the time being, and thus, left for future research.

Acknowledgements

Data Availability Section

Some or all data, models, or code that support the findings of this study are available from the corresponding author upon reasonable request. In addition, some or all data, models, or code generated or used during the study are proprietary or confidential in nature and may only be provided with restrictions.

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