

Analyzing housing market and price fluctuation among 22 regions in Tehran: An assessment between 2015 and 2018

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Abstract

An unusual/unprecedented housing market fluctuation was investigated in Tehran. According to the report published by the Central Bank in Iran, "Changes in Tehran housing market in May 2018" shows a significant drop in the housing market. The Economic Research and Policy Department of The Central Bank Iran <https://tsd.cbi.ir/display/content.aspx> published a report based on Tenement Management Information System (TMIS) (<http://www.iranamlaak.ir/>) data. These reports show an uneven housing market growth in terms of price and units sold in Tehran.

The objective of this paper is to investigate the facts involved in the housing sector as the safest-growing sector by over 42% inflation. To identify the qualitative and quantitative parameters in the housing market. Therefore, data were analyzed by G.I.S and SPSS software. The Exponential Growth model and Aggregated Indices Randomization Method (AIRM) to forecast the future unit demand. Two important changes in the 2018 report are the main points in this research. First, the total number of units sold by the real estate agents was 14900 which dramatically dropped in comparison to a month before by, 22.1% and in comparison to last year at the same time at 3.1%.

Second, the price of each apartment unit in comparison to the last month was 8.9%, and in comparison to the same time in last year, 45.8% increased. Results: However, these changes among 22 regions of Tehran are not the same, and regions 1, 2, 4, 5, 7,8,10, 11, 14, and 15 have the biggest share in the housing sold in the market by a total of 71.6% of sold units in May 2018. In particular, Region 5 is one of the most attractive (invest and living) and fast-growing regions in Tehran. The analysis shows that region 5 in the north part of Tehran is developing faster than other regions due to geographical location and its situation in Tehran spatial organization.

This research showed that under economic crisis and very high inflation housing is the safest and fast-growing sector. Moreover, Tehran's spatial organization and ecological foundations introduce the land suitability and different quality of living, and the housing market in Tehran growing uneven and these two introduce and guide the housing market in Tehran.

Keywords

Housing Market; Tehran; Price Fluctuations; 22 Regions; National Economy

1. Introduction

According to the latest report on the Tehran housing market in July 2018 which is available on the Tenement Management Information System (<http://www.iranamlaak.ir/>) data and published by The Economic Research and Policy Department of The Central Bank Iran, the Bank Markazi <https://tsd.cbi.ir/display/content.aspx>. An uneven and unprecedented increase in Tehran housing price, after huge inflation, was made by American sanctions. First, the number of units that real estate agents sold were 14900, and it was significantly decreased by 22.1% in comparison to a month before the data was released and in comparison to a year ago at the same time it shows a decrease of 3.1%. Second, the price of the apartment in comparison to June 2018 before data published increased by 8.9% and in comparison to the same time in last year by 45.8% increased. There are many different issues involved in such rapid price fluctuation in Tehran. The rapid market price fluctuation after Trump Administration and due to heavy sanctions on the Iranian banking system, the negative impact showed on the housing market as the most profitable sector. That how sanctions contribute to housing price fluctuation where housing, directly and indirectly, involves different industries/ sectors (transportation and steel) that price is based on the international market (Sadat Akhavi et al., 2016; Sadeghi and Tayebi, 2018). On the other hand, there are some equipment and machinery, and materials imports from other countries. Sanction and an unstable economy caused people to invest their money in the housing market as the safest and safest housing sector to protect their money. Therefore, the situation in Tehran is not the same and in some regions, the housing sector is very active in comparison to the other regions. Regions 1, 2, 4, 5, 7,8,10, 11, 14, and 15 out of 22 regions in Tehran have the biggest share in the housing market by a total of 71.6% of sold units in May 2018. Land and property in regions 1, 2, 4, 5, 7,8,10, 11, 14, and 15 are profitable and people not only look at them as the place to live also look at them as long-term investments. There is a relationship between the value of the land and social class. Affluent people like to pay money to get a better place to live that usually are among the prime lands. The current situation

in Iran does not really disturb the affluent their land and property price is increasing faster than in any other region. On the other hand, suitable land for development is available, designers, materials, and knowledge but rapid inflation does not encourage developers to take the high risk (Esfandi and Nourian 2021).

Therefore, there is a strong correlation between people's income and the housing market, when they have money they prefer to invest in land and property rather than anything else. During a house price bubble, the buyer thinks the home that has never been affordable for them now is acceptable as a long-term investment. Buyers' estimation is the house they buy now it might be very expensive in the future and they affect the market demand and price. Here is a strong link between multiple deprivation and income (poverty). The results of the CEPS/INSTEAD Working Paper Series show in each inflation the rich people do not feel deprived and high incomes live in the safest part of the economy (Fusco, 2012).

At the Economic Research and Policy Department of The Central Bank Iran, <https://tsd.cbi.ir/display/content.aspx> report we can see the housing market in Iran has polarized in Tehran by land suitability and price of the land. The situation for the housing market was with the gradual increase in the southern part of Tehran (regions 3, 9, 12, 13, 16, 17, 18, 19, 20, 21, and 22) in comparison to (regions 1, 2, 4, 5, 7,8,10, 11, 14, and 15) in the northern part of Tehran. Then the housing market introduced two different qualities correlated with land suitability, environmental comfort, and socio-economic factors. The Trump decision on Iran Nuclear Deal had an impact on the national economy as external important facts that made the price of the land and rental higher than a month and a year before. Therefore, people experienced very high inflation and they lost their saving ability to invest or consume goods (e.g. housing) in comparison to the past.

In this research, the northern part where the affluent people live and the southern part of Tehran where the middle class below people live are selected and G.I.S

and SPSS based mapping and analysis methods provided maps for a better understanding of the spatial expansion of housing price change in Tehran different regions.

2. Literature Review

Rapid population growth increases housing demand (Mehdianpour & Saremi, 2017) and it is known as an influential factor in increasing the house price. Market demand increase with the rapid rise and a slow decline in housing price and it can make an unhealthy market and affect the housing market and macroeconomy in different periods (He & Xia, 2020). These rises and declines sometimes are a result of informal urban physical development such as urban sprawl (Kamran et al., 2020; Kojuri et al., 2020). Therefore, urban housing in the global south is a complex issue that can be so different in the same city and with two adjacent neighborhoods (e.g. land price and quality of land) (Ghalehtemouri et al., 2021).

In addition, it is very well understood that investing in the housing market is very safe and secure with always price increasing (Shiller, 1981). The national housing price fluctuations can be a result of international economic situations and it can involve housing prices, rents, and urban land prices (Potepan, 1996). While, local, provincial and regional factors can effectively involve housing market price increases in different places, the national monetary policy is behind this co-movement and has a stronger influence on house prices (Del Negro & Otrok, 2007). Basu & Thibodeau, 1998 in their research showed that house price is related to neighborhood conditions and what is shared with the other neighborhoods then again the national monetary policies and system are stronger. Many studies show the national economy and monetary policies in the long term on the housing market (Ghaderi, & Izadi, 2017; Kamanroodi and Jafarpour Ghalehtemouri, 2020). Rapid price fluctuations in the housing market can be tangible in long-term studies (Shahbazi & Kalantari, 2012). The impact of national monetary policies on the quality of building materials (Nasim et al., 2019) socioeconomic factors (Shabanpour et al., 2012) environmental conditions, and neighborhood property

values (Boris et al., 2005) are significant. Furthermore, housing is known as one of the most important criteria in urban competitiveness (Keivani et al., 2003; Jafarpour Ghalehtemouri et al., 2020). However, government policies on the price by equilibrium prices can reduce the negative impact of price fluctuations in a country and equilibrium prices as policy and mechanism can take the price over and done with self-adjustments even though with future increasing trends (Zhang et al., 2007).

Since the national monetary policy is attributable to housing price fluctuations the literature in this realm of housing and real estate studies is so limited. Housing in the national economy has been influenced by international monetary policies more than any other social, economic, and environmental quality factors. In developed countries with appearing of first signs of financial-economic crisis, the government involves controlling the housing market price as the first and most important sector in the national economy (Moons & Hellinckx, 2019). Credit risk, financial situation, banking system, the main sources in the national economy, and international situation are important factors in housing prices. A major concern for the housing market can be the credit risk by financial institutions because of the correlation between the housing market and the banking system. As a prime example, in the United States in 2005 the impact of the financial institutions on the housing market was too destructive. The first negative impact came on the banks and nearly to collapse and the second impact was on the housing market collapse, which could be able to destroy the real economy. The housing market situation turned to a bad time ever such as synthetic securitization and credit derivatives (Canepa and Khaled, 2018).

House is the product of certain spatial and regional values, and the spatial regional values get their weight and meaning from the quality of the housing system, in geography, it is known as place identity (Movahed & Jafarpour Ghalehtemouri 2019). The spatial distribution of activities and wages makes a different spatial pattern in the housing market as well (Hanson, 2004) which deals with the long-term national economic policies and conditions. Where the different factors

play an important role in the housing market, price is the most important factor among the other factors. There are correlations between housing prices and the number of rent/sale contracts in real estate. However, public and private effective participation in the market as facilitators and regulators by balancing market forces and social needs and making it more affordable, in particular for low-income people (Sengupta, 2006).

Empirical research has documented how international resection changes the national economy and housing market (Franjo, 2018) and the correlation between the housing market and the decrease in the international interest rate and down payment requirement to buy a house. Long-run drivers and short-term dynamics (Asal, 2018) meaning the price of the house and housing market is the economic reflection. Asal in his research pointed out how the real house price increase influences the housing market. The pick point in (Asal, 2018) research is where he mentioned the degree of which is discounted by the business cycle and it is predictable in the short-term and medium-term. His research is based on the global finance problem in the Western Countries in the 1980s and 1990s. Therefore, it shows there are

some main factors behind the housing price, which vary from country to country. The US subprime financial crisis was so different from what it has seen in developing countries and is similar because it involves the banking system, national, international monetary policies, and financial institutions. (Lopreite and Scarpino, 2011) their research made a very clear understanding of the role of banking and financial institutions crisis on the housing market. The housing market fluctuations have two different uptakes in economists' eyes. First. Those who study the cause of the fluctuation that is external to the economic system (Exogenous). Second, Those who study the cause of fluctuation in the economic system (Endogenous). Figure 1 and figure 2 show the economic cycle.

He mentioned the fluctuation in figure 1 begins from the floor and upswing and downswing represent the economic activities. This is a way of crisis analysis means the current and the past analysis give us a predictable future. In figure 2 the economy grows around the middle values the economic systems do not have linear development, but rather discounted. This is the situation that can see in the intense economic depression. This

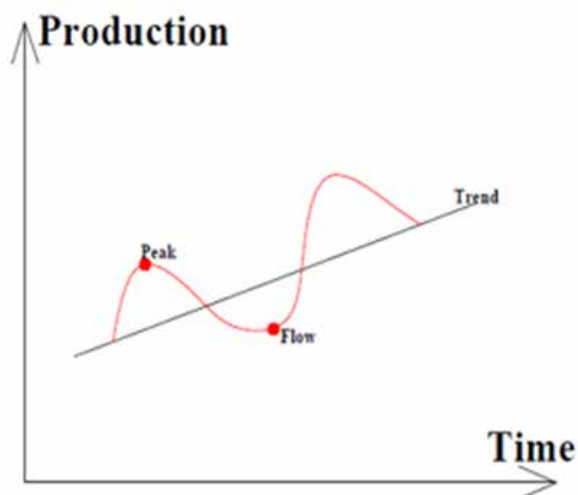


Figure 1. Economic cycle. Source: Lopreite and Scarpino (2011).

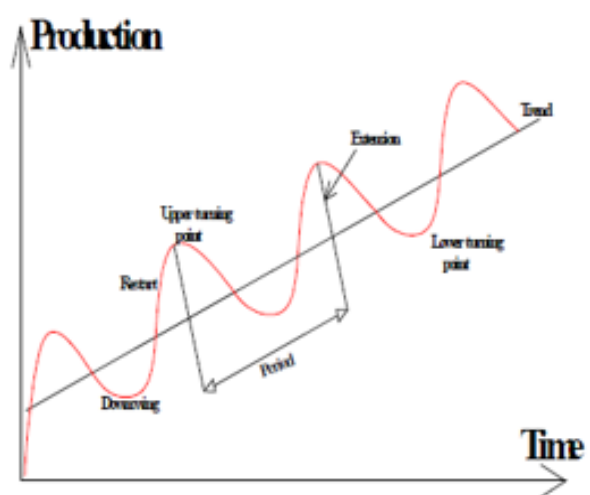


Figure 2. Economic cycle. Source: Lopreite and Scarpino (2011).

discontinuous course of the economy along with the growth path is said "economic cycle". Because the fluctuation is characterized by the phase of expansion (when the economic situation is good and the arrow moves above the value of the trend) and of recession (when it grows the below trend's value). Both sides of this movement are very important because it shows the available resources for the expansion and recession (Lopreite and Scarpino, 2011). In their research, they pointed out the very important side of how the housing market and links to other financial institutions. This is what the market encourages investors to invest in the housing market or they move their money in the housing market as the safest sector. Supply and demand in the housing market are not in the same situation and vary depending on time. Therefore, economic activities change the housing market. The most influential channels that can be very important for economic activities are

1. Any changes in the housing market make some people rich, and they change their way of living and consumption. In the end, it can change the level and quality of demand.
2. Increasing housing prices concerning production input causes more investors to involve in the housing, building, and construction market and increase demand for having a house. The other related sectors and services will be active.

3. Any changes in housing investment have an impact on the GDP and practitioners ratio. For this reason, housing has a special place in forming the business cycle.

4. Increasing house prices increases the collateral money for taking bank loans, and it is important for future investment (Riahi et al., 2016).

When the housing market is not predictable, the investors do not invest in the housing market or if some part (industry or service) does not work, will affect the house price and housing market. The housing market can be predictable if we know about Homelessness – but empty housing expensive cost of housing and inequality.

1. Geographical immobility (regional difference in house prices)
2. Boom and bust in house prices and effect on macroeconomic

3. Housing as a valuable good – social problems (crime and vandalism) arising from lack of sufficiently good quality housing.

4. Environmental costs of building new houses (Federal Reserve Bank of San Francisco, 2009).

Housing prices and buyer income make the housing market different in terms of material, size, quality, and design. In addition, they form a new pattern of living in the city and people find a new identity that is not what they had before. However, most of the existing literature in the housing market just pays attention to price and the housing market nationally rather than investigate what are the real international drivers. In most papers, the relation between the national economy and the housing market is not clear and they have never been addressed. According to the literature, the housing market during the recession is different in poor and rich areas.

3. Methodology

Considering the studied components and the nature of the subject, the approach of this research is descriptive-analytical. The studied indicators are comprehensive quantitative and qualitative indicators of housing in this study, which are first extracted by referring to statistics and general censuses and housing population, required statistics, and information. Then, using models and techniques of housing and population planning, and the extracted statistics analysis. First, by examining these indicators, the housing situation in Tehran regions 3 and 5 will be determined, and then by evaluating the current housing situation using housing and population forecasting models, we will look to the horizon of 2021. In the first part, we applied a theoretical basis, which has been based on the available literature on land price, housing price, national economy, urban planning, national economy, and macro-economy long-term and short-term price fluctuations. Once the estimated common factors identified suitable for this research we try to investigate what are the hidden sides in this research. Therefore, the banking system and the national policies conduct the research methodology to be more on statistical model data analysis. Data were analyzed by G.I.S and SPSS software for the Exponential Growth model and Aggregated Indices Randomization Method (AIRM) to forecast the future unit demand and

| Percentage share | | Percentage changes | | June | | | House/construction age |
|------------------|------|--------------------|-------|-------|-------|-------|------------------------|
| 2017 | 2018 | 2017 | 2018 | 2016 | 2017 | 2018 | |
| 46.8 | 43.7 | -10.1 | -9.6 | 8003 | 7197 | 6508 | More than 5 year |
| 16.6 | 16.3 | 5.2 | -5.2 | 2428 | 2555 | 2421 | 6-10 |
| 16.4 | 14.7 | 12.9 | -12.9 | 2763 | 2520 | 2120 | 11-20 |
| 11.5 | 14.6 | 46.2 | 23.4 | 1206 | 1763 | 2176 | 16-20 |
| 8.6 | 10.7 | 22.4 | 19.6 | 1084 | 1327 | 1587 | More than 20 |
| 100 | 100 | -3.1 | -0.8 | 15484 | 15362 | 14886 | Sum |

Table 1. The number of apartment units sold in terms of age.

Source: Tenement Management Information System of Iran (2018).

current tendencies. The present study uses housing and census data to survey the housing status and price changes in Tehran's capital city. The studied indices are the quantitative data which has been published by the Central Bank in Iran, "Changes in Tehran housing market in May 2018" the Economic Research and Policy Department of The Central Bank Iran <https://tsd.cbi.ir/display/content.aspx> report on Tenement Management Information System (<http://www.iranamlaak.ir/>) data. These reports indicated that there are some new and dramatic changes in Tehran housing Market after the US sanction and the national economic crisis. GIS is widely used to show on a map how two sides of the same city can move to different sides of the national economy and as a result of the international policies on monetary system and banking.

4. Current Status

4.1. Tehran Housing Market

The influence of the housing market on other sectors is significant. The housing market in developing countries due to a lack of effective assessment in national and regional planning, and rural migrations has increased the number of houses for rent (Gilbert, 2016). The direct and indirect role of housing in creating jobs is significant. According to the Statistical Center of Iran 2012, 2,412,121 persons (12%) work in the building and construction industry, and 99,697 people (5%) work

in real estate. In Tehran 315,085 people, (9%) work in building and construction, and 31,556 people (9%) work in real estate (Statistical Centre of Iran, 2018). The current situation in the Iran housing market has changed due to American heavy sanctions on Iran. The impact of American sanctions on the Iran housing market is significant and it is so clear when we compare the housing market last year and the current situation is obvious. The number of over 5 years old apartments that sold in 2018 was about 43.7%, however, this number in comparison to the last year's 3% has dropped and this 3% moved towards houses with more than 15 years old. Therefore, housing is a very vulnerable sector to the national and international monetary policies in Iran (e.g. sanction) and economic problems then different social classes are losing their ability to own/buy a house. In addition, the number of contracts between different regions in Tehran has changed. Cash as investment from high risk and unsafe or fewer interest sectors moved to profitable sectors like housing. This investment has never been equally in Tehran and varied in different regions, the high value lands occupied by rich people "where the land and property in terms of the environment are very pleasant, valuable, demandable, and expensive". As mentioned above the northern regions of Tehran are (regions 1, 2, 4, 5, 7,8,10, 11, 14, and 15). For instance, region 5 has the biggest share in the number of contracts by 13.9% and after that region, 2 with 8.9% and region 4 with 8.3%

signed the most contracts. In fact 71.6% of contracts out of Tehran contracts are in (regions 1, 2, 4, 5, 7,8,10, 11, 14, and 15). Table 2 shows how housing prices rising over one year has changed the taste of owners and builders.

The people who were willing (afford) to buy houses more than 20 years old in 2016 are missing in 2018 and they lost their ability to own a house. People at the bottom lines have lost their ability to own a house due to the cost of living. On the other hand, on top, those who looked for new houses have lost their ability and looked for affordable houses, which are more than 10 years old. Figure 3 shows the uneven housing market between northern parts of Tehran that, represent the upper class and rich people and the southern part of Tehran that represents low income and in some cases poor people. The housing market and situation in northern parts of Tehran are very promising and not only have those who involve in housing and construction but also for people who invested their money in the housing as a safe and promising market. They do not move to southern parts of Tehran where social class, size of the houses, and environmental issues affected the value (price) of the land and look so discouraging. Therefore, investors look for better parts in the northern parts of Tehran, where still some people are willing to buy and sell even though it has slowed down.

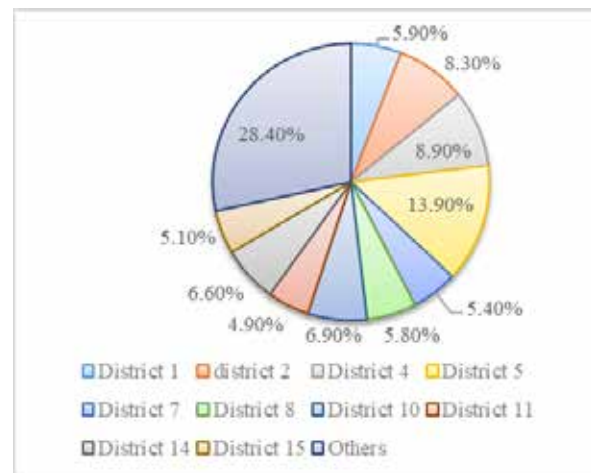


Figure 3. Housing market between different regions in Tehran in 2018. Source: Author Modification

4.1. The housing market and price fluctuation

In June 2018 the price for one square meter piece of land in Tehran was Riyal 6,750,000 which is 8.9% more expensive than a month before and 45.8% more expensive than one year before in June 2017. At the same time, region 5 with the highest price increase with (63.6%) and region 20 with (16.6%) the lowest increase are located in the west and northwestern in Tehran well, development in region 5 encouraged people to buy and rent the home. Also, poor quality of design, unpleasant environment, and being far from everywhere made the region 22 less attractive for living and investment.

| Change % | | Date | | | Number of contracts (unit) |
|--------------------------------|------------------------------------|------------|----------|-----------|--|
| In comparison to a year ago | In comparison to the last month | April 2018 | May 2018 | June 2018 | |
| -3.1 | -22.1 | 14886 | 19107 | 15363 | |
| 45.8 | 8.9 | 65107 | 59789 | average | Average p for per square meter (Thousand Riyal) |

Table 2. The number of “buying” contracts per year in Tehran.
Source: Tenement Management Information System (2018).

4.2.1 Comparing Indices

The highest land price is in region 1 in the north part of Tehran with an average of 13,129,500 riyals for 1 square meter of land. The lowest price of the land is in region 18 in the south part of Tehran with 2,685,000 riyals. Although, the price of the land in region 18 of Tehran with 26.4% and region 1 with 43.5% had increased. Contradictory region 18 is located in the southern part of Tehran but the housing market character is like the northern part of Tehran. Iran after American heavy sanctions on the Iranian oil and gas industry and banking system experienced very bad inflation. As a result, the Iranian riyal exchange has lost its value in comparison to the other foreign currencies and, in particular USD. The house price in the short-term and the long-term depends on the real drivers such as inflation, bank credit, and mortgage market in different nationalities (Kostas & Zhu, 2012).

Table 3 shows the housing market evolutions between March and May in 2018 the number of units in Tehran between March and May in 2017 reached 39000 which had a 5.2% increase in comparison to a year before the same period. At the time, the average price of the 1 square meter of land was 60.1 million riyals which is 38.6% more expensive than a year ago (tenement management information system, 2018).

Figure 6 shows that there is a strong correlation between the per square meter price and the number of

contracts. According to the available data in Tenement Management Information System, 14% of contracts out of the total contracts in March 2018 are consist of those houses or units with the price between 25-30 million Riyal and 35-40 million Riyal per square meter. After that, there is a slow downturn from 6.9% contract price of the land about 45-50 million Riyal. There is a strong correlation between the price of the land and the number of contracts and it is significant after 10 million Riyal for 1 square meter of land. Where the 0.8%, 0.7%, and 0.7% contracts for per square meter price for 130-135, 140-145, and 145-150 million Riyal is; there is a very sharp price rising with 4.1% for the houses more than 150 million Riyal.

According to the statistics unit, size has a very important role in the unit total price. As illustrated in Fig. 4 the bar chart, shows over 60% of the units sold are between 40 sq m2 and 90 sq m2, and the most demand has been for units in 60-70 sq m2.

Figure. 5. Shows over 50% of the contracts in Tehran have been for houses between 100 million Riyal (37,037 USD) to 500 million Riyal (185,185 USD). Most contracts are for 17.1 million houses. Also at the end of the figure, we can see a dramatic increase which id for luxury and expensive houses.

| Change % | | Date | | | |
|-----------|-----------|-----------|-----------|-----------|--|
| 2017-2018 | 2016-2017 | 2017-2018 | 2016-2017 | 2015-2016 | |
| 5.2 | 1.0 | 39039 | 37120 | 36755 | Number of contracts (unit) |
| 36.8 | 4.8 | 60085 | 43894 | 41873 | The average price per square meter (Thousand Riyal) |

Table 3. The number of contracts and average price fluctuation Tehran between 2015 and 2018.

Source: Tenement Management Information System (2018).

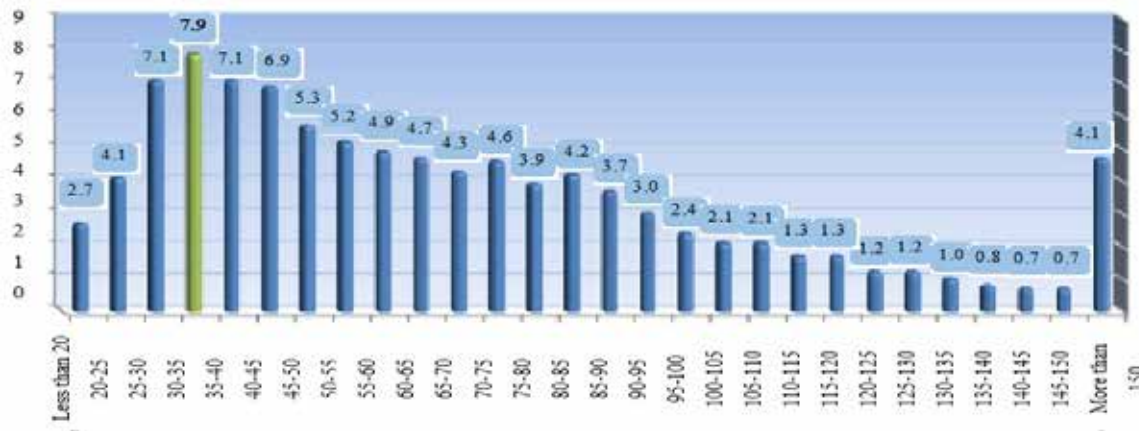


Figure 4. Frequency distribution of the sold units based on one square meter price (Million Riyal/ percent).

Source: <http://www.iranamlaak.ir>.

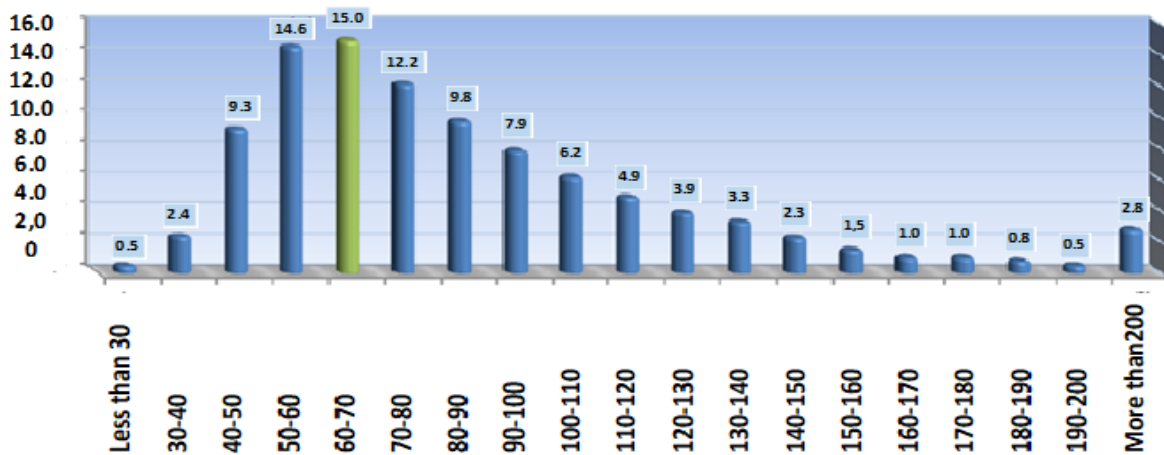


Figure 5. Frequency distribution of the contracted units based on unit size (Per square meter) (Percent/size).

Source: <http://www.iranamlaak.ir>.

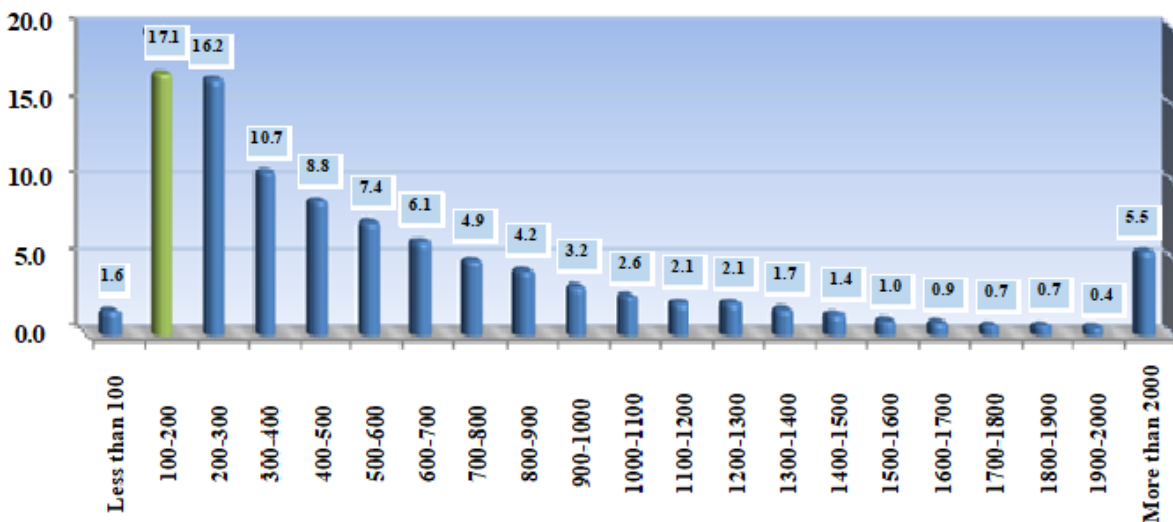


Figure 6. Frequency distribution of the contracted units based on unit price (million Riyal).

Source: <http://www.iranamlaak.ir>.

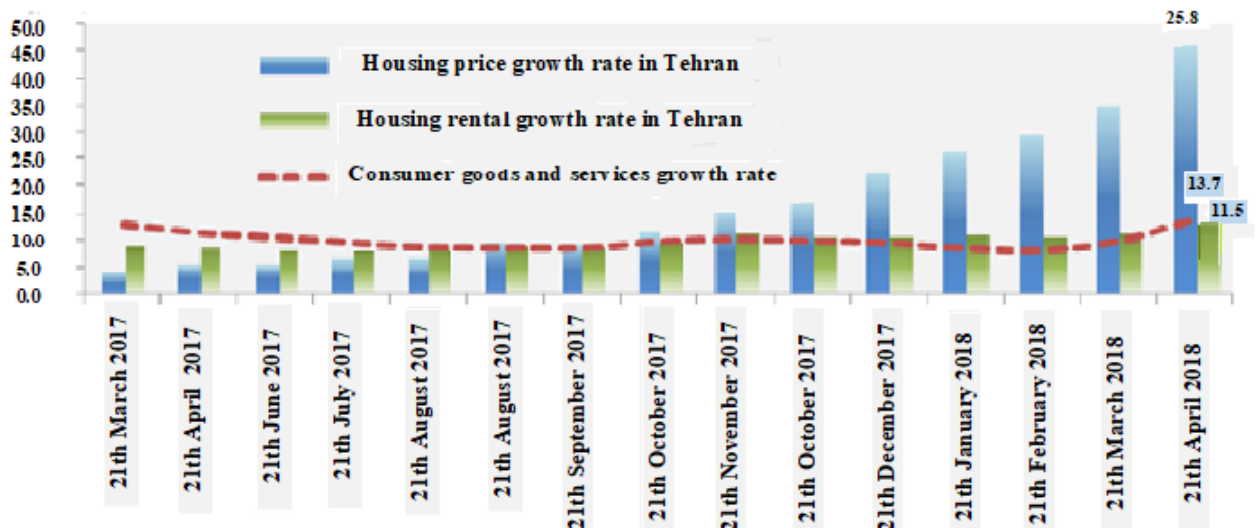


Figure 7. Monthly housing price growth rate, housing rental growth rate, consumer goods services growth rate increase.
Source: <http://www.iranamlaak.ir>; <https://tsd.cbi.ir/display/content.aspx>.

In figure 6, the monthly housing price growth rate, housing rental growth rate, consumer goods, and services growth rate increase show dramatic fluctuations in the housing market. Where in March 2017 the housing price growth was less than 0.5% and was less than consumer goods and services growth and just after one and half years it rocketed to 25.8%. While the unit rent and consumer goods and services have increased slowly. These changes in macro-economy appeared after the American heavy sanction on Iran and become the main driver economy and one of the reasons to change the investment in the housing market as the safest sector.

Figures 5, 6, and 7 are about the correlation between the number of contracts in size, per sq m2 price, and finalized unit price. Table 4 shows the average price for one sq m2 of land and the number of contracts in 22 regions in Tehran between March 2017 and April 2018. In table 4 the average price in 22 regions in Tehran is 65107 thousand Riyal. Region 5 with a reasonable price in comparison to the other regions and the north part of Tehran with 2071 has the most number of contracts among the other regions. There are just 4 regions out of 22 regions such as 2, 4, 5, and 10 that have more than 1000 contracts which 4 of them are located in the north

part of Tehran, and just region 10 is located in the south part of Tehran.

5. Results and Discussion

5.1. Housing Market analysis in the north part of Tehran
As mentioned above Tehran housing market following the ecological foundations and Tehran social ecology follows that. It means that the environmental situation provides a good condition for people who live in the northern part of Tehran. Therefore, the price/value of the land is better than in the southern part of Tehran. Tehran has 22 regions that are equally half located in the north and half located in the south but the housing market in these parts are too different due environmental, social, economic, and cultural of each side. For that reason, we choose region 3 and region 5 for a better understanding of the current housing market in Iran.

5.1.1. Region 5

Since, southern regions of Tehran (regions 3, 9, 12, 13, 16, 17, 18, 19, 20, 21, and 22) have 28% of the contracts out of the total housing market in Tehran. Region 5 of Tehran alone has 14% of the housing market out of 22 Tehran regions. The amount of contracts in region 5 is by the far highest of the other regions. Region 5 used to be the first

| 21 June 2018 | | |
|----------------------------|----------------------------------|-----------|
| Number of Contracts (case) | Average price (Thousand Riyals) | Region |
| 877 | 141844 | Region 1 |
| 1235 | 106534 | Region 2 |
| 714 | 117309 | Region 3 |
| 1321 | 71618 | Region 4 |
| 2071 | 83364 | Region 5 |
| 567 | 89797 | Region 6 |
| 798 | 59859 | Region 7 |
| 856 | 61471 | Region 8 |
| 302 | 44345 | Region 9 |
| 1026 | 40236 | Region 10 |
| 728 | 41089 | Region 11 |
| 440 | 36015 | Region 12 |
| 524 | 59216 | Region 13 |
| 976 | 47446 | Region 14 |
| 764 | 34427 | Region 15 |
| 236 | 32334 | Region 16 |
| 299 | 32196 | Region 17 |
| 334 | 28962 | Region 18 |
| 95 | 33021 | Region 19 |
| 340 | 29883 | Region 20 |
| 226 | 47951 | Region 21 |
| 157 | 60083 | Region 22 |
| 14886 | 65107 | Average |

Table 4. Average price for one sq m² land and the number of contracts in 22 regions in Tehran between March 2017 and April 2018. Source: <http://www.iranamlaak.ir>.

Tehran region from the west but after new divisions in Tehran and new regions, 21 and 22, region 5 does not have the same geographical position in Tehran anymore. Region 5 is 28.54 hectares and with 800,000 population. The geographical location and urban geography have made region 5 as one of the most attractive residential regions in Tehran. From the north with Alborz mountain range in Tehran, from the east, it reaches to Ashrafi Isfahani high way and Mohammad Ali Jenah, from the west with the Kan River and from the south; it reaches to Karaj Special Road. The surrounded regions are region 2 from the east, region 9 from the south, and regions 21 and 22 from the west. Region 5 is one of the biggest and rapidly growing regions with 29 neighborhoods divided by 7 zones. There are five regions (2,4,5,10, and 14) out of regions (1, 2, 4, 5, 7,8,10, 11, 14, and 15) which have

more than 1000 contract records by the real estate agents, and region 5 alone with 2017 contracts is by the far most signed contract region before region 4 with 1321 contracts.

Yet regions 21 and 22 as new urban development areas could not get the advantages of region 5 and they are among those regions with a less number of contracts. Therefore, what made region 5 livable as figure 4 shows is the unique geographical location in the northern part of Tehran. The pleasant geographical condition from the west ended to the Kan River and from the north Alborz Mountain Range. The strong multifunctional urban development and placing Olom Tahghighat University, International Neuroscience Institute, new big malls, shopping centers and pleasant environment made region 5 more attractive. The Tehran development tendency is

highly dependent on the pleasant environment areas. It means the price of the land is correlated with ecological resources. In addition; the transportation system is another fact that plays an important role in the housing market in region 5. The spatial organization of Tehran city made region 5 so transport friendly in terms of public and private transportation.

Region 5 is among the most population-attracted regions in Tehran. The population growth ratio shows still there are big demands for housing in region 5 in Tehran. However, as far as the demand for owning and renting a unit in region 5 is increasing the size of the houses become smaller. Based on current statics and demand in 2021 will be bigger than now and region 5 will place over 385743.78 families.

P = forecasted population

S = family size

H = Number of forecasted families

K = Family ratio

$$H = \frac{P}{S}$$

$$E = \frac{P}{K(S)}$$

Region 5 population growth ratio

$$\sqrt[15]{853312 \div 640000} - 1 = 0.019 \times 100 = 1.9$$

House Demand in 2021

$$p1400 = 853312(1 + 0.019)^{15} = 1126371.84$$

$$k = \frac{\text{Family}}{\text{number of unit}} = 290584 \div 287834 = 1.009$$

$$H = \frac{p}{k(S)} = 1126371.84 \div 2.92 = 385743.78$$

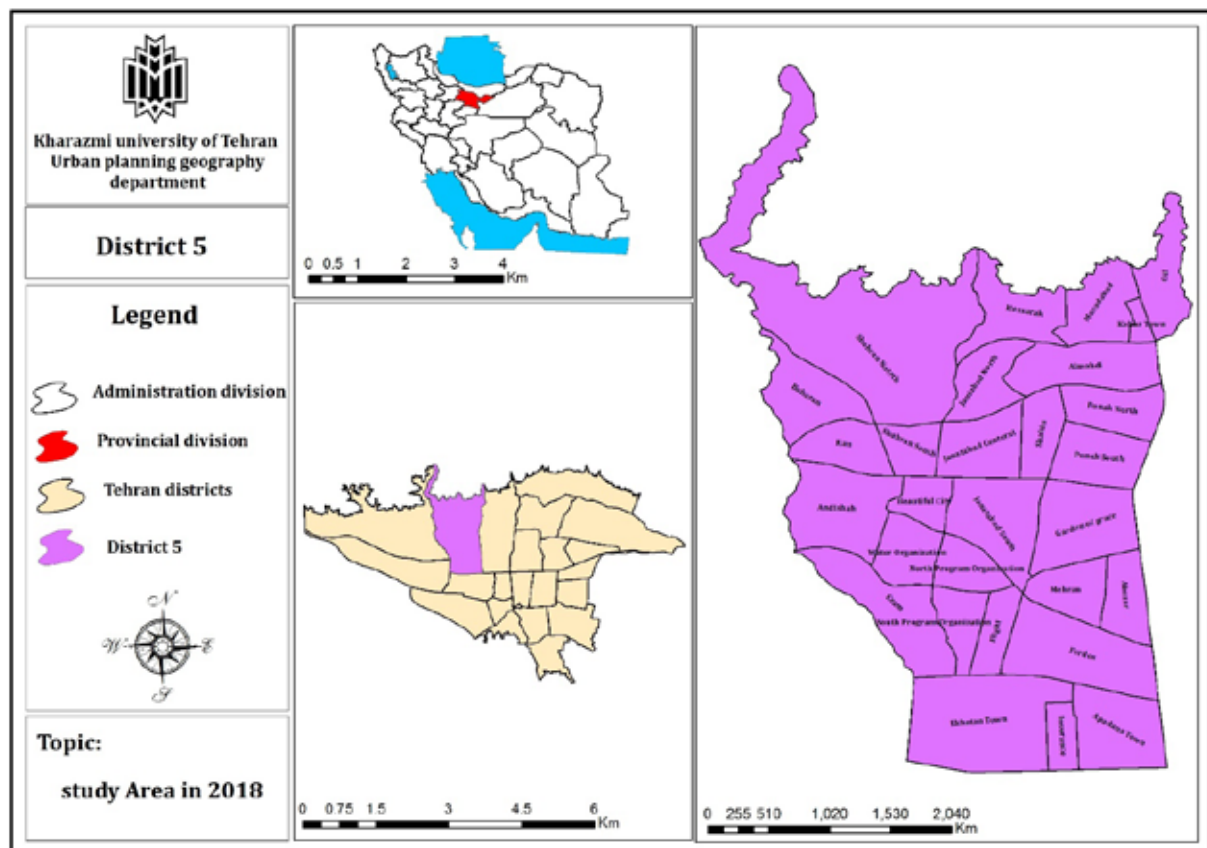


Figure 8. Region 5 in national and in Tehran political divisions. Source: own preparation.

There is a huge demand to buy a house or property in region 5 because not only there is a pleasant place to live, but it is known as a very profitable long-term investment. Region 5 is for the middle class who want to change their social and live in better environmental quality. Also, rich people, who live in the other provinces in Iran prefer to have a house there most of the time as an investment. Therefore, region 5 is a place that people live and invest in because the house unit size and price are affordable for the middle class. Region 5 in Tehran after the American heavy sanction and impact on the housing market and entire economic crisis still is the most profitable region with the highest number of real estate. The analysis shows by 2026 just the region 5 demand for new units is over 6411.

$$\sqrt[15]{919001 \div 932878} - 1 = -1.49 \times 100 = -0.1$$

Housing demand 6411

$$p_{2026} = 919001(1 + 0.019)^{15} = 320435.83$$

$$\sqrt[15]{919001 \div 932878} - 1 = -1.49 \times 100 = -0.1$$

$$k = \frac{\text{Family}}{\text{number of unit}} = 302197 \div 261509 = 1.15$$

$$H = \frac{p}{k(S)} = 320435.83 \div 3.47 = 92344.61$$

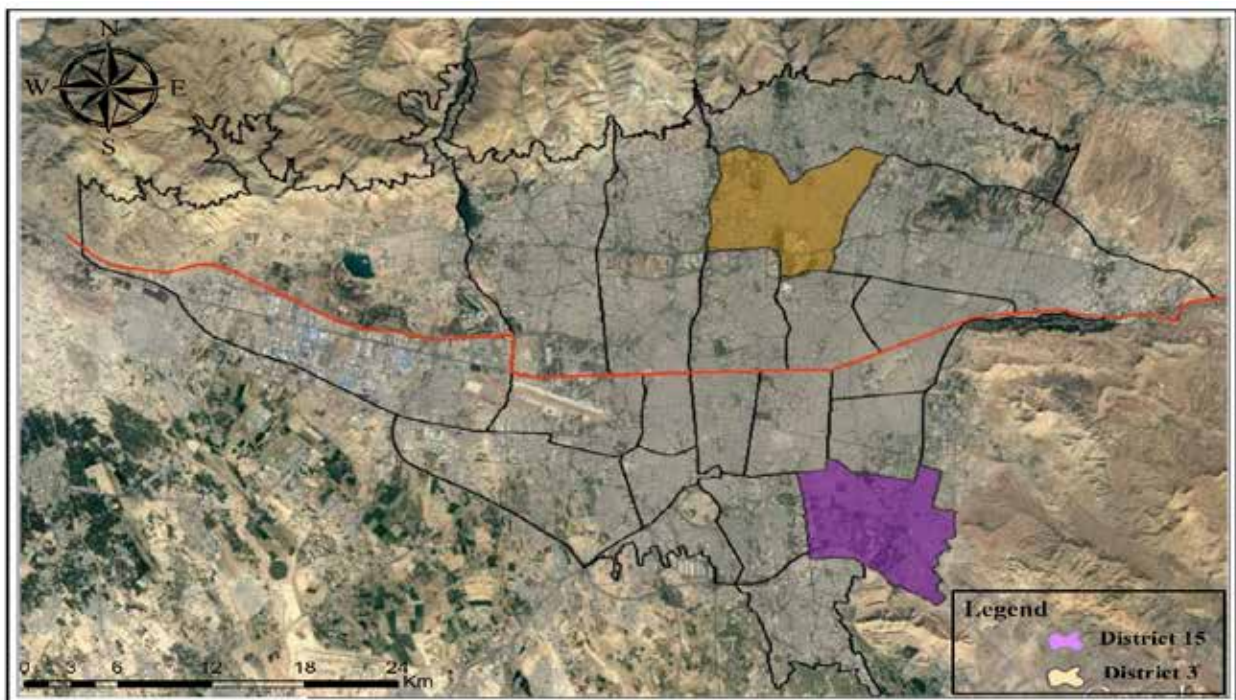


Figure 9. Region 3 is in the north part of Tehran and region 15 is in the south part of Tehran.

Source: Authors Modification.

Controversially region 3 is located in the northern part of Tehran as highlighted with yellow color in figure 9, and it is not as attractive as the other regions in the northern part of Tehran. On the other hand, region 15, which is highlighted by purple color, is located in the southern part of Tehran and does not have characters like other regions in the southern part of Tehran. The reasons that caused these two regions to become different are how government and banking policies are in the regions 15 with the most undeveloped pieces of land.

The application of the housing demand model is key to understanding the real demands in different regions as the most effective planning tool. In this research, the aim was not to measure the unit size or design. The focus was on the housing market alone as one of the most important needs in Iran and Tehran's capital city.

5.2.1. Housing Market analysis in the south part of Tehran – Tehran Region 3

Region 3 of Tehran Municipality is one of 22 regions of Tehran located in the middle of Tehran. The neighboring region in the north with region 1 of Tehran, in the east with region 4 of Tehran, in the southern regions 6 and 7 of Tehran, and the west with region 2 of Tehran. Region 3 is divided into 6 zones and 12 neighborhoods with an estimated population of 33,0004 in 11,888 households in 95 and 85 in 9,981 households, of which 14,1186 are men and 149540 are women. The population of this region in the years 75, 65, 55 was 237301, 217084, and 222007, respectively, which shows a decrease in population in 65 years. The population growth rate in the region is 1.57% literacy rate is 95.5% and the employment rate is 95.5%. This area is one of the highlights of high literacy rates. According to 2006 statistics, Iran's statistical center covers an area of 1161106 square meters and its green space reaches 21 square meters per person, which is in a very favorable position according to the international standards and prevailing standards in Tehran. The existence of 66 embassies and ambassadors' residency centers has made the area a diplomatic settlement.

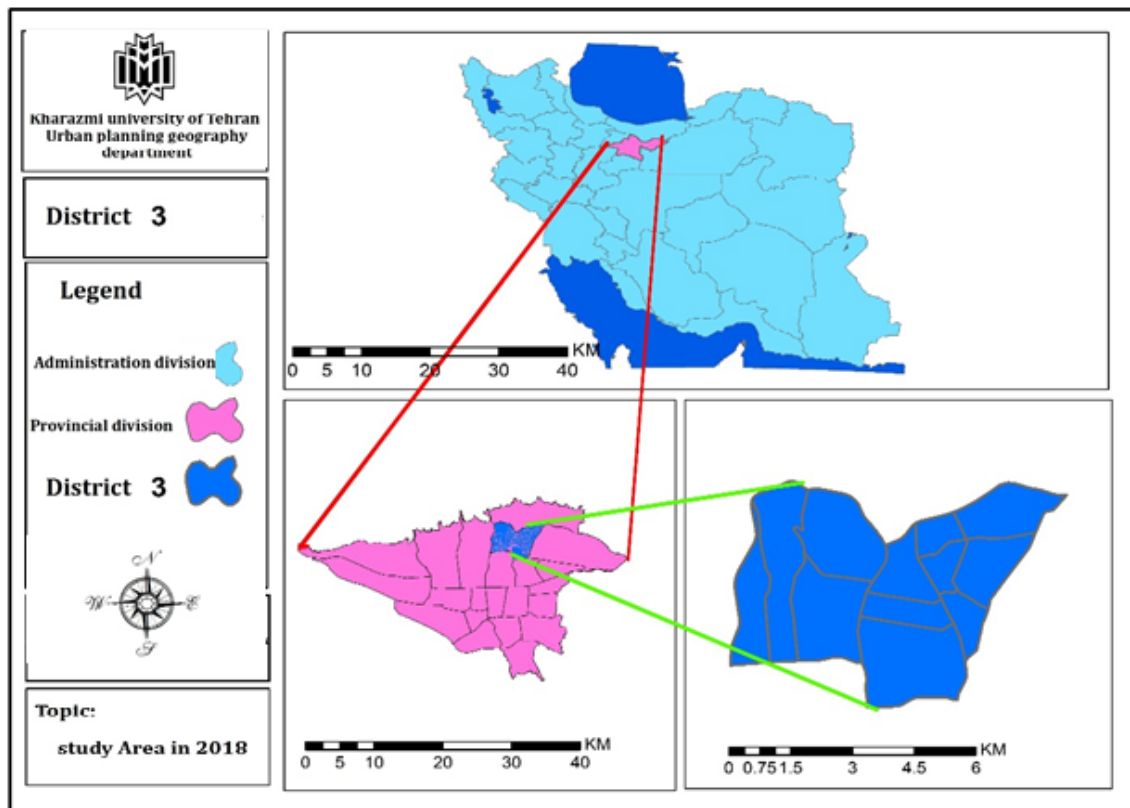


Figure 10. Region 3 in national and in Tehran political divisions.

Source: own preparation.

$$p_n = p_0(1 + r)^n$$

Population P_n on horizon 2025, population p_0 at the beginning of the period, r annual population growth rate, n interval; accordingly, the population growth rate (for the period 2006-2016) is calculated as follows:

$$R = \sqrt[n]{\frac{P_N}{P_0}} \times 100$$

That growth rate is estimated to be 1.2% in the 2006-2016 time interval, given the population of 2006 and 2016 region 3 which is (respectively) 290726, 33,0004, the population forecast for the horizon 2026 times. Is with

$$P_{2016} = p_{2026}(1 + r)^n$$

$$P_{2016} = p_{2026}(1 + r)^n$$

$$P_{2026} = 330004 (1 + .0127)^{10}$$

$$P_{2026} = P_{2016} (1 + r)^{10}$$

$$P_{2026} = P_{2016} (1 + r)^{10}$$

$$374392 = P_{2026}$$

As a result, the predicted population in 2026 is 374392

Estimated number of residential units required:

Using the mass method, we obtain the number of housing needed up to the 2026 horizon.

In this method, the predicted population (p) is divided by the mean of the household dimension (S) to obtain the predicted household balance (H). So we have: (Relation 1)

And if K interferes with the household factor in the housing unit. The number of housing needed (E) is obtained. (Relationship 2)

So concerning relation 1 we will have:

$$H = 374392 / 2.78 = 134673$$

And according to relation 2 we have:

$$E = 374392 / (1.02 (2.78)) = 132032$$

$$E = 374392 / (1.02 (2.78)) = 132032$$

Therefore, housing is not just about producing new units or urban land development (Antoniucci and Marella, 2018) house ownership (being a landlord) is important to reduce family costs and families can save more money. Second, the policy about housing should not be just about having a shelter/place to stay/sleep and it should decrease poverty. Third, placing poor people in poor housing systems does not solve the problem (e.g. Maskan Mehr Building). Forth, money that people pay for housing as rental or installment to buy a house should not make them poorer and the housing market should address the people's needs, abilities, and capabilities. Fifth, low rents reduce the poverty and help those who want to own a house in the future but this should become under the public and private housing manifest. Sixth, the housing market should monitor the money that comes from outside of the housing sector which just looks for more interest. This can be the main cause of housing market polarization huge part of money moves to those areas where they can see their interests in a short time. Seventh, the social aspects of the housing market should be highlighted by the government and in their housing policies and projects. Special social groups should be targeted (e.g. poor people or people with low income). Eighth, the condition and situation for people in the southern part of Tehran should be easier. The banking system should not have the same policies for house ownership in poor and rich areas (Reentries Consulting and Oxford Economics, 2010). Ninth, the bank and private sector should not guide people's money in the housing sector "as a good place to invest". The housing market should not be a sector or place for secure/safe investment otherwise other players take more interests (landowners, developers, contractors, real estates, cement/tile/pipe/ waterproofing companies.). Tenth, the policy should have closer eyes on different players who involve in the housing market in public and private sectors (e.g. banking system). Finally, the people who involve in housing markets in (regions 1, 2, 4, 5, 7,8,10,

11, 14, and 15) are so different from those who involve in the housing market in (regions 3, 9, 12, 13, 16, 17, 18, 19, 20, 21, and 22) the price of the land, the materials they use, design, and their links and connections in different ministries and organizations are different (nepotism). In terms of the place, there is a strong link between place productivity and residents' power it shows the biggest changes and the real currents of money are where these rich people live (urban ecological foundations).

CONCLUSION

According to the statistics, the American sanction changed the market behavior and the housing market became the safest place for investment in Iran. Importantly, in very short-term inflations as figure 10 shows the housing market growth rate is by the far rapid in comparison to the other sectors. However, the housing market in Iran follows ecological foundations in Tehran city. Population density shows those places that have a pleasant environment are more attractive for the population. The north part of Tehran is more pleasant to live with the highest amount of rain and face to the Alborz mountain range and temperate weather. On the other side, in the south part of Tehran close to the Iran central desert, it is drier and hotter. Therefore, ecological and geographical foundations provided a better socio-ecological and socioeconomic foundation in the north part of Tehran. Therefore, the recent housing market fluctuation price in Tehran city was so different in the north part where upper middle income and high-income people live and in the south part where the middle income and low-income people live. Tables 6, 7, and 8 show that the luxurious, big, and expensive houses have a specific place and they are in the north part of Tehran. The price for one sq m² in April 2018 was 65.1 million Riyal which had a 45.8% increase in comparison to April 2017. The number of contracts in April 2018 was about 14900 which is 3.1% less than last year. Also, based on the housing market fluctuations the price for rent in Tehran and in general in urban areas in comparison to the last year increased by 12.5% and 10.4%.

The spatial organization of the Tehran city has made region 3 of Tehran less prosperous than other northern regions. On the other hand, the housing market in region 15 in the south part of Tehran is growing much faster than in other southern regions. Region 5 rated over 14% of the total contracts in Tehran and analysis shows the demand for new houses and units is growing. The demand for new units in region 5 is over 6411 in 2026. Whilst, the demand for new units in region 3 of Tehran is 2021 in 2026. The current housing market in Iran and under the sanction, the house is a matter of investment rather than living. Therefore, not only do buyers find that housing is the safest place to invest; also, they look for maximum long-term interest. Their choice is based on size, building age, and land suitability.

Conflict of Interests

"The authors declare no conflict of interests".

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