Investigation on the effective factors for population mobility in spatial balance of the towns in Qazvin conurbation with emphasis on regional transportation

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ABSTRACT

An analysis of the commuting pattern in the towns of a conurbation requires the study of a variety of factors such as social, economic, environment, and so forth. Studying and evaluating the main factors affecting the commuting patterns of conurbation, by taking environmental potentials, population, existing status, activity poles, population centers, traffic volume, and transportation into account to analyze the observations, data, documentation, and information obtained from relevant organizations. Accordingly, this research has evaluated the towns and villages of the Qazvin conurbation with the help of four factors of average household size, average household income, average unit price of housing, and activity rate. Considering the spatial structure of connection networks, location and distance of towns from the city center (Qazvin) and the rate of changes of the factors have been analyzed. The type of present research is applied, the paradigm governing the research space is also of a positivist nature, the purpose or approach of the research attained with the help of analyzing data and information is descriptive as well. In terms of research strategy, our research benefits from deductive reasoning. In terms of method, it uses mixed method. Accordingly, in order to change the commuting pattern, we know that the volume of transportation is in direct relationship with spatial balancing of the structure of the Qazvin conurbation with the factors of household income. The price of newly built housing units and the rate of activity, and it is in inverse relationship and with the household factor. Therefore, the spatial mobility of the population from the surrounding towns to Qazvin and Alvand is high.

Keywords: Regional transportation, spatial balance, population mobility, Qazvin conurbation.

Introduction

The increase of population and urbanization has led to uneven urban growth. Unbalanced distribution of facilities and opportunities has affected the basic needs of social groups. As a result, the unbalanced spatial pattern of population has obvious effects on various economic, social, political and administrative aspects (Babaei Dermani, 2002: 35). This pattern has the effect of strengthening the center at the expense of the periphery's weakening, and eliminating the role of the small towns in urban hierarchy which is also an effective factor in the imbalance of urban system (Fanni et al., 2014: 112-113).

The inequality and lack of equilibrium in the optimal distribution of facilities exist in Iran, due to unelected
policies of the past (Tavakoli Nia, Kanouni and Sharifi, 2014: 80) and for many other reasons. Establishing such equilibrium was largely unplanned in planning, causing imbalances in housing and employment centers, and the creation of a non-balanced spatial mobility. Therefore, in order to achieve balanced and integrated development in the regional environment, the creation of a balanced and systematic hierarchy of housings is one of the basic needs (Khodadad, Nakhaei and Omidzadeh, 1393: 78 and 79).

Considering the indicators and factors related to the spatial equilibrium, and also the studies on the distribution of economic activities of different regions (of course, they have paid less attention to spatial dimension, and have not paid any attention to the structure of economic activities and employment in space), it is possible to plan and provide a rational strategy in accordance with the environmental capacities in order to increase the balance between the employment and housing.

Considering the high number of employees in the industrial service sector in Qazvin conurbation as well as the existence of numerous problems such as air pollution, high population density and high unemployment, traffic and lack of optimal utilization of agricultural and tourism capacities, non-balanced distribution pattern of service activities and the identification of capability points seems necessary in the transition from the main centers of activity towards these sub-centers in order to decentralize, and transfer the population and workers from the main centers to these points to improve the economic, social and biological conditions. In this regard, there is a need for analyzing the amount of population mobility in the Qazvin conurbation due to the lack of balanced distribution of activities in the region, low activity in peripheral towns, and the price of housing units and so on. There are many factors in creating the uncompetitive space in a conurbation. In terms of the importance, the impact of factors, the study of the factors of previous research and theoretical framework related to the area, the four main factors of household income, the prices of newly built housing units, household size, and activity rates with respect to distance from the city center (Qazvin city) have been studied.

**Background of the study**

Quantitative studies inside and outside the country in the area of balanced distribution of the pattern of employment and housing in the region, and its relationship with economic activities and population mobility have been conducted, including the study entitled "The study of the effects of creating new towns in balancing the housing space and regional working space: A case study of New Andisheh town" by Johari and Moradi Masihi (2011) with the aim of explaining the role of New Andisheh town in balancing the living and working space of the urban area of Tehran. The library research method, the statistical data and goal achievement matrix were used. These data were analyzed by using cross-sectional and multiple regression or triangulation methods. The results of the study showed that New Andisheh had the most positive effect on balancing the living space, planned employment in the region by attracting part of the overflow of the population of the major cities of the region and provided employment for its inhabitants and the urban area. A study by Khayr al-Din and Hakimzadeh Asl (2016) by the title of "The application of the pattern of integration of the settlement system and employment in the assessment of the spatial equilibrium of new urban cores: A case study of the new town of Pardis in Tehran metropolis)" with the aim of determining the growth process of the new Pardis town as well as the convergence or divergence process of this town with intended indicators to measure the integration of the housing and employment system. The methodology of the research is descriptive-analytical using library and field research. The results of the analysis showed that the new Pardis town is moving towards an imbalance between housing and employment, and the divergence of the housing and employment system. Monitoring the
convergence or divergence of the housing system and employment of new cities can adjust are used to improve the approaches to managing spatial change. Lau (2010) in an article examines the impact of urbanization on the employment of workers in the new Tienshui Wai city. The results of this study showed that lack of spatial balance between job and housing, and lack of balance between increasing travel time and travel costs reduce the freedom to choose travel modes and limit job selection options for workers. Ultimately, the combination of high unemployment rates and social deprivation has led residents to lose contact with relatives and friends and give up looking for long distances away from their houses. A study by Modarres (2010) titled "Multi-polarity, travel pattern, urban form: A case study of Southern California", based on studies conducted in the United States in 2005 by various analytical methods, suggests that spatial/temporal employment patterns should be used to better understand the spatial dynamics of travel patterns. The results show that (1) contrary to popular belief, all those who live in suburbs have no problem with long journeys, (2) employment patterns in multipolar cities provide a better justification for travel patterns, and (3) the pattern of travel for low-income groups, due to the decentralized nature of employment in the service sector is the most challenging issue. In general, this article suggests that supporting a particular urban form is likely to be frivolous and inaccurate in the absence of an irrefutable link between travel patterns and decentralized urban areas. In 2013, Dopping Zhang carried out a study on work-based placement effects which computes travel distances using the apparently unrelated spatial error regression model in ten US states. In sum, to create a suitable travel pattern, regional organizations must provide an active economic market, maintain the same industrial sectors together, and design the network well. Specific regional policies should be based on regional features such as population density and urban form. Although such studies are less about the equilibrium of town in a conurbation, the present study tries to investigate the factors affecting the urban population of urban cities by using the results of research and proposes solutions for the success of these towns in achieving its objectives in the field of employment.

Theoretical framework
The urban network is considered to be a collection of cities that is expanded and organized in a given space in conjunction with each other through population mobility, the flow of goods, thoughts and the provision of services. Flow of commodities, thoughts and population mobility, and the supply of services are the vital and driving forces of the urban system that make it dynamic. In fact, "the urban network refers to a set of cities that have been expanded in a region or in a geographical area just like interconnected circles and due to inconsistent growth, they have different irradiance in the area". Also, the urban system from the point of view of systemic attitude can be considered a set of cities that are in interaction with each other and in a special combination with a hierarchy of roles and functions, play a key role in national and regional development. In fact, the layout of cities in a given geographic context and their interconnection and interactions with each other through population mobility, flows of goods, thoughts and services can be considered as urban systems, provided that it forms a functional-structural interconnected system (Fanni et al., 2014: 114). This concept is one of the most challenging concepts in the field of urban and regional studies which has different attitudes and functions (Asadi and Zabardast, 2010; 19). The term conurbation has been used in other Persian texts as Shahrgan, urban system and urban network. The high density of the population, the proximity of two or more cities, the existence of a larger city, and the concentration of economic activities and services in the main city are one of the most important features of the conurbation. The conurbation is a collection of small towns that gradually connect to each other with the expansion of a city. Studies of major cities and collections in the
twentieth century have been done by C. B. Faust. In an article in 1932, he described the term "conurbation" as follows: I use the term conurbation precisely in the sense of a continuous urban area, an area of connected residential spaces occupied by factories and other buildings, ports, dock, parks, playgrounds and the like, in such a way that the rural lands are not separated from each other. Two critical criticisms have been made on the above definition of the conurbation. First, this definition does not adequately emphasize socio-economic factors. Second, there is no clear criterion for determining the external boundary of a continuous urban area (Barak Poor, 2004; 98-100). The urban area and conurbation are the surrounding areas of metropolises that have the highest population density and urban area, they are also in daily exchange (population mobility, cultural, etc.) with the main metropolis (Sasan Poor, 2011; 86-89).

The concept of conurbation was first introduced in the planning and management of Tehran along with other large cities and towns around them, and approved in 1995. Here, referring to the coordinates of Tehran conurbation can help in understanding the nature of the concept in a comparative way. Tehran is the capital city of Iran, and an area of about 700 square kilometers with a population of about eight million located in the geometric center of Tehran's conurbation (Asadi and Zabarddast, 2010: 24). Generally speaking, according to Patsien (2008), the conurbation area comprises one-third of the commercial and industrial activities of the whole world. Therefore, in order to achieve balanced and integrated development in the regional environment, the creation of a balanced and systematic hierarchy of settlements is one of the basic needs. The United Nations Regional Development Center considers the credibility of small and medium-sized towns in developing countries more in terms of development policies, including population distribution and policy planning in the infrastructure of the peripheral areas of metropolises (Khodadad, Nakhaei and Omidzadeh, 2014: 78 and 79).

Balance of Employment - Residence Pattern.

As a general principle, the ratio of job to housing, equal to one, leads to productivity, justice, and a better quality of life as well as to environmental viability.

More justice results to increasing access to housing, and providing low-cost employment to low-income workers near new business in the suburbs, which leads to a reduction in spatial imbalances (Shillcox, 2003: 4). The equilibrium between residence and employment is related to the spatial relationship between the number of jobs and geographic housing units (Peng, 1997: 1221). A range is considered to be reasonable when those who work in a job are located at a reasonable interval of time and distance from their place of residence or when all types of existing businesses and housing complement each other.

Realistic balance includes complementary features of employment and residence. Additionally, an acceptable range of equilibrium should be identified. The concept of balance refers to a range of travel, notes that a combination of housing is given in a reasonable distance from a work area (Giuliano, 1991: 305). The balance between workplace and house has been the subject of much debate over the past decades. Evidence suggests that the connection between the place people choose to live and work is very complicated. Some of these complexities are:

- Increasing travel costs are comparatively low compared to the increase in housing costs.
- The number of multi-employed households is increasing.
- Gender differences in households affect working commuting patterns.
- Balance relies on rules such as housekeeping, and commercial and industrial use for low-income people (Frank, 1994: 10)

The idea of a balance between housing and employment aims to encourage more businesses in housing rich areas, and providing more incentives. (Peng, 1997: 1220). Although the equilibrium is a relatively abstract concept that resists measurements, Margulis (1973) adopted a general rule that states a society is in a balanced condition, while the ratio of job
to the number of housing unit is between the range of 0.75 to 1.25 (Cervero, 1989: 136).

Conceptually, the deterioration of the balance of housing and employment can cause urban dispersion in two ways. First, a city may not only be able to decentralize its population, it may also suffer decentralization of employment. In some cases, it is even faced with the reduction of the role of the core of the city as a center of employment. Imbalances can be invoked in a different place, and degree of decentralization of population and employment (Cervero and Landis, 1997: 10; Cervero and Wu, 1998: 25).

Secondly, the imbalance between housing and employment due to the urban dispersion may result in the concentration of employment in the central trade zone despite the concentration of the population (Chow Loo, 2005: 552). Different measurements are used to determine the balance between residence and employment. The ration of job-to-housing is widely used to determine the numerical equilibrium between occupation and housing on a given geographic scale (Peng, 1997: 1223; Cervero, 1989: 137).

Of course, some experts consider the total number of housing units or the number of occupied houses or the number of labor force or population in the ratio of job to the number of housing units. Frank defined the equilibrium between residence and employment using the census, through the ratio of jobs to housing units ranging from 0.8 to 1.2.

He realized that in moderate areas, the distance between work and travel is reduced by vehicles. (Frank, 1994: 34). Others have calculated the proximity of work and family using the potential opportunity method. However, both methods do not show the real status of choosing a family's job (Zhao et al., 2011: 60). Some studies measure the balance using real numbers such as the ratio of job to family (Cervero, 1989: 137).

Some others measure equilibrium with regard to land use characteristics, such as mixed use in relation to residential and industrial land (Frank, 1994: 10). Others suggest that the balance between residence and employment should be measured by comparing the skills levels of local residents in relation to local employment opportunities, as well as comparing the income of employees and the cost of local housing (Hamilton et al., 1991: 1037). Indicators often used to measure the severity of imbalances between housing and employment include the average distance or time needed to go to work, but the contribution of different modes of transportation, access to housing, and occupation by various social groups (Zhao et al., 2011: 61).

Researchers generally use community-level data to calculate the ratio of jobs to housing units. A change in this method is to replace the housing factor with the employed residence to provide a more accurate level of balance. The second measure for assessing the balance between residence and employment is to calculate the ratio of job access to housing access (Shillcox, 2003: 2)

The ratio of occupation to housing only reflects the potential for greater balance. The degree of this potential is reflected by the share of employment in a community that has been gained by the residents and the share of employed people of that community. In addition to the numerical equivalence of occupations with housing, there must be an adaptation between the level of local residents' skills and local employment opportunities, as well as between employed people's income and the cost of local housing. Some other indicators for measuring the balance between housing and employment are: employment to population ratio, comparison of the number of employed people with the number of jobs, average distance or traffic time, the share of different modes of transportation, access to housing and occupation by various social groups, taking into account land use features such as mixed use in relation to residential and industrial land, comparing the skill levels of local residents with regard to local employment opportunities, and comparing the income of employees and the cost of local housing (Cervero, 1989: 137).
Spatial balancing

Regional inequalities can also be considered in the context of land coherence as a balanced distribution of human activities on the land. The balance can be achieved by reducing inequalities (e.g. between urban networks), preventing regional imbalances (such as differences between regions) by obtaining more coherent spatial and regional policies - an active process that leads to coherence (Petrişor, 2010: 33).

Therefore, one of the regional aspirations is to create a reasonable balance between people, employment and the environment, and the region is balanced by the fact that employed people have access to their jobs at a reasonable distance from their place of residence (Varesi and Kamali Baghrahi, 2016: 62). A common and important point is that both urban dispersal and multi-dimensional development depend on decentralized employment and show simply the housing-employment imbalance in a well-defined geographic region (Lin and Cui, 2013: 4).

Figure 1: Conceptual framework for the connection of population mobility and spatial balance in conurbations
(Source: Authors, 2017)

Theory and Methodology

The present study is of an applied nature, due to direct encounter with the sample and analysis of its changes based on existing foundations. The paradigm of the research space is positivist. The approach is descriptive by analyzing data. In terms of the research strategy we are dealing with a kind of deductive reasoning. Its method also is a mixed method, the research required data be collected and analyzed by the above criteria. In this regard, using quantitative methods, four factors are considered as the main index: analyzing the Pearson correlation coefficient ($r$) in SPSS, the correlation coefficients of the factors are calculated relative to the distance from the central city. Finally, with the help of these analyses, the process of factor changes is shown in relation to the distance from the central city. From a spatial perspective, the investigated factors are represented spatially using the ArcGIS tool. In demographic network analysis, with the help of network analysis, a graphical representation of circles and lines is used. Circles are also used to display points, factors, and lines to show the relationship between these points. This method has been used to analyze the network of transportation and infrastructure of Qazvin conurbation in order to show the amount of connections and spatial mobility in this area, analysis of the distribution of spatial mobility, and the amount of connection between community centers and activities. At the end of this process, the proposed spatial structure of the area has been addressed.

Data analysis

The increasing migration of people from villages to cities, as well as the rising amount population density, has led to an increase in the number of cities in the coming years so that over the course of 30 years the number of cities has come from two cities to seven, with a high concentration of population. In particular, the urban population in this area has caused the relative density of the population to grow 6 times from the relative density of the province and the proportion of urbanization has reached up to 84 percent. The household size throughout the country has declined and this area is not an exception. In the villages and cities of this area, the city of Qazvin in the western Eghbal village has the lowest household size and the highest household size is in the village of Nosratabad.
Distribution of income groups with an increasing-decreasing rate: The monthly household income of conurbation in the cities of Mohammadiyeh and Qazvin is between 156 million and 204 million Rials (1.5 million tomans per month) in the income group. The lowest incomes are in the cities of Bidestan and Sharifiyeh with an annual income of 92 to 102 million Rials (900 thousand tomans per month). In addition, in the spatial map of household income in other cities, we can see that the cities such as Alvand, Eghbaliyeh and Mahmoudabad are in the middle range.

Case study
The State Supreme Council of Urbanism and Architecture, with a delay of 14 years, approved the guidelines for defining and determining the boundaries of conurbations on 20.04.2009 and communicated on 07.06.2009, and accordingly the boundaries of the Qazvin conurbation in "The council of the Qazvin Conurbation Design Project" was discussed on 20.05.2009 once in the "Joint Meeting of Housing and Urban Planning and Infrastructure Commission of Qazvin Province Planning and Development Council" on 29.07.2009, and approved by the Supreme Council for Urbanism and Architecture. In the current situation (2016), the Qazvin conurbation has 7 towns and 76 villages with resident population. The largest city in this complex is the city of Qazvin with 355,000 people and as the conurbation center, it has the first and a different position in the Qazvin conurbation. After Qazvin, the city of Alvand with 69,000 people is in the second place, Eghbaliyeh with 55,000 in the third place, Mohammadiyeh with 49,000 in the fourth place and the towns of Bidestan, Mahmoudabad Nomooneh and Sharifiyeh with 20-16 thousand people come in the fifth to seventh place. Among the towns of this conurbation, Nosratabad near the Alborz industrial town with 13,000 people, and the Choobindar in the immediate vicinity of Eghbaliyeh with 9,500 people have the highest population. The conurbation area includes the central part of the city of Qazvin, Mohammadiyeh, and central districts of Alborz town. This area is 1423.5 km², which is 9.1% of the province including 2 countries, 3 districts, 6 villages and 7 towns. The current area of Qazvin conurbation from central Eghbaliyeh along with Qazvin and Alvand has been developed in 1976, even earlier, with the construction of the industrial city of Alborz. Also, one of the reasons for transforming the city of Qazvin into a major city and a center for services was because it is located in the path to major western, northwest, northern cities, and the central regions of Iran. The increasing migration of people from cities and villages to these cities, has led to the increasing population density, and consequently, increasing the number of cities in subsequent years. Urban centers have been expanded from two cities to seven cities during 30 years. Also, the relative density of the population increased to more than 6 times of the relative density of the province and the proportion of urban population to 84%. Establishment and placement of Qazvin in the northwest of the country led to the formation of a linear structure, and then a radial structure in the road network of this conurbation (Qazvin Conurbation Plan, 2009: 2). There are about 31,548 kilometers of main roads and subways including highway and freeway in the conurbation, most of which are located near the settlement centers. The household size in the whole country has been decreasing, and our area of study is not exempt from this fact. Qazvin has the minimum household size in western Eghbaliyeh and the maximum household size can be found in Nosratabad village.
Data analysis
Housing in low-priced cities has an upward rate. The cities of Mohammadiyeh, due to their favorable service conditions and the town of Alvand, and because of high amount of activity density are in the next grade. The average rate of activity of Nosratabad section in the city of Mohammadiyeh is as low as possible. The absence of a strong economic basis in this part is one of the factors to be mentioned. The employed population of the conurbation over the past two decades has risen from 81,686 to 119,338 in 1996 and then to 184,884 in 2006, in other words, employment in the conurbation has not increased along the active population.
The average price of housing units in the cities of Qazvin has been higher than the other cities, which has led to an increase in construction, and also the average annual growth in the conurbation during the first decade of the study period (1986-1996) was 3.9 percent. This figure increased to 4.5% from 1996 to 2006.

Identification of the dominant model of connection network between urban settlements according to the studies carried out in the connection structure among the cities of Qazvin conurbation, the highest connections are among Bidestan, Eghbaliyeh, and Sharifiyeh cities. The existence of connection networks with a limited variety of transport modes. The high concentration of activity in both Qazvin and Alvand has led to a daily reciprocating mobility of population, or so-called pandolic movement, in the conurbation network.

According to the data of various vehicles, because of the very low variety of public transport vehicles, the taxis (the pick-up and drop-off locations) that are fixed are the highest in number, and based on what is shown in the table, due to the concentration of activity in Qazvin and Alvand, a huge part of the main population mobility is directed to these two cities, especially Qazvin.

Figure 2: The spatial structure of existing transportation networks, survey of average monthly household income and activity rate

Source: Authors, 2016
<table>
<thead>
<tr>
<th>Commuting course</th>
<th>Distance between two towns</th>
<th>Taxi</th>
<th>Taxi (travels everywhere)</th>
<th>Driver (per 1.5 taxi)</th>
<th>Bus</th>
<th>Total of Vehicles</th>
<th>Number of transported passengers with call taxi</th>
<th>Number of Passengers</th>
<th>Private car</th>
<th>Average number of two passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qazvin-Mohammadieh</td>
<td>12</td>
<td>40</td>
<td>118</td>
<td>30</td>
<td>13</td>
<td>201</td>
<td>360</td>
<td>5420</td>
<td>6000</td>
<td>12000</td>
</tr>
<tr>
<td>Qazvin-Eghbalieh</td>
<td>11</td>
<td>60</td>
<td>157</td>
<td>45</td>
<td>8</td>
<td>290</td>
<td>320</td>
<td>6360</td>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>Qazvin-Alvand</td>
<td>14</td>
<td>60</td>
<td>177</td>
<td>45</td>
<td>20</td>
<td>302</td>
<td>700</td>
<td>8340</td>
<td>7000</td>
<td>14000</td>
</tr>
<tr>
<td>Qazvin-Mahmood Abad Nomooneh</td>
<td>7</td>
<td>50</td>
<td>148</td>
<td>37</td>
<td>-</td>
<td>235</td>
<td>260</td>
<td>4960</td>
<td>1500</td>
<td>3000</td>
</tr>
<tr>
<td>Alvand-Mohammadieh</td>
<td>12</td>
<td>40</td>
<td>95</td>
<td>48</td>
<td>20</td>
<td>203</td>
<td>160</td>
<td>5820</td>
<td>7000</td>
<td>14000</td>
</tr>
<tr>
<td>Qazvin-Sharifieh</td>
<td>15</td>
<td>45</td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>75</td>
<td>110</td>
<td>1610</td>
<td>4000</td>
<td>8000</td>
</tr>
<tr>
<td>Qazvin-Bidestan</td>
<td>14</td>
<td>55</td>
<td>-</td>
<td>38</td>
<td>-</td>
<td>93</td>
<td>160</td>
<td>2020</td>
<td>4500</td>
<td>9000</td>
</tr>
<tr>
<td>Total</td>
<td>88</td>
<td>350</td>
<td>695</td>
<td>388</td>
<td>61</td>
<td>1399</td>
<td>2070</td>
<td>34530</td>
<td>32000</td>
<td>64000</td>
</tr>
</tbody>
</table>

(Deputy Director of Transportation and Traffic Planning, Municipality, 2011) (Source: Authors, 2017).

Figure 4: Connection network between urban settlements

Source: Authors, 2017
Due to its habitation and the role of a dormitory with the highest population density to other cities, the city of Mohammadiyeh is important in the conurbation compared to other cities. By analyzing the demographic data in the spatial maps of the conurbation and grading the volume of these streams based on the volume of input, the spatial graph of the population flow has been determined in analyzing the relations and currents of the population between the cities of Qazvin conurbation. In addition to the number of vehicles, four other factors which are based on the main indices of disruptive equilibrium are related to the economic, demographic, and activity of these cities. The factors used are distance from the city center (Qazvin), housing unit price, average household income, activity rate, and city household size.

Multivariate analysis of variables was performed to determine the correlation between the main factors with SPSS software and with the help of the Bivariate Correlation, and the Pearson correlation was performed in two ways between the factors in order to determine their correlation. Pearson correlation was used for the factor of distance from the center with the factors of the newly built housing unit price, activity rate, household size, and household income were measured using Pearson coefficient and significant value (p-value, r) were (0.716, 0.07), (0.824, 0.23), (0.191, 0.682) and (0.699, 0.08), respectively. Considering the above calculation, the correlation coefficients, and binary significant value of each of the factors, we reach the conclusion that there is an inverse relationship between the distance from the center and the price of the housing unit, the activity rate and the average household income because of the negative Pearson correlation coefficient. Due to the higher value of -0.699, the correlation is very strong, and due to a slight increase of 0.05, there is a significant correlation between the factors. Because of the positive value of Pearson correlation coefficient, there is a direct relationship between the distance from the center and the average household size. Due to the fact that it is less than 0.33, a relatively weak relationship has been observed, and because of the fact that the value of its significance is much higher than 0.05, there is almost no significant relationship between these two factors.

The correlation analysis between the main factors with the help of Pearson correlation (r) between the factor of distance from the center with the factors of the newly built housing unit, the activity rate, household size, and household income were measured using Pearson coefficient and significant value (p-value, r) were (0.716, 0.07), (0.824, 0.23), (0.191, 0.682) and (0.699, 0.08), respectively. Considering the above calculation, the correlation coefficients, and binary significant value of each of the factors, we reach the conclusion that there is an inverse relationship between the distance from the center and the price of the housing unit, the activity rate and the average household income because of the negative Pearson correlation coefficient. Due to the higher value of -0.699, the correlation is very strong, and due to a slight increase of 0.05, there is a significant correlation between the factors. Because of the positive value of Pearson correlation coefficient, there is a direct relationship between the distance from the center and the average household size. Due to the fact that it is less than 0.33, a relatively weak relationship has been observed, and because of the fact that the value of its significance is much higher than 0.05, there is almost no significant relationship between these two factors.

<table>
<thead>
<tr>
<th>Town/City</th>
<th>Distance from Center(km)</th>
<th>Housing Unit Price(million tomans)</th>
<th>Activity Rate</th>
<th>Household average income(million tomans)</th>
<th>Household Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qazvin</td>
<td>0</td>
<td>2</td>
<td>38.42</td>
<td>1.5</td>
<td>3.3</td>
</tr>
<tr>
<td>Alvand</td>
<td>14</td>
<td>3.35</td>
<td>37</td>
<td>1.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Mahmoodabad Nomooneh</td>
<td>7</td>
<td>0.85</td>
<td>36.42</td>
<td>1.3</td>
<td>3.7</td>
</tr>
<tr>
<td>Sharifieh</td>
<td>15</td>
<td>0.85</td>
<td>36.42</td>
<td>0.9</td>
<td>3.4</td>
</tr>
<tr>
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<tr>
<td>Bidestan</td>
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<td>35.5</td>
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<tr>
<td>Eghbalieh</td>
<td>11</td>
<td>0.85</td>
<td>36.42</td>
<td>1.3</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Source: Authors, 2017
Considering the analysis of the change in household size and the distance from the center, and the average household income, it can be concluded that the household size in the cities of Qazvin and Alvand is lower than the other towns. On the other hand, the average income in these two cities is higher than cities that are far from a central city. It also indicates that families with a high average income are located in central cities with fewer family members. It can be said that the amount of income does not necessarily contribute to the rise of the population. In the cities of Qazvin and Mohammadiyeh, the cost of buying a housing unit is higher than the other towns, and the city of Qazvin has a very high activity rate due to its central role in economic, political and other fields. The rate of activity of the city of Mohammadiyeh is lower than the other cities due to the newness of the city, and its role of dormitory. Other cities generally located far from the city center, have a low activity rate, and a lower price for the housing unit.

Conclusion
Urban collections generally create relationships between the central city and other cities, among which these can be referred to daily, pendulous and massive cumulative flows between urban cities. In such a relationship, the cities of the surrounding areas have the most positive effect in balancing the living space and planned employment in the region because of the absorption of the overflow of the metropolitan areas and the employment of their inhabitants. According to research findings, the protection of a particular urban form is unwise and inappropriate in the absence of an irrefutable link between the patterns of travel,
individual, and decentralized urban areas. Spatial/temporal patterns of employment should be used to provide a better understanding of the spatial dynamics of commuting patterns, and supporting a particular urban form would be frivolous and false in the absence of an irrefutable link between travel patterns and decentralized urban areas. This fact will exacerbate the imbalance between housing, employment and the divergence of the housing and employment system. Monitoring the convergence or divergence of the settlement and occupation system of the surrounding towns of the main city can regulate and improve the management of spatial mobility, and establish the spatial balancing. In Iran, due to the unbalanced development of cities, central and major cities have a much higher absorption capacity than the towns in the area of their influence. This will change the population courses in all cities and leads to some kind of spatial imbalance in the conurbation. The main reasons for this are so many, but most of them are related to housing and employment. The factors of the average household income, the price of the housing unit, the activity rate, and the household size are part of other factors that are used to analyze the network. The amount of population flow in conurbations is also used to measure the amount of commuting and spatial mobility to analyze the distribution of spatial mobility. Accordingly, it has changed the volume of transportation (vehicles) contributing to the balance in the structure of Qazvin urban complex which has a direct relationship with the factors of household income, the price of new housing units and the rate of activity. It has also a reverse relationship with the household dimension factor. For this reason, the population mobility from peripheral cities to Qazvin and Alvand is high. What is outlined in the analysis is that low-income and large households have been settled in far-away towns with lower housing unit prices. Because of the low rates of activity in the towns such as Bidestan, Sharafiyeh, Eghbalieh, and Mohammadiyeh, the population mobility direction has been from such towns to the cities with a high concentration of activities like Alvand and Qazvin.

Suggestions and solutions
Among the main managerial and executive solutions, in order to balance the population mobility in Qazvin conurbation, we can propose the following solutions:
1. Shifting employment centers to smaller cities by taking human and environmental capacities, and potential of existing situations into account with regard to the development of small and medium-sized towns,
2. Providing special facilities for promoting entrepreneurship in order to increase the rate of activity, and thereby reducing the flow of population and unemployment,
3. Increasing per capita of municipal services in small and medium-sized cities,
4. Providing special facilities for increasing the purchasing power of poor and medium-sized families,
5. and, promoting the capacity of public transport networks in order to increase the speed and so forth.

References
Babaei Darmani, A. (2002). The role of small towns in spatial distribution of population (Case study: Sistan and Baluchestan province), Master thesis of geography, Sistan and Baluchestan University.


