

Examining The Evolution Of The Khuzestan Urban Population Using The Urban Primacy Indexes

Mokhtar Karami, Rasol Sarvestan, Ali Mohammad Mansourzadeh

Abstract: Examining the status of a city in the surrounding metropolitan area network not only helpful for Specialists to understand the ups and downs of city life and surrounding it ,but also can set the groundwork for hierarchical relationships settlements and planners for discipline the urban network is studied. Research to study the evolution of the urban population in Khuzestan province was conducted during the statistical period (1957-2012). The method is a descriptive and analytical study. To collect the data, in addition the study of literature, the Facts Sheet (the statistical yearbooks and census of population and housing censuses in all courses) has been used. Then to enter data and analysis it the Excel and Minitab software was used. Models used in this study are Ginsberg index, Urban Primacy Index, Two City Index, Four City Index, Mehta's Four City Index, Moomav and Alwosabi. The results show that is balance between the parameters of the Urban Primacy Indexes in Khuzestan province since 1957 to 1977. The process of balancing continue and is destroy until the beginning of the Imposed war and the depletion of the population of cities and in 1987 the Urban Primacy Index reached its highest level and due to the problems of the war in Ahvaz it earns the highest the Urban Primacy Index. Since 1987, the Urban Primacy Index reduced and their balancing process continues until 2012 that this balancing process due to natural population growth since after 1997.

Index Terms: Ginsberg index Urban Primacy Index, Two City Index, Four City Index, Mehta's Four City Index, Moomav and Alwosabi index, Shannon entropy and Khuzestan.

1 Introduction

In the last half century in Iran, The development of capitalism in the framework of oil-reliant economy was due to the recession of agriculture and rapid urban growth. The rapid growth of urbanization did not moderate, but also was due to the growth of large cities and prevents the growth of small towns and villages. In many parts of the world, the global economy is linked to hastily urbanization (Cohen, 2004: 24), and now for the first time in human history, half the world's population live in cities, while urban development is a global phenomenon. It is estimated that the world urban population reached from 2.86 billion people in 2000 to 4.98 in 2030(Cohen, 2004: 27). Until 1957 the urban development in Iran had a balanced process. But since 1340 the sudden change was began in the country's urban population growth based on Statistical Center of Iran and inconsistencies and double standards was created in the physical, social and economic cities. The second half of the twentieth century, the most important scientific and social challenges in the population planning was the rapid growth and increasing its focus on one or several points of the city, especially in the third world. First, West highlights the phenomenon and it is called an abnormality leads to unbalance and unfair distribution of opportunities and Inefficiency of the process. Subsequently, the developing countries also discuss the phenomenon and seek ways to overcome this problem.

Formation and development of large and small cities in urban systems of industrialized countries largely in coordination with the different stages of industrial development and has a normal pattern. But in developing countries, the rapid growth of urbanization and lack of coordination with the industrial development, urban system in these countries has created new problems. The outcome of such rapid growth was the large part of the urban population focusing on one or two large cities of the country. In fact, the centralization can be the reaction to the social division of labor and integration into the world economy. In the future generally and especially in the twenty-first century will be challenging, a challenge that arises from changes and technological developments, demographic, economic, political and international. The present study aims to examine the evolution of a population, and the first city in Khuzestan province that reflects the needs and capacities of communities and also is the most important scheduling needs. Without knowledge of changes in population and urbanization cannot proceed to decide and cannot take appropriate policies and strategies to mobilize and allocate resources. To achieve this goal, we first presented the concepts of population and population structure with analyzes of them (Lvnz curve in 1977 to 1997). Then, use the Urban Primacy Indexes to determine the level of Urban Primacy in Khuzestan province from 1957 to 2007 like Ginsberg index Urban Primacy Index, Two City Index, Four City Index, Mehta's Four City Index, Shannon entropy, Moomav and Alwosabi.

2 Assumptions

It seems that evolution of Khuzestan Urban Primacy during the years 1957 to 2012 are in the balance. It seems that the Urban Primacy in Khuzestan using four Mehta cities located at the bottom of excellence.

2.1 History

German geographer Mark Jefferson in 1939, in the Special paper for the first time proposed the idea of Urban Primacy. His explanation for the phenomenon of large cities where the majority of population and economic activities are concentrated and often been the capital, these cities called the first city and the phenomenon called Urban Primacy. He claimed that most developing countries and some developed

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countries have prime urban systems. Jefferson to determine the Urban Primacy at the 44 developed countries in the world used proportional method to calculate the ratio of first to second city. Ziyari and colleagues in 2007, studies the urban hierarchy of West Azerbaijan province, using the model of the rank and size, the difference between the floor and curved Lvnz during the years 1977 to 1997 and concluded that the urban hierarchy at the city network is semi-balanced. Latifi in 2009 investigation the Urban habitations in the Mazandaran province by using the principle of rate and the size of the census in 1987 and 1997 and concluded that the urban system in the province is relatively unbalanced and represents the concentration and aggregation of population in the central part of the province.

2.2 The studied area

Khuzestan province with an area of 64,057 square kilometers in the South West of Iran and It is located on the shore of the Persian Gulf and the Arvand River and is considered the center of Iran's oil production. Ahwaz is the provincial capital. The province is the fifth most populous province of Iran. Khuzestan is limited to Lorestan from the north, and is limited to Bakhtiari province from the North East and East, and is limited to Ilam province from the northwest and is limited to kohgiluyeh province from the East and Southeast, and is limited to Bushehr province and the Persian Gulf from the south and at end is limited to Iraq from west. The province has a population of 4,531,720 people (Census 2012) with 1, 083, 341 households, which included 793289 urban and 290052 rural households. Khuzestan province ranging from 47 degrees with 42 minutes to 50 degrees, And 39 minutes east of the Greenwich meridian and ranging from 29 degrees with

58 minutes to 32 degrees and is located 58 minutes north of the equator.



Figure 1: Khuzestan and its position in the country

2.3 Urban population of Khuzestan

The number of cities increased from 28 in 1997 to 47 in 2007 and 62 in 2012. Urbanization ratio (the proportion of the urban population of the province's total population) increased from 62 percent in 1997 to 2/67 in 2007 and 8/71 percent in 2012. After the census of 2007 to 2013, 14 villages into cities and 29 villages have joined the city's population which was 154,406 people in 2007. In 2012 (according to the division of the country in 2013), In 2012 (according to the division of the country in 2013), Khuzestan province's urban population has been 3251881 people And the population of Ahwaz has been 34/2% of the urban population. The total population of 19 city (6/30 of cities) that each population of them is in the range of 6239-1277 people, has been 1/98 percent (less than 2%) of the population urban.

Table 1: Relative Distribution of the population of Khuzestan province in terms of population categories in 2011

Share of the total urban population percent-	Population	rNumbe	Populational classification
1..07	34759	14	Less than 5000
3.7	120345	16	5600-<10000
3.86	125492	9	10000<18000
6.87	223394	8	20000-45000
10.15	330050	5	52000-75000
40.16	1305820	9	100000-240000
34.2	1112021	1	than one million more
100	3251881	62	total

Among the cities in Khuzestan in the year's 1957 and 1967 Abadan and in the years after 1977 Ahwaz had the largest population. During the period 2012-1977 Average annual growth rate of urban population of Khorramshahr ,Abadan and Arvandkenar has been Respectively 23/- ,92/- and 35/1-% (in the sense that each of the city's population in 2012 has been less than in 1977) and in other cities province has been positive. Among cities with a population of over 50 thousand people, the lowest and highest average annual growth rate of population was belonged to Masjed Soleiman (84 / . Per cent) and IZEH (2.7 percent). Major cities in the province (Ahwaz, Abadan, Dezful, MAHSHAHR, Khorramshahr and Andimesh) located in the plains area and this phenomenon was mainly due to industrial activities, mining and refining of crude oil and natural gas, foreign trade this area.

2.4 Curve Loans

Lorenz curve shows population of cities in the years 2012-1997 the lowest curve in 1997 and had a maximum distance from the normal line in 2012, in other words, population of cities in the province in 1997 has been relatively moderate According to the final results of General Population and Housing Census 2012, the population of Khuzestan province was 4,531,720

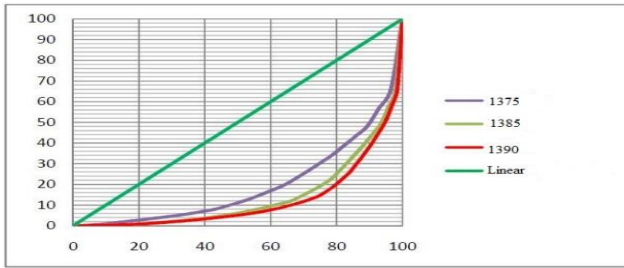


Figure 2. Lorenz curve cities of Khuzestan province in 1956 - 2011

people (03/6% of the total population), and in this regard has been ranked fifth among the provinces. The sex ratio in the province population is 102; this means that 102 men (and boys) are present for every 100 women (and girls). Because of the Province sending migrant, the rate of population growth in the decades 65-1977, 85 1997, 90 2007 (especially during the 1987-1977 which coincided with the imposed war) has been less than the same extent in the whole country and in the decade 55 – 1987 and 1987 has been more than the same extent in the whole country (Table 1). Higher rates of population growth in the decades 75-1987 has been for imposed war refugee return. Average annual growth rate province population in the 90-2007 has been 17.1% and without considering immigrants entered and exited has been 41/1 percent. The rate of 3.1 percent was for the country. In the decade 90-2007 concurrent with country divisions, rural and urban population growth rate in 2013, respectively has been 1/38% and 68 %. In 90-2007 4-1 person household's contribution increased and family size (The average number of members) have been significantly decreased. Age pyramid that represents the gender and age structure of the population, in the years 1997 and 2012 has changed dramatically. In 1997 the age groups 9-5 years and 24-20 years and in 2012 age groups 29-25 years were highlighted than other age groups. These ages are born in the year 1982. Also in 1997 the declining birth rate, the base of the pyramid age (age group 4-0 years) has been scaled and in 2012 due to population increased wave (because of Reaching population born during 1982 (first wave) to the modern age generation (fertility)) The base of the age pyramid is raised.

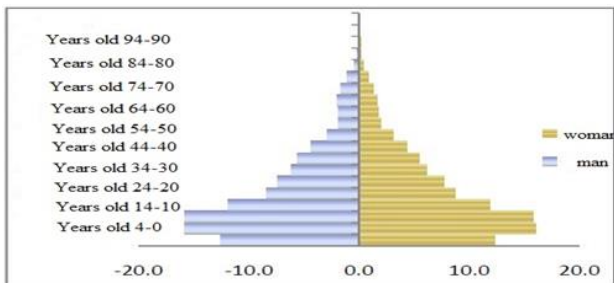


Figure 3: Age pyramid of the population in Khuzestan province 1996

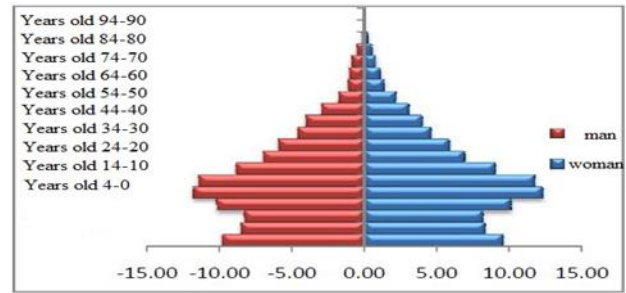


Figure 4: Center housing a population of Khuzestan in 2011

3 Research Method

According to this article, research method in this paper is (descriptive - analytical). Initially, the required Statistics for Urbanization housing organization were extracted by referring to the Facts Sheet population and the Internet (Statistics Agency Khuzestan province). Then by using Ginsberg index, Urban Primacy Index, Two City Index, Four City Index, Mehta's Four City Index, Moomav and Alwosabi index, Excel and Minitab software the Khuzestan urban is analyzed.

3.1 Description research models

Urban Primacy Index (UPI) is ratio of largest city population (p_1) to the total urban population (p) or the urban area where the Urban Primacy index to be calculated for its. Whatever Numeric Value of the index is higher; the largest city has a higher Urban Primacy.

$$First\ Urban = \frac{p_1}{\sum_{i=1}^N p}$$

3.2 Two City Index

A very popular method to determine Urban Primacy is Two City Index which is used more widely by urban and area planners due to Simplicity. This indicator pertaining to Zypf Rank – Size Rule and has a specific relationship that obtain by Ratio of First city population to the second city population.

$$Two\ cities = \frac{P_1}{P_2}$$

In this index it is balanced if the numerical value which is obtained ends to 2 and there is not Urban Primacy. But it is more than 2 the Urban Primacy Index exist.

3.4 Four City Index or Ginsberg index

This index is based on the Rank – Size city distribution as Two City Index and calculates by ratio of first city population to sum of the second, third and fourth City Population. This index is also known as the index leaf Keynes.

$$kynzbrg = \frac{P_1}{P_2+P_3+P_4}$$

3.5 Mehta's Four City Index

To determine the amount of urban primacy, Mehta modifies the four cities formula and proposed the best method to identifying Urban Primacy by Fraction of the first city size to sum of the four biggest cities in the country.

$$Mehta = \frac{P_1}{P_1+P_2+P_3+P_4}$$

Richardson with reviewing city Rank – Size rule and Mehta's Four City Index to determine the amount of urban primacy introduced the range of this index as follows:

3.6 Moomav and Alwosabi index

The index is achieved by dividing sum of the first and second city population to sum of the third and fourth city Population.

$$MoMA \text{ and } Wosabi = \frac{P_1+P_2}{P_3+P_4}$$

Whatever Numeric Value of the index is higher; urban system of the city has a higher Urban Primacy.

4 The results

To evaluate the Urban Primacy in Khuzestan province in the years 1957 to 2012 (Statistics and information related to urban population censuses have been conducted in these years is easily available) Urban Primacy indexes was used which expressed in the previous section. The result of these calculations is reflected in tables and charts. And then the entropy index is used to obtain Urban Primacy and show the results below.

Table 2: results of the first model city in Khuzestan province during 1956-2011

2012	2007	1997	1987	1977	1967	1957	year index
0.34	0.34	0.33	0.36	0.26	0.22	0.17	Urban Primacy
4.48	4.18	3.97	3.83	2.76	2.44	2.30	Two City
1.97	1.75	1.53	2.26	0.68	0.49	0.37	Ginsberg
0.66	0.64	0.60	0.69	0.48	0.33	0.27	Mehta
4.30	3.72	3.12	6.98	1.23	0.86	0.64	Moomav and Alwosabi

4.1 Urban Primacy

Urban Primacy Index (UPI) is ratio of largest city population (p1) to the total urban population. The weak point of this model that is not considered the cities rank. According to the table and diagrams, The Urban Primacy Findings show that in 1957 to 1977 it had an increasing trend which is reached to 0.17 in 1957 and 0.26 in 1977. But Increased to 0.36 in 1987 with the sudden growth of about 10 %. This trend has not been maintained for the following years So that we are seeing a decline Urban Primacy in 1997 and we are also seeing a percentage increase in 2011 and 2012.

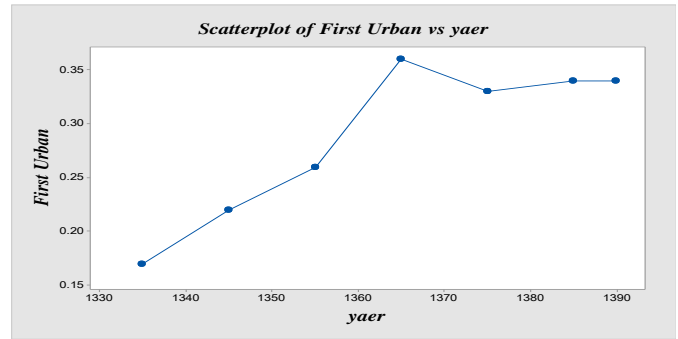


Figure 5: Diagram of the first city in Khuzestan province from 1956 to 2011

4.2 Two City Index

According to Table and diagrams show that the Urban Primacy index in the province has been balanced trend since 1957 to 1977 and gradually increased from 2.30 to 2.76. And the Upward trend continued so we see that the Urban Primacy is 3.83 with 1.07 differences to 1977. After this year, the upward trend continues higher than it is from previous years So that increased to 4.84 in 2012 which Due to Urban Primacy increase during this process caused by imposed war in Iraq in 1987. And then The Urban Primacy increased in the year 1997 to 2012 due to natural population growth, also the index has maintained its upward trend.

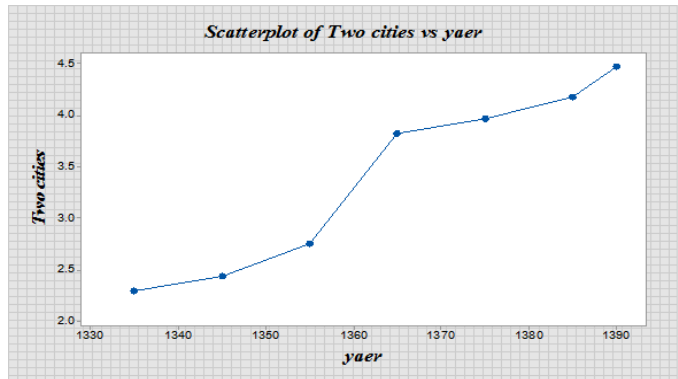


Figure 6 shows both the cities of Khuzestan province, 1956-2011

4.3 Ginsberg index

According to the findings of the table and diagrams, Ginsberg model show that the Urban Primacy in the years 1957 to 1977 has upward trend. And reach from 0.37 to 0.68% in 1977. Suddenly the index increased to 2.26 percent with the rapid increase. But this year, the Urban Primacy reduced and reached to 1.53. Again, after this year they had a few changes ascending so that in 2012, reached to 1.97 because it appears that the natural population growth during this period.

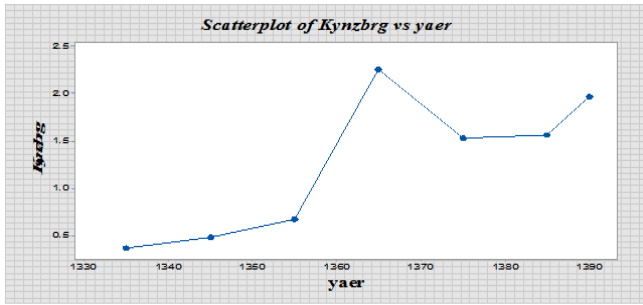


Figure 7: Diagram of Keynes leaves Khuzestan province from 1954 to 2011

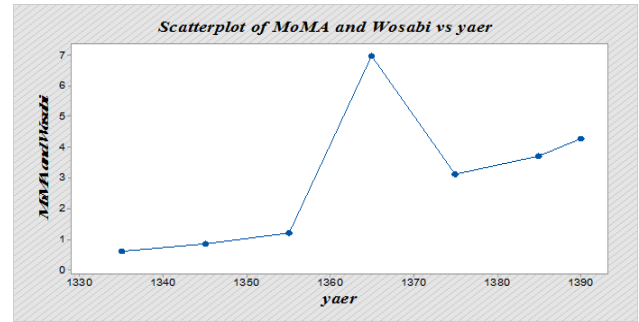


Figure 9 shows a diagram of the MoMA Valvsaly Khuzestan province from 1956 to 2011

4.4 Mehta’s Four City Index

According to the findings of Table and diagrams, Mehta’s Four City show that has minimum value in 1957 and maximum value of Urban Primacy in 1987. In fact, the Urban Primacy in the years 1957 to 1977 had a modest upward trend, the index reached to 0.69% with the sudden increase and dramatic growth in the Urban Primacy. Since 1987 to 1997 and later reduced to 0.6%. From this year onwards, with slight changes increase so that reached to 0.64% in 1997 and 0.66% in 2012. This trend show that Mehta’s Four City index values are not different a lot from each other and the Urban Primacy is roughly balanced.

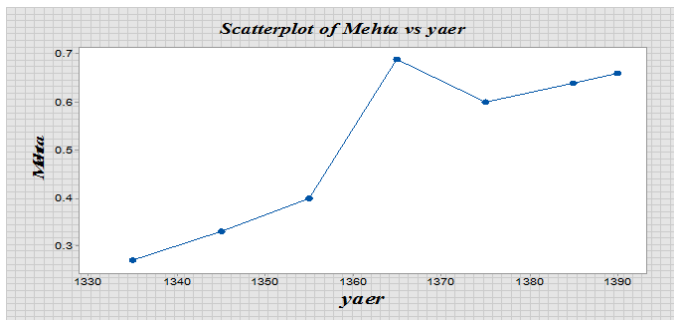


Figure 8: Chart of Khuzestan Mehta 1956-2011

4.5 Moomav and Alwosabi

Study the table and Moomav and Alwosabi model diagrams show that the Urban Primacy in 1957 and 1967 shows a modest trend in the province. But in the years 1977 to 1987 rise of a sudden change so that respectively reached to 1.23 and 6.98 in 1977 and 1987. In this model the Urban Primacy has the maximum value in 1987 which reached upper limit on the census in year which the major reason is due to issues of imposed war and empty the two major cities and a number of smaller cities and also reduce the some cities population and increasing population of Ahvaz, despite the war. Since 1987, the Urban Primacy reduced and So that reached 3.12 in 1997 and so again increased so that increase to 3.72 in 2007 and 4.30 in 2012. Investigation of the Urban Primacy indexes model shows that the Two City Index model has a higher balanced trend. Given the Mehta’s Four City model values and according to number Table of the Urban Primacy shows that they are had a minimum excellence in 1957 and 1977, between 1997 and 2007 years had degree of excellence and the years 1987 and 2012 have High degree of excellence of the Urban Primacy.

Table 4: arch the first city in the urban system based on four factors in the Khuzestan province from 1956 to 2011

Four City Index	The superiority of urban
1-.65	Ultra The superiority
.54-.65	Superiority
.41-.56	The superiority desirable
Less than .41	Minimum superiority

5 Conclusion

Population dispersion in each country is different for many reasons, which the rate of urbanization is one of the most important. Many developing countries show pattern of population distribution in the form of a very big city, while in developed countries the distribution of urban population has been distributed in cities across the country. Study the Urban Primacy in Khuzestan province according to the mentioned models show that due to values of proposed Mehta’s Four City model Richardson from 1957 to 1977, has been the low Urban Primacy, in the years 1997- 2007 have been the desirability Urban Primacy, And the years 1987 and 2012 have been the Urban Primacy excellence. During the period 1957 to 2012 the Urban Primacy indexes show that from 1957 to 1977 the Urban Primacy is slow, but in 1987, suddenly reaches in the upper, and this year reduced from 1997 onwards, and then gradually increase again from 1997 onwards. The Urban Primacy Were consistent in all five indexes and the results are consistent with each other, So that in all indexes the Urban Primacy suddenly increase in 1987 and after this year they dropped back to its natural trend with natural population growth continued until 2012.

6 Resources

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