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The Impact of Service Sector on Forming Primate City Phenomenon in Khuzestan Province

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Abstract: In the literature of urban economics, primate city is a phenomenon that a very large city is formed among small cities in urban system of a region that a major part of population and its economic activities of that region is concentrated in it. According to urban economics theories, GFP is one of the factors that can be influential in forming a primate city phenomenon. Given service sector in the economy of Khuzestan Province and despite this province is industrial one, more than half of employed people are engaged in service sector. In this research, the effectiveness of service sector on forming the phenomenon of primate city in this province has been addressed by separating GDP based on sectors' VAT. To do this research, time series data during 1991-2011 and Autoregressive Distributed Lag (ARDL) model by using Microfit software were used. The results indicated that service sector has significant impact on primate city of Khuzestan Province both in short-term and long-term. According to the findings, for balanced growth of urban system in the province, it is recommended that to change supportive policies from service sector to other economic sectors of the province, particularly agriculture sector.

Keywords: urban economy, urban concentration, primate city, Khuzestan Province

JEL Classification: O18, R12, N65, R10

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1- Introduction

Whenever a set of economic, political, historical, and geographical factors form a very large city among small cities in urban system of an area (province or country), it is called urban primate and this phenomenon is called urban primacy in urban economics literature.

Different factors affect formation of urban primate including GDP, limited resources for infrastructure investments in all areas, economic structure, government's supportive policies, and historical-geographical position of cities. Urban primate has advantages including increase efficiency, economic integration, more creativity, absorbing investment, inventions etc. Yet, the concentration of population and economic activities in urban primate increases density and costs of transport and housing (living costs in general) leading to reduce quality of life. In order to maintain quality of life in urban primate, the officials of urban primate use the resources of other cities. If no urban primate exists, those resources were absorbed in other cities to improve their quality of life. This overshadows all urban system of the area. As a result, quality of life is reduced in other cities of this area. Thus, it can be said there is an optimal degree of primacy that is obtained via mutual relationship between benefits and socially marginal costs of urban concentration increase (Farahmand, 2007).

Henderson (2003) believed there is an optimal degree of primacy that is reduced by development progress. The violation of optimal level results in inefficient allocation of resources and reduction in productivity and production. He suggested countries with limited resources for infrastructure investment should allocate

these limited resources to one or two cities leading to urban primate.

Many urban economists consider urban primacy as an effective factor on productivity of production factors. Combes et al., (2012) believed that firms are more productive in larger cities on average because of two main reasons. Firstly, intense competition in big cities only let those enterprises with highest productivity survive, and low productivity firms are removed. The second reason is economic costs of integration in large cities that increase productivity by expanding interactions between people and firms. These factors increase firms' willingness to inhibit in larger cities.

Puga (2010) regarded urban environment as an effective and important factor on productivity of production factors, and believed that firms and work forces are more productive in large and dense urban environments (such as urban primacy) rather other places. However, a very large volume of investments and skilled labor is absorbed by large cities and the most important innovations are occurred in big cities.

Urban primate has the most infrastructure, production, service, and social and welfare facilities among cities in a region. This absorbs people and activities to this city. Consequently, it is more focused, and this affects urban system completely (Akbari et al., 2010).

In developing countries, concentration of population in large cities is increasing greatly leading to create urban primate and urban primacy while distribution of cities' size is more balanced in developed ones. The phenomenon of primacy is seen in most provinces. In such a way that, the province center acts like urban primate, and generally, it is demographically-

functionally different from the second city in the province. Urban primacy has been increased in Khuzestan Province in recent years. According to 2011 census, Ahwaz population was 1133 thousand people i.e. more than four times of the second city of the province i.e. Dezful with the population of 231 thousand people (www.amar.org.ir).

Khuzestan Province has 4 percent area of the country and about 6 percent of Iran population. 71 percent of this population lives in urban areas. The share of Khuzestan Province of GDP in 2011 was equal to 13.4 percent of oil and 5.84 percent without oil. It has allotted the second and the fourth rank to itself among Iran provinces respectively. However, it ranked the third in 2011 in terms of GDP per capita considering oil sale, and tenth without considering it among other provinces indicating importance and position of this province in the country. According to labor force census in autumn 2012, equal 51.2 percent of employed people in the province engaged in service sector, 18.1 percent in agriculture sector, and 30.7 percent in industry and mining sector (www.amar.org.ir).

Since service sector is one of the most important economic sectors in Khuzestan Province and more than half of employed people work in this sector, this paper aims to investigate the impact of service sector on urban primacy phenomenon.

2- Literature Review

a) Foreign Researches

Puga (1996) investigated urban development models difference in European countries and less-developed ones. He stated that less developed countries experience rapid process of urban development. As

the percentage of urban population in less-developed countries gets close to more developed ones, the model and size of their urban accumulation is different from what is seen in more developed areas, particularly European countries. In less developed countries, concentration of population is sharply on the rise in large cities creating urban primate and urban primacy phenomenon while in developed countries; distribution of cities' size is more balanced.

Adkins et al., (1999) investigated the relationship between urban primate and economic development in some countries in Asia and America. They used GDP, population, and urban lands as effective variables on urban primate. The results indicated positive and significant impact of GDP and urban lands and negative impact of population on urban primate.

Henderson is one of the researchers who researched a lot on urban primate. In 2000, by using econometric methods, he stated that there is an optimal degree of urban primate depending on countries' conditions and features. Less or more urban primate level results in considerable loss in terms of economic growth. He reported the average index of urban primate at the level of 0.31 internationally (the ratio of population of the first city to the country's urban population). The average is used as expected degree of urban primate in comparative studies.

Nitsch (2006) dealt with the relationship between freedom of trade and urban concentration by using urban primate as an index to measure urban concentration. The results indicate negative impact of foreign trade share on GDP and positive impact of actual GDP variables of per

capita, land area, share of labor force but agriculture of total employed people and capital on urban primate.

Galiani & Kim (2008) stated that many researches have been done on urban concentration and urban primate in recent years. The overall results indicate that economic, demographic, and geographic factors are of great importance in forming urban primate. For instance, GDP of per capita and total population increases urban primate whereas total land area reduces the share of trade of GDP and density of urban primate transport.

B) Iranian Researches

Faraji et al., (2016) aimed to identify and understand the reasons of forming urban primate phenomenon in developing countries. Descriptive-analytical methodology was used in this research. The results indicated that the phenomenon should be analyzed in different economic, social, cultural, historical, and political aspects.

By using the methods of investigating urban primate degree, Zebardast (2007) concluded that urban primacy degree was more than optimal by 1976, but it was reduced after that by using decentralization policies.

Farahmand et al., (2009) studied the impact of urban primate on economic growth of the country. In this study, the index of urban primate was used in measuring urban concentration, and its impact was investigated on Iran's economic growth in the form of Solow-Swan regression model for 1960 to 2006. The results indicated that urban primate affects economic growth, and its effectiveness is dynamic and a function of revenue.

Najjarzadegan (2009) investigated the impact of governmental investment in transport sector on urban primate level by using Henderson model during 1963 to

2009. The results indicated that increasing investment in transport sector reduces urban primacy and negative impacts of excessive concentration in Iran.

Akbari et al., (2010) investigated the impact of petrol subsidy on urban primacy by using time series data during 1968-2006 and ordinary least squares technique. The results indicated that paying subsidy could not reduce urban primacy in Iran.

Farahmand & Badri (2012) investigated the relationship between aggregation (in the form of urban concentration) and economic growth in growth regression model of Solow and Swan in a selection of Asian-Pacific countries by using panel data during 1980-2009. The results of economic growth model, by entering the variables of the second level and ability of urban primacy indicate that urban primacy affect economic growth in the form of square. This impact is as reversed U. in other words, first, economic growth increases by rise in urban primacy, it peaked at one point and then it decreased.

Maqsoodpoor and Taeimehpoor (2016) investigated the impact of unbalanced distribution of population in cities in the form of urban primacy on tax capacity in Khuzestan Province. The results indicated that urban primacy has negative and significant impact on tax capacity in order that as urban primacy increases one percent in Khuzestan Province, tax capacity reduces 2.3 percent in short term and 3.5 percent in long term.

In previous researches on urban primacy, different (economic, geographic, and demographic) factors are effective on the formation of urban primacy. One of these variables is GDP that has had positive impact on urban primacy in most

studies. In this research, by separating GDP into service, agriculture, industry, and mine sectors, it has been investigated the impact of each GDP elements, emphasizing on service sector, on the formation of urban primacy phenomenon in Khuzestan Province by using time series data during 1991-2011, and Autoregressive Distributed Lag (ARDL) method.

3- Theoretical Principles

The idea of urban primacy was firstly proposed by Jefferson in 1939 in an article entitled "urban primacy law." In order to explain very large cities that a major part of population and economic activities of countries were concentrated on them, and they were mostly capital cities, he used the term of urban primacy and called this phenomenon urban primate. In his opinion, urban primacy in urban system of less-developed countries is relatively too much larger than the second and third cities of these countries in comparison with urban system of developed ones. He claimed that most developing countries and some developed ones have urban primate system. It means that urban primates in urban system of these countries are national concentration centers and they are dominating in urban system. When the population ratio of the largest city to the second city is two, the size of the city is called urban primate (Farahmand et al., 2009).

In developing countries, urban development and economic growth are going together. With economic development, the combination of economy production changes from agricultural and rural productions toward industrial and service productions. By applying capital-intensive technologies, labor force immigrates

from agricultural sector to cities. The change of production combination leads to urban development in economy since firms and individuals gather in cities in order to take advantage of urbanized and localized economies of scale in industries and services. On the other hand, governmental supportive policies of urban industries and infrastructure investment or subsidy of capital market in cities leads to more attraction of cities and immigration of labor force from village to city (Akbari et al., 2010).

Because of localized economies of scale, when industrial and service production is centralized in commercial-industrial areas, it is more efficient. Spatial proximity or high density of activity in an area increases information among producers and it makes market function efficient. On the other hand, transport and transaction costs are reduced among producers and transport costs for local citizens and considerable positive external impacts are created. All of these factors can cause the formation of primacy (Henderson, 2000).

Theorists disagree about mechanisms creating and forming a very large city (urban primate) among small cities. Some regard urban primates as the results of the colonial infrastructures of colony capitals, and some others refer to modern or industrial infrastructures built in a city by other cities' cost. Significantly, the growth of urban infrastructures increases population growth of city (Zebardast, 2007).

Several factors can be effective on the formation of urban primate. GDP, limited resources for infrastructure investments in all areas, economic structure of the region, population

growth, government policies, and historical and geographical position are some of the important ones. It is evident that each of these issues, depending on city location, can play role in the formation of urban primate.

Government policies may affect the ratio of urban development and its form that is degree of urban concentration. Particularly, in developing countries, the government supportive policies of one or some large political cities, and generally capital, lead to excessive concentration. The expansion of infrastructure investments in cities leads to establishment attraction in them and absorb many firms and people to them. Too much government support of one (or more) city makes this

city (or cities) have the most infrastructures, production centers, services, and social and welfare facilities. This leads to absorb people and activities to the city or cities), and concentration increases as a result (Akbari et al., 2010).

Urbanization rate in a country, and countries' economic dependence on agriculture or related industries affect urban primate. However, as countries population density is lower; the ratio of population growth is lower; and as countries have less ethnic diversity, urban primacy is more likely to occur (Akbari, et al, 2010).

Table1 represents a summary of effective factors on urban primate mentioned in previous studies.

Table1. A summary of effective factors on urban primate

Positive relationship	Negative relationship
<ul style="list-style-type: none"> - The largest city is national capital. - Concentrated administrative system - Colonial countries - Dominant role of agriculture sector - The ratio of urbanization - The ratio of population growth 	<ul style="list-style-type: none"> - Industrial level or per capita of GDP without regarding agriculture sector - The area of cultivated lands - High level of interdependence in urban system - Mature culture and urban system - Urban population, the ratio of employed people in industry sector to services and literacy

Reference: (Akbari, et al., 2010)

The Indicators of Measuring Urban Concentration:

a. Herishman & Herfindal Index (HHI): It is calculated by squaring the market share of each city of total urban population. This criterion was used by Wheaton & Shishido (1981) and Henderson (1988).

b. Beam parameter of size distribution of cities: it is overall degree of dispersion in distribution of cities' size and its size indicates how fast sizes are reduced by moving from up to down of distribution of cities' size. This index was used by Rosen & Resnick (1980).

c. Urban primacy index: this index is measured with the population ratio of the largest city to total urban population of the country or region. Urban primate criterion is used for abundant examples and many years applied by Mutlu (1989), Ades and Glaeser (1995), Junius (1999), and Henderson (2000). (Farahmand, 2007). Thus, urban primacy index has been used in this paper.

4. Research Methodology

Model Specification and its Estimation Method

The model used for experimental analysis of effective factors on primacy phenomenon in this research is in accordance with proposed theoretical principles and previous studies i.e. Adkinz et.al (1999). They considered three effective variables on primacy as GDP, population, and urban lands. Thus, the basic model used in this study is as follows:

$$\text{Primacy}_t = \beta_1 + \beta_2 \text{GDP}_t + \beta_3 \text{POP}_t + \beta_4 \text{LAND}_t + e_t \quad \text{Equation (1)}$$

The variable of primacy is obtained by the ratio of Ahwaz urban population (the largest city of Khuzestan Province) to total urban population of the province. GDP, population, land and β s are coefficients of the variables, and e_t is disturbing element of the model.

Unavailable statistic about the variable of urban land of Khuzestan Province is the limitation in this model for the studied period, so this variable was omitted and the model is as equation2:

$$\text{Primacy}_t = \beta_1 + \beta_2 \text{GDP}_t + \beta_3 \text{POP}_t + e_t \quad \text{Equation (2)}$$

However, if GDP is divided through value added to different parts, the effectiveness of each part on primacy is obtained (Khodaverdi., Poormoghimi., et al., Zaranejad et al., 2014).

Thus, equation (2) will be as follows:

$$\text{Primacy}_t = \beta_1 + \beta_2 \text{Agri}_t + \beta_3 \text{IM}_t + \beta_4 \text{Ser}_t + \beta_5 \text{POP}_t + e_t \quad \text{Equation (3)}$$

In which, Agri, IM, and Ser are agriculture, industry and mining, and service sectors. In this research, these variables were collected and used at 1997 base price.

Since logarithmic mode of the model provides answers for traction, logarithm is taken from both sides of equation (4) in order to have final model as follows:

$$\text{LPrimacy}_t = \beta_1 + \beta_2 \text{LAgri}_t + \beta_3 \text{LIM}_t + \beta_4 \text{LSer}_t + \beta_5 \text{LPOP}_t + e_t \quad \text{Equation (4)}$$

Equation (4) represents final form of the model in this research. Statistics of the variables of value added of services, value added of industry and mine sectors, value added of agriculture sector and population were extracted based on yearbooks of Khuzestan Province and economic accounts of the province (current and constant prices) in different years. Since statistics of Iran population is released based on census done every ten year by Iran Statistical Center, and annual population was needed to calculate primacy, the trend of required population variables was estimated by using average population growth.

The experimental model used in this research is ARDL by applying Microfit software. Generally, methods like Engel-Granger are not valid enough in studies dealing with small samples (few observations), because of not regarding short-term dynamic reactions between variables, as their estimations are unbiased; therefore, test hypotheses using the usual test statistics will be void (Nofarasti, 1999). Thus, the use of models with short-term dynamism resulting in more accurate coefficients of the model are regarded. Today, the use of ARDL in econometric has been increased. Some of its features are as follow:

Firstly, this approach makes a distinction between explanatory and dependent variables and it solves endogeneity problem. Secondly, it estimates long-term and short-term elements simultaneously and it removes the problems related to omitted variables and autocorrelation. Thirdly, identical reliability of variables is not needed and

model variables can be either $I(0)$ or $I(1)$. Fourthly, in small samples, estimations of this method are not biased. However, ARDL model estimates long-term model and error correction model. The difference of the results can be presented clearly (Abbasinejad & Goodarzi Farahani, 2013).

However, in ARDL method, optimal pauses are selected for each variable by using criteria such as Schwarz's Bayesian, and Akaike & Hannan Quinn. In this research, Schwarz's Bayesian criterion was used to determine the optimal interruption length of variables.

Before co-integration test, reliability test is done for all model variables in

order to ensure no collective variable is the second order i.e. $I(2)$, thereby bogus results are avoided. When there are $I(2)$ variables in the model, calculated F statistics are not reliable since F tests is based on the hypothesis that all variables in model are $I(0)$ and $I(1)$. Thus, performing unit root test in ARDL model is necessary to determine none of collective variables are not ranked two or more (Azarbayjani et al., 2009). Therefore, studied variables were tested by using Augmented Dicky Fuller test (ADF). The results have been presented in table2.

Table2. The results of unit root for variables

Row	Variable	ADF statistic	Critical values at 5%	Test result
1	LPrimacy	-4.284	-3.792	Reliable at $I(0)$
2	LAgri	-4.597	-3.020	Reliable with single differencing $I(1)$
3	LIM	-3.297	-3.040	Reliable with single differencing $I(1)$
4	LSer	-8.609	-3.081	Reliable with single differencing $I(1)$
5	LPOP	-6.796	-3.020	Reliable at $I(0)$

Reference: (Researchers' findings)

It is obvious that the logarithm variables of primacy, value added of agriculture sectors and population are reliable and other variables are reliable at $I(1)$ i.e. they will be reliable with single differencing.

5 Research Findings

The Process of Urban Primacy in Khuzestan Province

Most developing countries have faced with primacy during their urbanization process i.e. excessive swelling in the largest city (or cities), urban hierarchy. Iran is one of the countries that faced primacy during its urbanization process. City of Tehran was extremely inflated during last decades. Its population reached from nearly 1.5 million people in 1956 to

more than 7 million people (i.e. more than four times) in 2006. (Farahmand, et al., 2009). Moreover, urban primacy can be seen in other provinces. Province centers act like primate city rather cities of the area and the second city is different from the first one demographically-functionally.

City of Abadan was the most populated city of Khuzestan Province before 1976. 1976 census indicated that Ahwaz population has exceeded city of Abadan up to now. According to 2011 census, Khuzestan Province allotted 6.03 percent of the country's population with 4530 thousand people that 71 percent of this population lived in urban areas.

City of Ahwaz has the highest population among other cities in this province with 1133 thousand people population and 35.2 percent of urban populations of this province live there. After Ahwaz, Dezful (with 236 thousand people) and Abadan (206 thousand people) are the most populated urban areas of the province. Cities of Bandar Mahshahr, Andimeshk, Khorramshahr, Masjid Soleyman, Izeh, Shooshtar, and

Behbahan are in the next ranks demographically, and their population is between 100 and 154 thousand people. (www.amar.org.ir).

Diagram1 represents urban population process of the province, Ahwaz population, and total population of Khuzestan Province and diagram 2 represents the process of the province primacy in the studied period during (1991 to 2011).

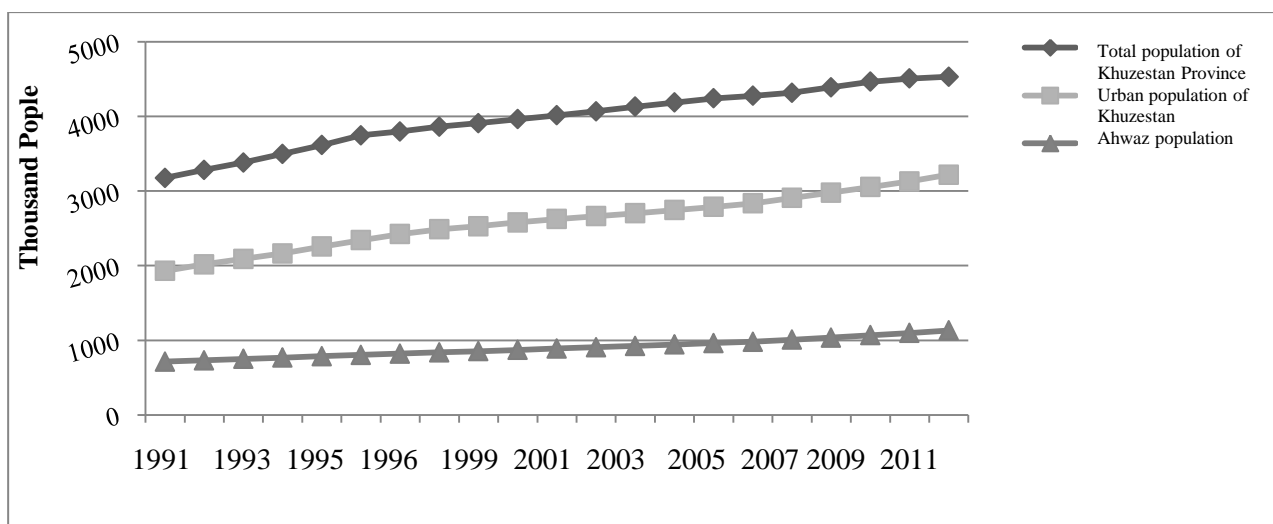


Diagram1. The trend of urban population of the province, Ahwaz population, and total population of Khuzestan Province (1991-2011)

Reference: (Statistical Center of Iran and researchers' findings)

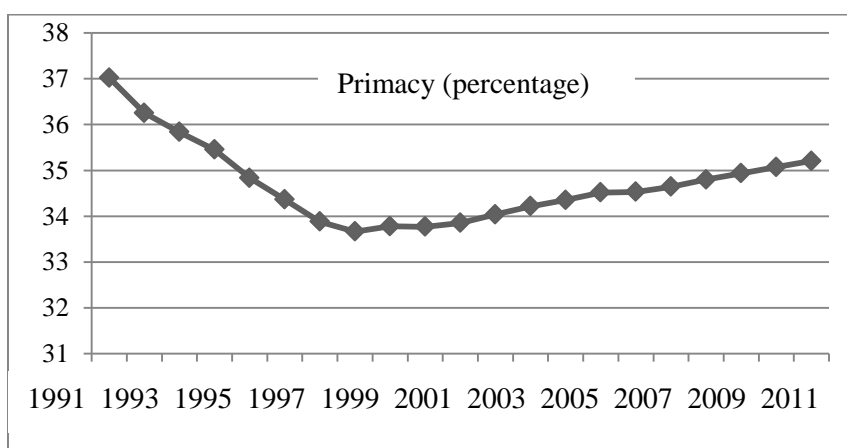


Diagram2. Primacy trend of Khuzestan Province (1991-2011)

Reference: (Statistical Center of Iran and researchers' findings)

As it can be seen, Ahwaz primacy trend has been descending from 1991 to

1998 because of returning refugees of the imposed war. Since 1998, Ahwaz primacy

has been increased with ascending trend. This means that it reached from 33.6 percent in 1991 to 35.2 percent in 2011.

Table 3 represents development of urban primacy phenomenon in Khuzestan Province.

Table3. Development of urban primacy phenomenon in Khuzestan Province

Year	Ahwaz population (thousand people)	Urban population of the province (thousand people)	Ahwaz urban primate (percentage)	Population of the second urban system of the province (thousand people)	The ratio of Ahwaz population to the second city of urban system of the province
1956	120	615	19.5	226 (Abadan)	0.53
1966	206	877	23.5	273(Abadan)	0.75
1976	334	1266	26.4	294 (Abadan)	1.13
1986	580	1485	39	151 (Dezful)	3.84
1996	805	2342	34.4	206(Abadan)	3.9
2006	979	2835	34.5	236(Dezful)	4.14
2011	1133	3218	35.2	231(Dezful)	4.9

Reference: (Statistical Center of Iran and researchers' findings)

As it can be seen in the third column of the table, the share of Ahwaz population of total urban population of the province (urban primate) was descending only during 1986 to 1996 and it was ascending in other years. The last column (the ratio of Ahwaz population to the second city of urban system of the province) represents rise in decentralization trend in the city of Ahwaz.

Model Results

In this part, the results of model estimation- $LPrimacy_t = \beta_1 + \beta_2 LAgri_t + \beta_3 LIM_t + \beta_4 LSer_t + \beta_5 LPOP_t + e_t$ _ have been investigated by using ARDL model. It is noteworthy that deduction and analysis of results in ARDL method include three equations of dynamic, long run, and Error Correction Model (E.C.M). Dynamic equation is based on an auto regression model. Table 4 represents its results.

Table4. The results of estimating dynamic model of ARDL

Row	Explanatory variable	Coefficient	T statistic	Sig
1	LPrimacy(-1)	0.78	20.35	0.000
2	LSer	0.005	3.42	0.005
3	LIM	0.007	1.90	0.081
4	LAgri	-0.005	-1.49	0.161
5	LPOP	0.001	0.052	0.959
6	(C)	-0.418	-1.526	0.153
R ² =0.94		F= 184.13	D.W= 2.24	
A: Serial Correlation =0.45348 [0.501]		B: Functional Form = 1.8145 [0.178]		
C: Normality =1.466[0.480]		D: Heteroscedasticity = 0.3462 [0.985]		

Dependent variable of logarithm is primacy.

Reference: (Researchers' findings)

The coefficient of determination (R²) results of the short-term model is 94% F statistic is 184.13 indicating high explanatory power of model. However, the results of pathology tests (diagnostic),

establishing all the classical hypothesis (lack of auto correlation, correct conditioned form, normal waste term, and homogeneity of variance) confirm for the intended model (last line of table4).

After estimating the dynamic equation, to ensure long-term relationship (not false regression), Banerjee, Dolado & Mester test should be done to ensure the existence of co-integration. As it was stated before, i.e. literature related to Auto Regressive Distributed Lag (ARDL) model, to do this test, the coefficient of lagged dependent variable is deducted number one and divided on its standard deviation. The test is done to ensure the

presence or lack of long-term relationship. T-statistic is -5.5591 i.e. more than the values of Banerjee, Dolado & Mester table in terms of absolute value. In other words, according to this test, the null hypothesis, regarding the lack of a long-term relationship, is rejected and long-term relationship among explanatory variables of the model and primacy variable is accepted. Table5 represents the results of this test.

Table5. The values of Banerjee, Dolado & Mester test to ensure about co-integration

Total coefficients	Total standard deviation	t-statistic	Critical value	Result
0.78544	0.038596	-5.5591	-4.46	Confirming long term relationship

Reference: (Researchers' findings)

After testing co-integration and ensuring about long-term relationship, short-term and long-term model coefficients

can be interpreted by estimating long-term model. Table6 represents the results of estimating long run relationship.

Table6. Long-term model corresponding ARDL primacy

Row	Explanatory variable	Coefficient	t-statistic	Sig
1	LSer	0.044	5.88	0.000
2	LIM	0.032	2.07	0.060
3	LAgr	-0.004	-0.13	0.896
4	LPOP	0.005	0.052	0.959
5	(C)	-1.948	-1.293	0.220

Reference: (Researchers' findings)

Investigating the relationship between dependent variable (i.e. primacy logarithm) and explanatory variables, long run relationship is confirmed. Convergence among economic variables prepares the ground for the use of error correction models. In fact, error correction model links fluctuations of short-term variables to its long-term values. In this case, we can link short-term relationship to its long-term relationship among model

variables by using error correction model (ECM). Table 7 represents the results of estimating ECM. It is obvious that the coefficient of ECM that indicates the speed of model adjustment moves towards equilibrium is significant and between zero and negative numbers, number one has been obtained. Negative indicates that the relationship between explanatory variables and primacy desires to long-term equilibrium.

Table7. The results of estimating ECM

Row	Explanatory variable	Coefficient	T statistic	Sig
1	The difference of the first order log of value added of service sector (dLSer)	0.005	3.426	0.004
2	The difference of the first order log of value added of industry sector (dLIM)	0.007	1.902	0.078
3	The difference of the first order log of value added of agriculture sector (dLAgri)	-0.006	-1.692	0.113
4	The difference of the first order log of population (dLPOP)	0.001	0.052	0.959
5	The difference between first-order intercept (dC)	-0.418	-1.526	0.149
6	The error correction with a time lag Ecm(-1)	-0.214	-5.559	0.000

Reference: (Researchers' findings)

However, to test the structural stability, Cumulative Sum Control Chart (CUSUM), and Cumulative Sum of Squares of Recursive (CUCUMQ) were calculated. Diagrams 3 and 4 represent their results.

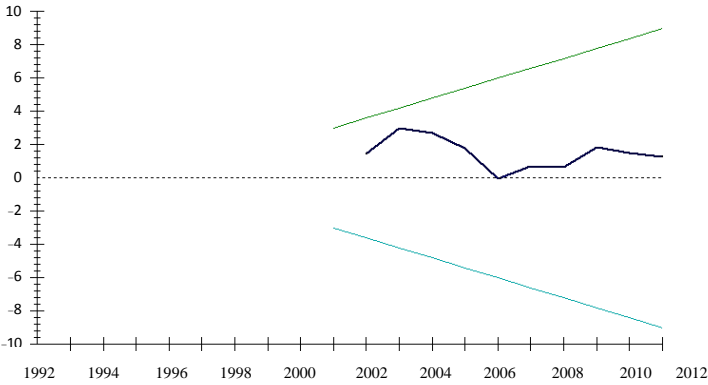
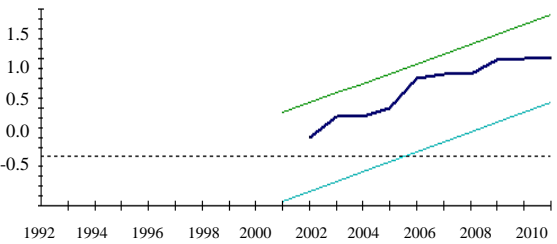


Diagram3. Stability test of coefficients (CUSUM)

Reference: (Researchers' findings)



***Straight lines indicate significance level at five percent.**

Diagram4. Stability test coefficients (CUCUMQ)

Reference: (Researchers' findings)

It is obvious that presented diagrams are within the confidence interval. Therefore, the null hypothesis based on the stability coefficients is accepted.

Interpretation of Research Findings

The coefficient of variable log of value added services (LSer) is positive and statistically significant. It indicates that 10 percent rise in values added of service sector can increase primacy 0.05 percent in short-term and 0.44 percent in long-term. The positive impact of service sector on primacy is in accordance with theoretical expectations because of accumulation of service jobs in big cities. The accumulation of more than a million people in Ahwaz has helped to create a suitable environment for service activities. In theoretical principles of primacy, the ratio of employed labor forces of service sector to industry sector has been introduced as a variable that has positive impact on primacy (Mutlu, 1989).

According to the census of labor force in the fall of 2013, more than half of employed people in Khuzestan province work in service sector. With increase in value added of service sector, the share of employed people in this sector can be increased. Thus, this sector has positive impact on primacy, statistically significant as well.

The coefficient of the variable log of value added of agriculture sector (LAgri) was negative both in short-term and long-term that indicates an inverse relationship between the value added of the agricultural sector and the primacy. This is in line with theoretical expectations. Since most agricultural activities of Khuzestan Province are concentrated in villages and small cities, increase in value added of agricultural sector helps people who work

in this sector to avoid immigration to Ahwaz metropolis, particularly immigration with the aim of finding job. Yet, the effectiveness of this variable has not been confirmed statistically that indicates factors other than jobs and income (including welfare, medical, and educational facilities etc.) may determine people's immigration to primate city.

The coefficient of log variables of value added of industry and mine sector is positive and significant. Industrial structure of Khuzestan Province and existence of oil and mine resources has created many industries, including steel, oil, and their related industries, in the city of Ahwaz. It means that accumulation of these activities has changed Ahwaz to an industrial metropolis. This caused changes in value added of industry sector have positive and significant impact on the province primacy.

Although the coefficient of population logarithm variable (LPO) was positive, it has not been statistically significant both in short-term and long-term. The effectiveness of population on primacy was different and often conflicting in previous studies, depending on the studied area and period. Mutlu (1989) and Galiani, & Kim, (2008) indicated the positive impact of population on primacy, but Adkins et al, (1999) indicated that population has negative impact on primacy. In this research, the coefficient of this variable is positive, but it is not statistically significant. This means that population increase in Khuzestan Province during the studied area could not have significant impact on its primacy.

The most important coefficient of estimating ECM is error correction term factor ($ecm(-1)$) since equilibrium

relationship among variables is explained based on this element. Significant coefficient with the statistic of -0.21 indicates that the principle of model specification was correct in long run and all explained equilibrium relationships move from explanatory variables towards dependent variable since long-term do not indicate causal relationship spontaneously, and only confirms the equilibrium relationship between the variables in the model, but the significance of $(ecm(-1))$ element indicates the assumed specification is correct in long-run. Given the results, it was specified that 21 percent of imbalance in primacy was adjusted in primacy and it approaches toward its long run trend.

6- Conclusion

Urban economics studies consider different factors in creating an urban primate. One of these factors is GDP. This research aimed to investigate the impact of service sector on forming primacy in Khuzestan Province by separating GDP to various sectors via value added of sectors.

The results indicated that value added of service sector has positive and significant impact on primacy of Khuzestan Province both in short-term and long-term that is in accordance with theoretical expectations of urban economics. The coefficient of this variable is more in short-term rather long-term. It indicates that the positive impact of service sector on formation and increase of primacy gets more with the passage of time. Moreover, industry and mine sector has positive impact and agriculture sector has negative impact on primacy of Khuzestan Province, although negative impact of agriculture sector has not been confirmed statistically.

Even though primacy can have significant economic benefits for the region, with advantages including efficiency increase, economies of integration, innovation, creativity, absorbing investments and inventions, but a critical issue is that increase in population density and economic activities helps to increase residents' transport and housing costs of urban primate. As a result, primacy officials attract resources to protect quality of life in primacy, otherwise, these resources would attract to other cities to improve their quality of life. This overshadows total urban system of the area. In other words, the cost of protecting residents' quality of life of urban primate is burdened by residents of other regions.

Appropriate recommendations in line with the results are as follows:

- Since primacy has been increased in Khuzestan Province in the past years, this phenomenon can have negative and unpleasant consequences such as waste of resources, the distance between amenities and infrastructures among cities by disturbing urban system balance of the province. Thus, it is recommended that officials to pay more attention in distributing facilities among cities.

- In last years, the share of service sectors of Khuzestan province economy has been increased so that despite being industrial, 51.2 percent of total employed people in the province worked in service sector in 2013. Therefore, it is recommended that officials to propel economic growth of the province toward production sectors, particularly agriculture sector, by switching supportive policies from service sector to other economic sectors in order to prevent intensifying primacy and its

negative outcomes on other areas in future.

- Potential of agriculture sectors in the province, according to the plains of the province and the presence of abundant water resources, can prepare a good opportunity to prevent increasing primacy and intensifying distance between cities in addition to have economic growth in this sector.

- Excessive concentration in urban primates by applying policies such as liberation and decentralization of financial markets and issuing different licenses, investment in intra-city infrastructures, concessions to regional and local institutions including financial independence to them.

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