International Journal of Geography and Geology
2016 Vol. 5, No. 5, pp. 86-96
ISSN(e): 2305-7041
ISSN(p): 2306-9872
DOI: 10.18488/journal.10/2016.5.5/10.5.86.96

AN ANALYSIS OF EFFECTIVE FACTORS ON SPATIAL DISTRIBUTION OF POVERTY IN RURAL REGIONS OF HAMEDAN PROVINCE

Mohammad-Reza Peirovedin[1] --- Masood Mahdavi[2†] --- Yousef-ali Ziyari[3]
[1]Student of Geography and Rural Planning, Department of Geography, Science and Research Branch, Islamic Azad University, Tehran, Iran
[2,3]Geography Lecturer, Department of Geography, Science and Research Branch, Islamic Azad University, Tehran, Iran

ABSTRACT

The aim of this paper is to examine the spatial distribution of poverty in order to show the effects of poverty rate of a region on the poverty of other rural regions of Hamadan province by making use of spatial econometric approach. The statistical population of the study included 383 rural households participating in the survey of household expenditure and income in 2012 is nine cities of Hamedan province. To analyze the data and to provide the poverty map, Spatial Econometrics and Matlab software and GIS were used as research tools. Initially, the poverty line and the estimated volume of poverty and deprivation were calculated and then, by measuring its volume, the distribution of poverty of the regions and its influence in the cities of the province were provided. Moran's I-statistic was obtained for poverty equals 0.211 which is significant at the 1% level and shows spatial autocorrelation. Poverty is not distributed equally in rural regions of Hamadan province and the geographical location of households living in the rural areas is effective on poverty. The results of the research showed that in calculating the model by Ordinary Least Squares (OLS) methods and spatial errors due to the spatial dependence in error terms, spatial error methods is better results than the OLS method. Variables such as average household size (+), gender of household head (-) and the proportion of households with housing (-) are statistically significant in identifying the poor people at less than 1% level and the type of jobs (+) at the 5% level respectively.

Keywords: Poverty line, Spatial distribution, GIS, Hamadan province, Econometricsmethod, Rural regions.

Received: 25 August 2015/ **Revised:** 16 September 2015/ **Accepted:** 25 February 2016/ **Published:** 17 March 2016

Contribution/ Originality

In Iran had not been carried out any specific statistical analysis about the spatial distribution of poverty in rural areas. This study is one of few studies which have investigated the effective factors on poverty and to determine poverty map in rural areas with the use of spatial econometric approach.

1. INTRODUCTION

Poverty is a social, economic, political and cultural reality which has long been one of the biggest problems of mankind. According to the World Bank reports in 2001, almost half of the world's 6 billion population spend less than $ 2 a day and nearly 1.2 million people spend less than a dollar a day for their personal purposes. Rural poverty includes almost 63 percent of total global poverty (Khodadadkashi, 2005).

† Corresponding author

In Iran, as well, due to the fact that 43 percent of the population live in rural regions, it can be said that an important part of poverty is dominant in rural areas as, according to studies, about 44 percent of rural households was under poverty line in 1999 in Iran (Arab and Hosseini, 2004).

Increasing the economic welfare of the people and decreasing poverty is one of the main objectives of the development programs in the country. Therefore, special attention has been paid to decrease poverty in the policies and programs including the 20-Year Vision of the Islamic Republic of Iran which has paid particular attention to the issue of poverty. (Paragraph 5, Part II, the 20-year visions of Islamic Republic of Iran). Furthermore, in different articles of the fifth program, the government has been obliged to take measures to promote the Human Development Index and to improve the lives of low-income groups.

For this purpose, it is necessary to identify the target groups and then to understand the detailed features of poor groups and to find the strategies to decrease poverty with regional or provincial orientations in providing programs to reduce poverty in the country. Various provinces and cities are different in terms of overall dominant economic conditions. This indicates the need for further and accurate investigations among provinces and cities.

2. STATEMENT OF PROBLEM

Hamedan province is of regions that is significantly different in terms of economic conditions and the extent compared to other regions. This is also important in terms of population as in terms of the extent, it is of 19,491 square kilometers, ranked the twenty-fifth (Ministry of Home Affairs, 2011) and in terms of population ranked thirteenth with 1765201 people in the country. In this province, in terms of consumption and household welfare level, there are differences between the different rural regions. Despite these differences, it is necessary that the living conditions of households especially rural families should be examined more accurately and taking into account the spatial dimensions. In sample data with spatial dimension, the occurrence of the two problems of spatial dependency and spatial anisotropy are not unexpected. Spatial Econometric approach compared to traditional (classical) econometric, considers these two issues, while Dower Hayek econometric ignores these two issues namely spatial dependency and spatial anisotropy (Cliff and Ord, 1981). Therefore, using spatial econometric approach makes the present study significant from other studies in the field of poverty.

3. OVERVIEW OF RELATED LITERATURE

Extensive studies have been conducted on the factors causing poverty by using provincial data in Iran and in various countries. Among these studies.Shafie and Bakhsoodeh (2004); (Arab and Hosseini, 2004); Tarazkar and Zibaei (2004); Musavi et al. (2005); Farajzadeh (2003); Jafari Sani (2005); Mukherjee and Benson (2003); Datt and Ravallion (1998); Friedman and Lichter (1998) can be mentioned.

One of the most important issues in the above studies is lack of attention to the spatial correlation in data with spatial dimension. Therefore, with respect to this issue, few studies have conducted on the study of effective factors on poverty and the data with spatial dimension by making use of spatial econometric including Palmer-Jones and Sen (2006); Jalan and Ravallion (2002); Benson *et al.* (2005); Voss *et al.* (2006) and Farrow *et al.* (2005).

However, using spatial econometric, some studies in Iran in the field of determining housing price (Akbari *et al.*, 2004) the effect of trust on economic growth (Rahmani and Amiri, 2006) and analyzing the inequalities of municipal tolls (Bidram *et al.*, 2007) and the determining of impact factors byspatial econometrics method in Fars province (Zibaee and Bagheri, 2011) have been conducted. Thus, in recent years, much attention have been paid to the issue of poverty and the application of spatial models in other countries, but in our country, no specific statistical analysis about the spatial distribution of poverty in rural areas by the

use of spatial econometric models had not been carried out. This study is aimed to investigate the effective factors on poverty and to determine poverty map in rural areas of Hamedan province with the use of spatial econometric approach.

4. RESEARCH METHODOLOGY

When considering the issue of poverty and measuring its rate, it is essential to determine an index to identify the boundaries between poverty and affluence and poor or non-poor. It should be noted that there are two stages in the measurement of poverty in the process of calculation of poverty: 1- calculation of "poverty line" and 2- estimation of "poverty size and deprivation".

4.1. Linear Measurement of Poverty

In order to detect and determine the poverty line and ranking poor people and households on the basis of economic and social conditions, the most common indicator or measure tool of the poverty line in this research paper is the following:

Half of Household Expenditure Survey

To measure poverty line based on the relative concept,the poverty line can be measured by determining the mean expenditure of household and a percentage of it. However, in this method, although relative concept of poverty has been emphasized, but there is no theoretical reasonable viewpoint to determine the desired percentage. In fact, determining 50 percent or 66 percent is voluntary and experimental for any researcher.

In this method, the mean expenditure is calculated at first. Then, 66 percent of the expenses is considered as the poverty line. (Khodadadkashi, 2001)

4.2. Estimating Volume of Poverty and Deprivation

Poor People Ratio

The simplest and most basic way for measuring volume and ratio of poverty is the Poor People Ratio. In fact, the measurement of poverty line in a society is to determine a limit for differentiating poor and rich. Thus, in order to measure the volume of poverty in a society, the census ratio is a good indicator. In this regard, having the poverty line and the household budgets, statistics in rural areas, census ratio can be calculated according to expenditure groups based on the following formula.

$$(1) \quad H=\frac{q}{n}=100$$

H = census ratio

q = the number of households whose income is lower than the required rate

n = total number of households

This indicator shows that what proportion of people lives below the poverty line. The index varies between zero (when there is no change in society) and one (when all people are poor in the society or the income of all individuals is lower than the corresponding income to the poverty line in the society).

As mentioned, in the calculations of the poverty severity index, the household income is used. In fact, equivalent income of all household will be calculated at first and then, the severity of poverty can be measured in terms of the equivalent income.

Since the information of household expenditure is more accurate and real than the income data,householdexpendituredata is used in this study.

5. SPATIAL ECONOMETRICS

In this study, the spatial econometric is used to estimate the desired model. Spatial econometrics refers to the application of econometric techniques in using the query data which has spatial components. Indeed, the spatial econometric is a branch of econometrics that studies the spatial correlation (Spatial Dependence or Autocorrelation) and spatial structure (Spatial Heterogeneity) in regression models with sectional data or combination of sectional and time-series data. When the sample data has spatial component, the use of traditional or classical econometric methods are not suitable. When using samples with spatial component, the two issues of problem of "Spatial Dependence" and "Spatial Heterogeneity" will occur (Wrigley *et al*., 1996).

Spatial dependence is a phenomenon that occurs in the sample data having a spatial element so that when there is an observation of a place like *i*, this observation is dependent on other observations in $j \neq i$. The spatial dependence can occur among several observations so that *i* can be any value from *1* to *n*; because it is expected that the observed sample data in a point in space is dependent on the observedvalues in other places.

'Spatial Heterogeneity' is a term which refers to the deviation in the relationship between the observations at the level of geographical space. In other words, by moving through the observations, the distribution of sample data will not represent a constant the mean index and variance.

Traditional econometric ignores spatial dependence and spatial heterogeneity; because Gus-Markov assumptions will be violated by assuming them. As a result, traditional econometric methods will be of no use and the proper method is spatial econometrics and its different methods (Fox, 1997; Greene, 2000).

5.1. Spatial Autoregressive Models

A set of spatial regression models for modeling spatial-sectional data sample have been introduced that its general form is as follows: (Anselin and Bera, 1998; Anselin, 2001a;2001b)

$$(2)\quad y = \rho W_1 y + \beta X + u$$

$$(3)\quad u = \lambda W_2 u + \varepsilon$$

$$\varepsilon \sim N(0, \sigma^2 I_n)$$

In which *y* is an n×1 vector of temporal dependent variables.*X* is the matrix of N×k of explanatory variables. The ρ parameter is the spatial time lag coefficient and dependent variable. The β parameter reflects the effect of explanatory variables on the changes in dependent variable which is estimated. The W_1 and W_2 arespatialcontiguity weight matrices with spatial$n \times n$ dimension. The λparameter is the spatial correlation coefficient through error term that is the equivalent of serial autocorrelation in time series data. The *u* is spatial dependent through error term and ε is error term and has a normal distribution with zero mean and $\sigma^2 I_n$variance. The spatial models can be extracted by imposing limitations on the general model.

5.1.1. Spatial Autoregressive Model (SAR)

If we impose W2=0restriction in the general model, then the general model is change to Mixed Regressive-Spatial Autoregressive Model since this model combine the standard regression model and dependent variable spatial lag. This model is similar to Lagged Dependent Variable Model in the time series. This model develops the first-order spatial regression model to a model that includes a matrix of *x* explaining variables like what is used in the traditional regression models. Anselin (1998) used the maximum likelihood (ML)method to estimate the parameters of this model. This mode is known as Spatial Autoregressive Model (SAR). In this model, the explanatory variables are entered in the *X* matrix as well and explain changes in *y* for the observation of spatial sampling:

$$(4)\quad y = \rho W_1 y + \beta X + \varepsilon$$

$$\varepsilon \sim N(0, \sigma^2 I_n)$$

5.1.1.1. Spatial Error Model (SEM)

Among the other models in the field of spatial econometric is Spatial Error Model (SEM). If $W_1=0$ is inserted in the general model, the resulting model would Spatial Errors Model:

$$(5) y = X\beta + u$$

$$(6) u = \lambda W_2 u + \varepsilon$$

$$\varepsilon \sim N(0, \sigma^2 I_n)$$

In this model, the error appear as the dependent variable. This model is more used in Hedonic pricing of assets (Mallios *et al*., 2009; Sander *et al*., 2010).

5.2. Determining Location in Spatial Models

Before analyzing the issue of dependence of the spatial heterogeneity, quantity and value of spatial aspects must be determined. In this research paper, the spatial data source is used to do so (LeSage and Pace, 2009). The data source is spatial, contiguity and neighborhood, whichreflect the relative location in the space of a regional unit to other units of the same kind. The contiguity and neighborhood criteria will be analyzed based on the obtained data from the studied population map. Based on this information, it can be determined that which regions are neighboring or adjacent with each other. Taking into account the spatial dependence, the units with contiguity relationship or to the units that are farther away have to show greater degree of spatial dependence.

As mentioned above, W matrix with n×n dimension shows the matrix of spatial dependence of different regions with the 0 and 1 elements. There are various methods such as face-like method, Queen-like method, elephant-like method, linear two-way method and so on to define the spatial dependence matrix. The contiguity face-like and Queen-like first-orderadjacent matrices are usually used in researches. The face-like neighborhood matrix Wij=1 is defined for regions which have a common side with the understudied region and Queen-like neighborhood Wij = 1 is defined for the areas common edge or vertex with the understudied region. This matrix is then standardized with regards to the rows. (Each element of each row is divided on the sum of the elements of each row to equalize the sum of the elements each row of the matrix to 1). (Askari and Akbar, 2000)

Using the above information source, a set of spatial data can be implemented on the map by making use of Spatial System and Contiguity System (LeSage and Pace, 2009) methods. And the Geographical Information Systems GIS can be used to produce the map.

5.3. Moran's Scatterplot

Moran scatterplot diagram was provided by Anselin in Anselin (1998) in order to understand the distribution of regions regarding neighborhood and contiguity that is used to display spatial dependenceof the desired variable. In this diagram, the standardized variable of each region is shown separately in front of the spatial delay of that region. The horizontal axis is standardized variable and vertical axis is the spatial delay of variable shown standardized. The spatial delay is the weighted average of variable inadjacent regions of each region which its weights are obtained from the*W* adjacent matrix. Thus, Moran scatterplot diagram shows each region with respect to the condition of the desired variable in the region as well as the situation of the variable in neighboring regions. Generally, it can be noted that Moran scatter plot shows regions with high variable level with neighbors that have high size of the desired variable in the first quarter or HH region and regions with low variable size with neighbors that have low levels of the variable in the third quarter or LL region and regions with low sizes with neighbors with high variable size in the second quarter or LH region and also regions with high variable size and neighbors with low variable size in the fourth quarter or HL

region. Therefore, HH and LL regions have positive spatial dependence for the desired variable and HL and LH regions have negative spatial dependence for the desired variable in different regions.

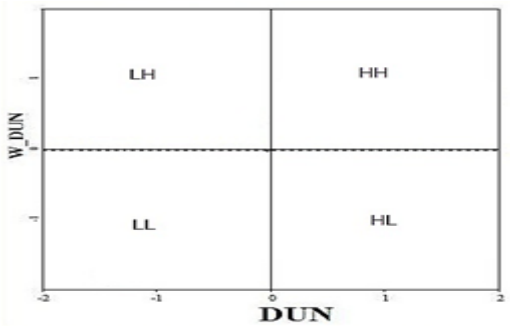

Fig-1. Schematic Moran Scatterplot

6. ESTIMATING THE RESEARCH MODEL

The data used in this study is of 136 rural households participating in the survey of household expenditure and income is the nine cities of Hamedan in 2012. To calculate the poverty rate, the number of members of each household was found on the basis of one adult's food equivalent at first and then, the total per capita expenditure of each individual was obtained by dividingof the total household expenses (food products and tobacco, clothing, housing, health, transport and communication, entertainment and cultural services, tools and household services and goods and other services) to the number of mature equivalent members per household. Sixty-six percent of the mean of per capita expenditure was considered as the poverty line (Jafari Sani, 2005). Moreover, by comparing it to the per capita expenditure of each households, poor households was identified. The poverty rate of each city was determined by the percentage of the number of poor households.

For estimating the model and for analyzing the resultsof the research, Eviews7, Matlab and Excel software were used andArcGIS10 software was used for drawing the map of the city of Hamedan province separately.

6.1. Normal Econometrics Method

The research model is provided according to the above theoretical framework and the aim of the study. Equation (7) shows effective factors on poverty:

(7) $y = \alpha + \beta_1 x_1 + \cdots + \beta_n x_n + u$

In this equation, the dependent variable (y) is the poverty rate and the independent variables (x) is the characteristics of household head including gender (percentage of men), age of household head, literacy (literacy rate), occupation (percentage of agricultural job), number of years of education, house ownership (percent of homeowners) and the household characteristics set ofvariables including the number of household members, number of household workers, the number of students and the rate of unemployment in parts of the city.

To achieve the aims and objectives of the study, the equation (7) is estimated using OLS method at first. Then, the diagnosis tests are done. Diagnostic tests includeHarveytest to assess consistency variance and normalcomponents of interfere and spatial autocorrelation test by the calculation of Moran-I statistic.

In Table 1, the coefficients value and the significant level of the estimated variables by OLS method suggest that in the estimated model, variables such as gender of household head and the proportion of households with housing are significant at 5 % and 1 % levels respectively and have negative correlation with poverty rate. This means that by increasing the number of female household heads or the number of people who do not have a poverty ownership, the poverty rate will be increased. Furthermore, the variable of the

number of farm workers was significant at 5% level and has a positive correlation with the percentage of poverty. In fact, by increasing the number of Household workers in the agricultural sector, the poverty rate increases in these households. Other variables are not significant. The R2 statistics equals 73 percent shows the goodness of fit.

Tab-1. Results of Estimating Effective Factors on Poverty by Linear Model (Partial Least Squares Method) and SEM Method.

Variable & Model Specification	Linear Model		SEM Method	
	Coefficient	t Statistic	Coefficient	t Statistic
Intercept	90.8	5.9***	88.3	5.9***
Gender of Household Head	-0.68	2.37**	-0.59	2.57***
Age of Household Head	0.5	1.03	-0.17	4.43
Number of Household Members	1.97	0.68	3.05	2.68***
Literacy of Household Head	-0.311	1.1	-0.68	1.1
Number of Household Workers	-0.21	0.103	-0.03	0.103
Householding	-0.465	4.186***	-0.465	4.168***
Unemployment Rate	0.6	0.869	0.31	0.869
Type of Activity	3.21	0.89	5.21	1.89**
R^2	0.73	-	0.75	-
Adjusted-R^2	0.72	-	0.74	-
Spatial Autocorrelation through Error Term (λ)	-	-	0.709	3.02***

*Indicates that the coefficients are significant at the 10% level.

**Indicates that the coefficients are significant at the 5% level.

***Indicates that the coefficients are significant at the 1% level.

Source: Own

6.2. Spatial Econometrics Method

6.2.1. Moran's I-Statistic

In the next step, spatial autocorrelation through error termwas tested using Moran-Istatistic which its results are shownin Table-2. (Moran, 1950; Cliff and Ord, 1981). The null hypothesis implies the lack of spatial autocorrelation through error terms. According to the results in the table, Moran-I statistic equals 0.21 which is significant at the 1% level and thus, the null hypothesis is rejected. As a result, the existence of spatial autocorrelation through error terms is confirmed. Therefore, the test of this statistic reflects thereplacementofspatial models with OLS calculation.

Tab-2. Results Moran's I-statistic for Linear Model

Description	Statistic Value	Moran-I Statistic	Marginal Probability
Moran-I	0.21	0.4	0.47

Source: Own

6.2.2. Spatial Errors Model (SEM)

The results of the calculation of SEM model are shown in Table-1. Mark of all variables are as expected. Variables such as gender of household head, number of household members and with housing are significant at 1% level and the variable of type of activity at 5% level. Other variables are not significant. Spatial autocorrelation between the errorcoefficient is significant at the 1 % level. In other words, there is spatial autocorrelation through error term. Determination coefficient of the model is 75%.

Indeed, the results of the model indicate the important fact that female of householdsheadwith high number of members and size as well as households without housing are considered as poor families.

To confirm the absence of a spatial autocorrelation through the error termsby SEM model, Likelihood Ratio (LR) Test is used that its results are shown in Table-3. Likelihood Ratio Test compared to the Moran-I Test is stronger . The null hypothesis is as follows:

H_0 : There is no spatial autocorrelation.

As it is observed in Table-3, this statistic is significant at 1% level and the null hypothesis is not confirmed. Therefore, according to the results of SEM model, the spatial autocorrelation through error term, this model and standard spatial model based on the existence of spatial autocorrelation through error terms is confirmed. It means that there are factors that cause spatial autocorrelation through error terms.

Tab-3. Results of Likelihood Ratio (LR) Test for Spatial Autocorrelation through Error Termin SEM Model

Description	Statistic Value	χ^2 Table Statistic	Marginal Probability
LR	43.046	40.29	0.945

Source: Own

6.2.3. Moran Scatterplot

Figure-2 shows a Moran scatterplot graph. The dependent variable in this diagram is the poverty percentage. The horizontal axis shows the standardized rate of poverty for a city and the vertical axis indicates the standardized rate of poverty for neighboring cities that have been defined by the weights matrix. The neighbors in the weights matrix are defined by first- order face-like method. This means that neighbors of a certain city include cities that have a common edge with the investigated region. The right upper quadrant of the Moran scatterplot diagram shows the cities with high poverty rates, which are neighbors with the cities with high poverty rate in some variables. The lower left quadrant shows the cities with low poverty rate and neighboring cities with lower poverty rate as well (low-low). The lower right quadrant shows cities with high poverty rate with neighboring cities with low poverty rate (high-low), and the upper right quadrant shows the opposite condition (low-high). Anselin (1998) showed that the slope of the regression line passing through these points shows Moran-I statistic, that is 0.379 for poverty in the diagram. Is. This statistic is positive and indicates that there is a positive spatial autocorrelation as 77 percent of the cities of this province has positive consistency (44% of the cities are in the HH region including Malayer, Tuyserkan, Nahavand and Hamedan cities. And 33 percent of cities are in the LL region including Razan, Kabodrahang and Famenin). Most of the cities and their neighboring cities are placed in sub-groups with high-high and low-low poverty.

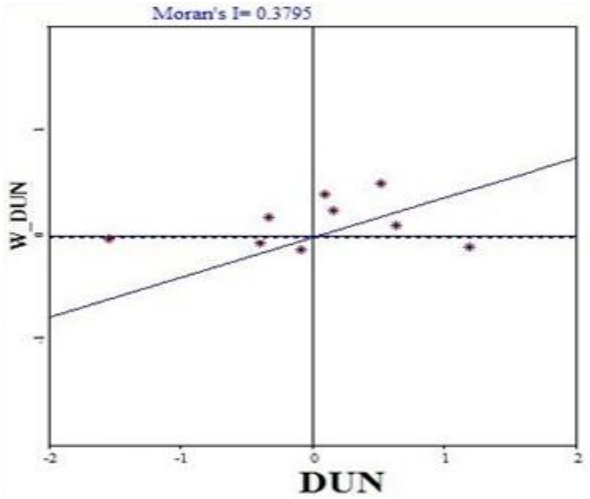

Figure-2. Morgan

7. CONCLUSIONS

In this research, the distribution of poverty in the cities of the province and the factors affecting poverty and spatial models have been discussed at first respectively. With regards to the percentage of the distribution of poverty in the cities of the province, Figure-3 shows that the highest percentage of poverty is of Tuyserkan city located in south west of the province and the lowest is of Razan city in the north of the province.

The highest percentof poverty that goes for Tuyserkan, Nahavand and Malayer cities located in the south and south west of the province ranged from 33 percent to 42 percent respectively. The poverty rate of the three cities of Hamedan (capital of the province) (29.4 percent), Famenin in the north (25 percent), and Asadabad in the West (16.7 percent) and Kabodrahang in northwest (17.6 percent) and Bahar in Central and West part of the province (33.3 percent) showed the uneven distribution of poverty in rural areas in Hamedan province. Therefore, as a hypothesis, the spatial autocorrelation is not unexpected.

The results listed in Table-1 reflect the fact that based on the different methods of calculation, Spatial Error Model (SEM) was recognized as the top model. Furthermore, effective factors on poverty in the different rural areas of Hamadan Provincebased on the results of the estimation of this model were analyzed. The variables, including average household size (+), gender of household head (-) and the proportion of households with housing (-) have significant effect on the percentage of poverty at less than 1% level of significance, and the type of jobs (+) at 5% level of significance (Table-1).

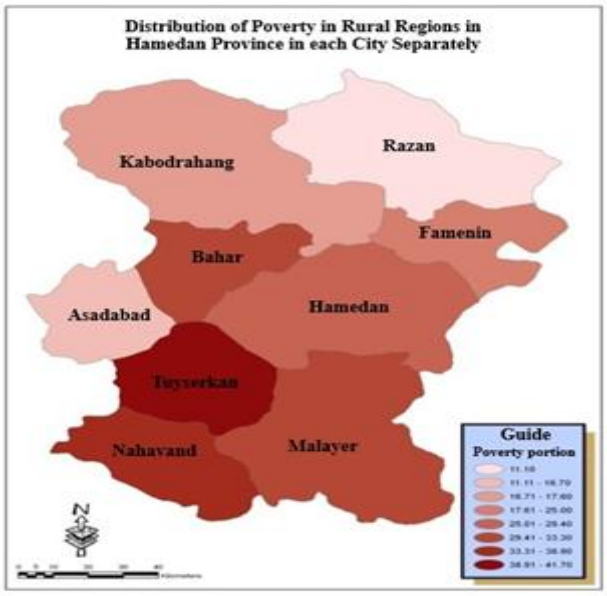

Figure-3. Map latitude and longitude:[Percentage of the Distribution of Poverty in Rural Regions in Hamedan Province

On the average household size, it can be said that, assuming constantother factors,the rate of poverty in rural areas increases 3 percent by 1% increase in household size most probably due to the reduction of per capita income and the increase of expenses.

By increasing the number of households headed by men, 0.59 percent of these households below the poverty line can move above the poverty line. In other words, the increase in the percentage of households headed by men will decrease the percentage of poor households.

Another variable is the job of the head of household for which the percentage of those with agricultural jobs is considered in this study. This variable has a positive effect of 5.2percent on the percentage of poor households. In other words, if the head of household has an agricultural occupation, the percentage of these households is higher in the poor group of households. Therefore, greater the number of these households increases the poverty percentage as well. This shows that agriculture in the province is not responsible for the

expenses of the rural households due to the structural problems and the heads of households whose main activity is agriculture are facing economic problems.

Another variable is the proportion of households with housing, which has a negative effect on the percentage of poor households. In other words, if more households have housing, the percentage of households below the poverty line is lower, so that by 1 percent increase in home ownership variables, the percentage of poverty is reduced for about 0.46 percent.

The results showed that whatever the percentage of agricultural jobs, and lack of housing is higher, the higher is the proportion of the poor households. Therefore, it is suggested that the government should adopt policies to reform the agricultural sector (small and dispersed agricultural lands and the large number of beneficiaries), support farmers, especially in recent droughts (establishing facilities and water equipment) and invest for non-agricultural employment opportunities and employment in accordance with the composition of the unemployed population in different regions in industry and service sectors. In addition, the ground should be prepared for reducing the number of poor households by facilitating the regulations of housing facilities and by paving the way for housing ownership and increasing housing. Therefore, if the background of housing is provided for the families without housing, household expenditure will be decreased and the percentage of them living below the poverty line will be increased. Variables such as household size and gender of household head (man) have positive and negative effect on the percentage of poverty respectively. Thus, the implementation of programs to reduce householddimension, especially in the form of governmental awareness and advertisement seems to be necessary.

Moreover, the government should support households that headed by poor housewives and old men by the identification of programs to identify them. Since poverty is also dependent on cultural issues than only on economic and social factors, the necessary steps should be taken for cultural development in these regions.

Funding: This study received no specific financial support.

Competing Interests: The authors declare that they have no competing interests.

Contributors/Acknowledgement: All authors contributed equally to the conception and design of the study.

REFERENCES

Akbari, N., M. Emadzadeh and E. Razavi, 2004. A study of effective factors on house price in Mashhad City: Spatial econometric approach in hedonic method. Journal of Economic Research, 32(11): 117-197.

Anselin, L., 1998. Spatial econometrics: Methods and models. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Anselin, L., 2001a. Spatial econometrics. In Baltagi (Eds). Companion to econometrics. Oxford, England: Basil Blackwell.

Anselin, L., 2001b. Spatial effects in econometric practice in environmental and resource economics. American Journal of Agricultural Economics, 83(3): 705–710.

Anselin, L. and A.K. Bera, 1998. Spatial dependence linear in regression models with an introduction to spatial econometrics. In A. Ullah, and D. A. Giles (Eds). Handbook of applied economic statistics. New York: Marcel Dekke. pp: 237–289.

Arab, M.A. and N.M. Hosseini, 2004. Assessment of poverty and its intensity in various occupational groups of rural households in Iran. Journal of Agricultural Economics and Development, 45(2): 120-135.

Askari, E. and N. Akbar, 2000. Methodology of spatial econometric, theory and application. Journal of Researches in Humanities Isfahan University, 13(1): 122-193.

Benson, T., J. Chamberlin and I. Rhinehart, 2005. An investigation of the spatial determinants of the local prevalence of poverty in rural Malawi. Food Policy, 30(5–6): 532-550.

Bidram, R., N. Akbari and I.R. Nasr, 2007. Analyzing inequality of municipality tolls in Isfahan Decuple regions: Spatial econometrics approach. Journal of Economic Researches Quarterly, 15(1): 95-105.

Cliff, A.D. and J.K. Ord, 1981. Spatial processes: Models and applications. London, England: Pion Limited.

Datt, G. and M. Ravallion, 1998. Why have some Indian states done better than others at reducing rural poverty. Economica, 65(257): 17-38.

Farrow, A., C. Larrea, G. Hyman and G. Lema, 2005. Exploring the spatial variation of food poverty in ecuador. Food Policy, 30(5-6): 510–531.

Fox, J., 1997. Applied regression analysis, linear models, and related methods. Thousand Oaks, CA: Sage Publications.

Friedman, S. and D.T. Lichter, 1998. Spatial inequality and poverty among American children. Population Research and Policy Review, 17(2): 91–109.

Greene, W.H., 2000. Econometric analysis. 4th Edn., Upper Saddle River, NJ: Prentice Hall.

Jafari Sani, M., 2005. Study of temporal and spatial distribution of poverty and food insecurity in Iran. M.A. Thesis in Agricultural Economics, College of Agriculture, Shiraz University.

Jalan, J. and M. Ravallion, 2002. Geographic poverty traps? A micro model of consumption growth in rural China. Journal Applied Economics, 17(4): 329–346.

Khodadadkashi, F., 2001. Measuring of poverty indicators in Iran. Iran: Institute for Statistics Publications, (4):5-75.

Khodadadkashi, F., 2005. Estimating poverty line in Iran during 1984-1999. Journal of Social Welfare, 15(1): 28-35.

LeSage, J.P. and R.K. Pace, 2009. Introduction to spatial econometrics. Boca Raton: Taylor & Francis.

Mallios, Z., A. Papageorgiou and D. Latinopoulos, 2009. Spatial hedonic pricing models for the valuation of irrigation water. Global NEST Journal, 11(4): 575-582.

Ministry of Home Affairs, 2011. Table of divisions and units of the country. Iran: Ministry of Home Affairs.

Moran, P.A.P., 1950. Notes on continuous stochastic phenomena. Biometrika, 37(1-2): 17–23.

Mukherjee, S. and T. Benson, 2003. Determinants of poverty in Malawi, 1998. World Development, 31(2): 339–358.

Musavi, N., Z. Farajzadeh, H. Shafiei and E. Shaverdi, 2005. Study of the determining factors of poverty among urban families in Shiraz city. Journal of Agriculture Bank, 8(1): 58-65.

Palmer-Jones, R. and K. Sen, 2006. It is where you are that matters: The spatial determinants of rural poverty in India. Agricultural Economics, 34(3): 229–242.

Rahmani, T. and M. Amiri, 2006. Effect of trust on economic growth in Iran provinces by spatial econometric methods. Journal of Economic Research, 78(3): 57-23.

Sander, H., S. Stephen Polasky and R.G. Haight, 2010. Value of urban tree cover: A hedonic property price model in Ramsey and Dakota counties, Minnesota, USA. Ecological Economics, 69(8): 1646-1656.

Shafie, H. and M. Bakhsoodeh, 2004. An analysis of the characteristics of poor groups and determining the percentage of poor people under poverty line in rural regions; case study: Sistan-Baluchestan province. The Fifth Conference of Agricultural Economics and Development, Zahedan.

Tarazkar, M. and M. Zibaei, 2004. Studying social welfare criteria and income distribution and poverty in urban and rural societies. Journal of Development and Agricultural Economics, 48(2): 137-154.

Voss, P.R., D. Long, R.B. Hammer and S. Friedman, 2006. County child poverty rates in the US: A spatial regression approach. Population Research Policy Review, 25(4): 369–391.

Wrigley, N., T. Holt, D. Steel and M. Tranmer, 1996. Analyzing, modelling, and resolving theecological fallacy. In P. Longley, and M. Batty (Eds). Spatial analysis: Modelling in a GIS environment. Cambridge, England: Geo-Information International. pp: 23–40.

Zibaee, M. and M. Bagheri, 2011. Determining of impact factors on poverty by spatial econometrics method in Fars province. Journal of Agricultural Economics, 2(1): 1-23.