Spatial Differences of Socio-Economic Indices among Divorced Population of Fars Province (Case Study; Divorced Population in 2006 Census)

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Abstract

The upward trend of divorce rate in Iran, has urged officials, researchers and sociologists to investigate this issue and it's affecting factors. Based on the documents of Iranian Statistical Center (ISC), there has been a raise in divorce/marriage ratio from 7.9 per houndred in 1996 to 12.3 in 1999 and 16.3 in 2006 (ISC,2010).

The present study, focusing on the socio-economic indices of the divorced population in Fars province, picks up a different view from that of other studies conducted in this field. This article tries to identify the relationship and rules applicable to personal and employment variables among divorced population using data mining and spatial data analysis techniques. The data investigated in this study include a sample of 370 divorced individuals from the total divorced population of 21601 in Fars, who have declared themselves "without marriage partner due to divorce" in the census 2006. The sample members are both male and female from all 24 counties of Fars province.

The results showed that, the raise of employment and educational level of women in urban areas is realted to increase in the percentages of divorced

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women. On the county, low education, unemployment, and place of work are significant factors among divorced men. An investigation on the spatial distribution pattern of divorced men and women in cities and rural area indicates that the formation of neighboring spans of divorced population in cities significantly are located in the central region of the province, and in villages which mostly are located in south, southeast and north of the province.

Introduction

Social sciences study social and those issues related to people and communities residing in a geographical area, however, the focal points have generally been on population and social issues with little attention to geographical space as a factor which would have impact on social aspects. In recent decades, divorce rate, as a social phenomenon, has been growing in different societies. Numerous investigations conducted focusing on economic, behavioral, cultural and social features paying no attention to spatial factors. This is the case in Iran too.

The present study, intends to investigate characteristics of divorced population throughout the counties (consist of urban and rural areas). The purpose of the study is to evaluate significance of important indices in the Fars counties and the differences in these regions. this study attempt to investigate spatial changes of the population without marriage partners due to divorce based on counties and socio-economic indices affecting divorce using an approach of exploratory analysis of spatial data.

In the following we will briefly discuss about divorce and its important factors in Iran. Next a brief review on Exploratory Spatial Data Analysis and Techniques will be presented. In succeeding part the processed data will offer. In the next section results and our analysis will appear, and the last section provides major findings.

Divorce and its related factors

Studies conducted by different researchers on divorce have used numerous micro and macro theories to some we refer briefly in the following part:

Social exchange theory: Social exchange theory tries to offer the most comprehensive approach to the etiology of divorce. According to this outlook, societies in transition, moving from their traditional patterns to modernization, face a crisis of values and in result, a rise in divorce rate (Kameli, 2007: 184). The criteria used to assess the rewards and costs of marriages and divorces differ not only among individuals, but also across cultures (Wei-Shiuan et al, 2001: 146).

Divorce traditionally has been accepted to some extent in most societies as an ''escape valve'' when marital relationships are irreversible (Goode, 1963; Price & McKenry, 1988), however, it is subject to some social disapproval in every society.

Social Anomy: In transition society ethical codes gradually disappear and the society loses its social control resulting in a condition of social dissatisfaction. This, in turn, results such negative social behaviors as divorce, suicide, etc. (Ahmadi, 2008: 40, Kameli, 2007:185).

Over the years, women have gained independence due to their often developing career in the work setting. Ermisch (1986) felt that marital disillusion often occurred when women had the experience of working and following their own career.

Role Conflicts: Women's attitude toward gender equality is higher than men's. Therefore, different role expectations have caused role conflict in the family and an increase in the divorce rate. Although men have lost some of their social and religious authority in the family, their economic and general authority remained intact. some studies found that incongruence between spouses in gender beliefs, expectations, and behaviors affected marital stability, causes identity disruption, and resulted in distancing, marital instability, and in result, in some cases divorce (Pasley et al., 2001, Ludwig F. Lowenstein, 2005: 159).

Economic and Financial Factors: The theory of power distribution and effort to achieve respect by man and wife, theory of need – man and woman's ideas and expectations of a married life, the theory of penetration and satisfaction or dissatisfaction of a part of their life and its impact on other parts of life, and the theory of automorphism and self-authenticity are of the best known theories in this approach (Kameli, M. 2007:185-186). The people who embarked on partnerships at an early age, cohabitants, those who had experienced parental divorce, and those

who were economically, somatically and emotionally vulnerable had higher risks of divorce(Ludwig F. Lowenstein, 2005: 157). Most couples tend to find themselves in financial difficulties from one side or the other, or in some cases, both sides as a result of separation and divorce. Frequently it results in unemployment and the reliance on state benefits. In most cases there is an association between emotional factors and subsequent partnership break-ups (Kiernan & Mueller, 1998).

A brief review on Iran and other countries studies showed that a majority of them are focused on a sociological study of divorce in societies, and especially urban areas.

Author	*Title*	*Divorce affected by*	*Year*
Qiasi et al	social causes of divorce in Shiraz	male rudeness	2009
Riahi et al	social analysis of a tendency towards divorce in Kermanshah	literacy and unemployed	2007
Zargar and Neshat doost	factors affecting divorce in Falavarjan	male drug usages and related parents meddle	2007
Mosavati	immigration and divorce	Rural immigrant family	2006
Fatehizadeh et al	the role of family factors in the low rate of divorce in Yazd, Ardakan and Meybod	Low religious orientation	2005
Qotbi, et al	divorce status and some effective factors on divorce in Dowlatabad Tehran	Parents meddle and male financial problems	2004
Shirzad et al	An epidemiology of separated men and women in Hamadan	literacy difference and drug use	2000
Rahimi	reasons for divorce in Khorasan	parents meddle, moral disagreement and polygamy	1999
Ogawa and Ermisch	Trends in divorce rate	divorce rate improved more than double in Japan since mid-1960s	1994
Poortman and Kalmijn	influence of women's work on the risk of divorce in Dutch	intensity of the wife's work, status of the wife's work and the potential success she achieved on the labor market in comparison with her husband	2002
Abdel Hameed Al Khateeb	divorce in Saudi Arabian families	marital aspects such as housing and marriage costs had changed faster than other cultural habits	1998

Author	Title	Divorce affected by	Year
Whittington and Alm	women and men respond to tax incentives in their divorce decisions	couples involved in this rather mercenary approach to divorce were a small proportion of those seeking divorce	1997
Lester	regional differences in divorce rates	consistency between social correlates with regional divorce rates	1999
Burgess	young Americans who wished to divorce	economic factors	1997

The most important indices affecting divorce and its growing rate in the mentioned studies are lack of mutual understanding, addiction, and level of education, women's higher education, women's work, unemployment, economic factors, age difference and residence in cities.

This research, investigates the impact of regional differences of social and economic factors on the number of the divorced population –which, in this study, includes individuals without a marriage partner due to divorce- focusing on those factors that could be obtained through the results of Iranian census data in 2006. These factors are as follows:

Social factors: overall literacy level, women with university education, immigration and the ratio of residence in cities.

Economic factors: unemployment, the rate of women in total employed population, and the rate of employed women in the total number of working women in cities.

Exploratory Spatial Data Analysis (ESDA)

Spatial autocorrelation and spatial distribution is fundamental feature of spatial data. It could be describe as "the coincidence of value similarity with location similarity" (Anselin, 2001; Zhang, P. et al, 2011: 557). In large amount of data in social, economic or environment cases the SDEA provide tools to find area or points with positive or negative spatial autocorrelation that in positive case refers to similarities in values clustering in space and in negative shows area surrounded by neighbors with very dissimilar values. Indicators such as Moran's I (Cliff & Ord, 1981) G statistics (Getis & Ord, 1992) geographically weighted regression (Fotheringham, AS. et al, 1998).

In regional studies, research depends highly to the available sample data to the researcher referring to places and areas identified as spots in the space. Facing data with an aspect of place, it seems that it is not suitable to use the current statistical methods. The significance of spatial analysis compared to the current statistical analysis is its liability to be used in analyzing samples with an aspect of place. When the data from a sample include an aspect of place, two problems would appear (Lesage, 1999):

1. There would be a spatial dependence among observations;

2. A spatial heterogeneity would appear in the relations under study.

The ESDA methods studies and analyses the data based on the use of data including an aspect of place, and using two general approaches: a) spatial dependence between the data samples in different places, b) spatial heterogeneity due to relations or model parameters which change along with the sample data by moving on the coordinates' page.

One of the methods of investigation of spatial order pattern is the coefficient of spatial autocorrelation where this coefficient is calculated using the second rule of geography, "every being is related to another, but the closer ones are of a closer relation compared to farther things" (Cliff & Ord, 1981, p. 8, Tobler, 1990, p. 3). In order to get to this coefficient, the closeness of places is reached to by calculating the distance between spots. Two methods to calculate this coefficient include (Lee, J. Wong, D. 2000: 78):

1. Getis-Ord Index

   "Getis-Ord statistics is often employed in hotspot analysis. It is a distance based statistics that measures the proportion of a variables found within a given radius of a point, to the sum of the variable in the study region. The statistics for location is defined as:

$$G_i(d) = \frac{\sum_{j=1}^{n} w_{ij}(d)x_j}{\sum_{j=1}^{n} x_j}; j \neq i$$

   Where x_j is the value of the observation at j, $w_{ij}(d)$ is the ij^{th} element of a binary weights matrix with ones for all sites within a distance d of location I and zeros otherwise, and n is the number of observation. A significant and positive G_i indicates that location I is

surrounded by relatively high values while a significant and negative G_i indicate that location I is surrounded by relatively low values.

This G_i statistic is useful to reveal spatial agglomerative pattern with high-value clusters or low-value clusters. It provides a flexible way of studying local spatial autocorrelation with positive variables that have a natural origin" (Zhang, P., 2011: 558).

2. Moran's Index

In this study, the coefficient of spatial autocorrelation has been calculated using each of both methods above in order to investigate the distribution pattern of the population without marriage partners due to divorce in the cities. The equation of the coefficient of spatial autocorrelation is as follows:

$$SAC \approx \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} C_{ij} W_{ij}}{\sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij}}$$

Where C_{ij} the similarity of coordinates (descriptive data) of points is ij, W_{ij} is the closeness of coordinates (descriptive data) of spots ij.

In the Moran index, the similarity of the coordinates' values of C_{ij} is calculated based on its difference from the ratio:

$$C_{ij} = (X_i - \bar{X})(X_j - \bar{X})$$

And Moran's I is calculated as follows:

$$I = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} C_{ij} W_{ij}}{S^2 \sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij}} = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij}(X_i - \bar{X})(X_j - \bar{X})}{S^2 \sum_{i=1}^{n} \sum_{j=1}^{n} W_{ij}}$$

Where S^2 or standard deviation is:

$$S^2 = \frac{\sum_{i=1}^{n}(X_i - \bar{X})^2}{n}$$

The indices resulted from equations 1 and 3 will present the three possible spatial orders based on table 1 (David L. B. et al, 2002).

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Table 1: three spatial order patterns possible based on cross-spatial autocorrelation statistic

Moran Index	Spatial order pattern
0<SAC<1	Cluster distribution pattern
SAC ≈ 1	Homogeneous distribution pattern
-1<SAC<0	Accidental distribution pattern

Material and Methods

The present study uses an analytical and co-relational investigation method. In this research data is collected using the usual methods in social studies including documentary inquiry by referring to overall results of census report in 2006 and sample counting of Statistics Center of Iran in 2006 on a county basis and extracting data using a data mining method.

Statistical results were obtained using ESDA approach among variables in the geographical information system. An investigation into the social and economic characteristics of the population without a marriage partner due to divorce and their spatial differences in the studied scale was possible through the use of such data.

The universe of this research includes all residents in Fars counties who live without a marriage partner due to divorce recorded in the census of 2006 (21601). A sample of these residents investigated by Statistical Center of Iran for gathering detailed information which we used their data in the study. First, we picked up the whole population of this sample (370 individuals) reside in different counties. Then, following personal and family information of them in 24 counties in the detailed data of 2006 census, there were 368 individuals having the information we looked for (Statistics Center of Iran, Detailed Data, 2008). An investigation of geographical differences of the divorced population and socio-economic indices throughout counties was done on this population. At the end, what makes this study significant is that our dependent variable is under the influence of different dependent variables in various counties of the province. In other words, the whole counties of the province do not fallow the same pattern in the issue of our investigation.

Divorce Status in Iran and Fars

Based on the available statistics, the number of divorces recorded in Iran in 2002, had been 67256 cases, which have increased into 110510 cases in 2008 and 125747 cases in 2009. This increase in the number of divorce cases has been especially more significant in cities. According to the Statistics and Registration Administration report in 2009, from the total number of 125747 cases of divorce recorded, 84.7% had taken place in cities while only 15.3% in villages. However, taking a glance at the recorded statistics of divorce in villages within a 10-year period, one could easily find more rapid growth in the rate of divorce in villages compared to cities (Figure 1) (Jahangiri, 2010). Fars province places at the 4th rank in divorced population in Iran.

Figure 1: the number of recorded divorce cases in Iran from 2000 to 2008
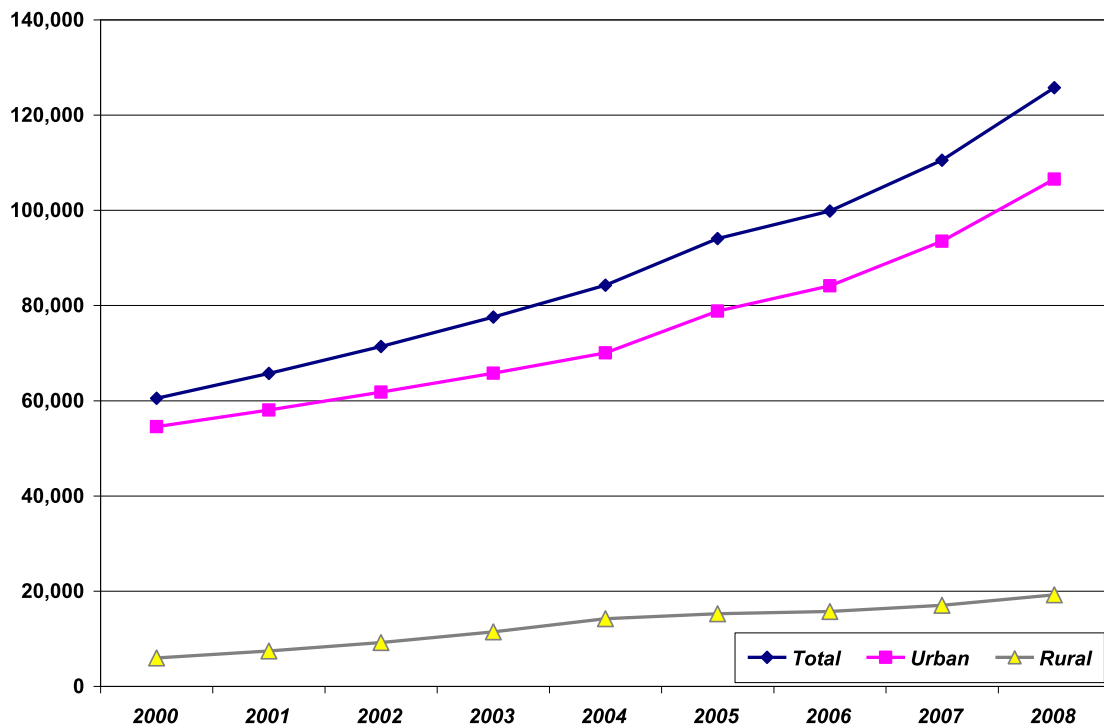
In this study, the number of individuals without a marriage partner due to divorce was taken as a dependent variable, and social and economic variables affecting divorce based on the results of the related literature, including the percentage of city-residence, unemployment, percentage of illiterate women, percentage of women with higher education,

employment of women, and the balance sheet of immigration in the cities, were taken as independent variables.

Results

The total number of samples used in this study is 368 individuals distributed within 24 counties in Fars province. Table 2 shows distribution based on sex, age, place of residence, and an age ratio of the sample under study.

Table 2: Distribution of the sample population

Quantity and percentage of the sample		total		male		female	
variable		Number	Percentage	Number	Percentage	Number	percentage
Gender		368	100	112	30	256	70
age	15-29	107	29.08	34	28.52	73	30.36
	30-44	153	41.58	53	39.06	100	47.32
	+45	108	29.35	25	32.42	83	22.32
Age mean		38.64		37.13		39.3	
Resident in city		219	40.5	39	34.82	110	42.97
Resident in village		149	59.5	73	65.18	146	57.03
Employment status	Employed	117	100	64	54.7	53	47.3
	unemployed	251	100	43	19.12	203	80.88
Education level	Illiterate	69	25.84	8	11.59	61	88.41
	Informal	5	1.87	1	20.00	4	80.00
	Lower than high school diploma	81	30.34	38	46.91	43	53.09
	High school diploma	90	33.71	35	38.89	55	61.11
	Higher studies	22	8.24	12	54.55	10	45.45

Spatial Order of Divorce Distribution in the Counties

In investigating the pattern of spatial order in the samples using the position of urban and their descriptive data, the resulting coefficient in the country shows the pattern of non-accidental distribution of samples

under study. Divorced population distribution in rural areas around urban regions show a centralized and cluster formation in special regions and places of the county. In general, the factor of contiguity of places in the whole county and in urban areas shows a more significant pattern than the pattern without spatial closeness (table 3).

Table 3: pattern of spatial order of divorced population distribution using Moran and Getis methods

	Without spatial contiguity	Level of significance	With spatial contiguity	Level of significance
County Moran-index	-0.037199	0.947943	-0.058982	0.786603
Urban area Moran- index	-0.013018	0.731650	-0.054062	0.842336
Rural area Moran- index	-0.013018	0.731650	-0.030411	0.900740
County Getis- index	0.000002	0.986353	0.322046	0.000157
Urban area Getis- index	0.000002	0.944227	0.385634	0.000070
Rural area Getis- index	0.000002	0.448329	0.246904	0.031799

An investigation of the related map based on the two methods mentioned above shows the distribution of the population without a marriage partner due to divorce in three different patterns. The distribution of divorced population in the whole county is generally around condensed population centers such as Shiraz metropolitan and cities of higher population, while the pattern of rural areas distribution shows the formation of scattered clusters in different counties.

Spatial Heterogeneity (Local Indicator of Spatial Association)-LISA

The term spatial heterogeneity refers to the deviation in relations among observations throughout geographical locations under study. Assuming that we have a linear relationship as follows:

$$Y_i = X_i b_i + e_i$$

In this equation, i refers to the observations obtained in n, …, i=1 point in space, X_i refers to vector index (1×k) from the explanatory variables

together with parameters related to that, Y_I is the dependent variable in the observation or place i, e_i shows random error in the mentioned relation. Based on the mentioned relation, while moving among observations, the distribution of the sample data shows no fixed ratio or variance. The local Moran's I or LISA index tries to distinguish those local spots where the deviation in relations among observations is minimum or maximum (Rogerson and Yamada, 2004:2200). This index for region i, describes the spatial association between a value in i and the area close to that as follows:

$$I_i = \frac{(x_i - \bar{x})}{S_x^2} \circ \sum_j W_{ij} (x_{ij} - \bar{x})$$

The result of above equation in the form of a positive index shows that regions of high value are surrounded by regions of high value (high-high), and regions of low value are surrounded by regions of low value (low-low). Negative index shows that regions of low value are surrounded by high-value regions (low-high) or high value by low (high-low).

In studying the changes in the spatial pattern of the population without a marriage partner due to divorce, the relationship between the number of samples under study and socio-economic variables affecting divorce such as unemployment, the percentage of female illiteracy, the percentage of women with higher education, employment of women, and the balance of immigration were used to distinguish deviation in relations among observations throughout counties. In order to distinguish changes in the spatial pattern in the samples under study, two methods of Moran local bi-variate indicator and the LISA bi-variate index are used.

In the investigation of the relation between the rate of male unemployment in urban regions of Fars counties and its impact on the population without a marriage partner due to divorce, the relationship between the two variables was positive only in a limited number of cities, despite the overall index of spatial dependence –which indicates the high rate of male unemployment and the divorced population. The existence of a negative index around megalopolises shows the low impact of the two variables in these regions. It means that the low male unemployment

rate in these regions is not following the overall pattern (overall spatial dependence) (Figure 2).

Figure 2: relation between male unemployment rate and divorced population
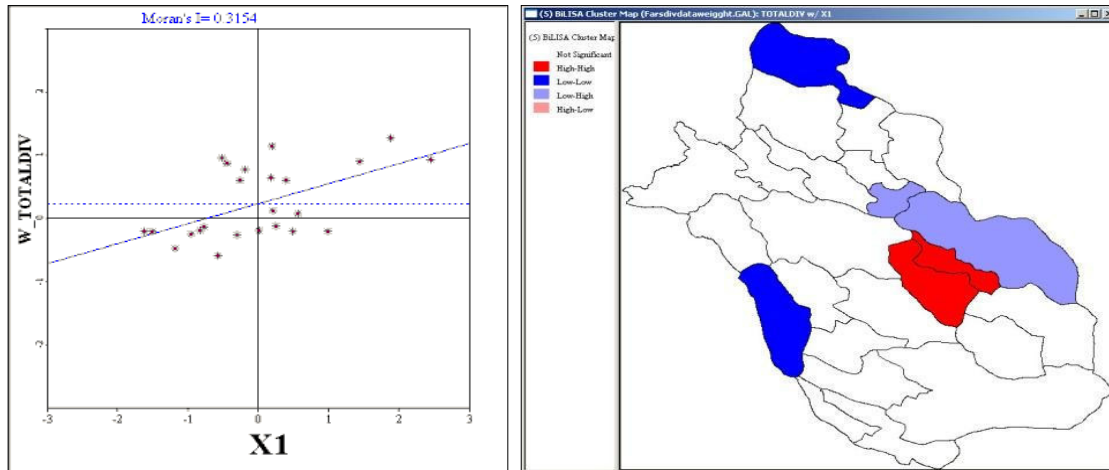
An investigation of the pattern of spatial changes in the relationship between the divorced population and the balance sheet of migration to cities, shows that places with a positive index of spatial heterogeneity are classifiable within two major groups: a) migrant-sending regions with a low divorced population (shown in Figure 3 in the form of regions of low value (low-low)), and b) migrant-receiving regions, generally with significantly large population of divorced individuals (shown in the form of regions of high value (high-high)).

In the rest of counties, a negative index in the relationship between the variable of balance sheet of migration and the population without a marriage partner due to divorce, indicate that being a migrant-sender or receiver does not affect the quantity of the population under study.

Figure 3: balance sheet of Immigration and the divorced population
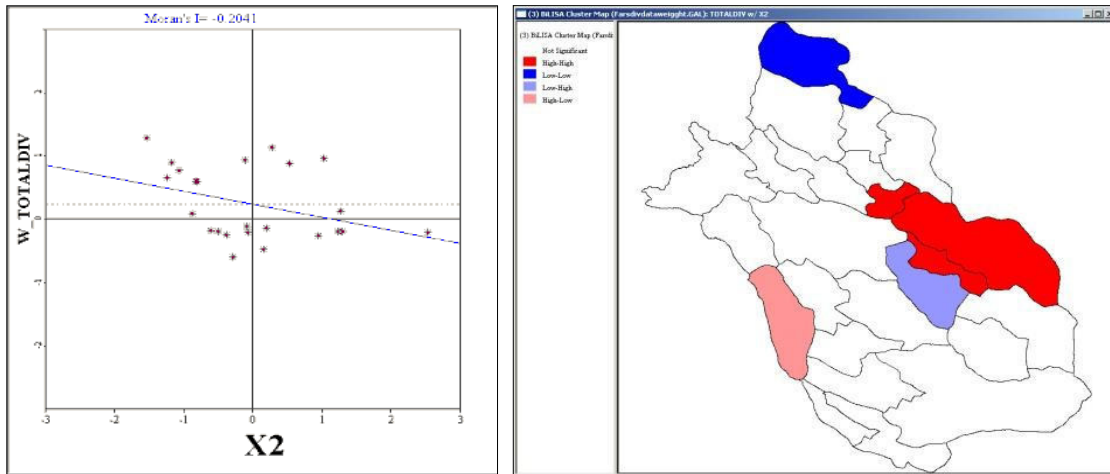
A study of the spatial changes in relationship between the divorced population and the rate of illiteracy in counties shows that regions with a positive index of spatial heterogeneity are limited to the eastern parts of the Fars in counties neighboring Neyriz. In that regions the rate of female illiteracy exceeds 30% and the homo-directionality of illiteracy rate and the population without a marriage partner due to divorce is correlated with a high spatial heterogeneity index. (Figure 4)

Figure 4: relationship between Illiteracy and distribution of divorced population
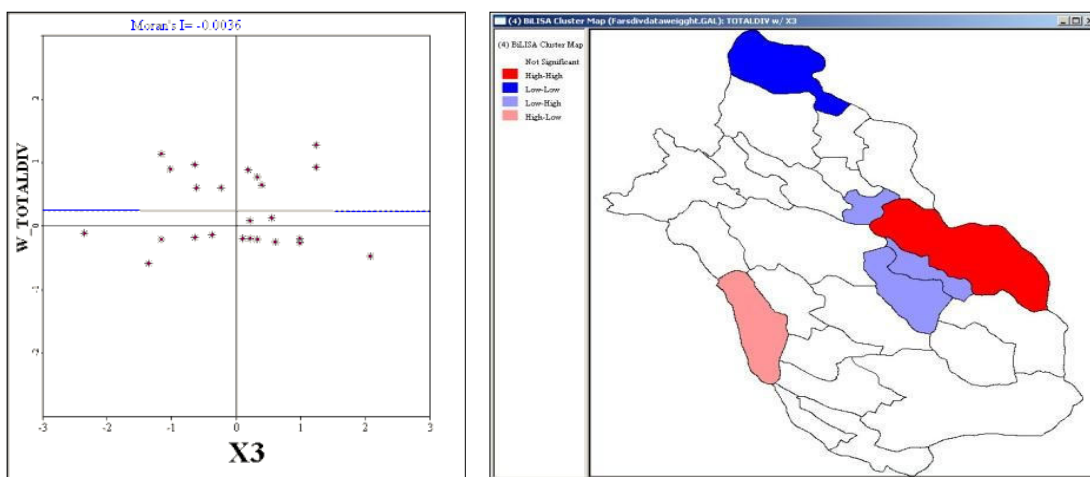
From an investigation of the spatial changes in relationship between the divorced population and the female population with university education,

it appears that regions of a negative spatial heterogeneity are generally in north, south and east parts of province or the neighboring areas. In other counties, independent areas were observable which had no significant relation with their neighboring parts. The ratio of female percentage with university education in 2006 in the whole country was 7.4% among literate women which is a significant portion of the total population with university education (10.9% of the whole literate population) (Figure 5).

Figure 5: relationship between rate of university education and distribution of divorced population
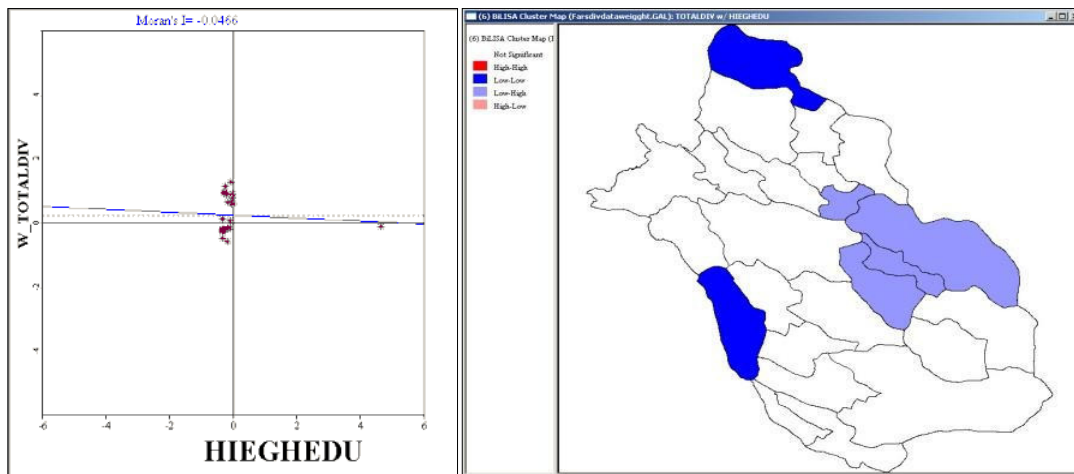
In studying the spatial change pattern of relationship between the population without a marriage partner due to divorce and the rate of women's employment, two indices were used: a) the share of employed women in the total employed population of the county; b) the share of employed women in the total population of women who contribute to the economy of their household.

The results show that regions of a positive heterogeneity index can be separated into two groups: the first group includes province capital and neighboring counties, and the second consists of the counties located in north, east and west, and some others scattering throughout the province. The ratio of female employment to the total employed population of the country in the 2006 census has been 12.6%, and in the majority of cities with a positive heterogeneity index, the employment rate had been higher than the province ratio. (Figure 6)

Figure 6: relationship between the shares of women's employment and distribution of divorced population
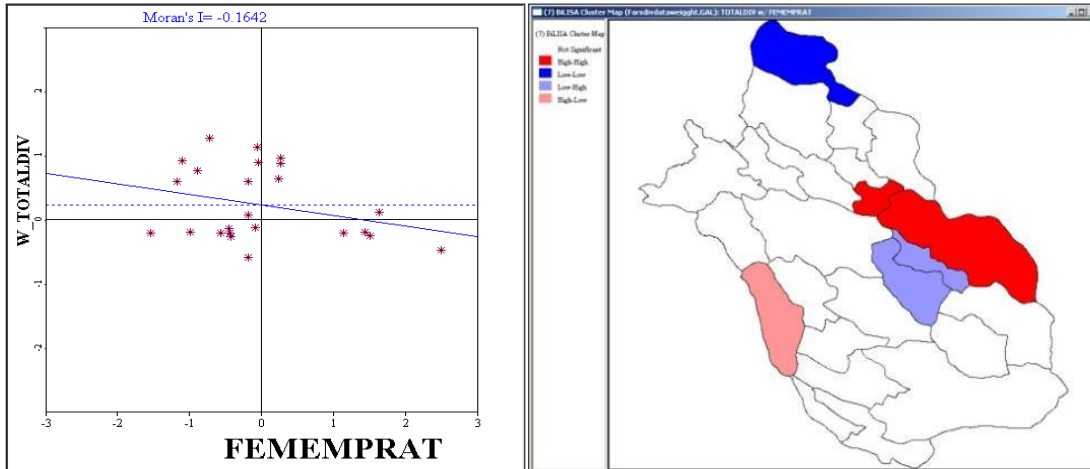
As for the index of "employed women in the total number of women" who contribute to the economy of their household, regions with a positive index of spatial heterogeneity are generally located around metropolitan of Shiraz. Studying these spots shows that in this region, more than 60% of the employed women contribute to the economy of their household, and the availability of employment opportunities around this city causes a significant number of population without a marriage partner due to divorce to reside there and form a region of a high value (high- high). (Figure 7)
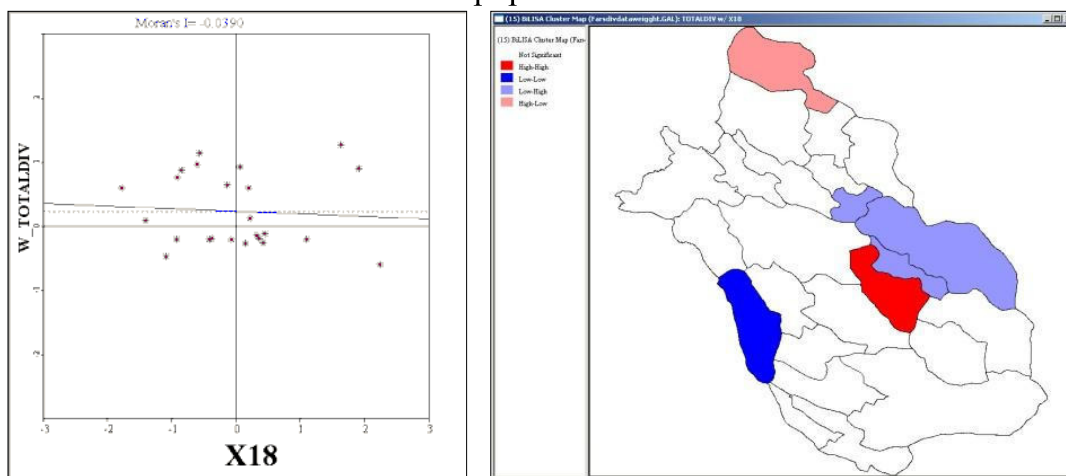
Figure 7: relationship between proportion of employement rate and the distribution of divorced population
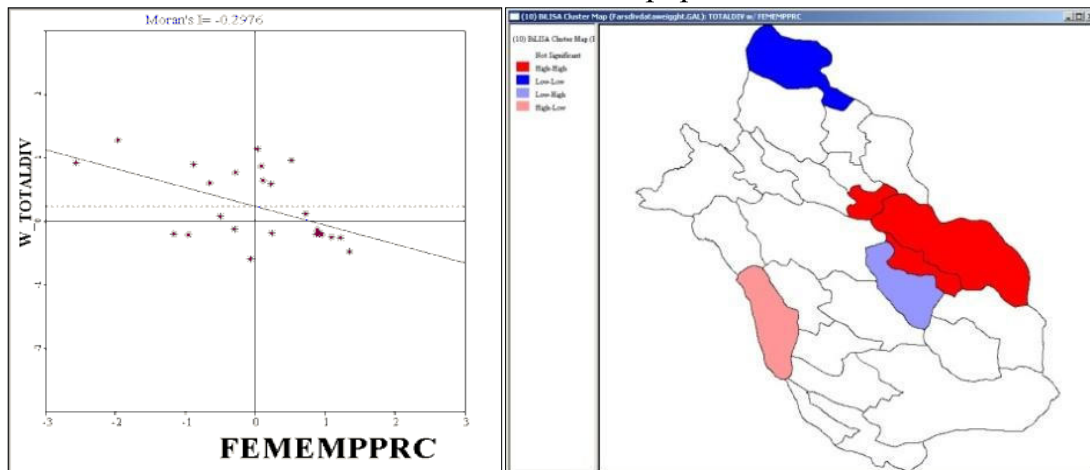
In studying the relationship between the urbanization index and the population without a marriage partner due to divorce, the positive heterogeneity index was for Fasa and Abadeh as two large cities that there urbanization index are above 85%. A statistical study of distribution shows a significant (95%) relationship between the considered variables around these cities. Despite the macro-pattern of the province, a study of the relationship between the urbanization index and the total divorced population residing in cities shows a weak relationship between the two variables in Shiraz County. The positive relationship of heterogeneity with lower percentage of urbanization indexes is lower than national ratio. (Figure 8)

Figure 8: relationship between the Urbanization index and distribution of divorced population in cities

There is another positive index of heterogeneity in decrease of population due to immigration and divorced population. There are some cities scatted around the province which are of lower urbanization but higher level of divorced population. In evaluating the relationship between the rural population and the population without a marriage partner due to divorce, it appeared that the same pattern is working. Rural areas with immigrants show positive heterogeneity with divorced population. (Figure 9)

Figure 9: relationship between the rural population index distribution of divorced population in cities
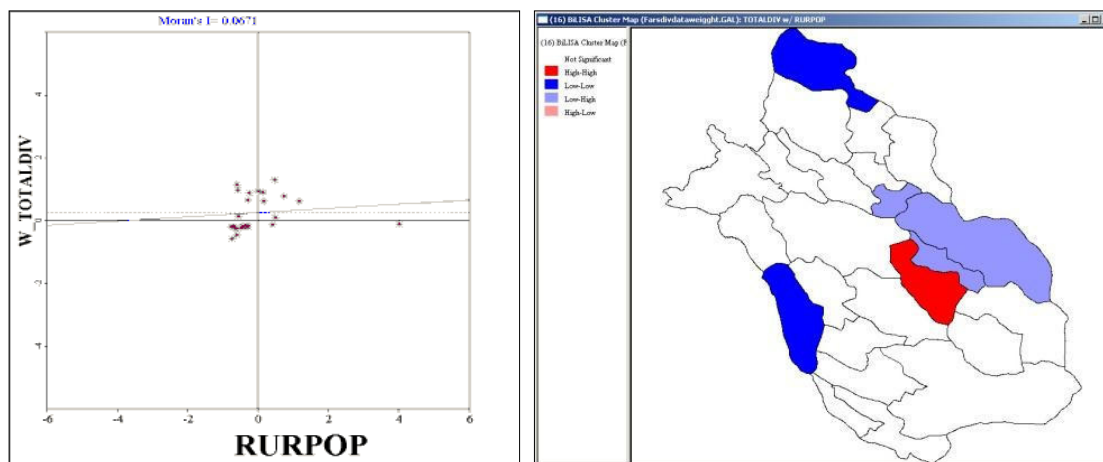
Discussion and Conclusion

Results of the study yield several important findings. Previous studies on divorce provide main factors that express overall reasons of divorce: unemployment, increase in female educational level especially university studies, female employment, immigration and urbanization. This study, besides showing spatial distribution of divorce causes in county level of Fars province, points out the main factors with different affection in various counties. In other words, the results show that different counties of Fars province do not follow the same pattern of increase in divorced population. Although "unemployment" and "high urbanization" indices are more related to metropolitan areas but the results of our study shows no especial correlation between them and divorce rate in Fars province. This study denotes that in all cities, regardless of being metropolitan or a small city, "crisis of values in transition" leads to increases the divorce problem. The rate of rise in female education at graduate and undergraduate level and female employment is higher in Fars province than national level. These variables have relation with increasingly divorce rate in metropolitan area of Fars (Shiraz). Illiteracy and immigration are other factors related to the rate of divorce in undeveloped and low density counties. In counties with high rate of illiteracy and unemployment in immigrant population, there is higher rate of population without a marriage partner due to divorce.

Finally, the investigation of spatial analysis and GIS techniques on the characteristics of the divorced population through the Fars counties indicate that these factors have different affects in different regions. In Shiraz county increase in women's university education and employment is correlated with higher divorced population. In Fasa and Estahban men's unemployment could be the reason for divorce. Low level of urbanization might be the reason of divorce in Fasa County as well. In Estahban, Neyriz and Arsanjan immigration is correlated with higher rate of divorced population. In Neyrize and Arsanjan, women's employment shows heterogeneity with divorced population as well. Illiteracy could be the case for Arsanjan too.

Abadeh is an interesting case due to the information resulted by this study. It has low rate of population without a marriage partner due to divorce. Meanwhile, it has high rate of unemployment, immigration, and illiteracy. On the other hand, the level of women's employment and university education is low in this county. In Farashband county high level of unemployment does not show any correlation with divorced population too. In Farashband with a low level of divorced population the level of university education and urbanization are low as well.

References:

Abdel Hameed Al Khateeb, S. (1998). Women, family, and the discovery of oil in Saudi Arabia. *Marriage and Family Review*, 27(1-2), 167-189.

Ahmadi, H. (2008). Sociology of deviance. Tehran: *SAMT press*.

Anselin, L. (2006). Exploring spatial data with Geoda: A workbook, spatial analysis laboratory department of geography. University of Illinois: *Urban-Champaign center for spatially integrated social science*.

Brinig, M. F. & Allen, D. W. (2000). These boots are made for walking: Why most divorce filers are women. *American Law and Economics Review*, 2(1), 126-69.

Burgess, S., Propper, C.,&Aassve, A. (1997). I want to be alone: Transitions to independent living, marriage, and divorce among young Americans. *Centre for Economic Policy Research*, Discussion Paper: 1715, 28.

Cliff, A. D. & Ord, J. K. (1981). Spatial processes: models and applications. London, Pion.

Buckeridge, David L. Richard Glazier, Bart J Harvey, Michael Escobar, Carl Amrhein, John Frank (2002), Effect of Motor Vehicle Emissions on Respiratory Health in an Urban Area. University of Toronto, Toronto, Ontario, Canada, *Environmental Health Perspectives*, 110(3).

Denesh, K. (1991). An investigation into reasons for divorce in Tehran city, *PEYKE MAMA Journal*, 6&7(1&2), 30-34.

Dolan, M. A.,& Hoffman, C. D. (1998). Determinants of divorce among women: A reexamination of critical influences. *Journal of Divorce & Remarriage*, 28(3-4): 97-106.

Ermisch, J. F. (1986). The economics of the family: Applications to divorce and remarriage. *Centre for Economic Policy Research*, Discussion Paper, 140.

Fatehizadeh M. Behjati Ardakani F, Nasre Isfahani. (2005). An investigation into the role of family factors in the low rate of divorce in Yazd, Ardakan and Meybod. *Studies in Education and Psychology journal*, 6(1),117-136.

Finnas, F. (2000). Ekonomiska faktorer och aktenskaplig stabilitet i finland. Economic determinants of divorce in Finland (with English summary). Ekonomiska Samfundets Tidskrift, 53(2), 121-31.

Fotheringham, A.S. ,Brunsdon, C. Charlton, ME. (1998) Geographically weighted regression: a natural evolution of the expansion method for spatial data analysis. *Environment and Planning*, 30,1905–27.

Getis, A. Ord, J. K. (1992). the analysis of spatial association by use of distance statistics. *Geographical Analysis*, 24, 189–206.

Goode, W. J. (1963). World revolution and family patterns. London: *The Free Press of Glencoe*.

Jahangiri, J. (2010). Review on social fundamentals of female pathology with emphasis on divorce. *Female Social Pathology Conference*, Tehran.

Kameli, M. J. (2007). factors affecting divorce in Iran. *DANESHE ENTEZAMI journal*, 9(3), 180-198.

Kiernan, K., & Mueller, G. (1998). The divorced and who divorces? STICERD (LSE) *Centre for Analysis of Social Exclusion*, Discussion Paper: CASE/07, May 40.

Lee, J. & Wong, D.W.S. (2000). Statistical analyst with ArcView GIS.New York: John Wiley & Sons, Inc Publication

Lesage, J. P. (1999). A Comparison of the Forecasting Ability of ECM and Var Models. *Review of Economics and Statistics*, 72, 664-671.

Lester, D. (1999). Regional differences in divorce rates: A preliminary study. *Journal of Divorce and Remarriage*, 30(3/4), 121-4.

Lowenstein, L. F. (2005). Causes and associated features of divorce as seen by recent research. *Journal of Divorce and Remarriage*, 42(3-4), 153-171.

Mosavati Azar, M. (2006). Rural immigration and divorce tendencies. *Population journal*, 5(15&16): 40-49.

Ogawa, N. & Ermisch, J. F. (1994). Women's career development and divorce risk in Japan. Labor, 8(2), 193-219.

Pasley, K., Kerpelman, J., & Guilbert, D. E. (2002). Gendered conflict, identity disruption, and marital instability expanding Gottmans' model. *Journal of Social and Personal Relationships*, 18(1), 5-27.

Poortman,A. R. & Kalmijn, M. (2002). Women's labor market position and divorce in the Netherlands: Evaluating economic interpretations of the work effect. *European Journal of Population*, 18(2),175-202.

Price, S. J., & McKenry, P. C. (1988). Divorce. Thousand Oaks, CA: *Sage Publication*, Inc.

Qiasi, P. Rosta, L. Barary, M. (2009). An investigation into the social causes of divorce in Shiraz. *Journal of Women and Society*, 1(3), 77-103.

Qotbi, M. Holakoei, K. Jazaieri, S.A. Rahimi,A. (2004). Study of divorce status and some effective factors on divorce in divorced individuals in Dowlatabad. *Social Welfare journal*, 3(12): 271-286.

Rahimi, H. (1999). An investigation into the reasons for divorce in Khorasan Province. *Population journal*, 8, 33-34.

Ressler, R.W. & Waters, M. S. (2000). Female earnings and the divorce rate: A simultaneous equations model. *Applied Economics*, 32(14), 1889-98.

Rogerson. P, Yamada, I. (2004). Monitoring change in spatial patterns of disease: comparing univariate and multivariate cumulative sum approaches. *Statistics In Medicine*, 23, 2195–2214.

Ruggles, S. (1997). The rise of divorce and separation in the United States, 1880-1990. *Demography*, 34(4), 455-466.

Sayer, L. C. & Bianchi, S. M. (2000). Women's economic independence and the probability of divorce: A review and reexamination. *Journal of Family Issues*, 21(7), 906-43.

Sedqpor, B. (1998). Review on factors of domestic violence and divorce. *ESLAH VA TARBIAT journal*, 39, 26-30.

Seifollahi, H. A. (1994). An investigation into reasons for divorce in Tehran city by factor analysis. *Journal of Social Sciences*, 3, 141-153.

Shirzad, J. & Kazemifar, A. A. (2000). An epidemiology of separating men and wives referring to the central office for forensic medicine in Hamadan province. *Forensic Medicine Journal*, 36, 207-212.

Statistical Center of Iran (SCI). (2008). General report of 2006 census. Tehran.

Tobler, W. (1990). Frame independent spatial analysis. *Taylor & Francis*, London.

Waters, M. S. & Ressler, R. W. (1999). An economic model of cohabitation and divorce. *Journal of Economic Behavior and Organization*, 40(2), 195-206.

Wei-Shiuan Jeng & McKenry, P. C. (2001). A comparative study of divorce in three Chinese societies. *Journal of Divorce and Remarriage*, 34(1-2),143-161.

Whittington, L. A., & Alm, J. (1997). Til death or taxes do us part (The effect of income taxation on divorce). *Journal of Human Resources*, 32(2), 388-412.

Zargar, F. & Neshatdost, H. T. (2007). An investigation into factors affecting divorce in Falavarjan County. *Journal if Family Research*, 3(11).

Zhang, P. et al, (2011). An exploratory spatial analysis of western medical services in republic Beijing. *Applied Geography*, 32, 556-565, doi:101016/j.apgeog.2011.07.003.