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THE CHILD IN THE FAMILY: A SPATIAL PERSPECTIVE[1]

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In the study, the values attributed to the child in the family were examined with explanatory spatial data analysis by using Turkish Statistical Institute 2016 Turkish Family Structure Survey. In this context, the information of 12 regions of Turkey was used. The values attributed to the child in the family were classified as economic, psychological and social. The child's financial contribution to the parents in the future and old age security for the parents were taken as economic values. As psychological values, the reputation of women who have children and the way children bring parents closer to each other were used. Finally, the son's continuation of the lineage and the son's increase in the mother's reputation were taken as social values of child. As a result of the global spatial autocorrelation tests, the economic value of the child's financial contribution to the parents in the future was found statistically significant. When the clustered relations were examined using LISA maps, the value of the child through his financial contribution to the parents in the future was found high in the Eastern Black Sea, Northeastern Anatolia, Middle East Anatolia and Southeastern Anatolia regions.

Keywords: *Child, Family, Exploratory Spatial Data Analysis.*

Jel Codes:*C31,C49, J13.*

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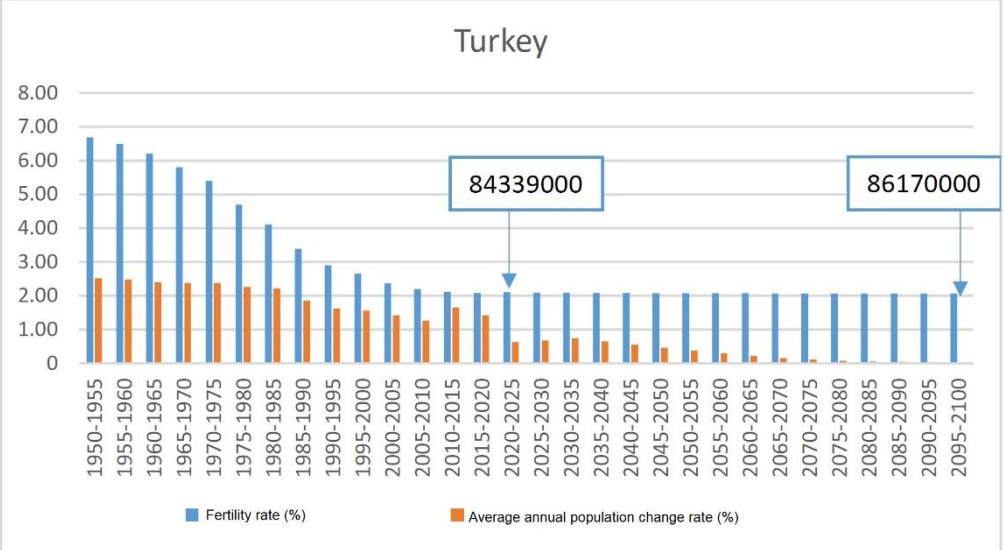
1. INTRODUCTION

Fertility rates, which represent live births per woman, have declined sharply in the last fifty years. According to the estimations of the Department of Economic and Social Affairs, Population Division of the United Nations, the population of Turkey, which was 84339000 people in 2020, will be 86170000 people in 2100 (Figure 1).

Figure 1. Population Structure Change in Turkey



Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition. Rev. 1.

The change in this population structure, which is shown by the fertility rates and the average population change rates, is due to the economic and social developments in Turkey. Industrialization, urbanization, developments in education, and women's participation in the labor market can reduce fertility rates. Klaus (2010) explains the change in fertility behavior in Turkey with the value of the child. He pointed out that economic approaches and fertility theories assume that a utility-maximizing individual has productive behavior, but there are no explanations for what utility means and how children are conceptually related to it. Many conceptual and empirical studies have been carried out in Turkey about the value of the child (Kağıtçıbaşı, 1981; Kağıtcıbaşı and Ataca, 2005, 2017). There are a limited number of studies that empirically investigate the value of the child by using the Family Structure Survey (TFSS) of the Turkish Statistical Institute, which provides information on Turkey. Koçkar and Harma(2018) investigated the cycle of violence in the family, family dynamics and the change in the value attributed to the child by using TFSS data. As a result of the factor analysis they performed, they determined three dimensions related to the value of the child. These are realistic benefit, reputation, and negative impact. The result of the study shows that the child provides a realistic benefit in the form of financial contribution to his parents in the future. However, it was found that there was a decrease in the opinion of the child providing reputation for the mother and of the child's negative effect on mother's

life. Yavuz and Güllüpınar (2019) used logistic regression to investigate the effects of demographic, socio-economic, cultural attitude variables and location variables on the economic value of the child. One of the important results of the study is that the tendency of the child to give the answer "I partially agree" instead of "I agree" to the financial contribution of the child to the parents in the future in the Southeastern Anatolia region is higher than the regions outside the West Marmara region.

In this study, firstly, it is aimed to contribute to the research of the value of the child with a nationally representative dataset of Turkey. Secondly, spatial differences or similarities in the value attributed to the child will be investigated that can explain the decrease in fertility rates in Turkey.

In the first part of the study, the conceptual components of the child's value are emphasized. In the second part, the data and the method used are introduced. In the third part, the results of the analysis are given. In the last part, a general evaluation was made.

2. THE VALUE OF THE CHILD

The concept of value takes place in many fields of social sciences in different ways. In economics, value is the material benefit that emerges in the form of use or exchange (prices) obtained from the goods and services produced by the individual (Rutherford, 2002). In sociology, utility is ethical principles and ideals that express what ought to be rather than what is. Values have an important place in sociology. Because values are an important element of what individuals learn when they are socialized within the community culture and they play an important role in social integration (Bruce and Yearley, 2006). In this context, knowing the values attributed to the child in the family, which is the basic unit of society, is very important in terms of understanding family dynamics, gender roles, social rules and fertility behavior.

The Value of the Child Study (VOC) I, conducted in the mid-1970s, examines the effects of the psychological, social, and economic benefits and costs of having children on fertility behavior. As a result of the study, which included Indonesia, Korea, Philippines, Singapore, Taiwan, Thailand, Turkey, the United States and Munich/Germany, the values attributed to the child were found to be economic, psychological and social. The economic benefit may occur in the form of the child's old age security for his parents, contributing to the family economy or helping with household chores. Psychological value indicates the psychological benefits of having a child for parents, such as joy, pride, success, and friendship. Finally, social value represents the social acceptance that comes with having a child. The continuation of the surname and family traditions are among the values socially attributed to the child (Ataca, Kağıtçıbaşı, & Diri, 2005). The main result of VOC I is that the economic value attributed to the child is found to be very important. Especially in underdeveloped countries such as Turkey, Indonesia, the Philippines, Thailand and Taiwan, which have a collectivist structure, the child is seen as an old age security for their parents.

Based on the results of the VOC I study, the theory of family change was proposed by Kağıtçıbaşı. In the study, a distinction was made between intergenerational financial and psychological dependencies in the family. While the value attributed to the economic child shows intergenerational material dependence; psychological value also indicates intergenerational psychological dependence. In the Value of the Child Survey II in Turkey, which was carried out in 2003 based on the family change model, intergenerational relations between three generations (grandmothers, mothers and adolescents) were investigated. The results show that the psychological value attributed to the child increases and the material value decreases (Kağıtcıbaşı & Ataca, 2015).

According to the theory of the value of the child, children are crucial for reducing uncertainty, both because of their ability to provide wealth and security for their aging parents and their contribution to social cohesion. Although the contribution of children to their parents decreases over time, their contribution to social integration does not decrease. This temporal shift in the value of children implies that, as in the economic fertility theory, the number of children demanded should decrease, but not zero (Friedman, Hechter ve Kanzawa, 1994).

3. METHODOLOGY

3.1. Dataset

The values attributed to the child in the family were examined for 12 regions at the NUTS-1 level of Turkey. In this context, the regions included in the study are Istanbul, West Marmara (Tekirdağ and Balıkesir), Aegean (İzmir, Aydın, Manisa), East Marmara (Bursa, Kocaeli), Western Anatolia (Ankara, Konya), Mediterranean (Antalya, Adana, Hatay), Central Anatolia (Kırıkkale, Kayseri), Western Black Sea (Zonguldak, Kastamonu, Samsun), Eastern Black Sea (Trabzon), Northeastern Anatolia (Erzurum, Ağrı), Middle Eastern Anatolia (Malatya, Van), Southeastern Anatolia (Gaziantep, Şanlıurfa, Mardin).

The data set used in the study is the 2016 Turkey Family Structure Survey (TFSS) of the Turkish Statistical Institute. In the study, the values attributed to the child were classified as economic, psychological and social. As economic value, the child's financial support to his parents in their old age and the child's taking care of his parents in their old age were discussed. As psychological value, the effect of child bringing the parents closer to each other and the effect of child enhancing mother's reputation were taken. As social value, the son's continuation of the lineage and the son's increase in the mother's reputation were used.

Variables were measured with a five-point Likert scale in the Family Structure Survey. There are 57398 observations in the study. In order to analyze the economic, psychological and social values attributed to the child spatially, the geometric averages of the variables measured with a five-point Likert scale were used. The following formula was used while calculating the geometric mean of the variables. (Carlin, J. B., Vidmar, S. and Ramalheira, C., 1998):

$$exp\left\{\frac{1}{n}\sum_i \ln(x_i)\right\} \quad (1)$$

3.2. EXPLORATORY SPATİAL DATA ANALYSİS (ESDA)

Exploratory spatial data analysis (ESDA) consists of techniques developed to identify and visualize spatial clusters, divergences and distributions. These methods provide information on global and local spatial autocorrelations.

3.2.1. Spatial Weight Matrix

The spatial weight matrix is a necessary tool in spatial data analysis to determine the neighborhood structure in the data set. In the literature, neighborhood is defined by binary relations that take the values 0 and 1. Here, non-adjacent regions are shown with 0, while neighboring ones are shown with 1 (Tatoğlu, 2022). While creating the weight matrix in the study, k-nearest neighborhood was preferred from the weights based on the distance between regions. The distance between regions was calculated using the Euclidean distance measure. The number of neighbors (k) is determined as four. The elements of the weight matrix (w_{ij}) and standardized (w_{ij}^*) elements can be expressed as follows (Celebioglu and Dall'erba,2010; Zeren, 2010):

$$\begin{cases} w_{ij}(k) = 0 \quad eğer\ i = j \\ w_{ij}(k) = 1 \quad eğer\ d_{ij} \le D_i(k)\ ve\ w_{ij}^*(k) = w_{ij}(k)/\sum_j w_{ij}(k) \quad k = 4\ için \\ w_{ij}(k) = 0 \quad eğer\ d_{ij} > D_i(k) \end{cases} \quad (2)$$

where d_{ij} is the Euclidean distance between regions i and j. $D_i(k)$ is the smallest fourth-order distance between regions i and j such that each region has exactly 4 neighbors.

3.2.2. Moran's I Statistic

In spatial data analysis, autocorrelations can be calculated globally and locally. (Moran, 1950). These spatial autocorrelations provide information about the existence of clustering or segregation between regions. In the study, Moran's I statistics were used to calculate spatial autocorrelations. In the study, Moran's I statistic was used to calculate the spatial autocorrelations.

$$I = \left(\frac{1}{s^2}\right)\frac{\sum_{i=1}^n \sum_{j=1}^n w_{ij}(x_i-\bar{x})(x_j-\bar{x})}{\sum_{i=1}^n \sum_{j=1}^n w_{ij}} \quad (3)$$

$$s^2 = \frac{1}{n}\sum_{i=1}^n (x_i - \bar{x})^2 \quad (4)$$

Here x denotes the variable of interest, while i and j denote regions. i and j are not equal to each other (i≠j). $\bar{x}$ is the mean of the variable x with a sample size of n. w_{ij} is the element of the weight matrix.

Moran's I statistic takes values between -1 and +1. A positive value for Moran's I statistic indicates positive spatial autocorrelation. Positive spatial autocorrelation is an indicator of clustering and shows that the region has similar characteristics with its neighbor. Negative values indicate negative spatial

autocorrelation. This shows that dissimilar regions are in a neighborhood relationship. 0 indicates that there is no spatial autocorrelation.

In the study, Global Moran's I statistic is used to investigate the existence of clustering in Turkey. However, this value does not indicate the location of the cluster. Therefore, Moran's I local spatial autocorrelations are estimated as follows (Anselin, 1995):

$$I_i = \left(\frac{(x_i - \bar{x})}{s^2}\right) \sum_{j=1}^{n} w_{ij}(x_j - \bar{x}) \quad (5)$$

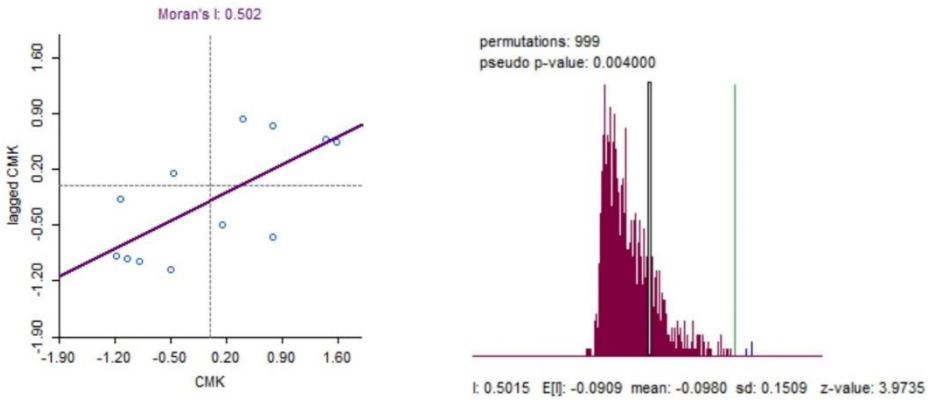
If I_i takes a negative high value, it indicates spatial segregation. On the contrary, a positive high value indicates a spatial clustering. Spatial autocorrelations can be classified into four categories. These are high-high (HH), high-low (HL), low-high (LH), and low-low (LL). While the positive values of the Moran's I statistic included the HH and LL categories; negative values include HL and LH categories. The HH region indicates that the high-value region has high-value neighbors. The HL region, on the other hand, indicates spatial segregation. This indicates that the region with high values is surrounded by the region with low observation values. (Aral ve Oğuzlar, 2021). Significant clusters and separations can be expressed visually through maps created with the help of LISA analysis.

In the study, Monte Carlo simulations based on data permutations performed 999 times were used to test the statistical significance of global and local Moran's I statistics. Moran's I statistic and pseudo p-value are calculated. A small pseudo p-value means that the null hypothesis of no spatial autocorrelation can be rejected. GeoDA program was used to calculate Moran's I statistics and to create LISA maps.

4. RESEARCH FINDINGS

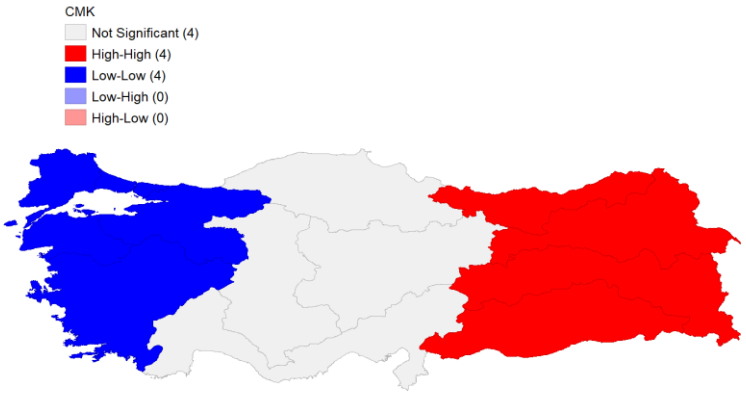
In order to examine the economic values attributed to the child at the NUTS-1 level in Turkey, the child's financial contribution to the parents in the future and the provision of old age security for the parents were discussed. The value attributed to the child due to his financial contribution to his parents in the future was researched across Turkey through the global Moran's I statistics and this value was found to be 0.502 (Figure 2). This indicates the presence of positive spatial autocorrelation. In order to investigate the statistical significance of the calculated Moran's I statistic, the data was permuted 999 times (Figure 2). According to the results, it was concluded that the global Moran's I statistic, which is calculated regarding the value attributed to the child, is statistically significant at the 1% significance level, due to the child's financial contribution to the parents in the future. This shows us that there is a spatial clustering in Turkey in the value of the child due to the child's financial contribution to the parents in the future.

Figure 2. Moran's I Scatter Diagram and Data Permutation Result of the Value Attributed to The Child Due To Child's Financial Contribution to the Parents in the Future



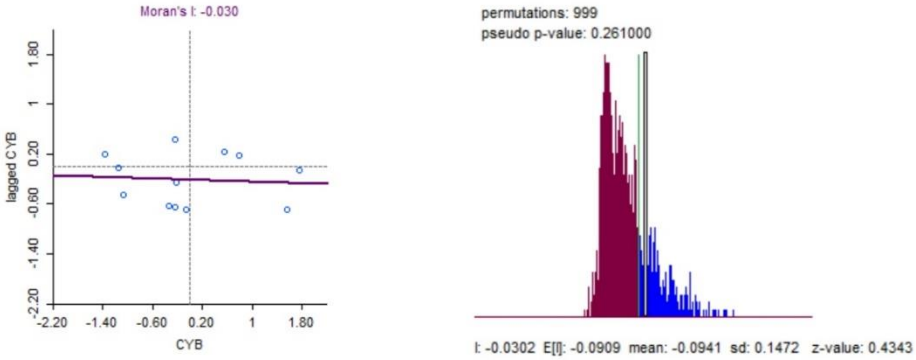
Significant local Moran's I statistics calculated for the value attributed to the child due to child's financial contribution to the parents in the future are shown in the map (Figure 3). Here, the blue regions are located in the low-low (LL) region of the Moran's I scatter diagram, and the red ones are in the high-high (HH) region. In the LL region, Western Thrace, Eastern Thrace and Aegean are located. This shows that the value attributed to the child in these regions is lower than the Turkey average in these regions, as child contributes financially to his parents in the future, and that these regions are in relation with regions with low observation values. The opposite is the case in the regions in the east of Turkey. Eastern Black Sea, Northeastern Anatolia, Middle Eastern Anatolia and Southeastern Anatolia are located in the HH region in Moran's I scatter diagram. For this reason, it is concluded that the value attributed to the child in these regions is higher than the Turkey average, and these regions are clustered with regions with high observation values, due to the child's financial contribution to the parents in the future.

Figure 3. LISA Cluster Map of the Value Attributed to the Child due to Child's Financial Contribution to the Parents in the Future



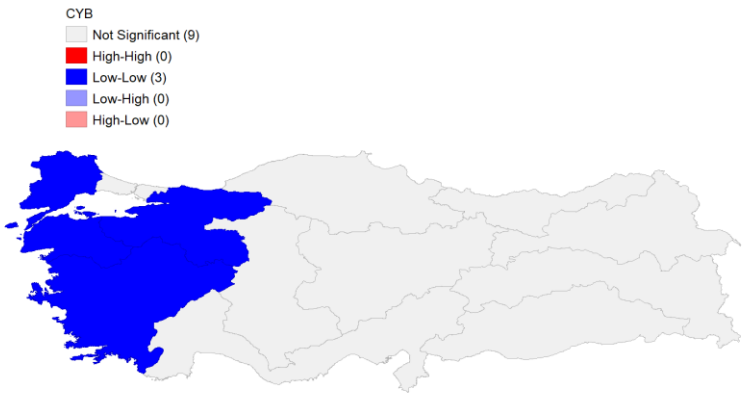
Moran's I statistics were calculated to spatially investigate the economic value attributed to the child, as the child provides old age security to the parents, and its significance was investigated through data permutations 999 times (Figure 4). According to the results, the global Moran's I statistic was found to be -0.030 and this value was statistically insignificant at the 1% significance level.

Figure 4. Moran's I Scatter Diagram and Data Permutation Result of the Value Attributed to the Child Because It Provides Old-Age Security to the Parents



The LISA map was obtained in order to investigate the significant clustering relations and disparities among the regions of the value attributed to the child due to providing old age security to the parents (Figure 5). Haritaya göre mavi ile gösterilen B Western Thrace, Eastern Thrace and Aegean regions are located in the LL region in the Moran scatter diagram. This situation shows that the value given to the child as he provides old age security to the parents is low in these regions, and the neighboring regions are also low-value regions.

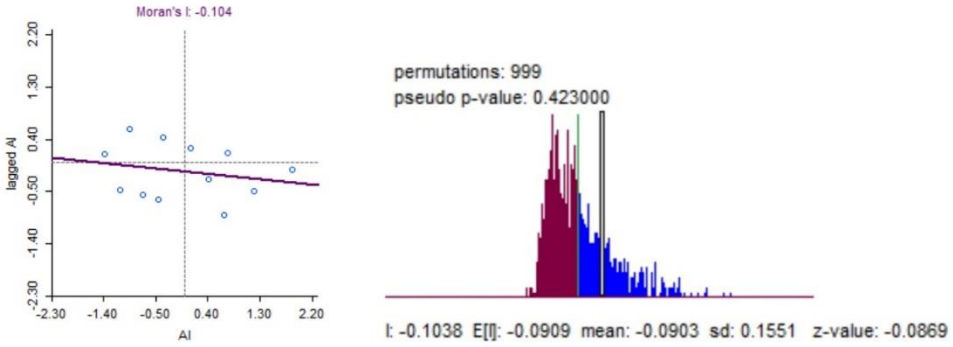
Figure 5. LISA Cluster Map of the Value Attributed to the Child Because He Provides Old Age Security to the Parents



The psychological values attributed to the child at the NUTS-1 level in Turkey, as the reputation of women who have children and the way children bring parents closer to each other, are discussed. First of all, the global Moran's I statistic was calculated to investigate the existence of a spatial autocorrelation

regarding the value attributed to the child in terms of providing reputation to the mother, and the statistical significance of this value was investigated (Figure 6). Global Moran's I statistic was found to be -0.104. This value indicates the presence of negative spatial autocorrelation. The global Moran's I statistic for the value attributed to the child in terms of providing reputation to the mother was permuted 999 times and tested at the 1% significance level and was found to be statistically insignificant.

Figure 6. Moran's I Scatter Diagram and Data Permutation Result of The Value Attributed to the Child in Terms of Providing Reputation to the Mother

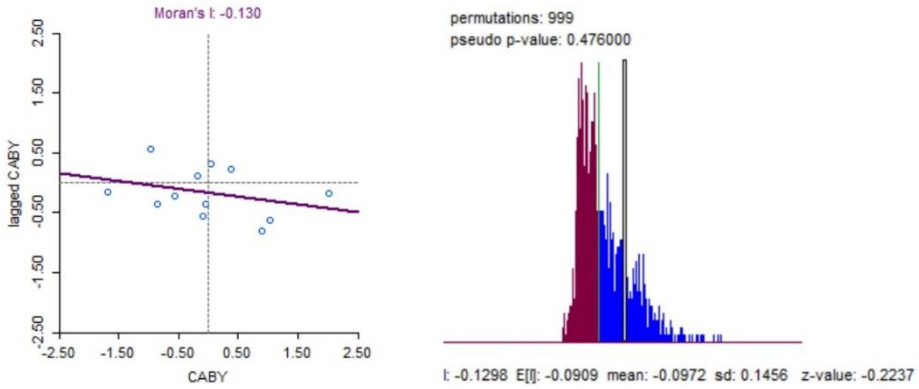


LISA analysis was carried out in order to determine the significant clustering relations and spatial disparities of the value attributed to the child in terms of providing reputation to the mother on the basis of regions. According to the local Moran's I results calculated in the LISA analysis, the value attributed to the child in terms of providing reputation to the mother was significant only in the Western Thrace region. This value is located in the high-low (HL) region of the Moran's I scatter diagram. This result shows that the value attributed to the child in terms of providing reputation to the mother is high in the Western Thrace region and low in its neighbors East Marmara, Istanbul and Aegean regions(Figure 7).

Figure 7. LISA Cluster Map of the Value Attributed to the Child in Terms of Providing Reputation to the Mother

It was concluded that there is a negative spatial autocorrelation pattern according to the global Moran's I statistics calculated for the psychological value attributed to the child because it brings the parents closer to each other (Figure 8). The global Moran's I statistic for this psychological value attributed to the child was permuted 999 times, and it was also found to be statistically insignificant at the 1% significance level. This shows that there is no spatial autocorrelation in Turkey in terms of this psychological value attributed to the child.

Figure 8. Moran's I Scatter Diagram and Data Permutation Result of the Value Attributed to the Child in Terms of Bringing the Parents Closer to Each Other

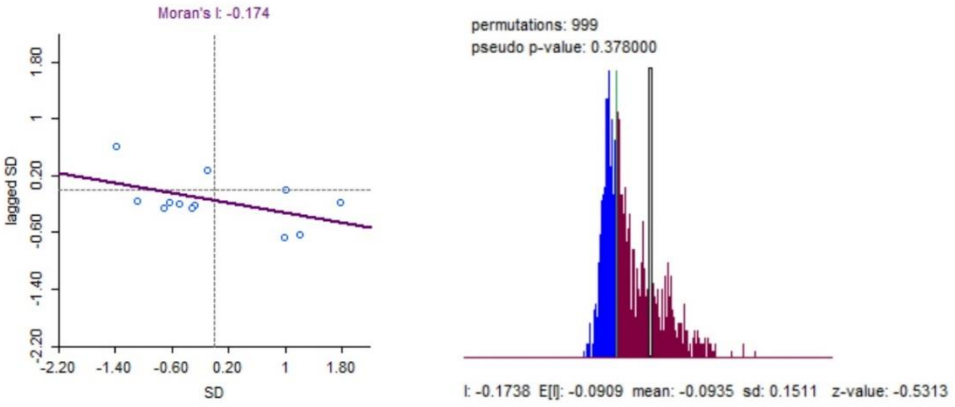


The existence of a significant spatial clustering or disparity specific to regions in terms of the psychological value attributed to the child due to the fact that it brings the parents closer to each other, which is found insignificant in the Moran's I scatter diagram throughout Turkey, has been examined by LISA analysis (Figure 9). The region in light red on the LISA map is the Western Thrace region and the local Moran's I statistics calculated for this region is statistically significant and is in the high-low region. This result shows that the value attributed to the child is higher in the Western Thrace region than in Turkey in general because it brings the parents closer together, and this region is surrounded by regions where this value is low.

Figure 9. LISA Cluster Map Distribution of the Value Attributed to the Child Because It Brings the Parents Closer to Each Other

As the social values attributed to the child at the NUTS-1 level in Turkey, the son's ensuring the continuation of the lineage and the male child's increasing the mother's reputation were discussed. In order to investigate the existence of a spatial autocorrelation regarding the value attributed to the child in terms of ensuring the continuation of the lineage, the global Moran's I statistics were calculated and the statistical significance of this value was investigated (Figure 10). Negative spatial autocorrelation was found in the results and this value was found to be statistically insignificant at the 1% significance level throughout Turkey.

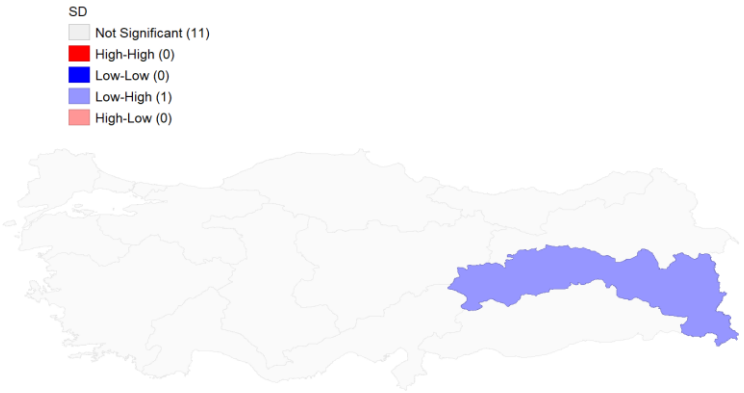
Figure 10. Moran's I Scatter Diagram and Data Permutation Result of The Value Attributed to the Child in Order to the Son's Ensuring the Continuation of the Lineage



The LISA map was used to investigate the existence of a significant clustering and spatial separation between regions in terms of ensuring the continuation of the lineage through the son as the social value attributed to the child (Figure 11). According to the results of local Moran's I statistics, only the Middle East Anatolia Region was statistically significant and is located in the low-high region of the Moran scatter diagram. The negative autocorrelation here shows that the value attributed to the child is

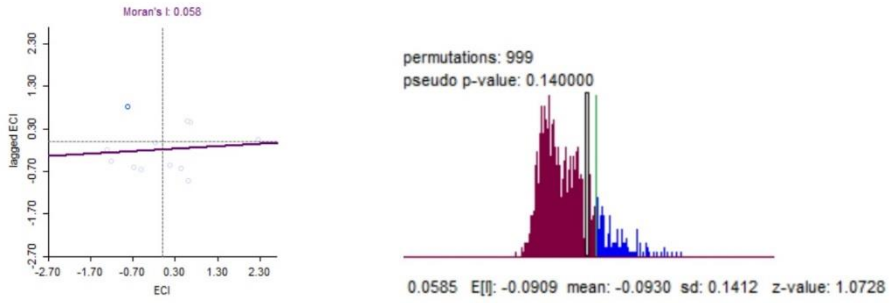
low in terms of ensuring the continuation of the lineage in the Middle East Anatolia region, however, this region interacts with the regions where the value attributed to the child is high in terms of ensuring the continuation of the lineage.

Figure 11. LISA Cluster Map of The Value Attributed to the Child in terms of Son's Ensuring the Continuation of the Lineage



As another social value attributed to the child, increasing effect of the mother's reputation through having a male child was used. For this purpose, the global Moran's I statistics were calculated and its statistical significance was investigated (Figure 12). According to the results, positive autocorrelation was found. However, this value is also statistically insignificant at the 1% significance level. This shows that there is no significant clustering in terms of this social value in Turkey.

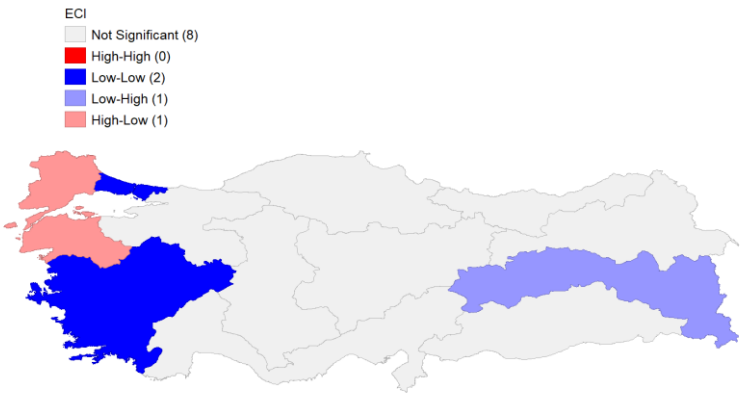
Figure 12. Moran's I Scatter Diagram and Data Permutation Result of the Value Attributed to the Male Child in terms of Increasing Effect of the Mother's Reputation



Since there is no significant clustering in Turkey in terms of the social value attributed to the child due to the fact that the son increases the mother's reputation, local Moran's I statistics were calculated to investigate the relations between the regions and significant clusters and disparities were shown through the LISA map (Figure 13). According to the results, in the Moran scatter diagram, Western Thrace region is in the high-low region, Istanbul and Aegean regions are in the low-low region, and the Middle East Anatolia region is in the low-high region. This situation shows that the value attributed to

the child in terms of increasing the reputation of the mother of the son in Western Thrace region is higher than the average of Turkey, and this value is lower in its neighbors. In eastern Turkey, the opposite is the case. The Middle East Anatolia region is located in the low-high region. This situation shows that this region has a lower average than Turkey and that the value attributed to the child is high in the neighboring regions in terms of increasing the reputation of the mother and this region is positively affected by this situation.

Figure 13. LISA Cluster Map of the Value Attributed to the Male Child in terms of Increasing Effect of the Mother's Reputation



5. CONCLUSION

Fertility rates have been declining steadily in the last fifty years in Turkey. The reasons for this can be listed as industrialization, urbanization, developments in the field of education, women's participation in the labor market and receiving education, and the change in the value attributed to the child. Values attributed to the child in the study were grouped according to the classification in the Value of the Child Survey I. These are economic, psychological and social values, respectively. In order to represent each value, two indicator variables were selected from the 2016 Turkey Family Structure Survey dataset. For economic value, it is preferred that the child contributes financially to his parents in the future and that the child takes care of his parents in their old age. As a psychological value, the child's bringing the parents closer to each other and the child increasing the mother's reputation, and the social value, the son's ensuring the continuation of the lineage and the male child's increasing the mother's reputation were used. In the study, the spatial similarities and differences of the value attributed to the child in Turkey were investigated using explanatory spatial data analysis at the NUTS-1 level. According to the results of the study, the child's financial contribution to his parents in the future as an economic value attributed to the child for Turkey in general was found to be statistically significant at the 1% significance level. There is a positive autocorrelation in terms of this value across Turkey. No statistically significant autocorrelation was found across Turkey for other indicators. However, the

global Moran's I statistic does not show us the location of the clusters. For this reason, local Moran's I statistics were calculated in the study. The results obtained are in line with expectations. The east and west of Turkey have the opposite clustering in terms of both economic value indicators, the child's financial contribution to his parents in the future, and the social values of the boy's increasing the mother's reputation. The economic value attributed to the child in terms of providing financial support to his parents in the future is higher than the Turkey average in the Eastern regions, and these regions affect each other positively. This result also coincides with the results of Yavuz and Güllüpınar's (2019) study. While the social value attributed to the boy in terms of providing reputation to the mother is low in the Aegean region and Istanbul, it is relatively high in Western Thrace. The social value attributed to the child in terms of ensuring the continuity of the lineage was found statistically significant only in the Middle East Anatolia region. This result indicates that the value attributed to the child is low in terms of ensuring the continuation of the lineage in the Middle East Anatolia region, while this value is high in the neighboring regions. Since the results of the study reveal the spatial differences in the value attributed to the child, it is expected to be useful in understanding the family dynamics spatially in population studies.

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