



## **Spatial comparative social attitude to family planning policies in Turkey from 1990 to 2000**

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### **Abstract**

The applications of family planning have been continued in Turkey though they have been changed according to time. However, their effect led to a spatial heterogeneity. In this work, levels of fertility rates depending on results of last two censuses of population in 915 districts were taken basis. Gini inequality measurement and gini correlation were preferred as method for 1990 and 2000 years. Obtained results showed that gini inequality nearing to 0 in rural regions where fertility rate is high supports homogeneous structure. In these regions, there is time stability in spatial distribution of fertility rate in opposition to the places where urban settlement is weighted. This circumstance supports that one-type application methods correctly selected in rural places can be sufficient for achievement of family planning works. On the other hand, it also supports that there is a need to develop special methods for every sub-regions in urban areas. Both internal and external geographic population movement limits the achievement of family planning applications in the regions where urban settlement is dense.

**Keywords:** Public health; demography; fertility rate; family planning.

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## **Introduction**

Spatial perspective is quite important for demographic works because it is impossible for policies determined for population to take individuals one by one. Otherwise, it is necessary to develop thousands of, even, millions of different population policies.

To apply individual opinions of test subjects to predict individuals' attitudes towards circumstance by means of polls in demographic works cannot always achieve to show a fact. For, there can be many differences between the attitude, which the individual will take, and the attitude, which the individual thinks to take. In brief, it is natural that there are differences between the expected attitude and realized attitude.

In this work, in which family planning applications represents "case" and periodic change of fertility rate represents "reaction", spatial reaction inter-regional comparison was made against family planning applications applied from 1990 to 2000 in Turkey. Gini correlation was used as spatial approach.

## **Background for Official Family Planning Programs in Turkey**

The first birth control organization in the United States was the National Birth Control League founded in 1915. (Guttmacher, 1973: 315) Fifty years later from the United States, in Turkey the official policy, expressed in the 1965 family planning law, advocates voluntary planning for the desired number of children. The program has been publicized through the mass media, but organized national efforts have been modest. To strengthen the program, the Minister of Health signed an agreement with the United Nations Fund for Population Activities under which it received up to US\$ millions for expansion of family planning and maternal and child health services.(Norman, Hofstatter, 1980: 25)

The first reaction to the high population growth in Turkey started with Professor Haluk Cillov's newspaper article in 1958. After the publication of the article, to take high population growth under control a commission was established by the Ministry of Health in the following year (Murat, 2006: 75).

The first reference to the family planning in national official program was made in First Development Plan. That the family planning would be among the applications made in order to increase health level was expressed in this plan (DPT, 1962: 39). As a result, it is possible

to observe that the family planning was accepted as an ordinary health service in the first plan. In addition, there was not a specific target in this matter.

It is observed that the first specific target in the family planning subject was in Second Development Plan. In this plan, family planning was firstly examined under a title and was determined as basis of population policy. To go to rural areas and to increase the population from 80,000 at the end of 1966 to 2,000,000 at the end of the plan in 1972 took their places in determined goals (DPT, 1967: 47, 226,227).

It is seen that the view on the family planning in Third Development Plan started to change. Family planning was accepted as a service completing mother-child health in the health service although it was predicted to reach annual 250,000-300,000 women (DPT, 1972: 818). Meaning of this policy change was to provide services for people who wanted to benefit from services of family planning in lieu of orienting public rather than to accept family planning as an instrument of population policy.

It was accepted that to provide services for people who wanted to profit from the family planning subject had been insufficient in Fourth Development Plan (DPT, 1978: 463). It was observed that desires in the former plan were repeated in this plan.

Family planning was more specifically determined than that in Fifth Development Plan. According to this, family planning was determined as offering suitable and effective family planning services for families to have children how many they wanted in conformity with their socio-economic levels (DPT, 1985: 151).

It was seen that Policy-makers' concerns seriously decreased for family planning subject in Sixth Development Plan (DPT, 1990). That two indirect references were made for family planning in 362 pages plan is conspicuous to support the above-mentioned unconcern.

Seventh Development Plan represents an animation in the family matter in the last times. When it is encountered with clues of returning to the perception in the Second Development Plan containing 1962-1972 period, after long years, family planning and population planning were firstly examined together. In addition to this, it is observed that inter-regional difference was firstly accepted and the removal of this difference was determined as a goal (DPT, 1995a: 36). That a special importance would be given to family planning works in the districts, where fertility rate was high, was declared both in the plan and in the five Annual Programs made during the plan (DPT, 1995a: 175; DPT, 1995b: 112; DPT, 1996: 119 DPT, 1997: 105; DPT, 1998: 162; DPT 1999: 165).

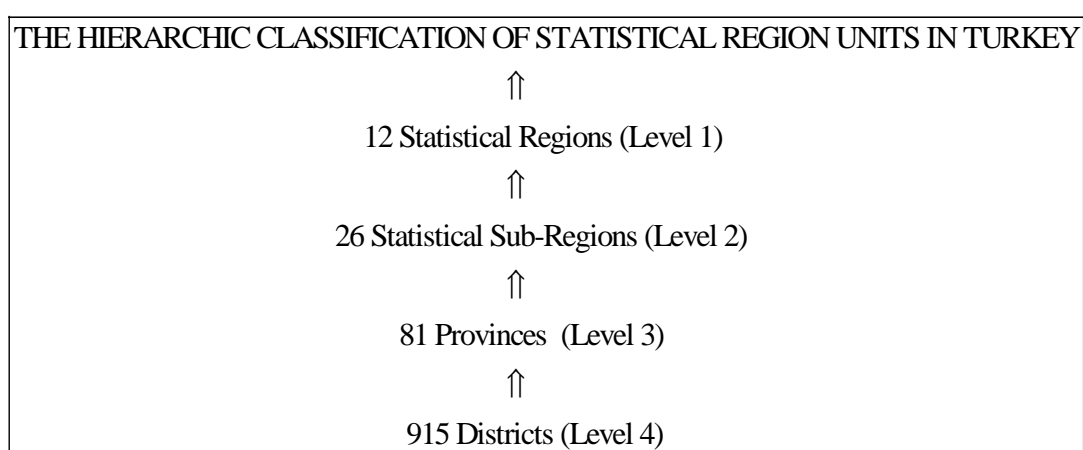
Intentions to remove spatial differences of family planning applications in Seventh Development Plan took their places in Eighth Development Plan and in first four Annual Programs of this plan (DPT, 2000a: 79; DPT, 2000b: 129; DPT, 2001: 147; DPT, 2002: 137; DPT, 2003: 143). It is possible to see that concerns of policy makers for family planning subject in Development Plan and in Annual Programs disappeared since 2004 (DPT, 2004; DPT, 2005; DPT, 2006a; DPT, 2006b; DPT, 2007).

## Data and Method

### *Data*

In Turkey, First population census was carried out in 1927. The next population censuses were carried out between 1935 and 1990 regularly. In years ending with 0 and 5 After 1990, population censuses have been planned to be carried out in years ending with 0 by a law. In this regard, the fourteenth population census was carried out on 22th October 2000 (Turkstat, 2005). Estimations can be just made for other years.

In Turkey, Extensive Information related to fertility rate is available only from Population censuses. In the population censuses, there are three different types of regional definition:



Turkey is composed of 12 statistical regions (level 1) and 26 statistical sub-regions but these regions are not administrative units. The statistical regions are based on 81 provinces,

and a governor administers each province. In addition, 81 provinces are discriminated 914 districts, and a head official of a district administers each of these units.

In this study, gini and gini correlation indices are based on fertility rate in 915 districts as a regional unit. 915 fertility rates were calculated to be used in this work depending on numbers of women population in fertility age in 1990 and 2000, and on numbers of children (Turkish Statistical Institute, 2007a). Explanatory variables in regression applications are based on Turkish Statistical Yearbook 2006 (Turkish Statistical Institute, 2007b).

### ***Gini as an Inter-Regional Homogeneity Index for Fertility Rate***

In the academic literature, there are many kinds of inequality indices for measurement of regional disparity. Some of these many statistical methods: Dahl's and Nagel's indexes like Gini index are based on deviations; coefficient of variation, logarithmic variance, Theil index is based on entropy of information theory and Atkinson index is based on normative social welfare models (Chakravorty, 1996). However, Gini coefficient is the most commonly referred and the best-known index (Ravallion, 2001, 6; Fedorov, 2002, 447; Moran 2003, 353; Milanovic, 2007, 12).

The disparity indices are used for many different scientific areas (whether inter-regional disparity or not). These disparity indices are used for measurement of:

- The regional inequality in productivity and GDP per capita (Such as, Duro, Esteban, 1998; Benito, Ezcurra, 2005; Ezcurra, et al. 2005; Ezcurra, & Rapún, 2006; Ezcurra, Pascual, 2007; Escurra, Pascual, Rapún, 2007; Gezici, 2007), agricultural yield fertility (Sadras, Bongiovanni, 2004), the human capital and education “years of education” (Medrano, Sanhueza and Contreras, 2006; Siew, Lim, Tang, 2008) and the capital stock per capita (Lu, 2008) for economics,
- the occupational segregation by gender or nationality (Chagravarty, Silber, 2007) for sociology,
- the decomposition of migration flow (Sweeney, Goldstein, 2005) for demography,
- the levels of nationalism for political parties (Johns, Mainwaring, 2003),
- the centralization (Dawkins, 2006) and regional distribution of workforce (Carlino, Chatterjee, 2002; Heindenreich, 2003) for urban and regional planning,

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- the energy-intensity inequalities across countries (Alcantara, Duro, 2004) and in air, water, land, underground pollution per capita across states (Millimet, Slottjet, 2002) for environment science,
- the pitfall for competitive balance (Utt, Fort, 2002) and attendance (Schmidt, Berri, 2001) in Major League Baseball for sports,
- the offenders distribution (Oberwittler, 2004) for criminology,
- a test method of goodness (Jammalamadaka, Gorla, 2004) for statistics,
- body lengths of helminth parasites (Poulin, Latham, 2002) for helminthology.

In addition, the inequality indices can be used for health and medical science. The index of health inequality used is not one of the more commonly used ones in the literature. The index was based on responses to a WHO internet-based survey, and thus reflected the opinions of those respondents. The choices involving selection of a measure of inequality are normative; the more commonly used measures such as the Gini coefficient and the variance represent a particular set of these normative choices (WHO, 2006, 6).

WHO proposed a comprehensive approach to the measurement of health inequality that parallels the extensive literature on inequality assessment in other fields such as economics? The conceptual basis for this approach was developed. To summarize the key conclusions, the most relevant quantity of interest for studying health inequality is the distribution of health expectancy across individuals, constructed for a period, using a clearly defined method for linking the distributions of health risks at different ages. Operationalizing the measurement of the distribution of health expectancy across individuals (or regions) requires measurement of the distribution of mortality risk at each age and the distribution of health states at each age (WHO, 2006, 6-7). Hence, measurement for inequality in health focused on inequality in mortality (for example, Hicks, 1997; Galal, Qureshi, 1997; see for literature, Bleichrodt, Doorslaer, 2006) and life expectancy (Cornia, Menchini, 2006; Wu, Savvides & Stengos, 2008).

Number of the studies for relationship between economic inequality and (infant of others) mortality has larger inequality in health. Leigh and Jencks (2007) said that there were more than 100 articles on the question of leading changes in economic inequality to changes in mortality rates (for example, Kawachi, Kennedy, 1997) In addition, Kakwani, Wagstaff,

van Doorslaer (1997) used concentration index to estimate socioeconomic inequality in health.

However, there is no enough literature to directly focus on the measurement of fertility rate, and I cannot find any sample application for geographic distribution of fertility rate. In this study, I focus on inter-regional (among 915 districts in Turkey) inequality for regional fertility rate as an inter-regional homogeneity indicator.

Mostly, health inequality indicators are different from ordinary economic data. More general health measures are nearly always categorical and ordinal rather than cardinal. Thus to obtain a summary measure of inequality it is necessary to either (a) employ an inequality measure which is specifically designed to deal with ordinal data or (b) to transform the ordinal measure into a cardinal measure and then employ a standard inequality index. (Madden, 2008,2).

Fertility rate is not categorical, but it is not pure cardinal measure, too. The fertility rate may be limited more than economic indicators such as GDP per capita allow. For example, inter-country fertility rate in the world may be from 2 to 7 children per women for the least from the highest rate although inter-country GDP per capita in the world may be from \$100 to \$70,000. Therefore, the calculation process for health inequality may be more difficult than economic data and the meaning of these indices are different from each other. The gini or other similar inequality indices for economics define inequality in the distribution of inter-individual or inter-regional distribution. However, the indices in health like fertility rate define to level of homogeneity among individuals or regions.

This structure of fertility rate data, used for all of methods to inequality measurement may be limited. According to Wagstaff, Pierella and Van Doorslaer (1991, 545), the six measures of inequality that have been used to date in the literature on inequalities in health are: the range, the Gini coefficient (and the associated Lorenz curve), a pseudo-Gini coefficient (and an associated pseudo-Lorenz curve), the index of dissimilarity, the slope index of inequality (and the associated relative index of inequality) and the concentration index (and the associated concentration curve). In this study, I preferred to relative index of inequality.

Relative index of inequality is a kind of gini inequality indices. Lerman and Yitzhaki (1984) have derived the following convenient formula for the Gini of an income component (fertility rate for my study) Y:

$$G_Y = \frac{2 \text{cov}(Y, R_Y)}{N\bar{Y}} \quad [1]$$

where  $n$  = number of region,  $\bar{Y}_i$  = mean of  $Y$  for all regions, and rank ( $Y$ ) runs from (for the region with the lowest value of  $Y$ ) to  $n$  (for the region with the highest value of  $Y$ ). (Lerman and Lerman, 1986; Milanovic, 1997; Beenstock and Felsenstein, 2007; Milanovic, 2007)

### ***Gini Correlation for Changing of Inter-Regional Fertility Homogeneity from 1990 to 2000***

In this study, I used a measure of periodic change in homogeneity among regions for fertility rate. The Gini correlation between  $Y$  in period  $t$  and fertility rate rank in period  $t-1$  is defined as

$$\Gamma_{t,t-1} = \sum_{i=1}^n \frac{\text{cov}(Y_{it}, R_{it-1})}{\text{cov}(Y_{it}, R_{it})} \quad [2]$$

and is bounded between 1 and  $-1$ . It measures the degree of (backward) absolute mobility.  $Y$  is absolute immobile when  $\Gamma=1$ : If  $\Gamma=0$  there is random absolute mobility because it is not possible to infer  $R_{it-1}$  using information on  $Y_{it}$ . For all practical purposes, this represents the case of complete mobility. When  $\Gamma=-1$  there is perfectly perverse mobility: the highest swaps rank with the lowest, the second most high fertility rate with the second most least fertility rate, and so on.

The difference between the Gini correlation and the Spearman's rank correlation coefficient is that Spearman's attaches no importance to fertility rate, whereas Gini attaches importance to fertility rate. The rank and Gini correlation coefficients are both unity under the same circumstances; when  $R_{it}$  and  $R_{it-1}$  are perfectly correlated, i.e., the ranks do not change. They are both minus unity under the same circumstances. However, the rank and Gini correlations are zero under different circumstances. The rank correlation is zero when there is no correlation between  $R_{it}$  and  $R_{it-1}$ . The Gini correlation is zero when there is no correlation between  $Y_{it}$  and  $R_{it-1}$ : This means that the Gini and rank correlations generally differ unless fertility rate and rank happen to be perfectly correlated. (M. Beenstock and D. Felsenstein, 2007)



### ***Ordinary Least Square Regression Analysis***

It can be meaningful to give information about the implementation process used in this study instead of constituting one by one-mathematical equations in the implementation stages, for regressive analysis is very known analysis. In conclusion, the multiple regressive analysis is one of the best-known subjects of economics and econometric science.

High rate correlation is not wanted in the implementations of regression among the independent explaining variables, for variance also grows with the high correlation and especially contributes to enlarge estimation distances in the interval estimations. This situation means a vague in the estimates (Isikara, 1975). If there is linearity among independent variables, it is possible that the coefficients of explaining variables are statistically unimportant and even can be possible that their signs are in the opposite direction (Salvatore, Reagle, 2002). Multi – collinearity frequently seems in the economic data (Creel, 2004). It is tested whether or not there is multi-collinearity between the growing variance factor and the variance inflation factor. Thus, it is determined how much parameter factors and variances deviate from their real values because of the multi-collineary (Tekin, Caglayan, 2003). As a result, the determination of whether there is multi-collineary is so important.

While VIF value is calculated with the following formula as times as the number of the independent variance, a matrix is constituted, taking the diagonal values of matrix as base.

$$VIF = \frac{1}{(1 - r_{x_1, x_2}^2)} \quad [1]$$

There are discussions about what the maximum value of VIF coefficient must be. Variance is as smaller as correlation among variances is (Weisberg, 2005). Some academicians argue that this value must not be bigger that five (Tekin, Caglayan, op. cit.). Some explain that if the value of VIF becomes more than 10, it is concluded that there is multi-collinearity among the independent variances (Gujarati, 2004).

Ramsey's RESET test is another important test in the regression analysis. Ramsey's RESET test, "regression specification error test", is one of the oldest tests used in the

regression analysis and, its use continues at the present (Davidson, Russell, 2002). With this test, whether or not there is a determination error in the model, “deficit-excess variance and wrong equation are tested (Johnston, Dinardo, 1997; Kennedy, 1998).

One of assumptions of the ordinary least squares “OLS method is the stable variance in the regression analysis (Sumer, 2006: 18). If the error term variance is not the same for all the observers in the model, in this situation the problem of heteroskedasticity emerged. (Maddala, 1992). If the stable variance does not provide the assumption, coefficients are not the effective parameter predictors, determination of the statistical tests and confidence interval becomes inefficient (Salvatore, Reagle, 2002; Guris, Çağlayan, 2000).

The question of heteroskedasticity can be seen not only in the time series but also in the cross section series (Greene, 2002). However, generally, it is encountered in the spatial econometrics because of the measure differences (Genceli, 1989). White test is also used to test the assumption of the homoskedasticity. In addition, it can be used in the spatial econometric models (Arbia, 2005).

For two regression equations established in this study beside the determination of the VIF values, Eviews 4.0 packet program was used.

## **Results**

### ***Gini Inequality Measurement and Correlation Coefficient Results for Statistical Regions in Turkey***

In Table 1, both gini inequality measurement and gini correlation coefficients were comparatively offered in the application. The application was separately repeated for 12 regions and for whole country. The number of observation changes between 26 and 915. Entire population itself was used for all regions and for whole country.

Table 1  
Spatial Comparison with Basic Statistics and Gini Correlation Coefficients for Fertility Rate in Turkey from 1990 to 2000

Districts	Year	Basic Statistics					Gini	
		N	Max.	Min.	Mean	St.Dev.	Inequality Coef.	Correlation Coef.
TURKEY	1990	915	1161	194	459.0	175.97	0.194	0.922
	2000	915	1097	137	392.8	156.13	0.199	
TR1: ISTANBUL	1990	26	529	194	335.3	79.19	0.129	0.473
	2000	26	521	137	289.1	78.00	0.145	
TR2: WEST MARMARA	1990	57	402	245	307.7	34.59	0.060	0.709
	2000	57	352	190	264.1	32.81	0.068	
TR3: AEGEAN	1990	127	601	261	361.4	69.50	0.102	0.811
	2000	127	580	189	311.6	61.15	0.104	
TR4: EAST MARMARA	1990	81	550	270	352.0	47.42	0.073	0.692
	2000	81	410	210	303.2	42.24	0.077	
TR5: WEST ANATOLIA	1990	61	566	236	413.5	63.36	0.086	0.851
	2000	61	562	177	382.0	81.47	0.119	
TR6: MEDITERRANEAN	1990	91	602	247	408.9	47.55	0.123	0.810
	2000	91	610	193	361.2	77.06	0.119	
TR7: CENTRAL ANATOLIA	1990	84	670	323	453.2	79.06	0.096	0.770
	2000	84	611	256	391.0	74.29	0.090	
TR8: WEST BLACK SEA	1990	105	716	298	437.7	88.87	0.111	0.805
	2000	105	619	229	353.2	85.72	0.134	
TR9: EAST BLACK SEA	1990	79	668	235	412.3	94.25	0.126	0.855
	2000	79	544	213	350.7	76.72	0.121	
TRA: NORT EAST ANATOLIA	1990	57	1008	303	572.7	172.41	0.168	0.931
	2000	57	842	244	509.8	155.50	0.172	
TRB: CENTRAL EAST ANATOLIA	1990	70	1161	278	664.7	245.81	0.211	0.957
	2000	70	1097	150	540.3	237.73	0.247	
TRC: SOUTH EAST ANATOLIA	1990	77	1148	517	793.3	146.37	0.104	0.913
	2000	77	1057	390	675.1	158.39	0.132	

When values of gini inequality measurement's coefficients in 1990 and in 2000 are examined, it is seen that spatial inequality increased in all the statistical regions except Eastern Black Sea and Central Anatolia. The first attractive important result in applications, in which gini approach is used, is that a dense spatial inequality increase was materialized in fertility rates in Turkey from 1990 to 2000. These results' interpretation is that a regional heterogeneity was constituted in individual reactions at national level against family planning applications.

When results of coefficients are examined across 12 statistical regions and for Turkey, generally, it is seen that gini inequality measurements were realized at low level in the regions where economic development is high both for 1990 and for 2000. In other words, spatial differentiation of fertility rates decreased in parallel with the height of developmental level.

When gini correlation “mobility” coefficients are also examined, it is observed that gini correlation coefficients are near to 1 in statistical regions where gini inequality measurement coefficients are near to 0. These results’ interpretation is that a spatial degeneration is materialized in the statistical regions where have fertility rates near to each other.

### ***Functional Relationship between GDP and Gini Inequality Measurement Results for Statistical Regions***

Inequality has a declining inclination in the realization of gini inequality measurement’s coefficients in 12 statistical regions when developing. This circumstance was showed by creating a regression equation between gross domestic product “GDP” per capita as \$ USA in 2001 and gini coefficients. Results of regression were offered in table 2.

Table 2

Functional Relationship between GDP per capita as \$USA Gini Inequality Measurement Coefficients: OLS Regression Analysis Results for Statistical Regions in 2001, 2000

<b>Variables</b>	<b>Coefficient</b>	<b>t - value</b>	<b>Prob.</b>
Constant	0.67249	3.18326	0.00980
LN(GDP per capita as \$USA)	-0.07264	-2.58412	0.02720
N = 12			
R-squared	0.40040		
Adjusted R-squared	0.34044		
F-statistic	6.67768		0.02722
*Heteroscedasticity (White test)	0.42444		0.66658
**Reset (Ramsey Reset test)	1.64837		0.23125

Dependent variable: Gini Inequality Measurement Coefficient in Statistical Regions "Level 1"

Notes:

\* This regression is not affected by heteroscedasticity.

\*\* There is no specification error.

In the result of regression equation set up between natural logarithmic form of GDP per capita and gini coefficient, when fertility rate increases in statistical regions, “heterogeneity” of spatial inequality decreases in the fertility rate. At the same time, when fertility rate decreases, spatial “heterogeneity” increases in the fertility rate. This result can also be interpreted that when income level increases, spatial homogenization is supported in terms of fertility rate. At the same time, spatial heterogeneity is supported with decrease of income level.

Regression equation created with fertility rate was repeated for rate of urbanization and size of households. However, meaningful results cannot be statistically reached. As a result, a conclusion was not obtained that urbanization or size of households had a functional effect over spatial distribution of fertility rate.

***Functional Relationship among Rate of Urbanization, Size of Households and Gini Correlation Results For Statistical Regions in Turkey***

That gini correlation coefficients are in statistical regions where spatial equal distribution is “more homogenous” shows that there is a serious degeneration in spatial distribution of fertility rate. This circumstance was emphasized before. To concretize character of regions where degeneration of spatial homogeneity is lived, a new multiple linear regression equation was established. In this equation, explanatory variables were constituted by rate of urbanization’s and average size of households’ levels. Independent variable was also determined as gini correlation coefficients. Results for regression were offered in table 3.

Table 3  
Functional Relationship Among Rate of Urbanization, Average Size of Households and Gini Correlation Coefficients: OLS Regression Analysis Results for Statistical Regions in 2000, from 1990 to 2000

<b>Variables</b>	<b>Coefficient</b>	<b>t - value</b>	<b>Prob.</b>
Constant	0.75202	3.34692	0.00860
Rate of Urbanization	-0.46211	-2.07717	*0.06760
Average Size of Households	0.06825	2.59193	0.02910
N = 12			
R-squared	0.68469		
Adjusted R-squared	0.61462		
F-statistic	9.77159		0.00555
**Heteroscedasticity (White test)	1.65689		0.27714
***Reset (Ramsey Reset test)	1.71327		0.22691

Dependent variable: Gini Correlation Coefficient in Statistical Regions "Level 1"

Note: There is no multi-collinearity for vif values smaller than 10.

\* 10%

\*\* This regression are not affected by heteroscedasticity.

\*\*\* There is no specification error.

When results of regression were examined, it was seen that rate of urbanization had a negative effect on gini correlation coefficients in regions when average size of households had a positive effect in the coefficients. This means that immobility in spatial fertility rate

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increased from 1990 to 2000 when rate of urbanization decreased. In other words, spatial distribution of fertility rate became stable in the places where rural settlements were dense and where there were large families. Now this circumstance continues. Mobility among periods also increases in cities, too.

### ***Functional Relationship between GDP and Gini Correlation Results for Statistical Regions in Turkey***

Regression equation created between gini correlation coefficients and natural logarithmic form of gross domestic product as \$USA. Results of regression were offered in table 4.

Table 4

Functional Relationship between GDP per capita as \$USA and Gini Correlation Coefficients: OLS Regression Analysis Results for Statistical Regions in 2001, from 1990 to 2000

<b>Variables</b>	<b>Coefficient</b>	<b>t - value</b>	<b>Prob.</b>
Constant	2.67606	5.84453	0.00020
LN(GDP per capita as \$USA)	-0.25022	-4.10724	0.00210
N = 12			
R-squared	0.62783		
Adjusted R-squared	0.59061		
F-statistic	16.86938		0.00212
*Heteroscedasticity (White test)	2.21036		0.16562
**Reset (Ramsey Reset test)	0.60068		0.45820

Dependent variable: Gini Correlation Coefficient in Statistical Regions "Level 1"

Notes:

\* This regression are not affected by heteroscedasticity.

\*\* There is no specification error.

When regression analysis is examined, it was observed that GDP per capita had a negative effect on gini correlation coefficient. This means that periodic immobility for spatial distribution of fertility rate increased from 1990 to 2000 when level of income in regions decrease. In other words, spatial distribution of fertility rate becomes stable in low-level income regions. This stable circumstance has continued. When level of income increases, mobility among periods increases, too.

## Discussion and Conclusion

Turkey is a country that has a dynamic population. Under this circumstance, it is possible to see that the tendency to have more children in small settlements of rural areas is strong. Having more children in rural areas is still perceived as a kind of social security. This structure started to weaken in urban areas.

That distribution of spatial fertility rate is high in the regions where low-rate income is intense attracts attention. It is possible to attach this difference to these regions dissatisfied in terms of family planning services. However, it is seen that a resolution is constituted in the decreasing of fertility rate in statistical regions, in which high-income urban settlements are intensive (table 1, 2). However, this resolution should not lead policy makers to be overcome by languor. Especially, it should not be forgotten that there is a serious mobility based on the time in the spatial distribution of fertility rate in the regions where big cities exist (table 3, 4). In reality, to attach directly this mobility to family planning of state is not suitable. It is known that large numbers of people migrated to the region where “pull area” was. In addition to the migrants from outside of the region, the population in the region is mobile. Consequently, the composition of population in these regions has quite a heterogenic character in opposition to that in the rural areas.

In these perspectives, there is a need for spatial differentiation of family planning programs realized by policy makers. To follow common policy for all regions will make expectations difficult.

It is possible to follow one-type family planning policies in rural areas such as North Eastern Anatolia, where fertility is quite high, and low-rate income, rural settlements are dense and large families live. For, though spatial heterogeneity is high in fertility rate on cross-section data, mobility based on time is very quite limited. Level of gini correlation coefficient shows immobile character depending on time in these type statistical regions. Moreover, it should not be forgotten that to obtain effective results is quite difficult. Consequently, social resistance is powerful against family planning in the places where rural settlement is dense.

There is a dangerous circumstance in places such as Istanbul, where fertility rate is quite low. A degenerative process pervaded the urban areas where spatial homogeneity was quite well. It is necessary to determine different aimed masses for family planning in

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opposition to rural areas; otherwise, there is a dangerous possibility that people coming from rural areas can transform the character of rural areas into these regions. The results of gini correlation coefficient support probability of this transformation.

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