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GENDER AND SPATIAL EDUCATIONAL ATTAINMENT GAPS IN TURKEY

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ABSTRACT

This paper aims to investigate differences and similarities between and among the seven regions as well as the developed and the less developed provinces in Turkey for their gender gaps in educational attainment of the labor force. The study uses analysis of variance techniques to test equality of means between the regions and the provinces for the census period 1970 to 2000. The purpose is to determine whether gender gaps narrowed or expanded. The statistical tests rejected equality of the means for the six census periods for the seven regions and for the provinces. Multiple comparison procedures showed that changes in the means needed about a decade to materialize.

Keywords: Gender, Education, Region, Turkey, Developed provinces, Less developed provinces, ANOVA

Contribution/ Originality

This study contributes to the existing literature of gender gaps in education in developing countries. The paper substantiates the findings of other studies in that cultural and institutional differences do prevail in the treatment of women. In Turkey, for instance, the ratio of education of women to men is less than one, approaching one as the economy developed.

1. INTRODUCTION

Tansel and Güngör (2013) wrote a comprehensive study regarding the output effects of male and female education in Turkey. Their research is in line with many studies examining gender effects on economic growth or output levels. The aim was to estimate the effects of education pertaining to regions and to less and more developed provinces of Turkey for a period ranging

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between 1975 to 2000. By using the framework of Mankiw *et al.* (1992) — which is based on the works of Solow (1956) and Swan (1956) as well as many other sources, TG concludes that an emphasis on the role of female education on development and growth, especially in developing countries, has important policy implications in Turkey. Therefore, a decrease in educational gender gaps promotes labor productivity. In the process of producing their work, TG provided valuable census data related to male and female educational gaps in Turkey that could be used for further analysis. In particular, the data were arranged by years and the seven regions in Turkey.

A regional basis has been used for many studies because regions differ in the availability of natural resources, the composition of the population, tax and regulatory environments, and historical evolution. These differences persist despite forces that tend to create a more homogeneous society, such as the national government, national market, and migration of people. Regional definitions are also an issue due to the wide variety of choices, including geographical features, political boundaries, resource endowments, cultural background, changing technologies, and urbanization. Yet, there are forces in play that tend to induce the minimization of gaps of major economic activities. In other words, according to Angulo *et al.* (2001), there is a tendency toward equalization, for instance, among countries, regions, provinces, or municipalities. In a broader sense, as Doyle (1997) and O'Leary (1997) have stated, it is a process by which economic variables other than income display a narrowing of gaps.

The focus of this paper is to employ analysis of variance to find out whether gender gaps across the regions and provinces in Turkey tended toward equalization on average, because of the conjecture that the gaps in educational attainment affect them differently. In other words, to find out whether regions in Turkey, partitioned in accordance with time horizons and regional classifications, tend toward the national trends.

Section 2 is a review of literature on the importance of human capital for economic growth, followed by Section 3, which provides description of data and methodology. Section 4 contains the results, and Section 5 concludes.

2. LITERATURE REVIEW

The concern of this paper is the educational attainment of the labor force of males and females. Nowadays, high technical knowledge skills are considered of great importance for economic growth, especially in the service sector. Hiziroglu *et al.* (2013) contend that the service industry in Turkey grew substantially since 1980. Then the trade export was nearly 0.7 percent below the European Union and the rest of the world. By 2000, Turkey no longer lagged behind the rest of the world. These observations are testaments to an excellent educational infrastructure and a well-educated work force, in spite of gender and spatial inequalities in educational attainment.

In a similar vein, Senadza (2012) also noted the gender and spatial gaps in educational attainment in Ghana, where the inequalities persist between-gender as well as between-spatial dimensions. Greater equity is called for in a similar way as in Turkey. Changes in attitudes and cultural practices are required to eliminate the imbalances. Livanos (2012) provides another

example of gender inequalities, this time in Greece, where gender discrepancies in earnings and occupational segregation are prevalent. Livanos enumerates reasons for the gaps in earnings and occupational segregation. For women educational choices are, for instance, education and humanities with low wage returns as compared to the educational choices with high wages available to men.

Dao (2013) provides a comprehensive picture using data on nineteen developing economies to gain information regarding their income and consumption inequality.[1] Again, the culprit for large gender differences is the inequality of investment in human capital as measured by inequality in education where skilled laborers tend to benefit the most. Institutions that provide human capital and innovation make a difference in income inequality as posited by Nakabashi *et al.* (2013), who provide a case study for Brazilian municipalities. In Brazil, the difference in GDP per capita between the richest and poorest municipalities is about 190 fold. This paper will show that the difference in developed and less developed provinces in Turkey in educational attainment is based on institutional factors at the local levels.

Better educational institutions would increase income per capita and reduce income inequality, according to Baldi (2013), who studied the joint development of physical and human capital. When every individual (male/female) has equal access to public education, equality occurs for skilled jobs. High skilled education, being scarce, induces the brain-drain attraction to the rich countries in the West, as observed by Loubaki (2012). Some 85 percent of skilled migrants in rich countries (U.S., Canada, Australia, France) are natives of developing countries, numbering 20.5 million of stock in 2000, which shows that educational attainment is highly prized.

Turkey as a topic of interest is of utmost importance for its strategic geographic location, and its cultural and political situation linking East and West. Turkey is an important role model for many Middle Eastern countries. Policies that promote the cause of female advancement, especially in education and equality, can go a long way for emulation by developing countries that find themselves torn between their traditional cultural values and the need to join the vibrant global economy.

3. DATA AND STATISTICAL METHODOLOGY

TG provided, in particular, two tables of data for the seven regions of Turkey for the census years 1970, 1975, 1980, 1985, 1990, and 2000. The first table is concerned with the average years of schooling of the labor force by gender. The second table deals with the gender ratio (female/male) of schooling attainment, again for 1970 to 2000. The regions included are Marmara, Aegean, Mediterranean, Black Sea, Central Anatolia, Southeast Anatolia, and Eastern Anatolia.

A third table partitions the seven regions into 38 less developed provinces and 29 more developed provinces, with 67 provinces in total. TG correctly indicates that regional data from a

[1] On the effects of Saving-Investment gap on income inequality, see Bahmani-Oskooee, Hegerty and Wilmeth (2012). Other variables affecting income inequality are discussed in Bahmani-Oskooee (1997) and Bahmani-Oskooee, Goswami and Mebratu (2006).

single country has the advantage of a reduction in cross-sectional variation in the data. Changes in definitions or collection of data over time in Turkey, however, required TG to make some adjustments to the original data because provinces in Turkey increased from 67 in 1975 to 81 in 2000. The adjustment required the addition of the new provinces to the old 67 provinces, establishing econometric consistency. To observe the nature of variability across regions and to investigate whether the sample means for regions approach an overall average over time, one-way analysis of variance (ANOVA) is performed. The null hypothesis

$$H_0: \mu_1=\mu_2=\ldots=\mu_7=\mu$$

is for equality of the seven region averages to an overall average for the six census years under consideration, and

$$H_0: \mu_1=\mu_2=\mu$$

tests the hypothesis of equality of the less developed and the developed provinces averages to a common average. The results of ANOVA are tested by the F-ratio. A significant value of F indicates that the observed values contain variability that cannot be explained by chance alone, and H_0 must be rejected. The test, however, does not tell which of the means are different. If H_0 is rejected, then a subsequent comparison procedure, called multiple comparisons, is usually undertaken. This procedure, as explained by Olson (1987), compares all the combinations of the sample means, two at a time. While there are several multiple comparison procedures, the one used here is the Tukey Simultaneous Comparison, which ranks the observed means in ascending order and separates them into homogeneous sets. Let N be the number of regions and G the number of census years. That is N=7 and G=6. Let A_g denote the set of regions in the gth set for a given census year, that is $i \epsilon A_g$. The total variance S^2 can be decomposed into a between sum of squares and a within sum of squares as

$$S^2 = \sum_{g=1}^{G} \frac{N_g}{N} \Sigma (\bar{Z}_g - \bar{Z})^2 \qquad \text{between sets} \tag{1}$$

$$+ \sum_{g=1}^{G} \frac{N_g}{N} \sum_{i \in A_g} \frac{1}{N_g} (Z_i - \bar{Z}_g)^2 \quad \text{within sets} \tag{2}$$

where

N_g=the number of regions in A_g and,

$$\bar{Z}_g = \sum_{i \in A_g} \frac{Z_i}{N_g}.$$

Note that the degrees of freedom for total S^2 and its partitions into between and within sets differ. For the total, with N=7 observations, the degrees of freedom are N-1=41. For the between portion, with the number of years G=6, the degrees of freedom are G-1=5. For the within portion, the degrees of freedom are N-G=36. For provinces test of hypothesis, the corresponding degrees of freedom are 9, 1, 8, respectively.

4. RESULTS

Summary results of regional average years of schooling of the labor force by gender for the census years 1970 to 2000 are shown in Table 1. Table 1 clearly shows the gaps between male (Panel A) and female (Panel B) for every year under consideration, yet at the same time, there were considerable increases for both genders along the years. The coefficient of variation (CV) continued to decrease for both genders, which implies consistent reduction of variation within the seven regions for every census year between 1975 and 2000. The results for testing whether these changes along the census years in Table 1 are statistically significant, employing analysis of variance of equation 1 and equation 2, are shown in Table 2. The findings shown in Table 2 indicate that equality of means for both male and female is rejected with p=0.000. Note that the between MS is considerably larger than the within portion, implying that the changes are occurring more so along the census years rather than within the seven regions. Multiple comparisons showed that for both genders, the statistically significant differences took about a decade to materialize from each census year to the next. Tables 3 and 4 function in a similar manner as the earlier Tables 1 and 2, providing descriptive statistics and ANOVA results for gender ratio (female/male) of schooling attainment of the labor force. What Table 3 shows is that the ratio substantially increased between 1970 and 2000; ANOVA of Table 4 confirmed that the changes were statistically significant at p=0.0263, rejecting the equality of means along the census years 1970-2000. The coefficient of variation (CV) in Table 3 continued to decline for every census year, implying a reduction in variation between regions. Multiple comparisons again showed that the differences in means became pronounced after a decade period rather than five years.

Tables 5 and 6 perform a somewhat different task from the previous four tables by considering differences between regions classified by provinces, full (67), less developed (38) and more developed (29) for gender gaps of average schooling of the labor force for the census years 1975-2000. Table 5 provides the ANOVA results, which indicate that the equality of means is accepted for the full and male averages, with respective p=0.1177 and p=0.3324, and rejected equality for female, with p=0.0340. Here, the between MS is considerably larger than the within MS, which tells the story that the female schooling is considerably larger for the developed as compared to the less developed provinces, signifying, perhaps, the effects of social and traditional forces in the treatment of women in different provinces in Turkey. This result is of importance for future policies to upgrade the educational attainment of women in the less developed provinces.

5. CONCLUDING REMARKS

This paper, through the use of data on seven regions and the less developed and the more developed provinces in Turkey for the census periods ranging between 1970 and 2000 aimed to investigate whether the means of the gender gaps become narrower over time. The methodological approach was analysis of variance to test equality of means. The F-tests rejected equality of the means, showing improvements in about one-decade intervals.

REFERENCES

Angulo, A.N., J.M. Gil and A. Gracia, 2001. Calorie intake and income elastics in EU countries: A convergence analysis using cointegration. Papers in Regional Science, 80(2): 165-187.

Bahmani-Oskooee, M., 1997. Effects of devaluation on income distribution. Applied Economics Letters, 4(5): 321-323.

Bahmani-Oskooee, M., G. Goswami and S. Mebratu, 2006. Black market premium and income distribution. Journal of Developing Areas, 39(2): 17-28.

Bahmani-Oskooee, M., S. Hegerty and H. Wilmeth, 2012. The saving-investment gap and income inequality: Evidence from 16 countries. Journal of Developing Areas, 46(2): 145-158.

Baldi, G., 2013. Physical and human capital accumulation and the evolution of income and inequality. Journal of Economic Development, 38(3): 57-83.

Dao, M.Q., 2013. Factor endowment, human capital, and inequality in developing countries. Journal of Economic Studies, 40(1): 98-106.

Doyle, E., 1997. Structural change in Ireland –The contribution of sectoral employment distribution to labour productivity convergence between Ireland and the EU: 1970-1990. Journal of Economic Studies, 24(1/2): 59-71.

Hiziroglu, M., A. Hiziroglu and A.H. Kokcam, 2013. An investigation on competitiveness in services: Turkey versus European union. Journal of Economic Studies, 40(6): 775-793.

Livanos, I., 2012. Educational segregation and the gender wage gap in Greece. Journal of Economic Studies, 39(5): 554-575.

Loubaki, D., 2012. On the mechanics of the brain-drain reduction in poorest developing countries. Journal of Economic Development, 37(3): 75-106.

Mankiw, N.G., D. Romer and D.N. Weil, 1992. A contribution to the theory of economic growth. Quarterly Journal of Economics, 107(2): 407-437.

Nakabashi, L., A.E.G. Pereira and A. Sachsida, 2013. Institutions and growth: A developing country case study. Journal of Economic Studies, 40(5): 614-634.

O'Leary, E., 1997. The convergence performance of Ireland among EU countries: 1960-1990. Journal of Economic Studies, 24(1/2): 72-83.

Olson, C.L., 1987. Statistics: Making sense of data. Boston, MA: Arlyn and Bacon, Inc.

Senadza, B., 2012. Education inequality in Ghana: Gender and spatial dimension. Journal of Economic Studies, 39(6): 724-739.

Solow, R.M., 1956. A contribution to the theory of economic growth. Quarterly Journal of Economics, 70(1): 65-94.

Swan, T., 1956. Economic growth and capital accumulation. Economic Record, 32(2): 334-361.

Tansel, A. and N. Güngör, 2013. Gender effects of education on economic development in Turkey. Journal of Economic Studies, 40(6): 794-821.

Table-1. Descriptive statistics of average years of schooling of the gender labor force

	Gender	Mean	Std	CV
Panel A: Male				
	1970	3.389	0.756	0.223
	1975	3.970	0.745	0.188
	1980	4.803	0.704	0.147
	1985	5.323	0.621	0.117
	1990	5.751	0.611	0.106
	2000	6.950	0.534	0.077
Panel B: Female				
	1970	1.447	0.804	0.556
	1975	2.111	0.986	0.467
	1980	2.603	1.214	0.466
	1985	3.336	1.244	0.373
	1990	3.840	1.335	0.348
	2000	4.937	1.540	0.312

Note: The averages are for seven regions.

Source: Tansel and Güngör (2013).

Table-2. ANOVA for equality of average schooling (1970-2000)

Panel A. Male				
		MS	**F**	**P-value**
	Between	11.427	25.74	0.000
	Within	0.444		
Panel B. Female				
	Between	11.084	7.56	0.000
	Within	1.466		

Note: ANOVA for testing equality of means of seven regions for census years 1975-2000.

Source: Tansel and Güngör (2013).

Table-3. Descriptive statistics of gender ratio (female/male)

Year	Mean	Std	CV
1970	0.399	0.152	0.381
1975	0.507	0.164	0.323
1980	0.519	0.187	0.360
1990	0.610	0.174	0.285
1995	0.651	0.171	0.263
2000	0.700	0.177	0.253

Note: The averages are for seven regions.

Source: Tansel and Güngör (2013).

Table-4. ANOVA for gender ratio (female/male)

	MS	F	P-value
Between	0.085	2.91	.0263
Within	0.029		

Note: ANOVA for testing equality of means of seven regions for census years 1975-2000.

Source: Tansel and Güngör (2013).

Table-5. Descriptive Statistics of average years of schooling of the labor force for provinces

Group	Mean	Std	CV	Min	Max
Full (67 provinces)					
Full	4.408	1.090	0.247	3.09	5.96
Male	5.206	1.134	0.218	3.78	6.82
Female	3.186	1.012	0.318	1.99	4.58
Less Developed (38 provinces)					
Full	3.886	1.116	0.287	2.57	5.49
Male	4.880	1.211	0.248	3.37	6.61
Female	2.468	0.931	0.377	1.40	3.75
More Developed (29 provinces)					
Full	5.090	1.055	0.201	3.77	6.57
Male	5.632	1.038	0.184	4.31	7.10
Female	4.128	1.116	0.270	2.77	5.67

Note: The computations are for the census years 1975-2000.

Source: Tansel and Güngör (2013).

Table-6. ANOVA for average years of schooling of the labor force

	MS	F	p-value
Full (67)			
Between	3.624	3.07	0.1177
Within	1.179		
Male			
Between	1.414	1.11	0.3224
Within	1.271		
Female			
Between	6.889	6.52	0.0340
Within	1.056		

Note: The test is equality of means of schooling for full (67 provinces), less developed (38 provinces) and more developed (29 provinces) for census years 1975-2000.

Source: Tansel and Güngör (2013).