

# The educational attainment of Turkey's labor force: A comparison across provinces and over time

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## Abstract

This paper presents regional and provincial data on the educational composition of Turkey's labor force over time as well as estimates of the human capital stock measured as the average years of formal education received by the workforce. The data set is comprised of the estimated human capital stock for the set of 67 provinces over the census years from 1970 to 1990. Although regional disparities have persisted, the data show significant improvements in the educational attainment of the labor force during the past two decades.

## 1. Introduction

Human capital may be defined as the skills, knowledge and physical well-being that are endowed in individuals. Human capital accumulation by the labor force is believed to improve labor productivity and thereby to promote faster economic growth. For this reason, human capital has come to be recognized as

an important factor into production.<sup>1</sup> Human capital is not only a measure of the quality of the labor force but also an important indicator of the development level of a country. There were significant improvements in the educational attainments of the labor force during the past two decades. The mean years of education increased from 2.72 years in 1970 to 5.29 years in 1990. While the proportion of primary school graduates increased by 20 % to 56 % in 1990, the proportion of nongraduates (no education and some education) declined from 56 % in 1970 to 22 % in 1990. A comparison of the educational attainments of the labor force by regions is also provided. Finally, educational attainment trends by sex indicate significant improvements in closing the gender gap over time during 1970-1990, although regional differences in this respect are striking. The gender gap is widest in the Eastern and Southeastern Anatolia regions and smallest in the Marmara region. While in Southeastern Anatolia female years of education attained is about 38 % of the male years of schooling, it is about 89 % in Marmara region in 1990. Information provided in this paper facilitates cross-sectional or panel studies that require a measure of provincial human capital stock by making available a data set on the human capital stock of Turkey's provinces over time.

This paper is divided into the following sections: Following the introductory section, the alternative measures of human capital and their various advantages and disadvantages are outlined in Section 2. Section 3 provides an outline of the construction of the educational attainment data set. The full provincial human capital data for Turkey as well as an analysis of the main features and trends of this data set are provided in Section 4. Section 5 presents the conclusions.

## 2. Measures of Human Capital

Human capital includes skills and knowledge acquired by the population through formal and informal education (such as on-the-job training and learning-by-experience) as well as the general health of the population which improves with better nutrition, increased awareness of health issues and better social services. A composite index of the human capital stock which takes all of these factors into account is difficult to construct from the available data.

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<sup>1</sup> Studies that deal with productivity growth at the micro level and studies that deal with aggregate output growth at the macro level now include estimates of the human capital of workers in the production functions they model alongside the traditional inputs into production: land, labor and physical capital.

The most common approach to estimating the endowment of human capital in individuals is to concentrate on the formal education system. Although other forms of human capital accumulation may be significant, the formal education system is believed to make the greatest contribution in promoting widespread development of knowledge and skills.

There are several ways of calculating the human capital variable, each having its particular set of advantages and disadvantages. The three most widely used measures are enrollment ratios, literacy rates and the average years of education completed. Barro and Lee (1993) provide a good discussion of the sources and methodology of the various proxies for the human capital stock. The International Economics Department of the World Bank advocates the use of the 'average years of formal education completed by the labor force' over other measures of human capital stock (Nehru et al., 1993). Lau et al. (1991) have calculated the average years of schooling of the working age population for 58 developing countries. Nehru et al. (1993) have constructed an education stock series for 85 countries for the years 1960 to 1987 measured as the mean school years of education of the working age population between 15 and 64. In both articles, the perpetual inventory method was used to fill in information for missing years. The second article, however, adjusted the data for the effects of mortality, grade repetition, and drop-out rates. In another article, Dubey and King (1994) calculated the stock of education for the same 85 countries and time period, this time differentiating it by age and sex. A more recent study by Sala-i-Martin and Mulligan (1995) has introduced the use of index numbers to construct a human capital data set for 47 US states for the census years beginning from 1940. They believe that their measure is a better approximation of the human capital stock than the 'average years of education' measure. These measures are briefly reviewed below.

Enrollment ratios are among the most commonly used proxies of human capital stock in empirical studies. Current enrollment in the formal schooling system partially determines the future human capital stock of workers. Enrollment is therefore an educational investment that will augment the future stock of human capital. According to Psacharopoulos and Arriagada (1986), the drawback to using enrollment ratios as proxies for human capital is that greater enrollment at all levels of formal education does not necessarily guarantee increases in the future human capital of the labor force. This depends on the labour force participation decision of graduates as well as the success rate of students in passing courses and moving on to the next grade. Another shortcoming pointed out by Barro and Lee (1993) is that the enrollment figures refer to the registered number of students at the beginning of each year; the

actual number that regularly attend school during the year may be lower. The problems mentioned with enrollment ratios tend to bias the estimate of stock of human capital upward. Despite the drawbacks, enrollment ratios are commonly used because the data is more readily available (especially across countries) than other measures which may be better such as the average years of formal education completed by the labor force.

A second common measure of the human capital stock is the literacy rate. Because it is a 'stock' measure it refers to the actual endowment of human capital in individuals at a point in time and is a more accurate measure of current educational attainment than enrollment ratios. However, as Barro and Lee (1993) point out, literacy is only the first step in the process of human capital accumulation which may be acquired at the primary level of formal education or informally. At increasingly higher levels of education there are a different set of skills and knowledge that individuals will acquire beyond literacy that will have greater value in terms of human capital.

The average educational attainment of the labour force is considered to be a superior measure over the previous two measures. Not only is it a 'stock' measure like the literacy rates but unlike the literacy ratios, it incorporates the higher levels of educational attainment that correspond to a different set of skills beyond literacy that are an important part of human capital formation. However, as Sala-i-Martin and Mulligan (1995) argue, the use of average educational attainment to represent human capital stock has the following disadvantages: First of all, workers that have attained different levels of schooling are treated as perfect substitutes in the labor market; secondly, workers with the same amount of education are assumed to possess the same amount of skills. The alternative measure that Sala-i-Martin and Mulligan provide is a human capital index that is based on the educational attainment of the labor force. Their methodology is based on finding the 'optimal' index number by minimizing an expected error criterion; this measure is believed to overcome the problems outlined for the mean years of schooling measure and is explained in detail in their paper.

In this article, the average years of formal education completed is used as the measure of human capital stock. The construction of the average years of educational attainment variable is given in the methodology section below.

### 3. Methodology

In this paper, the human capital stock is defined as the average years of

formal education completed by the labor force 12 years of age and over. The data are taken from the censuses conducted by the State Institute of Statistics. The censuses provide information only on the level of formal education completed by each employed worker; information about the actual number of years of formal education received by non-graduates at each level is omitted. Therefore, the measured 'average years of formal education completed by the labor force' variable may underestimate the stock of human capital if the partially completed levels of schooling have value in terms of augmenting the stock of human capital. The average years of formal education received is estimated using the following formula (Psacharopolous and Arriagada, 1986),

$$\text{average years of schooling} = \sum YE_j LF_j$$

where  $j$  represents the level of schooling,  $YE_j$  is the number of years of schooling corresponding to each level, and  $LF_j$  is the portion of the labor force that has achieved the level of schooling represented by  $j$ . Table 1 gives the categories of schooling and the years of formal education associated with each category in Turkey. The first category 'no formal education' is approximated by the number of illiterate persons in the labor force. Those who have had 'some formal education' are assumed to have completed, on average, the first two years of primary school. The number of persons in this category are taken from the 'literate without diploma' classification used in the censuses.

**Table 1**  
Schooling Levels and the Number of Years of Completed Formal Education  
Associated with Each Level

$j$ = level of schooling	$YE_j$
no formal education	0
some formal education	2
primary school	5
middle school	8
high school	11
higher education	15

#### 4. The educational attainment of Turkey's labor force

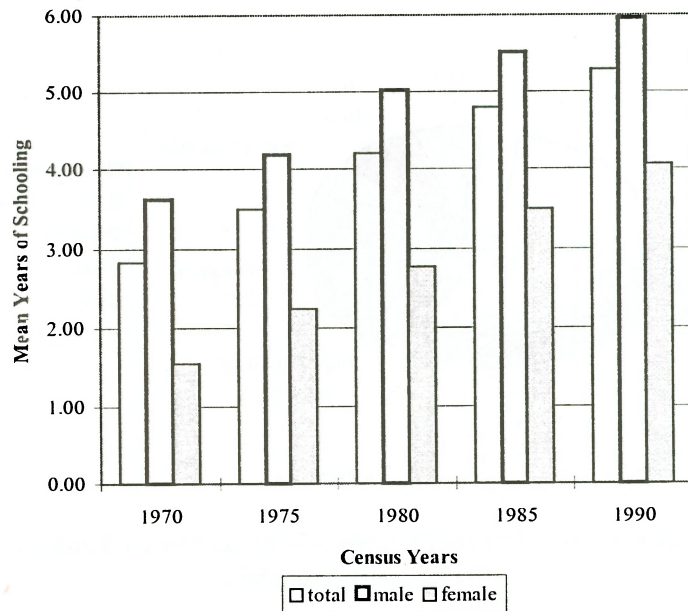
Figure 1 shows that the average educational attainments of the male, female and total labor force have increased steadily since 1970. For the total labor force, it doubled from 2.7 years in 1970 to 5.3 years in 1990. In 1990, the male average educational attainment value is 1.6 times its 1970 value (an increase from 3.62 to 5.95 years) while the increase in the female value is more striking: the 1990 value is 2.6 times its 1970 value (it increased from 1.55 to 4.07). Table 2 provides regional and provincial data on the educational composition of the labour force and the average years of formal education completed in 1990.

The shift in the educational composition of the total labour since 1970 can be seen in Figure 2. In 1970, the largest portion of the labour force had no formal education. Together with those individuals who had some education this made up 56 % of the labour force. Those who had completed the primary level of education made up the second highest portion of the labour force at 36 %. In 1990, the 'no education' and 'some education' categories fell to 22 % of the labour force, and 56 % of the labour force had completed the primary level of schooling. There are also significant increases in the proportion of individuals with at least a junior high school, high school and university education; in 1970, they made up only 7 % of the labour force.

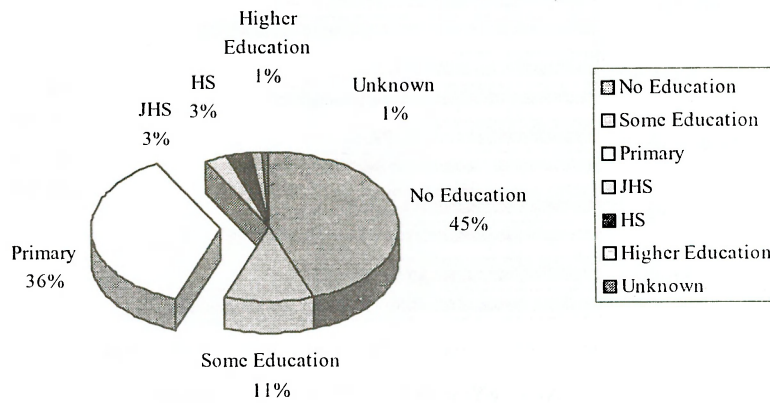
##### *4.1. Regional Differentials*

Table 3 is a summary table of the mean years of schooling by region and census year. The average years of formal education received shows quite a lot of variation across regions. The Eastern and Southeastern Anatolia have the lowest levels of educational attainment among Turkey's seven regions followed by the Black Sea region. The Marmara region has the highest mean years of schooling value in every census year. As Figure 3 illustrates, all regions show steady increases in the educational attainment of the labour force since 1970. The average school attainment level for Southeastern Anatolia more than doubled from 1.46 in 1970 to 3.73 in 1990 whereas for the Marmara region it grew by only 60 % from 3.94 to 6.29 in the same period. In 1970, the Southeastern Anatolia region's value was only 37 % of the value for the Marmara region; in 1990, it became 59 % indicating a decline in the disparity between the least and most educated regions since 1970.

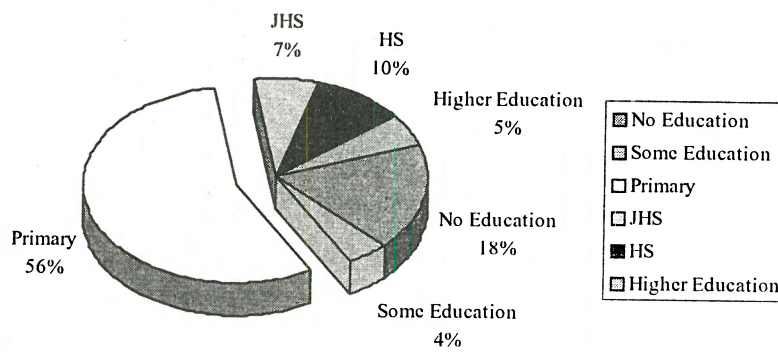
**Figure 1**  
Average Years of Formal Education Completed by the Labour Force



**Figure 2**  
Educational Composition of the Labour Force in 1970

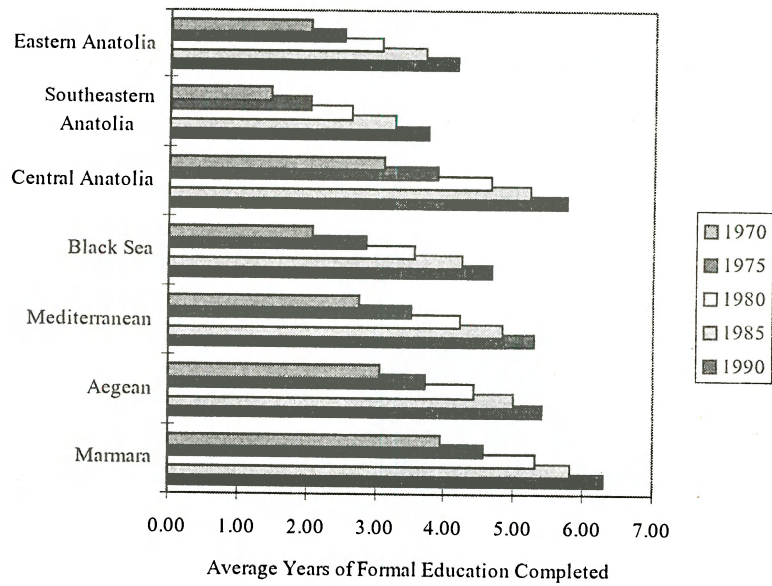


**Figure 2 (Continued)**  
Education Composition of the Labour Force in 1990



**Figure 3**

Average Years of Formal Education Completed by the Labour Force  
(Regional Averages)





**Table 2**  
The Educational Composition of Turkey's Labour Force by Province in 1990

Region and Province	Total Labor Force	Percentage of the Labour Force with:						Mean Years of Schooling	
		No Education	Incomplete Primary	Junior High School	High School	Higher Education	School Unknown		
<b>Marmara</b>									
Balıkesir	484368	16.9	5.2	58.9	5.7	8.6	4.6	0.0	5.14
Bilecik	87666	10.6	5.5	61.6	6.5	12.0	3.9	0.0	5.61
Bursa	693836	10.3	4.0	60.3	9.3	10.7	5.3	0.0	5.82
Çanakkale	253754	14.9	8.3	60.9	5.1	7.2	3.7	0.0	4.96
Edirne	225522	13.7	6.4	60.2	6.2	9.2	4.3	0.0	5.30
Istanbul	2707397	3.5	1.9	56.2	12.2	15.9	10.2	0.1	7.11
Kırklareli	168870	9.5	5.9	61.9	7.2	10.8	4.7	0.0	5.68
Kocaeli	372455	8.8	3.8	57.4	9.9	14.4	5.7	0.1	6.18
Sakarya	333904	14.0	5.2	64.3	5.7	7.4	3.4	0.0	5.10
Tekirdağ	245199	9.2	4.7	62.9	7.9	10.7	4.5	0.1	5.73
<i>Regional Average</i>	5572971	8.0	3.6	58.4	9.7	12.9	7.3	0.1	6.29
<b>Aegean</b>									
Afyon	357345	16.6	4.0	62.7	6.3	7.3	3.1	0.0	4.99
Aydın	419057	16.0	4.9	62.8	4.8	7.2	4.3	0.0	5.06
Denizli	377378	14.3	4.1	63.5	6.0	8.0	4.1	0.0	5.23
İzmir	1145300	9.4	3.5	57.8	8.5	12.4	8.4	0.0	6.26
Kütahya	288852	18.5	5.2	60.5	5.8	6.9	3.1	0.0	4.82
Manisa	607016	17.9	4.8	64.2	4.4	5.7	3.0	0.0	4.73
Muğla	317122	11.4	3.8	66.6	4.9	8.4	4.8	0.2	5.45
Uşak	139375	17.9	5.2	58.4	6.6	8.1	3.8	0.0	5.02
<i>Regional Average</i>	3651445	14.0	4.2	61.5	6.3	8.8	5.2	0.0	5.41
<b>Mediterranean</b>									
Adana	762315	16.6	3.8	56.0	7.4	11.2	5.0	0.0	5.45
Antalya	578319	13.7	3.2	61.7	6.1	9.5	5.6	0.2	5.53
Burdur	131291	11.5	5.0	63.8	6.2	8.6	4.9	0.1	5.47
Hatay	479030	19.7	5.0	58.0	5.7	7.9	3.8	0.0	4.89
Isparta	208980	11.4	3.6	61.0	7.5	10.9	5.6	0.0	5.76
İçel	550487	11.9	4.2	60.9	7.0	10.7	5.1	0.0	5.64
K.Maras	392041	25.6	4.8	55.3	5.0	6.2	3.0	0.0	4.39
<i>Regional Average</i>	3102463	16.3	4.1	58.8	6.5	9.5	4.7	0.1	5.30
<b>Black Sea</b>									
Amasya	174158	18.6	4.8	59.0	5.4	8.4	3.8	0.0	4.97
Artvin	113659	19.1	5.7	54.5	6.9	9.8	3.1	0.8	4.98
Bolu	287899	16.5	7.9	59.8	4.9	7.2	3.6	0.0	4.87
Giresun	250250	25.6	6.7	50.0	6.1	8.1	3.3	0.1	4.52

Table 2 (Continued)

Region and Province	Total Labor Force	Percentage of the Labour Force with:							Mean Years of Schooling
		No Education	Incomplete Primary	Primary	Junior High School	High School	Higher Education	School Unknown	
Gümüşhane	83231	22.9	5.6	54.1	6.0	8.1	3.3	0.0	4.68
Kastamonu	233559	29.5	5.6	53.5	3.4	5.2	2.9	0.0	4.06
Ordu	416790	26.7	5.5	52.5	5.6	7.2	2.5	0.0	4.35
Rize	170781	18.0	4.8	59.7	5.9	8.4	3.1	0.1	4.94
Samsun	555564	22.5	6.3	56.1	4.8	6.8	3.6	0.0	4.59
Sinop	137698	25.8	7.0	55.4	3.2	5.6	2.9	0.0	4.23
Tokat	346962	24.9	4.9	56.3	4.7	6.2	2.9	0.0	4.41
Trabzon	391325	20.5	6.1	53.0	6.5	9.6	4.2	0.0	4.99
Zonguldak	488349	17.4	4.5	60.6	5.5	8.4	3.6	0.0	5.02
Bayburt*	52483	20.7	7.2	57.6	5.3	6.6	2.6	0.0	4.57
<i>Regional Average</i>	3702708	22.1	5.8	55.9	5.3	7.5	3.3	0.1	4.66
<b>Central Anatolia</b>									
Ankara	1191857	5.5	1.9	48.1	10.7	18.6	15.2	0.1	7.63
Cankırı	136421	20.1	4.8	57.5	6.1	8.2	3.3	0.0	4.86
Çorum	293271	25.8	5.9	57.6	3.7	4.4	2.6	0.0	4.17
Eskişehir	254182	7.8	3.2	57.0	10.0	14.6	7.4	0.0	6.43
Kayseri	361895	14.3	3.5	60.3	7.2	9.6	5.1	0.0	5.48
Kirsehir	111493	18.3	3.4	58.2	6.8	9.0	4.3	0.0	5.15
Konya	769064	13.6	3.4	66.1	5.6	7.3	3.9	0.0	5.21
Nevşehir	143734	15.6	4.0	63.5	6.0	7.5	3.4	0.1	5.07
Niğde	153275	22.1	4.9	58.9	4.9	6.1	3.1	0.0	4.57
Sivas	341517	23.7	5.1	51.8	6.8	8.8	3.8	0.0	4.78
Yozgat	280105	25.1	4.3	57.9	4.8	5.5	2.3	0.1	4.32
Aksaray*	141581	22.5	4.6	60.7	4.9	4.8	2.5	0.0	4.42
Karaman*	100150	14.1	3.6	68.1	4.6	6.5	3.0	0.0	5.02
Kırıkkale*	127204	13.4	2.9	52.9	11.9	14.5	4.4	0.0	5.90
<i>Regional Average</i>	4405749	14.4	3.5	56.7	7.5	10.9	7.0	0.0	5.75
<b>Southeastern Anatolia</b>									
Adıyaman	219040	34.1	5.9	47.2	4.8	5.7	2.3	0.0	3.83
Diyarbakır	412497	42.5	5.2	36.5	5.0	7.5	3.2	0.0	3.64
Gaziantep	414019	21.4	5.0	57.6	6.0	6.6	3.3	0.0	4.68
Mardin	216217	45.4	4.4	37.0	4.7	6.2	2.2	0.2	3.33
Siirt	93599	44.6	6.4	36.5	4.3	5.8	2.4	0.0	3.29
Urfa	378927	43.3	5.7	39.0	4.4	5.4	2.2	0.0	3.35
Batman*	122425	40.5	5.8	38.5	5.2	7.6	2.4	0.0	3.66
Şırnak*	107291	53.5	4.1	31.4	4.0	5.5	1.5	0.0	2.80
<i>Regional Average</i>	1964015	38.2	5.3	42.5	5.0	6.4	2.6	0.0	3.73

\* Refers to newly created provinces.

**Table 2** (Continued)

Region and Province	Total Labor Force	Percentage of the Labour Force with:						Mean Years of Schooling	
		No Education	Incomplete Primary	Junior High School	High School	Higher Education	School Unknown		
<b>Eastern Anatolia</b>									
Ağrı	186421	42.5	6.4	40.1	4.1	5.2	1.7	0.0	3.29
Bingöl	113200	38.2	5.1	45.5	3.7	5.3	2.1	0.0	3.58
Bitlis	132976	39.7	7.7	39.5	4.4	6.5	2.2	0.0	3.53
Elazığ	201318	26.7	4.2	46.0	7.6	10.6	4.8	0.1	4.89
Erzincan	141363	18.3	5.0	55.1	8.2	9.7	3.8	0.0	5.14
Erzurum	374614	26.4	5.2	52.3	5.4	7.3	3.4	0.0	4.46
Hakkari	74014	45.1	3.9	37.6	4.2	7.2	1.9	0.0	3.38
Kars	330283	27.7	6.2	50.9	5.8	7.1	2.3	0.0	4.26
Malatya	295911	22.2	3.9	52.0	7.6	9.8	4.4	0.0	5.03
Mus	164065	43.4	6.6	40.1	3.7	4.6	1.7	0.0	3.18
Tunceli	64826	26.0	3.8	48.5	7.4	11.4	2.9	0.0	4.79
Van	248259	44.6	6.2	38.0	3.6	5.4	2.2	0.0	3.23
<i>Regional Average</i>	2327250	31.9	5.4	46.7	5.5	7.4	2.9	0.0	4.15
<b>TURKEY</b>	24726601	17.8	4.4	55.9	7.0	9.7	5.2	0.0	5.29

\* Refers to newly created provinces.

**Table 3**  
Mean Years of Schooling Completed by the Labor Force  
(by region and census years)

Region	1970	1975	1980	1985	1990
Marmara	3.94	4.57	5.32	5.82	6.29
Aegean	3.05	3.71	4.42	4.99	5.41
Mediterranean	2.76	3.50	4.22	4.83	5.30
Black Sea	2.07	2.86	3.56	4.25	4.66
Central Anatolia	3.11	3.87	4.65	5.23	5.75
Southeast. Anatolia	1.46	2.03	2.63	3.25	3.73
Eastern Anatolia	2.02	2.50	3.04	3.70	4.15

#### 4.2. Gender Differentials

Table 4 presents the educational attainment trends by region and gender.<sup>2</sup> This table clearly shows that a gender gap exists in the educational attainment of the labour force in Turkey for all regions and census years. However, the gender ratio given by the last row for each region also shows that this gap is closing. The gender ratio is the female average years of formal education completed over the male average years of formal education completed in percentage terms.

In 1970, for Turkey as a whole, female educational attainment is 42.8 % of that of the educational attainment of the male labour force. In 1990, the gender ratio is 68.3 % indicating a substantial decrease in the disparity in the educational attainment of the genders. The gender disparity is most striking for the Eastern and Southeastern Anatolia regions; in 1990 female educational attainment is only 38.1 % of the male level for Southeastern Anatolia and 48.6 % of the male level for Eastern Anatolia. The gender gap is smallest for the Marmara region, the gender ratio increasing from 63.1 % in 1970 to 88.9 % in 1990.

Gender and regional differentials in average educational attainment of the 15-64 year-old population for selected regions of the world are given in Table 5. The data are taken from Dubey and King (1994).

The above table shows that there were increases in the average years of schooling from 1960 to 1987 for both males and females with the exception of the OECD figures for the male population which declined by 0.1 years over the period. As expected, the gender gap in average educational attainment is lowest for the OECD countries in both 1960 and 1987 followed by the Latin American and Caribbean countries. The gender ratio clearly shows that the gender gap is closing for all seven regions. For the OECD, the average female educational attainment was 79.4% of the male figure in 1960; this increased to 90.6% in 1987. The greatest increase in the gender ratio occurred for the two regions that started out with the greatest gender gaps in 1960: the Sub-Saharan Africa and South South Asia. The disparities in educational attainment across regions, therefore, appear to be closing both in terms of the gender gap and the actual average educational attainment values.

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<sup>2</sup> The provincial educational attainment trends by year and by gender are available from the authors upon request. The mean years of schooling by province for the 1970, 1975, 1980, 1985, and 1990 census years are given in Tansel and Güngör (1997).

**Table 4**  
Educational Attainment Trends by Region and Sex

Region	Year	Percentage of the Labour Force with:							
		Total Labor Force		No Education		Incomplete Primary		Primary	
		male	female	male	female	male	female	male	female
Marmara	1970	2086797	859568	18.3	47.2	14.6	10.0	52.4	33.5
	1975	2487969	967850	13.2	36.2	10.7	7.4	59.1	44.9
	1980	2894484	1022931	10.1	31.3	7.2	6.4	59.8	44.2
	1985	3344163	1139836	6.2	20.4	5.5	7.4	61.5	51.1
	1990	4125076	1447895	4.8	16.9	3.2	4.5	60.8	51.6
Aegean	1970	1375677	845568	25.3	60.3	14.6	7.3	51.2	28.2
	1975	1648527	916984	19.3	48.9	10.5	5.5	59.3	40.2
	1980	1786661	1014411	14.3	43.8	7.7	4.8	61.0	42.4
	1985	2036735	1108678	8.8	29.2	6.5	7.4	64.5	52.8
	1990	2348396	1303049	7.4	25.8	4.0	4.6	64.6	56.0
Mediterranean	1970	966520	585288	29.0	69.8	14.6	5.8	48.3	20.9
	1975	1229610	651008	21.4	55.7	11.6	6.1	56.1	33.2
	1980	1416884	805391	16.7	52.4	7.5	4.0	58.3	34.6
	1985	1689888	915148	10.5	34.4	6.4	7.6	62.5	47.8
	1990	2010942	1091521	8.7	30.3	4.0	4.4	62.6	51.9
Black Sea	1970	1248344	1081383	35.3	79.4	16.9	5.5	41.0	12.5
	1975	1706281	1260151	26.5	65.6	13.2	5.6	51.5	26.1
	1980	1788756	1454273	20.2	59.3	9.2	4.3	55.1	31.0
	1985	1903791	1538388	12.3	38.7	8.7	10.4	60.2	44.9
	1990	2043616	1659092	10.9	36.0	5.5	6.1	60.5	50.2
Central Anatolia	1970	1741437	1100237	26.0	66.8	13.3	6.5	48.1	20.3
	1975	2150810	1189334	19.3	53.9	9.7	5.8	55.8	32.8
	1980	2317487	1298929	14.2	48.8	6.5	4.2	57.0	35.3
	1985	2587255	1427390	8.7	32.5	5.6	7.2	59.9	47.6
	1990	2885962	1519787	7.0	28.5	3.2	4.0	59.7	51.1
Southeastern Anatolia	1970	656097	417294	53.6	92.5	14.4	2.2	26.5	3.4
	1975	813230	443224	44.0	87.0	12.6	3.1	35.4	7.6
	1980	856821	487897	35.9	86.5	9.7	2.3	41.1	7.8
	1985	1042346	585490	25.8	73.4	9.5	6.5	48.7	16.2
	1990	1279860	684155	22.4	67.7	5.8	4.4	53.0	22.9
Eastern Anatolia	1970	856121	624870	41.0	81.6	14.3	5.0	36.7	10.2
	1975	1143079	775771	35.2	74.4	11.5	4.4	43.9	18.8
	1980	1223164	844104	28.4	74.7	9.1	3.2	46.7	18.5
	1985	1328553	932335	19.4	57.5	9.1	8.0	52.3	29.8
	1990	1379708	947542	17.0	53.7	5.8	5.0	54.6	35.2
TURKEY	1970	8276229	5435333	29.2	69.2	14.6	6.4	45.9	19.7
	1975	11179506	6204322	22.7	57.9	11.2	5.6	53.7	30.9
	1980	12284257	6927936	17.3	53.9	7.8	4.4	56.0	32.7
	1985	13932731	7647265	11.1	37.9	6.8	8.0	59.8	43.8
	1990	16073560	8653041	9.3	33.7	4.1	4.8	60.2	47.9

Table 4 (Continued)

Percentage of the Labour Force with:												
	Year	Junior High School		High School		Higher Education		Unknown		Mean Years of Schooling		Gender Ratio
		male	female	male	female	male	female	male	female	male	female	
Marmara	1970	5.9	2.3	5.1	4.0	2.8	1.6	0.8	1.3	4.41	2.78	63.1
	1975	7.0	3.5	6.3	5.9	3.3	1.9	0.4	0.2	4.94	3.61	73.0
	1980	8.1	4.0	9.1	9.5	5.7	4.7	0.0	0.0	5.64	4.40	78.1
	1985	9.7	4.8	11.2	11.4	5.9	4.9	0.0	0.0	6.07	5.08	83.6
	1990	11.0	6.2	12.9	12.9	7.2	7.8	0.1	0.1	6.48	5.76	88.9
Aegean	1970	3.5	0.8	3.2	1.7	1.4	0.7	0.8	1.0	3.73	1.94	52.1
	1975	4.6	1.4	4.1	3.0	1.8	0.8	0.3	0.1	4.28	2.69	62.8
	1980	5.7	1.5	6.8	4.8	4.4	2.7	0.0	0.0	5.08	3.27	64.4
	1985	7.2	2.1	8.7	5.8	4.3	2.6	0.0	0.0	5.54	3.99	72.0
	1990	8.2	2.9	10.1	6.5	5.7	4.2	0.0	0.0	5.93	4.47	75.4
Mediterranean	1970	3.3	0.7	3.2	1.8	1.3	0.5	0.3	0.5	3.53	1.50	42.5
	1975	4.5	1.4	4.5	3.0	1.5	0.5	0.4	0.1	4.14	2.30	55.7
	1980	5.7	1.6	7.3	5.0	4.4	2.4	0.0	0.0	4.99	2.85	57.1
	1985	7.1	2.3	9.3	6.0	4.1	1.9	0.0	0.0	5.46	3.67	67.2
	1990	8.3	3.0	11.0	6.9	5.4	3.5	0.1	0.1	5.89	4.21	71.4
Black Sea	1970	2.5	0.4	2.8	0.9	0.9	0.4	0.6	0.8	3.05	0.94	31.0
	1975	3.7	0.8	3.9	1.6	1.0	0.2	0.2	0.1	3.72	1.69	45.4
	1980	5.3	1.1	6.4	2.7	3.6	1.6	0.1	0.0	4.62	2.26	48.9
	1985	6.9	1.6	8.7	3.4	3.2	1.0	0.0	0.0	5.17	3.10	59.9
	1990	8.1	1.9	10.4	4.1	4.6	1.8	0.1	0.0	5.61	3.49	62.3
Central Anatolia	1970	4.2	1.1	4.5	2.5	2.8	1.5	0.9	1.3	3.97	1.75	44.1
	1975	5.5	1.9	5.9	4.0	3.3	1.5	0.5	0.2	4.59	2.57	56.0
	1980	7.2	2.0	8.6	5.9	6.3	3.7	0.1	0.0	5.45	3.22	59.0
	1985	8.8	2.5	10.8	6.7	6.2	3.5	0.0	0.0	5.92	3.98	67.2
	1990	9.9	2.8	12.6	7.8	7.6	5.8	0.0	0.0	6.36	4.59	72.1
Southeastern Anatolia	1970	2.1	0.3	2.2	0.8	0.8	0.3	0.4	0.5	2.15	0.38	17.8
	1975	3.3	0.5	3.4	1.3	0.7	0.2	0.6	0.2	2.78	0.66	23.6
	1980	5.1	0.5	5.5	2.0	2.6	0.9	0.1	0.0	3.65	0.83	22.6
	1985	6.3	0.6	7.0	2.2	2.7	0.9	0.0	0.0	4.31	1.38	32.0
	1990	7.1	0.9	8.4	2.6	3.3	1.5	0.0	0.0	4.75	1.81	38.1
Eastern Anatolia	1970	2.9	0.4	3.0	0.9	1.1	0.6	1.0	1.2	2.88	0.84	29.1
	1975	4.2	0.8	4.0	1.3	0.9	0.2	0.3	0.1	3.34	1.26	37.6
	1980	5.9	0.8	7.1	2.0	2.8	0.8	0.0	0.0	4.19	1.39	33.2
	1985	7.5	1.2	8.6	2.5	3.0	0.8	0.0	0.0	4.79	2.15	44.9
	1990	8.3	1.5	10.4	3.1	4.0	1.5	0.0	0.0	5.24	2.55	48.6
TURKEY	1970	3.9	0.9	3.8	1.9	1.8	0.9	0.7	1.0	3.62	1.55	42.8
	1975	5.0	1.6	4.9	3.0	2.1	0.8	0.4	0.2	4.18	2.24	53.6
	1980	6.5	1.7	7.6	4.8	4.7	2.5	0.1	0.0	5.02	2.77	55.1
	1985	8.0	2.3	9.6	5.7	4.6	2.4	0.0	0.0	5.52	3.51	63.6
	1990	9.1	3.0	11.3	6.7	5.9	4.0	0.1	0.0	5.95	4.07	68.3

**Table 5**  
The Average Years of Education Completed  
by the 15-64 Year-Old Population for Selected Regions of the World

Region	Male		Female		Gender Ratio*	
	1960	1987	1960	1987	1960	1987
OECD	9.7	9.6	7.7	8.7	79.4	90.6
Sub-Saharan Africa	1.3	3.6	0.3	2.0	23.1	55.6
Middle East & North Africa	2.5	5.7	0.8	3.3	32.0	57.9
East Asia & the Pacific	2.5	6.6	0.8	3.8	32.0	57.6
South Asia	2.3	4.9	0.5	2.4	21.7	49.0
Latin America & the Caribbean	3.8	5.6	2.5	5.0	65.8	89.2
Developing Countries	2.5	5.7	0.9	3.4	36.0	59.6

Source: Dubey and King (1994)

\* The gender ratio is the average female educational attainment divided by the average male educational attainment times 100.

## 5. Conclusion

In this paper, the human capital stock measured in terms of the average years of formal schooling completed by the labor force is presented for the 67 provinces of Turkey for 1990. This measure is preferred over the more widespread enrollment ratios and literacy rates as a measure of the human capital stock because it not only measures the actual endowment of knowledge and skills possessed by individuals but also because it incorporates the higher skill levels associated with higher levels of educational attainment. Studies that have attempted to construct cross-country human capital data sets have faced the obstacles of inconsistencies in the data collection and processing of statistical agencies (i.e. differing definitions of the labour force, varying quality of the collection process) as well as institutional differences of the formal education system in different countries (i.e. length of the school year, length of the school day, the school age range at different levels of schooling and so on). These problems are reduced when constructing a data set using the provinces of the same country as the cross-sectional unit. However, the present human capital data set for Turkey has ignored possible differences in the quality of education received by individuals in different provinces. The difference in the quality of education in Turkey is evidenced by the regional and provincial

differentials in the number of successful high school graduates who get placed into a university program as a result of the two-tier university entrance examinations. Another problem is the effect of internal migration (from the less-developed regions to the more developed ones) on the measured average years of education variable. Migration literature suggests that migrants tend to have higher educational attainments than the average attainment level prevailing in their home province. It is also possible that their educational attainment may be lower than the average of the receiving provinces. To the extent that this occurs it may lower the average years of schooling in both groups of provinces and, therefore, hinder comparisons of the average educational attainment figures over time.

The main trends in the data may be summarized as follows:

- There is an overall increase in average educational attainment levels since 1970 for the female, male and total Turkish labor force.
- The educational composition of the labor force has changed since 1970. In 1970, the majority of labor force participants had no formal education; in 1990, the majority had completed at least the primary level of schooling.
- Regional and gender disparities in education are apparent in each of the census years. However, these differences also appear to be closing; female average educational attainment is increasing at a faster rate than male average educational attainment. The same is true for regions that have the lowest levels of average educational attainment (the Eastern and Southeastern Anatolia regions); they also appear to be catching up with the other regions.
- As the work of Dubey and King (1994) shows, gender and regional disparities also exist across different groups of countries. Again, the gaps in educational attainment across regions are closing; countries with the lowest average educational attainment levels appear to be catching up to the more developed countries that have higher levels of average educational attainment.



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### Özet

Türkiye'deki işgücünün eğitim düzeyi: Zaman içinde ve iller arasında bir kıyaslama

Bu makalede Türkiye'deki işgücünün eğitim yapısı zaman içinde bölge ve il bazında verilmektedir; insan sermayesini temsil eden işgücünün ortalama eğitim düzeyi de ayrıca hesaplanmıştır. Veri tabanı 1970'den 1990'ı kapsayan sayım yıllarından oluşmaktadır. Bölgesel farklılıkların devam etmesine rağmen, ortalama eğitim düzeylerinde bir iyileşme görülmektedir.