

EDUCATION AND INCOME DISTRIBUTION: EVIDENCE FROM PROVINCES OF TURKEY

Yrd. Doç. Dr. Kemal Baş

Mersin University

Faculty of Economic and Administrative Sciences

•••

*Ekonomik Büyüme, Gelir Dağılımı, Eğitim ve Nüfus Artışı İlişkileri:
Türkiye Örneği*

Özet

Toplumdaki kişilerin eğitim düzeyi ve dağılımı, gelir dağılımı üzerinde etkisi olan değişkenler arasında yer alır. Bu konuda yapılan ampirik çalışmaların büyük bir çoğunluğunda, eğitim düzeyi ve eğitimin dağılımı gelir dağılımını açıklayan değişkenler içinde önemli bir yer almaktadırlar. Örneğin, Psacharopoulos'un (1977) çalışmasında elde ettiği bulgulara göre, eğitim eşitsizlik indeksindeki değişiklik, tek başına, gelir dağılımındaki eşitsizliğin yüzde 23'ünü açıklamaktadır. Bu çalışmada da aynı değişkenler arasındaki ilişkiler araştırılırken Türkiye'deki 19 ilin yatay-kesit verileri kullanılmıştır. Regresyon analizleriyle elde ettiğimiz bulgulara göre de, eğitimin dağılımındaki eşitsizlikle, gelir dağılımındaki eşitsizlik arasında istatistiksel olarak güçlü ve anlamlı bir ilişki bulunmaktadır. Ancak, beşeri sermaye teorisinin önermelerinin tersine bir sonuç çıkmıştır. Bu iki değişken arasında teoriye göre beklenen işaret pozitif iken, bu çalışmada ortaya çıkan işaret negatiftir. Böyle bir sonucun pek çok nedenlerinden biri ülkenin tümünü temsil etmesi bakımından örnek sayısının az olması olabilir. Diğer önemli bir gerçek ise, Ram'in (1985) çalışmasında ileri sürdüğü sava göre, gelir dağılımı eşitsizliği ile eğitim eşitsizliği arasında pozitif bir ilişkinin varlığı, ekonomik gelişmenin belirli bir eşik düzeyine ulaşmasına bağlı olabilir.

Abstract

Although the relationship between the size of individual earnings and education has been rather well established, the change in the distribution of income among individuals resulting from a change in the level of schooling is not yet settled. The principal variables whose effects on income inequality have been assessed include rate of growth of income, population increases, education level, educational inequality index and economic structure. Furthermore, the impact of these variables on income inequality has been investigated in a cross-country perspective. The overwhelming evidence from these studies indicate that there is a strong and statistically significant positive relationship between educational inequality and income inequality (in most cases measured by the Gini coefficient). In this study, instead of cross-country data used in those studies, we use cross-provincial data available on 19 provinces in Turkey. The statistical results contradict the relationships suggested by the human capital models between variables noted above. In this study, none of the estimated coefficients were found to be statistically significant except the regression coefficient of educational inequality. Furthermore, contrary to our expectations, the sign of the coefficient of educational inequality is found to be negative.

Education and Income Distribution: Evidence from Provinces of Turkey

1. Introduction

Following the development of human capital theory in the early sixties, education became a popular independent variable in income distribution studies. In their endeavor to identify and measure the main sources of income inequalities, through single country or cross-national samples, researchers tried to quantify the effect of educational inequality on income distribution. These researchers include among others, Marin and Psacharopoulos (1976), Psacharopoulos (1977), Ahluwalia (1974), Ram (1981, 1984 and 1985), Tilak (1989), Fields (1975) and Fernandez and Rogerson (1996). This paper is, mostly inspired and motivated by the studies noted above. The purpose is to investigate the relationship between income distribution, education and some other variables, however, with an important difference. Instead of cross-country data used in those studies, we use cross-provincial data available on 19 provinces (out of 80) in Turkey. The evidence obtained from the statistical analysis contradicts the relationships suggested by the human capital models between the variables noted above. In this study, none of the estimated coefficients were found to be statistically significant except the regression coefficient of educational inequality index. Furthermore, contrary to our expectations, the sign of the regression coefficient of educational inequality is found to be negative. In other words, the results obtained in this work indicates that the higher the educational inequality the lower is the Gini coefficient. There may be a lot of factors involved here, some them will be discussed in the sections below.

The organization of this paper is as follows. Section 2 will be a brief review of the literature which is a small part of the vast amount of research that is increasing at a rapid rate on education and income distribution. In Section 3 data will be described. Section 4 will discuss the methodology. The estimating

equations and the main results are described in the Section 5. Policy implications and conclusions will appear in Section 6.

2a. A Brief Review of the Literature

From the days of Adam Smith, education was believed to be a possible contributor to greater social and economic equality. Even prior to Adam Smith, we find references in the literature to the equity role of education. It was William Petty who first advocated equitable distribution of education. The 18th and 19th century school reformers in the U.S. like Horace Mann, Henry Barnard, James G. Carter, Robert Dale Owen and George H. Evans favored educational opportunities to be extended to the poorer groups. Horace Mann, a typical example of these reformers, viewed the school as an effective instrument to achieve justice and equality of opportunity and remove poverty (TILAK, 1989: 29).

Simon Kuznets (1955) predicted long back that income distribution in capitalist countries would become more equal as the labor force becomes more educated. T.W. Schultz (1963) has stated that changes in human capital (in the US) is a basic factor reducing the inequality in the personal distribution of income. This aspect has received the attention of the empirical researchers since the beginning of the 1970s. Education is argued to be vital to increase economic equality (HARBISON, 1973). Tinbergen, analyzing the problem in his numerous works, both from a positive point of view and a normative point of view, concluded that human capital is one of the most important determinants of income inequality.

The relationship between education and income distribution is, however, somewhat complex, as education's effect on income inequality depends upon not only the way education is planned, developed and financed, but also it is contingent upon the socio-economic factors, employment probabilities, wage structure, the fiscal base etc. For instance, changes in the pay offs to different levels of education also influence earnings distribution. If the return to higher education fall, relative to the return to investment in primary education, earning distribution is likely to improve. On the other hand, if the opposite occurs, the increasing returns to higher education relative to returns to lower levels of education reflect a trend towards greater inequality. As Knight and Sabot observed, "the change in educational composition of the labor force itself has an effect on inequality. Whether it raises or lowers inequality, *ceteris paribus*, depends on the relative size of the different educational categories, their relative mean wages, and their relative wage dispersions" (KNIGHT/SABOT, 1983: 1132).

The process by which education effect income distribution can be simply explained as follows: education creates more skilled labor force. This will produce a shift from low paid, unskilled employment to high paid, skilled employment. This shift, produces higher labor incomes, a reduction in skill differentials, and an increase in the share of wages in total output. The increase in the number of more educated and skilled people will increase the ratio of such people and decrease the ratio of less educated people in the total labor force. In the labor market over supply of highly educated people results, given no change in demand, in lowering their wages. On the hand, as a result of this process, the wages of those with less education will increase. Thus on the whole contributes to diminution in income differences in the labor market. Thus expansion of education effects not only the wages of those who receive better education, but also of those who do not. In addition, earning distribution can be affected by education, as earnings and education are highly related, education may compensate for adverse socio-economic background and open up better socio-economic opportunities for the weaker sections of the society leading to faster mobility and higher wages. The financing pattern of education also influences income distribution. As education is largely state financed, the composition of relative shares of various income groups in the state revenues, and the relative benefits received by various groups from education influences, if not exactly determines, income distribution (AHLUWALIA, 1976: 322).

Chiswick (1971) based on data on a small sample of 9 countries found that schooling inequality is directly related to earnings inequality, and hence improvement in schooling inequality could be an equalizer of income distribution..

Cheney and Syrquin (1975) based on a sample of 50 countries came to a similar conclusion when adjusted enrollments in schools (primary and secondary levels) were used to explain income distribution. "High levels of education are associated with a shift of income away from top 20 percent, with a large proportion going to the bottom 40 percent than would otherwise be its share" (CHENEY/SYRQUIN, 1975: 63).

Ahluwalia (1974) also found significant positive relationships between school enrollments and income equality. Using cross-country data on 66 countries, he found a significantly positive relationship between education and inequality. This led him to conclude that education is positively related to equality in terms of income shares of the lowest and middle groups. More importantly, primary school enrollment ratio was more significant in explaining the income share of the bottom 40 percent population, while the secondary school enrollment rate is more significant in explaining that of the middle 40 percent. The secondary enrollment ratio and the income share of the top 20

percent were negatively related, suggesting that expansion of secondary education leads to redistribution of income away from the top income quintile.

Tinbergen (1975) using the same data found a positive relationship between income inequality and the Lorenz coefficient of schooling in the labor force, and argued that "educational policies deserve to be programmed not only with a view to improve education in the widest sense, but also in order to influence income distribution. In most of our results the equalizing consequences of extended education are reflected" (TINBERGEN, 1975: 148). Furthermore, he showed that economic growth does not automatically reduce income inequality (TINBERGEN, 1975: 103).

There are more important studies based on cross-country data. Psacharopoulos (1977) showed with the help of data on 49 countries, including 37 less developed countries, that educational distribution alone explains 23 percent of Gini coefficient of income inequality. He argued that a policy of more equal access to education (i.e., by flattening the educational pyramid) might have the desired impact of making income distribution more equal (PSACHAROPOULOS, 1977: 392).

Another cross-country study of 32 countries (WINEGARDEN, 1979) concludes that higher average levels of schooling exert an equalizing effect on income distribution. The mean level of educational achievement as well as the dispersion of education act as an equalizing influence on income disparities. Further, it was shown that inequalities in education play a large (larger than what the previous studies revealed) role in generating income disparities.

Ram (1984) used on a sample of 28 countries, including 26 less developed countries. He regressed income shares of the bottom 40 and 80 percent population were alternatively on a set of variables, including mean and variance of educational levels. In the cases where the income shares of the bottom 40 percent population was the dependent variable, hardly any variable was significant; and in the other case, variance in educational levels turned out to be marginally significant. Furthermore, while the variable on mean education level has an expected positive sign. Based on this Ram concludes that "higher mean education appears to be an equalizer, and greater educational inequality is probably an income disequalizer" (RAM, 1984: 420).

Tilak (1986) also found with the help of data on 50 countries, a significant effect of education on the income shares of different groups of population. Secondary enrollments had the most significant positive effect on the income shares of the bottom 40 percent and middle 40 percent population. Expansion of education of all levels had a strong negative effect on the income share of the top 20 percent population, suggesting that education, on the whole, might redistribute income from the top 20 percent population to the lower and middle

income groups of the population. In another cross-country study Tilak found that secondary level of education had a more significant effect on income distribution than what the earlier research indicated. He argued that primary education may not be adequate to produce any recognizable significant effect on income distribution (TILAK, 1989: 88).

Richards and Leonor (1981) related changes in educational distribution with later changes in income distribution in a few Asian countries. The data on the distribution of educational assets and work incomes among the workers at two points of time in Sri Lanka and the Philippines indicate that the distribution of education and income appears to improve over time. However, they concluded that "overall distribution of work incomes probably owes much more to the distribution of occupations and to factors operating on occupational income independently of educational level, than to the distribution of education" (RICHARDS/LEONOR, 1981: 175).

Langoni (1973b) in a study on Brazil showed that distribution of income became more unequal between 1960 and 1970 in part because the distribution of schooling became more unequal. The increase in the variance of education of the labor force is found to be responsible for the increase in income inequality. Educational differences explained 33 percent of inequalities in the distribution of income during this period. University education in the country expanded much more rapidly than primary education. Obviously, the pattern of expansion of education, higher versus primary, and the distribution of earnings are highly related. In fact Langoni found that education was by far the most important variable for explaining individual differences in income.

Marin and Psacharopoulos found that an increase in the average level of schooling of the population not only is a socially profitable investment, but also "might not have the alleged bad side effect of worsening the size distribution of income" (MARIN/PSACHAROPOULOS, 1976: 337). In fact, as far as primary education is concerned, it has a significant effect on inequality in earnings. A 10 percent increase in enrollments would reduce the variance of (log) earnings by 4.7 percent in Mexico. Similarly, providing secondary school to 10 percent of those with primary school graduate in US would reduce the variance in earnings by 4.4 percent. Further, expansion of higher education by 5 percent would worsen the inequality index by 2 percent.

A few studies did however, report either limited or insignificant or contradictory effects of education on income inequality. For instance, a cross-country study of 70 countries (RAM, 1981) argues that countries with lower per capita income have more unequal enrollment; more unequal income distribution means greater enrollment inequality. He concludes that income distribution is an important determinant of school enrollment structures than to propose that the shape of the present "educational pyramids" exert a significant

impact on, or is an important determinant of, the present income distribution (RAM, 1981: 260). In other words, according Ram, the shape of income distribution determines the shape of educational distribution, not the other way around.

Bhaduri (1978) also argues that "human capital approach cannot be considered to be a general explanation of income differences and any policy prescription for income equalization mainly through equalization of educational opportunities should be considered inadequate in most cases" (TILAK, 1989: 42). According to Bowles (1972), social class and family origins are more important determinants of income inequalities, Chiswick and Mincer (1972) found positive but small effects of school inequality on income inequality, but unemployment was more important than level of education or its distribution on income distribution in the US. Thurow (1975) extended the argument further to state that if the distribution of job opportunities does not change, the overall income distribution may not change even if more people are educated.

However, Fields (1980) indicated that when inequality was decomposed and the determinants of income were analyzed, education turned out to be the most significant factor in 13 out of 14 studies on 10 countries, in the lone exception of Thailand where education was the second most important factor. Thus on the whole, according to Fields, education is found to be one of the most important variable effecting income distribution.

2b. Public Subsidization of Education and Equity

Education in most societies is highly subsidized by the government. This subsidization in general, and in higher education in particular, is said to have been producing several perverse effects on income distribution, as the public subsidies for higher education largely accrue to high income groups resulting in deterioration in income distribution

An examination of private and social rates of return to education indicates that in many countries the level of subsidization of higher education exceeds that in primary education. For example, in Africa the index of subsidization is 157 in higher education compared to 92 in primary education. This subsidization index for a given level of education is defined as the percent by which the private rate of return exceeds the social rate (PSACHAROPOULOS, 1985).

Distribution of enrollments particularly in higher education favors high income groups is well documented. In many developing countries education itself is a privilege of a few high income groups, and this skewness in the distribution of enrollments intensifies by increasing levels of education.

The evidence on distribution of enrollments by income groups is difficult to get, but some strong empirical evidence does exist. Anderson (1987) found that in Chile 63 percent of the enrollment in higher education belonged to the top household income quintile, and the corresponding proportion for the bottom two quintiles is hardly 8.7 percent. This unequal distribution along with unequal public subsidization of higher education is generally found to be inequitable.

Thus the pattern of allocation and financing of education may significantly influence the effect of education on income distribution. As Tullock stated, "higher education is a highly regressive scheme for transferring funds from the people who are less well off to those who are well off" (TULLOCK, 1983: 183-84).

Using a somewhat different approach, Bhagawati (1973) arrives at a similar conclusion: at all levels of education, richer classes receive greater benefits. Since at higher education, richer classes contribute a large proportion of students, the benefits received by rich classes would be higher at higher levels of education. He argues: "For each class of education, the State (in capitalist LDC's) will subsidize the cost of education; the benefits of these subsidies will accrue disproportionately less to the poorer groups at each level of education; the higher the educational level being considered, the higher will be the average income level of the groups to which students belong; and the rate of governmental subsidization to higher education will be greater than that to primary education" (BHAGAWATI, 1973: 24). Bhagawati explains these regressive effects of public subsidization with the help of differences in opportunity costs of education and employment probabilities.

On the whole, public subsidization of education has equitable effects, as the redistributive effect of primary education subsidies cancels out the regressive effect of higher education subsidies to a greater extent. Some of the anomalies in this process can be corrected either through reforming the mechanism of education subsidization or through progressive measures in labor market, particularly relating to wages, employment, taxes, etc. For example, even through the distribution of enrollments in secondary and university education in Japan is in favor of high income groups, the progressive tax policies facilitate education to work as mechanism of redistribution of income from the rich to the poor, with the middle class receiving a relatively small net benefit (JAMES/BENJAMIN, 1987).

The perverse effects of public subsidization of higher education, particularly on inequality in education were analyzed by Psacharopoulos (1977). He found through a cross-section sample of 64 countries (42 less developed and 22 developed countries) that the higher the level of subsidization of higher education the higher the educational inequality. Further, he showed that

educational inequality is higher in the less developed countries, where public subsidization of higher education is higher.

Ram (1982) however, arrived at a somewhat different conclusion in a similar cross-country study on the same problem. While noting that income inequality and educational inequality are related, Ram argued that the disequalizing effect of public subsidization of higher education is not statistically significant, and if there is any effect at all, it is stronger (but not significant) in the developed countries. In both developed and less developed countries, when separately analyzed, the relationship between subsidization at secondary or higher levels and income inequality is of course positive. However, he concluded that subsidy at the first level of schooling appears to be an equalizer. In other words, according to Ram, public subsidization of primary education only, not the other levels, has an equalizing effect on income distribution.

In the preceding pages we have quickly surveyed the vast amount of research that is increasing at a rapid rate on education and income distribution. The studies are of various types including (a) studies on correlation between mean education level and income inequality, (b) studies on correlation between distribution of education and distribution of income, (c) studies on correlation between changes in educational levels and changes in distribution of income inequalities within a country, and (d) studies on public subsidization of education and its effects on income distribution.

These studies clearly establish that (a) the contribution of education is significant in reducing poverty and improving income distribution, (b) with respect to income distribution, the contribution of primary education is more significant than that of higher education.

3. The Data

As indicated before, instead of cross-country data used in the preceding studies noted above, in this paper we use cross-provincial data on income distribution in Turkey. Since the estimated Gini coefficients by the State Institute of Statistics (SIS) were so much different for the 19 provinces selected (out of 80), we thought to be worthwhile and interesting to investigate the similar relationships sought by the other researchers who used cross-country data.

The data on annual disposable income of households by selected 19 province centers by quintiles, deciles, %5, %1 groups were calculated by (including the Gini coefficients for each province) the SIS in 1994. These computations are based on the 1994 Household Income Distribution Survey of the SIS. The data on educational attainment of population by the provinces is too

made available by the SIS in 1990. These data are obtained from the 1990 Census of Population. The statistics provided by the SIS include population 6 years of age and over by the provinces, level of literacy, level of formal education and sex. The data on per capita gross domestic product is an average of period 1987-1997 in 1987 prices, also provided by the SIS. All of this data are provided in Table 1.

4. The Methodology

Our theoretical point is quite simple. The human capital models, which motivate inclusion of educational distribution variables in income inequality functions, obviously suggest a relationship between educational and income distributions of population. The model is almost identical with the model used by Ram (1981), and is quite close to the specifications of Ram (1981) and Psacharopoulos (1977). The "educational inequality" index is computed for the three levels of education in exactly the same manner as was done by Psacharopoulos (1977: 390). However, in this study instead of enrollments by school level used in those studies, we use level of formal education completed as a percentage of population 6 years of age and over; since enrollments by school level statistics are not available for the provinces. The formula used is as follows:

$$\text{GINI}_i = f [\text{EDINEQ}_i, \text{Ln}(\text{GDP}/\text{pci})] \quad (I)$$

Where

GINI_i stands for Gini coefficient describing income distribution in province (i),

EDINEQ_i stands for educational inequality index within the province (i), as measured by the coefficient of variation of formal education completed by school level. Computation of the educational inequality index is shown in Table 2. The variables which are used in this study are provided in Table 1. Data are available only for the 19 provinces, and,

LnGDP/pci stands for natural logarithm of average gross domestic product per capita in province (i), during 1987-1997, in 1987 prices.

5. Specification and Results

A cross-provincial model purporting to explain differences in income distribution across provinces must have the following properties (PSACHAROPOULOS, 1977: 385).

a) It must be based on a theory of relative earnings determination within a given province.

b) The variables must be measurable in a large number of provinces so as to avoid biases associated with small samples.

c) It must be as simple as possible because at this level of aggregation specification refinements are lost if systematic disturbances operate in some provinces but not in others.

Combining the above properties, first a simple regression model is used where the Gini coefficient is the dependent variable and the independent variable is the educational inequality index just as Psacharopoulos (1977) worked with model 1. Then the $\ln(\text{GDP}/\text{pc})$ added to the equation model 2. The results are as follows. The t-statistics are indicated in the parentheses.

$$(R.1) \quad \text{GINI} = 1.036 - 0.6519 \text{EDINEQ}$$

$$(3.786) \quad (-2.211)$$

$$R^2 = 0.22 \quad F = 4.88$$

$$(R.2) \quad \text{GINI} = 1.546 - 0.0287 \ln \text{GDP}/\text{pc} - 0.7616 \text{EDINEQ}$$

$$(2.001) \quad (-0.708) \quad (-2.259)$$

$$R^2 = 0.25 \quad F = 2.26$$

Model 1 shows that the coefficient of schooling inequality in the income distribution equation becomes statistically significant at the conventional levels of significance. This variable alone explains 22 percent of Gini coefficient (apparently, almost the same as 23 percent estimated by Psacharopoulos in his study in 1977 using cross-country data). However, quite surprisingly and unexpectedly, the evidence here indicates that educational inequality and income inequality (Gini) are inversely related. In other words, the higher the educational inequality the lower is the Gini coefficient, which is contrary to what the theory suggests. This peculiarity is apparent in both of the equations. Therefore, it is very difficult for us to interpret the result of these estimations. There may be a lot of factors involved. One of the important factors may be that the sample size is too small to be a good representative of the whole country. Another important fact is that Ram (1985) in a study on income distribution indicates that there is a threshold level of economic development for education and income equality to be positively related. In another exercise on education expansion and schooling inequality, Ram (1987) observed that "expansion of schooling may accentuate income inequality at early stages. At a later stage, however, the overall impact of educational expansion on income distribution is likely to be favorable" (in TILAK, 1989: 37). May be it is contributing to the view

that "income distribution must get worse before it gets better" (FIELDS, 1980 in TILAK, 1989: 73).

We have also added population growth rate, per capita gross domestic income growth rate and other educational variables such as population ratios which completed primary, secondary, and tertiary levels of education to the equations above as independent variables. However, none of the estimated coefficients were found to be statistically significant except the regression coefficient of educational inequality.

6. Concluding remarks

Cross-section studies of this type, based on province level has well-known data problems which greatly reduce the feasibility and usefulness of more sophisticated procedures, and have constrained most income-inequality studies to fall in this pattern. They are still useful if one exercises appropriate caution in drawing inferences. The empirical evidence obtained in this study on the relation between educational inequality and income distribution seems to be very different from, as far as the sign of the relationship concerned, the earlier studies noted above. There is nothing in the estimates to indicate that a larger educational inequality increases income inequality, in fact our estimates imply the opposite. As pointed above, there may be a lot of factors involved. One of the important factors may be that the sample size is too small to be a good representative of the whole country. Another important fact is that, as stated before, there is a threshold level of economic development for education and income equality to be positively related (RAM, 1985). Moreover, as Ram (1987) stated "expansion of schooling may accentuate income inequality at early stages. At a later stage, however, the overall impact of educational expansion on income distribution is likely to be favorable" (in TILAK, 1989: 37). May be it is contributing to the view that "income distribution must get worse before it gets better" (FIELDS, 1980 in TILAK, 1989: 73).

While no superiority is claimed for the estimates reported in this work, considerable caution seems to be needed in interpreting the results obtained here and in using them for educational policy guidance.

However, in spite of evidence obtained in this study, as a strong believer in education, I am inclined to agree that education can be looked upon as a promising tool to reduce income inequality. Although empirical evidence is mixed at this point, educational policies accompanied by other reforms (such as policies to reduce unemployment, land and tax reforms) can work toward equalizing income distribution and hence, contribute toward the social and political harmony of the country.

TABLE 1. PROVINCIAL DATA USED IN THE REGRESSIONS

PROVINCES	GDP/pc	GDP/pcGR	Gini	Ln(GDP/pc)	POGR	EDINEQ
		%			%	
ADANA	1782211	42	.59	14	11,61	0,83
ANKARA	2162544	20	.39	15	18,58	0,82
ANTALYA	1857271	24	.48	14	40,46	0,92
BURSA	2184189	15	.42	15	28,78	0,94
DENIZLI	1814605	43	.42	14	11,74	0,97
DIYARBAKIR	976922	02	.42	14	22,07	0,93
ERZURUM	607799	02	.45	13	4,10	0,96
ESKISEHIR	1752722	26	.39	14	4,22	0,91
GAZIANTEP	1365260	23	.34	14	15,45	0,99
ICEL	1887756	09	.41	14	24,49	0,93
ISTANBUL	2588118	14	.59	15	34,54	0,86
IZMIR	2639063	19	.41	15	20,38	0,87
KAYSERI	1169153	26	.51	14	4,44	0,95
KOCAELI	4235515	08	.41	15	34,56	0,93
KONYA	1184183	08	.43	14	13,69	1,00
MALATYA	1103645	14	.35	14	21,00	0,93
SAMSUN	1282863	28	.42	14	-0,90	0,97
TRABZON	1026718	06	.45	14	8,74	0,93
ZONGULDAK	1443019	41	.33	14	-9,11	0,98

Notes:

GDP/pc = per capita GDP.

GDP/pcGR = per capita GDP growth.

Gini = Gini coefficient.

POGR = population growth rate.

EDINEQ = Educational Inequality Index.

Source: Computed by the State Institute of Statistics from 1994 Household Income Survey, SIS, Ankara.

Per capita GDP= Average for the period of 1987-1997 computed from SIS sources.

Per capita GDP growth= for the period of 1987-1997 computed from SIS sources.

EDINEQ= Educational Inequality Index, computed by the author. See Table 2. For computation.

TABLE 2. COMPUTATION OF THE SCHOOL INEQUALITY INDEX*

PROVİNCES	(A) Primary School %	(B) Second. School %	(C) Higher Education %	A+B+C	$\sqrt{\sum_{i=1}^3 (S_i - \bar{S})^2 / 3}$							= EDİNEQ
					\bar{S}	$S1-\bar{S}$	$(S1-\bar{S})^2$	$S2-\bar{S}$	$(S2-\bar{S})^2$	$S3-\bar{S}$	$(S3-\bar{S})^2$	
AĐANA	43,97	15,85	2,59	62,41	20,80	23,16	36,62	-4,95	24,53	-18,21	331,68	0,83
ANKARA	43,42	25,39	7,28	76,09	25,36	18,06	326,07	0,03	0,00	-18,08	327,02	0,58
AÑTALYA	51,11	15,30	3,82	70,24	23,41	27,70	767,31	-8,11	65,81	-19,59	383,70	0,86
BURSA	51,65	17,02	2,99	71,66	23,89	27,76	770,82	-6,87	47,17	-20,90	436,63	0,86
DENİZLİ	52,18	13,20	2,49	67,87	22,62	29,56	873,57	-9,42	88,80	-20,13	405,33	0,94
DIYARBAKIR	27,32	10,08	1,61	39,01	13,00	14,31	204,88	-2,92	8,55	-11,39	129,72	0,82
ERZURUM	41,94	12,33	1,93	56,20	18,73	23,21	538,76	-6,40	41,00	-16,81	282,51	0,91
ESKİŞEHİR	50,69	21,28	3,71	75,68	25,23	25,47	648,49	-3,95	15,59	-21,52	463,00	0,77
GAZİANTEP	42,73	10,36	1,60	54,70	18,23	24,50	600,35	-7,87	61,97	-16,63	276,56	0,85
İÇEL	48,39	16,32	2,92	67,64	22,55	25,85	668,10	-6,23	38,75	-19,62	385,05	0,85
İSTANBUL	48,35	22,77	5,31	76,43	25,48	22,87	523,25	-2,71	7,32	-20,17	406,79	0,69
İZMİR	48,96	19,53	4,91	73,40	24,47	24,49	599,73	-4,94	24,37	-19,55	382,31	0,75
KAYSERİ	48,36	14,53	2,51	65,40	21,80	26,56	705,38	-7,27	52,83	-19,29	372,12	0,89
KOCAELİ	49,94	18,84	2,91	71,69	23,90	26,04	678,23	-5,06	25,56	-20,99	440,47	0,82
KONYA	53,78	12,23	2,19	68,19	22,73	31,05	963,85	-10,50	110,26	-20,55	422,11	0,98
MALATYA	42,68	15,72	2,41	60,81	20,27	22,41	502,12	-4,55	20,71	-17,86	318,88	0,83
SAMSUN	46,08	12,04	2,15	60,27	20,09	25,99	675,52	-8,05	64,80	-17,94	321,88	0,94
TRABZON	44,03	16,86	2,61	63,49	21,16	22,86	522,72	-4,30	18,53	-18,56	344,43	0,81
ZONGULDAK	50,17	12,80	1,99	64,96	21,65	28,52	813,31	-8,85	78,41	-19,66	386,66	0,95

Source: Columns 2, 3 and 4 are Estimated from the State Institute of Statistics 1990, Census of Population.

* The computation method used is the same as psacharopoulos, 1997.

References

- AHLUWALIA, Montek S. (1976), "Income Distribution and Development: Some Stylized Facts," *The American Economic Review*, 66/2: 128-35.
- ANDERSON, C. Arnold (1987), *Social Selection in Education and Economic Development*, EDT Series 82 (Washington D. C.: World Bank, Education and Training Department).
- BENABOU, Roland (1996), "Equity and Efficiency in Human Capital Investment: The Local Connection," *Review of Economic Studies*, 63: 237-64.
- BHADURI, Amit (1978), "Education and Distribution of Personal Income: An Analysis of Issues and Policies," *Industry and Development* (UNIDO), 2: 3-14.
- BHAGAWATI, Jagdish (1973), "Education, Class Structure and Income Equality," *World Development*, 1/5: 21-36.
- BLAUG, Mark (1981), "Thoughts on the Distribution of Schooling and the Distribution of Earnings in Developing Countries," *Planning Education for Reducing Inequalities* (Paris: UNESCO, IIEP): 77-93.
- BLEJER, Mario I. / GUERRERO, Isabel (1990), "The Impact of Macroeconomic Policies on Income Distribution: An empirical Study of the Philippines," *The Review of Economics and Statistics*, Vol. 72: 414-422.
- BOWLES, Samuel (1972), "Schooling and Inequality from Generation to Generation," *Journal of Political Economy*, 80/3, Part II: Supplement: 219-51.
- CHENERY, Hollis B. / AHLUWALIA, M.S. / BELL, C.L.G. / DULOY, J.H. / JOLLY, R. (1974), *Redistribution with Growth* (London: Oxford for the World Bank).
- CHENERY, Hollis B. / SYRQUIN, M. (1975), *Patterns of Development 1950-1970* (New York: Oxford for the World Bank).
- CHISWICK, Barry R. (1971), "Earnings, Inequality and Economic Development," *Quarterly Journal of Economics*, 85/1: 21-39.
- CHISWICK, Barry R. / MINCER, J. (1972), "Time-series Changes in Personal Income in the United States from 1939 with Projections to 1985," *Journal of Political Economy*, 80/2, Part II: Supplement: 34-66.
- FERNANDEZ, Raquel / ROGERSON, Richard (1996), "Income Distribution, Communities, and the Quality of Public Education," *The Quarterly Journal of Economics*, 111/1: 135-64.
- FERNANDEZ, Raquel / ROGERSON, Richard (1998), "Public Education and Income Distribution: A Dynamic Quantitative Evaluation of Education-Finance Reform," *The American Economic Review*, 88/4: 813-33.
- FIELDS, Gary S. (1975), "Higher Education and Income Distribution in a Less Developed Country," *Oxford Economic Papers*, 27/2: 245-59.
- FIELDS, Gary S. (1980), *Poverty, Inequality and Development* (Cambridge: Cambridge University Press).
- HARBISON, F.H. (1973), *Human Resources and the Wealth of Nations* (New York: Oxford).
- JAMES, Estelle / BENJAMIN, Gail (1987), "Educational Distribution and Income Redistribution through Education in Japan," *Journal of Human Resources*, 22/4: 469-89.
- KNIGHT, J.B. / SABOT, R.H. (1983), "Education Expansion and the Kuznets Effect," *American Economic Review*, 73/5: 1132-36.
- KUZNETS, Simon (1955) "Economic Growth and Income Inequality," *The American Economic Review*, 45/1: 1-28.
- LANGONI, Carlos G. (1973b), "Income Distribution and Economic Development in Brazil," *Conjuntura Economica*, 27/9.
- LEIPZIGER, D.M. / LEWIS, M. (1980), "Social Indicators, Growth and Distribution," *World Development*, 8/4: 299-302.
- MARIN, Alan / PSACHROPOULOS, George (1976), "Schooling and Income Distribution," *Review of Economics and Statistics*, 58/3: 332-37.

- PSACHAROPOULOS, George (1977), "Unequal Access to Education and Income Distribution," *De Economist*, 125/3: 383-92.
- PSACHAROPOULOS, George (1985), "Returns to Education : A Further International Update and Implications," *Journal of Human Resources*, 20/4: 584-604.
- RAM, Rati (1981), "Inequalities in Income and Schooling: A Different Point of View," *De Economist*, 129/2: 253-61.
- RAM, Rati (1984), "Population Increase, Economic Growth, Educational Inequality and Income Distribution: Some Recent Evidence," *Journal of Development Economics*, 14/13: 419-28.
- RAM, Rati (1985), "The Role of Real Income Level and Income Distribution in Fulfillment of Basic Needs," *World Development*, 13/5: 589-94.
- RICHARDS, P. /LEONOR, M. (1981), *Education and Income Distribution in Asia* (London: Croom Helm for the International Labor Organization).
- RITZEN, J.M.M. (1977), *Education, Economic Growth and Income Distribution* (Amsterdam: North-Holland).
- SCHULTZ, Theodore W. (1963), *Economic Value of Education* (New York: Columbia University Press).
- SMITH, Adam (1976), *Wealth of Nations* (New York: Modern Library).
- TANSEL, Aysit /KAZEMİ, Abbas (2000), "Equity in Educational Expenditures in the Middle East and North Africa," *Journal of Middle Eastern Studies* (forthcoming).
- THUROW, Lester (1975), *Generating Inequality* (New York: Basic Books).
- TILAK, Jandhyala B.G. (1986), "Education in an Unequal World," *Educational Planning: A Long Term Perspective* (New Delhi: Concept Publishers for National Institute of Educational Planning and Administration): 27-50.
- TILAK, Jandhyala B.G. (1989), "Education and Its Relation to Economic Growth, Poverty, and Income Distribution: Past Evidence and Further Analysis," *Research Papers Number 3* (Washington D.C.: World Bank).
- TINBERGEN, Jan (1975), *Income Distribution: Analysis and Policies* (Amsterdam: North- Holland).
- TULLOCK, Gordon (1983), *Economics of Income Distribution* (Boston: Kluwer-Nijhoff).
- WINEGARDEN, C.R. (1979), "Schooling and Income Distribution: evidence from International Data," *Economica*, 46/181: 83-87.