Measuring Returns to Education in Turkey

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The purpose of this paper is to examine the returns to individually acquired education in Turkey. In contrast to the traditional neo-classical growth theory models, technological progress is embedded within the new endogenous growth models emphasising the endogenous determination of growth process. Thus, human capital stock is incorporated as an endogenous determinant of growth rate into the model that is highly associating the human capital accumulation with the innovative capacity and productivity. With the development of human capital theory, the educational level of the population as one of the key determinants in economic growth, is considered to be affected by the returns to education. The key relationship for the estimation of returns to education was derived by Mincer (Mincer, 1974). Since then, the topic has become centre of focus, and a large number of studies have estimated returns to education. One of the most comprehensive surveys by Psacharopoulos covers the cross – country returns to education estimations for 60 countries, reveals that the developing countries possessed the highest return to an additional year of schooling (1994). Recent country specific studies, on the other hand, while providing evidence on the decreasing returns to education in Norway (Haegeland et. al. 1999), and Austria ( ), empirical findings for China (Heckman & Li, 2003), and Italy (Brunello et. al., 2000) suggest increasing returns to education. Furthermore, returns to education estimations reveal heterogenous results varying accordingly with the degree programmes and gender in Britain (Sloane & O'Leary, 2004), and West Germany (Lauer & Steiner, 2000).

Despite the huge literature on the estimation of returns to education in terms of both cross – country and country specific analysis, studies concerning Turkish case remain limited (Tansel, 1994, 1999). This paper aims to make an update contribution to the literature in Turkey. Role of the educational level (primary, secondary, and higher education) in explaining earnings dispersion is analysed by estimating standard Mincerian equation, and using a national level household budget survey data. Estimating earnings equations for 1994 and 2003, preliminary findings demonstrate that returns to education have been instable and changing across the different sectors of the economy. Even though the education has been an important determinant of wage dispersion in Turkey, the findings reveal substantial heterogeneity in returns to different educational levels.

Introduction

Human capital investment as the source of economic growth and development has been the focus of considerable debate in the economics literature. In contrast to the traditional neo-classical growth theory models, technological progress is embedded within the new endogenous growth models emphasising the endogenous determination of growth process. Thus, human capital stock is incorporated as an endogenous determinant of growth rate into the model that is highly associating the human capital accumulation with the innovative capacity and productivity. With the development of human capital theory, the educational level of the population as one of the key determinants in economic growth, is considered to be affected by the returns to education. The key relationship for the estimation of returns to education was derived by Mincer (Mincer, 1974). Since then, the topic has become centre of focus, and a large number of studies have estimated returns to education. One of the most comprehensive surveys by Psacharopoulos covers the cross – country returns to education estimations for 60 countries, reveals that the developing countries possessed the highest return to an additional year of schooling (1994). Recent country specific studies, on the other hand, while providing evidence on the decreasing returns to education in Norway (Haegeland et. al. 1999), and Austria (Fersterer & Winter-Ebmer, 1999), empirical findings for China (Heckman & Li, 2003), and Italy (Brunello et. al., 2000) suggest increasing returns to education. Furthermore, returns to education estimations reveal heterogeneous results varying accordingly with the degree programmes and gender in Britain (Sloane & O'Leary, 2004), and West Germany (Lauer & Steiner, 2000).

Despite the huge literature on the estimation of returns to education in terms of both cross – country and country specific analysis, studies concerning Turkish case remain limited (Tansel, 1994, 1999). This paper aims to make an update contribution to the literature in Turkey. Role of the educational level (primary, secondary, and higher education) in explaining earnings dispersion is analysed by estimating standard Mincerian equation, and using a national level household budget survey data. Estimating earnings equations for 1994 and 2003, preliminary findings demonstrate that returns to education have been instable and changing across the different sectors of the economy. Even though the education has been an important determinant of wage dispersion in Turkey, the findings reveal substantial heterogeneity in returns to different educational levels.

The research is organised under three section. First section briefly describes the data set used, and the econometric specifications used in estimating the impact of education on personal earnings, net of any transfers from the state and any taxes paid. Second section reveals and discusses the estimation results. The third and last section makes the concluding remarks.

Data and Methodology
Data Set

Micro data used in this research are drawn from Household Budget Surveys for the years 1994, 2003, and 2004. Household Budget Survey is a representative sample of whole Turkish population, covering approximately 8600 households. Survey contains information both on family composition (household data) and on individuals. The sample used in this study is restricted to full – time working, non – agricultural employees aged from 15 to 58 for females and 60 for males.

Raw data used in this research include; gender, age, highest completed school degree, gross yearly earnings, gross monthly earnings, number of months employed per year, average weekly hours of work, occupation, and sector. Additional data estimated by using the raw data include; dummies for the educational degrees, years of schooling, potential work experience, and average hourly earnings. A distinction is made between a total of five educational levels. Illiterate and those never went to school belong to the reference group for the dummies. Starting level is 8 – year elementary school for the years 2003, 2004, and 5 – year prior to the educational reform in 1996. The next level refers to junior school which is categorised under the general school and vocational school, each lasting minimum 3 years. Higher education comprises both vocational high schools,

and university degrees (= 2 to 4 years of schooling). Postgraduate studies comprising MSc, MA, and doctoral studies associated with two or more years of schooling after the university education. Since the actual years used by the individual for completing the degree are not known, years of schooling data is estimated on the basis of minimum years required to complete each educational degree registered for the individual.

The potential number of years an individual spent in working life is calculated as age minus completed years of schooling minus age of school start, that is 6 in Turkey. For men, an extra year has been subtracted for the military service is obligatory for Turkish men. Average hourly wages are estimated from the gross annual earnings divided by the number hours worked in a year, that is average weekly hours of work multiplied by 4 and total number of months employed per year.

Econometric Model Specification

Two different approaches to measuring the impact of education on earnings have been used in this research. First, the standard Mincerian earnings function has been used for empirical testing of the returns to years of schooling. Second, a multiple treatment model OLS regressed in order to evaluate the returns to different educational degrees.

Standard Mincerian semi - logarithmic earnings equation specified as;

$$\ln W_i = \alpha + \beta S_i + \gamma_1 EXP_i + \gamma_2 EXP_i^2 + \varepsilon_i \qquad (1)$$

where; ln W_i refers to the log of gross hourly wages, S is the years of schooling, EXP if the potential years of experience, and the ε_i is the error term. Mincerian equation assumes a linear relationship with the earnings and the years of schooling and potential experience. This hypothesis is obtained from the human capital theory based on the assumption that the individuals accumulate human capital both at school, and in the labour market. Thus, earnings are assumed to depend on the level of schooling and on the job training proxied by potential experience. The model however, is subject to some sources of bias. First, this one factor model assumes that there are no differential trends for different educational levels. Rates of return are considered to be linear assuming each additional unit of education, that is years of schooling, has the same returns. Second, years of schooling and potential work experience explain about one third of the observed variation in individual earnings. Inclusion of a set of instrumental variables such as family characteristics (parental education, occupation, etc.) and other location / region related variables, or the use of siblings / twins data are proposed and used to account for the endogeneity of schooling (Altonji & Dunn, 1996). Due to the lack of data on family characteristics and twins or siblings, this sort of bias cannot be eliminated from this research.

In order to account for the returns to different educational degrees, a multiple treatment specification, distinguishing the impact of many different educational levels, is also used for empirical estimation.

$$\ln W_i = \alpha + \beta_1 S_{1i} + \beta_2 S_{2i} + \beta_3 S_{3i} + \beta_4 S_{4i} + \beta_5 S_{5i} + \varepsilon_i \qquad (2)$$

Where; $S_1 = 1$ if the individual completed elementary school, $S_2 = 1$ if the individual completed junior school, $S_3 = 1$ if the individual completed vocational school, $S_4 = 1$ if the individual completed a higher education, and $S_5 = 1$ if the individual has a postgraduate degree.

Empirical Findings on Returns to Education in Turkey

Coefficients documented in table 1 obtained by estimating a standard Mincerian equation, that regresses the log of individual earnings on years of schooling, potential experience and its square. In line with the conventional wisdom, hourly wages increase with education. Comparing the estimation results for 1994, and 2004 demonstrates an increasing trend in returns to education for both men and women. However, each additional year of schooling reveals much higher returns for

women than men, which may be due to the fact that the women have less opportunities to get educated, and in turn much higher marginal returns in Turkey. The effect of potential experience is also positive, and an additional year of experience seems to account for around 4 percent of the increase in earnings for both genders in 1994. There is also a considerable increase in the impact of accumulated experience on earnings over the years.

Table 1: **Standart OLS Specification: gross log hourly wages regressed on years of schooling, potential experience, and square of potential experience**

	1994		2004	
	MEN	WOMEN	MEN	WOMEN
Year of Schooling	.09 (.00200)	.08 (.00494)	.10 (.00312)	.14 (.00684)
Potential Experience	.04 (.00310)	.04 (.00569)	.08 (.00383)	.05 (.00712)
Potential Experience Squared	-.0003 (.00005)	-.0005 (.00017)	-.0011 (.00006)	-.0005 (.00016)
Number of Observations	9788	3560	5627	1220
R – square	.20	.23	.32	.29

Replacing the years of schooling variable with dummies for different educational degrees, table 2 reveals the following results.

Table 2: Returns to educational degrees

	1994		2004	
	Women	Men	Women	Men
Elementary (8 years)	.04 (.01355)	.05 (.02779)	.06 (.01006)	.06 (.04287)
Junior (3 years)	.16 (.01983)	.16 (.03284)	.23 (.01115)	.14 (.04669)
Vocational (3 years)	.05 (.02706)	.17 (.04717)	.21 (.01257)	.15 (.04932)
Higher Education (2-4 years)	.10 (.01851)	.10 (.03543)	.19 (.01114)	.16 (.04857)
PostGrad. (2-4years)	.11 (.02123)	.16 (.05343)	.25 (.02357)	.21 (.01227)
EXP	.0425 (.01533)	.0373 (.00323)	.0519 (.00696)	.0744 (.00292)
EXP SQUARED	-.0006 (.00028)	-.0003 (.00006)	-.0004 (.00017)	-.0010 (.00006)
N of Observations	2187	3788	2609	3627
R2	.27	.20	.35	.30

It is interesting to note that, the returns to education have fallen for the lower educational levels and have risen for the higher and post graduate education for both men and women. Marginal returns to elementary school diploma seems to decrease over the years, which may be due to the fact that both sectors increased the demand for higher qualifications.

Comparing returns to men and women, though in 1994 male workers have had higher returns for their educational attainments, over years the gap seems to get closed. In order to detail this analysis, a sectoral look at the dynamics of returns to educational degrees may highlight some facts. Table 3 demonstrates that, in 1994 the services sector revealed higher rewards for the junior

and higher education for women compared to the industry sector. Though, there seems that there is not much significant increase in rewarding male workers for their educational degrees completed over the years. It appears that there is a striking increase in the returns to higher education in the industry sector over 10 years for both genders. Though there is not much change in returns to vocational training over the years for men, it seems to bring much more reward for women particulary for in the services sector. There is particularly a considerable increase in rewarding of the vocational education for women across ten years, which may possibly be the outcome of an increase in demand for technically skilled labour in especially female dominated industries over the years. Men appear to get higher rewards for their accumulated experience relative to their female collegues.

Table 3: Sectoral Analysis of the Returns to Educational Degrees

	INDUSTRY - 1994		SERVICES - 1994		INDUSTRY - 2004		SERVICES - 2004	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Elementary	.05 (.05196)	.05 (.07413)	.05 (.03073)	.04 (.07183)	.05 (.09793)	.02 (.08538)	.06 (.03549)	.03 (.07161)
Junior	.15 (.06240)	.12 (.09211)	.15 (.03649)	.18 (.87576)	.15 (.09276)	.13 (.01228)	.16 (.03761)	.14 (.06134)
Higher Education	.16 (.07366)	.09 (.09343)	.15 (.03878)	.14 (.08328)	.20 (.08695)	.20 (.06082)	.16 (.03898)	.21 (.06362)
Post Graduate	.01 (.07961)	.06 (.08244)	.17 (.07105)	.04 (.07865)	.25 (.08973)	.25 (.05714)	.18 (.07722)	.17 (.05764)
Vocational	.18 (.06844)	.10 (.08984)	.16 (.05479)	.09 (.09763)	.16 (.09943)	.15 (.06133)	.17 (.04240)	.21 (.06584)
EXP	.03 (.00591)	.03 (.01333)	.03 (.03637)	.03 (.01153)	.07 (.00527)	.05 (.01429)	.06 (.00219)	. 05 (.00654)
EXP-squared	-.0004 (.00010)	-.0003 (.00021)	-.0003 (.00006)	-.0003 (.00018)	-.0009 (.00011)	-.0002 (.00032)	-.0008 (.00004)	-.0010 (.00018)
Number of observations	3151	1251	7717	1335	3907	995	10510	1497
R-square	.17	.18	.18	.28	.36	.19	.30	.30

Concluding Remarks

The average returns to additional year of schooling has revealed even lower marginal returns for the lower educational degrees for both genders, but significantly increasing trends for higher educational levels for both men and women. Increase in the rewarding of the industrial sector appears striking. Marginal returns to a year of schooling for the higher and postgraduate education imply considerable rise over the years for both genders. Though there is not much change in returns to vocational training for men, it seems to bring much more reward for women over the years, particulary for the services sector. This increase in returns to higher levels of education and vocational schooling may be attributed to the industrialisation and the corresponding increase in human capital needs of the country over ten years. The results also display a marked improvement in the rewarding of accumulated experience. The rewarding of work experience has been increased notably across years especially for male workers. In constrast, accumulated work experience has been only moderately reflected in the wages of women.

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