Private Returns to Higher Education in Turkey: An Application in Public Education Sector

Hüseyin Ergen

Mersin University, Faculty of Education, Department of Educational Sciences,
Mersin, Turkey
E-mail: ergen@mersin.edu.tr

ABSTRACT In this study, private returns to higher education in education sector in Turkey has been addressed. Rate of returns was calculated by using data obtained from an application in which MoNE [Ministry of National Education] assistant specialist participated; then comparisons were made across the countries and within Turkey by using the findings of previous studies. According to the findings of this study it has been observed that; the calculated rates are higher in average. However, rate for women's higher education is higher than that for men. Rates for education personnel was found higher compared to those previously found for workers in other sectors. It can be concluded that the opportunity cost of investments in human capital in education sector, in average, is low.

INTRODUCTION

According to Human Capital Theory, education which is recognized as an investment has a return, like other types of investments to other types of capital. Investment in education yields private returns and social returns which may be analyzed in both micro and macro contexts. Macro dimension of education investments involves in growth accounting and results in estimation of the relative contribution of an education variable within a production function by using national accounts data. This education variable is used as a proxy for human capital which was offered to replace the "residual" factor in growth accounting, and was considered either as representing a distinct form of capital or quality of labor power (Ergen 1999). Within country, data can either be analyzed by growth accounting or cross-provincial panel regressions, while cross-country data were analyzed only by regressions after data standardization. Results of the studies in the "contribution of education to growth" literature indicate that the contribution of education is relatively higher in many settings (McMahon 1999).

Along with its aggregate benefits, computing private and social benefits may help micro level decision makers to invest efficiently on human capital. Knowing how big is the benefit,

public and private sides decide on how much should and can they invest in different types and levels of education. In general, benefits accrue to private side increases with the specificity of education to a certain field of specialization. In this sense, training, for instance, may be general, firm specific, or individual (Belfield 2000). The cost of investment, accordingly, is burdened by the sides who capture the benefits proportionately. A general or social benefit might be defined in "narrow" or "wide" senses, depending on whether returns in consideration include externalities or do not (Psacharopoulos and Patrinos 2004a).

Private benefits of higher education may be referred in terms of market or non-market outcomes. Among the market outcomes are employability, higher earnings, less unemployment, labor market flexibility, and greater mobility; while among the non-market outcomes are better consumer efficiency, better own and family health and better children quality (McMahon 1999; Mora et al. 2007). Private returns are, ultimately, measured as the earnings premia ensued after human capital chain which relates higher education levels with higher earnings through skill and knowledge accumulation, increase in employment opportunities and increases in marginal productivity (Tilak 2002). Those who have earned more can invest more on education in

turn. Because specificity increases, the importance of private returns also increases in terms of decisions on investing in human capital through higher education.

These decisions are dealt within the context of higher education demand, school choice, and matching research. Another use of private rate of return to higher education is related to financing, in specific, cost-benefit analysis (Woodhall 2004). Because demand for education increases and government lacks the ability to finance all the higher education demanded, higher values of private rates are often used as an argument to make individuals and parents share the costs at an increasing rate. Despite this argumentation, implementations differ from country to country at the privatization level of higher education financing.

As uses of the private rates of returns to higher education differ, their calculation and interpretation may also differ depending on data availability and purpose.

Objectives

The first objective of this study was to offer a new methodology to calculate private returns to higher education. This new methodology, discussed in the Methodology section below, involves in using micro data obtained through an application. As an example for the use of this method, rate of returns to higher education of specialists working in MoNE, Turkey were calculated. Secondly, the findings are discussed in comparison to global patterns in the world in the literature. Thirdly, it was aimed at providing a comprehensive review of the literature on returns to higher education in Turkey. The results related to latter two objectives were presented in the Results and Discussion sections.

METHODOLOGY

Private rates of returns have been measured or estimated by several methods in the literature. Some of the methods involve in measuring rates of returns using only earnings information, while some others make use of full cost data as well (Becker 1993). An example for the former was presented by Groot and Oosterbeek (1992) and used by Cohn and Addison (1998) to calculate returns to lifelong education in OECD countries. Their calculations were based on following formulae:

$$r = \ln[\mu(Y_s)] - \ln[\mu(Y_s - \delta_s)]/\delta_s \qquad (1)$$

where s stands for schooling. This method was called as "short-cut" method and recommended to be used when only average earnings of graduates of certain educational levels are available (Cohn and Addison 1998: 254).

If, on the other hand, longitudinal or cross sectional earnings data for individuals were available, estimation of an earnings equation is recommended to calculate private rates of returns (Psacharopoulos 1994). Many calculations have been made through estimation of the regression coefficient of education variable (β) in Mincerian earnings function (Belfield 2000):

$$\ln Y = \alpha + \beta E + \gamma X + \delta X^2 \qquad (2)$$

where E stands for years of education and X for experience. In this semi-logarithmic form, estimating value of , results the percentage effect of one extra year of education on earnings. A variety of estimation methods are used depending on the nature of data and identifying assumptions (Blundell et al. 2001).

Another widely used method is called "full discounting" or "elaborate" method and uses indirect and direct cost data in addition to earnings data (Mora et al. 2007). Inclusion of cost data might not be meaningful for lower levels but higher education level, since private costs incurred by individual may be reduced to zero considering publicly financed primary schools and elimination of children from labor. There may be some forgone earnings and some private costs for secondary education (especially for vocational secondary education), although this level is considered more and more in compulsory education. Full discounting is useful for computing rates of returns for higher education when micro data were available. This method has been used for calculating private rates of returns by using micro data and formulated as (Psacharopoulos and Patrinos 2004a):

$$\sum_{t=1}^{42} \frac{(Y_u - Y_s)}{(1+r)^t} = \sum_{t=1}^{5} (Y_u + C_u)_t (1+r)^t \qquad (3)$$

where represents the earnings differential between a university graduate and a secondary school graduate; and stands for the indirect and direct costs of schooling. The main difference of this approach is to calculate a present value of lifelong earnings instead of estimating the contribution of education on earnings. In Equation (3), rate of return to education (r) is

equivalent to a market interest rate which equates present value of future earnings to present costs.

Private rate of return for an individual university student who compares the direct and indirect costs incurred and lifelong earnings to be yielded as a result of undertaken investment can be calculated within a framework of "stylized age-earnings profile" (Mingat and Tan 1987; Woodhall 2004; Psacharopoulos and Patrinos 2004a). Within this framework the typical individual compares the sum of indirect costs (forgone earnings) and direct costs (tuition and other expenses) of investing in higher education to benefits of it over high school education throughout her/his productive life (benefits). Of course some other non-pecuniary benefits over pecuniary ones are considerable as well as some pension and longevity effects after retirement (Belfield 2000). The concave shape of earnings function indicates the increase in earnings with experience at a decreasing rate. The difference between earnings of university and high school graduates increase by time. The area between two curves is estimated by calculating the present values of benefits of further education.

A simplified version of the short-cut method shown in Equation (1) would be:

$$r = (\bar{Y}_u - \bar{Y}_s) / 5\,(\bar{Y}_u), \qquad (4)$$

The weakness of this method is that the earning functions lose their concavity and take a flat form as shown in a flat age-earnings profile (Mingat and Tan 1987; Woodhall 2004; Psacharopoulos and Patrinos 2004a).

Application of short-cut method is very easy, although it has the weakness of assuming constant earnings in the future. However, utilization of present values need not provide *ex ante* correct measures future benefits including the possible changes in labor market conditions.

Another strategy would be using data obtained by means of a data gathering tool. This approach involves in calculating past costs and future benefits in current prices. Therefore, cross sectional data obtained from a sample of professionals are used. Private rate calculated by this "survey" method can be formulated as:

$$r = (\bar{Y}_u - \bar{Y}_s) / (\bar{Y}_{su} + \bar{C}_u) \qquad (5)$$

where is average income of a high school graduate, which would be earned during university education but forgone. Equation (5) results

in flat earning functions, but uses direct cost data as well (filling part of cost-box falling below the horizontal axis). This method's advantage is that every person can calculate her/his own costs and benefits by taking the length of their own university education and start ages to university and profession into account, therefore the assumption of typical individual in Equations (1) and (5) is released. The disadvantage of the method is the use of survey data, which lowers the reliability due to subjectivity.

In this study the method summarized in Equation (5) was used. In the later sections, the method of the study is explained in detail. In the following two sections, the findings of meta-analyses on private rates of returns to higher education globally and in relation to Turkey were reviewed.

Data and Application

Data of this study were collected by means of an application form administered during an in-service training seminar conducted by TUBITAK TUSSIDE in two terms, the first was held on 15-17 September 2015 and the second was held on 30-September-2 October 2015. The aim of the seminar was to increase skills and knowledge of MoNE [Ministry of National Education] assistant specialists on education finance. Among other activities an application concerning the private rate of return calculation was conducted through filling a structured form which was previously prepared by the author. Before the application, a brief presentation concerning the value of investments to different forms of capital and use and comparison of the returns had been done in the first stage of the seminar program part devoted to returns to human capital. This part of seminar was planned for the acquisition of understanding the rationale behind the public-private provision of education services. At the second stage, computation of private returns to higher education was instructed by means of graphics showing age-earnings profiles. In the third stage of the seminar part, an application prepared to level up the attendees' learning from comprehension to application was carried on.

The application form was comprised of three parts in one sheet. In the upper part, each attendee computes direct expenditures (A) and indirect costs (B) of her/his own higher education, summing up total costs (C). In the second

part, firstly, everyone calculates her/his future earnings depending on current earnings structure, start age and retirement age (D1); and, an assumed lifetime earnings is calculated as if they were started to work as a high school graduate (D2). (D1 – D2) results in total regular earnings (D). Later, estimates of irregular earnings premium (E) and non-pecuniary returns (F) were also asked. (D+E+F) = G was considered as the total benefits of obtaining a higher education degree. In the third part they were asked to compute (G/C) to find how much their own higher education yield a private return over their high school.

The seminar was conducted in four sessions, two sessions in each meeting. A total of 67 attendees have participated out of 85. In each session results of the exercise have been shared and the part of the seminar was completed. The exercise papers were collected and later controlled for mistakes. After data entry the arithmetic averages were calculated.

RESULTS

The private rates of return calculations vary across occupations and fields of study. In this study, private rates for education staff in public sector was computed. Calculations were carried out by computing average costs and returns to MoNE specialist's higher education by using the data obtained by questionnaire developed by the researcher. It was found that private rates for higher education of assistant specialist of MoNE were higher in 2015 compared to average. The averages obtained from the application forms were shown in Table 1. The data related to irregular earnings and monetary expression of non-monetary benefits were not shown because of unreliableness (only a few have filled that parts). Yearly returns were obtained through dividing total benefits by average years of work (39.3 years for women and 39.6 years for men).

Returns for women is more than twice as higher as the average returns to women's higher ed-

ucation computed in OECD (2014). On average they doubled the average (19.2 for men and 19.3 for women; OECD 2014). On the other hand, some of the other studies have found much higher rates (Salehi-Isfahani 2009; Tansel and Bircan 2012).

As discussed in following sections of this study the patterns for rates of returns to education have been changing across the world. The previous pattern concerning the levels of education was decreasing, although findings for Turkey were not in line with this pattern (Tansel 1999). In recent years, patterns were observed to change show as the one in Turkey: The returns are increasing as the levels of education increase. Although this change was attributed to the demand for high skilled labor power, the reason for Turkey could be claimed to be segmentation in labor market. In addition to this segmentation effect, a new world-wide effect of changing technology on the demand for skilled labor, the returns to higher education in Turkey is getting higher in recent years.

If gender was considered, recent studies in Turkey found higher returns to women's work on an average compared to previous ones, although findings are mixed across countries. Results from the application in this study confirm this pattern in Turkey. The reason is lower opportunity cost for women's higher education, which can be primarily related to lower labor participation rates for women with lower education.

DISCUSSION

Global Findings and Patterns

The rate of return literature begins in the late fifties. Since early 70's, meta-analyses originated by Psacharopoulos from World Bank has been studied. Findings of meta-analyses on returns to education globally yielded some general patterns. There were four patterns in Psa-

Table 1: Private returns to higher education of MoNE assistant specialists according to self-reports (TRY)

	N	Direct costs	Forgone earnings	Average cost	Average return	Rate of return (%)
Female	25	17,761	42,136	59,897	1,185,808	50.4
Male	42	20,326	53,214	73,541	926,817	31.8
Total	67	19,369	49,080	68,450	1,023,455	37.8

Note: USD/TRY = 2.90 by the time application was administered

charopoulos' initial study: (1) the returns to primary education were highest and declining by level; (2) private returns were higher than social returns for higher education; (3) returns to human capital were higher than returns to physical capital; and (4) returns to higher education were higher in developing countries (Psacharopoulos 1973 cited in Psacharopoulos 1981). These patterns in 1973 study were derived from the evidence from 32 countries, and was also obtained to a large extent, when the coverage was extended to 45 countries seven years later. The difference was that returns to physical capital exceeded returns to human capital in developed countries. An additional pattern was that returns to women's education was higher than to men in developed countries, while evidence was mixed for developing countries (Psacharopoulos 1985).

In 1994 global update, it was observed that "private returns were considerably higher than social returns because of the public subsidization of education" (Psacharopoulos 1994). The global patterns elicited from the evidence from 75 countries were as follows: (1) returns to education diminishes by the level of per capita income; (2) while social rates were declining, returns to higher education has increased over time; (3) Overall, returns to female education were higher; while private rates of women's primary and higher education were lower; (4) Returns to general education were higher relative to returns to vocational education in secondary level; (5) Returns to higher education fields such as engineering, business and economics, medicine, and law were higher than returns to education in sciences, social sciences and agriculture fields; returns to education were higher in private sector relative to public sector and lower in self-employment relative to paid employment (Psacharopoulos 1994).

In 2004 further update, evidence from 98 countries, resulted in similar patterns: Diminishing returns to education by per capita income; higher private returns than social ones; diminishing returns by level of education, except that private returns to higher education is higher than private returns to secondary education. The private returns to higher education were rising over time despite an overall decrease in all observed countries. Returns to female education were still higher and the difference in higher education level was closed (Psacharopoulos and Patrinos 2004a, b). In sum, an additional year of educa-

tion was founded to add ten percent to a person's earnings.

These findings have been subject of criticism on the grounds that the data were weak and methodology of the studies the data obtained from were heterogeneous. While rejecting these claimed weaknesses (Psachaopoulos and Patrinos 2004b) and pooling research originated from World Bank has been seen as correcting these methodological problems (Colclough et al. 2010; Montenegro and Patrinos 2013).

Although Psacharopoulos' earlier studies found that returns to primary education were highest, in the beginning of the new millennium, a change in the pattern of returns to private education has been observed. (Colclough et al. 2010). Based on the results of studies on 36 countries; it was observed that earnings-schooling relationship was rather convex instead of being concave; meaning that upper levels of education yields higher income over previous level (Colclough et al. 2010). In another World Bank study, similar patterns has been observed, this times using more comparable data and single methodology (Montenegro and Patrinos 2013).

Another source of data for comparison of international rates of return to schooling is OECD reports. OECD (2014) provides private rate calculations based on net present values for 29 member countries. In OECD (2014), private returns were more than double for a tertiary education graduate compared to a secondary education graduate (9.5 for a man and 9.2 for a woman); and also, private returns to tertiary education more than doubled the public returns to that level of education (9.3 for man and 9.1 for women). It was also analyzed that across OECD countries, the returns to men's higher education were higher than those of women; and private returns were higher than public ones on average (OECD 2014).

Based on previous OECD data, Cohn and Addison (1998) calculated rates returns to education by short-cut method for 19 countries in 1992 and 1994 and found that the returns to higher education were relatively high in all countries; and returns to male's and female's education were very different and vary across countries. Cohn and Addison (1998) also used Mincerian and full cost methods and found varying rates.

Psacharopoulos (2014) expresses four emerging patterns based on returns to education: (1)

they were higher in developing areas compared to developed countries; (2) private returns exceed social ones; (3) returns to higher education were rising; (4) there exists wide differentiation by fields of study. The patterns for higher education were attributed to demand for more educated labor power to "complement advances in technology" (Psacharopoulos 2014).

In one of the recent studies, Altonji et al. (2016) analyzes the earnings outcomes of different higher education programs. According to their findings graduates with education major earn eighty percent less than those with an engineering major on average in U.S. Returns to an undergraduate degree other than education has yielded positive returns in comparison to an education BA. A STEM and a business degree make highest differences for their holders (Altonji et al. 2016). In another recent study, Toutkoushian and Paulsen (2016) illustrate the case of a hypothetical person's BA's private return in a similar way the calculation was done through the application form used in this study. They also estimate returns to BA in U.S to examine different methods to measure returns to higher education (Toutkoushian and Paulsen 2016). Van der Valden and Bijlsma (2016) have also recently analyzed the differences in returns to college degree by using OECD data and emphasize matching of higher skills to job requirements, as well as the signaling value of college degrees. Bostwick (2016) also emphasized the signaling value of higher education concerning STEM majors in US. Stevenson (2016) stresses on quality of education in addition to field of study and award level. Naylor et al. (2016) found some evidence that earning premia for university degree is rising over time in the UK. Lindley and Machin (2016) also found significant rise in postgraduate wage premium for US labor market. Peet et al. (2016) observed heterogeneous returns across countries, meaning that the returns are not systematically higher for developing countries, which has been the case for the past two decades. Salisbury (2016) found higher returns for tertiary education for women in South Africa.

In sum, findings of the recent studies show that returns to higher education are higher and increasing over time through the world. This situation is also observed from comparison of the results of past and present studies on private returns to higher education in Turkey, as well.

Findings of the Previous Research on Returns to Higher Education in Turkey

One of the earliest of rates of return calculations for higher education in Turkey was reported as 8.5 percent (social) and twenty-six percent (private) by using data from a survey administered on private sector wage earners in 1968 (Krueger 1972). The results were computed by short-cut method and were included in Psacharopoulos (1985, 1994) meta-analysis. Psacharopoulos and Patrinos (2004b) used Tansel's (1994) findings. Other than global reports and meta-analyses, private returns to higher education in Turkey was studied in many studies using comparative, national and provincial data. These studies use either methods and findings are diverse, but some patterns emerge.

Findings from Earning Function Estimates

In an earlier study, Tansel (1994) used 1987 Household Income Survey data and estimated the returns to higher education of wage earners in Turkish manufactory sector as 16.0 and 13.4 for men and women respectively. Maximum likelihood estimates were 16.2 percent and 11.8 percent for men and women. Higher rates were found for higher education, except for middle school education of women, which was the highest. In this study lower rates for women's higher education might have been attributed to relative marginal productivity concerning the work women do mostly in the sectors included, because the rate of return for women increases to 16.8, while that of men decreases to 12 when computed over vocational high school education.

Tansel (1999) used 1994 Household Income and Expenditure Survey data and found that returns to education have increased by education level in both public and private sectors and there was not much gender differences. Private rate of return to a university education after a general high school was sixteen percent in public services, 8.2 percent for state owned enterprises, and 20.2 for private sector for men; while the same rates were 17.86 in public and 21.54 percent in private sector for women (Tansel 1999). Tansel (2000) used the same data set and found that private rates of return to higher education for men were eighty-two percent for covered wage earners, 60.7 percent for uncovered wage earners, and 25.66 percent for self-employed;

while the same rates for women were 86.88 percent for covered, 85.42 percent for uncovered wage earners, and no significant return for self-employed women for university degree (Tansel 2000). Tansel (2005) estimates rates by employment sector by using same data set and found somewhat different coefficients but the patterns were same: for men as 27.4 percent in public sector, 2.7 percent in state owned enterprises, and 19.4 percent for private sector; for women seven percent for public sector, thirty percent in state owned enterprises, seventy-one percent in private sector (Tansel 2005).

Dayioglu and Kasnakoglu (1997) also used 1994 Household Income and Expenditure Survey data and found that one year of education increases private returns by 12.4 percent for women and 9.98 percent for men. The rates were higher as the level of education gets higher. The returns to university education over a high school was estimated 5.8 percent for men and 6.3 percent for women (Dayioglu and Kasnakoglu 1997). Ozcan et al. (2003) also used 1994 Household Income Survey data and found that rate of returns to higher education over a high school education were estimated as 86 percent for wage earner men and 48 percent for self-employed men. The same rate for wage earner women was found ninety-one percent, while no significant rate was estimated for self-employed women (Ozcan et al. 2003).

Aydemir and Kirdar (2013) used 2002-2010 household income and expenditure surveys data and estimated that an extra year of schooling increases annual earnings by10.2 percent in 2005. For 2002-2010 period yearly effect of education was estimated as three percent, while effect of education sector was estimated as twenty-five percent by OLS (Aydemir and Kirdar 2013). For younger cohort (18-25 years of age) findings could be summarized as low returns in Turkey in general and higher returns for women (Aydemir and Kirdar 2014).

Tansel (1996) used 1989 Household Labor Survey data and "found that self-employed men and women had higher earnings than wage earner men and women respectively" (Tansel 2000). The rate of return to higher education was 16.9 percent for wage earners and 14.7 percent for self-employed men and 14.68 percent for wage earner women and 25.28 percent for self-employed women (Tansel 2004). Bakis et al. (2009) used 2006 household labor force survey data

and estimated the private rate of return resulted from a one more year of formal education as 5 percent (cited in ERG 2012). Filiztekin (2011) confirmed the same rate (5%) by using 2004-2009 household labor force surveys data. Private rate of return to higher education was estimated as forty percent (Filiztekin 2011). McGivney (2012) used 2009 and 2010 Labor Force Survey data and found that average returns to a university degree over high school was thirty-two percent. She also founded that an education major had no significant premium over this average return while a major in health has a forty percent markup, and majors in engineering, services, business and law have some markups varying between twelve to fourteen percent (McGivney 2012).

Gurler and Ucdogruk (2007) used 2002 household budget survey data to estimate Mincerian earning function and found that the rate of return to higher education in Turkey for women was 20.23 percent, while that for men was 7.36 percent in 2002. Tansel (2010) used 2002-2005 Household Budget Surveys data and compared the findings to those obtained from 1994 Household Income and Expenditures data. Returns to higher education over a high school estimated for men were: 16.6 percent in 1994, 18.98 percent in 2002, 16.69 in 2003, 16.63 in 2004 and 17.22 in 2005; while the rates for women were 41.17 percent in 1994, 34.68 in 2002, 22.13 in 2003, 18.38 in 2004 and 28.64 in 2005 (Tansel 2010). Tansel and Daoud (2011) have estimated for-all rate as 11.7 percent for 2004 and 11.8 percent for 2008 by using household budget data. Tansel and Bircan (2012) used 1994 Household Income and Consumption Expenditure Survey and 2002 Household Budget Survey data and estimated rate of returns to higher education 55.9 percent in 1994 and 52.3 percent in 2002. Per year returns were also increasing by education level (Tansel and Bircan 2012).

Salehi-Isfahani et al. (2009) used 1988 Labor Farce Survey, 1994 Household Income and Expenditures Survey, and 2003 Household Budget Survey data and estimated rate of return to an additional year of education as 6.5 percent for 1988, 9.6 percent for 1994, and 12.4 percent for 2003. Private rates of return to higher education over a general high school education were found as fifty-eight percent for 1988, 52.9 percent for 1994, and seventy-two percent for 2003 (Salehi-Isfahani et al. 2009). The private rates of returns to education increases with education

level, and this finding was attributed to market demand for skills (Salehi-Isfahani 2010). Tunaer and Gulcan (2006) used 1994 Household Income and Expenditures Survey and 2004 Household Budget Survey data and found that an extra year of education increases earnings by nine percent for men and eight percent for women in 1994; and ten percent for men and fourteen percent for women in 2004. Among university graduates there was not of much gender difference: 1ten percent in 1994 for each and nineteen percent for women and sixteen percent for men in 2004 (Tunaer and Gulcan 2006).

Oksuzler (2009) used World Values Survey data for 2000-01 and regressed six levels of income by ordered logit analysis and found high probabilities for university graduates to fall into highest category. Arbak (2012) estimated Mincerian function for 12 Mediterranean countries by using same international survey data (European Values Survey and World Values Survey) and found a relatively higher private rate of return for Turkey. In Turkey, an additional year of education increases income by 18.5 percent, with diminishing returns by years of education completed (measured by negative effect of squared term), and with experience yields no earning, in 2000-01 (Arbak 2012).

There are some other estimates based on provincial data. Erdogan (1999) used 1994 household income distribution survey data to estimate returns to education in Izmir, Denizli and Bursa provinces of Turkey. The private rates of return to higher education were found thirty-three percent for males and ninety-three percent for females (Erdogan 1999). Sari (2002) used 2000 Household Income Distribution Survey data and estimated Mincerian earning function to compute returns to education in Bolu province, in Turkey and concludes that one further year of education results in 12.1 percent increase in earnings. He also found higher rate of return for higher education (110%) over secondary education (Sari 2002). Cebeci et al. (2015) used findings in Caliskan (2007) and Psacharopoulos and Patrinos (2004b, 2002) to describe micro-level impact of education on income. Caliskan (2007) had founded an 84.5 percent increase in earnings by completing an undergraduate education in Usak, Turkey by using data gathered from a survey administered by researcher. Mecik (2010) had also used data from a self-administered sur-

vey in Eskisehir province and found that rate of return to higher education as one hundred and twelve percent over high school education.

Findings from Full Cost Method

The earliest study attempting to estimate private returns to higher education in Turkey was Ozelli (1970). In this study private rates were computed by full-cost method by using public sector officials' earnings data in 1960, and were found very low (1-3%) due to high cost of higher education compared to secondary education (Ozelli 1970). The high cost structure of Turkish higher education in 1960's was confirmed later (Krueger 1972; Akalin 1980). The former study found higher rates by using only earnings data (25-27%) in 1968, but commented on cost of higher education depending of the findings of previous studies (Krueger 1972). The latter study used 1970 data to compute rates of return to higher education for public officials by full-cost method and found private rate as 10.5 percent and social one as 8.3 percent (Akalin 1980).

Calculations of rates of returns to higher education in Turkey using full-cost method have resulted somewhat higher rates than those reported by OECD (2014) in later studies. Urer (1983) used public personnel earnings data and some generated cost data and found that private rate of return to higher education was 12.9 percent for general services and nineteen percent for technical services in 1980. Tek (1987) had calculated private rate as 27.6 percent for public sector by using typical earning and expenditure data generated according to then applied criteria in 1985. Erkan (1998) had calculated private rate for higher education over secondary education as 0.38 percent in 1995 and 1.24 percent in 1980 for public officers; while the rates were higher for unionized laborers who for public establishments: 1.03 percent in 1980, 2.45 percent in 1987, and 2.81 percent in 1995 (Erkan 1998). Turkmen (2002) had calculated private rate as 27.6 in 1987 by using 1987 Household Income Survey data and Student Costs Survey data; and 26.5 percent in 1994 by using 1994 Household Income Survey data expenditure data from a national report. Kucuk (2005) used the earnings data for public servants provided by Istanbul Treasury and find that yearly rates of returns to higher education were 8.5 percent for general services and 31.5 percent for technical

services in 2004. Ozgur (2005) had calculated private rate as 20.5 percent and social rate as 16.3 percent for 2002 by using 2002 Education Expenditures Survey data. By using 1987 and 1994 Household Income Survey data private rates for higher education were computed as 27.6 percent for 1987 and 26.5 percent for 1994 (Ozgur 2005). Tas and Yenilmez (2008) used 2002 Education Expenditures Survey results and 2004 Household Budget Survey results and calculated private rate of return to higher education as 22.1 percent in 2004.

Yesilbag (2008) had calculated private rate of returns to 15 different fields of study in Turkey in 2005 by means of a survey developed by researcher. The survey was applied to graduates of different fields who were working at either public or private sector via various means including e-mail and websites according to availability. Private returns to higher education for all fields were computes as 16.6 percent, for education sciences and teacher training as 15.8. The rates were over ten percent in all fields and under 20 percent (Yesilbag 2008).

Akkoyunlu-Wigley and Akkoyunlu (2011) used OECD (2010) present value data and interpreted that the private returns to higher education were high. Cekim (2014) used the results computed by Duman (2008) to interpret that the rate of returns to higher education in Turkey is higher education compared to that of primary and secondary levels. Duman (2008) had used short-cut method by using data from Household Income and Consumption Expenditures Survey (HICES) for earnings and State Planning Organization and MoNE data for costs; and calculated the private rates of return as 27.6 percent, 26.5 percent and 28.43 percent for 1987, 1994 and 2005 respectively. Private returns are higher than social ones; and private returns are higher than previous levels in each year (Duman 2008).

Full-cost method has also been used to calculate returns to higher education for different professions in Turkey. In her several studies Golpek calculated rates of return for a typical physician working in public sector as 36.91 percent (private) (Golpek 2011); for a typical lawyer working in public sector as 40.5 percent (private) and twenty-nine percent (public) (Golpek 2013); again for a typical lawyer working in public sector as 40.5 percent (private) (Golpek 2014); and for a typical engineer working in public sec-

tor as forty-five percent (private and thirty-three percent (public) (Golpek 2015).

Ozsoy (2012) collected data from alumni of Eskisehir Anatolian University via a self-developed survey sent by e-mail. The average rate of return for all graduates was calculated as 22.2 percent, while this rate was 16.5 percent for Faculty of Education graduates in 2008-09 (Ozsoy 2012). The returns were higher for men (24.3%) than for women (20.78%) (Ozsoy and Surmeli 2011).

Overall evaluation of the findings from literature on returns to higher education in Turkey suggest that higher education yields best among all. The findings of recent studies show that the returns are increasing over time. Results of this study also supports these findings.

CONCLUSION

In this study, private rates of returns to higher education for an occupation group in public education sector in Turkey, consisting of university educated individuals from various fields including law, business and economics, engineering and teacher education were calculated and compared. Results show higher rates compared to findings of other studies with higher rates for women's education, as well.

Private returns to higher education were observed highest among returns to all education levels for two decades. On the contrary, global findings have shown that primary education's returns were highest all over the world, and higher education's return follow. Findings of the recent studies reveal that the patterns across the world have been converging the one in Turkey for probably different reasons. Both of the reasons might be combined in recent years. The first reason is considered to be increasing demand for higher educated labor force, which resulted from technological change. This reason applies to global trends as well. The second reason might be segmentation of labor markets in Turkey, which needs to be analyzed through further research.

In this study, the author has tried a new method to calculate private returns to higher education. This method involves obtaining data through application which is done after a seminar work. Rationale for calculation method is quite similar to full cost method. The method used in this study was a variant of full cost meth-

od. In this method participants are educated first and then an application is done. The method yields a flat age-earnings profile like short-cut method. The difference is that this method is applicable to members of a profession and they must be instructed before application.

RECOMMENDATIONS

The method used to calculate returns to higher education is recommended for calculations of private rates of returns of group members of a profession. All the methods are acceptable, depending on the availability of data. Another recommendation for further research, which might be revealed from the literature review presented in the discussion section of this study is that, further research must focus on, the returns of different majors in different sectors.

REFERENCES

Akkoyunlu AW, Akkoyunlu B 2011. Turkiye'de egitimin degerinin olculmesi. *Hacettepe Universitesi Egitim Fakultesi Dergisi,* 40: 375–385.

Altonji JG, Arcidiacono P, Maurel A 2016. The analysis of field choice in college and graduate school: Determinants and wage effects. In: EA Hanushek, SJ Machin, L Woessman (Eds.): *Handbook of the Economics of Education.* Volume 5. Amsterdam: North-Holland, pp. 305-396.

Arbak E 2012. Measuring Returns to Education and Human Capital in the Southern Mediterranean. MEDPRO Technical Report No. 17 / September 2012. From <www.medpro-foresight.eu>, <www.ceps.eu> (Retrieved on 16 January 2016).

Aydemir A, Kirdar M 2013. Estimates of the Return to Schooling in a Developing Country: Evidence from a Major Policy Reform in Turkey. *MPRA Working Paper No.* 51938.

Aydemir, A, Kirdar MG 2014. Low Wage Returns to Schooling in a Developing Country: Evidence from a Major Policy Reform in Turkey. *IZA Discussion Paper No.* 9274.

Becker GS 1993. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education.* 3rd Edition. Chicago: The University of Chicago Press.

Belfield CR 2000. *Economic Principles for Education: Theory and Evidence.* Cheltenham, UK: Edward Elgar.

Blundell R, Dearden L, Sianesi B 2001. Estimating the Returns to Education: Models, Methods and Results. *Working Paper.* London: Centre for the Economics of Education, London School of Economics.

Bostwick V 2016. Signaling in higher education: The effect of access to elite colleges on choice of major. *Economic Inquiry,* 54(3): 1383-1401.

Caliskan S 2007. Egitimin getirisi: Usak ili ornegi. *Suleyman Demirel Universitesi Iktisadi ve Idari Bilimler Fakultesi Dergisi,* 12(2): 235–252.

Cebeci E, Algan N, Cankaya S 2015. The returns of the education in the context of micro-macro analysis. *Procedia: Social and Behavioral Sciences,* 174: 916–925.

Cekim M 2014. *Income Inequality and Education in Turkey: 1980-2005.* Master's Thesis, Unpublished. Lund, Sweden: Lund University SEM.

Checci D 2006. *The Economics of Education: Human Capital, Family Background and Inequality.* Cambridge: Cambridge University Press.

Cohn E, Addison JT 1998. The economic returns to lifelong learning. *Education Economics,* 6(3): 253–307.

Colclough C, Kingdon G, Patrinos H 2010. The changing pattern of wage returns to education and its implications. *Development Policy Review,* 28(6): 733-747.

Dayioglu M, Kasnakoglu Z 1997. Kentsel kesimde kadin ve erkeklerin isgucune katilimlari ve kazanc farkliliklari. *ODTU Gelisme Dergisi,* 24(3): 329-361.

Duman A 2008. Education and income inequality in Turkey: Does schooling matter? *Financial Theory and Practice,* 32(3): 369-385.

ERG [Egitim Reformu Girisimi] 2012. Egitim Izleme Raporu 2011. From <http://erg.sabanciuniv.edu/tr/node/80> (Retrieved on 24 March 2016).

Erdogan S 1999. Temel insan sermayesi modeli: Secilmis illerde ekonometrik yaklasim. *Dokuz Eylul Universitesi Iktisadi ve Idari Bilimler Fakultesi Dergisi,* 14(1): 75-95.

Ergen H 1999. Turkiye'de egitimin ekonomik buyumeye katkisi. *Ekonomik Yaklasim,* 10(35): 21–52.

Erkan E 1998. Turkiye'de kamu kesiminde egitim icsel getiri orani 1980-1995. *Ekonomik Yaklasim,* 9(29): 5-16.

Filiztekin A 2011. Social Returns to Education in a Developing Country. *Working Paper.* December 2011, Sabanci University ID: SU_FASS_2011/0007.

Groot W, Oosterbeek H 1992. Optimal investment in human capital under uncertainty. *Economics of Education Review,* 11(1): 41-49.

Golpek F 2011. Turkiye'de yuksekogretimin getirileri ve fiyati: Tip fakultesi ornegi. *Yuksekogretim ve Bilim Dergisi,* 1(3): 134-141.

Golpek F 2013. Turkiye'de dort yillik universite egitiminin sonunda kim kazanir? Hukuk fakultesi ornegi. *Yuksekogretim ve Bilim Dergisi,* 3(1): 48-56.

Golpek F 2014. Turkiye'de yuksekogretimin fiyati ve getiri orani: Hukuk fakultesi ornegi. *Egitim ve Bilim,* 39(175): 172-182.

Golpek F 2015. Turkiye'de dort yillik egitimin sonunda kim kazanir: Toplum mu birey mi? *Egitim ve Bilim,* 40(177): 19-30.

Gurler OK, Ucdogruk S 2007. Turkiye'de cinsiyete gore gelir farkliliginin ayristirma yontemiyle uygulanmasi. *Journal of Yasar University,* 2(6): 571–589.

Krueger AO 1972. Rates of return to Turkish higher education. *The Journal of Human Resources,* 7(4): 482-499.

Kucuk G 2005. *Egitim Yatirimlarinin Bireysel ve Sosyal Getirisi: Turkiye'de Calisan Kadinlar Orneginde Bir Arastirma.* Master's Thesis, Unpublished. Istanbul, Turkey: Marmara University.

Lindley J, Machin S 2016. The rising postgraduate wage premium. *Economica,* 83(330): 281-306.

McGivney EJ 2012. *The Returns to University Education in Turkey by Disciplines*. Master's Thesis, Unpublished. Istanbul, Turkey: Graduate School of Arts and Social Sciences, Sabanci University.

McMahon W 1999. *Education and Development: Measuring the Total Benefits*. Oxford: Oxford University Press.

Mecik O 2010. *Sosyal Sermaye ve Beseri Sermayenin Bireysel Ekonomik Getirisi: Eskisehir Ili Ornegi*. Master's Thesis, Unpublished. Usak, Turkey: Institute of Social Sciences, Usak University.

Mingat A, Tan JP 1987. Analytical Tools for Sector Work in Education. World Bank Discussion Paper. *Report No.* EDT74. World Bank.

Montenegro CE, Patrinos HA 2013. Returns to Schooling around the World. *Background Paper for the World Development Report 2013*. World Bank.

Naylor R, Smith J, Telhaj S 2016. Graduate returns, degree class premia and higher education expansion in the UK. *Oxford Economic Papers,* 68(2): 525–545.

OECD 2010. Education at a Glance 2010: OECD Indicators. OECD Publishing. From <http://www.oecd-ilibrary.org/education/education-at-a-glance-2010_eag-2010-en> (Retrieved on 25 September 2015).

OECD 2014. Education at a Glance 2014: OECD Indicators. OECD Publishing. From <http://www.oecd-ilibrary.org/education/education-at-a-glance-2014_eag-2014-en> (Retrieved on 25 September 2015).

Oksuzler O 2009. Does Education Pay Off In Turkey? An Ordered Logit Approach. MPRA Paper No. 14375. From <http://mpra.ub.uni-muenchen.de/14375/1/MPRA_paper_14375.pdf> (Retrieved on 28 March 2016).

Ozcan YZ, Ucdogruk S, Ozcan MK 2003. Wage differences by gender, wage and self-employment in urban Turkey. *Journal of Economic Cooperation,* 24(1): 1-24.

Ozelli MT 1970. The estimates of private internal rates of return on educational investment in the first Turkish Republic, 1923-1960. *International Journal of Middle East Studies,* 1(2): 154-176.

Ozgur E 2005. *Turkiye'de Kalkinmaya Yonelik Egitim Politikalari ve Egitim Yatirimlarinin Geri Donusu*. Master's Thesis, Unpublished. Eskisehir, Turkey: Eskisehir Osmangazi University.

Ozsoy C, Surmeli A 2011. Toplumsal Cinsiyet Acisindan Yuksekogretimin Getirisi Uzerine Bir Arastirma. *9th International Conference on Knowledge, Economy and Management Proceedings*. June 23-25, Sarajevo-Bosnia and Herzegovina.

Ozsoy C, Surmeli A 2012. Egitim yatirimlarinin getirisi: Anadolu Universitesinin sosyal bilimler alaninda egitim veren fakulte mezunlarina yonelik bir arastirma. *Anadolu Universitesi Sosyal Bilimler Dergisi,* 12(2): 69–85.

Patrinos HA 2008. Returns to education: The gender perspective. In: M Tembon, L Fort (Eds.): *Girls Education in the 21st Century: Gender Equality, Empowerment, and Economic Growth*. Washington DC: The World Bank, pp. 53-66.

Patrinos HA, Psacharopoulos G 2010. Returns to education in developing countries. In: P Peterson, E Baker, B McGaw (Eds.): *International Encyclopedia of Education*. Volume 2. 3rd Edition. Oxford, UK: Elsevier, pp. 305–312.

Peet ED, Fink G, Fawzi W 2016. Returns to education in developing countries: Evidence from the living standards and measurement study surveys. *Economics of Education Review,* 49: 69-90.

Psacharopoulos G 1981. Returns to education: An updated international comparison. *Comparative Education,* 17(3): 321–341.

Psacharopoulos G 1985. Returns to education: A further update and implications. *The Journal of Human Resources,* 20(4): 583–604.

Psacharopoulos G 1994. Returns to investment in education: A global update. *World Development,* 22(9): 1325–1343.

Psacharopoulos G 2007. The Returns to Investment in Higher Education: Methods, Data and Policy Implications. Chapter 2. In: JG Mora, L Vila, G Psacharopoulos, KS Evanthia, H Vossensteyn, E Villareal (Eds.): Rates of Return and Funding Models in Europe. Final Report to the Directorate General for Education and Culture of the European Commission. From <https://go8.edu.au/sites/default/files/events/eac2007rates_of_return_and_funding_models_in_europe.pdf> (Retrieved on 9 February 2016).

Psacharopoulos G 2014. The returns to investment in higher education. In: ME Menon, DG Terkla, P Gibbs (Eds.): *Using Data to Improve Higher Education: Research, Policy and Practice*. Rotterdam: Sense Publishers, pp. 121–148.

Psacharopoulos G, Patrinos HA 2004a. Human capital and rates of return. In: J Geraint, J Johnes (Eds.): *International Handbook on the Economics of Education*. Cheltenham, UK: Edward Elgar, pp. 1-57.

Psacharopoulos G, Patrinos HA 2004b. Returns to investment in education: A further update. *Education Economics,* 12(2): 111-134.

Salehi-Isfahani D 2010. Human Development in the Middle East and North Africa. *UNDP Human Development Reports Research Paper* 2010/26.

Salehi-Isfahani D, Tunali I, Assaad R 2009. A comparative study of returns to education of urban men in Egypt, Iran, and Turkey. *Middle East Development Journal,* 1(2): 145–188.

Salisbury T 2016. Education and inequality in South Africa: Returns to schooling in the post-apartheid era. *International Journal of Educational Development,* 46: 43-52.

Sari R 2002. Kazanclar ve egitim iliskisi: Il bazinda yeni veri tabani ile kanit. *METU Studies in Development,* 29(3-4): 367–380.

Stevenson A 2016. The returns to quality in graduate education. *Education Economics,* 24(5): 445-464.

Tansel A 1994. Wage employment, earnings and returns to schooling for men and women in Turkey. *Economics of Education Review,* 13(4): 305–320.

Tansel A 1996. Self-employment, wage employment and returns to education for urban men and women in Turkey. In: T Bulutay (Ed.): *Education and the Labor Markets in Turkey*. Ankara: State Institute of Statistics, pp. 175–208.

Tansel A 1999. Public-Private Employment Choice, Wage Differentials and Gender in Turkey. *Yale University Economic Growth Center Discussion Paper No.* 797, USA.

Tansel A 2000. Wage Earners, Self-employment and Gender in the Informal Sector in Turkey. *World Bank Working Paper No.* 24, World Bank.

Tansel A 2002. Determinants of school attainment of boys and girls in Turkey: Individual, household and community factors. *Economics of Education Review,* 21(5): 455-470.

Tansel A 2005a. Education and labor market outcomes in Turkey. In: World Bank (Report No. 32450-TU) (Ed.): *Turkey-Education Sector Study: Sustainable Pathways to an Effective, Equitable, and Efficient Education System for Preschool through Secondary School Education.* Washington DC: The World Bank, pp. 139–145.

Tansel A 2005b. Public-private employment choice, wage differentials, and gender in Turkey. *Economic Development and Cultural Change,* 53(2): 453–477.

Tansel A 2010. Changing Returns to Education for Men and Women in a Developing Country: Turkey 1994-2005. *IZA Discussion Paper.*

Tansel A, Bircan FB 2012. Wage inequality and returns to education in Turkey: A quantile regression analysis. *Review of Development Economics,* 16(1): 107–121.

Tansel A, Daoud Y 2011. Comparative Essay on Returns to Education in Palestine and Turkey. *IZA Discussion Paper No.* 5907.

Tas U, Yenilmez F 2008. Turkiye'de egitimin kalkinma uzerindeki rolu ve egitim yatirimlarinin geri donus orani. *Eskisehir Osmangazi Universitesi Sosyal Bilimler Dergisi,* 9(1): 155–186.

Tek Z 1987. Turk Yuksek Ogretiminde Maliyet-Fayda Analizi Ve Harc Uygulamasi. *State Budget Specialists' Research Report.* Ankara: Ministry of Finance and Customs.

Tremblay K 2002. Investing in human capital and returns. In: OECD, UNESCO (Eds.): *Financing Education – Investments and Returns: Analysis of the World Education Indicators.* Paris: OECD, UNESCO, pp. 15–60.

Tunaer BM, Gulcan Y 2006. Measuring Returns to Education in Turkey. *Paper Presented at International Conference on Human and Economic Resources,* 24-25 May, Izmir, Izmir Economics University.

Tilak JBG 2002. Education and poverty. *Journal of Human Development,* 3(2): 191–207.

Toutkoushian RK, Paulsen MB 2016. *Economics of Higher Education: Background, Concepts, and Applications.* Dordrecht: Springer.

Turkmen F 2002. *Egitimin Ekonomik ve Sosyal Faydalari ve Turkiye'de Egitim-Ekonomik Buyume Iliskisinin Arastirilmasi.* State Planning Organization Specialist Thesis, Publication No. 2655. Ankara: SPO.

Ucdogruk S, Ozcan KM, Ozcan YZ 2000. Turkiye'de gelismislik indeksine gore secilmis illerde gelir farkliliklarini belirleyen etmenler. *Ekonomik Yaklasim,* 11(37): 29–57.

Unal LI 1992. Egitim ve gelir iliskisi. *Ankara Universitesi Egitim Bilimleri Fakultesi Dergisi,* 25(1): 113–129.

Urer F 1983. *Turkiye'de Yuksekogretim Harcamalarina Maliyet-Fayda Analizinin Uygulanmasi.* State Planning Organization Specialist Thesis. Ankara: SPO.

Van der Valden R, Bijlsma I 2016. College wage premiums and skills: A cross-country analysis. *Oxford Review of Economic Policy,* 32(4): 497–513.

Woodhall M 2004. *Cost-benefit Analysis in Educational Planning.* Paris: UNESCO, IIEP.

Yesilbag Y 2008. *Egitim ve Ekonomi: Turkiye'de Yuksekogretimin Getirileri Uzerine Bir Arastirma.* Ankara: Sobil Yayincilik.