

DETERMINANTS OF HOUSEHOLD EDUCATION EXPENDITURES BY EDUCATION LEVEL: THE CASE of TURKEY

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Abstract

There is a cost of educational attainment, which is covered by households as well as the state. While government spending on education emphasizes public responsibility for the realization and support of the existing service, education expenditures by households emphasize benefiting from educational services.

The expenditures made by households differ by some socio-economic factors and are not the same for all levels of education. Some levels of education may cost more in terms of basic and supportive requirements.

The purpose of this study is to identify determinants of household education expenditures and to examine whether education expenditures at education levels are affected by the same determinants. Data used in the study was obtained from the 2017 household budget survey, which was prepared by Turkey Statistical Institute.

Keywords: *Household Education Expenditures, Educational Attainment, Censored Regression Model, Tobit Model*

JEL Codes: *D12, I26, C24*

Introduction

Education is an important part of development, in terms of the benefits it provides to individuals' capitals and the economic and social structures of nations. Decision makers who are aware of this development, make the necessary investment in education, which is the basic element of human capital, due to its

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effects on productivity levels, and benefit highly from the return of education as a result of increased productivity. Although the resources allocated by the state for education increase regularly every year in our country, the limited amount of these resources, which are not sufficient for the entire society, makes households to allocate a certain amount from their budgets for education. Some households also allocate a certain amount of their budgets to education in order to make a difference in the economic and social acquisitions they will gain regardless of the limited resources they have. However, some socio-economic factors involving households do not allow the desired educational investment to be made for each household at the desired levels, and therefore these investments differ by the household and the education level at which the investment will be realized. In this context, the main purpose of the study is to identify the determinants of household education expenditures, and to determine whether these determinants also make sense at different educational levels. Data used in the study was obtained from the 2017 household budget survey, which was prepared by Turkey Statistical Institute. In this study, after briefly mentioning the concept of education, human capital theory is discussed in terms of educational attainment and education expenditures, and the conceptual framework of factors affecting education expenditures is explained by the household production theory and quality quantity theory, which are intertwined with human capital theory. Secondly, a literature review is included regarding the studies on educational attainment and education expenditures and then methodology is explained briefly. Finally, factors that may have an effect on the education expenditures made by different levels of education are estimated with the Tobit model.

Education, Educational Attainment and Education Expenditures

In both developed and developing countries, the educated workforce is extremely important for growth and development. Education is important not only to provide knowledge and skills to the individual, but also to raise social awareness and it allows the society to adapt into new markets and technologies in the new world order. States and individuals who want to be a part of this change take a certain responsibility and bear some cost, but this is not the same for each economic unit. Many economic, social, psychological and demographic factors cause education investments to differ.

Education provides a number of both individual and social benefits. The investments made by the individuals who are a part of the society in which they live, will find a reflection in the society in which they are interacting. (Çalçalı, 2009:25). Therefore, it is possible to state that the individual and social benefits of education cannot be separated from each other with very clear boundaries. Education, which tries to create a strong society in social sense, also contributes to

the formation of an economically strong country through educated individuals who are also part of production. (Taş & Yenilmez, 2008:159). When the individual benefits of education are examined; in the labor market, it is possible to say that educated workers have at least three main advantages over less educated workers. The first is that they get higher wages, the second is that they experience more upward mobility in income and occupation, and finally, they are more stable in employment (Mincer, 1991:2). Increased earnings of workers at higher education levels result from two factors. The first is the increased efficiency of human capital, which allows workers to earn more hourly wages, and the second is that increased education levels reduce the chances of unemployment and the duration of unemployment (Saxton, 2000:3).

The most important benefit of education is the increase in the income of individuals. The relationship between education and earnings is based on the assumption that the positive contribution of the individual to the qualities it has positive effects on productivity. (Çalışkan, 2007:291). The skills acquired by the individual increase their working habits and productivity. As income and productivity are related, the more education an individual has, the higher the income will be (Stiglitz, 1973:136). Considering that wages are determined on the basis of productivity, individuals have to generate an increase in productivity level in order to gain more. Moreover, they have to increase their human capital (Yumuşak et al., 2009:331-332). Investments made to increase the productivity of individuals are explained by human capital models. As a result of these investments, productivity increases and manifests itself as an increase in skills. Increasing the productivity of its employees leads to an increase in their earnings. (Kıvılcım & Üçdoğruk, 1997:284). Considering all these assumptions, Mincer (1974) developed the basic human capital model.

Table 1 prepared by TurkStat, “Monthly Average Gross Wage and Yearly Average Gross Earnings by Educational Attainment” shows the education-income relationship. In the study covering 2006, 2010 and 2014, there is a linear relationship between the income of individuals and their education levels. As the education level increases, it is observed that there is a positive, observable change in earnings, and approximately three times the difference between the monthly and annual average gross wages of individuals with primary and lower education levels and higher education and above.

Table 1: Monthly Average Gross Wage and Yearly Average Gross Earnings by Educational Attainment

	Monthly Average Gross Wage			Annual Average Gross Earnings		
	2006	2010	2014	2006	2010	2014
Primary School and Below	764	1032	1526	9676	13099	18602
Elementary and Secondary School	760	1026	1514	9640	13043	18476
High School	922	1280	1707	11802	16414	21222
Vocational High School	1233	1593	2263	16334	21280	28143
Higher Education	2088	2663	3952	27310	35383	51405

Source: TÜİK Income Distribution Survey, 2016

Benefits of education are not limited to success at finding a job and earning money; schooling also affects nonmarket outcomes. Nonmarkets effects of education points out that relationship between one's education and one's own health status, health status of one's family, the schooling received by one's children members, contribution to the efficiency of choices made, influence fertility choices (Wolfe & Zuvekas, 1995:1-2). The benefits provided by education are not only individual but also social benefits. It is possible to express the social benefits of education with externalities. The external benefits of education are those benefits to society that are above and beyond the private benefits realized by the individual decision maker, that is, the student and the family (McMahon,1987:133). Duda (2013) stated the social benefits of education as social cohesion, adoption of new technologies, job amenities and fringe benefits, crime reduction (Duda, 2013:91)

Considering all these stated benefits of education, it is seen that these benefits are seen to be related to economic, social, and political life. Education is not only a consumer good, but also an investment good that is expected to yield returns in the future. This occurred with the emergence of human capital theory in the 1960s.

Education Expenditures

There is a cost to the demand for education that exists across society and in families that are its smallest unit. This cost is covered by families as well as the state. While the government expenditures on education emphasizes public responsibility in terms of providing the necessary service and supporting the

service, the education expenditures made by the households emphasize the use of educational services.

Report on education expenditures published by TurkStat in 2018 has reached the conclusion that education expenditures in 2017 increased by 9.8% compared to the previous year and came up to approximately 177 billion TL and 19% of these expenditures are made by households (TurkStat, 2018) Educational statistics published by TurkStat in 2017, education expenditures of households the 2011-2017 period by education levels are shown in Table 2.

Table 2: Household Education Expenditure by Level of Education, 2011-2017

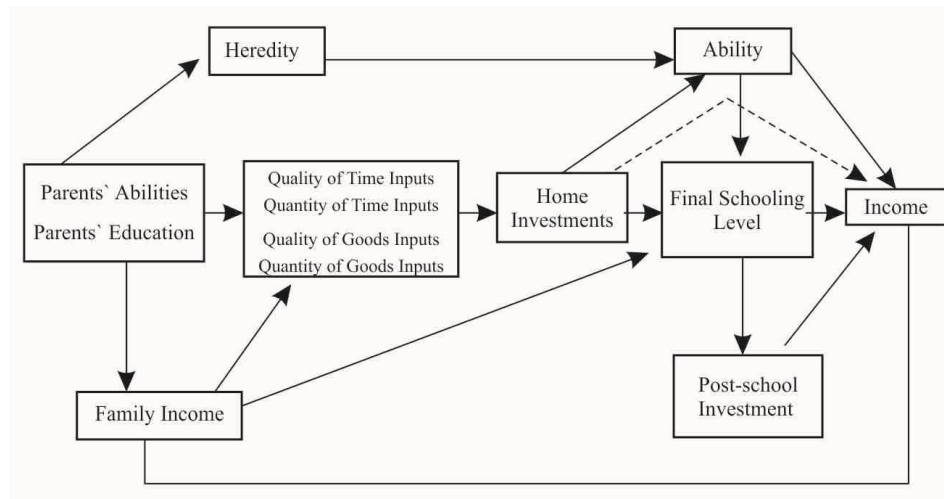
	2011	2012	2013	2014	2015	2016	2017
Pre-primary Education	896	1202	1272	1565	1469	1820	2073
Primary School	2376	3088	3377	4087	4721	5172	5631
Secondary Education	2542	3405	3572	4574	5230	6947	7531
General Secondary Education	3196	3857	4125	4975	5079	6564	7892
Vocational and Tech. Up. Secondary Education	1678	2285	2453	3008	2785	3272	3378
Total Upper Secondary Education	4874	6142	6578	7983	7865	9836	11269
Tertiary Education	3094	4394	4634	5403	547	6215	7090
Total	13782	18230	19433	23613	24832	29989	33593

Source:TUIK, 2017

As shown in Table 2, expenditures made by households in each education level the 2011-2017 period increased regularly year to year. At each level of education, the needs of children for their education are different. In addition to the observation that this differentiation increased in 2011-2017 period as the transition from the current education level to the next education level, the expenditures at the secondary level are as high as the expenditures at the higher education level, and in some years, the expenditures at the secondary level are higher than the expenditures at the higher education level.

Education is expected to provide capital, such as competence, knowledge and skills to improve health conditions, provide stable employment, increase one's income, maximize output, improve the individual's quality of life. The acquisition of this educational capital provides social, cultural and economic benefits. However, in order to benefit from these benefits, some important investments must be made. Nations and individuals who have invested in education, which plays an important role in the acquisition of human capital, have experienced a faster development than those who invest in non-human capital. (Schultz, 1961:1). The decisions of the children who continue their lives in line with the decisions made by their parents since the moment they were born are made by the parents and the expenditures related to education are made by them as well. The family is an important institution in the determination of an individual's welfare (Ermisch, 2016:1).

Figure 1: Home Investments in Children



Source: Haveman & Wolfe, 1995; Leibowitz, 1974

Figure 2 shows the connection between parent education and household resources, on the one hand, and the connection between the education of the child, on the other. From the beginning, economists have seen children's attainment in education as an aspect of family behavior theory. The family is seen as a production unit that uses real inputs to produce utility for its members. Adults of the family make decisions regarding the production of the family's economic resources (eg labor supply). They also determine the uses of these resources. The amount of family resources allocated to children, the nature of these resources, and the timing of their distribution influence the attainments of children in the family. Children are also influenced by the family's choices, such as the number of siblings, the type of

the environment they were born and raised in, location movements, and structural changes in the family (Haveman & Wolfe, 1995: 1832). It is not surprising to find similar educational levels in both parents and children, as children share many features with their parents.

Determinants of Educational Attainment and Household Education Expenditures

Economic theories concerning educational attainment and education expenditures concentrate on social and economic factors. In addition to the human capital theory, which has gained momentum under the leadership of Gary Becker, the household production theory attributes household resources and investments directly to the educational attainment of children. The resources a family owns depend on how many people the family consists of and how much disposable income the family has for resources. Household production theory is a natural result of human capital theory and time allocation theory. The assumption at the center of the theory is that households as not only a producing unit as well as a consuming unit. Households produce products by combining goods and time inputs using traditional cost minimization rules.

Household economics considers the family as not only a consuming unit but also as a producing unit. Households produce products by combining goods and time inputs according to traditional cost minimization rules (Becker, 1965:516). Unlike a commercial firm, household products are consumed by household members rather than sold. These products are produced with scarce resources like products produced by a company. These products cannot be purchased from the market (Becker, 1993:23). The concept of time constitutes one of the most important points of the theory. Becker handled the concept of time in two dimensions as the time spent in the study and the time out of work, and emphasized the time out of work as consumption time (Becker, 1965:495-496).

To produce children referred to as "quality children" by Becker, parents must spend time at home and devote real resources to develop an environment that promotes and supports education. Since families are different, the time and money they spend on investments will be different (De Serf, 2002:3). A number of individual, familial, economic and socioeconomic factors are linked to educational attainment and household education expenditure. Many factors to be counted as household income, education level, professions of parents, marital status, number of siblings are the inputs of household production functions.

In the leading article written by Gary Becker (1960), an economic framework is created by analyzing the factors that determine fertility, where

children are seen as durable goods that provide income for parents. After the quality-quantity theory was proposed by Becker (1960), it was developed by Becker and Lewis (1973). According to this theory, children are assumed to benefit as durable consumer goods. (Becker, 1960:211). Becker (1960) asserts that the nature of children is directly related to the amount spent on them, while the number of children is also directly related to income. Becker's quality-quantity model is an investment model in which households decide the level of resources(quality) allocated per child. The model assumes that these investments (education, health, etc.) lead to higher levels of child quality. The direct effect of the model is that there is a trade-off between the investments made on the child and the number of children. Becker (1960) rejected statements suggesting that children are inferior goods or that high-income families who spend more money on their children have lower fertility than they face higher-priced children. Instead, he stated that children are superior goods and this problem will be solved within the static preferences model (Hotz et al., 1997: 294; Selim, 2004:5). As with other goods, child demand is affected by the costs and benefits that parents face. With a rational choice account, parents tend to produce the number of children that maximize their benefits depending on the limitation of available resources. Benefit from children is similar to benefit from other goods in the utility function. As a result, child demand depends on the cost of producing child services, based on the parents' preferences, the resources they have, and the cost of producing other services (Kimenyi et al., 1988: 132).

Literature Review

Regarding the determinants of educational attainment and education expenditures firstly studies conducted abroad and then domestically will be included.

Acerenza and Gandelman (2016) examined household education expenditures in twelve Latin American and Caribbean countries. They concluded that the largest education expenditure was made in the USA, Bahamas, Chile and Mexico, and the lowest in Bolivia, Brazil and Paraguay. In addition, it was determined that the highest expenditure was made at the higher education level and for individuals aged 18-23. Chi and Qian (2016) investigated educational expenditures made in and out of school in China. They found that out-of-school expenditures significantly increased the burden on household education expenditures and the compulsory education policy implemented was effective in reducing education expenditures within the school, but did not prevent out-of-school education expenditures. Huy (2012) examined the factors affecting households' spending for the education of children in Vietnam. According to the results obtained from the Tobit model, they determined that household income had an impact on total education expenditure. Households with primary or secondary

school-age children spend more on education, while children at the preschool level and college-age children spend less on education. Andreou (2012) analyzed household education expenditures in Cyprus, using data from 1996, 2002 and 2008, and observed that expenditures on education increase with income. The most important factors affecting the level of household expenditure on education are income, number of children in household, region of residence and head's age and education. Qian and Smyth (2011) analyzed the parents' education expenditures for their children using household survey data from 32 selected cities in China. Their conclusion shows that household income has significant impacts on education spending, both domestic and overseas. Psacharopoulos and Papakonstantinou (2005) using more than 3000 samples investigated the time and money spent preparing for the higher education exams, and how much they spend privately while participating university. It is found that out-of-pocket spending for university entrance exams and studying at college was higher than that of public spending. In addition, poor families spend more of their income on the education of their children. Tilak (2002) examined household education spending by different population groups as well as household education spending in rural areas using the National Survey of Human Development in India. The main findings that emerge from this study are: Families in the low income group, which are in poor condition with their socio-economic characteristics, allocate a significant share of education. Household income, education level of household head and household size are the most important factors affecting education expenditures. Ermisch and Francesconi (2001) examined the effects of family characteristics in England on the attainment of children in education with data from 1991-1997. They found a very strong relationship between parents' educational attainment and that of children. One of the remarkable results is that the attainment of children living in single-parent families and from the lowest income group in education decreases significantly. Beneito, Ferri, Molto and Uriel (2001) analyzed the determinants of secondary education and higher education spending in Spain through the tobit model. Their findings indicated that secondary education expenditures are more affected by economic and social factors. Kanellopoulos and Psacharopoulos (1997) examined private education expenditures in Greece using data from the 1988 family expenditure survey. They found that the education level and profession of the household head are the most important determinants of household expenditures, but the size of the household and the number of children under the age of six negatively affect private spending on education.

Acar, Günalp and Cilasun (2016), using Turkish Household Budget Surveys from 2003, 2007 and 2012 examined determinants of household education

expenditures within an Engel curve framework. They found that the estimated expenditure elasticities have lower values for the top- and the bottom income quartiles while they have larger values for the middle-income quartiles. Bayar and İlhan (2016), using data from Turkish Household Budget Surveys investigate the determinants of household expenditures and education expenditures of different income groups. Their findings show that 2002, however, income elasticity of education expenditure is higher for poorer households compared to the richer ones, which means that the poor are more sensitive to income changes with respect to education expenditures. However, they have not reached such a result in 2013. Sülkü and Abdioğlu (2014) using data from Turkish Household Budget Surveys from 2003 to 2009 examined the financial burden of individual education. They concluded that factors such as education level of the household head, the level of income of the household, living in an urban settlement, and having at least one child in the family over the age of eighteen affect education expenditures. Duman (2012) examined the effect of international money transfers on the human capital investments, education expenditures and living conditions of children, and found that these monetary transfers caused an increase in the education expenditures of households due to their positive effects on the living conditions of households. Dayıoğlu and others (2009) examined the effects of sibship size, birth order and sibling sex composition on children's school enrolment in urban Turkey. Their findings show that sibship does not have any effect on the enrollment of children. In addition, birth order and sibling sex composition matter more for poorer households suggests that scarce financial resources play an important role in bringing about the sibling composition effects. Gürler et al.(2007) using data from Turkish Household Budget Survey 2004 investigated the factors that affect the education demands of individuals aged 15-23. According to the sequential probit model results, in which education levels were taken as dependent variables, it was determined that boys' participation in education was higher than girls. Moreover, the results indicate that the demand for education increase with age. Tansel and Bircan (2006), using data from Turkish Household Budget Survey 1994 investigated the determinants of private tutoring in Turkey. They found a positive relationship between mother's educational attainment and private tutoring expenditures and found private tutoring expenditures increase at a decreasing rate with the age of the household head.

Methodology

In regression models, the dependent variable of interest cannot be fully observed, or all values of the dependent variable can be fully observed, but if the relevant variable is selected from a sample that does not represent the population, the method used to analyze such observations must be different. In such cases,

limited dependent variable models, latent variable models, generalized tobit models and selection models are preferred. (Cameron & Trivedi, 2005:529). Censored or truncated regression models, which are also referred to as the Tobit model, were proposed by Tobin (1958) and are often used by economists to analyze limited dependent variables, i.e., dependent variables that are subject to a known upper or lower constraint. (Olsen, 1978:1211). Tobin analyzed household expenditures on durable consumer goods using a regression model that takes into account the fact that expenditures cannot be negative, and named the model as a limited dependent variables model. (Amemiya, 1985:360). Consider regression model

$$y^* = \beta_1 + \beta_2 x_t + u_t, \quad u_t \sim iid(0, \sigma^2) \quad (1)$$

In

expression (2.1) y^* is a latent variable which is either censored or truncated. Ordinary least squares estimation using truncated or censored samples yields estimators biased and inconsistent. Values of all variables for the whole sample are available in linear regression models. Explanatory variables of the entire sample are observed with censoring, but information about the observations of some dependent variable is limited. Any dependent variable that is censored or truncated is a limited dependent variable. "In regression models where the range of change of the dependent variable is limited in any way, if the observations outside a given range are completely lost, then the truncated model but at least if the independent variables can be observed, is the censored model." (Üçdoğruk et al., 2001:14).

The most known censored sample regression model is the Tobit model, also known as the Standard Tobit model. It is given by

$$y_i^* = x_i' \beta + \varepsilon_i \quad i = 1, \dots, N \quad (2)$$

$$y_i = y_i^* \quad , y_i^* > 0 \quad (3)$$

$$= 0 \quad , y_i^* \leq 0 \quad (4)$$

y_i^* , is a latent variable that can be observed when it is positive. Notice that the error term is normally distributed with zero mean and constant variance. This model is a standard regression model where all negative values are equal to zero and observations are censored below (Verbeek, 2004: 219). Note that $y_i^* > 0$ and $y_i^* \leq 0$ may be changed to $y_i^* > y_0$ and $y_i^* \leq y_0$ without essentially changing the model, whether y_0 is known or unknown, because y_0 can be absorbed into the constant term of the regression (Amemiya, 1985:363). Tobit model assumes that the parameters for the effect of the explanatory variables on the probability that an

observation is censored and the effect on the conditional mean of the non-censored observations are the same. (Franses & Paap, 2004:139).

Data

In this part of the study, we will try to identify the determinants of the households' spending on education by allocating a certain share from their budgets by using the data of the 2017 Household Budget Survey of TurkStat. In this context, the application will be analysed by the Tobit model method since some values of the dependent variable are unlikely to be observed. Household spending on education is not the same for all education levels. The differences between the levels of education can bring together different needs in terms of both basic and supportive needs. For this reason, the factors affecting education expenditures will be determined separately for each education level (preschool, primary school, secondary school-high school, pre-university and university). Turkstat Household Budget Survey for 2017 consists of surveys obtained from different regions of Turkey. The household budget survey is a very detailed study that includes the characteristics of the household, socio-economic indicators, household income and the expenditures made for the purchase of goods and services. The data set consists of data of a total of 12165 households. The main focus of the study is the education expenditures of the households, and since the surveys obtained do not contain the amounts related to the annual expenditure, the monthly expenditure variable is multiplied by 12 for each household and is arranged as an annual education expenditure variable. In addition, in order to determine the factors affecting the education expenditures made by the households at each education level, the education expenditure variable was calculated separately for each education level.

In order to analyze the expenditure-income relationship, which has been the subject of many researches in economic theory, in the context of education expenditures-total annual income of the household, the logarithmic transformation of the father's annual total income variable is included in the models.

Descriptive statistics of the data are shown in Table 3. It is seen in Table 3 that the education expenditures, which constitute the purpose of the research, are at an average 1003.311 TL in 2017. In addition, it is seen that the expenditures made in each education level differ by education level.

It can be stated that while the average amount of spending at preschool level is around 75 TL, this spending increases with the increase in education level, and the average amount of education expenditure at the university level has increased to around 175 TL.

It is seen that this figure is realized as 301 TL in average at the secondary education level.

The income variable, which is closely related to spending, was examined as the income of the father. It has been observed that the total annual income of the father is 28410 TL on average and the average annual total expenditure of the household is 43062 TL. About half of the household members (52%) are individuals aged between 6-14. The number of individuals aged 0-5 and 15-19 is about 30%, and the number of individuals aged 20-24 is 22% of household members. When the parental education level, which is thought to have a significant effect in the research, was examined, the average education level of the father (7,72 years) was higher than the average education level of the mother (5,72 years). In addition, approximately 65% of mothers and 51% of fathers were illiterate or primary school graduates, which shows that the level of education is critical for our country. While the rate of mothers with university and higher education level is 7%, this rate is 14% for fathers. When the status of the parents at work was examined, it was determined that 31% of the mothers and 63% of the fathers were working. Moreover, it was observed that working mothers and fathers in the household mostly worked as regular employees (15% - 42%).

As for father's occupation, skilled agricultural and fishery workers represented the highest percentage (15 %), followed by skilled agricultural and fishery workers (11%), service workers and shop and market sales workers and crafts and related trades workers (11%). While 44% of the households lived in a house, it was found that the average number of rooms in the households was 3.54 and that there were an average of 0.49 computers in each household.

Table 3: Descriptive Statistics

Variable	Mean	Standard Deviation
Education Expenditure		
Total Household Education Expenditure	1003.311	4068.427
Total Education Expenditure of pre-school level	75.097	804.1666
Total Education Expenditure of Primary School level	130.976	1522.034
Total Education Expenditure of Middle- High School level	301.661	2284.174
Total Education Expenditure of Pre-University level	86.934	665.416
Total Education Expenditure of University level	175.370	1756.242
Number of People		

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Age Between 0-5 years old	0.303	0.606
Age Between 6-14 years old	0.524	0.856
Age Between 15-19 years old	0.302	0.609
Age Between 20-24 years old	0.221	0.524
Mother's level of education	5.875	4.563
Illiterate	0.243	0.429
Primary School	0.417	0.493
Middle School	0.108	0.310
High School	0.123	0.328
University	0.070	0.255
Father's level of education	7.720	4.176
Illiterate	0.070	0.255
Primary School	0.443	0.496
Middle School	0.142	0.349
High School	0.186	0.384
Vocational school	0.043	0.203
University	0.107	0.310
Mother's Employment Status		
Mothers Work	0.316	0.465
Regular Employee	0.150	0.358
Casual Employee	0.019	0.137
Employer and Self Employed	0.046	0.210
Unpaid Family Worker	0.099	0.299
Father's Employment Status		
Fathers Work	0.635	0.481
Regular Employee	0.422	0.493
Casual Employee	0.045	0.207
Employer	0.042	0.200
Self Employed	0.225	0.418
Unpaid Family Worker	0.002	0.044
Father's Occupation		
Legislators, senior officials and managers	0.053	0.224
Professionals	0.057	0.232
Technicians and associate professionals	0.046	0.211
Office clerks and customer services clerks	0.033	0.181
Service workers and shop and market sales workers	0.114	0.318
Skilled agricultural and fishery workers	0.152	0.359
Crafts and related trades workers	0.116	0.321
Plant and machine operators and assemblers	0.087	0.281

Elementary occupations	0.073	0.261
Father's Total annual income	28410.21	38224.03
Total annual household expenditure	43062.17	36241.44
Type of Residence		
House	0.440	0.496
Twin or terraced house	0.020	0.142
Blocks of flat (Less than 10 apartments)	0.235	0.424
Blocks of flat (10 or more apartments)	0.302	0.459
Number of rooms in household	3.546	0.851
Number of computers in household	0.494	0.683

Empirical Results

Education expenditure models are estimated according to different education levels.

Independent variables of "number of individuals aged between 15-19 in household" and "number of individuals aged between 20-24 in household" in the pre-school and primary school education expenditure models are not included in the models.

Households that do not spend on education are censored with zero. Therefore, 9345 observations in preschool education expenditure model, 9334 observations in primary education level education expenditure model, 8942 observations in secondary education-high school level education expenditure model, 9440 observations in pre-university education expenditure model and finally 9148 observations in university level education expenditure model are censored from the left.

Heteroskedasticity problem was encountered in all models, therefore robust Tobit estimators were obtained. The results obtained are shown in Table 4.

Table 4: Education Expenditure Robust Tobit Estimation Results by Education Levels

Variables	Pre-School	Primary	Middle-High	Pre-University	University
Number of people					
Age Between 0-5 years old	7.124 (0.461)*	1.207 (0.429)*	-1.920 (0.383)*	-6.295 (1.077)*	-2.240 (0.470)*
Age Between 6-14 years old	2.286 (0.320)*	6.055 (0.379)*	3.135 (0.237)*	-1.207 (0.492)**	-2.341 (0.370)*
Age Between 15-19 years old			3.970 (0.308)*	10.278 (0.670)*	1.506 (0.388)*
Age Between 20-24 years old			1.505 (0.372)*	1.903 (0.646)*	5.986 (0.415)*
Mother's level of education (illiterate)					
Primary School	4.954 (1.294)*	4.646 (1.205)*	4.005 (0.746)*	3.402 (1.279)*	1.784 (0.853)**
Middle School	8.183 (1.368)*	6.331 (1.349)*	5.168 (0.938)*	3.293 (1.799)***	0.911 (1.153)
High School	9.327 (1.418)*	7.492 (1.381)*	6.172 (0.943)*	4.900 (1.691)*	4.294 (10.72)*
University	9.290 (1.588)*	8.479 (1.569)*	4.699 (1.131)*	2.703 (2.050)	4.269 (1.238)*
Father's level of education (illiterate)					
Primary School	2.277 (2.161)	0.090 (1.954)	1.954 (1.338)****	0.050 (2.172)	3.755 (1.859)**
Middle School	4.573 (2.208)**	0.736 (2.062)	2.257 (1.428)****	1.015 (2.391)	4.229 (1.963)**
High School	4.007 (2.228)***	1.672 (2.050)	1.466 (1.427)	1.964 (2.355)	5.386 (1.951)*
vocational school	3.267 (2.443)	1.531 (2.268)	1.412 (1.628)	4.156 (2.658)****	8.585 (2.077)*
University	4.049 (2.398)***	1.100 (2.236)	1.534 (1.600)	1.806 (2.740)	3.829 (0.067)***
Mother's Employment Status (Unpaid Family Worker)					
Regular Employee	3.275 (0.769)*	2.106 (0.756)*	2.349 (0.555)*	0.223 (1.060)	-0.253 (0.667)

Casual Employee	-0.791 (2.687)	2.062 (2.105)	0.961 (1.451)	-5.686 (3.390)**	-0.830 (1.989)
Employer and Self Employed	5.206 (1.212)*	1.816 (1.315)	2.449 (0.914)*	3.294 (1.642)**	1.200 (1.157)
Father's Occupation (Elementary occupations)					
Legislators, senior officials and managers	2.964 (1.295)**	2.624 (1.256)**	0.615 (0.908)	-0.054 (1.690)	1.912 (1.157)**
Professionals	0.826 (1.400)	1.794 (1.355)	-0.009 (1.042)	2.847 (1.830)****	1.289 (1.054)
Technicians and associate professionals	3.055 (1.290)**	2.269 (1.276)**	0.753 (0.949)	1.548 (1.721)	3.459 (1.045)*
Office clerks and customer services clerks	1.659 (1.488)	2.418 (1.412)**	-0.800 (1.120)	0.778 (1.967)	4.151 (1.136)*
Service workers and shop and market sales workers	1.580 (1.097)	1.318 (1.066)	0.578 (0.721)	1.118 (1.326)	2.504 (0.847)*
Skilled agricultural and fishery workers	2.098 (1.318)** *	0.040 (1.345)	-0.721 (0.824)	1.160 (1.385)	-0.135 (0.989)
Crafts and related trades workers	3.191 (1.065)*	2.371 (1.038)**	1.013 (0.695)****	-0.786 (1.364)	1.085 (0.900)
Plant and machine operators and assemblers	2.538 (1.161)**	1.871 (1.141)****	-0.165 (0.778)	-1.814 (1.528)	1.278 (0.968)
Father's Total Income	1.117 (0.433)**	0.741 (0.350)**	0.473 (0.210)**	0.859 (0.447)**	0.068 (0.243)
Total annual household expenditure	2.186 (0.582)*	3.136 (0.577)*	3.458 (0.423)*	1.258 (0.774)****	3.271 (0.485)*
Type of Residence (House)					
Twin or terraced house	-0.717 (2.270)	-0.805 (2.433)	-0.043 (1.631)	-2.212 (3.471)	0.902 (1.896)
Blocks of flat (Less than 10 apartments)	2.233 (0.812)*	3.096 (0.851)*	2.116 (0.584)*	2.146 (1.100)**	0.607 (0.704)
Blocks of flat (10 or more apartments)	0.408 (0.818)	3.096 (0.839)*	2.831 (0.574)*	2.712 (1.071)**	1.621 (0.673)**

Number of computer in household	0.997 (0.388)**	0.704 (0.389)***	1.421 (0.298)*	2.381 (0.531)*	2.162 (0.348)*
N	9776	9776	9776	9776	9776
Number of Observations Censored from the Left	9345	9334	8942	9440	9148

Note 1: * significant at 1% level. ** significant at 5% level, *** significant at %10 level, **** * significant at %15 level. Note 2: Expressions written in parentheses in variables are the base category. Note3: Values in parentheses are the standard error of the coefficient estimates.

The number of different age groups in the household was found statistically significant in all models. As can be seen in Table 4 the number of people aged 0-5 in the household increase pre-school and primary school expenditures. On the contrary, it is observed that education expenditures of secondary school-high school, pre-university and university level decrease. This result shows that while there are individuals in different age groups from the same household, individuals aged 0-5 have reduced spending on further education A similar situation exists in households with individuals aged 6-14. The presence of individuals between the aged 6-14 in the household increases the educational expenditures for pre-school, primary and secondary school-high school levels, while decreasing the pre-university and university-level educational expenditures. If there are individuals aged between 15-19 in the household, the highest expenditure is made to the pre-university education level, whereas if individuals aged 20-24, is made to the university level. These results are expected. After graduating from high school, individuals preparing for the university entrance examination make private tutoring expenditures. In addition, after attending university, there are expenditures such as nutrition, shelter, educational materials. These mentioned expenditures cause an increase in expenditures for individuals aged 15-19 and 20-24.

Another variable whose effect was investigated in education expenditures at different educational levels is parent's educational status. Parent's years of education are both positive and statistically significant. When the obtained results are evaluated as a whole, it was determined that mothers graduated from primary, secondary, high school and university at all education levels spend more education than illiterate mothers. Coefficients were not statistically significant in the university education expenditure model of mothers with middle- high school education level, and in the pre-university education expenditure model of mothers with university education level).

The same is true in the education of the father. In all models, it is seen that fathers who graduate from primary, secondary, high school, vocational high school

and undergraduate-graduate level spend more education expenditure than illiterate people. All coefficients meet the expectations economically, but the education level of the father is not statistically significant in some models as seen in Table 4.

One of the striking result is that in terms of level of education, mothers spend more on pre-school and primary level while fathers spend more on university level.

Different results were obtained according to the mother's employment status. When the model results are analyzed, in the pre-school, primary, secondary, high school and university level education expenditure models, wage-earned mothers spend more on education than unpaid family workers. However, coefficients were found statistically insignificant in pre-university education and university-level education expenditure models. When the casual employee mothers were examined, the only coefficient found statistically significant was the pre-university education expenditures.

According to this result, casual mothers spend less on education than unpaid family workers. Although it is determined that mothers who are employers or self-employed spend more on education than unpaid family employees, the coefficients in the primary and university level education expenditure models are not found statistically significant.

The father's occupation did not yield stable results in the models of education expenditures made by different educational levels. Although most of the coefficients were obtained positively in accordance with economic expectations, they were not found statistically significant.

In terms of the type of residence, it was seen that living in twin or terraced house had no effect on all education expenditures models. However, living in blocks of flat (less than 10 apartments and 10 or more apartments) had a positive effect on education expenditures.

It was observed that the total income of the father and the total expenditure of the household increased the education expenditures made at all education levels in the direction of expectation. In addition, the number of computers in the household is another variable that increases education expenditures. The relevant variable is economically and statistically significant at all educational levels. It has been determined that the number of computers in the household is most effective at pre-university and university education levels. The effect of the computer on education expenditures is positive as expected, with the assumption that the parents were taken to be able to educate their children more effectively through the computer.

Conclusion

This paper investigates the socio-economic factors on the household education expenditure and estimates with alternative models by using data from Turkey Statistical Institute 2017 Household Budget Survey. The determinants of household education expenditures were investigated by considering five different education levels (pre-school, primary school, middle school-high school, pre-university, university). For the stated purpose, the possible effects of the number of household members, which are thought to have an impact on the relevant models, the education of the parents, the working status of the parents, the occupation of the father, the income of the father, the total expenditure of the household, the number of rooms in the household and the number of computers were examined. The established models were estimated by the tobit analysis method, and robust estimators were calculated due to the heteroskedasticity problem, so that efficient and unbiased estimators were obtained. In the results obtained, it was determined that the number of individuals in the household was effective on the total household education expenditures, especially the presence of individuals aged between 15-19 in the household increased the household education expenditures considerably. The fact that the specified age group coincides with the age group that has individuals at high school and university level clearly showed that the education expenditures incurred at the relevant education levels in the households are higher. However, the presence of individuals between the ages of 0-5 in the household has decreased the expenditures of secondary school-high school, pre-university and university level, and the presence of individuals between the ages of 6-14 reduces pre-university and university level expenditures. It was determined that the education level of the parents was another effective factor on the total education expenditures. It is clear that the more the education levels of the parents increased, the more the expenditures increased. It is seen that the education level of the mother is more important than the education level of the father. Also, it is seen that, in the different education levels in which the expenditure is incurred, the parents spent higher in the years of basic education and spent less passing to the next education level compared to the previous education level. The importance of educated parents for the education of their children is an undeniable fact before us. In addition, the fact that only 7% of mothers and 14% of fathers graduated from a higher education institution in the year of the study reveals the fact that education in our country has been overlooked. Although the parent's employment also increases the total education expenditures. Employed mothers at the pre-university education level spend less on education. The fact that the education of the mother is more important than the education of the father, which is emphasized in the details of the study, reminds us of a fundamental problem for our country, which is the girls who are not

sent to school despite being in compulsory school age. One of the main determinants of household expenditures is their income. In our cultural structure, the young girls, especially in rural areas, who are forced to get married at an early age, whose time is wasted with the housework, are ignored when it comes to their personal development. Even though some fulfilled projects such as "Dad, Send Me to School", "Come on Girls to School" suggest some kind of solutions, they are insufficient in terms of providing radical solutions. Regular legal proceedings that aim to increase the participation into education, non-governmental organizations taking more responsibilities, the meetings steadily held in order to raise the awareness of the families and to persuade them will likely to suggest more solution to the problem in the long term. In this context, the main steps to be taken by the state, such as lowering unemployment levels in the country and raising the minimum wage to more reasonable levels, will partially narrow the distance between the rich and the poor in investments to be made in education.

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