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Factors Affecting Household Expenditures on Education: A Heckman Sample Selection Application for Turkey

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Abstract

Education is undoubtedly one of the most important elements for the development levels of countries and societies. It is also one of the essential requirements in today's world. Education is a key element of an individual's initial and later social development, therefore development across countries. Today, in most developed countries, the state spends a large amount of fund for education. Households, as well as governments, spend a lot on education. In this study, the expenses for the education of households in Turkey were discussed, and the effect of socio-demographic and economic factors on these expenditures was examined. For this purpose, the data set obtained from the 2019 Household Budget Survey published by the Turkish Statistical Institute (TURKSTAT) was analyzed with the Heckman sample selection model. According to the analysis results, the fact that the head of the household is male in a family, his age, and being married had a negative effect on education expenditures. Education expenses were positively affected by household income, population, the number of technological devices, and the employment of the head of the family. In addition, the structure of the household, the presence of individuals who smoke, go to the cinema, and do sports also affected household education expenditures.

Keywords: Household budget survey, education expenditure, Heckman sample selection, Turkey

Introduction

Education is one of the essential factors of development, and the quality of education is the key determinant of the speed at which a region achieves economic growth. Education can promote sustainable economic development through various channels, such as labor productivity increase, encouragement of good governance, reduction in income inequality, and assistance to the public health sector, and an investment made in education results in numerous economic and social benefits (Sun et al., 2019). Education both has an important effect on income and professional status and is considered a universal cure for economic problems such as unemployment and poverty (Andreou, 2012). Well-educated people bring along high levels of labor productivity. This also refers to more qualified workers and more ability to bring advanced technology from developed countries. The level and distribution of educational attainment also affect social outcomes such as child mortality, fertility, children's education, and income distribution (Barro & Lee, 2013).

Education can increase the value of labor force of individuals by developing their economic abilities, which can increase their wages and prevent poverty. For this reason, education is critical in reducing poverty (Song, 2012). Education provides people with the ability to improve themselves. Additionally, it increases the possibility of acquiring a profession and making progress in it (Cavus et al., 2021). Human capital theory argues that education enables individuals to acquire the knowledge and ability they need for a decent job accordingly, increases productivity and promotes economic growth (Song & Zhou, 2019). The importance of education, especially in developed countries' comprehensive and sustainable growth and general development of a nation, is generally accepted in the international community, as a result of which significant successes were obtained in the universalization of

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elementary education across the world. Government expenditure on education and private participation in education have also consistently increased over the years all over the world (Saha, 2013).

One of the most significant costs of raising a child is the investment made in his/her education. In this regard, household and state are two significant actors making investments in human capitals of children and youths. Household and government education expenditures are both a goal and a means to achieve other development goals, such as economic growth, poverty reduction, improved health status, greater equity, and reduced fertility (Mussa, 2013). The houses in developed countries attach great importance to the development of children's human capitals. Parents make much expenditure on education, thus expect this to help their children achieve more success and then improvement in their houses' living standards in the future (Wei et al., 2021).

As a country where the share of the working-age population in the total is increasing, Turkey has strong economic development potential, and it is doubtless that high level education will have a significant effect in achieving this potential. In Turkey, educational status is not promising. Although the average education period of the adult population is seven years, this is lower than the one in developed countries. By increasing compulsory education to 8 years in 1997 and then to 12 years in 2011, it was aimed to increase the education period of the labor force. However, it is still required to increase the education level, which necessitates more investment in education (Acar et al., 2016). The resources allocated to education in Turkey increased to 161.1 billion TL in 2019; this figure corresponds to approximately 17% of budget expenditures. This amount was allocated for the sub-items as follows: 11.4 billion for scholarships and education loans, 4.2 billion for mobile teaching and food aid, 1.2 billion for housing support, 1.4 billion for textbooks, 1.7 billion for supplementary education, 3.4 billion for the education of individuals with disabilities, 47.2 billion for higher education, 500 for higher education scholarships and loans (per student), 6 billion for private school support, 552 million TL for tuition exemption (TEDMEM, 2020). Although the resources allocated for education is increasing every year in Turkey, households must reserve a certain amount of their budgets for education as the resource allocated for state is not sufficient. In addition, some households allocate a certain part of their budget to education in order to make a difference in their economic and social gains, regardless of the limited resources they have. However, some socio-economic factors affecting households do not allow each household to make the desired investment in education; thus, these investments differ according to the household and the level of education to which the investment will be made (Demiroglari & Kiren Gurler, 2020). In Turkey, the share of educational expenditure in the total expenditure of households by years is shown in Table 1.

Table 1

Percentage of Household Expenditures of Education in Turkey by Year

Survey year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Household Expenditures % Educational services	2.0	2.3	2.4	2.4	2.2	2.3	2.3	2.3	2.5

Source: TURKSTAT (2020)

According to Table 1, although there is no cumulative course, the lowest expenditure percentage was determined to be in 2011, while the highest expenditure percentage was reached in 2019.

In the field of education economy, it is a common practice to use an education production function to predict the effects of education by family background, parental education, educational expenses, etc. There is comprehensive literature showing that educational expenditures have significant effects on education (Acerenza & Gandelman, 2019; Andreou, 2012; Chi & Qian, 2016; Deng & Xue, 2014; Donkoh & Amikuzuno, 2011; Himaz, 2010; Huy, 2012; Jenkins et al., 2019; Kousar et al., 2017; Majumder & Mitra, 2016; Wei et al., 2021). There are a number of studies carried out regarding the educational expenditure of households in Turkey (Acar et al., 2016; Bayar & İlhan, 2016; Demiroglari

& Kiren Gurler, 2020; Kuvat & Ayvaz Kizilgol, 2020; San & Chaloupka, 2016; Susanli, 2013). These studies generally underlined the socio-demographic and economic conditions of households.

In a study conducted according to the 2003, 2007 and 2012 Household Budget Surveys, it was reported that the income elasticity of education increased over the years. The increase in the educational level of the household head has an increasing effect on educational expenditures. On the other hand, the household population has a reducing effect on educational expenditures (Acar et al., 2016).

According to the results obtained in a study conducted based on the 2002, 2010, and 2013 Household Budget Surveys, education expenditures of high-income households are not sensitive to changes in income level. In other words, richer households do not change their attitudes towards education expenditure significantly when there is a change in their income. However, elasticity is higher for poor households, which means that when there is a change in their income levels, they are very sensitive to such a change, and their education expenditures increase. On the other hand, if there is a decrease in level of income, education expenditures reduce more than the decrease in the level of income. In addition, the educational level of the household head affected education expenditures positively in these three years (Bayar & İlhan, 2016).

In another study carried out based on the 2017 Household Budget Survey, the increase in household income increased the likelihood of education expenditure. The increasing educational level of household head increased education expenditure. Moreover, the increase in the number of individuals living in the household reduced the likelihood of education expenditure (Kuvat & Ayvaz Kizilgol, 2020).

In another study conducted based on the 2017 Household Budget Survey regarding different educational levels, the household education expenditures were found to have a positively relationship with mother's education, father's education, mother's employment status, income, and number of computers owned in 2017 (Demiroglari & Kiren Gurler, 2020).

This study examines the factors that influence the education expenditures of households in Turkey. The primary purpose of this study is to identify the socio-demographic and economic factors that influence household participation in education expenditures and expenditure levels. Using the Heckman sample selection model, the most current household expenditure data supplied by TURKSTAT was evaluated for this purpose. In addition to socio-demographic and economic aspects, which are commonly identified in the literature regarding education expenditures, variables reflecting the cultural characteristics of the households are also included. In this regard, this study identifies cultural characteristics not previously discussed in the literature, in addition to socio-demographic and economic factors. In addition to existing education policies, these microeconometric research are essential for developing policies suited to the socioeconomic and demographic characteristics of families. The main hypothesis of this study is whether household factors are effective in education expenditure decisions and expenditure levels.

Method

Sample and Dataset

In this study, the data obtained by the 2019 Household Budget Survey was used, which was administered to 11521 houses by TURKSTAT between January 1, 2018 - December 31, 2018. This is the latest survey carried out regarding household expenditures in Turkey. TURKSTAT creates a data set covering one year by compiling the data of this survey, which is administered to an average of a thousand households every month. In addition to expenditure data of households, some socio-demographic and economic characteristics are also collected. In this data set, education expenditure data were not provided alone, but a single "education expenditure" data were obtained by collecting expenditure data on 13 different sub-items related to education by the researchers. In response to this dependent variable (EducExp), various characteristics of the family's head and the household itself were utilized as independent variables. Age (Age), gender (Male), education (Education), marital status (Married), and employment

(Employed) data of the head of the household are included in the study as independent variables; household income (Income/1000), household population (Household Population), household type (Alone, Couple, Couple with children), number of technological devices owned (Technology), car ownership (Car), smoking in the household (Cigarette), going to the movies (Cinema), doing sports (Sports) and paid TV subscription (Paid TV). The data set was reduced to 11301 households by removing the observations with missing and outlier values.

Analysis

In econometric research, the dependent variable may sometimes be continuous but limited. This mostly refers that while a dependent variable is observed to be positive for some of the population, it is zero for some of the population (Verbeek, 2008). The least-square method of a model containing such a dependent variable leads to biased empirical estimates (Long, 1997). Tobit model, which was brought to the literature by Tobin (1958), is frequently used for cases where the dependent variable takes a zero value. As dependent variables are operated through censorship in this model, statistical inefficiency is avoided. However, important limitations of the Tobit model include the fact that the assumptions of normality and homoscedasticity cannot be satisfied, which can lead to biased and inconsistent estimations (Greene, 2003). Moreover, the Tobit model mandates that the effects of independent variables on the dependent variable are the same for probabilities and levels. Due to these factors, the standard Tobit model has been utilized less frequently recently. In such a scenario, the sample selection model (Heckman, 1979) can be utilized to provide less restrictive, more consistent, and asymptotically efficient estimates for independently analyzing the effects of expenditure probability and levels. This model is also referred to as Type-II Tobit (Amemiya, 1985).

The Heckman sample selection model can be expressed using a notation similar to Yen and Rosinski (2008) as follows;

$$\begin{aligned} \log y &= x'\beta + v \quad \text{if} \quad z'\alpha + u > 0, \\ y &= 0 \qquad\quad \text{if} \quad z'\alpha + u \leq 0 \end{aligned} \tag{1}$$

where *y* denotes the dependent variable of the model, *x* and *z* are the independent variable sets, and β and α are the corresponding parameter vectors. Additionally, *u* and *v* represent bivariate normally distributed error terms with zero mean and a finite covariance matrix;

$$\begin{bmatrix} u \\ v \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho\sigma \\ \rho\sigma & \sigma^2 \end{bmatrix}\right) \tag{2}$$

where σ denotes the standard deviation of *v*; ρ represents the correlation between *u* and *v*. The standard deviation of *u* is unknown, thus it is set at unity, given that the selection outcomes are observed as binary, which means that the value is either 1 or 0. The sample likelihood function is;

$$L = \prod_{y=0}[1 - \Phi(z'\alpha)] \prod_{y>0} \Phi\left[\frac{z'\alpha + \rho(\log y - x'\beta)/\sigma}{(1-\rho^2)^{1/2}}\right] y^{-1} \frac{1}{\sigma}\phi\left(\frac{\log y - x'\beta}{\sigma}\right) \tag{3}$$

where y^{-1} is the Jacobian transformation from log *y* to *y*. Additionally, $\phi(.)$ and $\Phi(.)$ denote the standard normal probability density function (pdf) and cumulative distribution function (cdf), respectively. When errors are independent (ρ=0), (3) reduces to that of the two-part model, in which case the log-likelihood

function can be split into the parameters α and $[\beta,\sigma]'$. Therefore, estimation can be broken down to a probit model (to estimate α) using the whole sample and a linear regression of log y on x (to estimate β and σ) using only the non-limited observations (Cheah & Tan, 2014).

In addition, the dependent variable y is log-transformed to ameliorate potential issues with non-normality and heteroscedasticity of error terms (Aksoy et al., 2019). Calculating marginal effects by obtaining the conditional means of a log-transformed dependent variable may, however, produce misleading findings. This is demonstrated by Yen and Rosinski (2008), and they provide alternative formulas for the conditional mean of the dependent variable and marginal effects for a log-transformed sample selection model. According to Yen and Rosinski (2008), the conditional mean of the dependent variable y is;

$$E\left(y \mid y > 0\right) = \exp\left(x'\beta + \sigma^2/2\right)\Phi\left(z'\alpha + \rho\sigma\right)/\Phi\left(z'\alpha\right). \quad (4)$$

Hence, the marginal probability of a positive observation is;

$$Pr(y > 0) = \Phi\left(z'\alpha\right), \quad (5)$$

and the unconditional mean of y is;

$$E(y) = \exp\left(x'\beta + \sigma^2/2\right)\Phi\left(z'\alpha + \rho\sigma\right). \quad (6)$$

The marginal effects on probability, conditional mean, and unconditional mean are given by the derivatives of (5), (4), and (6), respectively. The marginal effects of probability determine the probability of participation in expenditures. For the conditional mean, the marginal effects determine the level of spending for those who participate in the expenditures. For the unconditional mean, the marginal effects indicate the expenditure level for the entire population, including both participants and nonparticipants. For statistical inference, standard errors were calculated by the delta method. Stata version 14.1 was used to estimate the log-likelihood function of the Heckman sample selection model.

When estimating a multiple regression model, care should be taken against the multicollinearity problem. Multicollinearity represents a highly linear intercorrelation between explanatory variables in a multiple regression model and leads to incorrect results of regression analyzes (Kim, 2019). To control the effect of multicollinearity, the variance inflation factor (VIF) should be calculated for each variable. A rule of thumb is that if the VIF for an independent variable is greater than 5 or 10, the multicollinearity of that variable is suspiciously high. In this case, it can either inflate or deflate the standard errors of the coefficients. As a result, the coefficients can, falsely, become significant (or insignificant). Another effect of multicollinearity is that a sign change of the coefficient in which a negative effect can become positive and vice versa (Tsagris & Pandis, 2021).

Results

The definitions, means, and standard deviations of dependent and independent variables are given in Table 2. Additionally, the VIF values of the independent variables are presented. The sample covers the data of 11301 houses, as seen in Table 2. 38.9% of these households made expenditures on education. While the mean monthly education expenditure for the whole sample was TL 131.831, the mean

monthly expenditure of the households making education expenditure was found to be TL 338.673. In addition, as all VIF values provided for the independent variables were less than 5, this shows that there was no multicollinearity problem between the independent variables (Alkan & Tekmanlı, 2021; Çebi Karaaslan, 2021).

Table 2

Variable Definitions and Sample Means

Variable	Definition	Mean	Std. Dev.	VIF
Dependent variable				
EducExp	Monthly education expenditure (TL)	131.831	630.406	
	Among spending (TL)	338.673	975.204	
	Expenditure rate (%)	0.389	0.488	
Continuous explanatory variables				
Education	Education of household's head	7.845	5.036	1.820
Age	Age of household's head	51.609	15.024	1.920
Technology	Number of technological devices in household	10.052	3.669	1.780
Income/1000	Monthly household income (1000 TL)	5.386	4.293	1.530
Household population	Number of household members	3.385	1.755	2.190
Binary explanatory variables (Yes = 1; No = 0)				
Male	Household's head is male	0.773	0.419	1.680
Married	Household's head is married	0.795	0.404	3.300
Employed	Household's head is employed	0.606	0.489	1.570
Alone	Household consists of one person	0.098	0.298	2.030
Couple	Household consists of couples	0.198	0.399	3.490
Couple and children	Household consists of couples and children	0.480	0.500	2.960
Car	Household has a car / cars	0.450	0.498	1.220
Cigarette	Members of household smoke	0.520	0.500	1.100
Cinema	Members of household go to cinema	0.091	0.288	1.190
Paid TV	Household has a paid TV	0.146	0.353	1.270
Sports	Members of household do sports	0.074	0.262	1.120
Sample size			*11301*	

At least one independent variable must be in the selection equation and not the level equation in the Heckman sample selection model. Ignoring such exclusion may result in a collinearity problem (Puhani, 2000). In this instance, education and household structures were omitted from the level equation and incorporated into the selection equation. In Table 3, the maximum likelihood estimation results of the Heckman sample selection model are provided. It is seen that the parameters are mostly statistically significant at which level of alpha ($p<.05$). The regression coefficients also produced economically logical results in terms of their direction. In addition, the estimated correlation coefficient (ρ) and the corresponding covariance term (λ) between the selection and level equations are statistically significant. This indicates the importance of selectivity correction. Statistical insignificance of the error correlation would have suggested a lack of endogenous sample selectivity and use of the two-part model instead.

Table 3

Maximum Likelihood Estimation of the Heckman Sample Selection Model

	Selection	Level
Variables	Estimate (Std. Error)	Estimate (Std. Error)
Constant	-1.137*** (0.098)	3.894*** (0.211)
Education	0.042*** (0.003)	
Age	-0.011*** (0.001)	0.015*** (0.003)
Technology	0.057*** (0.005)	0.065*** (0.01)
Income/1000	0.003 (0.004)	0.056*** (0.006)
Household population	0.176*** (0.01)	-0.163*** (0.021)
Male	-0.188*** (0.041)	-0.206** (0.085)
Married	-0.13** (0.056)	0.116 (0.095)
Employed	0.068** (0.034)	0.255*** (0.072)
Alone	-0.331*** (0.064)	
Couple	-0.441*** (0.059)	
Couple and children	0.232*** (0.04)	
Car	0.035 (0.029)	0.083 (0.059)
Cigarette	-0.108*** (0.027)	-0.031 (0.056)
Cinema	0.208*** (0.047)	0.154* (0.087)
Paid TV	0.167*** (0.04)	0.028 (0.076)
Sports	0.136*** (0.05)	0.025 (0.091)
σ		1.928*** (0.045)
ρ	-0.659*** (0.038)	
λ	-1.271*** (0.101)	
log-likelihood	-14463.38	

Note: Asymptotic standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.10

As Heckman sample selection is a nonlinear method, maximum likelihood estimation is not sufficient to interpret the coefficients exactly, and marginal effects are required. The marginal effect values are shown in Table 4 in order to discuss the effect size in addition to the effect direction of the variables used in the model. Here, the probability represents the likelihood of making educational expenditures, whereas the conditional and unconditional levels represent the effects on the average expenditure level of the spending households and the entire population, respectively. Marginal effects are interpreted as the effect of each added unit for continuous variables, while for binary variables, they are interpreted as the effect of having the relevant feature. The probability series is multiplied by 100 for convenience of presentation as a percentage.

Table 4

Marginal Effects of Explanatory Variables on Education Expenditures

	Probability*100	Conditional Level	Unconditional Level
Education	1.564*** (0.12)	7.093*** (0.709)	5.045*** (0.431)
Age	-0.411*** (0.045)	0.692* (0.411)	-0.437*** (0.168)
Technology	2.116*** (0.174)	20.263*** (1.557)	10.531*** (0.745)
Income/1000	0.119 (0.15)	9.826*** (1.144)	3.611*** (0.536)
Household population	6.516*** (0.382)	2.654 (2.832)	11.67*** (1.353)
Male	-6.95*** (1.514)	-65.567*** (13.271)	-34.248*** (5.63)
Married	-4.816** (2.064)	-2.671 (15.618)	-8.872 (7.179)
Employed	2.528** (1.252)	53.604*** (11.193)	22.796*** (4.635)
Alone	-12.212*** (2.359)	-55.373*** (11.001)	-39.384*** (7.65)
Couple	-16.273*** (2.183)	-73.792*** (11.129)	-52.485*** (7.264)
Couple and children	8.555*** (1.473)	38.792*** (7.069)	27.591*** (4.876)
Car	1.295 (1.062)	19.55** (9.025)	8.93** (3.791)
Cigarette	-3.972*** (1.009)	-23.204*** (8.553)	-14.615*** (3.651)
Cinema	7.7*** (1.748)	60.368*** (13.589)	33.678*** (6.106)
Paid TV	6.168*** (1.469)	32.531*** (11.519)	21.479*** (5.101)
Sports	5.012*** (1.845)	26.891* (14.11)	17.612*** (6.276)

Note: Asymptotic standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.10

According to the marginal effects of the model given in Table 4, one-year increase in the education of household head increased the probability of making education expenditure by 1.564 percent. One-year increase in the education of household head increased the conditional expenditure level by TL 7.093 and the unconditional expenditure level by TL 5.045. One-year increase in the age of household head decreased the probability of making education expenditure by 0.411 percent. This increased the conditional expenditure level by TL 0.692 and decreased the unconditional expenditure level by TL 0.437. One unit increase in the number of technological devices owned by a household increased the probability of making education expenditure by 2.116 percent. It also increased the conditional expenditure level by TL 20.263 and the unconditional expenditure level by TL 10.531. TL 1000 increase in the monthly disposable income of a household increased the conditional expenditure level by TL 9.826 and the unconditional expenditure level by TL 3.611. One person increases in the number of a household population increased the probability of making education expenditure by 6.516 percent. It also increased the unconditional expenditure level by TL 11.670.

The households headed by a male were found 6.95 percentage points less likely to make expenditure on education than households headed by a female. In addition, while the conditional expenditure levels were TL 65.567 lower, the unconditional expenditure levels were TL 34.248 lower. Families with a married head were 4.816 percentage points less likely to spend on education than the households with an unmarried head. Families with an employed head were 2.528 percentage points more likely to spend on education than the households with an unemployed head. In addition, while the conditional expenditure levels were TL 53.604 higher, the unconditional expenditure levels were TL 22.796 higher. Households with only one person were 12.212 percentage points less likely to spend on education than other households. Moreover, while the conditional expenditure levels were TL 55.373 lower, the unconditional expenditure levels were TL 39.384 lower. Households with a couple were 16.273 percentage points less likely to spend on education than other households. In addition, while the conditional expenditure levels were TL 73.792 lower, the unconditional expenditure levels were TL 52.485 lower. The households with a couple and children were 8.555 percentage points more likely to make education expenditure than other households. Moreover, while their conditional expenditure levels were TL 38.792 higher, their unconditional expenditure levels were TL 27.591 higher.

The conditional and unconditional expenditure levels of households with a car are 19.55 TL and 8.93 TL more than those without a car, respectively. The likelihood of the households with individuals smoking to make education expenditure was 3.972 percentage points lower than other households. Moreover, while the conditional expenditure level was TL 23.204 lower, the unconditional expenditure

level was TL 14.615 lower. The likelihood of the households with individuals going to cinema to make education expenditure was 7.7 percentage points higher than other households. Moreover, while the conditional expenditure level was TL 60.368 higher, the unconditional expenditure level was TL 33.678 higher. The households using paid TV were 6.168 percentage points more likely to make education expenditure than other households. In addition, while the conditional expenditure level was TL 32.531 higher, the unconditional expenditure level was TL 21.479 higher. The likelihood of the households with individuals doing sports to make education expenditure was 5.012 percentage points higher than other households. Moreover, while the conditional expenditure level was TL 26.891 higher, the unconditional expenditure level was TL 17.612 higher.

Discussion and Conclusion

This study examines the factors that influence the education expenditures of households in Turkey using the Heckman sample selection method. According to the findings of the investigation, the education level of the household's head has a positive effect on expenditure levels. Similarly, in a study carried out in Sri Lanka, it was concluded that households with more educated heads were in a tendency to demand more education (Himaz, 2010). In another study conducted for Turkey, it was determined that the increase in parent education resulted in an increase in education expenditures (Susanli, 2013). A study carried out in India reported that an increase in the education of a household head raised the share of education in the budget significantly (Azam & Kingdon, 2013). This is an expected result because well-educated individuals are aware of the value of education, and accordingly do not hesitate to spend a large part of their income for the education of their families (Jenkins et al., 2019).

An increase in the age of the household's head has a positive effect on conditional expenditure levels but a negative effect on unconditional expenditure levels and probability. In a similar vein, in a study carried out for the West Bengal Region of India, it was found out that increasing the age of household head affected education expenditure negatively in rural and urban areas (Majumder & Mitra, 2016). Moreover, it was reported in another study conducted regarding twelve Latin America - Caribbean countries and the USA, that increasing the age of household head was identified to have a negative effect on education expenditure (Acerenza & Gandelman, 2019).

An increase in the number of technological devices used in the household positively affects the probability of expenditure and its levels. Households must be rich so that family members can receive education. According to both life cycle and permanent income hypotheses, household expenditures are a function of not only current income but also wealth. In a study conducted in Ghana supported this by reporting that the durable goods variable, including mostly technological devices, had a positive effect on education expenditures (Donkoh & Amikuzuno, 2011). A similar conclusion is seen in another study carried out in Turkey. In this respect, it was found out that an increase in the number of computers in a household had an effect, especially in pre-university and university education levels. Parents assumed that their children would be educated better by computers (Demiroglari & Kiren Gurler, 2020).

An increase in the household income positively affects expenditure levels. In a study conducted in China, it was found out that families with higher income, well-educated and professional parents made more education expenditure (Qian & Smyth, 2011). It was reported in another study executed in Pakistan that as household income increased, education expenditures raised, too (Kousar et al., 2017). In a study conducted in Turkey, it was established that as the total expenditures of low-income households increased, their education expenditures increased at a slower rate. Therefore, it was concluded that education had become a necessity in this income group's household budget and that the quality of education is less important (Acar et al., 2016).

An increase in the number of household members has a positive effect on the probability of expenditure and the level of unconditional expenditure. It was determined in a study conducted in Nigeria that household population had a positive effect on education expenditures (Ogundari & Abdulai, 2014). Another study performed in China revealed that household size had a positive effect on education expenditures (Chi & Qian, 2016). In a study carried out in Thailand, it was found that larger households

were more likely to make education expenditure (Wongmonta & Glewwe, 2017). It is expected that a larger family and productive parents attach importance to children's education and make more education expenditure (Wei et al., 2021).

Male-headed households have lower expenditure probability and levels than female-headed households. In a study carried out in Nigeria, it was specified that the likelihood of the households headed by a female in rural and urban areas to make education expenditure was higher (Ogundari & Abdulai, 2014). In a similar vein, a study conducted in Nigeria reported that the households headed by a male were in a tendency to make less education expenditure (Jenkins et al., 2019). Households with married heads are less likely to spend on education. Similarly, it was reported in a study executed in China that single parents made more expenditure on their children's education (Chi & Qian, 2016). Households with a working head are more likely to spend on education and have a greater expenditure level.

While the probability of expenditure and its levels are lower for single-person and couple households, the expenditure probability and levels are greater for households consisting of couples with children. In a similar vein, in a study conducted in Vietnam, it was found out that the households with children enrolled in primary and secondary school were more likely to make education expenditure (Huy, 2012). This shows the effect of individual number in a household population. More importantly, this refers to the effect of having children, and especially the likelihood of the households with school-age children was higher to make education expenditure (Wongmonta & Glewwe, 2017).

The presence of smoking in the household has a negative effect on the probability of education expenditure and expenditure levels. This could be attributed to an exclusion effect. Similarly, a study conducted in Turkey between 2007 and 2011 revealed that cigarette use reduced education expenditures (San & Chaloupka, 2016). In a study conducted in Bangladesh, it was determined that tobacco-using households allocate a smaller portion of their budget to education expenditures (Husain et al., 2018). Similarly, a study conducted in Chile reported that households spending on tobacco allocated a smaller part of their budget to education expenditures (Paraje & Araya, 2018). Although automobile ownership has no effect on the probability of expenditure, it has a positive effect on expenditure levels. Additionally, the variables of having a household cinema habit, having a paid TV subscription, and having a sporting habit affect the probability of education expenditure and expenditure levels positively.

In Turkey, education is of importance both for households and the state, both of which make a significant investment in education. The investment made on education results in long-term expectations of qualified individuals, qualified labor, and a quality society. The fact that households make expenditures on education regardless of state investments reveals that education is attached importance by individuals. In this study, the factors affecting the education expenditure of households in Turkey have been discussed, and micro-level outputs have been obtained. As there were households not making expenditure on education, censored observation emerged, and the Heckman sample selection model has been used for analysis.

The analysis results have shown that the variables of age, education, gender, and marital status of household's head have statistically significant relationships with education expenditures. In addition, the variables of household type (single living individual, couples, couples and children), car ownership, number of technological devices, income, household population, presence of an individual smoking, going to cinemas, doing sports and households' paid TV have also statistically significant relationships with education expenditures. The majority of the study's findings are consistent with the existing literature (Acar et al., 2016; Acerenza & Gandelman, 2019; Azam & Kingdon, 2013; Chi & Qian, 2016; Demiroglari & Kiren Gurler, 2020; Himaz, 2010; Jenkins et al., 2019; San & Chaloupka, 2016; Susanli, 2013). At this point, the negative impact of the increasing age of the household's head on education expenditures draws attention. Certain applications (such as public service advertisements and TV programs) that may capture the attention of the elderly may be beneficial. In addition, the fact that male-headed households spend less on education is indicative of an issue. At this stage, it is evident that males are less inclined to invest in education. Particularly, the presence of certain educational materials in areas where men frequently spend time, such as coffee shops and tea houses, might increase the desire for education by spreading awareness. Another significant result is that smoking households spend less on education. This may be due to the fact that money that should be spent on education and other

essential requirements is instead spent on cigarettes. This situation, referred to as the "crowding-out effect" in the literature, is a very serious issue. In this scenario, the significance of anti-tobacco policies becomes apparent. In addition to the frequently used tax instrument and fines, a stronger emphasis on health and economic effects in audiovisual media may produce positive benefits.

This study differs from previous studies by subjecting variables such as individuals going to cinema, doing sports and paid TV, which refers to the socio-cultural structure of a household. The results of the study showed that all these variables had affected education expenditures positively. For this reason, it can be concluded that families with improved socio-cultural structures allocate more resources for education and attach more importance to education. In this regard, policymakers should take steps to enable a socio-cultural structure engaging in more reading, research and that is sports-oriented. This is a step that should be taken for a society allocating more resources for education and attaching more importance to education. This may contribute to laying the foundation of a society in which education is more valued.

This study is based on 2019 data for Turkey; the findings cannot be generalized to other time periods or populations. It is anticipated that the findings will shed light on the policies to be implemented. In the future, multivariate models can be developed by categorizing the sub-items for which education expenditure data is obtained. In addition, censored regression models based on panel data can be developed for training expenditures, along with the preparation of suitable data sets that take the time dimension into account.

Declarations

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