

## **EURASIAN JOURNAL OF SOCIAL SCIENCES**

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### **VOCATIONAL AND GENERAL EDUCATION OF GIRLS AND BOYS IN TUNISIA: THE EFFECTS OF INCOME AND PARENTAL EDUCATION**

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#### **Abstract**

Throughout Tunisia, basic education is compulsory. Children are required to enroll for at least 9 years from age 6. This paper examines gender differences in education choice of upper basic education of youths aged 15–24 in Tunisia. To investigate the factors that influence an individual's choice between vocational education, general education (secondary and high education) and leaving school, the paper estimates a multinomial probit model of education choice. We focus on the impact of household income, parental education, sector of economic activity of father, household size, urban location and region of residence on investments in children. These issues are addressed using data from the 2010 National Population-Employment Survey that provided information on educational attainment and vocational training of more than 55,000 youths aged 15-24. The findings of this paper suggest that there are gender differences in education choice. Increases in permanent income contribute more to the probabilities of the two types of education of girls than of boys. Parental education has a positive significant effect on their attitudes towards children education and the impact of mother's higher education was more important for the education of boys than of girls. While, father's coefficient estimates show the relative benefit to girls general education. Children whose fathers work in agriculture are at disadvantage. The negative effect on girls' education was larger than on boys' at the two streams of education. The coefficient estimates on the manufacturing sector increase the probabilities of receiving general education and decrease the probabilities of undertaking vocational education for both girls and boys.

**Keywords:** School Choice, Human Capital, Vocational Education, Tunisia

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#### **1. Introduction**

Education is a very important factor contributing to economic growth, individual and social development (Mankiw *et al.* 1992). Gender differences in resource allocation within the household and the links between conditions in the labor market and parental investments in children have been the subject of research by a number of studies (Rosenzweig and Schultz, 1982; Thomas, 1990).

Several factors contribute to gender differences in the educational investments in children (Parish and Willis, 1993; Schultz, 1993). Returns to education might be greater for boys than for girls, inducing parents to provide more schooling to their sons than their daughters (Rosenzweig and Schultz, 1982). In addition, parents might invest more heavily in sons than

daughters if they expect greater future flows of remittances from their male offspring (Shapiro and Tamashe, 2001).

High levels of enrollments have been achieved at the basic school level for both boys and girls in Tunisia. In 2012, the schooling rate of the population aged 6-14 is 98 percent for both boys and girls. There is no gender difference; however, small differences exist depending on the region and urban/rural areas. The vast majority (97 percent) of children completed their basic schooling (MICS, 2013). But, boys attend more vocational training than do girls and have higher employment rates. Thus, the purpose of this study is to examine gender differences in education choice of upper basic education of youths aged 15–24. This paper aims to identify the factors that influence the choice of girls and boys between vocational (or technical) education and general (or secondary) education in Tunisia.

The Tunisian education system consists of basic school, secondary school and high school. Throughout Tunisia, basic education is compulsory. Individuals are required to enroll in a basic school for at least 9 years from age 6. Secondary education, on the other hand, is non-compulsory and covers grades 10 to 13. Secondary education aims to equip students with skills that would prepare them for high studies. General education (basic, secondary and higher education) is provided by the State, and while some students attend private fee paying schools the vast majority attend state funded schools. Vocational education is also provided by the state but outside the education system and by private vocational or technical schools. In 2007, the Tunisian agency for vocational training has 134 centers. The agency provides training in 360 specialties involved in the economic sectors of the country (Bouamoud, 2007).

Post-basic students normally pass to secondary education. Regarding attendance at a secondary education, 73 percent of children are enrolled in secondary school. Table 1 shows that the net secondary school enrolment of girls (76.6 percent) is better than that of boys (69.2 percent). Attendance is much better in urban areas (81 percent in urban areas against 60 percent in rural areas). The rate is also relatively low among children whose mother was not educated (62 percent) and those from the poorest households (49 percent) (MICS, 2013).

**Table 1. Net secondary school enrolment ratio<sup>1</sup> (%) 2011-2012**

		Boys	Girls
Place of residence	Rural	56.2	62.4
	Urban	76.4	85.3
Economic well-being	Wealthy	96.3	90.9
	Middle	71.6	80.8
	Poorest	46.2	52.6
Mother's education	Illiterate	56.8	66.5
	Primary	76	83.6
	Secondary	92.6	93.7
	University	92.9	97.3
Tunisia		69.2	76.6

Source: MICS, 2013

For children who do not have the ability or desire to obtain a secondary education, other types of vocational education and training may be options. Individuals in this process obtain a certificate or diploma from a vocational or technical school. Secondary education, other than preparing students for high education, also aims to equip them with basic skills that would make them competent in office jobs. While, vocational education aims to equip students with

<sup>1</sup> **Net secondary school enrolment ratio** - The number of children enrolled in secondary school that belong to the age group that officially corresponds to secondary schooling, divided by the total population of the same age group.

specialized technical skills for jobs such as those for mechanics, electricians, electronics as well as business skills such as management and bookkeeping and others skills as agriculture and fisheries, restaurant and tourism...

To investigate the factors that influence an individual's choice between the two types of education, the paper estimates a multinomial probit model of education choice. The data available for this study contain information on individual, household and community characteristics related to the probability of education choice. Individual and household factors included the age, household expenditure, parental education, household size and sector of economic activity of father. The community characteristics included the urban location and the region of residence. The use of this data makes it possible to examine the determinants of probabilities of the choice between general and vocational education of boys and girls and exploring differences in their choice behavior. The findings of this paper suggest that there are gender differences in education choice.

The outline of the paper is as follows. Section 2 describes the theoretical framework guiding the analysis of education choice and its empirical specification. Section 3 presents the data and variables used in the empirical estimation of the impact of individual, household and community characteristics on the probability of education choice. Next, results are presented and discussed in section 4. Section 5 summarizes the empirical findings.

## 2. The Model

The conceptual framework guiding the empirical implementation is the human capital theory model emphasizing the fact that investment of the household in children education generates benefits in terms of enhanced future earnings and entails direct costs and opportunity costs associated with delayed entry into the labor market (Schultz, 1974; Mincer, 1974; Becker, 1975). In this model the optimal investment level of the household in children education increases with the returns to human capital and decreases with the cost of education.

The fundamental idea of the child quality–quantity model is that parents maximize their utility as a function of number of children, quality of children and a composite consumption good of household members subject to income and time constraints for the household members (Becker, 1991). Optimization results in a set of reduced form household demand equations for the number of children, children's education, and consumption good. The demand for the schooling of children could be represented as a function of the wages of household members, market prices of inputs, unearned household income and a set of child, household and the local labor market characteristics (Tansel, 2002).

This paper estimates the probability of individual's choice of education by gender using a multinomial probit model. Royalty (1998) proposes that one of the major advantages of the discrete choice model is that the interpretation of the estimated coefficients on event probabilities is easier. The structural equations of the multinomial probit estimator are:

$$Y_j = X_j\beta_j + u_j$$

where  $j$  represents the alternative outcomes (1: receiving general education, 2: moving to the vocational education and 3: withdrawing from school),  $X_j$  the vector of individual, household and community dependent variables and  $u_j$  is the normally, independently distributed disturbance term.  $\beta_j$  is the vector of coefficients to be estimated. The multinomial probit estimator allows for flexible correlation structures across alternatives and does not rely on the restrictive assumption that the unobserved attributes of all the alternatives (of the dependent variable) are perceived as equally similar (Theodossiou and Zangelidis, 2009).

The dependent variable  $Y_j$  takes the value 1 if the individual's choice of upper basic education is a vocational one, 2 if general education is chosen and 0 for someone leaving school.

The following variables are used as the determinants of education choice. Children's age and a squared term in age are included to observe the age effects and to capture the nonlinear effect of age on probabilities of education choice.

Parental schooling levels specifications use dummy variables for primary, secondary, and university schooling. The illiterate variable represents reference level. The parental education is expected to have a positive impact on children education. Recent literature demonstrates high correlations between parental education and child education (Delaney *et al.* 2011). Educated parents are more able to assist in their children’s learning. Thus, the positive effect of parental schooling on the probability of receiving general education is expected to be larger than that of vocational education.

Household expenditure is used as a proxy for household permanent income because of the absence of income data. The household expenditure indicator is predicted using durable goods (e.g. TV, refrigerator, washing machine, telephone and car). Positive association between household income and general and vocational education of children is confirmed in a number of studies (Moenjak and Worswick, 2003; Schultz, 1993). Opportunities for progress in school are especially likely to be more limited for children from poor households (Lloyd and Blanc, 1996). Since wealthier households are likely to be able to pay for schooling, children from such households are expected to be more likely to stay longer in general education to higher level (Tansel, 2002). If schooling is regarded as a normal consumption good, then household income should be positively related to the demand for schooling.

Household size is expected to have a negative effect on children education according to the child quantity–quality model. Parish and Willis (1993), suggests that large family size will tend to lower educational attainment for all children. Household demographic composition is likely to influence the time allocation of children among schooling and work at home (Skoufias, 1994).

Sector of economic activity of father is expected to capture the effects of the alternative opportunities for children’s time. Service is the control group. A dummy variable indicates whether the household is located in an urban area. Rural location was the reference category. Finally, dummy variables representing residence in one of the seven regions of the country are included to control for further regional differences in education choice. The district of Tunis is the reference region.

### 3. Data

The micro data used in the analysis come from the National Population-Employment Survey (NPES) of 2010, conducted by the National Institute for Statistics (2010). The NPES Survey provides much information on demographic structures, educational levels, migration, size of working population, employment and unemployment, and household living conditions.

Our sample for analysis consists of boys and girls aged 15–24 living with their parents. Individuals who did not live with their parents at the time of the survey are completely excluded from our estimation. The basic sample extracted from the National Population Survey and used in this investigation consists of 55,106 youths. Table 2 summarizes the average probabilities of education choice for girls and boys. Means and standard deviations of the explanatory variables for boys and girls are given in Table 3.

**Table 2. Mean education choice probabilities by gender**

	General education	Vocational education	Leaving school	Sample size
Girls	71.12	5.98	22.9	27,058
Boys	56.87	11.77	31.36	28,048
Total	63.87	8.92	27.21	55,106

We restrict the sample to children living with their parents for two reasons. First, one of our primary concerns is the impact of parental education on child education choice. Second, older children leave the household of their parents after a certain age (going to work or starting own family) and therefore, those we observe still in the household would be an unrepresentative sample.

Table 2 shows that girls have 71.12% chance of receiving general education and 5.98% probability of moving to vocational education. In contrast, boys exhibit lower general education probability than girls and a higher rate to vocational education, respectively 56.87% and 11.77%.

Table 3 provides definitions and descriptive statistics of the variables used in estimating the education choice model. Exogenous variables are parental education level, age, household expenditure (proxy for income), household size, sector of economic activity of father, region and community of residence. There are six sectors of economic activity: agriculture, health and education, manufacturing, energy, construction and services. Seven regions are accounted for: Tunis, northeast, northwest, east-central regions, west-central regions, southeast and southwest.

**Table 3. Descriptive statistics**

	All sample		Girls		Boys	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age	19.308	2.713	19.208	2.686	19.398	2.734
Household size	5.852	1.561	5.944	1.580	5.770	1.538
Female	0.491					
Mother's education						
Illiterate	0.393		0.390		0.395	
Primary	0.376		0.373		0.378	
Secondary	0.193		0.196		0.189	
University	0.039		0.040		0.038	
Father's education						
Illiterate	0.176		0.173		0.179	
Primary	0.477		0.477		0.478	
Secondary	0.265		0.266		0.264	
University	0.082		0.085		0.080	
Sector of economic activity of father						
Agriculture	0.209		0.203		0.215	
Manufacturing	0.105		0.106		0.104	
Energy	0.021		0.021		0.020	
Construction	0.189		0.193		0.186	
Service	0.296		0.296		0.296	
Health and education	0.179		0.179		0.179	
Urban location	0.641		0.641		0.641	
Region of residence						
Tunis	0.149		0.147		0.150	
Northeast	0.125		0.120		0.130	
Northwest	0.157		0.158		0.155	
East-central regions	0.183		0.179		0.187	
West-central regions	0.157		0.159		0.156	
Southeast	0.124		0.132		0.116	
Southwest	0.105		0.105		0.106	
Sample size	55,106		27,058		28,048	

Average of age is 19.3 years old with a standard deviation (SD) of 2.71 years. Average age of girls is 19.2 years old with SD of 2.68 years and the average age of boys is 19.4 years old with SD of 2.73 years. Average household size in the sample is about 5.85 individuals with SD of 1.56.

Girls represented 49.1 percent of the sample. For both girls and boys, about 37 percent of children have mothers with primary education, 19 percent have mothers with secondary education and only 4 percent have mothers with higher education. 47 percent of children have fathers with primary education, 26 percent have fathers with secondary education and 8 percent have fathers with higher education.

Sixty-four percent of children live in urban areas. About 15 percent of them live in Tunis, 28 percent live in the north; 34 percent live in central regions and 23 percent live in the south.

20.9 percent of fathers work in agriculture, 10.5 percent of them work in manufacturing and 29.6 percent work in service. 17.9 percent of fathers were employed in health and education, 18.9 percent in construction and 2.1 percent in energy sector.

#### **4. Estimation Results**

Table 4 provides the results of multinomial probit models of education choice for boys and girls aged 15–24. These results show that among girls and boys, age, household expenditure, parental education, household size, and community and region of residence are significantly related to the decision to undertake vocational education versus general education. The impact of independent variables on the education choice of boys and girls is as follows.

##### **4.1. Effects of Parental Education**

Father's and mother's education impacts for the two streams of education were positive and highly significant. Mother's education is found to be more important than the father's education at the two streams of education of girls and boys. Further, there are sizeable differential effects for boys and girls. The effects of the both parents' education on sons' vocational education was larger than on daughters'. The positive influences of parental education on the probability of undertaking general education are larger than that of vocational one, except for parents with primary schooling. Mother's primary and secondary education has almost the same effect on general education of girls and boys. While, mother's higher schooling was more important of the education of boys than of girls'. Father's schooling coefficient estimates show the relative benefit to girls' general education. This result indicates that increases in parental education have a big effect on their attitudes towards their children general education.

##### **4.2. Effects of Permanent Income**

Household permanent income, proxied by the household expenditures, has a positive and highly significant effect on general and vocational education of girls and boys and increases in permanent income contribute more to the probability of general education than of vocational one. The effect of income on girls' education was larger than on boys'. One explanation for the larger income effect for girls is that better off households can afford to hire help for childcare and other household work, reducing girls' domestic obligations. Thus, increases in household income will benefit girls' schooling because they relax the time constraints that girls face.

##### **4.3. Effects of Household Size**

The size of household has a significant negative impact on girls' and boys' education and the negative effect on the probability of receiving general education is slightly greater than that of vocational one. This result presumably reflects the fact that, in large household, children of school age often play an important role in provision of home activities, as child care to younger children, making it harder for them to continue their education. However, the negative effects of household size on the education of both girls and boys reflect also the negative association of

the number of children in the household and the average level of child schooling based on the child quantity–quality model. Families with many children can't afford education for everyone.

**Table 4. Multinomial probit estimates of education choice by gender**

	Vocational education				General education			
	Girls		Boys		Girls		Boys	
Age	0.505	***(0.105)	0.185	***(0.068)	-0.08	(0.053)	-0.094	** (0.047)
Age squared	-0.011	***(0.003)	-0.004	** (0.002)	0.001	(0.001)	0.001	(0.001)
Household expenditure	0.189	***(0.024)	0.121	***(0.016)	0.268	***(0.013)	0.237	***(0.012)
Household size	-0.034	***(0.011)	-0.044	***(0.008)	-0.045	***(0.006)	-0.048	***(0.006)
Mother's education								
Illiterate								
Primary	0.23	***(0.041)	0.277	***(0.029)	0.211	***(0.022)	0.217	***(0.021)
Secondary	0.507	***(0.067)	0.539	***(0.046)	0.756	***(0.044)	0.721	***(0.034)
University	0.426	** (0.211)	0.921	***(0.185)	0.995	***(0.161)	1.271	***(0.162)
Father's education								
Illiterate								
Primary	0.099	** (0.048)	0.163	***(0.035)	0.142	***(0.024)	0.111	***(0.023)
Secondary	0.261	***(0.061)	0.304	***(0.044)	0.521	***(0.034)	0.41	***(0.031)
University	0.406	***(0.145)	0.578	***(0.098)	1.116	***(0.106)	1.047	***(0.078)
Sector of economic activity of father								
Service								
Agriculture	-0.279	***(0.054)	-0.123	***(0.038)	-0.101	***(0.028)	-0.052	** (0.026)
Manufacturing	-0.125	** (0.059)	0.229	***(0.041)	-0.015	(0.035)	0.083	***(0.031)
Energy	-0.03	(0.129)	0.373	***(0.096)	0.028	(0.083)	0.326	***(0.076)
Construction	-0.204	***(0.049)	0.062	* (0.035)	-0.071	***(0.027)	0.03	(0.024)
Health and education	0.119	** (0.055)	0.231	***(0.039)	0.158	***(0.035)	0.272	***(0.029)
Urban location	0.332	***(0.043)	0.084	***(0.031)	0.325	***(0.022)	0.16	***(0.021)
Region of residence								
Tunis								
Northeast	-0.389	***(0.057)	-0.318	***(0.041)	-0.324	***(0.037)	-0.411	***(0.031)
Northwest	-0.033	(0.065)	-0.136	***(0.047)	-0.165	***(0.041)	-0.019	(0.035)
East-central regions	-0.658	***(0.052)	-0.487	***(0.037)	-0.404	***(0.033)	-0.368	***(0.028)
West-central regions	-0.589	***(0.066)	-0.508	***(0.048)	-0.229	***(0.037)	-0.139	***(0.032)
Southeast	-0.605	***(0.067)	-0.305	***(0.045)	-0.229	***(0.038)	-0.31	***(0.035)
Southwest	-0.071	(0.078)	-0.154	***(0.057)	-0.168	***(0.049)	0.015	(0.041)
Constant	-6.375	***(1.049)	-2.443	***(0.671)	1.794	***(0.509)	1.782	***(0.458)

**Notes:** \*\*\* Significant at the 1% level, \*\* Significant at the 5% level, \* Significant at the 10% level.

#### 4.4. Effects of Urban Location and Region of Residence

The positive effect of an urban location is statistically significant. The coefficient estimates indicate that residing in an urban area increases the probability of education of girls and boys. The value of the coefficient estimates were much larger for girls than for boys suggesting that urbanization contributes more to the education of girls than of boys. Living in an urban location is associated with higher probability of vocational education of girls. This may be because in rural area technical schools may not be available and girls have less spatial mobility than boys. Often, they are not allowed to move to attend a school far from home.

The probability of individual's choice of education varies according to the region of residence at the time of survey. The reference group corresponds to youths in Tunis. All of the coefficient estimates on the regional dummy variables were statistically significant, except for the southwest and the northwest. The negative effects of the regional dummy variables suggest lower probabilities of general and vocational education in all regions as compared to the District of Tunis. This was not surprising result since Tunis, the capital of Tunisia, is the most developed region of the country.

#### **4.5. Effects of Sector of Economic Activity**

Sector of economic activity of father plays a significant role in influencing the individual's choice of upper basic education. For both boys and girls, having father in agriculture significantly decreases the probability of undertaking both general and vocational education and the effect on girls' education was much larger than on boys'. For children who can work with their parents in agriculture the opportunity cost of going to school will be higher than those who can't. The coefficient estimates on the construction, energy and manufacturing sector were mostly significant implying an increase in the probabilities of receiving the two types of education for sons and a decrease in the probabilities of undertaking vocational education for daughters. The effects of father's employment in health and education sector were positive and significant suggesting that father's employment in this sector increases the probabilities of receiving the two types of education for both girls and boys. The positive effect on boys' education was larger than on girls' at the two streams of education.

#### **4.6. Age Effects**

For both girls and boys, the highly significant effect of age indicates that the probability of undertaking vocational education increases with age. It appears that vocational education is often chosen when student repeat many grades and become older, they may get withdrawn from general education institutions. In this case, they try a second chance with vocational training. The age has a greater impact on the vocational education of girls than on that of boys. The impacts of age on general education were mostly insignificant.

### **5. Conclusion**

This paper, using the microeconomic data of Tunisian youths aged 15-24, investigates the extent to which the probabilities of education choice between general education and vocational one is affected by parental schooling level, income, household size, urban location and sector of economic activity of father. The findings of this paper suggest that there are gender differences in education choice. Girls have higher chance of receiving general education and lower probability of undertaking vocational education than boys.

Several conclusions emerge from this analysis. First, both father and mother's education have strong positive effects on the probabilities of education choice of boys and girls, with that of women being larger. Second, household income has a significant positive influence on the probabilities of education choice. The estimates suggest important differences by gender in parental education and expenditure effects. Parental education has a big effect on their attitudes towards general education and mother's higher education was more important for the schooling of boys than of girls. Father's schooling coefficient estimates show the relative benefit to girls' general education. The positive impacts of parental schooling on sons' vocational education was larger than that on daughters'. The effects of household expenditures are much greater for girls than boys implying that an increase in permanent income contributes more to the probabilities of the two types of education of girls than of boys. Our analyses have also documented statistically significant effects of urban location suggesting that urbanization contributes more to the education of girls than of boys. Finally, the coefficient estimates on the father's employment in manufacturing, construction and energy sector imply an increase in the probabilities of receiving the two types of education for boys and a decrease in the probabilities



of undertaking vocational education for girls. Children whose fathers work in agriculture are at disadvantage and the effect on girls' education was larger than on boys'. It is a challenge to the government targeting effective upper basic education to children, girls in particular, who are living in poverty on rural area.

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