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Study of Factors Affecting Private Demand for Higher Education in Iran

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Abstract: Household income and education cost impact on private demand for higher education. This study is dedicated to a research report in which the income and own-priceelasticities of urban households demand for higher education are estimated in different income groups for the period 2007-2012 using the almost ideal demand system, showing higher education is a normal good. Different amount of income elasticities showed that higher education for households of the seventh to tenth income groups is a necessity good while for other income groups is a luxury good. The coefficients for the own-price elasticity are negative and consistent with the demand law. Households demand for higher education in the 1st-6th income groups is elastic (sensitive) and in the seventh to tenth groups is inelastic. Therefore, it can be expected that if the price of higher education increases or the household income decreases equal to 1% for the first to sixth income groups their demand for higher education will reduce more than 1% while the percentage of reduction in households demand belonging to seventh to tenth income groups will be less than the percentage reduction in their income or increasing the price of higher education.

Key words: Own-price elasticity of demand for higher education, income elasticity of demand for higher education, almost ideal demand system, panel data, demand, income

INTRODUCTION

Higher education in addition to bring return of investment in a form of human capital, it also has consumer benefits. Non-pecuniary benefits of higher education consists of student's satisfaction, changing their lifestyle and appropriate marriage. Therefore, higher education could be interpreted as a consumer service that can be put in the person or household's utility function.

The effective factors which determine the optimal level of higher education demand include the student or his/her family income as well as direct and indirect costs that should be paid. It is expected that the increase of income leads to increase in the educational expenditures of the person or his/her family for the use of higher education. The demand for higher education depends on its price, like other commodities and the relation between demand for education and the cost is reversed.

The government policies are also effective on this issue. Some governments believe the universities must develop quickly as the training centres for the specialist human resources to achieve the economic development (Emadzadeh, 1995). As a result, some governments try to provide large subsidies for the students of the public universities to reduce their cost of education.

On the other hand, in Iran factors such as rapid increase in population, high rate of youth in the population composition and high unemployment rate led to increase in demand for higher education. Meanwhile, the government has increasingly inclined to transfer its financial responsibility share of higher education cost to households in respond to its growing demand. But providing higher education at a cost higher than students or their parent's ability or their willingness to pay and the also existence of economic conditions like unemployment will lead to decrease in the household income, so it can have a negative effect on the demand for higher education.

It is clear that in order for government to make appropriate decisions to finance higher education, needs to know the behaviour of various classes of households to determine and change the share of higher education cost on the household expenditure and predicting the effects of price change on demand for higher education. I have tried to answer the following questions in this study:

- Is higher education, a normal good for all groups of urban households and is the demand for it, consistent with the demand law?
- Are own-price and income elasticities of demand for higher education different in various income groups households?

This study has focused on the study of the private demand for higher education through the estimation

of own-price and income elasticities. The study is based on the theory of the consumer behaviour in micro-economics.

Theoretical framework: The theory of the consumer behaviour in micro economics is the theoretical basis of the research in which the size of the demand for a good is a function of variables such as price and income.

Own-price elasticity of demand is a tool that measures the change in the quantity of demand as a result of change in price. If the change in demand is significant because of change in price, demand for good will be elastic and if there is no significant change in the quantity of demand from the change in price, demand will be inelastic. A "normal good" has a positive income elasticity of demand. An inferior good has a negative elasticity of demand. A "luxury good" has an income elasticity that larger than one. A necessity good has an income elasticity that is <1 (Begg *et al*., 1987).

In this study, the urban household demand for higher education is analysed using income and own-price elasticities in the form of "Almost Ideal Demand System (AIDS)". Also higher education is studied as a private consumer good. Although, education contains of botha consumption and an investment but in practice modelling the investment aspect of education within the complete consumer demand framework is almost impossible (Kim, 1988).

It is expected that the demand for higher education in the Iranian rich urban households is inelastic and that higher education is a necessity good for them while for the low-income households, the demand is elastic and higher education is a luxury good.

The basic model (AIDS): Many economic researchers have used the "almost ideal demand system" model. Buse (1994) states that it has been used for 237 studies, during 1980-1991. In this study, the aggregation level of the data has been selected on the basis of the household unit as the smallest consumer unit and household behaviour has been analysed (studied) through estimating equations using more data.

Systematic approach for analysis of the household behaviour requires to consider all items of consumer expenditure. Therefore the consumer's goods of households categorized into four subgroups of commodities available: higher education, food, housing and other goods and services. The characteristics of flexibility in the cost function and lack of dependency to the assumption of the linearity of Engel curve have caused the "AIDS" ability for displaying the correct behaviour of consumers in the lowest level of aggregation among the current demand systems. Therefore, in this study because the selection of level of aggregation is based on households consuming units and the four commodity groups as well as the set of the mentioned advantages, the aforementioned system has been selected to explain the household behaviour for determining the share of the cost of higher education in the total consumption expenditure of household.

Deaton and Muellbauer have introduced almost Ideal Demand System (AIDS) as the following linear approximation:

$$\omega_i = a_i + \sum_j \gamma_{ij} \log(p_j) + \beta_i \log\left\{x/p\right\}$$
$$w_{it} = a_i^* + \sum_{j=1}^{n} \gamma_{ij} \ln p_{jt} + \beta_i \ln\left(\frac{M_t}{p_t}\right) + u_{it} \quad (1)$$

Where:

α = The $(\alpha_i - \beta_i\alpha_0)$
w_i = The budget share of i
p_j = The goods price of j
M = The total of household expenditures
P_t = The also a second grade function of the prices that estimated by stone index

$$\ln(p^*) = \sum_k w_k \ln(p_k) \quad (2)$$

Deaton and Muellbauer, believe in gaining a more accurate estimation of the consumer behaviour by adding social characteristics of households to this model using dummy variables n hich ase he AIDS will be added and named demographically augmented AIDS. Accordingly based on this, the model is as follows:

$$w_{ij_t t} = a_{i0} + \sum_{s=1}^{d} \theta_{is} Z_s + \sum_{k=1}^{n} \gamma_{ik} \ln p_{ik_t t} + \beta_i \ln\left(\frac{M_{ij_t t}}{p_{j_t t}}\right) + e_{ij_t t}$$
$$i,k = 1,\ldots,n \qquad j = 1,\ldots,m_t \qquad t = 1,\ldots,T \quad (3)$$

$$\sum_1^m \alpha_k = 1, \sum_k \gamma^*_{kl} = \sum_{i=1}^{m} \beta_i = 0 \quad (4)$$

The used price index in this study is the stone index which is same as the proposed option of Deaton and Muellbauer and it is used in a large number of experimental studies.

Own-price and income elasticities of demand: The identified Phillips equation is also used for estimationof the income elasticity (expenses):

$$\eta_i = 1 + \left(\frac{\beta_i}{w_i}\right) \quad (5)$$

Equation 5 has been used for estimation of own-price elasticity:

$$\varepsilon_{ij} = -1 + \left(\frac{\gamma_{ij}}{w_i}\right) - \beta_i \quad (6)$$

Literature review: Langelett *et al.* (2015) demonstrated that demand for education at Dakota State University for $9000 tuition fee is elastic. Jung *et al.* (2013) using data from 2001, 2004 and 2008, found that in the US having health insurance by a young student increased his/her chances for registration as a full time student by 22%. The mentioned impact is more for older students.

Buss *et al.* (2004) used cross-section data of students to estimate demand functions and found income elasticity of 1.21 and own-price elasticity of 0.76. Noorbakhsh and Culp (2002) found and that demand for the education for non-resident students is more sensitive in comparison to resident students with respect to fees and income factors. Heller (1997) found that students of colour are more sensitive to the changes of tuition fee in comparison to white students. Funk (1972) estimated own-price elasticity of demand for higher education at private institution using data from 1959-1970 and showed demand was inelastic. Kim (1988) estimated income elasticity of demand for education in US was 1.34% for 1958-1982. Sasaki (1996) using Deaton and Muellbauer system and time series data of Japanese household's budget, estimated own-price elasticity of education equal to -0.838. Matsuda *et al.* (1999) using data of labour household's budget for 1980-1995, estimated income elasticity of education approximately equal to 1.1%. Fallahi *et al.* (2012) using the Linear Expenditure System (LES) and urban household data for 1989-1994 showed that income elasticity of demand for education is >1 and own-price elasticity is <1. Ansari (2013) using urban household budget data for 2004-2007, showed thatprivate demand for education in the lower or middle-income households is elastic towards changing the price of education and for the middle-upper class is inelastic. Khodadad Kashi and Heydari estimated income elasticity for education and found that education in the Iranian households is a normal necessity good. Mohammadi and Noroozi (2010) showed that income elasticity of education for Iranian households in 1965-2006 was <11 and own-price elasticity was 1.04.

One of shortcomings in above researches is that demand for education is estimated separately from the demand for other commodities ina single equation that is based on the unrealistic assumption of independence of demand function for higher education from other goods.

In some of these studies, education has been considered as a subsidiary goods like other commodities and behaviour of household has not been studied in different income groups separately. Therefore, in this study, demand for higher education has not been estimated apart from other goods. Instead, it has been studied in the framework of a comprehensive system of demand in which the distribution of consumer expenditure is based on the principles of heterogeneous and inseparable preferences. Also higher education has been considered as the main issue and demand for it categorized on households separately in the form of income groups.

MATERIALS AND METHODS

The used method in this research is multiple regression with panel data.

Research data: The data used in this study includes the unprocessed data of households budget in 2006-2011 and the related price indexes that reported by the Statistical Center and the Central Bank of the Islamic Republic of Iran, respectively.

In the study, due to the inappropriateness method of collecting data of household income and because of expenditure being more stable, the total expenditure has been used, instead of household income. The cost of higher education consists of enrollment expenditure items and the public university tuition fee (Payame Noor, non-profit, etc.), University of Applied Science and Technology and Islamic Azad University.

Statistical tests and estimation method: The data for the present study, the multiple and extracted quantities (observations) from the different periodic units, namely, the household's demand for higher education are $\underline{N}$ that there are some observations about them at each year ($\underline{T}$) in terms of costs and they have been located side by side at the time period of the study (2006-2011). The advantage of using the panel data in comparison with time series and cross-section data is more number of data and creating more variety, less linearity between variables, degrees of freedom and more efficienc. Obtaining consistent estimations from the model coefficients are subject to establish certain assumptions and selection of appropriate method for estimating the multiple models, depends on the statistical tests and the research assumptions about the vector formation of coefficients among the cross-sectional units during time.

Testing of stationary and co-integration: The stationary characteristic of data could prevent forming spurious regression among the variables and it requires to ensure the stationary of variables before estimating the model. The economic meaning of the co-integration is that even though "it is possible that the time series have a stochastic trend but they follow each other during the time in a way that the difference between them is stable" (Mohamad, 2009). Of course, in this study, there is no possibility of testing the unit root, due to the limitation of

the time (2006-2011) and the results of the mentioned tests are not valid. Therefore, it is not necessary to test the unit root and the panel co-integration in this study (Shahbazi and Moharramzadeh, 2012).

Another issue is the investigation about the possibility of combining data. In other words, it is necessary to determine the appropriate model before estimating, through the testing homogeneity or heterogeneity of cross section data. For selecting between the methods of integrated regression model (pooling) and the Panel Model, the "the results of statistic test (Leamer)" (In some studies of this test will also be referred as Chaow test) was used. The null hypothesis of F is based on homogeneity of sections (pooling statistical data) and if it is rejected, the opposite hypothesis, meaning, the existence of heterogeneity among sections (the method of panel data) will be accepted.

As it can be in Table 1, according to the obtained value of probability for the F-test (0.000) is <0.05 as a result, panel hypothesis for data confirmed.

After the F-test and rejecting the hypothesis of H_0, for selecting the model, one of the Fixed-Effect (FE) and Random-Effect (RE) Model should be chosen. Hausman test has been formed based on the presence or absence of correlation between the estimated regression error term and independent variables. If such correlation exists, the random effect model will be applied and if there is no correlation, fixed effect model will be used. But in most studies related to household spending such as this study, the assumption is correct that ^{N} randomly selected from among a large population as a result, it was diagnosed that the "Random Effect Model" is more suitable for this study. Of course because there is a correlation among different error terms for the estimation of the equations system demand, a more effective estimator is needed for estimating of all equations simultaneously. For this purpose, the method of "Generalized least squares" was used with "Seemingly Unrelated Regression" (SUR-GLS) to estimate "Random Effect Model".

Table 1: The results of statistic test (Leamer)

Income groups (deciles)	F-statistic	Probability of null hypothesis (Leamer test)
1st	38.19	0.000
2nd	84.47	0.000
3rd	65.27	0.000
4th	8.74	0.000
5th	6.65	0.000
6th	6.73	0.000
7th	6.54	0.000
8th	6.33	0.000
9th	6.48	0.000
10th	6.54	0.000

Researcher's own calculation

RESULTS AND DICUSSION

Empirical findings (estimated income and own-price elasticities): The variable coefficients were estimated in AIDS for each income group of urban household and the results showed that all coefficients are significant. The coefficients of the main variables are also consistent with the demand law and the consumer behavior theory and it can be accepted that the research model has appropriately explained the behavior of households. Since, the interpretation of the parameters in the estimated coefficients in forms of flexible functions such as AIDS is not possible, the own-price and income elasticities of the demand for higher education were considered, according to income groups of households separately.

The results of estimating income elasticities on the Table 2 demonstrated that the signs of the income elasticities are positive for all income groups and so, higher education is a normal good and by increasing income, higher education costs will increase in all urban households. In addition, the size of the elasticity coefficients for the income groupsare different, meaning that higher education for urban households that belongs to the seventh to tenth income groups is a necessity good and it is a luxury good for the 1st-6th groups of urban housholds.

Estimating the coefficients of the own-price elasticities. Table 3 showed all relevant signs are negative and consistent with the theory. Also the demand for higher education is elastic in relevant households in the first to sixth groupsand the demand is inelastic for the households belonging to the seventh to tenth groups. Increasing the cost of education, means increasing the price of the included items in the higher education index and of course the tuition fee has a major share of the costs.

Table 2: Estimated income elasticities of demand for higher education (in terms of different income deciles (2006-2011)

Decile	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Income elasticity	1.87	1.66	1.53	1.37	1.28	1.15	0.96	0.85	0.63	0.46

Table 3: Estimated own-price elasticities of demand for higher education (in terms of different income deciles (2006-2011)

Decile	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Own-price elasticity	1.92	1.83	1.67	1.48	1.31	1.12	0.92	0.74	0.47	0.18

The researcher's calculation based on the estimated coefficient

CONCLUSION

This study has attempted to present new evidence on the estimation of the demand for higher education. For the development of higher education the role of the demand side is more important than the supply side. Providing higher education at a higher cost (prices) level than the ability or desire of the students or their parents to pay is the most important obstacle to achieving the goal of increasing enrollment in higher education system. In this study by using the household budget statistics and the estimated parameters in the AIDS system, the income and own-price elasticities (costs) were estimated in the grouped households with different income. The positive sign of the income elasticity and the negative sign of the own-price elasticity showed that higher education for all income groups in the urban household is a normal good and the estimated coefficients are compatible with the theory. Also, the size of own-price and income elasticities of higher education demand for urban households are different, according to the different income groups. The results showed that higher education is a necessity good for urban households in the seventh to the tenth income groups and it is a luxury good for the 1st-6th of the income groups. In addition, the household demand of the first to sixth income group is elastic for higher education and for the households of the seventh to tenth income groups is inelastic. According to the research findings, existence of economic conditions such as increasing the unemployment rate, recession, decreasing government subsidy amount or increasing inflation rate, cause to decrease the purchasing power of the lower-income households and as a result it leads to reduce the share of higher education into the total consumption expenditures of the lower-income households. Also, policies such as taking or increasing the tuition fee, leads to the unequal distribution of educational opportunities, even if it is used for financing the higher education, the compensation of the deficit in the budget and the implementation of programs to improve higher education quality by reducing the budget share of higher education in household consumption expenditure, the removal process of the students in the lower-income households will be intensified. Of course, the inelastic demand for higher education in the households of the seventh to tenth income groups shows that the private providers of higher education services have a stable market for providing the educational services to this group of households and they can develop their investment. It is suggested that monitoring and predicting the effects of the government fiscal and monetary policies on the household's decisions about the various expenditures and changing their share in higher education and if it is necessary, conducting the compensatory measures via providing economic and financial policies and actions.

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