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# Estimation of income elasticity of urban households' demand for public education in cities

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**Abstract**

Current article is allocated to the report of a research in which the income elasticities of urban households' demand for public education in time period of 2009-2014 were estimated separately according to the income deciles and by applying Rotterdam Demand System, it was clarified that public education is normal good. Different size of estimated elasticities indicated that public education is necessary for the households belonged to the sixth to tenth income deciles and it is luxury for first to fifth income deciles and it can be expected that if the income of households belonged to the first to fifth deciles faces with reduction, mentioned households for one percent reduction of income will reduce their demand for public education more than one percent and they will consume the related resources for necessary goods and services. In contrast, the households belonged to the sixth to tenth deciles reduce the share of luxury goods and services in their cost basket so that not to be forced to reduce their public education costs proportional with income reduction. Therefore, the effective policies on households' income should be compiled and executed in a manner that not to cause reduction of the demand of households for education especially for groups with low and average income.

**Key Words:** *Demand for public education, income elasticity of public education, Rotterdam Demand System*

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## Introduction

Education in addition to the investment return, has consumptive benefits too. Non-monetary return of education not only embraces the student satisfaction, but also it includes hygiene and health of person and household and using of new technology in the house management and...etc too. Therefore, education can be interpreted as a service that in addition to the investment aspect, can be placed in the utility function of person or household as a consumptive good. Demand function of consumers for the public education services with maximization of utility function has been formed with regard to the budget constraint and the income of person or household is effective on it. It is expected that increase of income leads to the abundance of educational costs of person or family for using educational services such as quantitative and qualitative services. International and national economic conditions like economic sanctions and in the framework of Iran's economy and pursuit of economic policies which cause high inflation make the distribution of income more imbalanced (Mohammadi and et al, 2015, P.40). Decrease of income can cause households' reaction of reducing the educational costs level in various forms. For example, a group substitutes the governmental schools instead of non-governmental schools. Another group might reduces the amount of using of extra curricular lessons and compensatory educational services or private tutor. Even low-income households may prevent from sending their children to the school (especially girls).

Clearly, wise policy making of government needs to recognize the households' behavior about making decisions between combination of costs, especially changing the share of public education in the household's cost basket. In this regard, at current article, it has been attempted that the following questions to be responded:

Is the public education a normal and necessary good for all income groups of urban households?

Does the size of income elasticity of demand of public education differ for households belonging to different income groups?

This article concentrates on studying private demand of public education through estimation of income elasticities and we deal with public education as the main subject in this article. Analysis of income elasticities has become possible through estimating the parameters in the frame of Rotterdam Demand System and the purpose of this study is to recognize the type of public education services from the aspect of being necessary or luxury and its degree from different deciles of households.

## 2. The research background

Caner and Okten (2013) by using of students information entered to the Turkey's universities through test and data related to the governmental subsidies of Turkey found out that the students belonged to the richer families and/or with more educated parents have more probability for success in the entrance test of universities and registration in the universities that have more governmental subsidies. Barros and Rodringuez (2008) with utilization of data in the years of 1985-1998 of Spain have estimated the income elasticity coefficient of education equal to 1.3 percent and indicated that education is a luxury good and household's demand for it is sensitive to the change of income. Chow and Shen (2005) estimated the income elasticities for the primary and secondary periods in order 0.42 and 0.81 respectively by using data related to the years of 1991 to 2012 in China provinces. Matsuda and et al (1995) estimated the income elasticity of education about 1.1 percent by using data related to the budget of Japanese laborer households in the years of 1980-1995.Kim (1988) has estimated the income elasticity of demand for education in United States of America equal to 1.34 percent for time period of 1958-1982 and indicated that increase of



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education demand during the mentioned period mainly has arisen from increase of real income. Fallahi,Mohammadzadeh and Farid (2013) with studying the data of 8 commodity groups related to the urban households during the years of 1989-1994 indicated that the schooling group is classified in the category of luxury commodities. Ansari (2012) by using data related to the urban households budget during the years of 2004-2007 and almost ideal demand system estimated the income elasticities of demand for education separately according to the quintuple groups of households and it was clarified that private demand of education is luxury for households with low and average low income and it is necessary for the classes with high and average high income. KhodadadKashi and Heydari (2011) have estimated the income elasticities for education and found out that education in the consumption basket of Iranian households is accounted as the necessary commodity. Mohammadi and Norouzi (2010) have estimated the income elasticities for educational services positive and less than one in time period of 1965-2006 and concluded that is accounted as the necessary and normal commodity for Iranian households. Ansari and Mohammadi (2010) classified the urban households in five groups in time period of 2004-2007 and estimated the income elasticities for each group by applying the Engel function added to the economic and social variables. The results indicated that education is a necessary good for all groups and sensitivity of households' demand for education (with average and high income) to the income changes are in order the most and least. Torkamani and Dehghanpur (2009) by using data related to the urban and rural households' costs indicated that the schooling group for urban and rural households is luxury. Souri and Mashayekh Ahangari (1998) have studied the consumption model of Iranian households (443 urban and rural households) in time period of 1992-1995 for eight groups of consumptive commodity and indicated that the commodity group of education is luxury.

Analysis of above studies indicated that shortcoming of some of them has been the independence of education demand from other goods which is based on the same implicit assumption of independence of education demand from other goods and is hardly defendable. Separability feature depends on the additive separability ability and more general view about separability (weak or strong) is as the creation of limitations on substitution relations between education and other goods. In this article, demand for public education is studied in the frame of a complete system of demand. Concentration on public education, study of urban households' demand separately according to the income deciles and using Rotterdam Demand System for estimating the income elasticities are other features of current research.

## 3. Theoretical principles

Demand for goods not only is influenced by the good price, but also it is influenced by purchasers' income. Income elasticity measures responsiveness of demand to purchaser's income change and it is the ratio of percentage change in quantity purchased to percentage change in income (Samuelson.P.A, Nordhaus, W, 1987, P.907). For Normal good, the number of units demanded at each price increases as income rise. (Wonnacott P, Wonnacott R, 1986, P.59). Mostly, the goods with income elasticity less than one are considered necessary and the goods with income elasticity more than one are considered luxury. When income is increased, the goods that costs on them are increased relatively quicker than income, will occupy an increasing share of income. Therefore, if we compare the models of different persons, costs with each other, it will be observed that the share of these commodities from income for rich people is larger than poor people and therefore naturally they are considered luxury (Liard, Walters, 1998, P.159). In this article, the report of



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estimation of income elasticities of demand for education is presented in which the education demand equation isn't separated from other commodities and it is studied in the framework of a complete system of demand in which distribution of consumptive costs is according to the principles of non-homogenous and inseparable preferences. Other features of current research are concentration on public education, analysis of urban households' demand separately according to the income deciles and using of Rotterdam demand system for estimating the demand parameters in order to calculate the income elasticities. Moreover, in the approach of this article, education is studied as a private and consumptive commodity. Although education contains of both a consumption and an investment, but in practice modelling the investment aspect of education within the complete consumer demand framework is almost impossible (Kim, 1988, P.174).

### 3-1. Rotterdam Demand System

One of the systems recognized for demand which is not according to the special subordinate form of utility functions is Rotterdam Demand System (Khosravinezhad, 2000, P.58). The amounts of consumers' demand from goods are indicated with and the utility function of consumer is $u(q_1,\ldots,q_n)$ . The purpose of consumer is to maximize the above utility function with regard to the budget constraint $\sum_{i=}^{n} p_i q_i = m$ and P1 to Pn as the price of n commodities and m as the total costs. After mathematical solution of the utility maximization process, the optimum amounts of commodities are obtained in the frame of a function of prices and income:

$$q_i^0 = q_i(\overline{m}, p_1,\ldots, p_N) \qquad (1)$$

That $q_i^0$ indicates demand function for ith good and m is real income. If we differentiate from above function according to the variables logarithm, we have:

$$d(\log q_i) = \frac{\bar{d}(\log q_i)}{d(\log m)} d(\log \overline{m}) + \sum_{j=1}^{n} \frac{\partial(\log q_i)}{\partial(\log p_j)} d(\log p_j)$$

If the equations sides are multiplied by $w_i = \frac{p_i q_i}{m}$ (share of ith good in the household budget), we will have:

$$w_i d(\log q_i) = p_i \frac{\partial q_i}{\partial m} d(\log \overline{m}) + \sum_{j=1}^{n} \frac{p_i p_j}{m} \frac{\partial q_i}{\partial p_j} d(\log p_j) \qquad (2)$$

According to this, the summarized form can be obtained:

$$\mu_i = p_i \frac{\partial q_i}{\partial m}, \qquad \pi_{ij} = \frac{p_i p_j}{m} \frac{\partial q_i}{\partial p_j} \qquad (3)$$

that $\mu_i = p_i \frac{\partial q_i}{\partial m} = \partial(p_i q_i)/\partial m$ is the final share of the costs of ith good and with increase of total costs equal to one monetary unit, the costs spent on ith good will be increased equal to . There is the univalent constraint for sum of final share of costs namely:

$$\sum_{i=1}^{n} \mu_i = 1 \qquad (4)$$

Above relation is obtained by differentiating from the sides of budget constraint $\sum p_i \cdot q_i = m$ unto the nominal income (m). Price coefficients $\pi_{ij}$ arrange n×n matrix which is equal to the positive amount of $\overline{m}$ multiplied by $p(\partial q/\partial p')p$ matrix. P is the diametric matrix from the prices of $p_n,\ldots,p_2,p_1$ and its dimensions are equal to n×n.

$[\pi_{ij}]$ is the negative semi-definite matrix from n-1 degree. (5)

Therefore, specialty of $\pi_{ij}$ matrix and reduction of its degree to n-1 are arisen from the following constraint:



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$$\sum_{j=1}^{n}\pi_{ij}=0 \qquad i=1,\ldots,n \qquad (6)$$

With applying definitions (3) and using of them on equation (2), we will have:

$$w_i d(\log q_i)=\mu_i d(\log \overline{m}) + \sum \pi_{ij} d(\log p_j) \qquad (7)$$

Relation (7) indicates Rotterdam Demand System in the state of absolute prices and real income. System of Rotterdam demand equations according to the annual data can be written in the following form:

$$w_{it}^{*} Dq_{it}=\mu_i Dq_t + \sum_{j=1}^{n}\pi_{ij} Dp_{it}+\varepsilon_{it} \qquad (8)$$

Dependent variable in the state of a few changes namely annual data is:

$$w_{it}^{*}=\frac{w_{i,t-1}+w_{it}}{2} \qquad (9)$$

that its symmetrical properties hold true for $w_{it}^{*}$ the year t and t-1 and also the sum for (observation length) in t periods is equal to one. Therefore the dependent variable is as follows:

$$;\left(\frac{q_{it}}{q_{i,t-1}}\right) \qquad (10)$$

The $\mu_i d(\log \overline{m})$ phrase which is the final share of costs multiplied by logarithm changes of real income in the time of unlimited changes in the conditions that equations follow a few changes will be as follows:

$$Dq_t=\sum_{i=1}^{n} w_{it}^{*} Dq_{it} \qquad (11)$$

That is the sum of all variables in the left side of n demand equations and also the weight average from logarithm changes of n commodities amounts that the weights are the same $w^{*}$ which is the average of costs share for the year's t and t-1. Therefore, $Dq_t$ is interpreted as the logarithm changes of quantitative index for all n commodities or equal to the logarithm changes of real income. The price index can be also defined in the form of logarithm changes of prices:

$$Dp_t=\sum_{i=1}^{n} w_{it}^{*} Dp_{it*} \qquad (12)$$

Therefore, system of Rotterdam demand equations in the state of a few changes (annual data) is obtained as follows:

$$w_{it}^{*} Dq_{it}=\mu_i Dq_t+\sum_{j=1}^{n}\pi_{ij} Dp_{it}+\varepsilon_{it}$$

The last phrase of above equation $(\varepsilon_{it})$ includes the disorder sentences of demand equations which are arisen from the effects of variables eliminated from model (variables except prices and income) and the errors arising from measurement of variables. It is assumed that has an average equal to zero, simultaneous variance-covariance of them for the total time period is fixed and other covariances (non-simultaneous) are equal to zero. If we sum the sides of demand equations (8) on n commodities, it will be as follows:

$$\sum_{i=1}^{n} w_{it}^{*} Dq_{it}=\sum_{i=1}^{n}\mu_i Dq_t + \sum_{j=1}^{n} Dp_{jt}\sum_{i=1}^{n}\pi_{ij}+\sum_{i=1}^{n}\varepsilon_{it}$$

If we consider Rotterdam Demand System in four-commodity state:

$$\sum_{i=1}^{3} w_{it}^{*} Dq_{it}=\left(\sum_{i=1}^{3}\mu_i\right)Dq_t + \sum_{j=1}^{4}\left(\sum_{j=1}^{3}\pi_{ij}\right)Dp_{it}+\sum_{j=1}^{3}\varepsilon_{it} \qquad (13)$$

With regard to the condition basis of $\sum_{i=1}^{4}\mu_i=1$, the first phrase of left side of the equality is $(1-\mu_4)Dq_t$ and for the $Dp_{it}$ coefficients with regard to the existence of symmetry, we have:

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$$\sum_{i=1}^{3}\pi_{ij}=\sum_{i=1}^{3}\pi_{ji}=-\pi_{j4}=-\pi_{4j}$$

Sum of disorder sentences for 4 commodities becomes equal to zero,. Therefore we can write as follows:

$$Dq_t-w_{4t}^{*}Dq_{4t}=(1-\mu_4)Dq_t-\sum_{j=1}^{4}\pi_{4j}Dp_{jt}-\varepsilon_{4t} \quad (14)$$

Equation (14) is another form of equation (13) and it is equal to the fourth demand equation. The last equation was a linear combination of equations before itself and total number of $\mu$s and $\pi$s in the state of n demand equations (n-commodity) is equal to $n+n^2$. Equation (14) indicates a linear constraint between $\mu$s that for estimation, the last equation (or one of the equations) should be eliminated. With elimination of one of the equations, n price parameters and one income parameter are eliminated and the estimation of them isn't needed. In addition, $\sum_{i=1}^{n}\pi_{ij}=0$ relation entitled symmetry constraint causes to reduce $\frac{1}{2}n(n-1)$ parameters. Therefore, total number of estimative parameters is reduced after exertion of two constraints of sum of $\mu$s and symmetry to $\frac{1}{2}(n+2)(n-1)$. The price index applied in this research is also Aston index which is the option suggested by Dayton and Muelbauer and it has been used in abundant empirical studies.

**3-2. Income elasticity (costs) in Rotterdam Demand System:**

With regard to the general relation of model, we had:

$$w_i d\log q_i=\theta_i d\log Q+\phi\sum_{j=1}^{n}\theta_{ij}d\log\left(\frac{p_j}{p'}\right)$$

The above demand function can be rewritten in the following form:

$$d\log M-d\log p=d\log Q=d\log\frac{M}{p}$$

That $d\log Q$ phrase indicates change in income in the conditions that has been deflated by the price index of divisia. The income elasticity of demand can be extracted from the quantities of above function which is:

$$\frac{\theta_i}{w_i}=\frac{\partial q_i}{\partial M}\cdot\frac{M}{q_i}$$

**4-Methodology**

The method used in this research is multivariable regression with combinative data.

4-1. The research data

The data of this research embrace the raw information of household budget during the time period of 2009-2014 and the index of related prices which are published in order by Iran's statistics center and Central Bank of Islamic Republic of Iran. In this study like most of similar researches due to the improper method of collecting the information of household income and more stability of costs, the sum of consumptive costs has been used instead of households 'income. In addition, the aggregation level of data according to the statistical unit of household has been selected as the smallest consumptive unit that causes the analysis of households' behavior in different costs levels and estimation of equations with utilization of more data number to become possible. The systematic approach for analyzing the households' behavior needs the consideration of all costs items in the household cost basket and therefore, the consumption basket of household has been classified into four following sub-groups of public education, food, housing and other goods and services and the most important cause of it in addition to the public education as the research subject is the main share of two commodity groups of food and housing in the cost basket of urban households. The



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| Cost items / Decile | Education cost | Food cost | Clothing cost | Housing cost | Hygien cost | Cost of other commodities and s & services |
|---|---|---|---|---|---|---|
| First | 3.1 | 28 | 2.7 | 31.3 | 4.95 | 29.95 |
| Second | 4.2 | 25.4 | 2.9 | 24.6 | 5.8 | 37.1 |
| Third | 5 | 18.9 | 3.3 | 19.5 | 4.4 | 48.9 |
| Fourth | 6.4 | 15.3 | 2.6 | 14.7 | 3.2 | 57.8 |
| Fifth | 8.3 | 10.8 | 2.2 | 11.7 | 2.2 | 64.8 |
| Sixth | 9.1 | 8.4 | 1.95 | 8.3 | 1.8 | 70.45 |
| Seventh | 10.2 | 6 | 1.6 | 6 | 1.4 | 74.8 |
| Eighth | 8.5 | 4.7 | 1.3 | 4.8 | 1.2 | 79.5 |
| Ninth | 7.7 | 3.1 | 0.96 | 3.2 | 0.9 | 84.14 |
| Tenth | 6.9 | 1.9 | 0.84 | 2.4 | 0.8 | 87.16 |

Table 1. The share of costs kinds in the cost basket of urban households separately according to the income deciles during the years of 2009-2014 (percent),Reference: writer's calculation

public education costs include the education costs items of primary school, pre-school, secondary school, high school, pre-university and compensatory classes and types of costs related to the registration and tuition fee of governmental and private schools, adults and night schools, compensatory classes for entrance exam of university and cash donations to the school.

Different behavior of households at the time of income change causes that the consequences of income change on households' behavior from the aspect of distribution of income among kinds of consumptions and especially public education services to be studied separately according to the different income groups and also the fitness of demand system coefficients in definite income domains is done. In this study, urban households have been classified in the frame of income deciles and demand parameters for each one of them have been estimated.

**4-2. The statistical study of some features of households**

Some of the households features classified in the frame of income deciles are as follows:

Information of table 1 indicates on average the share of public education costs of households belonged to first to seventh deciles is increased from 3.1 percent for first decile to 10.2 percent for seventh decile but after that, it is reduced with descending order to 6.9 percent for tenth decile.

**4-3. The statistical tests and estimation method**

The data of current study have been the quantities (observations) extracted and combined from different periodical units namely households applicants for public education services (N) that in each year T, there are observations about them in the costs framework that have been placed beside each other in the years of time period of study (2009-2014) (Khosravinezhad, 2002-P.122). The main framework of the models with combinative data is in the following form:

The signs i are for households (sections: N), t is for time (year:T) and k is considered for the number of explanatory variables and is the disorder sentence of equation. Here, in addition to the sectional structure of time series of the research, the main reason for utilization of the model according to the combinative data is to solve the problem related to the unobserved effect that if some definite assumptions are provided, we can reach to the compatible estimations of the model coefficients (Davoodi and Shahmoradi, 2004, P.99 and 100). In such conditions, selection of proper method for estimation of combinative mod-



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els depends on the results of statistical tests and assumptions realized about formation of coefficients vector among sectional units during the time. In this part, the possibility of estimation of model is tested in the form of combinative data and determination of fixed or random effects.

**4-3-1. The reliability and co-integration tests of variables**

In the sectional models that time doesn't have any role, studying the reliability of the model variables isn't necessary but in the econometric literature, before estimation of model according to the combinative data, the reliability and co-integration of the variables are studied. Reliability of data prevents from creating spurious regression among the variables. For testing the reliability of variables, we can use unit root test of panel data of augmented Dicky-Fuller, Phillips-Perron and Levin-Lin-Chu, but in this research due to the limitation of time period of 2009-2014, there hasn't been the possibility of unit root test and the results of mentioned tests aren't valid. Therefore, in this study, doing the tests of panel unit root and panel co-integration isn't necessary (Baltagi, 2005, quoted from Shahbazi, 2012, P.38).

**4-3-2. The significance test of the group effects (model estimation method)**

For analyzing the information with combinative data method, in some cases, F (Leamer) test is used in which hypothesis H0 according to the equality of intercepts and hypothesis H1 according to the inequality of intercepts are tested. In other words, before estimation, it is necessary that the proper model to be identified through testing the homogeneity or non-homogeneity of the sections. F (Leamer) test was used for selecting between the methods of pooled and panel regression model. This test specifies that whether the regression determination coefficient with fixed effects significantly is larger than determination coefficient of Pooled regression model or not (Lotfi and Kheirpur- 2014-P.53). The null hypothesis of F-statistic is according to the homogeneity of sections (Pooled statistical data). In other words, according to the amounts of sum of squares residuals from fitting of two constrained (stability of $\beta_{1i}$) and unconstrained (changeability of $\beta_{1i}$ ) models, the hypothesis test according to the equality of intercept for all sectional units of $\beta_{1i}$ can be done. If the null hypothesis is rejected, the opposite hypothesis namely existence of non-homogeneity between the sections (panel data method) is accepted.

As it is observed in the table 2, with regard to this issue that the probability amount obtained for F-Leamer (0.000) is less than 0.05, therefore the null hypothesis according to the existence of non-homogeneity of sections and being Pooled is rejected, the hypothesis of being panel is confirmed and for efficient estimation, the method of Generalized Least Squares (GLS) is used.

**4-3-3. Housman test (for recognizing the fixed or random state of the sectional units differences)**

After confirmation of the method of panel regression model according to F Leamer test, for estimation of model, it is necessary that one of the different methods of fixed and random effects to be selected. One of the problems of fixed factors model is the existence of a lot of fixed parameters which cause to reduce freedom degree and the random factors model is used for solving this problem. For stipulation test of the "random effect" model versus "fixed effect" model, the model is estimated in two forms of fixed and random effects and then the obtained coefficients are compared. The null hypothesis in Housman test is in this form that the estimated coefficients by random effect estimator are "equal" to the coefficients obtained from fixed effect estimator. The logic of Housman test function is in this manner that if individual effect is fixed, the estimators of fixed and random effects will be different with each other evidently, but if individual effect is random, two



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| Decile | F-statistic | Null hypothesis probability (Leamer test) | 2λ-statistic | Null hypothesis probability (Housman test) |
|---|---|---|---|---|
| First | 18.36 | 0.00 | 131456.41 | 0.00 |
| Second | 78.36 | 0.00 | 142371.25 | 0.00 |
| Third | 135.37 | 0.00 | 374324.45 | 0.00 |
| Fourth | 7.43 | 0.00 | 6134.25 | 0.00 |
| Fifth | 4.73 | 0.00 | 5217.34 | 0.00 |
| Sixth | 4.452 | 0.00 | 3574.32 | 0.00 |
| Seventh | 4.367 | 0.00 | 608.42 | 0.00 |
| Eighth | 4.431 | 0.00 | 324.48 | 0.00 |
| Ninth | 4.156 | 0.00 | 103.38 | 0.00 |
| Tenth | 4.276 | 0.00 | 4086.243 | 0.00 |

Table 2. Results of F Leamer and Housman tests, Reference: Researcher's calculations

| Decile | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th |
|---|---|---|---|---|---|---|---|---|---|---|
| Income elasticity | 1.55 | 1.35 | 1.27 | 1.14 | 1.08 | 0.85 | 0.67 | 0.64 | 0.54 | 0.33 |

Table 3. The results of calculation of income elasticities (costs) for income deciles of urban households (2009-2014),Reference: writer's calculation according to the estimated coefficients

estimators will be almost similar (Sajjadifar and Khiabani, 2011, P.63). The test statistic for determining the model estimation method according to one of the methods of fixed or random effects of Housman indicates that the amount of probability obtained in Housman test is less than 0.05 and therefore, the null hypothesis of Housman test is rejected and thus, the fixed effects method has been more efficient than random effects method and as a result the fixed effects method has been used in this research. Although it seemed that in the studies related to the household costs, since N has been selected from a large population randomly, the «random effect model» is more proper (Khosravinezhad and et al- 2013-P.84). But the research results indicated that the fixed coefficients method is more efficient. Housman test results have been presented in the table 2.

**5-The research findings**

**5-1.Estimation of Rotterdam Demand System**

The coefficients of variables related to the Rotterdam Demand System were estimated for each one of the income deciles and the obtained results indicated that the coefficients are significant for all income deciles of households. In addition to the ratio of significant parameters statistically, the signs of the main variables, coefficients are compatible with the demand law and the theory of consumer's behavior. Therefore, it can be accepted that the research model (according to the Rotterdam Demand System) has explained the households' behavior in a proper form.

**5-2. The results of estimation of income elasticities (costs)**

In this part, the results of income elasticities estimation are presented in order to analyze the manner of decision-making of urban households from the aspect of allocation of resources to the public education. Since the presentation of the parameters coefficients estimated in the Rotterdam Demand System isn't useful, we suffice to present the income elasticities of demand for public education separately according to the household's deciles.

The results related to the estimation of elas-

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ticities in the table 3 indicated that the sign of income elasticities for all deciles is positive and therefore the public education is normal good and with increase of income, the costs of public education of all urban households are increased. In addition to this, the elasticities have been different for income deciles and the sensitivity of urban households' demand has been reduced with moving from low income deciles toward higher deciles. In other words, public education is necessary for urban households belonged to the sixth to tenth income deciles and it is luxury for first to fifth income deciles. According to this, in the conditions that because of unemployment or lack of increase of salary proportional with increase of the public level of prices, urban households of first to fifth deciles face with real income reduction (purchase power), for one percent reduction of income, they will reduce their demand for public education more than one percent. In contrast, the households of sixth to tenth deciles for one percent of reduction of income will reduce their demand for education less than one percent. Of course, the size of estimative coefficients for elasticities indicates difference in the amount of sensitivity and reactions domain to the income changes. For example, the households of tenth decile in the conditions for one-percent reduction of their income will reduce 0.33 percent of their educational costs while the households of sixth decile in facing with one-percent drop in their income, will reduce their educational costs about 0.9 percent. According to this, since the sum of income elasticities is equal to one, it can be expected that the households of low income deciles at the time of income reduction, reduce the share of public education in the household cost basket and consume it for necessary commodities and services. Also the households belonged to sixth to tenth deciles when facing with their income reduction, reduce the share of commodities and services which are accounted luxury in the household cost basket so that not to be forced to reduce the educational costs proportional with reduction of income.

**6. Conclusion and suggestion**

For development of schooling coverage, the role of demand side perhaps is more important than the supply side and the role of government's policies on demand side is determinative. The economic policies of government influence on the income level of people and they are effective on the public education demand on behalf of them and formation of human capital in the country. In responding to the research questions, in this study with utilization of parameters estimated through equations of Rotterdam Demand System, the income elasticities (costs) of households classified in the frame of income deciles were estimated the most important results were as follows:

Education has been normal good for all urban households and cost elasticities for income deciles are different, commodity group of public education is necessary for households of sixth to seventh income deciles and it is luxury for first to fifth deciles. The largest and smallest sizes of income elasticity in order belong to the households of first decile (1.55) and tenth decile (0.33). The sensitivity of households' demand for public education to the income change for lower deciles is more than higher deciles. Therefore, it is expected that the reduction (increase) of income of mentioned households lead to reduction of their demand` (increase) their demand for education relatively more than prosperous households.

The research results indicated that public education is luxury good for low-income households and their demand for education is sensitive to the income change. In other words, if the purchasing power of mentioned deciles is reduced by the effect of factors like unemployment, economic stagnancy, reduction of subsidies amount or increase of inflation rate, the persons in mentioned stratum will reduce their costs for public education more than the



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relative reduction of their income. In such conditions, the economic problems can lead to the students drop out and at least reduction of educational costs of low-income households in the household cost basket. In contrast, reduction of economic pressure on households and prediction of compensatory acts can reduce the severity and reduction of deprived household's demand for education Therefore, it is expected that the effects of financial and monetary policies of government on decision-making of households about combination of costs types and changes in the share of public education to be sighted and in next step, the private demand for education should be strengthened by providing compensatory acts through presenting financial and economic encouragements for the households that have members who are studying and also reducing the schooling costs. For example, allocation of non-cash targeted subsidies (such as food, presentation of textbooks and school uniform and other necessities of schooling, providing free transportation for the residents of regions that their residence place is far from school, enjoyment of medical and unemployment insurances and similar social concessions) to the residents of deprived regions in a way that is related to the education of family members at schooling age, increases the demand for education.

In contrast, public education is a necessary good for the families dependent on the high income deciles and indicates that private suppliers of public education services to this group of households are facing with stable market and they can develop their investment. In this regard, the government shouldn't deprive this group of households from achieving the opportunities and desired results that markets present by prevention from exerting the limitations without logic and scientific support on the market mechanism. Revision in the law and provisions related to the activity of non-governmental schools such as facilitation of issuance of permission for founders, development of schools freedom in giving variety to the educational plans in order to satisfy the demands of students, parents and prevention from creating the conditions that some non-governmental schools have been placed in the exclusive situation and can waste the society's rights in a non-competitive space are some acts which are classified in the category of developing and strengthening the market's benefits. In contrast, government can improve the quantity and quality of educational services presented in this kind of schools in line with equality of educational opportunities by concentration of regard and allocation of more resources to the governmental schools.

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