

## **The Role of Economic Factors in the Growth and Development of Human Resources in Open and Distance Universities in Iran**

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### **Abstract**

The human development index is a combined index for measuring the basic dimension of life, which is to have access to required facilities to gain knowledge, taking benefit of a long-time and healthy life and achievement to standard living level. The main objective of this study is to identify the economic factors affecting the growth of academic population in open and distance universities of Iran. The method applied in this study was documentary-analytical method and time series and ordinary least square (OLS) regression model were also used. Statistical population in this study consists of 500 PNU (Payame Noor University) centers. The data of the statistical population included number of applicants of BA of academic year 2001-2014 in PNU and the reliability of independent variables was confirmed using Dickey Fuller Test. Effective variables for distance education were firstly derived using Delphi method. The results obtained from this study show that total Customer Price Index (CPI), earning per master's degree, scholarship and student loan, Gross National Production (GNP), average household income, agriculture field tuition, human science tuition and national income have had positive effect on number of PNU applicants.

### **Keywords**

Economic Factors, Payame Noor University, Open and Distance Education, Demand for Distance (online) Education, Human Resource Development.

### **Introduction**

The human development index is a combined index for measuring the basic dimension of life, which is to have access to required facilities to gain knowledge, taking benefit of a long-time and healthy life and achievement to standard living level [3,8]. Making decision to continue education after high school is usually postponed for a few years to enter to labor market [19]. In many developing countries like Iran, economic conditions can make problem with making decision to continue higher education. National participation rate in higher education needs consistency and carefulness of policy making evaluations, which is under effect of various factors[23]. However, methodology and available data causes makes problem with identification of effective and important factor of total demand. Using econometrics approaches, various variables could be evaluated carefully. In Iran, demand for distance education and PNU is done every year through national exam organized with a set of available data in total demand.

### **Theoretical framework**

The human development index is used as a scale to measure development and considers social and cultural dimensions, along with economic dimension of development [3]. Knowledge, skill and expertise could be the main factors of human capability in it [6]. Higher education is the underlying factor for economic, social and individual growth and plays effective role in increasing number of graduates of university [19]. Marginson has claimed that enrolment rate in higher education during the years 2000-2012 has been increased respectively to 44.1 and 36.0% in

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countries like Turkey and Iran. The motivation of enrollment in higher education is investigated from various attitudes [18]. The first attitude considers higher education as a consumptive commodity and considers student as economic-rational consumer, which analyzes the cost/benefit of higher education against other consumptive commodities. In the economic researches, scholars consider the theory to analyze the effect of tuition, expenses and household income on decision to participate in higher education. The second attitude considers higher education as capital commodity and considers student as rational investor, which analyzes current income value expected from investment in higher education with other types of investment. The third attitude considers sociology for enrolment in higher education. In order to use the theory, scholars emphasize individual and demographic information of students like economic and social base, race, parents' education level and academic ability [11].

According to Cobb-Douglas, as economics accumulates physical capital, human capital could be also enhanced through education and hence, change in technology is the outcome of investment on human capital[8]. Imagine that the graduate of high school faces the decision making that enter to university or labor market. Individual cost/benefit estimation in decision making of individuals is considered as function of determinant factor [12,20]. The concept of demand in economics is defined as the amount of product gained by customers in any time and in any price. In general, factors determining demand include income level, satisfaction and value system, product price and comparison of products with other ones [22]. One of the basic causes of increased demand for entrance to higher education system is increasing quality level and labor division and increasing complexity of skills and professions [2]. In analysis of theoretical roots and bases of growth and promotion of higher education, the theory of human capital mentions that participation in higher education in economic growth could be achieved through improving quality of human resources [4]. Gary Becker believes that human capital factors (education, training and health conditions) in production could be the most important phenomena in economic growth. Some economists like Arthur Lewis assume unlimited workforce supply and emphasize the academic and technical ability of human and consider this factor as the capital [3].

Advent of distance education institutes has changed the pattern in higher education system. Such change needs flexibility, lack of centralization and creation of new strategies. Demographic information and behavioral traits could provide more recognition of market and departments that universities tend to provide in future for distance education [13]. The candidates of entering to Iranian universities and higher education centers attend a national exam every year after ending the high school education to enter to these centers and their academic performance could be cleared in their total gained value in the exam [5]. Demand in higher education is one of the main issues, which should be considered by managers and planners with reduced academic population. Investment in higher education in both public and private sectors is depended on the number of students in entrance exam. Therefore, in view of academic officials, low participation could affect access to resources. The governmental support for higher education is firstly caused by local and provincial officials. Theoretically, the role of government's support is one of the complementary supports to produce educational capital by the families [23]. In order to achieve the main objective of this study, the question is analyzed: what are the economic factors affecting academic population growth in PNU of Iran?

#### **Literature review**

Various studies have been conducted in field of analysis of factors affecting demand in higher education and some of the studies are referred here. Oliveira et al have claimed that public expenses in higher education caused by GDP have been in positive correlation with demand[19].

Vieira and Vieira have mentioned that the obtained economic indices like real GDP, annual and per capita GDP, real net income were not significant statistically. Moreover, tuition has had negative effect on number of demand[25].

Strickland has found that there is no significant effect on average income level or household

income distribution for higher education demand. Direct education cost has negative expected effect in whole time[24].

Hoerack and Weiler have claimed that educational and student loan, GNP, academic degree income has had significant effect on entrance to higher education system[15] .

Koshal et al have found that average household income is an underlying variable[17] .

Hsing and Chang have found that changeability of enrolment based on tuition, income, wage and unemployment rate is obtained respectively to -0.254, 0.675, 0.577 and 0.041[16] .

Hight has found that income sensitivity in demand for enrolment in private sector is significantly higher than public sector for higher education. Hence, increased household income could lead to high tendency for private sector. Difference in tuition of education institutes has not been a factor for reduction of enrolment in private institutes compared to public institutes[14].

Gerlich has claimed that in the demand for distance education, tuition has not affected online enrolment significantly[13]. Corazzini et al have found that reduction in tuition has led to increase in number of enrolments in the university[12]. Chen has claimed that increase in enrollers in master course and students in total number of students could be depended on GNP. Increase in average credit hours of students in tuition and costs of state could lead to decrease in enrollers in master course and enrollers in total number of students[8].

Choi has found that household income, tuition and expenses, GNP have affected demand of students significantly. Variables of academic employment rate, wage difference and family size have been negatively correlated to demand of students[10]. Stafford et al have found that household income has had positive effect on entrance to higher education system [23].

Therefore, related research studies show that controllable and uncontrollable factors by university both have an irreversible effect on the demand for higher education. Researchers have sought to investigate these factors in open and distant universities in Iran, especially at Payame Noor University.

## Methodology

The method applied in this study was documentary-analytical method. Statistical population in this study consists of all centers and branches of Payame Noor University (PNU) in 31 provinces consists about 500 centers. In terms of time scope, available data was used. In this study, Ordinary Least Square (OLS) regression model was used for purpose of data analysis. To obtain the variables, at the first, a list of factors affecting demand in higher education was obtained using Delphi method and due to the literature and interview with scholars. After the required investigations and another interview with scholars, the data of effective variables were finally collected. The dependent variable in this study was number of enrollers during BA course in PNU from 2001 to 2014 annually. As use of unsteady time series in common methods of econometrics may lead to creation of false regression, it was required to ensure of steady nature of applied time series before everything to estimate the parameters of the studied model. One of the most common methods for this purpose is augmented Dickey Fuller Test. In this test, relevant statistics of Dickey Fuller test was compared to the critical value of McKinnon table. If the absolute value estimated is higher than the absolute value of McKinnon test, the H0 based on existence of unit root is rejected, which refers to steady nature of time series; otherwise, the time series is unsteady and the reliability of time series should be tested through differentiation. In data analysis section, MICROFIT and MIPLE software was used.

For purpose of data analysis, 4 regression model were used as follows:

$$- DLNS1=C+LBT+LYK+LU+DLNT+DLCPI+DLYF+DLN2+DLBA$$

Where;

DLNS1 Refers to number of enrollers in BA course of PNU; C refers to intercept; LBT refers to total state budget; LYK refers to average income of manufacturing laborers; LU refers to unemployment rate of youth of age 15-24; DLNT refers to total state population; DLCPI refers to total consumer price index; DLYF refers to income per MA degree; DLN2 refers to workforce graduated of high school and DLBA refers to higher education budget.

$$- DLNS2=C+DLSE+LSEE+DLCT+LGDP+LGNP+DLNEE+LYA+DLYD$$

Where;

DLSE refers to total employed portion in industry; LSEE is ratio of educated employees to total employees; DLCT refers to education and student loan; LGDP refers to gross domestic production; LGNP refers to gross national production; DLNEE refers to total workforce; LYA refers to average annual household income; DLYD refers to income per diploma degree.

$$- DLNS3=C+LB1+LS3+LCA+LYL+LNE+DLN3$$

Where;

LB1 refers to urban household dimension; LS3 refers to population of primary student; LCA refers to average household costs; LYL refers to BA degree income; LNE refers to number of employed people in industrial workshops; DLN3 refers to academic graduated workforce.

$$- DLNS4=C+LB2+DLS2+LS1+LSK+DLSA+DLSAE+DLN1+LYE+LSF$$

Where;

LB2 refers to

rural household dimension; DLS2 refers to number of secondary school students; LS1 refers to number of high school students; LSK refers to agriculture department tuition; DLSA refers to basic science tuition; DLSAE refers to human science tuition; DLN1 refers to educating or graduated population in labor market; LYE refers to national income; LSF refers to technical and engineering department tuition.

## Results

What are economic factors affecting growth of academic population in PNU?

**Table 1.** Economic factors affecting growth of academic population in PNU

Variable	Coefficients	SD	Stat (prob.)
DLCPI	0.375	0.307	1.22 (0.289)
DLYF	0.144	0.049	2.91 (0.043)
DLCT	0.583	0.185	3.13 (0.035)
LGNP	21.31	10.001	2.13 (0.100)
LYA	0.74	0.396	1.87 (0.133)
DLYD	-0.083	0.027	-3.06 (0.038)
LGDP	-22.10	10.032	-2.20 (0.092)
LCA	-2.918	1.419	-2.055 (0.079)
LYL	-0.598	1.012	-0.590 (0.573)
LSK	0.725	0.813	0.891 (0.423)
DLSA	-6.363	4.587	-1.387 (0.238)
DLSAE	0.822	0.716	1.148 (0.315)
LYE	0.862	0.719	1.200 (0.296)
LSF	-0.955	0.559	-1.709 (0.163)

The results in table 1 show the economic factors affecting growth of academic population in PNU and it could be found from the results that total consumer price index has a positive effect on number of students. In other words, per one percent increase in DLCPI, number of students is increased to 37%. MA degree income (DLYF) has a positive effect on number of student. In other words, per 1% increase in DLYF, number of students is increased to 14%. Education and student loan (DLCT) has a significant effect on number of student. To this end, per 1% increase in DLCT, number of students is increased to 58%. Gross national production (LGNP) has a positive effect on number of students too. In other words, per 1% increase in LGNP, number of students is increased to 21%. Average household income (LYA) has also a significant effect. In other words, per 1% increase in LYA, number of students is increased to 74%. Diploma degree income (DLYD) has a negative effect on number of students. This means that per 1% increase in DLYD, number of students is decreased to 8%. Gross domestic production (LGDP) has a negative effect on number of students too. In other words, per 1% increase in LGDP, number of students is

decreased to 22%. Also, average household income (LCA) has negative effect on number of students. It means that per 10% increase in total household cost, number of students is decreased to 29. BA degree income (LYL) has a negative effect. In other words, per 1% increase in LYL, number of students is decreased to 59%. Agriculture department tuition (LSK) has a positive effect. It means that per 1% increase in this variable, number of students is increased to 7%. Basic science tuition (DLSA) has negative effect. It means that per 10% increase in DLSA, number of students is decreased to 63%. Human science department tuition (DLSAE) has a positive effect, so that per 1% increase in this variable, number of students is increased to 8%. But technical engineering department tuition (LYE) has a negative effect. The meaning of that is per 1% increase in this variable, number of students is decreased to 9%. National income has a positive effect. It means that per 1% increase in this variable, number of students is increased to 8%.

### Conclusion

In this study, the data of 2001-2014 have been used through using documentary-analytical method and OLS model to determine economic factors affecting growth of academic population in PNU. According to obtained results, it could be found that total consumer price index (DLCPI), BA degree income (LYL), education and student loan (DLCT), gross national production (LGNP), average household income (LYA), agriculture department tuition LSK and human science tuition (DLSA) and national income (LYE) have had positive effects on number of enrolments in PNU and have led to increase in number of students.

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