Higher Education and Economic Growth in Iran's Provinces

Hassan Daliri and Nader Mehregan
Department of Economic, Bu Ali Sina University, Iran

Abstract: In this study, researchers examined effect of higher education in the 28 provinces of Iran during 2001-2008. Researchers estimated model by Panel data. Also, we used of dummy variables for examine effect of section or provinces on constant and effect of higher education on province's GDP. Results of this study showed that higher education has positive effect on province's GDP in 18 provinces and section effect on quality and quantity of effect of higher education on province's GDP. In addition, there are differences constant for one of the provinces. Thus, we can conclude that higher education is causing production to increase if the economic infrastructure to employ a trained labor force otherwise, education will not be able to influence the production.

Key words: Higher education, economic growth, panel data, dummy variables, labor force, GDP

INTRODUCTION

The long run, economic growth is influenced by the intentional accumulation of knowledge or R and D (Romer, 1990) and human capital (Lucas, 1988) and institutions and other variables. But the higher education sectors of many countries always obtain at least some of their GDP. The economics of higher education goes back at least to Smith (1976) who suggested that professors should get paid based upon the number of students enrolled in their classes. Higher education pertain the stage of learning that occurs at universities, academies, colleges and institutes of technology. The study mentioned by Mankiw *et al.* (1992) defined the role of education by the proportion of the workforce with secondary education. Iran is the most populous country with the second largest economy in the Middle East. It has a population of 73,864,000, GNI equal $4,350. After the Iran-Iraq war, very new universities were founded and doctoral programs were developed in the previous. To the extent that Iran has 1,795 number of universities and Higher Education Center now that 1,200 numbers of universities depend of public sector and 595 numbers depend of private sector. Higher Education System in Iran has grown substantially in recent years (Hamdhaidar *et al.*, 2008). In the provinces of Iran, Tehran province has its place in the greatest number of students (599,046 students equal 18% total student in Iran). After Tehran, Isfahan (26,738 student equal 7.9% total student in Iran) and Fars (22,170 student equal 6.5% total student in Iran) provinces have the highest student in Iran's provinces.
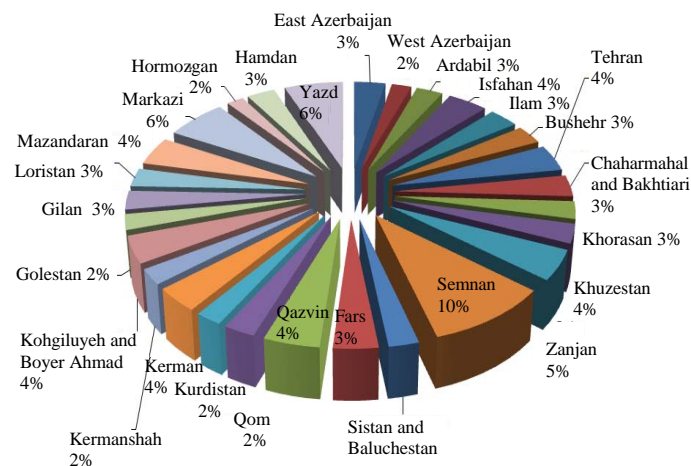

Fig. 1: Average no. of students per one hundred thousand people

Corresponding Author: Hassan Daliri, Department of Economic, Bu Ali Sina University, Iran

On the other hand, Kohgiluyeh and Boyer Ahmad has the least number of students in the provinces of Iran (28,470 students' equal 0.8% total student in Iran). But the number of students per one hundred thousand, Semnan (14,273 number of students per one hundred thousand) has the largest number of students and Golestan (3,116 number of students per one hundred thousand) has the lowest student. Figure 1 shows the distribution of average number of students per one hundred thousand people in the provinces of Iran during evaluated years in this study (2001-2008). In this study, we will review effect of higher education in the provinces of Iran during 2001-2008.

MATERIALS AND METHODS

Researchers use the Cobb-Douglas production function. It is modeled as a function of labor, physical capital and human capital. We can show production function as:

$$Y = AK_t^{\alpha} L_t^{\beta} H_t^{\gamma} \tag{1}$$

Where:
Y = The real output
K = The physical capital
L = The raw labor input
H = The quality of human capital
A = An exogenous knowledge and technological factor

Assume that individuals invest in education at the beginning of their lives and then work until they retire or die. Their earnings depend on their human capital and knowledge accumulated that it has a function of schooling since, they were born. The only cost of schooling is the foregone earnings. The cost of education is derived from the income which they gathered in the past. Amount of gain which people get from the education:

$$I = wH(E) \tag{2}$$

Where:
I = The earnings of an individual
w = The wage per unit of human capital
H(.) = The quality of human capital as a function of schooling which is denoted by E

Thus, an estimated structural earnings function can be specified as:

$$\ln I = constant + f(E) \tag{3}$$

Equations 2 and 3 imply that human capital will be given by:

$$H = e\, f^{(E)} \tag{4}$$

While the constant term in Eq. 3 will correspond to ln(w). The standard assumptions about the f(E) function are that $f_E > o$, $f_{EE} \leq o$. To simplify the model, researcher assume that $f(E_t) = E_t$. Substituting Eq. 4 into Eq. 1, the production can be re-expressed as follows:

$$Y = AK_t^{\alpha} L_t^{\beta} e^{\gamma E_t} \tag{5}$$

We will transform this function to linear function and we will continue to use it to estimate the model. We have used data from the provinces of Iran, since after the revolution (or 1979). So, the data consists of 28 provinces and 8 years (2001-2008). We estimate the model using panel data. We used GDP of provinces for Y, labor force participation rate for L, capital formation rate for K and number of student in university (private and public) for higher education.

RESULTS AND DISCUSSION

Researchers need understand the effects of section (provinces) on effect of higher education so, researchers introduce dummy variables for each province. First researchers estimate the dummy variable effects on the coefficients of higher education:

$$y = C + \alpha K_{it} + \beta L_{it} + \gamma D_i H_{it}$$

So that, i show number of provinces and t showed number of years. We use the F test that testing are equal the coefficients? The statistics was equal 69.99 so, $H_0\, B_e$ rejected and coefficients are not equal. But tests for the individual provinces showing that the coefficients of 10 provinces no significant differences together.

Thus, researchers have the same coefficient for the 10 provinces and re-estimate the model. The results show that the Vigor Model to explain increased. We will continue to enter the dummy variable for the constants:

$$y = D_i C + \alpha K_{it} + \beta L_{it} + \gamma D_i H_{it}$$

The estimated model shows that the constants of provinces are significantly different together. But tests for each province showed that only one of them is different constants from the rest:

$$y = D_x C + C + \alpha K_{it} + \beta L_{it} + \gamma D_i H_{it} + \gamma H_{Jt}$$

x = The province has a different constant
I = The provinces has a different coefficients for higher education
j = The provinces has a equal coefficients for higher education

Result from estimating the model showing in Table 1. Therefore, the obtained results show that labor and capital have significant positive effects on economic

Table 1: Results from estimating

| Names of province	Constant	Coefficient of capital	Coefficient of labor	Coefficient of higher education
East Azerbaijan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
West Azerbaijan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Ardabil	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Isfahan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	8.39e-08 (0.000)
Ilam	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	1.28e-06 (0.000)
Bushehr	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	1.60e-06 (0.000)
Tehran	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	8.03e-08 (0.000)
Chaharmahal and Bakhtiari	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	1.793-07 (0.034)
Khorasan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Khuzestan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	3.59e-07 (0.000)
Zanjan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Semnan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	3.513-07 (0.000)
Sistan and Baluchestan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Fars	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	7.58e-08 (0.000)
Qazvin	-0.0382 (0.00)	4.46e-09 (0.00)	0.0011 (0.000)	2.77e-07 (0.000)
Qom	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	4.60e-07 (0.000)
Kurdistan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Kerman	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	9.59e-08 (0.000)
Kermanshah	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	1.51e-07 (0.023)
Kohgiluyeh and Boyer Ahmad	-0.1038 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	6.97e-08 (0.000)
Golestan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Gilan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Loristan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	9.67e-08 (0.032)
Mazandaran	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	8.33e-08 (0.000)
Markazi	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	2.46e-07 (0.000)
Hormozgan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	6.65e-07 (0.000)
Hamadan	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	-4.8e-08 (0.0120)
Yazd	-0.0382 (0.00)	4.46e-09 (0.00)	0.00119 (0.00)	1.20e-07 (0.000)
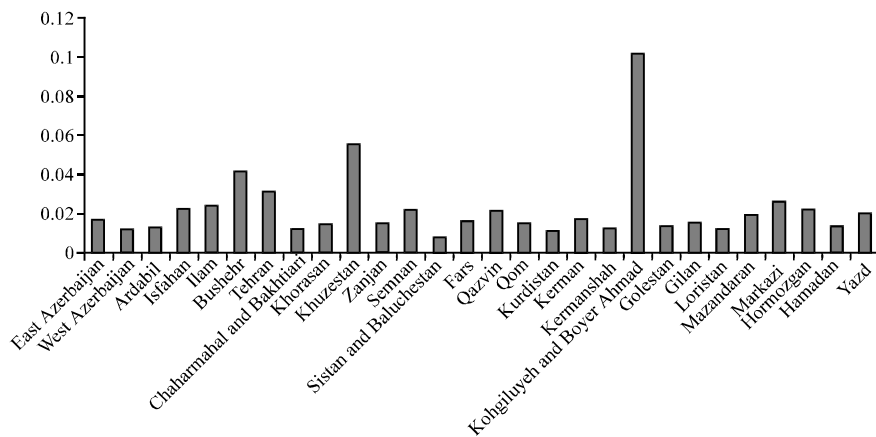
Fig. 2: Average per capita income during 2001-2008

growth but the impact of higher education is depend on effect of province. So that, higher education has a negative effect on economic output in the 10 provinces: East Azerbaijan, West Azerbaijan, Ardabil, Khorasan, Zanjan, Sistan and Baluchestan, Kurdistan, Golestan, Gilan and Hamadan but in other provinces, higher education has a positive and significant impact on economic production or GDP of provinces.

The 10 provinces which higher education has a negative effect on production, they are often the poorest provinces in Iran according to GDP per capita. Figure 2 that showing the average per capita income in the period studied this research; respectively provinces; Sistan and Baluchestan, Kurdistan, West Azerbaijan, Loristan, Chaharmahal and Bakhtiari, Ardabil, Hamadan, Golestan, Khorasan, Zanjan, Gilan have the lowest average per capita income between provinces in Iran.

Hence, there is no infrastructure of economic in these provinces that caused they can not use of higher education accumulated in labor. So in these provinces, higher education does not play an important role in producing. But other provinces since, a vigor infrastructure of economic they can use of higher education accumulated in labor. Moreover, the constant of the model of Kohgiluyeh and Boyer Ahmad is different from the other provinces. This result was achieved due to

the fact that per capita income in this province (Kohgiluyeh and Boyer Ahmad) is very different from other provinces (Fig. 2).

CONCLUSION

Results of this study showed that higher education has positive effect on province's GDP in 18 provinces and section effect on quality and quantity of effect of higher education on province's GDP. In addition, there are differences constant for one of the provinces. Thus, we can conclude that higher education is causing production to increase if the economic infrastructure to employ a trained labor force otherwise, education will not be able to influence the production.

REFERENCES

Hamdhaidar, S., H. Agahi and A. Papzan, 2008. Higher education during the Islamic government of Iran (1979-2004). Int. J. Educ. Dev.. 28: 231-245.

Lucas, R.E., 1988. On the mechanics of economic development. J. Monet. Econ., 22: 3-42.

Mankiw, N.G., D. Romer and D.N. Weil, 1992. A contribution to the empirics of economic growth. Q. J. Econ., 107: 407-437.

Romer, P.M., 1990. Endogenous technological change. J. Polit. Econ., 98: 71-102.

Smith, A., 1976. The Wealth of Nations. University of Chicago Press, Chicago, IL.