

## An Estimation of Human Capital Share in Economic Growth of Iran Using Growth Accounting Approach

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**Abstract:** One of the important factors in economic growth of each country is human capital that plays an important role in economic development and growth. On the other hand, one of the best methods for calculation of human capital share is growth accounting which not only focuses on econometric models, but also calculates the share of each factor through growth accounting; that is considered as the innovation of the present research in comparison with similar researches. The findings indicate that the effect of human capital on economic growth of Iran is positive during 1978-2010. Moreover, the share of this factor in the Second Five Year Economic Development Plan of Iran is higher than others.

**Key words:** Growth Accounting • Human Capital • Iran

### INTRODUCTION

Since beginning of normal economic analyses, the issue of economic growth has been always taken into consideration by economists. One of the issues discussed in economic growth is growth factors and the most important one is human capital. Nowadays, considering human capitals, population growth is one of the determinant factors of growth. In fact, human capital is the missed link led to economic growth in many countries [1]. On the other hand, active labor and capital stock also play important role in economic growth. In this paper, growth accounting has been used for calculation of share of human capital, active population, capital stock and productivity. In growth accounting, total factors share is equal to 100 and total factors values is equal to average growth [2-4] and these cases distinguish the present research from other studies. The period of study is 1957-2008 in Iran. The results show that the share of human capital in the Second Five Year Economic Development Plan is more than other plans. Moreover, the share of active labor and capital stock is also positive and more than others in the Second Five Year Economic Development Plan.

**Literature Review:** Saeidiny and susaraie [5] in their studied they get this result that there is a strong correlation between effectiveness and the employees performance and poor one between innovation and the

employees performance. Sadeghi & Emadzadeh [6] tried to estimate elasticity of production in classification of human capital and other production factors to identify the importance of human capital in comparison with other production factors. According to the results, the production elasticity of physical capital factors, labor and education of skilled manpower is respectively 0.42, 0.87 and 0.15 of gross domestic product. Komeyjany and Memarnejad [7] in a paper entitled "the importance of quality of manpower and research and development in Iran's economic growth" concluded that variable coefficient of human capital was 0.06 within a short time and based on T-statistic has positive and significant effect on production (equal to 4.55). Furthermore, considering human capital coefficient during long time, i.e. 0.209, we can emphasize on firm positive and significant effect of human capital on gross product. In other words, each percent of increase in human capital during short term and long term will increase production respectively for 0.063 and 0.209 percent. It means that in economy of Iran, human capital has positive and significant effect on gross domestic product which is more effective during long term in comparison with variable short term effects.

Mokhtari and Tavakoli [8] modelled through 12 countries, works with five regional groups and developing ICT solution to improve the use of ICT in Iranian universities and using content analysis and the giving geostationary to the Instructors, they could extract, 65 solution branches for updating professors ict skills.

Niazazari [9] in her article showed, one of the topics required for planning in management of imports of educational services is knowledge about country's relative advantages in the production of equipment and services related to imports of educational services. Taghavi and Mohammadi [10], based on the statistics of the years 2002-2009, studied the effect of human capital indices on economic growth of Iran and concluded that human capital and its various indices such as percent of literates in the country and or average education years of the manpower during the said period in Iran, had ascending trend and the growth of these indices with an interruption has positive and significant effect on gross domestic product growth. Ghalandarzahi has explained the importance of human capital on economic growth of Iran through endogenous economic growth models. He concluded that sustainable relation is gained when the economic structure of the country can prepare the way for attracting skilled and qualified manpower in different fields. Komejani and Mahmoudzadeh concluded that after total factor productivity, capital other than information communication and technology has predominant effect on economy and human capital as well as information technology capital have limited share notwithstanding their positive and significant effect. Abbas [11] performed a comparative analysis between two developing countries of India and Pakistan. He considered higher education enrolment rates as human capital indicator. The results of his studies indicate that human capital has positive effect on economic growth of Pakistan; while it has negative effect on economic growth of India. Memon, *et al.* [12] in his paper showed: the education is the lifeline for efficient and stable working of human society. education help develop individual personality making the person knowledgeable, competent, capable and skillful. Nazari and Ehsani [13] in their studied title "the effect of communication skills and interpersonal communication on organization effectiveness of Iranian sport managers and presenting a model" showed that there are significant relationship between communication skills, interpersonal communication with subordinates and upper management and effectiveness in sport. Bloom *et al.* [14], in a study entitled "Health, Human Capital and Economic Growth" tried to estimate human capital share in forms of education, work experience and health on growth rate of aggregate income. They also found that health improvement has positive effect on aggregate product level. Benhabib and Spiegel [15] studied the role of human capital in economic development. They used aggregate cross-country data of physical capital and

human capital in order to estimate growth calculation regressions by an aggregate product function. The results of their studies indicate that human capital has minor effect on product level that is insignificant in terms of statistics. Lee and Hwang studied human capital in both forms of education and health in economy of China using Mankiw- Romer and Weil generalized model. The results show that health and education have positive and significant effect on economic growth of China. Samiei Nasr and Bafande Zende [16] at their studied titled "a model to evaluate the readiness of Iranian enterprises to gain entry to international market" wants to build a theoretical framework that identifies the important skills for successful export from different business areas and make an empirical ranking of their importance. A survey containing 72 practical export skills was sent to 153 Iran exporting companies in East Azarbayjan province of Iran. The findings show that skills in international finance and risk management, international regulations and international trade research were viewed as being more important. Constantina and Stenjus [17] in an essay entitled "Foreign Investment, Human Capital and Long Term Economic Growth" have studied the effect of human capital on economic growth. The increase of human capital along with foreign direct investment may increase economic growth in countries with average income. Gaumont and Leonard [18] in a paper entitled "Human Capital and Economic Growth in Planning Models" concluded that long term economic growth rate in United States depends on human capital partnership. Rabiei studied entrepreneurship and innovation using Romer endogenous economic growth model and has considered a model for economic growth of Iran which investigates the effect of variables like labor, physical capital, human capital, research and development and importation of machinery on aggregate importations. Afraz and Ghaemi [19], study at "investigating the effect of technology-based education on the pre-service English teachers' transferable skills". They proved the fact that, in the context of Iran, applying computer and the internet in education is hugely ignored and most of the students are growing computer illiterate.

**Trend:** The reports available with Statistical Center of Iran show that, in the First Five Year Economic Development Plan, the number of secondary school students has increased from 1672647 to 2584345 persons during the years 1989-1993; in fact it has a growth rate of 0.54. In the Second Five Year Economic Development Plan, their number was increased from 2919591 to 4008576 persons

during the years 1994-1999; i.e. a growth rate of 0.37. In the Third Five Year Economic Development Plan, the number of students was reduced from 4063714 to 3817771 persons with growth rate of -0.06. In the Fourth Five Year Economic Development Plan, their number was reduced from 3772585 to 3569839 during the years 2004-2007 with growth rate of -0.05. Moreover, active population has had ascending trend during the Development Plans and the number of active population at the beginning of the first Development Plan has increased from 13942000 to 23578000 persons at the end of the Fourth Development Plan. Their number has increased from 23,578,715 to 24,204,201 persons during the years 2007-2010. Capital stock has also had an ascending trend and it has increased from 827723 to 1656500. The ratio of active population to total population is equal to 41 percent in 2005, 40.4 percent in 2006, 39.8 percent in 2007, 38 percent in 2008, 38.9 percent in 2009 and 39 percent in 2010.

**Research Methodology and Presentation of Model:** In this study, production is a function of total factor productivity, capital stock and human capital. The number of secondary school students has been considered as human capital index. Based on the estimated coefficients and growth accounting method, the share of economic growth factors can be calculated as follows:

$$\text{LN}Y = \alpha + \beta \text{LN}N + \gamma \text{LN}K + \delta \text{LN}M \quad (1)$$

Where Y, N, K and M respectively means gross domestic product, active population, capital stock and human capital. The variables of LnM, LnN and LnY and LnK have no unit root based on Dickey-Fuller Test; in fact

they are dynamic variables. On the other hand, based on Granger Causality Test [20] the coefficient gained from model variables during the long time for human capital logarithm is 0.04 which indicates that each percent of increase in human capital logarithm causes 4% increase in gross product. On the other hand, the coefficient gained for active population logarithm is 0.28 which indicates that each percent of increase in active population logarithm may cause 0.28% increase in gross domestic product and the coefficient gained for capital stock is 0.67 which shows each percent of increase in capital stock may cause 0.67% increase in gross product.

**Growth Accounting:** Average economic growth of gross domestic product is equal to 7 in the First Development Plan of which 1.52 is allocated to human capital. In fact, 21.7% of gross domestic product growth is subject to human capital. Generally it can be concluded that human capital had no economic growth in line with production increase in the First Development Plan. In the Second Development Plan, we see lower economic growth in ratio to other plans and on the other hand, human capital growth is desirable. In fact, human capital share from economic growth is about 42.8. Human capital share has reduced in the Third Development Plan and only 18.47% economic growth has allocated to human capital. In fact, from total economic growth that is equal to 5.03, only 0.93 relates human capital and we do not see any increase in line with economic growth and human capital. Human capital share has significantly reduced in the Fourth Development Plan in a way that only 13.55 percent of economic growth relates to human capital and from the total economic growth that is equal to 6.64; only 0.9

Table 1: Share of factors using growth accounting

	Share of Growth in First Plan 1989-1993	Share of Growth in Second Plan 1994-1999	Share of Growth in Third Plan 2000-2004	Share of Growth in Four Plan 2005-2009
Active population	15.7	36.50	21.60	16.40
Human capital	21.7	42.80	18.48	13.55
Fixed Capital	15.8	36.80	23.20	16.41
Productivity	46.7	-16.25	53.20	53.60
Share of Whole	100.0	100.00	100.00	100.00

Source: Authors findings

Table 2: Quantity of factors using growth accounting

	Quantity of Growth in First Plan 1989-1993	Quantity of Growth in Second Plan 1994-1999	Quantity of Growth in First Plan 2000-2004	Quantity of Growth in Four Plan 2005-2009
Active population	1.10	1.17	1.09	1.09
Human capital	1.52	1.37	0.93	0.90
Fixed Capital	1.11	1.18	1.17	1.09
Productivity	3.27	-0.52	1.09	3.56
GDP in IRAN	7.00	3.20	5.03	6.60

Source: Authors findings

relates to human capital. Generally, it can be said that human capital has the highest and lowest share from economic growth respectively in the Second and Fourth Development Plans and while we witness insignificant economic growth in the Second Development Plan, but this factor has highest share in comparison with other plans.

**Conclusion Remarks:** Since human capital has played an important role in economic growth of most developed countries, but its role is not significant in Iran and it is recommended that:

- Structure, capacity as well as culture building is necessary for institutionalization of manpower quality, which must be made by government.
- Education in elementary and secondary schools should be in a way that the students learn all subjects theoretically and practically.
- Education Department should present a method based on which the students as human capitals, would be proficient in basic concepts of computer and make familiar with foreign languages, especially English, prior to university admission.

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