



**Original Article**

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## A Study of the Use of Human Capital in Economic Development with Emphasis on the Roles of Health, Instruction Inequality & Education Distribution

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**ABSTRACT:** This paper discusses how Today the role of Productivity is crucial in providing suitable conditions for economic growth and development, While productivity growth can be rooted in the quality and quantity of manpower across the country (Iran) in the period 1965-2012 ; In this paper, we seek to define indicators of human capital (health and education inequality as the quantity and quality indicators of human capital) and its impact on the per capita income in Iran. In this study, At First, we used the bounds testing approach (Bounds testing) to analyze the long-run relationships in addition to new test for analyzing the static variables. Then, we seek to estimate the equations using autoregressive distributed lag (ARDL) and Erroe correction method (ECM). The results indicate that there was a significant and positive relationship between the variables of health, labor productivity and percentage of productive capacity with the per capita income in the short & long terms. Finally, we concluded that the impact of distributed education on per capita income and economic growth is negative respectively. Namely, Improving per capita income and economic growth requires the education dispersion to be reduced. In other words, Emphasis should be given to the elementary and secondary schools rather than higher education. At the end, the structural stability and diagnostic tests (CUSUMSQ & CUSUM) show that the estimated model and coefficients are stable during the period.

**KEYWORDS :** Labor productivity, Human capital, Education Gini coefficient, ARDL Method, Bounds Test.

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## 1. INTRODUCTION

In economic literature, how to apply economic factors and resources (labor, capital and technology) in the process of economic growth and development is important and as the economy places in higher level of development, the intensity usage of physical and human resources will decrease gradually and attempts to improve the quality level of these resources via technical changes and production factors efficiency. Accordingly, deployment of capital and labor character along with technology provides the situation for increasing the productivity level of total factors in economic activities. Since higher and continuous economic growth in economy has led to faster transition in production structure of the economy from one stage to another stage of economic development. In these structural changes, high share of labor force productivity and its influencing factors (especially human capital) in economic development leads to good production rather than bad (physical resource utilization instead of qualitative change in production (Barbz, 1999)). In the past three decades, the economy of Iran has always experienced different economic growth with fluctuation. However, this growth has been improved over the country developing programs especially the third and fourth (first three years) than before it, so that the average economic growth in the third and fourth programs (three-year) were 1/6 and 7/6 per cent respectively which have been placed at higher levels compared to the previous period. In recent decade, the capacity of Iran's economy has been gradually higher over the past two decade in terms of GDP (gross domestic product) size duo to its economic growth improvement. It is obvious that, labor force productivity is one of the main sources of economic growth (or value added level changes ) in Iran's economy. In this regard, the labor force should provide better services not only in production process, but also should indicate a greater sensitivity and precision in applying other production factors so that factors have been had higher efficiency too. Thus, the role of labor force, especially skilled labor in a coordinated system for achieving higher goals in economic growth is important. Labor force which has more human capital will have greater productivity that leads to more economic growth. Studies which have been done on factors causing economic growth have attributed less than 50 per cent of the growth to primary production factors (labor, capital, land) and the rest to other factors such as changes in technology, productivity increment and remaining factor. Human capital is a qualitative factor affecting on production process that is not explainable by labor factor and does not seem to have resources other than educational resource (Emadzadeh and Baktash, 1384).

## 2. LITERATURE SEARCH

In this section, we will introduce the theoretical studies and examine the growth variables and their affecting factors.

### 1.2. Theoretical Studies

Adam Smith, for the first time in his famous work under the title of "The Wealth of Nations" emphasized on the role of human capital and the importance of investment on economic development. In Smith's ideas, developed skills of labor force, as a means of capital results in production efficiency level promotion. Specialists have more production ability than others and are the creator of more values in production process. According to Schultz's idea (1959), known as the father of human capital theory, human acquisitive ability has been the most important source of growth. So he answered to the growth riddles scientifically. According to his belief, when we invest in human capital parts, human productivity increases which will increase the production and income and actually assigned as a capital. Unlike classical and neoclassical economists, Schultz never considered labour forces as a homogeneous and isotropic factor. He believes that labor force will have different skills and quality on the basis of training which he receives that differentiates him from the other labour (MehdiPour, 2001). In 1960s, people like



Becker (1964), Schultz (1961) And Mincer (1974) showed that education, through labor force wage, the different approach of Solow-Swan growth model entered the human capital as an endogenous variable into the growth patterns. These researchers emphasize on the role of education in promoting innovation capability of individuals and compatibility with new technologies in order to accelerate the technological development. Becker introduced health and hygiene as a part of human capital in his early theory about human capital. But in empirical studies have focused on training. In other words, he does not consider health as a main element of human capital . In recent studies, two methods for modifying the neoclassical growth model- and human capital inclusion have been proposed. The first method which is proposed by Mankiw, Romer and vol (1992) has considered human capital (education) as a factor among other productive factors. In addition to training, Nals and Owen (1995) also considered health as a growth key factor in human capital components by extending this approach. In Second method, by knowing that the total productivity growth is variable, it depends on the level or rate of change in human capital. Accordingly, human capital can be effective on economic growth through improving productivity and technology. The patterns formed by the second method are known as endogenous growth patterns. According to endogenous growth theory, factors affecting productivity permanently affect economic growth. One of the effective factors is the human capital that can affect productivity and ultimately increases the economic growth. For the first time, Grossman (1972) explicitly mentions health as an important component of human capital and extracted the demand pattern for health from human capital theory. Grossman makes a distinction between health as a consuming goods and capital goods. Suhrcke M et al (2005) believe that health effect on economic growth depends on substituting and incoming effects. On one hand, more healthy people have higher productivity resulting higher wages. This increment caused higher incentive to supply more labor force (substitution effect). On the other hand, people's health increases the receiving wages during their lifetime. This may incline to reduce the labor force supply (income effect). In the meantime, if the substitution effect dominates the income effect, it will cause health improvement, productivity increment and economic growth. Lopez (2003) indicates that both employers and employees benefit from investing in training, skills and experience. Higher education has a significant effect on wages and productivity.

Ozbilgin (1993) believes that people with higher education always looking for better and more efficient ways of doing things and innovative solution of problems in organizations. Based on the mentioned theoretical studies, many empirical studies including BenHabib and Spiegel (1994) and Barro and Sala-i-Martin (1995) has been done in confirming of this pattern and has been shown that human capital has a positive effect on economic growth. But in the meantime, we face with other empirical studies (Pritchett (1996), Islam (1995), Lawe, Jemysen) that were not consistent with theoretical discussions and have no sense of training and in some cases negative effects on economic growth. Several studies have been carried out in response to this lack of consistency between the empirical and the theoretical discussions and their reasons. Lack of considering human capital quality in studies has been known as the origin of this difference by some group (Hanushek and Kim (1995) and others have claimed that the channel of education effects on economic growth is a weak channel. In fact, economic growth is known as human capital development factor (Bils and Klenow (2000, 1998)).

Among those who have tried to respond this problem are Lopez, Thomas and Wang (1998). These researchers have expressed in a paper that ignoring the distribution of labor force education leads to the problem of negative effects of human capital on economic growth in different countries (Nili, 1382). Feature of most empirical studies is that health or training are applied alone as an indicator of human capital in the analysis . But a few are utilized both health and training factors as an indicator of human capital which can affect productivity and economic growth. In this study, it has tried to use health and labor force productivity indices as well as the education distribution as human capital quality and their effect on economic growth



can be assessed. Given the above, training indices, health and labor force productivity have positive impact on per capita income theoretically. So the question which proposed here is: how is the relation between the mentioned indices and Iran’s per capita income?

**2.2. Examination Of Growth Variables and Their Affecting Factors**

Before the Iranian Revolution (1357), Iran's economic growth had been rapid. During the 1350s, Iranian modernization and industrialization which was traditionally become a farming community was considerable. However, the pace of economic growth reduced significantly before the Islamic Revolution in 1357. After the revolution in 1359, the Outflow of asset from Iran was about 30 to 40 billion dollars. After the Islamic Revolution, Iran's long-term goals were economic independence, creating full employment and a comfortable and standard living for the citizens. But at the end of the twentieth century, the economy had faced many problems and obstacles. Iran's population has more than doubled in the last twenty years, coinciding with young population increment, although a large proportion of the population had been active in agriculture from 1340, Iran was major importer of food. Economic problems caused to migration from the countryside to the cities. As shown in Table 1, Economic growth have had upward trend, during the war this trend has become downward. Although the Second Development program faced with a sharp fall in economic growth, in the first, third and fourth program have grown significantly. Comparison of labor force productivity index with indicators such as economic growth actually shows that despite the acceleration of economic growth in development programs, the labor force productivity index is downward and this is mainly due to too much emphasis on the government policies and its direction in development programs in order to create new employment opportunities for reducing the imbalances of supply and demand labor force. During 1344-1388, labor force productivity Changes trend had become gradually positive through the development program. These changes can be associated with macro-level indicators. However, the average per capita growth of real output has not increased relatively. Life expectancy rates have always risen (except in war). But recently, the increasing has faced with reducing rates.

Table 1: Average growth of effective factors on economic growth

Period	Economic Growth	Life Expectancy	Average years Educated workers	Average growth of Labor force productivity
1344 - 1357	2/76	1/13	2/8	0/40
Imposing War	-1/91	-0/039	4/1	-4/16
First Development program	7/42	1/09	5/4	4/38
Second Development program	3/25	1/03	6/5	0/35
Third Development program	6/12	1/018	7/5	2/24
Fourth Development program	6/74	1/012	8/3	2/77

Source: Central Bank, World Health Organization, Iran Statistical Center

**3. PREVIOUS STUDIES**

In a study, Raeesi (1374) has introduced family as the smallest social unit that is capable of playing role in productivity fate of a community and has considered the health as the most important effective factor on productivity and consequently economic growth. The results of the study indicate that hygiene supply is not only important in public health, but also accounted as one of the fundamental pillars of productivity promotion. Nili and Nafisi (1382) have examined the impact of human capital on economic growth by considering the training distribution, mean amount of dispersion of the education years among the practitioners in Iran and showed that the



economic growth has declined by increasing the dispersion of the practitioners' education years. Hence, by focusing on the educational level of employees from elementary level to high school rather than higher education will increase the economic growth through the labor force productivity growth channel .

Komijany and Memarnezad (1383) have explained the importance of human force quality and research and development on economic growth through the endogenous economic growth models. The results of this study indicate the strong and significant effect of labor force on economic growth and also verified the significant and positive effect of human capital on production.

Hejazi azad ( 1386 ) has introduced a theoretical framework to examine the impact of health and hygiene on labor force productivity in which life expectancy as health and hygiene indicator, physical capital per capita and percentage of actual output to potential output are considered as the most important effective factors on labor force productivity. The results indicate that higher labor force productivity can be achieved through increasing the level of physical capital per capita and reducing unemployed capacity in addition to health promotion. During 1345-1383, the annual average of labor force productivity has increased 1.8 per cent; approximately 38.2% of this growth has been obtained by promotion of labor force hygiene and health level.

Emadzadeh and et al (1388) have studied and examined the quality effect of labor force on economic growth in selected countries. The variables used include training, experience and hygiene. The model evaluation results in high-income countries indicate that training, hygiene and experience variables have significant positive impact on economic growth. These results are confirmed in middle-income countries. In low-income countries, only training variables and labor force experience have affected the economic growth for this group of countries.

Shahbazi and et al (1391) evaluated the human capital of labor force (including training and health) effect labor force productivity using the ARDL method. According to the results, positive correlation of training and hygiene indicators with labor force productivity has been proved on the theoretical basis.

Stiglitz (1975) has paid attention to human force quality in a study of "Theory of selection, training and income distribution", he believes that as the society become more educated, the degree of learning and labor force innovation and ultimately the productivity and efficiency increases. McMahon (1987) entered the indicators related to human capital such as investment in elementary and secondary and investment in higher education into the production function. The results of this study indicate that capital investment in elementary and secondary education have had 21.2 % revenue rate, but the impact of capital investment in higher education was not a desired result.

Nals and Owen (1995) evaluated the relationship between human capital and economic growth with an empirical experiment. The results show that there is a strong correlation between hygiene and economic growth. But the correlation between training and economic growth is weak.

Bloom and Canning ( 2000 ) by examining the relationship between life expectancy and per capita income in some developing countries have concluded that the countries where life expectancy is more than five years, real per capita income grows faster in 0.3 to 0.5%.

Bloom and et al (2004) found that life expectancy and training have a significant positive effect on economic growth. Improvements in health, not only increases the production through labor force productivity but also increases it through capital accumulation. The study also shows that -



improvement in life expectancy for one year leads to 4% increment in production. Owy and Adenga (2005) examined the relationship between economic growth and training and health costs over the period of 1970-2000 for Nigeria data in terms of collective patterns and error correction. The results of this study showed that there is a long term relationship between GDP growth and training and health costs.

By measuring the health status with infant mortality rate, life expectancy rate, health crude rate and national per capita as economic growth indicator, Malik (2006) have concluded that if OLS method is used, there will be no significant relation between health status and economic growth. However, as SLS2 method was used, it is concluded that there is a very significant effect on health index on economic growth.

Ako and Damont (2008) examined the relationship between human capital (training and health) and economic growth for USA during the period of 1929-1997 by using time series approach. Stimulation reaction and variance analysis have been applied to examine the importance of relationships between variables with each other. The results showed that causality relationship is established from both health and training to economic growth direction. The dynamics growth in USA is also described a little by previous level of training and health.

#### 4. METHODOLOGY INTRODUCTION AND RESEARCH METHOD

According to Nals and Owen’s human capital and also Lopez and et al education distribution pattern, we can explain the theoretical model. Based on Lopez and et al idea in order to calculate total output for goods that are not tradable, distribution indicator should also be considered. In other words, we also want to enter the education distribution indicator in equation of production function provided by Nals and Owen. Therefore, in production function of each individual, in addition to physical capital and human capital (training and health), we enter another indicator that reflects the ability each individual. In mathematical explanation of this case, Thomas and Feng act as following. We consider the production function of each individual :

$$Y_i = AK_i^\beta \alpha_i H_i^\alpha \tag{1}$$

Where:

$Y_i$  = value added generated by i-th individual (labor force productivity)

$A$  = Total productivity index

$K_i$  = physical capital Share

$\alpha_i$  = Parameter that reflects the ability level of i-th individual

$H_i$  = human capital of ith individual (including training and health).

$K$  Represents all of exchangeable factors that have side-line production equal to each individual. So, we can assume that there is no need to distribution consideration in  $K$  huge value computation. After doing some mathematical operation, Lopez and Thomas and Feng come to the equation:

$$\text{Ln}(y_0) = \text{Ln}(c) + \beta \text{Ln}(\text{Pro}) + a \text{Ln}(\text{Ur}) + \lambda \text{Ln}(h_0) + \text{Ln} \left[ 1 + \frac{1}{2} a(a-1) \left( \frac{\sigma_h}{h_0} \right)^2 + a \left( \frac{\sigma_{ah}}{h_0} \right) \right] \tag{2}$$

Where Pro is labor force productivity Index;  $h$  is health index and Ur is utilization index of Production capacities (potential production to actual production ratio). After two steps of optimization on above equation, they both concluded that: there is an optimal distribution of training which is called  $\sigma_h^*$  for each country.

1. If  $\sigma_h^* = \sigma_h$  , the training distribution effect on per capita income will be spoiled completely.
2. If  $\sigma_h^* < \sigma_h$  , the training distribution effect on economic growth will be positive and it means that the per capita income can be increased by increasing the training distribution. In other words, in this case, we should increase the per capita income by focusing on people who have more abilities.
3. If  $\sigma_h^* > \sigma_h$  , the training distribution effect on per capita income will be negative and it means that the per capita income can be increased by reducing the training distribution. In other words, in this case, rather than developing the higher education, it is focused on lower levels of education. The considerable Point here is that the logarithmic term of equation (1) is a function of  $\sigma_h$  or training distribution, so we can approximate the equation (2) with a linear correlation as follows where  $\delta$  coefficient in equation (3) Could be interpreted as error rate reflector (note that the last factor in equation (2) is one). In this case, the equation (2) is summarized as follows:

$$\ln(y_0) = \ln(c) + \delta_2 \ln(H_0) + \delta_3 \ln(\text{Pro}) + \delta_4 \ln(\sigma_h) + \delta_5 \ln(\text{Ur}_0) \quad (3)$$

Using equation (3) and after examination of the final model, by adding an intercept and error term and also interruptions of variables to the function, we have:

$$\ln(Y/L)_t = c_0 + \sum_{k=1}^p \delta_1 \ln(Y/L)_{j,t-k} + \sum_{k=0}^{q_2} \delta_2 \ln h_{i,t-k} + \sum_{k=0}^{q_3} \delta_3 \ln \text{Pro}_{i,t-k} + \sum_{i=0}^{q_4} \delta_4 \ln(\text{GINI})_{i,t-k} + \sum_{i=0}^{q_5} \delta_4 \ln(\text{Ur})_{i,t-k} + \Psi T_t + \varepsilon_t \quad (4)$$

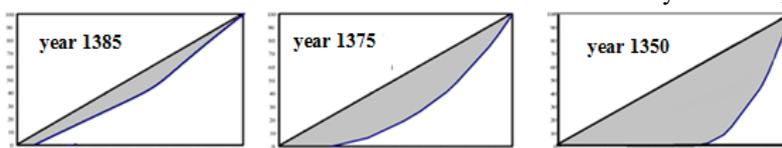
Where: Y/L is per capital income, Pro is labor force productivity, H is health indicator (life expectancy), GINI is education distribution indicator (Gini index), Ur represents the utilization indicator of production capacities (potential production to actual production ratio),  $\varepsilon_t$  is error component and  $T_t$  represents the process variable. In this research, indicator which is used for examination of training inequalities (Gini coefficient of training) and its effect on economic growth is Gini coefficient of training.

Thomas, Wang and Fan (2000) provide the following equation to measure the Gini coefficient of training which represents the distribution among the different educational levels:

$$\text{GINI}_t = \frac{1}{\text{ED}_t} \sum_{i=2}^n \sum_{j=1}^{i-1} P_i |y_i - y_j| P_j$$

GINI is the Gini coefficient of educations , ED is average years of labor force education,  $P_i$  and  $P_j$  are population proportion which have passed a certain level of education ,  $y_i$  and  $y_j$  education years of different educational levels and n is the number of educated groups used in this study. In order to calculate the Gini coefficient of training, eight academic groups are used including: illiterate, elementary education, guidance education, high school education, associates, bachelor, master and doctoral. Also the indicator of education distribution in the form of Lorenz curve will be displayed. In this method, the cumulative percentage of educations on the vertical axis and the cumulative percentage of employed population on the horizontal axis are measured.

Figure 1: The Lorenz's Curves of educations distribution indicator for the years 1350, 1375 and 1385



## 5. MODEL EVALUATION AND ANALYSIS RESULTS:

Co-integration testing should be performed to ensure the lack of estimation of spurious regression and proof of statistics validity of normal t and F. The co-integration implies a long-run equilibrium relationship that the economic system moves over time towards it. In present study, first, Dickey Fuller’s generalized unit root test and Phillips Peron had been applied, but it should be mentioned that Peron has criticized the test results in 1989 and expressed that if there is a structural break in the data, the classic unit root test will be. Dickey Fuller’s common unit root tests. Generalized Dickey Fuller, Phillips Prone and others will be valid, if there is no structural break in the data, but if there is structural break in above test to examine the -accumulation degree, the test results will not be reliable. In other words, the tests such as generalized Dickey Fuller may report the variable as accumulated of one degree by mistake. In fact, the variable may be static by considering the structural break (Zivot and Andrews 1992). Therefore, the collective degrees of variables were examined by using Zivot – Andrews’s unit root test with one structural break and Lamizin Papel with two structural breaks because in internal investigation this important issue has not been considered in the study of unit root variables and the results were sufficed to Dickey Fuller’s test.

The result of four tests described in Table 2 and indicates that the variables are not collective of one degree but some of them are I(0) and others are I(1). The life expectancy variable in Dickey Fuller’s generalized unit root test and Phillips Peron became I (2). But by considering the failures in Zivot – Andrews and Lamizin Papel, we came to conclusion that life expectancy variable is I (0). Since the accumulation degree of no variables is more than one, boundaries test and examining it with values of Narayan table were used to evaluate the collective relationship among variables. Boundary test results confirm that there is a collective relationship between model variables in the significant level of 5%. (Table 3).

Table 2: results Summary of unit Root Tests

Test	Lpro	Lh	LGINI	LUr	LY / I
ADF	I(1)	I(2)	I(1)	I(1)	I(1)
PP	I(1)	I(2)	I(1)	I(1)	I(2)
ZA	I(1)	I(0)	I(1)	I(1)	I(1)
LP	I(1)	I(0)	I(1)	I(1)	I(1)

Source: Researcher’s findings

Table 3: Critical values for the boundaries test that are presented by Narayan

K=4	0/01		0/05		0/1	
N=44	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
FIII	4/04	5/89	2/96	4/33	2/48	3/7
FIV	4/42	5/83	3/25	4/43	2/78	3/81
FV	4/88	6/55	3/57	4/92	3/03	4/21

**Note:** N is the number of regression variables in model. FIII Statistics indicate F related to unbound intercept with no trend. FIV Statistics indicate F related to unbound intercept with bound trend and FV Statistics indicates F related to intercept with unbound trend.

Table 4: collective boundaries test results (test band) for a long term relationship

Model	FIII	FIV	FV
F Calculated			
Lag 1	3.046	7.72*	7.83*
Lag 2	2.54	6.50*	7.53*

Note: \* statistic F Significance at 5% level indicates that it has been compared with the critical values reported by Narayan.

Long-term relationships results and coefficients estimation are provided in Table (5)

Table 5: Long-term relationships estimation in ARDL model (1,2,0,1,0,2)

Variable	C	Lh	LPro	LGINI	Url	T
Coefficients	3/01	0/597	0/569	2/248	0/245	0/065
(Probability)t	5/77 [.00]	2/55 [.015]	3/62[.001]	3/41 [.002]	1/91 [.065]	5/77 [.00]

**Note:** The coefficients that are obtained from the long-term relationship estimation are long-term tension of per capita income as compared to above variables. Numbers in parentheses indicate the significance probability of coefficients.

In the long term, all coefficients except variable index of potential output to.. Which is significant at 10% level are statistically significant in assurance level of 95% and 99%. Since the model specified logarithmically, the coefficients shows the long term tension of per capita income than any of effective factors. Thus, each one per cent increment (decrement) of population life expectancy (H), Causes 0/6 Percentage increment (decrement) in per capita income. This positive relationship can be explained that healthier people make more production per hour. On one hand, productivity increased by improving physical and mental activities and on another hand, psychologically and physically healthier people use technology and production tools better and more efficient. In other words, increasing the desirability of life style causes life expectancy increment and the labor force tends to increase their work supply. Health of their families and the labor force increase the motivation and decrease mental concerns and revelation. Health and better nutrition make a better way to achieve higher levels of education for students and lessen the possibility of absence and failing in the training class. If we know that better health makes higher life expectancy, healthier people will have higher life expectancy and show a greater incentive for investing in training and learning itself. Therefore the health and hygiene from two channels, one direct and another through training affected labor force productivity and consequently per capita income. Also, each one percent increment (decrement) in labor force productivity (Pro) causes 0.57 percent increment (decrement) in per capita income. This positive relationship can be justified that more labor force productivity increases the output per fixed amount of labor force and provides economic growth. Also, the percentage rate of utilization production capacity (percentage of actual output to potential output) is equal to 0.245; it means that one percent increment in the ratio increases the per capita income of 0.245 % assuming all other factors being constant. Thus, fixing the problems of production units in order to reduce unemployed capacity have great effect on national income and product. The relationship between Gini coefficient of education which has been used as education distribution indicator and per capita income can be explained as follows: In the present study, we come to conclusion that the effect of education on income distribution is negative (note that Gini coefficient of education is a number between one and zero, so its

logarithm will be a negative number and although the training factor in pattern is positive, the effect on per capita income is negative. It means that the training distribution is more than the optimal value. So, education distribution should be reduced for improving the per capita income and economic growth. In other words, we should emphasize on elementary to high school instead of focusing on higher education. These results can be interpreted as follows: In Iran people who do not enter the university get job much faster than those who enter the college and consequently assess more experiences and skills earlier than those who spends on higher education. And also because of occupation disproportion with highly educated individual's specialty and the lack of purification plans for academic courses due to the requirements of country as well as the poor relation of universities with industry and other services and products sectors, we can concluded that the results obtained in this study are not so far from the mind and reality. Larger positive intercept indicating a greater influence of other factors not included in the model. Factors such as the efficiency of using specialized labor force, governmental research funding, resources allocation, resources management, competition power of economy, labor laws, effective payroll system, Excessive intervention of government in labor market and many other factors that are not entered directly into the model. The results of ECM error correction pattern also show that in a short term and in each period (years) in the level of 95%, changes in per capita income by changes in the population life expectancy, labor force productivity, production capacity of economy. The error correction coefficient of model is smaller than one and statistically significant. Being negative implies that any imbalance in the long-term move toward the equilibrium. The model error correction index that is equal to -0.245 indicates that each period 24.5 percentage of imbalance of the per capita income is fixed and-four courses are required to correct short term balance error and the model returns to long-run equilibrium It should be mentioned that statistic  $F = 290/13$  is a reason for total significance of regression.

Table 6: Results of ECM error correction pattern

Explanatory variables	Coefficients	Statistics t(Probability)
dLPro	1/001	32/5 (0/00)
dLGINI	·/069	0/45 (0/65)
dLH	·/146	3/378 (0.002)
dLUr	·/060	2/83 (0/008)
dC	·/738	3/30 (0/002)
dT	·/016	5/047 (0/000)
ECM(-1)	-0/245	-3/46 (0/001)
R2=0/98	DW=2/19	F=290/13(0/000)

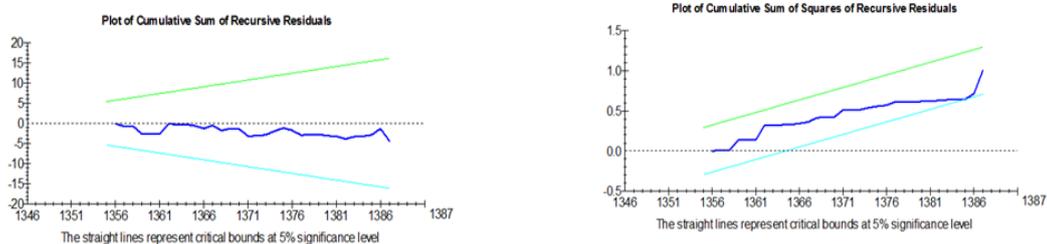
Diagnostic tests of ARDL (1, 2, 0, 1, 0 and 2) model are also provided in table (7). The model diagnostic tests including normality tests are all acceptable (according to the statistics F and LM) and indicate that this model does not have autocorrelation and non-parallelism variance and also explained truly.

Table 7: Diagnostic tests of model

version	Serial Correlation		Heteroscedasticity		Normality		Functional Form	
	Statistics	Prob	Statistics	Prob	Statistics	Prob	Statistics	Prob
LM	2.4	0.12	3.47	0.062	0.33	0.193	0.54	0.46
F version	1.95	0.172	3.6	0.065	----	----	0.42	0.52

**Source:** Researcher's findings from Microfit software.

In figure 1, CUSUM and CUSUMQ graph to check the stability of the coefficients in the ARDL (1,2,0,1,0,2) model are given. As the graph is not outside the lines related to the critical values at any point, we can accept no structural failure and stability coefficients of ARDL model at 5% level.



## 6. RESULTS AND DISCUSSION

Importance of labor force in production process at the macro and micro levels is clear, however, despite the emphasis given to this policy, performance of labor force productivity and economic growth in Iran's economy in recent decades shows that the potential labor force is not used in the production process and the slow promotion of labor force productivity and economic growth in Iran's economy has always been observed. According to challenges, actual and potential opportunities for per capita income and labor force productivity, we can represent a perspective to achieve higher goals of economic growth in accordance with our modern times. In this study, the perspective for productivity and economic growth in Iran's economy is two imaginable options. The first option is to continue the current trend and annual growth of labor force productivity with a rate of 5.2 per cent productivity combined with productivity inequality among the economic sectors and economic growth of 6 per cent. The second option is targeting labor force productivity growth and consequent economic growth in the medium and long term horizon which can be examined at through a twenty-year perspective document. Three targeting of quality and quantity is drawn in this document for Iran's economy including: Achieving the first place in economy, science and technology in the Middle East region, preserving the Islamic and revolutionary identity and inspiring in the Islamic world, Constructive and effective interaction in international relations. Notable point here is that all three targeting have closed relationship with productivity and shows the importance of productivity as important channel in achieving high economic growth in key discussion of country's macro policies. Therefore, for achieving top position in the region in the terms of production volume and per capital income rapid and continuous growth is required that can increase the level of national output compared to other countries. The economic growth of more than 6.9 per cent over the next three programs and a minimum of 8 per cent in the fifth development program are essential. If this growth occurs by increasing the quality and quantity of production, the efficiency share of human capital in economic growth will be determined. Generally, the results of research show positive effect of human capital and labor force productivity on per capita income. Major effective-factors are per capita income, health and hygiene indicators, production capacity index, Labor force productivity. Ug Education distribution indicator which entered in the model for qualitative study of training index shows that people with elementary and secondary education have higher productivity than those with higher education.

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## ETHICAL CONSIDERATION

Authenticity of the texts, honesty and fidelity has been observed.



### **AUTHOR CONTRIBUTIONS**

Planning and writing of the manuscript was done by the authors.

### **CONFLICT OF INTEREST**

Author/s confirmed no conflict of interest.

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