

## ESTIMATION OF THE EDUCATION INFLUENCE ON THE POPULATION INCOME

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### ABSTRACT

*From the beginning of the 20-th century, forming the knowledge economy, creating the human capital and providing the sustainable development on basis of the development of education arrange the priorities of the economical policy in the advanced countries of the world. Some researchers show that if all other factors are constant and the portion of population having the high education in structure of economically active population grows, it will raise the labour productivities and wages of all workers including the workers having the lower education level too. In this study international research methods have been investigated for the qualitative evaluation of educational system and comparison with the achievements of other countries. Based on world countries data, authors have comparatively analyzed the indicators characterizing the welfare of population such as income and wages influenced by the education. In the study the mode of life of population, including the relationship of between the income of the population and level of their educations have been investigated through the econometric modelling. Models have been realized by means of Eviews Software on based of data for the years 1996-2017.*

**Keywords:** *education, income, mean years of schooling, sustainable development, wages*

### 1. INTRODUCTION

In accordance with conception of "Human development and its measurement" emerged in the ending of XX century, it is not allowed to characterize the economic development only like as the increase in a wealth, increment in investment opportunities and financial resources. According to this theory besides humans are the means of economic progress, they are the final aim as well. If we say in other word, for living longer and healthy the purpose of development should be arranged by creating the suitable environment, providing with personal freedom and social protection, improving material and moral welfare of people. A lot of research shows that, the main reason of differences between poor countries and rich countries are based on human capital deficiencies and irrational utilisation, but not based on physical capital deficiencies. Nevertheless some countries are not able to mobilize the adequate resources for development of the education and its role in developing the society is accepted unconditionally by them. Because besides the education is an important term in forming the economic growth and national wealth, in its turn it creates the human capital.

## **2. SOCIAL ECONOMIC IMPORTANCE OF EDUCATION**

Education is a process of transmitting the competences and skills being an important for the practical activity. According to the international definition defined by UNESCO, the education is a process of improving the skills and behaviours for intellectual maturity and personal development. As it seems the definition of education doesn't imply only formal education, i.e. teaching process at the schools and universities. The education is characterized as a stable and varied learning process. American public man and philosopher John Dewey noted in its publishing work named as "Democracy and education" in 1916 that education, in its broad sense is the means of continuity of social life. The primary ineluctable facts of the birth and death of each one of the constituent members in a social group determine the necessity of education. With the growth of civilization, the gap between the original capacities of the immature and the standards and customs of the elders increases. Mere physical growing up, mere mastery of the bare necessities of subsistence will not suffice to reproduce the life of the group. Education, and education alone, spans the gap (Dewey, 2004, pp. 2-3). Dewey's Democracy and Education shows how education can be used as a tool to transform not just the self but also the society. Here, Dewey outlines the importance of education in how we deal with the world in general (Mancenido-Bolanos, 2016, p. 85). Besides transmitting the scientific knowledge to the young generation, the education forms intellectual potential of society and state. The education provides the development of person and forms the cognitive interests and thinking and provides the preparation to the labour and social life. The positive effects of education are already accepted in fact. The education of any person has an advantage not only for himself/herself, but also the other ones with who are working and living together. There is some studies show that if the other factors stay a constant and a portion of persons having higher education grows then it will increase the productivities and wages of all employees including the employees with the level of lower education. Empiric investigations give evidence of the strong positive correlation both the between the education of parents and their heaths and between the education of parents and their children`s health. The children and infant mortality rate among the parents having higher literacy is less than that parents having lower literacy. A lot of research fulfilled by World Bank in different countries made known that there is a positive correlation between the education and democracy. So, training and teaching process provides the development of social development and strengthens the efforts in defence of people's freedom of speech and the potential of participation in the activities of democratic institutes.

## **3. HUMAN CAPITAL AND COMMON WEALTH**

The definition of "Human capital" is related with the name of American economist and scientist Theodore Schultz. In his studies dedicated to analyses of causes and factors of increasing the labour productivity he has characterized the human capital like as aggregate of work abilities attained and improved by humans. As to his thinking, the education transforms the human from the simple employee to the creative one. Besides the direct education expenditures of secondary and higher education, he estimated the capital investments in self training, increasing the experience in the work and as well as health, education and scientific fields as an investment in human capital (Schultz T.W., 1961). Gary Becker who had a significant contribution to the enhancement of conception of human capital in his fundamental work named as "Human Capital" pointed out that the investments in human capital not only involves the education expenditures and also the expenditures related with health and bringing up children, i.e. any expenditures raising the human's productive force. In generally the definition of a human capital is accepted as an aggregate of skills, knowledge and social attributes, as well as individual characteristics like as creative imagination concentrated in human in the purpose of creating the economic value. The more human's skills make the capital made by him/her become more valuable, it means that income on the such capital (salary) must be higher.

In the developed countries capital investments in human capital are admitted as the most effective expenditures for society which quickly covering itself on account of returns. Human capital is considered as one of the factors strengthening the economic potential and the economic growth in generally. In this type of approach the development is not only measured through increasing the economic growth rate, but also through human capital investment and reduction of poverty (Becker G.S., 2009). For a long time, economists have been considering the physical capital as a main part of the wealth. The results of the research fulfilled in 1995 on 192 countries by World Bank show that 24% of aggregate wealth in the world estimated in the amount of 689 trillion was physical capital; 69% of the amount was human capital (Table 1). The appropriate analyses have been carried out by 141 countries in 2018. In accordance with this analysis the common wealth in the world increased by 66% and has reached to 1143 trillion dollars in 2014 compared with 1995 (an average annual growth rate was 2.7 percent).

*Table 1: Global Wealth, by type of asset, 1995 and 2014  
 (The changing wealth of nations reports, World Bank 2018, pp.47).*

	1995		2014	
	Trillion, US\$	Percent	Trillion, US\$	Percent
<i>Produced capital</i>	164,8	24	303,5	27
<i>Natural capital</i>	52,5	8	107,4	9
<i>Human capital</i>	475,6	69	736,8	64
<i>Net foreign assets</i>	-2,9	<1	-4,6	<1
<i>Total wealth</i>	689,9	100	1143,3	100

The human capital assumes the prevailing special weight in the structure of common wealth. Human capital wealth is defined as the discounted value of future earnings for a country's labour force. In other words, human capital wealth is considered to be an asset that generates a stream of future economic benefits (earnings) (World Bank, 2018, pp.47). The volume of human capital amounted to 737 trillion in year 1995, but its portion in common wealth was equal to 69%. Human capital volume increased by 55% compared with year 1995 and its portion in common wealth decreased up to 64%. Its average annual growth rate was 2.3 percent. Based on estimation of World Bank, after the year 2000 this decline in the share of human capital wealth was entirely due to upper-middle and high-income OECD countries, which together account for more than 80 percent of global wealth as well as most human capital wealth (The changing wealth of nations reports, World Bank 2018, pp.46). The volume of common wealth per capita amounted to 128929 dollars in 1995 (Table 2). This indicator increased by 30.7% and has reached to 168580 dollars in 2014 compared with the year 1995 (an average annual growth rate was 1.42 percent). In comparison with the year 1995 the human capital per capita increased by 22.2% in 2014 and has reached to 108874 dollars. In 1995 the human capital per capita was 88874 dollars and the average annual growth rate during the previous year was 1.06%. As it is shown from the table human capital consists of 2/3 part of the common wealth per capita. So, the special weight of human capital in the human capital per capita was 68.9% in 1995, but 64.4% in 2014. The scale of economy and development trends, national-mental values, resource opportunities, joint markets as well as the comparisons of countries having higher indicators in the fields of education with Azerbaijan have been given in the below table.

*Table following on the next page*

*Table 2: Trends in wealth per capita, 1995-2014  
 (The changing wealth of nations reports, World Bank 2018, pp.123)*

	1995	2000	2005	2010	2014	Annual growth
<i>Total wealth per capita (US\$)</i>	128,929	138,064	145,891	158,363	168,580	1.42%
<i>Human capital per capita (US\$)</i>	88,874	96,478	97,707	102,170	108,654	1.06%
<i>Human capital as share of total (%)</i>	69	70	67	65	64	

The common wealth of Azerbaijan has been estimated as 813.7 milliard dollars and special weight of human capital was equalled to 14%. The common wealth per capita has been estimated 85341 dollars, but human capital volume 11961 dollars. Overall, estimates of human capital wealth per capita are closely correlated with GDP per capita. Building on the underlying growth theory, previous issues of the Changing Wealth of Nations reports measured total wealth as the present value of consumption in the national accounts. Since consumption typically accounts for 80 percent of GDP in many countries, this led to an almost perfect correlation between wealth estimates and GDP, whether in aggregate levels or per capita. Rankings of countries according to their total wealth per capita and their GDP per capita were therefore almost identical (The changing wealth of nations reports, World Bank 2018, pp. 131).

*Table 3: Total wealth and human capital, 2014  
 (The changing wealth of nations reports, World Bank 2018, pp.123)*

	<i>Total wealth</i> Billion, US\$	<i>Human capital</i>		<i>Total wealth</i> per capita (US\$)	<i>Human capital</i> per capita (US\$)
		<i>Billion,</i> US\$	<i>Human capital as</i> share of total (%)		
<i>Russian Federation</i>	2714,1	1306,1	48.1	188,715	90,812
<i>Kazakhstan</i>	3127,8	1324,6	42.4	180,911	76,617
<b><i>Azerbaijan</i></b>	<b>813,7</b>	<b>114,1</b>	<b>14</b>	<b>85,341</b>	<b>11,961</b>
<i>Turkmenistan</i>	779,3	252,2	32.4	146,831	47,510
<i>Ukraine</i>	2536,5	857,6	33.8	56,053	18,952
<i>Turkey</i>	3565,9	936,6	26.3	45,998	12,081
<i>Georgia</i>	165,2	79,2	47.9	44,327	21,251

### **3.1. Estimating the levels of education on the labour resources and employment**

The education provides the young to become the active citizens and preparation of specialists raising their opportunity of finding the jobs. The results of the selective survey “On economic activity of population” conducted in our country with the technical support of International Labour Organization (ILO) show that the number of labour resources in 2017 was 7221.6 thousand persons. As it is shown in the table that 15.3% of labour resources were specialists with higher education, but 11.3% were specialists with secondary education and 5.2% - with primary vocational. There is an extreme supply of the labour forces which have no occupational competences, but full secondary education. So, 68.2% of labour resources and 67.4% of total employment do not have the primary vocational education. According to the methodology of International Labour Organization the definition of the economic activity population implies the persons supplying their labours to produce products or services, i.e. the number of employment and unemployment.

The percentage ratio of the number of economic activity population to the number of labour resources reflects the level of economic activity of the population. The level of economic activity of the population in 2017 was 70.3% (Table 4). It is shown from the table that the employment level of labour resources having the education and the primary vocational is higher than other ones. The level of the economic activity among the specialists of higher education is 75.3%, but the employment level is 95.8%. The appropriate indicators among the educated persons having secondary education are 67.1% and 94.2%, but the primary vocational education 74.3% and 93.4% accordingly.

*Table 4: The main characteristics of labour market of Azerbaijan on the levels of education, 2017 (The State Statistical Committee of the Republic of Azerbaijan: Labour market (2018) Retrieved 08.12.2018 from <https://www.stat.gov.az/source/labour/?lang=en>)*

	Total	High	Secondary education	Primary vocational	Upper secondary	Lower secondary	Primary	No schooling
	<i>Share of labor force, by educational attainment</i>							
<i>Persons,</i>								
<i>thousands</i>	7221,6	1104,9	816,2	375,7	3874,8	876,9	162,4	10,7
<i>Percent</i>	100	15,3	11,3	5,2	53,7	12,1	2,25	0,15
	<i>Share of employment, by educational attainment</i>							
<i>Persons,</i>								
<i>thousands</i>	4822,1	796,9	516,4	260,5	2892,6	306,6	49,0	-
<i>Percent</i>	100	16,5	10,7	5,4	60	6,4	1	
	<i>Share of unemployment, by educational attainment</i>							
<i>Persons,</i>								
<i>thousands</i>	251,7	35,2	31,6	18,5	131,4	33,3	1,7	-
<i>Percent</i>	100	14,0	12,6	7,4	52,2	13,2	0,7	-
	<i>Economic activity and inactivity rate (%)</i>							
<i>Economic activity rate</i>	70.3	75.3	67.1	74.3	78	38.8	31.2	-
<i>Economic inactivity rate</i>	29.7	24.7	32.9	25.7	22	61.2	68.8	100
<i>Employment rate</i>	95	95.8	94.2	93.4	95.7	90.2	96.6	-
<i>Unemployment rate</i>	5	4.2	5.8	6.6	4.3	9.8	3.4	-

The probability of employment on the labour resources having lower education level is low, but probability of economic inactivity and unemployment is high. The economic inactivity means the able-bodied population not willing to work, not seeking the job and aged 15 Years old and over. Labour resources of this group are not involved in working activity and because they are not active participants of the labour market. The level of economic inactivity is defined as the percentage ratio of the number of economic inactivity population to the number of labour resources. The conducting analyses show that the level of the economic inactivity among the educated persons with lower secondary education is 61.2%, among the persons with primary education 68.8%, but among the persons with no schooling is 100%. The persons with the level of lower secondary have the highest unemployment indicator - 9.8%. It predicates that the quality of the secondary education is low. Having no vocational competences and high educations are causes for working of this group of employees in the workplace with lower income besides decreasing the job finding opportunities sharply. The conducted analyses show that one of the main contradictions of labour market is that 16.5% of total employments have a

higher education. It is explained by the low levelled ratio of coverage with high education - 23%. Note that nevertheless average coverage ratio of higher education in the world in 1955 was 2.1%; it increased up to 32.9% in 2017. At present in the developed countries this indicator was 74%. (Muradov, 2017, pp. 13.) Increasing the demand for higher education in the world and being a mass character are explained by creating new knowledge and accelerating the application processes besides this level of education provides the preparation of specialized specialist. The mass character of higher education and its availability provide the transmissions of scientific- technological innovations to the country besides increasing the provision of highly qualified personnel. In the purpose of increasing the number of highly qualified personnel since 1950 in U.S. higher education was relatively open and forgiving. Students who did not do well enough in high school to enter a university could go to a community college and then transfer to a better institution. The institutions of higher education were geographically close to the people, enabling even rural families to send their children to college. The outcome was that sometime in the twentieth century American colleges and universities became the finest in the world (Goldin, 2016, p.18).

### **3.2. The relationship between the education and populations income**

There is a mutual relationship between the population's income and the level of education. Besides raising the labour productivity, the education is an investment object enabling the increase of the population's income. In economic theory, the relationship between education acquisition and income is traditionally embedded within the human capital approach (Becker, 1964; Schultz, 1963; Mincer, 1958). The acquisition of education, synonymous with 'investment in human capital', increases the productivity of people, which converts into higher earnings. In turn, workers earn less because they are less productive, being deficient in human capital. Thus, following the logic of this model, being poor (in terms of income) and illiterate (poorly educated) are synonymous (Botezat, 2016). Increase or decrease in the population's income impacts directly to the volume and structure of expenditures assigning to the human capital of families. If incomes are an adequate to meet the necessary requirements of the families (foods and non-foods), then they are just interested in assigning of a part of their incomes to human capital. In its turn it impacts positively on improving the mode of life, forming the intellectual potential and increasing the role of science and education in the economic growth. The fulfilled analysis shows that in comparison with 2005 in 2017 the annual population income increased by 6.1 times and has reached to 49.2 milliard manats. The appropriate growth in real incomes of population has been observed in previous periods and equalled to 39.8 milliard manats in 2017. In the purpose of increasing the wages and social aids, the government has realized large scaled investment programmes and institutional reforms by using the receiving higher incomes from oil sector. Just distribution of oil incomes through the state transfers programs has caused the increase in the population incomes and improvement of the welfare of majority of population. Consequently, the annual nominal incomes per capita increased by 5.2 times and reached to 5011 manats, but real incomes increased by 5.3 times and reached to 4062 manats in 2017 compared to 2005 (Figure 1). The selective research of budgets of households shows that no schooling is one of the factors defining the decrease in family incomes. So, the head of the families having the better level of education have the higher income levels (Figure 2). In the Figure the incomes per capita in the families of head of families having no schooling have been compared with head of families having higher education. While decreasing the levels of education, i.e. the intellectual levels of the head of the families, in that case their incomes decrease too. The incomes per capita of households with the head of families having higher education are greater than that ones who having no schooling by 17.7%. The appropriate indicator is 6.9% in the families having the secondary and primary vocational education.

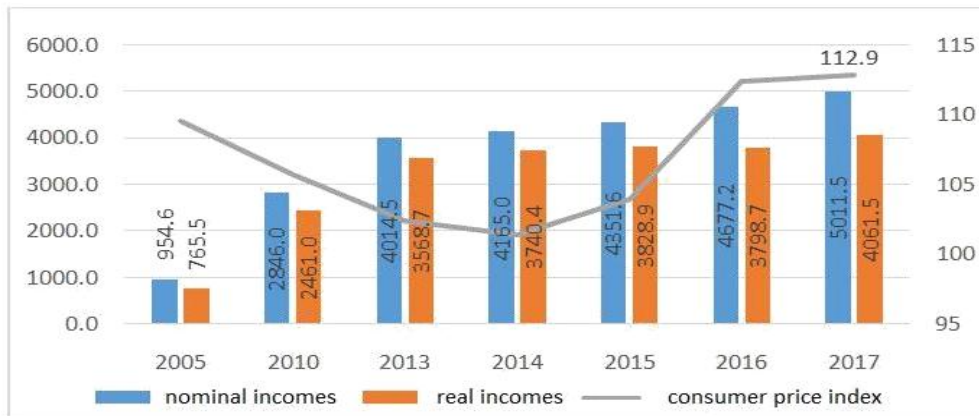


Figure 1: Populations incomes per capita (manats) and consumer price index  
 (The State Statistical Committee of the Republic of Azerbaijan: Demography, 2018. Retrieved 08.12.2018 from <https://www.stat.gov.az/source/demography/>, The State Statistical Committee of the Republic of Azerbaijan: System of national accounts and balance of payments, 2018. Retrieved 08.12.2018 from [https://www.stat.gov.az/source/system\\_nat\\_accounts/](https://www.stat.gov.az/source/system_nat_accounts/))

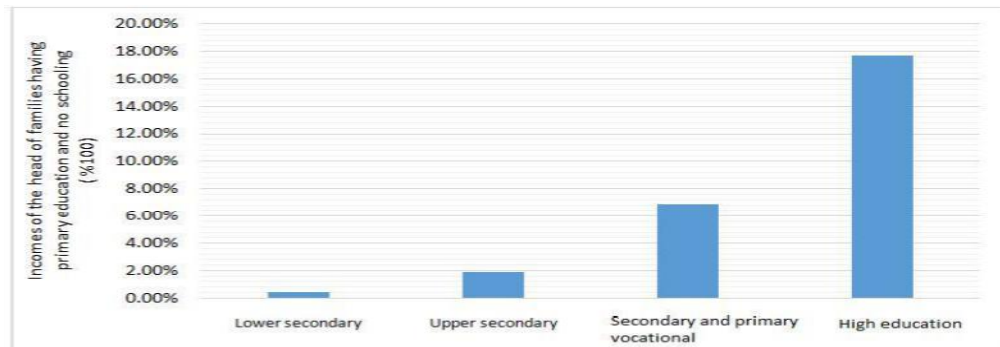


Figure 2: The relationship between the level of the education and incomes  
 (The State Statistical Committee of the Republic of Azerbaijan: Budget of households. Retrieved 08.12.2018 from [https://www.stat.gov.az/source/budget\\_households/?lang=en](https://www.stat.gov.az/source/budget_households/?lang=en))

Although the special weight of persons with the upper secondary education in the total employments over the country is high i.e. 60% (see: Table 4), we have to note regretfully that the special weight of self employed persons prevail among these employees. The selective research of households shows that greater than 45% of monthly incomes of the head of families having the general and incomplete secondary educations are obtaining the incomes from the self-employments and agricultural sectors. The self-employed persons in the country are doing its activity mostly in the agricultural and trade sector. The employments of population in the agricultural sector are constrained by natural economy, i.e. the employment enables the persons to meet the daily requirements rather than earning the additional income. The higher level of the education doesn't give guarantee for providing the economic growth and improving the welfare of the population. So, the indicators reflecting the economic development and welfare in any country may be lower than the neighbouring country having the lower level of education than that one wherein located in the same region. It may be explained by some factors:

1. Inefficient usage of human capital (for example: employment of higher education and highly qualified specialists in the places aren't needed for such knowledge and skills);
2. Irrationality of investments in education and human capital (for example, personnel preparation without considering the demands of labour market and perspective development trends);

- Low quality of the education (for example, corresponding the knowledge and competences obtained in the process of training with the requirements of the markets, preparation of personnel based on old programmes and materials);

### 3.3. Econometric estimation of the dependence of population incomes on the level of education

The below mentioned table enables us to compare the average annually and monthly income and wages per capita, as well as indicators characterizing the education. As it seem that the economically developed countries among 18 countries shown in the table the level of education and population` income are higher.

*Table 5: Incomes per capita, wages and education index, US dollar, 2017*  
 (World Data.info: Average income around the world, 2015. Retrieved 11.12.2018 from <https://www.worlddata.info/average-income.php> , Human Development Report: Education index, 2018. Retrieved 11.12.2018 from <http://hdr.undp.org/en/content/education-index> , OECD.Stat: Average annual wages, 2018. Retrieved 11.12.2018 from [https://stats.oecd.org/Index.aspx?DataSetCode=AV\\_AN\\_WAGE](https://stats.oecd.org/Index.aspx?DataSetCode=AV_AN_WAGE) )

	Average annual wages	Average monthly salary	Average income annually,	Average income monthly	Education index	Mean years of schooling
Germany	44466	3706	43490	3624	0,940	14.1
Australia	61620	5135	51360	4280	0,929	12.9
Denmark	65674	5473	55220	4602	0,920	12.6
Ireland	53112	4426	55290	4608	0.918	12.5
New Zealand	46917	3910	38970	3248	0.917	12.5
Norway	65786	5482	75990	6333	0,915	12.6
United Kingdom	45280	3773	40530	3378	0,914	12.9
Iceland	90662	7555	60830	5069	0.912	12.4
Netherlands	52705	4392	46,180	3848	0.906	12.2
Finland	46772	3898	44580	3715	0,905	12.4
Sweden	47783	3982	52590	4383	0,904	12.4
United States	60558	5047	58270	4856	0,903	13.4
Russian	-	-	9230	769	0.832	12
Kazakhstan	-	-	7890	658	0.814	11.8
Ukrain	-	-	2390	199	0.794	11.3
Iran	-	-	5400	450	0.741	9.8
Azerbaijan	<b>3684</b>	<b>307</b>	<b>2947</b>	<b>246</b>	<b>0.709</b>	<b>10.7</b>
Turkey	-	-	10930	911	0.689	8

Note that, since 1990 the education index have being computed on the based of database of UNESCO Statistics Institute by UN Development Programme. The education index means a mathematical mean of subindices of Expected Years of Schooling Index and Mean Years of Schooling. Expected Years of Schooling Index is calculated on basis of schooling years along the life of a child reaching to official schooling age. But Mean Years of Schooling Index means the average time spending to the education by citizens aged 25 Years old and over along the life. The required time by the law for calculating the each level of education is taken as the basis. A lot of research carried out UN Development Programme shows that there is a strong dependence between population`s incomes and Mean Years of Schooling.



#### 4. ECONOMETRIC ESTIMATION OF THE IMPACT OF MEAN YEARS OF SCHOOLING TO THE GDP: OPTIMAL MEAN EDUCATION YEAR

It is shown from the table 5 that the countries having a longer mean years of schooling as a rule population incomes become higher too. But it doesn't mean that mechanically increasing the mean schooling years will increase the income as well. Firstly, besides the increasing the mass character of coverage of mean schooling, it is important to increase the quality of the education. For instance, though mean years of schooling is 11, but this one for people aged 25 and over is 10.7. It means that it was not possible to involve the whole population in schooling. On other side raising the years of schooling may vainly increase the expenses of the state and population as well. How long should be Mean Years of Schooling for a maximum effect in Azerbaijan? In order to answer this question the below mentioned regression has been estimated econometrically. By considering GDP per capita as one the main indicator of development, the GDP based on purchasing-power-parity (ppp) per capita have been taken as the result indicator in the model.

$$\text{LOG(GDP\_PPP)} = 1.67502 * \text{MYS} - 0.07185 * \text{MYS}^2 + \text{AR}(1) = 0.90544 \text{ UNCOND] } (1)$$

(s.e)                      (0.084503)                      (0.008166)                      (0.180716)

**R-squared=0.866538, Adjusted R-squared=0.799807.**

Here, LOG(GDP\_PPP) – GDP based on purchasing-power-parity (ppp) per capita, MYS – mean years of schooling, (s.e) – standard errors of parameters, R-squared – determination coefficient, Adjusted R-squared – shows the determination coefficient being defined more precisely. In order to provide the adequacy of the model first order autoregressive AR(1) factor have been included in the model. The main characteristics of Model (1) and other appropriate tests having been realized through Eviews 9 evidences that the model is an adequate. As it seems from the regression that the impact of MYS factor on GDP\_PPP is in the shape of a parabolic and arms of the graphic are down (as the coefficient of MYS<sup>2</sup> is negative). Therefore there is such level that where GDP\_PPP reaches a maximum. It is known us from mathematical analysis that this level is the point, where the first derivative equals zero.

$$1.67501735129 - 2 * 0.071849983714 * \text{MYS} = 0 \quad (2)$$

If we solve the equation (2) then we will get MYS = 11.65634656. It gives a sense that if mean years of schooling for aged 25 and over in Azerbaijan is about 11.7 years, then GDP per capita reaches a maximum. Consider that nowadays the schooling years is 11, mean years of schooling for aged 25 and over is 10.7 years, while switching the secondary school to 12-year educational system then GDP level will be maximum on this factor.

#### 5. CONSLUSION

Hence the research evidences that the distribution of oil incomes through the state transfers programs has caused the increase in the population nominal and real incomes and improvement of their welfare. The analysis of social-economic indicators shows that there is an extreme supply of the labour forces who have no occupational competences, but full secondary education. So, the major part of the labour resources and employments has not got vocational - qualification training. Besides decreasing their job finding opportunities, it is a cause for working of this group of employees in the workplace with lower income. The selective research of budgets of households shows that not having an education is one of the factors defining the decrease in family incomes. So, there is a strong dependence between population's incomes and the level of education. The household having better-educated head of family have the higher income.

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