The relationship between education, income, economic freedom and happiness

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Abstract. Education is a factor for economic prosperity and social development in modern society. As well education allows its owner to receive a higher income and gives the opportunity for self-expression, creative fulfilment, as well as moral satisfaction from current activities. The life of educated people is not only longer, but also more interesting and informative. Moreover people with a higher level of education are happier also. In this aspect the purpose of the article is to determine the relationship between the quality of education, the degree of economic freedom, the level of income and the feeling of happiness. This paper presents results of the correlation analysis between indicators of education, income, happiness and economic freedom for 145 countries for 2018. The author of the work calculated Pearson (product-moment) correlation, the Spearman rank correlation, and Kendall's Tau correlation in the Statistica. The analysis showed that Education Index has a strong relationship with Happiness Index, Economic Freedom of the World Index, Index of Economic Freedom and GDP. The analysis showed that education is closely related to the level of income and self-awareness of happiness. Education is also closely related to economic freedom. Also, the results of the study suggest that education not only contributes to an increase in income, but also makes persons happier.

1 Introduction

Contrary to numerous predictions about global job cuts in an era of rapid technological development, this did not happen. This is evidenced by the statistics of the World Bank. According to annual reports, the technology does not reduce the number of jobs, and the impact on the change in the proportion of jobs in the labor force. Development of information technologies stimulates the emergence of entire sectors of the economy. Because of this, there is the release of employment in certain sectors by increasing demand for labor in the others.

As noted in the World Bank report technology is reshaping the skills needed for work. The demand for less advanced skills that can be replaced by technology is declining. At the same time, the demand for advanced cognitive skills, sociobehavioral skills, and skill combinations associated with greater adaptability is rising. Already evident in developed countries, this pattern is starting to emerge in some developing countries as well [1].

Education is becoming a major factor in ensuring the competitive advantages of countries and companies in the global community. Education not only raises the level of income, it expands the boundaries of consciousness, opening up new opportunities and creating prospects. That is why the study of the relationship of education, income, economic freedom and the feeling of happiness is relevant and timely.

Many researchers consider the questions to determine the relationship between indicators of well-being, income, freedom, happiness, etc.

Veenhoven revealed a positive correlation between freedom and happiness for 46 nations. However, he found that freedom and happiness do not always concur. Freedom is positively related to happiness among rich nations, but not among poor nations. On the other hand, economic freedom is positively related to happiness in poor nations, but not in rich nations. The results of the study show that freedom does not always produce happiness. The analysis included available data in the early 1990's [2].

Gropper, Lawson, and Thorne explored the empirical relationship between liberty, as measured by economic freedom, and happiness across more than 100 countries. Scientists found a positive relationship between national levels of happiness and economic freedom. GDP per capita also has a strong positive effect on happiness. Around the world, freer people, as a rule, are richer, live longer and happier [3].

Mehrara and Musai investigate the causal relationship between education and GDP in developing countries for the period 1970-2010. The study revealed a strong causality from investment and economic growth to education in the analyzed countries. However, education does not have a significant impact on GDP or investment in the short and long term. This means that it is the formation of capital and GDP that determines education in these countries, and not vice versa [4].

Webster researched direction of causation pertaining to economic expansion and increased measures of freedom by examining the economic growth-economic freedom relationship. A study of data from 141 countries

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showed that economic freedom did precede economic growth. However, reciprocal analysis for models building has shown that economic growth does not cause economic freedom [5].

Nikolaev analyzed the relationship between economic freedom and indicators of quality of life. Data cover the period from 1972 to 2010 for developed and developing countries. He found that economic freedom is strongly and positively correlated with most of areas of well-being such as community, safety, and life satisfaction. The analysis showed that changes in economic freedom foster human development in both the short run and the long run. All studies showed a positive relationship between the analyzed indicators [6].

Gregorio and Lee investigated the relationship between education and income distribution. Panel sample covers a large number of countries for the period from 1960 to 1990. They found that education factors play a significant role in making income distribution more equal. The results of the study are mixed. On the one hand, a high level of education and its even distribution in society leads to a more even distribution of income. On the other hand, the level of education does not explain the differences in income between countries. The study examined both interethnic and intertemporal relations between education and income [7].

Yilmaz and Tag explored the relationship between economic freedom and happiness in their work. The results of evaluations have shown that economic freedom has a strong impact on subjective well-being in society. In the same place, scientists found a strong negative relationship between limited government and subjective well-being [8].

Esmail and Shili investigated relationship between the level of happiness and economic growth. The work is devoted to the analysis of how happiness influences GDP and economic development. The results of the study show that social factors are the most important in determining happiness. At the same time economic and political factors are also important [9].

2 Research hypothesis

In this work we assume that the relationship between educational level and awareness of being happy exist. Education not only allows its owner to receive a higher income, but also gives the opportunity for self-expression, creative fulfilment, as well as moral satisfaction from current activities.

The life of educated people is not only longer, but also more interesting and informative. Therefore, we can assume that people with a higher level of education are happier also. In addition, happiness in a subjective understanding is impossible without satisfying basic needs. In this case, the ability to meet these needs is determined by the level of income and economic freedom. Therefore, if there is a relationship between happiness and education, then there should be a relationship between education and income, since a high level of education contributes to the mobility of labor resources, as well as to more interesting, promising and highly paid job. Consequently, the relationship between education indicators and indicators of income and economic

freedom should be clearly expressed. Thus, the study assumes that the level of education is closely related with all the analyzed indicators.

The purpose of the study is to determine the relationship between the quality of education, the degree of economic freedom, the level of income and the feeling of happiness.

3 Methods

Studies were conducted on panel data for 145 countries for 2018. The data sources for the study were World Development Indicators, The Education Index, The World Happiness Report, The Index of Economic Freedom and Economic Freedom of the World Index [10-14].

We did not divide panel sample data into groups for achievement of statistically significant research results and objectivity of analysis. For example, research [2] is severely limited in that it covers a small number of countries. As noted by the author of this study, as a result, many of the differences observed do not reach statistical significance.

The Pearson (product-moment) correlation, the Spearman rank correlation, and Kendall's Tau correlation were used in the research process. The calculations are implemented in the Statistica. This approach to data analysis was successfully tested in the study [15].

Pearson correlation coefficient is calculated by the formula:

$$r = \frac{\sum_{i=1}^{n}(X_i - \overline{X}) \times (Y_i - \overline{Y})}{n \times \sigma_x \times \sigma_y}, \qquad (1)$$

where:

X_i, Y_i – compared quantitative traits;

$\overline{X}$, $\overline{Y}$ – selective arithmetic averages;

n – a number of compared observations;

σ_x, σ_y – standard deviations in the databases compared;

$(X_i - \overline{X}) \times (Y_i - \overline{Y})$ – product of moments.

The Spearman`s rank correlation coefficient is calculated by the formula:

$$r_S = 1 - \frac{6 \times \sum d^2}{n(n^2 - 1)} \text{ or } r_S = 1 - \frac{6 \times \sum (x' - y')^2}{n(n^2 - 1)}; \qquad (2)$$

where:

d – the difference between the ranks of corresponding variables X and Y;

x' – values of ranks, replacing the actual variants or qualitative features of the argument x;

y' – values of ranks, replacing the actual variants or qualitative features of the function y;

n – number of observations.

The Kendall correlation coefficient is calculated by the formula:

$$\tau = 1 - \frac{4R}{n(n-1)}, \qquad (3)$$

where $R = \sum_{i=1}^{n-1}\sum_{j=i+1}^{n}\left[\left[x_i < x_j\right] \neq \left[y_i < y_j\right]\right]$ – the amount of "mess" (inversions) formed by the values y_i and

placed in ascending order of the corresponding x_i; n – the number of set objects.

The founders of the theory of human capital the Nobel laureates Theodore William Schultz and Gary Stanley Becker have long proved the effectiveness of investments in education. It is confirmed that education contributes to increasing earnings in the long term. Therefore, investment in education is beneficial both to the individual and to the state.

It is widely known that education is an important factor in the formation of income, but it is advisable to determine how closely related these two indicators. The existence of a relationship between educational level and economic freedom is also interesting. In addition, it is advisable to determine the relationship between education and the level of happiness, and as far as education allows a person to be free and independent in an economic aspect. If educated people as a whole receive more income compared to uneducated, it is necessary to determine whether they are happier if they perceive themselves as such.

According to human capital theory, education is not the only factor in earnings growth, but also allows a person to self-actualization, self-assertion to raise their social status, etc. That is, a high level of education should have a strong correlation with economic freedom and self-awareness of happiness, because additional knowledge opens up new opportunities for experience and self-realization not only in the professional sphere.

It should be noted that the correlation relationship as opposed to functional, shows only the tendency of change of one value under the action of another. Therefore, based on the correlation one can argue only about the degree of relationship between variables, but not about the existence of a causal relationship between them.

Education is an important component of well-being and it is used to measure quality of life and economic development, which is a determining factor whether a country is a developed, developing or underdeveloped country.

The Education Index is calculated on the basis of two indices: Mean Years of Schooling Index and Expected Years of Schooling Index [11]. Expected years of schooling is number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout the child's life. Mean years of schooling is average number of years of education received by people ages 25 and older, converted from education attainment levels using official durations of each level [15].

Happiness is understood as a subjective assessment of satisfaction with one's life. Since the level of happiness is not an absolute indicator, only its subjective assessment is possible.

The level of happiness is measured by the Happiness Index, which is calculated on the basis of three main happiness measures: life evaluations, positive affect, and negative affect. Happiness assessment is carried out using a variety of subjective well-being measures, which in subsequent reports are referred to as "happiness".

Happiness is rated on a scale ranging from 0 to 10, where 0 means the worst possible life and 10 means the best possible life. A positive influence includes the average frequency of happiness, laughter and pleasure on the previous day, and a negative affect comprises the average frequency of anxiety, sadness, and anger on the previous day [12].

Freedom in the general sense is understood as the possibility of making a choice in all spheres of life – economic, political, social, personal, etc.

Economic freedom is the fundamental right of every person to control his labor, property, produce, consume, and invest. The Economic Freedom Index measures the impact of freedom and free markets around the world. The index includes 12 freedoms – from property rights to financial freedom.

As an indicator of the quality of education, we take Education Index, one of the three components of the Human Development Index calculated by the UNDP, per capita income measured in GDP US dollars и GDP US dollars PPP for the whole group of countries, Happiness Index Happiness Index, Economic Freedom of the World Index, Index of Economic Freedom. We calculate the correlation between these indicators for the entire sample.

4 Results

The analyzed sample includes 145 countries for 2018, while the sample is balanced, that is, the sample contains data for all indicators for each country. The results of the correlation analysis are presented in Table. 1.

Table 1. The Relationship between Education Index, Happiness Index, Economic Freedom of the World Index, Index of Economic Freedom and GDP.

Variable	Marked correlations are significant at p < ,05000; N=145 (Casewise deletion of missing data)		
	Pearson Correlations	Spearman Rank Order Correlations	Kendall Tau Correlations
HI	0,771259	0,769307	0,578069
FIW	0,578534	0,642119	0,466908
EF	0,514523	0,631251	0,458684
GDP US$	0,653197	0,867830	0,684567
GDP PPP $	0,668527	0,862748	0,676320

Source: own calculation based on data from [10-14]

The results of the analysis are presented in table. 1, show a strong and a very strong direct relationship between the analyzed indicators.

Moreover, this dependence is revealed when calculating the correlation coefficients of The Pearson correlation, the Spearman rank correlation, and Kendall's Tau correlation, which gives grounds to speak about the objectivity of the results obtained.

Our study for a panel sample from 145 countries of the world showed quite a strong direct relationship between the Education Index and Happiness Index (Fig. 1).

More educated people generally feel happier than less educated people. The results of the analysis confirm the conclusion that education makes an individual's life happier, expanding the possibilities of self-realization,

development of personal qualities, choice of place and working conditions. In addition, education gives a person the chance to be freer in the economic aspect.
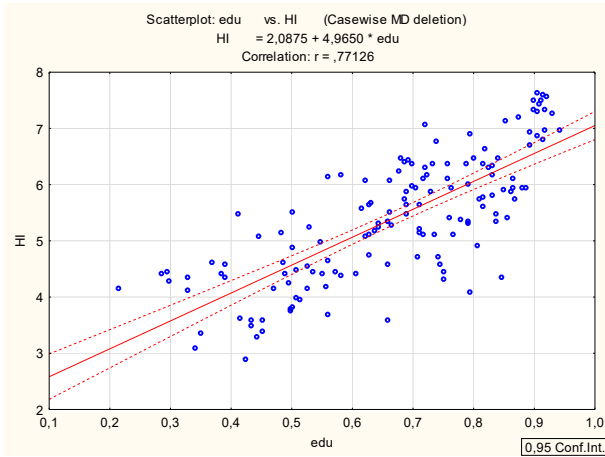

Fig. 1. The relationship between the Education Index and Happiness Index, 2018

In addition, there is a higher average dependence between education and economic freedom, represented by Education Index and Economic Freedom of the World Index (Fig. 2-3).
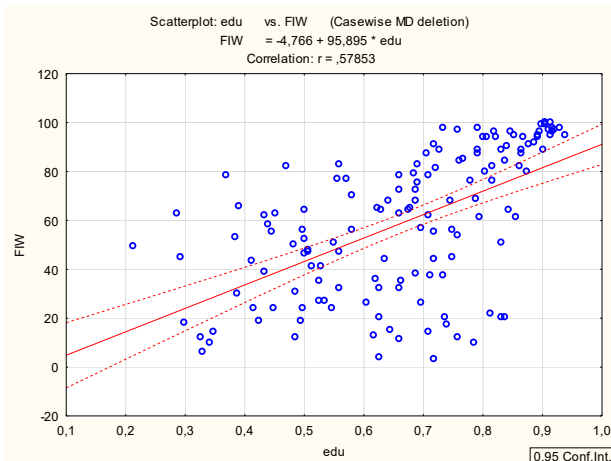

Fig. 2. The relationship between the Education Index and Economic Freedom of the World Index, 2018
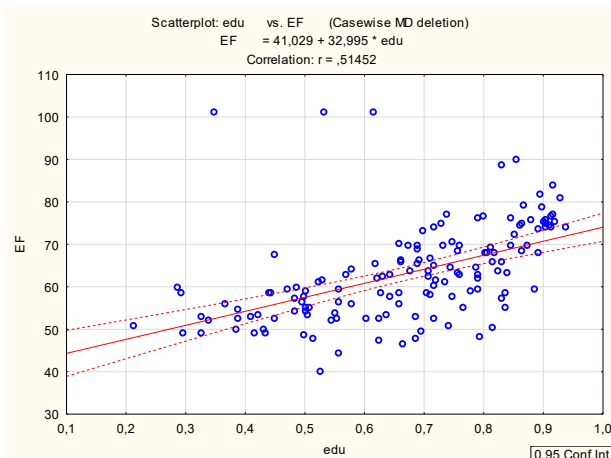

Fig. 3. The relationship between the Education Index and the Index of Economic Freedom, 2018

It should also be noted that there is a stronger variability of the analyzed indicators presented in Fig. 2 and Fig. 3. This can be explained by the fact that the Economic Freedom of the World Index and Index of Economic Freedom calculation methodology focuses on various aspects of economic freedom. Economic Freedom of the World Index has 25 components. Many of the components are themselves made up of several sub-components. In total, the index incorporates 43 distinct variables. Index of Economic Freedom based on 12 quantitative and qualitative factors, grouped into four broad categories.

You can also find a strong relationship between the Education Index and the level of economic development, determined by GDP per capita. For the analysis, we used the indicators of GDP per capita in US dollars and GDP in US dollars at the purchasing power parity of currencies (Fig. 4-5).

The relationship on Fig. 4-5 shows a pronounced direct relationship between level of education and income.
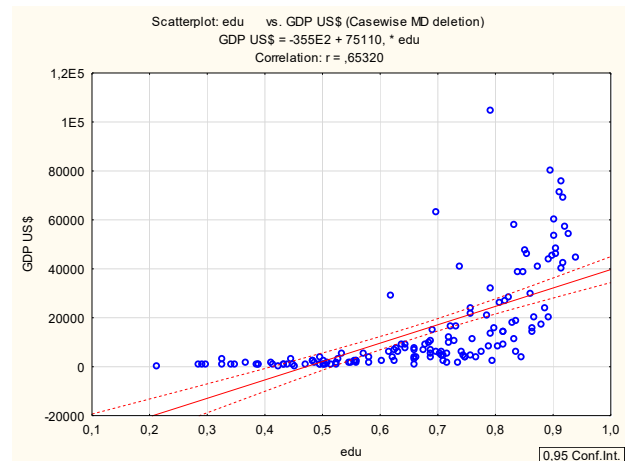

Fig. 4. The relationship between the Education Index and the level of economic development (in GDP, US dollars), 2018
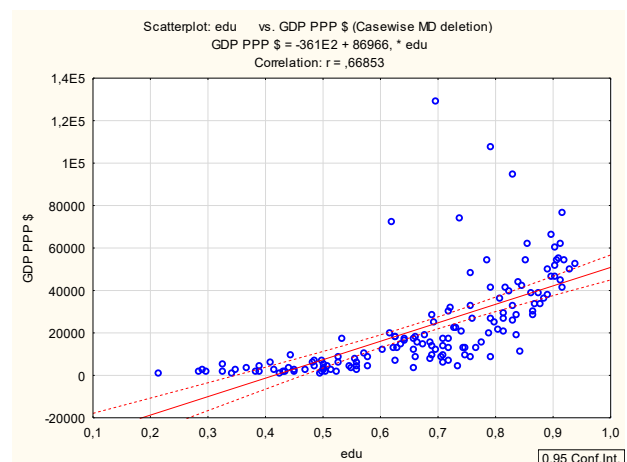

Fig. 5. The relationship between the Education Index and the level of economic development (in GDP, US dollars PPP), 2018

It is noteworthy that the income level represented by GDP, US dollars PPP has a stronger correlation with the education index than GDP, US dollars. This can be explained by the fact that the GDP, US dollars PPP indicator reflects the real income level of the country's population, adjusted for inflation.

The analysis showed that education is closely related to the level of income and self-awareness of happiness. This can be explained by the fact that a higher income received through education provides more opportunities for implementation and opens up new perspectives. Education is also closely related to economic freedom, but the graphs show a stronger variation between these indicators, which can be explained by the fact that not free countries can provide a fairly high level of education of the population, mobilizing state financial resources in this direction, as was the case in the former USSR.

The top of 20 countries by rating for the analyzed indicators are presented in Table 2. Those countries that are in the top 20 in all the analyzed indicators are highlighted in red those countries that are in the top 20 by 5 indicators are highlighted in green, yellow – by 4, blue – by 3, gray – by 2, those countries that are in the top 20 once out of six are not highlighted.

Table 2. Top 20 countries by indicators of Education Index, Happiness Index, Economic Freedom of the World Index, Index of Economic Freedom and GDP [10-14].

	Happiness Index	Education Index	Economic Freedom of the World Index	Index of Economic Freedom	GDP US$	GDP PPP $
1	Finland	Germany	Finland	Hong Kong	Luxembourg	Qatar
2	Norway	Australia	Norway	Singapore	Switzerland	Luxembourg
3	Denmark	Denmark	Sweden	New Zealand	Norway	Singapore
4	Iceland	Ireland	Canada	Switzerland	Iceland	Ireland
5	Switzerland	New Zealand	Netherlands	Australia	Ireland	United Arab Emirates
6	Netherlands	Norway	Australia	Estonia	Qatar	Kuwait
7	Canada	United Kingdom	Luxembourg	Canada	United States	Switzerland
8	New Zealand	Iceland	New Zealand	United Arab Emirates	Singapore	Norway
9	Sweden	Netherlands	Uruguay	Ireland	Denmark	Hong Kong
10	Australia	Finland	Denmark	Chile	Australia	United States
11	Israel	Sweden	Iceland	United Kingdom	Sweden	Iceland
12	Austria	United States	Portugal	Georgia	Netherlands	Netherlands
13	Costa Rica	Canada	Ireland	Luxembourg	Austria	Denmark
14	Ireland	Switzerland	Japan	Lithuania	Hong Kong	Saudi Arabia
15	Germany	Czech Republic	Malta	Netherlands	Finland	Austria
16	Belgium	Belgium	Switzerland	Denmark	Canada	Germany
17	Luxembourg	Slovenia	Austria	United States	Germany	Sweden
18	United States	Lithuania	Belgium	Sweden	Belgium	Australia
19	United Kingdom	Israel	Germany	Latvia	New Zealand	Belgium
20	United Arab Emirates	Estonia	United Kingdom	Mauritius	United Arab Emirates	Bahrain

As seen from Table 2, most of the countries are represented in almost all of the analyzed ratings. This fact confirms the results of the correlation analysis conducted in this work, and also indicates the presence of a relationship between the all analyzed indicators.

5 Discussion

Despite the identified relationship between indicators of education, happiness, income and freedom, this study does not explain the direction of the identified relationship. The issue of causality relationship of the analyzed indicators remains unresolved. The solution to this problem in further studies can be implemented based on the use of Granger causality tests. In other words, the answer to the question is of certain interest, is education a source of income and happiness? Or people feel happier and have more educational opportunities in a higher income society.

Also, in our opinion, the issues of identifying differences in the interdependencies between the analyzed indicators in countries with different levels of economic development need to be addressed. In particular, is the level of happiness and economic freedom determined by the size of income in a particular group of countries? Or income does not affect the level of happiness.

6 Conclusion

The importance of education should not be underestimated, since it is interconnected with all spheres of the economy and society. However, the value of education depends not only on its level, but also on the

institutional conditions that are necessary for its implementation.

For illustration, the poor quality of the institutional environment and weak formal institutions lead to the emergence of corruption. Accordingly, corruption is an indirect indicator of the quality of the institutional environment. Corruption has a negative impact on existing institutions, including the institute of education.

As an example, the functioning of the institute of education can be mentioned. In the conditions of normal market activity, the knowledge and qualification, the level of which is certified by a diploma, is of paramount importance. On the contrary, because of the high level of corruption and the use of pseudo-contests for occupation of vacant positions, the level of knowledge is not taken into account; only the formal availability of a diploma is required. In such conditions, the demand for diplomas without the corresponding level of knowledge increases, and the demand for corrupt services is also increasing. When the knowledge gained is not a competitive advantage for obtaining a vacant position, incentives for their receipt are reduced. Accordingly, the value of education in society decreases. Therefore, the state should not only finance the education system, but also create favorable conditions for the implementation of skills acquired in the learning process.

Summing up, we can conclude that when the development strategy of the economic system is determined, it is necessary to take into account not only economic indicators. Happiness, freedom, education are also important. This study confirms the conclusion about the importance of education and therefore need to improve the level of education in society. Also, the results of the study suggest that education not only contributes to an increase in income, but also makes persons happier.

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