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Original Research

An Investigation of the Relationship Between Life Expectancy at Birth and Economic Growth in Developing Countries

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Abstract

This study aimed to investigate the relationship between life expectancy at birth and economic growth in developing countries. The Document and Library review was used to collect data. Then, the relevant information was extracted from the World Bank website. The necessary information was collected through the World Bank website (2000-2020) to analyze the information and hypothesis test. After collecting the required information for the considered countries, the research hypotheses were examined using correlation and regression analysis and the panel data statistical method, and the data was prepared for analysis. Then, Eviews 12 is used to perform the final analysis. The results showed that there is a positive and direct relationship between Healthcare expenditures as one of the indicators of life expectancy at birth and economic growth in developing countries. It is also concluded that there is a negative and inverse relationship between Food Poverty as one of the sub-indicators of life expectancy at birth and economic growth in developing countries, while there was a negative and inverse relationship between the Death Rate as one of the sub-indicators of life expectancy at birth and economic growth in developing countries. In addition, there is a positive and direct relationship between Access to Educational Facilities as one of the sub-indicators of life expectancy at birth and economic growth in developing countries. Finally, there is a positive and direct relationship between Median Household Income as one of the indicators of life expectancy at birth and economic growth in developing countries.

Keywords: Life expectancy at birth, Economic growth, Developing countries, Panel data.

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Introduction

Today, reliable information on Neonatal death in any society is necessary to evaluate health system programs and determine priorities for implementing essential interventions to control various diseases and injuries (Abdulsalam Abubakar et al). This information can be effective for judging health changes and upgrading the health system to another level and finally lead to economic growth in the long term (Dumitrescu, E. and Hurlin, C). Of course, the raw and specific death rate alone cannot be a good benchmark concerning death at birth in a society. Therefore, this indicator, along with life expectancy at birth (the average number of years a baby will live after birth), is used as a variable of life expectancy, if the mortality probability for the next years will be the same as now (Kiran, B et al). The economic growth of developing countries leads to an increased income and the abundance of available goods, thereby increasing the welfare of the society (Metin and Özlem). Access to educational facilities as one of the indicators of life expectancy at birth can have a significant impact on the economic growth of developing countries (Abdul Salam et al., 2021). Considering the importance of studying factors affecting life expectancy at birth, it can be said that health is a valuable thing and a goal for humanity, in which economists seek to find an optimal mechanism and method to improve the health level of society and developing countries (Kieran et al., 2019). Understanding the nature of health and the factors affecting it at the birth of babies is very important to achieve higher levels of health (Abdul Salam et al., 2021).

Economic misery from the negative economic growth rate of a country is one of the factors affecting life expectancy at birth. It is one of the economic indicators that was seriously emphasized by economists (Damitriso and Horlin, 2020). An increase in inflation in developing countries can lead to an increase in medical products and services costs. These problems lead to a decrease in life expectancy at birth in society (Kao, C., & Chiang, M. H, 2012). The high unemployment rate has forced the government to develop policies related to unemployment reduction. It makes household health expenses less important, thus leading to a reduction in general health expenses (Pedroni, P). Reductions in public health expenditures in turn decrease health outputs including life expectancy at birth (Breitung, J, 2011). An increase in unemployment, a general decrease in personal income, and mental stress worsen health conditions and decrease life expectancy in society (Westerlund, J, 2018). Education is one of the most important factors for determining the health output and life expectancy at birth and reducing the inflation rate and death rate among families, as well as increasing the economic growth rate in developing countries in the long term (Metin and Ozlem, 2019). The results of studies have shown that families with higher education have better health status (Brittany, 2011). These families pay more attention to health and choose the right nutrition and lifestyle, and can better use health information and the healthcare system (Damitriso and Horlin, 2020). Accordingly, the main research problem is to investigate the relationship between life expectancy at birth and economic growth in developing countries.

Literature review and theoretical foundations

Economic growth in developing countries is a process in which Gross Domestic Product (GDP) growth is the main axis. The growth in the absolute amount of goods and

services has usually been accompanied by an increase in the average material well-being or the product per capita, as well as population growth (Damitriso and Horlin, 2020). The modern definition of economic growth in developing countries also includes an increase in economic welfare (Metin and Ozlem, 2019). Life expectancy at birth is one of the important indicators of mortality condition. It expresses the cultural, social, economic, and health status of society (Kiran et al., 2019) and can be useful in evaluating the services provided (Programme, 2018). Infant mortality can be due to unfavorable economic conditions and a lack of economic freedom (Abdul Salam et al., 2021). Many factors such as medical and health status, welfare levels and social security, social services provision and insurance, occupational and economic security, food safety and nutritional quality, literacy level, etc. have an effect on life expectancy at birth in different societies. The improvement of each of these criteria has a direct role in increasing the quality of life expectancy (Damitriso and Horlin, 2020).

Health expenditure is one of the criteria that can affect the life expectancy in a society in the long term (Kendall, J, 2017). Increasing health expenditure and reducing food poverty by governments to reduce poverty lead to a decrease in mortality rates; In this way, we can expect an increase in the life expectancy indicator (Im, K et al., 2015). Governments usually develop the indicators of life expectancy to increase economic growth and achieve the desired economic growth in the long term according to strengthening human resources algorithms (Westerland, 2018). A developing country's economic growth rate increases if life expectancy at birth is at a standard level, while the death rate decreases in the long term, and governments can provide more suitable facilities to society over time according to predetermined algorithms (Abdul Salam et al., 2021).

Financial development improves life expectancy and mortality rates through several channels (Westerland, 2018). There are also factors related to the domestic economic condition that help improve the mortality rate and life expectancy at birth (Metin and Ozlem, 2019). In keeping with the studies, there are four influencing channels of financial development, health output, and economic growth, including income growth, infrastructure development, education, and risk management (Damitriso and Horlin, 2020). Economic growth leads to the infrastructure development that is needed to increase critical health output at birth and life expectancy (Kieran et al., 2019). These infrastructures include hospitals, roads, electricity, and food supply (Levin, A et al, 2013). Access to electricity is also necessary for hospitals and provides better medical services (Kendall, 2017). Positive fluctuations in family income (increase) are one of the indicators that can greatly increase life expectancy at birth (Damitriso and Horlin, 2020). The fact that the average income of households is higher than the average income of all households in society helps to stabilize the standards related to health and food in people's lives, and we can expect an increase in the economic growth of countries in the long term after improving the general well-being of households. (Metin and Ozlem, 2019). The following hypotheses have been raised to achieve the research goals after examining the research problem and preliminary studies about possible answers:

H1: There is a significant relationship between life expectancy at birth and economic growth in developing countries.

H11: There is a significant relationship between health expenditures as one of the indicators of life expectancy at birth and economic growth in developing countries.

H12: There is a significant relationship between food poverty as one of the indicators of life expectancy at birth and economic growth in developing countries.

H13: There is a significant relationship between mortality rate as one of the indicators of life expectancy at birth and economic growth in developing countries.

H14: There is a significant relationship between access to educational facilities as one of the indicators of life expectancy at birth and economic growth in developing countries.

H15: There is a significant relationship between median family income as one of the indicators of life expectancy at birth and economic growth in developing countries.

In the following, some related past studies are reviewed. Nowrozi et al. (2021), in the research "Effective Factors on Productivity Growth in Iran and Hope for the Future", concluded that out of the 20 variables used, 5 variables of foreign investment, investment in the railway safety, innovation index, and exchange rate were removed from the model. In keeping with the results, the neural network model with Tansig activation function with 3 neurons has a predictive power of 0.993 and a minimum model error of 0.0019. Pourali et al. (2021), investigated the effects of macroeconomic variables and the public and institutional welfare state on the economic growth in selected countries. Yekta et al. (2021) discussed the relationship between life expectancy and fear of COVID-19 among working people. The findings showed that life expectancy has a significant and inverse relationship with panic and fear of the COVID-19 pandemic, that is, with the increase in fear of COVID -19, life expectancy decreases. Babaei (2021) researched "the effect of health indicators and macroeconomic variables on the quality of life expectancy". The results of comparing the panels of developed and developing countries indicate that the impact of economic and health variables on the life expectancy indicator is more in developing countries than that in developed countries in almost both classes of investigated indicators.

Shafiei et al. (2019) investigated the effect of financial development indicators on the life expectancy of men and women in selected developing countries using The generalized method of moments (GMM) method. Finally, based on the estimated results, it was proved that the facilities assigned to the private sector as one of the financial development indicators have a significant and positive effect on the life expectancy of men and women in developing countries. Metin and Ozlem (2019) studied the relationship between life expectancy at birth and economic growth in 56 developing countries. The results showed that life expectancy at birth has a positive effect on economic growth in most cases, but in some cases, financing will have an indirect and adverse effect on economic growth due to the increase in government debt. Abdussalam (2021) investigated life expectancy at birth and the accumulation of human capital and economic growth. The results showed that life expectancy at birth has a positive and direct effect on the country's economic growth. It was also proven that financial development

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in some cases may have a negative and inverse effect on economic growth in any country, but in most cases this effect is positive.

Dumitrescu and Horline (2020) investigated the factors influencing economic growth and life expectancy at birth. The results of this research showed that the accumulation of human capital in most cases, affects the economic growth of countries and life expectancy at birth, but in some cases, it has also led to social problems and economic stagnation in different countries.

Karin et al. (2019) investigated financial development and economic growth and life expectancy at birth using the panel data statistical method. The results showed that financial development has a positive effect on economic growth and life expectancy at birth, but in some cases, financial development and life expectancy at birth cause economic recession in a country with the intervention of some other variables such as inflation rate and reduction of capital accumulation. Kendall et al. (2017) investigated the impact of life expectancy at birth and human capital on economic growth. The results showed that in most cases, life expectancy at birth has a positive effect on economic growth, but in some cases, direct financing will harm economic growth because of an increase in public debt of the government.

Methodology

The geographical scope of the research is developing countries. This study is correlational research in terms of nature and content. The Causal-Comparative method has been used to analyze the correlation between variables. The applied research approach was selected according to the research objective. Real information and different statistical methods are used to reject or accept hypotheses. The present research is in the field of Proof theory and is performed in the framework of deductive-inductive arguments, which means that the theoretical foundations and literature are used to accept or reject hypotheses through library studies, articles, and sites in a deductive format and gathering information in an inductive format. The current research uses the library and archival studies. First, the important contents of the past research are summarized using library studies and the Note-taking technique. Then the relevant information was extracted from the World Bank website. The conceptual model of the research is developed in Figure 1.

Model numbers 1 to 5 will be used to test hypotheses 1 to 5, respectively, as described below. In this model, research hypotheses 1 to 5 will be confirmed if the coefficients (coefficients related to independent variables) are significant at the 95% confidence level. The mathematical model of the research (adapted from Metin and Ozlem, 2019) is estimated as follows:

$$\ln(Y_{i,t})IPC = \alpha_0 + \beta_1 LEB1_{i,t} + \beta_2 LEB2_{i,t} + \beta_3 LEB3 + \beta_4 LEB4 + \beta_5 LEB5 + \varepsilon_{i,t} \quad (1)$$

Dependent variable:

($\ln(Y_{i,t})IPC$): Economic growth in developing countries

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Economic growth will be measured by GDP (Metin and Ozlem, 2019).

Independent variables:

($LEB1_{i,t}$): Health expenditure as one of the life expectancy indicators

($LEB2_{i,t}$): Food poverty as one of the life expectancy at birth indicators

($LEB3$): Food poverty as one of the life expectancy at birth indicators

($LEB4$): quality of educational facilities as one of the life expectancy at birth indicators

($LEB5$): Median family income as one of the life expectancy at birth indicators

In these models, we assume:

i represents the company (Cross-sectional units) and t represents the year.

$\varepsilon_{i,t}$ = Random error of company i in year t

The required information was collected through the World Bank website for a period of 21 years (2000-2020) to analyze the information and test the hypotheses. The research hypotheses were examined using correlation coefficient and regression analysis and the statistical method of panel data after collecting the required information from the selected countries. Preliminary calculations were done using Microsoft Excel and the data was prepared for analysis. Then Eviews is used to perform the final analysis.

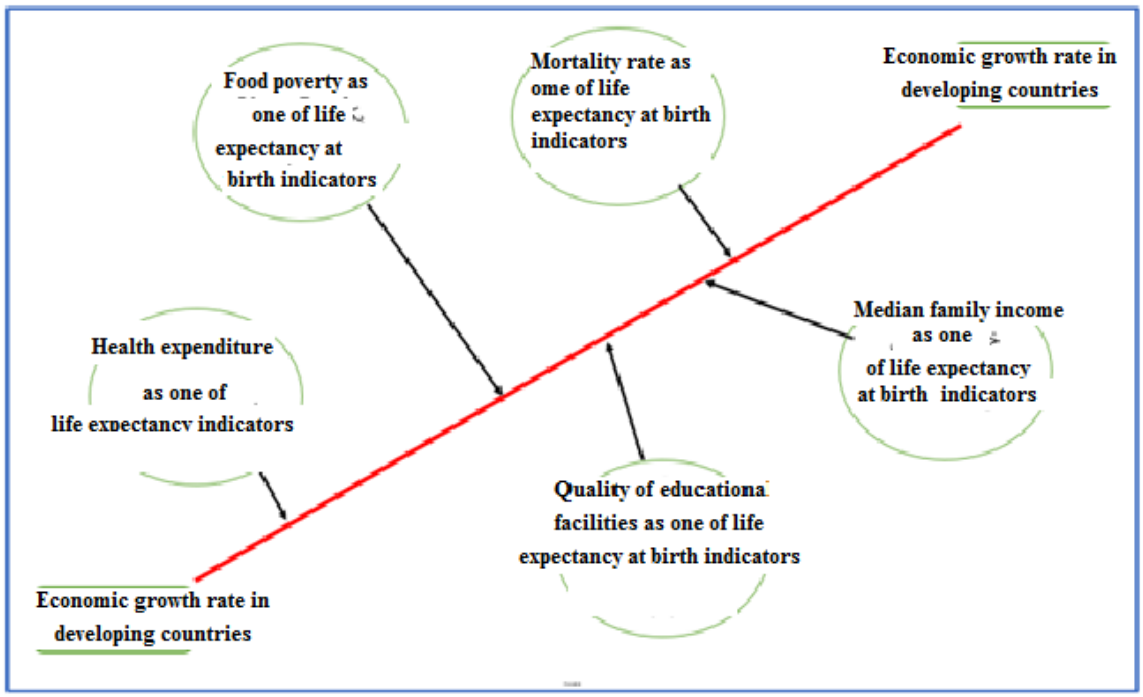

Figure 1: Conceptual model of the research (Metin and Özlem)

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Findings

The summary of descriptive statistics related to the variables of the model with the help of SPSS Statistics 22.0 is presented in Table 1 after screening and deleting unnecessary data. The average, lowest and highest economic growth rates in the sample developing countries are 0.0561, 0.0322, and 0.0830, respectively (Table 1). Skewness and kurtosis, which should be 0 and 3 respectively for the variable to have a normal distribution, show that the economic growth rate does not have a normal distribution.

Table 1. Descriptive statistics for research variables

Variable	Number of observation	Average	standard deviation	Min	Max	Skewness	Kurtosis
Economic growth rate in developing countries	2142	0.0561	0.1974	0.0322	0.0830	0.818	0.049
Health expenditure as one of the life expectancy indicators	2142	0.5515	0.1637	0.2267	0.6274	0.390	0.097
Food poverty as one of the life expectancy at birth indicators	2142	0.1474	0.1559	0.0052	0.2188	0.359	0.392
Quality of educational facilities as one of the life expectancy at birth indicators	2142	0.1216	0.2685	0.0023	0.2864	1.106	4.911
Median family income as one of the life expectancy at birth indicators	2142	0.3350	0.1814	0.0215	0.6615	0.115	3.327

In the present study, the normality of the dependent variable was investigated through the Kolmogorov-Smirnov (K-S) statistic. Table 2 shows the results of the K-S test for the variable of economic growth in developing countries. Since the economic growth variable in developing countries has a significance level of K-S statistic less than 0.05, the economic growth variable in developing countries haven't had a normal distribution.

Table 2. The results of the normality test of the dependent variable

Variable	Number (N)	Statistics (K-S)	Significance
Economic growth variable in developing countries	2142	3.412	0.001

The normality of the dependent variable for economic growth in developing countries is a necessary condition for regression models, therefore, it is necessary to normalize this

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variable before *hypothesis testing*. Johnson Transformation was used to normalize the data and analyzed using Minitab. The results of the K-S test after the data normalization process are described in Table 3. Since the Kolmogorov-Smirnov statistic for the dependent variable of economic growth in developing countries is higher than 0.05 (0.944), after normalization of the data, the significance level of the variable of economic growth in developing countries has a normal distribution after the normalization process.

Table 3. The results of the normality test of the dependent variable of economic growth in developing countries after the normalization

Variable	Number (N)	Statistics (K-S)	Significance
Economic growth variable in developing countries	2142	0.528	0.944

Table 4. Matrix of Pearson correlation coefficients between research variables

	Economic growth rate in developing countries	Health expenditure as one of the life expectancy indicators	Food poverty as one of the life expectancy at birth indicators	Mortality rate as one of the life expectancy at birth indicators	Quality of educational facilities as one of the life expectancy at birth indicators	Median family income as one of the life expectancy at birth indicators
Economic growth rate in developing countries ($P-Value$)	1					
Health expenditure as one of the life expectancy indicators ($P-Value$)	0.084 (0.037)	1				
Food poverty as one of the life expectancy at birth indicators ($P-Value$)	0.062 (0.124)	-0.015 (0.710)	1			
Mortality rate as one of the life expectancy at birth indicators ($P-Value$)	0.020 (0.614)	-0.015 (0.719)	-0.061 (0.134)	1		
Quality of educational facilities as one of the life expectancy at birth indicators ($P-Value$)	-0.013 (0.749)	-0.015 (0.719)	-0.138 (0.001)	-0.030 (0.466)	**1**	
Median family income as one of the life expectancy at birth indicators ($P-Value$)	0.049 (0.225)	0.031 (0.451)	0.068 (0.093)	-0.030 (0.462)	-0.009 (0.83)	1

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In this study, the collinearity relationship between independent variables was investigated using the Pearson correlation coefficient. In this section, the relationship between the research variables and the correlation between them was discussed using Pearson's correlation coefficient and was analyzed by Spss software. The correlation coefficient matrix between research variables is presented in Table 4. There is a direct relationship between the independent variables of the research, which is a normal correlation (table 4). Therefore, it is possible to enter these variables in one model at the same time due to the absence of a collinearity problem between these variables and it is not necessary to check and test them as separated models.

The results of the research hypothesis test

In this section, first, the necessary model for estimating the model is determined for each hypothesis, and then the research model is estimated and the results are interpreted and all the above tests have been analyzed by Eviews.

The first research hypothesis

The purpose of testing the first hypothesis of the research is to analyze the relationship between health expenditures as one of the indicators of life expectancy at birth and economic growth in developing countries. This hypothesis is estimated using model (1) in the form of panel data. It will be approved if the β_1 coefficient is significant at the 95% confidence level.

$$\ln(Y_{i,t})IPC = \alpha_0 + \beta_1 LEB1_{i,t} + \beta_2 LEB2_{i,t} + \beta_3 LEB3 + \beta_4 LEB4 + \beta_5 LEB5 + \varepsilon_{i,t} \quad (3)$$

Chow or bounded F test was used to determine whether the use of the panel data method would be efficient in estimating the desired model. The Hausman test is used to determine which method (fixed effects or random effects) is more suitable for estimation (fixed or random detection of cross-sectional unit differences). The results of these tests are presented in Table 5. The results of the Chow test and its P-Value (0.0240) indicate that the panel data method can be used. It is necessary to estimate the model using the fixed effects method according to the results of the Hausman test and its P-value (0.0246) which is less than 0.05.

Table 5. Chow and Hausman test results for model (1)

Test	Number	Statistics	Statistics number	Degrees of freedom	P-Value
Chow	2142	F	4.2669	(505, 101)	0.0240
Hausman	2142	χ^2	6.6055	5	0.0246

The Jarque–Bera test is used to test the normality of error sentences. The results of the Jarque -Bera test indicate that the residuals obtained from the estimation of the research model at the 95% confidence level have a normal distribution so that the probability of this test (0.9285) is greater than 0.05. The Breush-Pagan test was used to check the homogeneity of variances. It can be said that the model has a variance heterogeneity

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problem due to the significance level of this test, which is less than 0.05 (0.0182). The generalized Least Squares (GLS) estimation technique was used to solve this problem. The value of Durbin Watson's statistic is equal to 2.32 according to the initial results of the model estimation and since it is between 1.5 and 2.5, it can conclude that the remainders are independent of each other. Finally, the model does not have a clear error since the significance level of Ramzi's test (0.1931) is greater than 0.05. The summary of the results of the above tests is presented in Table 6.

Table 6. The results of the tests related to the statistical hypothesis of the model (1)

Ramsey statistics		Durbin-Watson statistics	Breusch-Pagan statistics		Jarque-Bera statistics	
$P-Value$	F	D	$P-Value$	F	$P-Value$	χ^2
0.1931	1.6490	2.32	0.0182	7.9341	0.9285	1.9335

Model (1) of the research is estimated using the panel data method and as fixed effects, taking into account the results of the Chow and Hausman tests as well as the results of the classical regression statistical hypothesis test. The model estimation results are presented in Table 7. The estimation of the model using Eviews is as follows. In the test of the significance of the model, since the probability value of the F statistic is less than 0.05 (0.0000), the significance of the model is confirmed with 95% confidence. The coefficient of determination of the model also shows that 67.23% of the economic growth in developing countries is expressed by the variables of the model.

Table 7. The results of the research hypothesis test using the fixed effects method

Dependent variable: economic growth in developing countries Number of observations: 2142 years - country				
Variable	Coefficient	t statistics	P-Value	Correlation
Fixed component	0.1511	6.8177	0.0002	Positive
Health expenditure as one of the life expectancy indicators	0.0479	2.0688	0.0157	Positive
Food poverty as one of the life expectancy at birth indicators	-0.1090	2.4200	0.0259	Negative
Mortality rate as one of the life expectancy at birth indicators	-0.0257	4.4999	0.0006	Negative
Quality of educational facilities as one of the life expectancy at birth indicators	0.0068	3.2248	0.0072	Positive
Median family income as one of the life expectancy at birth indicators	0.0221	2.5439	0.0232	Positive
The coefficient of determination of the model				0.6723
F statistics ($P-Value$)				12.3462 (0.0000)

Since the probability of the t statistic for the variable coefficient of health expenditure for one of the indicators of life expectancy at birth is less than 0.05 (0.0157), a significant relationship between health expenditure as one of the indicators of life expectancy at birth

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and economic growth in developing countries was confirmed at a 95%. confidence level. The positive coefficient of this variable (0.0479) indicates a direct relationship between health expenditures as one of the indicators of life expectancy at birth and economic growth in developing countries so economic growth increases in developing countries in 0.0479 units with an increase of 1 unit of health expenses as one of the indicators of life expectancy at birth.

The second research hypothesis

The test of the second hypothesis is to investigate whether there is a significant relationship between food poverty as one of the indicators of life expectancy at birth and economic growth in developing countries. Since the probability of the t statistic for the variable coefficient of food poverty as one of the indicators of life expectancy at birth is less than 0.05 (0.0259), a significant relationship between food poverty as one of the indicators of life expectancy at birth and economic growth in developing countries is confirmed at the 95% confidence level (Table 7). The negative coefficient of this variable (-0.1090) proves the inverse relationship between food poverty as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in developing countries decreases by 0.1090 units with an increase of 1 unit in food poverty as one of the indicators of life expectancy at birth.

The third research hypothesis

In this hypothesis, the relationship between mortality rate as one of the indicators of life expectancy at birth and economic growth in developing countries was investigated. Since the probability of the t statistic for the variable coefficient of mortality rate as one of the indicators of life expectancy at birth is less than 0.05 (0.0006), a significant relationship between mortality rate as one of the indicators of life expectancy at birth and economic growth in developing countries is confirmed at the 95% confidence level (Table 7). The negative coefficient of this variable (-0.0257) proves the inverse relationship between mortality rate as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in developing countries decreases by 0.0.257 units with an increase of 1 unit in mortality rate as one of the indicators of life expectancy at birth.

The fourth research hypothesis

The test of this hypothesis is to investigate whether there is a significant relationship between the quality of educational facilities as one of the indicators of life expectancy at birth and economic growth in developing countries. Since the probability of the t statistic for the variable coefficient of quality of educational facilities as one of the indicators of life expectancy at birth is less than 0.05 (0.0072), a significant relationship between quality of educational facilities as one of the indicators of life expectancy at birth and economic growth in developing countries is confirmed at the 95% confidence level (Table 7). The positive coefficient of this variable (0.0068) proves the direct relationship between the quality of educational facilities as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in

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developing countries increases by 0.0068 units with an increase of 1 unit in quality of educational facilities as one of the indicators of life expectancy at birth.

The fifth research hypothesis

This hypothesis investigates whether there is a significant relationship between median family income as one of the indicators of life expectancy at birth and economic growth in developing countries. Since the probability of the t statistic for the variable coefficient of median family income as one of the indicators of life expectancy at birth is less than 0.05 (0.0232), a significant relationship between median family income as one of the indicators of life expectancy at birth and economic growth in developing countries is confirmed at the 95% confidence level (Table 7). The positive coefficient of this variable (0.0221) proves the direct relationship between median family income as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in developing countries increases by 0.0221 units with an increase of 1 unit in median family income as one of the indicators of life expectancy at birth.

Discussion and results

The results show that there is a significant relationship between health expenditures as one of the indicators of life expectancy at birth and economic growth in developing countries. The positive coefficient of this variable (0.0479) proves the direct relationship between health expenditures as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in developing countries increases by 0.0.479 units with an increase of 1 unit in health expenditures as one of the indicators of life expectancy at birth. Therefore, according to the analyzes related to the acceptance of the hypothesis, it can be concluded that there is a positive and direct relationship between health expenditures as one of the indicators of life expectancy at birth and economic growth in developing countries. The result of the first hypothesis test is consistent with the significant relationship between the independent and dependent variables in Peng et al. (2017), Anginer et al. (2016), and Cummins and Weiss (2013), but it is inconsistence with the results of Karatelli (2012) and Selinta (2010) regarding the type of correlation (direct or reverse).

It can be said that there is a significant relationship between food poverty as one of the indicators of life expectancy at birth and economic growth in developing countries, based on the presented results. The negative coefficient of this variable (-0.0190) indicates the inverse relationship between mortality food poverty as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in developing countries decreases by 0.01090 units with an increase of 1 unit in mortality rate as one of the indicators of life expectancy at birth. Therefore, according to the analyzes carried out to prove the second hypothesis of the research, it can be concluded that there is a negative and inverse relationship between food poverty as one of the indicators of life expectancy at birth and economic growth in developing countries. The results of the second research hypothesis are consistent with the research findings of Kambara et al. (2017), Fuji et al. (2013), and Karatelli (2012), but they are inconsistent with the research findings of Selinta (2010).

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It can be said that there is a significant relationship between mortality rate as one of the indicators of life expectancy at birth and economic growth in developing countries, based on the presented results. The negative coefficient of this variable (-0.0257) indicates the inverse relationship between mortality rate as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in developing countries decreases by 0.0257 units with an increase of 1 unit in mortality rate as one of the indicators of life expectancy at birth. Therefore, according to the analyzes carried out to prove the third hypothesis of the research, it can be concluded that there is a negative and inverse relationship between mortality rate as one of the indicators of life expectancy at birth and economic growth in developing countries. The result of the third hypothesis is consistent with the significant relationship between the independent and dependent variable in Peng et al. (2017), and Cummins and Weiss (2013), but it is inconsistent with the results of Karatelli (2012) in terms of the type of relationship (direct or reverse).

It can be concluded that there is a significant relationship between the quality of educational facilities as one of the indicators of life expectancy at birth and economic growth in developing countries, based on the presented results. The positive coefficient of this variable (0.0221) indicates the inverse relationship between the quality of educational facilities as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in developing countries increases by 0.0221 units with an increase of 1 unit in 0.0221 in increase as one of the indicators of life expectancy at birth. Therefore, according to the analyzes performed to prove the present hypothesis, it can be concluded that there is a positive and direct relationship between the quality of educational facilities as one of the indicators of life expectancy at birth and economic growth in developing countries. The results of this hypothesis are consistent with Fuji et al. (2013) and Karatelli (2012) and are inconsistent with Selinta's (2010).

It can be said that there is a significant relationship between median family income as one of the indicators of life expectancy at birth and economic growth in developing countries, based on the presented results. The positive coefficient of this variable (0.0068) indicates the inverse relationship between median family income as one of the indicators of life expectancy at birth and economic growth in developing countries so that economic growth in developing countries increases by 0.0068 units with an increase of 1 unit in median family income in increase as one of the indicators of life expectancy at birth. Therefore, according to the analyzes carried out to prove the fifth hypothesis, it can be concluded that there is a positive and direct relationship between median family income as one of the indicators of life expectancy at birth and economic growth in developing countries. The result of the current hypothesis is consistent with the significant relationship between the independent and dependent variable in Peng et al. (2017), and Cummins and Weiss (2013), but it is inconsistent with Caratelli (2012) in terms of the type of relationship (direct or reverse).

Finally, it is recommended that organizations participating in the human resource d publish more comprehensive information about economic growth in developing countries for people according to the results of this research and similar research. Human resource development standards development authorities are recommended to voluntarily disclose

comprehensive information about the level of economic growth in developing countries and measures related to demographics. Since the promotion of human resources can have important effects on the decisions of individuals and families in a society, the provision of complete and transparent information by government bodies on the factors affecting economic growth in developing countries will be very helpful. Economic analysts and human resources development consultants should perform special analyzes based on the state of economic growth in developing countries and the factors affecting it according to human resources development standards along with the normal analyzes and techniques. According to the results of the first hypothesis, it is recommended to perform research on the relationship between health expenditures as one of the indicators of life expectancy at birth and economic growth in developing countries and its impact on countries' emigration.

In keeping with the results of the second hypothesis of the research, it is suggested to perform research on the relationship between food poverty as one of the indicators of life expectancy at birth and economic growth in developing countries and its impact on the growth rate of crimes in societies. Based on the results of the third hypothesis in this research, it is recommended to research the relationship between the death rate as one of the indicators of life expectancy at birth and economic growth in developing countries and its impact on the inflation rate in these countries. According to the results of the fourth hypothesis of the research, it is suggested to research the relationship between the quality of educational facilities as one of the indicators of life expectancy at birth and economic growth in developing countries and its impact on tourism development. to the fifth hypothesis of the research, it is recommended to perform research on the relationship between median family income as one of the indicators of life expectancy at birth and economic growth in developing countries and its impact on political relations between countries.

References

Abubakar, A., Kassim, S. H. J., & Yusoff, M. B. (2015). Financial Development, Human Capital Accumulation and Economic Growth: Empirical Evidence from the Economic Community of West African States (ECOWAS). *Procedia - Social and Behavioral Sciences, 172*, 96-103. doi:https://doi.org/10.1016/j.sbspro.2015.01.341

Babaie, M. (2020). The effect of health indicators and macroeconomic variables on the level of life expectancy: Comparison of developing and developed countries with the panel data approach. *Studies in Medical Sciences*, *31*(7), 568-575.

Breitung, J. (2001). The local power of some unit root tests for panel data. In *Nonstationary panels, panel cointegration, and dynamic panels* (Vol. 15, pp. 161-177): Emerald Group Publishing Limited.

Dumitrescu, E.-I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic modelling, 29*(4), 1450-1460.

Gürler, M., & Özsoy, Ö. (2019). Exploring the relationship between life expectancy at birth and economic growth in 56 developing countries. *Journal of Global Health Reports, 3*, e2019001.

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of econometrics, 115*(1), 53-74.

Kao, C., & Chiang, M.-H. (2001). On the estimation and inference of a cointegrated regression in panel data. In *Nonstationary panels, panel cointegration, and dynamic panels* (Vol. 15, pp. 179-222): Emerald Group Publishing Limited.

Kendall, J. (2007). The importance of local finance and human capital in regional growth: The case of India. *University of California Santa Cruz, Job Market Paper*.

Kiran, B., Yavuz, N. C., & Guris, B. (2009). Financial development and economic growth: A panel data analysis of emerging countries. *International Research Journal of Finance and Economics, 30*(2), 87-94.

Levin, A., Lin, C.-F., & Chu, C.-S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics, 108*(1), 1-24.

Norozi, F., Nonejad, M., Ebrahimi, M., & Khodaparast Shirazi, J. (2021). Investigation of Productivity Growth Factors in Iran Using Artificial Neural Networks Algorithm. *Economic Growth and Development Research, 11*(42), 58-35. doi:10.30473/egdr.2019.48433.5378

Pedroni, P. (2004). Panel cointegration: asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric theory, 20*(3), 597-625.

Pourali, M., Rajaei, Y., & Dalmanpour, M. (2020). Effects of macroeconomic and institutional variables on the economic growth of selected developing countries. *Applied economics, 10*(32 and 33 (spring and summer 1999)), 79-96.

Shafiei, A., Nonejad, M., Zare, H., & Haghighat, A. (2020). The effect of financial development indicators on life expectancy of men and women in selected developing countries using GMM. *Macroeconomics Research Letter, 14*(28), 231-260.

UNDP, U. (2018). Human development indices and indicators: 2018 statistical update. *United Nations. Obtenido de http://hdr.undp. org/sites/default/files/2018_human_development_statistical_update_es. pdf*.

Westerlund, J. (2007). Testing for error correction in panel data. *Oxford Bulletin of Economics and statistics, 69*(6), 709-748.

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