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How does mortality affect sustainable development goals?

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ABSTRACT

Aims: The aim of this study was to reveal the relationship between the sustainable development indicators index score and mortality, including maternal deaths, deaths under the age of five (u5mortality) traffic deaths, and death of non-communicable disease (NCD mortality).

Methods: Panel data method was used in the analyses, mortality rates independent variables belonging to 11 OECD countries with regular data between 2000-2020; sustainable development indicators index score was considered as the dependent variable.

Results: According to the results of the least squares analysis, a 1% increase in maternal mortality reduced the sustainable development index score by 0.021%; a 1% increase in under five years mortality reduced the sustainable development index score by 0.037%; a 1% increase in NCD mortality reduced the sustainable development index score by 0.044%; a 1% increase in trafficmortality reduced the sustainable development index score by 0.016% ($p<0.01$). A Granger-type causality relationship was identified in different directions between the Sustainable Development Index score and various types of mortality. Additionally, it has been observed that the variables exhibit a long-term relationship. The results of this research explain that long-term mortality rates account for approximately 10% of all sustainable development-related indicators, emphasizing that a healthy social structure is a fundamental requirement for the sustainable development of countries.

Conclusion: Therefore, according to the empirical evidence obtained from the research, the increase in mortality negatively affects the SDG index score in the countries under analysis.

Keywords: Econometric evaluation, sustainable development goals, mortality

INTRODUCTION

The science of economics, expressed as ensuring the effective management of scarce resources in the context of needs and dealing with effects quantitatively, has begun to address economic efficiency within the framework of sustainability. This is a result of the decrease in resources on a global scale and the increase in consumption due to changes in needs. In this context, the literature attempts to explain the quantitative evaluation that deals with the framework of economic growth using the concept of Economic Development within the socioeconomic structure shaped and transformed by the economy.

Development is a dynamic concept that entails a positive change from the current situation. Progress in the world cannot be solely addressed through quantitative growth. The term 'sustainable' was first introduced in the 1972 report titled 'Limits to Growth,' emphasizing the importance of qualitative growth by considering the environment, nature, and ecology. The primary goal of the report is to establish a global equilibrium. It has been seen as essential to prevent sudden and uncontrolled collapses, to ensure that the material needs of the people are met, and to build a development that will provide continuity. In the report, sustainability is defined as a process in which depleted resources in nature are endowed with the ability to renew themselves continuously.[1,2]

Sustainable Development in the Brundtland Report published in 1987; it has been defined and accepted as "meeting the needs of the present while allowing future generations to meet their needs".[3]

Transforming Our World; 17 Sustainable Development Goals and 169 targets of these goals were determined within the scope of the 2030 Agenda for Sustainable Development. In this context, the aim is to realize human rights, empower women, and ensure gender equality in the light of economic, social, and environmental dimensions on a global scale.[4] The report (SDR) on objectives and targets prepared in an up-to-date manner for sustainable development includes yearly data for all countries; the spread score is presented in the form of a report that includes raw values, normalized scores, board ratings, trends, and target scores. With this report,

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the SDG Index score, along with all target and indicator scores, is calculated retrospectively over time using time series data that include missing values from previous years. The report also provides detailed information about the main goals and objectives of the SDG Index score.[5] In this index, "SDG 3: Healthy and Quality Life Goals", the goal for 2030 is to ensure a healthy and quality life for all ages. This includes reducing the mortality rates of children under the age of five, the maternal mortality rate below 70 per 100,000 live births, and the premature death rate from non-communicable diseases by one-third. This goal was covered under 17 sub-headings in the SDG index score. The aim of this study was to reveal the relationship between the Sustainable Development Indicators Index score of the member countries of the Organization for Economic Cooperation and Development and various types of mortality including maternal deaths, deaths under the age of five, traffic deaths, and NCD mortality.

Within the scope of the analysis, 1 (one) main hypothesis was determined and 2 (two) sub-questions were proposed to explain the main hypothesis.

- **H1:** Sustainable development goals are related to mortality.
- **Q1:** What was the level of impact of mortality on sustainable development goals?
- **Q2:** How did mortality affect sustainable development goals?

Studies evaluating the relationship between sustainable development goals and health are frequently carried out in the literature. These studies generally focus on projections, scenarios and relational assessments.[6-8] In this study, from a different perspective, econometric (panel data analysis) methods were used to examine the mortality data, which is one of the Sustainable Development Goals and health indicators. Therefore, it is thought that the findings obtained by empirical econometric methods in this study will enrich the literature on health from a methodological point of view.

METHODS

The study was designed retrospectively with using secondary data so ethical approval was not required. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

In the analysis, the relationship between the mortality and the SDGScores was analyzed by panel data method. Panel data analysis is a method that allows the evaluation of cross-section data and time series data in a common area.[9] Since the study was considered within the scope of countries with data in a certain year range, this analysis method was considered suitable for the study. In the analysis, an econometric model was established in which the mortality was considered as the independent variable and the SDGScores the dependent variable. This study was designed as a descriptive cross-sectional type. The significance tests of the model were evaluated with the least squares method, and the Granger causality test, cointegration tests and variance decomposition models were applied to determine the causality and long-term relationships between the variables. For this study, 11 countries with regular mortality data under the heading "SDG3: Good Health and Well-Being" were used between 2000-2020. These countries were Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hungary, Spain, and Türkiye. In **Table 1**, the analysis includes the variables, their abbreviations, source information for the data, and detailed explanations for each variable under the corresponding sub-headings. It should also be noted here that in this research, in order to obtain more reliable results from the analysis results and to meet the assumption of normal distribution, log transformation was applied to the variables and analyzes were carried out on the variables whose logarithm was taken.

Statistical Analysis

Statistical analyzes were performed using the Eviews 10 program (Eviews 10, IHS Global Inc., 4521 Campus Drive, #336, Irvine, CA 92612).

Table 1. Definition of variables*

Variables	Definition	Unit	Source	Abbreviation
SDG index score	The SDG Index Score, and all goal and indicator scores, retroactively calculated across time using time series data that was carried forward in years with missing data in period t	Score Point	sdgindex.org	SDGScore
Maternal mortality	Maternal mortality rate in period t	per 100000 live births	sdgindex.org	Matmort
Under five years mortality	Mortality rate, under-5 in period t	per 1000 live births	sdgindex.org	u5Mort
Traffic deaths	Traffic deaths in period t	per 100000 population	sdgindex.org	Trafficmort
Non communicable diseases mortality	Age-standardized death rate due to cardiovascular disease, cancer, diabetes, or chronic respiratory disease in period t	% in adults aged 30–70 years	sdgindex.org	NCDmort

*The data were included in the analyzes by taking logarithmic transformations.

RESULTS

According to the descriptive information of the variables in to the analysis;

- SDG Score Index mean was 77.55±4.63 (min: 66.20, max: 86.40)
- Maternal mortality mean was 8.89±5.42 (min: 2.94, max: 31.70)
- Under five years mortality mean was 6.05± 5.28 (min: 2.22, max: 37.88).
- NCD mortality mean was 13.75±4.24 (min: 8.46, max: 29.09).
- Traffic mortality mean was 7.49±2.93 (min: 3.07, max: 16.65).

The representation of the variables according to countries and year ranges was given in **Figure 1**. **Figure 1** shows a negative correlation between the SDG Index score and the mortality that were the subject of the study.

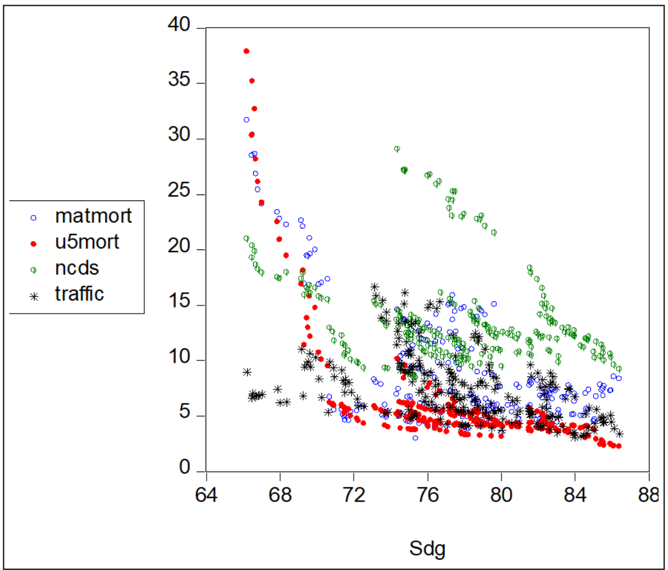

Figure 1. Relationship between SDG scores and mortality variables, 11 countries, 2000-2020.

Source: Prepared by the author.

Econometric Model

At this stage of the study, the mathematical function of the model to be used in econometric analysis was given.

$$SDGScore = f\ (Matmort, U5Mort, NCDmort, Trafficmort\ )$$

The econometric model to be estimated from this equation was established as follows:

$$SDGScore_{it} = \beta_0 + \beta_1 Matmort_{it} + \beta_2 u5Mort_{it} + \beta_3 NCDmort_{it} + \beta_4 Trafficmort_{it} + u_{it}$$

In the model in the equation; the "β_0" coefficient constant expresses the SDGScore that occur independently of the explanatory variables. While "β_1" for Matmort, "β_2" for u5Mort, "β_3" for NCDmort, "β_4" for represents the parameters to be estimated for Trafficmort, "u" represents the error term; "i" denotes the cross-sectional dimension of the panel data, and "t" denotes the time dimension. "SDGScore" was taken as the dependent variable.

Least Squares Test

The least squares test (LS) method is one of the methods used to measure the significance of an econometric model.[10] In the analysis it was observed that the fixed-effect model gave more consistent results compared to the Hausman test result in estimating the SDGScore and the number of independent variables, which are the dependent variables of the analysis ($p<0.00$). According to these results, our model was analyzed under fixed effects and it was determined that the power of the independent variables to explain the dependent variables was consistent (R2 99%, adjusted R2 99%). It has been determined that there was no multicollinearity problem in the model (VIF: between 0-10), there was no cross-sectional dependence (Peseran CD: 0.3761), there was no correlation between variables (Durbin Watson: 1.5), and there was no heteroscedasticity problem (Breusch Pagan: 1.0000). These tests confirmed the significance of the econometric model established in the research. According to the least squares analysis results in **Table 2**, a 1% increase in maternal mortality reduced the sustainable development index score by 0.021%; a 1% increase in u5mortality reduced the sustainable development index score by 0.037%; a 1% increase in NCDmortality reduced the sustainable development index score by 0.044%; a 1% increase in trafficmortality reduced the sustainable development index score by 0.016% ($p<0.01$).

Table 2. Least square test results

Dependent variable	Independent variables	Coefficient	Prob.	R2	Adjusted R2	F-Statistic	Prob (F-statistic)
SDGScore				0.99	0.99	5252.747	0.0000*
	Matmort	-0.021517	0.0000*				
	u5Mort	-0.037982	0.0000*				
	Trafficmort	-0.016846	0.0000*				
	NCDmort	-0.044602	0.0000*				
	C	4.603150	0.0000*				

Hausman Tests cross section/period: 0.0000; Peseran Test:0.3761; Breusch PagaN LM Test: 1.0000; JB Normality Test: 0.476877; Skewness: 0.115125; Kurtosis: 2.682425; VIF:1.281404-6.793452; Durbin Watson: 1.51

*,**,*** significance at %1,%5,%10 level respectively. Source: Prepared by the author.

Cointegration and Granger Casuality/Block Exogeneity Wald Tests

Granger causality analysis is a method that evaluates the contribution of the lagged values of the other variable (sample Xt variable) in explaining the current value of one of the variables (sample Yt variable).[11] It is frequently applied in panel data analysis to determine the direction of the relationship between variables. The most important assumption of this analysis was to ensure the stationarity of the variables. Unit root tests are a widely used method for testing stationarity. Generally, variables are stationary if their mean and variance do not change over time. The most commonly used unit root tests in the literature are ADF tests, PP tests, Im-Pesaran-Shin (IPS) tests, Levin-Lin-Chu (LLC) tests.[9,11-13] For this reason, unit root tests were applied to the variables in order to determine the stationarity status of the variables subject to the research. The results and significance values of these tests were given in Table 3.

Table 3. Unit root tests results

Variables	Level	Levin, Lin and Chu	Breitung t-stat	IM, Pesaran and Shin W-stat	ADF	PP
SDGScore						
	Level					
	Invidual effects	0.9914	-	1.0000	1.0000	1.0000
	Invidual effects and trends	0.4668	0.4305	0.6164	0.7216	0.2915
	None	1.0000	-	-	1.0000	1.0000
	1.diff.					
	Invidual effects	0.0000*	-	0.0000*	0.0000*	0.0000*
	Invidual effects and trends	0.0000*	0.0000*	0.0000*	0.0000*	0.0000*
	None	0.0000*	-	-	0.0004*	0.0000*
Matmort						
	Level					
	Invidual effects	0.0705***	-	0.8749	0.9198	0.2950
	Invidual effects and trends	0.3861	0.3700	0.5514	0.5860	0.0196**
	None	0.0000*	-	-	0.0000*	0.0000*
	1.diff.					
	Invidual effects	0.0038*		0.0000*	0.0000*	0.0000*
	Invidual effects and trends	0.0000*	0.0054	0.0000*	0.0000*	0.0000*
	None	0.0000*	-	-	0.0000*	0.0000*
u5Mort						
	Level					
	Invidual effects	0.0000*	-	0.0029*	0.0007*	0.0000*
	Invidual effects and trends	0.0000*	1.0000	0.0000*	0.0000*	0.9994
	None	0.0155*	-	-	0.0192**	0.0000*
	1.diff.					
	Invidual effects	0.0000*	-	0.0000*	0.0000*	0.9969
	Invidual effects and trends	0.0000*	0.0028*	0.0000*	0.0000*	0.9988
	None	0.0000*	-	-	0.0009*	0.0812***
Trafficmort						
	Level					
	Invidual effects	0.0004*	-	0.6969	0.6625	0.0265**
	Invidual effects and trends	0.8998	0.6413	0.9839	0.9947	0.9473
	None	0.0000*	-	-	0.0000*	0.0000*
	1.diff.					
	Invidual effects	0.0000*	-	0.0000*	0.0000*	0.0000*
	Invidual effects and trends	0.0000*	0.0679***	0.0000*	0.0001*	0.0000*
	None	0.0000*	-	-	0.0000*	0.0000*
NCDmort						
	Level					
	Invidual effects	0.0015*	-	0.9255	0.5996	0.0000*
	Invidual effects and trends	0.6112	0.5240	0.8660	0.9235	0.4281
	None	0.0000*	-	-	0.0000*	0.0000*
	1.diff.					
	Invidual effects	0.0000*	-	0.0000*	0.0000*	0.0000*
	Invidual effects and trends	0.0002*	0.0080**	0.0000*	0.0000*	0.0000*
	None	0.0000*	-	-	0.0143**	0.0000*

*,**,*** significance at %1,%5,%10 level respectively.

According to the unit root test results, the variables become stationary at different levels when the level values and first differences were taken. It was determined that the variables were stationary in common at the I(1) level. For this reason, in the Causality and Co-Integration analyzes conducted in the study, the variables were studied at the I(1) level. The second step after this results was to determine the lag length. According to **Table 4**, the lag lengths of the variables were at the 3rd lag according to the AIC, SC, HQ, LR and FPE. Thus, the lag length of the model was determined as 3rd lag length according to the information criteria.

In **Table 4**, after evaluating that all of the variables were stationary at the I(1) level by the unit root test, the lag length of the model was determined in the VAR model, and the long-term relationships were investigated by Johansen Fisher cointegration analysis between the variables. To test whether there was a long-term relationship between the variables, eigenvalue (max-eigen value) and trace statistics were used. While investigating the long-term relationship between the variables with the Johansen Fisher cointegration test, the 3rd length was applied to determine the lag length of the VAR model. According to the results of Johansen's (1988) cointegration tests; the trace test statistic of the H0 hypothesis (r=0), which states that there was no cointegration between SDGScore and mortality, was found to be 168.80 since this value was greater than the critical value of 69.81 at the 1% significance level, the null hypothesis was rejected. Trace test indicated 5 cointegrating eqn(s) at the 0.05 level.

In the Granger casualty analysis, the lag length of the model was determined as 3rd lag length in VAR model and the results was given in **Table 5**. The results obtained from the diagnostic tests of Granger causality tests showed that there was no heteroscasticity, serial correlation, cross-sectional dependence in the model and that the model did not contain a unit root, and supported the accuracy of the results obtained. According to the Granger causality analysis results, four different causal relationships were identified between the variables subject to the research.

As a result of the causality analysis made after the determination of long-term relationships, variance decomposition was performed in the research model in order to show how much of the SDGScore Index of mortality variables was explained. Variance decomposition investigates the percentage of change in a variable attributable to itself and the percentage attributable to other variables.[14] As can be seen in **Table 6**, SDGscore index variable was determined by its own shocks in the short run under the 100.000 monte carlo simulation. According to this test results; at the end of the 10th period, 90.79% of the SDGscore variable was explained by itself, 1.46% by Matmort, 0.39% by u5Mort variable, 3.41% by Trafficmort variable, and 3.93% by NCDmort variable.

Table 4. Laglength criteria and cointegration test results

A. VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	1747.243	NA	1.03e-16	-22.62653	-22.52792	-22.58648
1	1990.503	467.5651	6.03e-18	-25.46108	-24.86946	-25.22076
2	2099.697	202.7889	2.02e-18	-26.55450	-25.46988	-26.11393
3	2168.260	122.8787*	1.15e-18*	-27.12025*	-25.54262*	-26.47942*
4	2186.953	32.28868	1.26e-18	-27.03835	-24.96770	-26.19726
5	2197.244	17.10659	1.53e-18	-26.84732	-24.28366	-25.80597
6	2215.464	29.10588	1.69e-18	-26.75928	-23.70261	-25.51767

B . Cointegration Test

	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None *	0.340430	168.8080	69.81889	0.0000
At most 1 *	0.193681	95.56254	47.85613	0.0000
At most 2 *	0.184009	57.67404	29.79707	0.0000
At most 3 *	0.095212	21.88414	15.49471	0.0047
At most 4 *	0.023995	4.274528	3.841466	0.0387

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level; * Denotes rejection of the hypothesis at the 0.05 level; Roots of Characteristic Polynomial:0.956986-0.098292.

Source: Prepared by the author.

Table 5: Granger casuality/block exogeneity wald tests

Hipotesis	Probability	Result	Interpretation of the result
SDGScore ≠> Matmort	0.2155	Received	
SDGScore ≠> u5Mort	0.0967***	Rejected	
SDGScore ≠> Trafficmort	0.8352	Received	
SDGScore ≠> NCDmort	0.4022	Received	
Matmort ≠> SDGScore	0.4277	Received	SDGScore → u5Mort
Matmort ≠> u5Mort	0.9404	Received	
Matmort ≠> Trafficmort	0.4798	Received	
Matmort ≠> NCDmort	0.0441**	Rejected	
u5Mort ≠> SDGScore	0.8769	Received	Matmort → NCDmort
u5Mort ≠> Matmort	0.6314	Received	
u5Mort ≠> Trafficmort	0.9660	Received	
u5Mort ≠> NCDmort	0.7631	Received	NCDmort → SDGScore
Trafficmort ≠> SDGScore	0.1276	Received	
Trafficmort ≠> Matmort	0.9140	Received	
Trafficmort ≠> u5Mort	0.8046	Received	
Trafficmort ≠> NCDmort	0.1863	Received	NCDmort → Trafficmort
NCDmort ≠> SDGScore	0.0104**	Rejected	
NCDmort ≠> Matmort	0.4059	Received	
NCDmort ≠> u5Mort	0.3519	Received	
NCDmort ≠> Trafficmort	0.0851***	Rejected	

Roots of Characteristic Polynomial:0.956986-0.098292; Serial Correlation LM Tests:0.2332; Residual Portmanteau Tests for Autocorrelations:0.0441; Residual Heteroskedasticity Tests (Levels and Squares): 0.6109; Residual Heteroskedasticity Tests (Includes Cross Terms):0.1850; *,**,*** significance at %1,%5,%10 level respectively. Source: Prepared by the authors.

Table 6. Variance decomposition analysis results of SDGScore variable*

	SDGScore	Matmort	u5Mort	Trafficmort	NCDmort
1	100.00	0.00	0.00	0.00	0.00
2	95.50	0.75	0.16	0.75	2.81
3	93.97	1.02	0.36	1.26	3.36
4	91.19	1.34	0.35	3.26	3.83
5	91.04	1.35	0.36	3.39	3.84
6	90.94	1.44	0.37	3.39	3.84
7	90.84	1.44	0.37	3.40	3.92
8	90.82	1.45	0.37	3.42	3.93
9	90.81	1.46	0.38	3.41	3.93
10	90.79	1.46	0.39	3.41	3.93

*Estimated under 100.000 monte carlo simulation. Source: Prepared by the author.

Impulse-response functions reveal the effects of shocks on variables and their effects at what time, with the help of tables or graphics. With this process, it is understood in which variable the shocks occur and how the variables will react to these shocks. In order to determine how the shocks will occur, the movements of the variables within 10 periods were examined first under the 100.000 monte carlo simulation. The reactions of the other series against a 1-unit change in the shocks occurring in the variables were revealed with the help of graphs.[14] As seen in **Figure 2**; a standard deviation shock given to the Matmort variable negatively affected the SDG score index until the middle of the 4th period; while it turned positive halfway through the 5th period; it turned negative till the 7th period; then turned positive starting from the 7th period, and was continued until the end of the period. While a standard deviation shock given to the u5mort variable affected the SDGScore variable positively from the 1st period to at the end of the 10 period. A standard deviation shock given to the NCDmort variable negatively affects the SDG score variable till the beginning of the second period. However, it had a positive effect on the SDG score variable from the 2nd period to the beginning of the 5th period then the negative effect, was seen between the 5th and 6th periods, and from the 6th periods it turned positive at the end of the 10 periods. A standard deviation shock given to the Trafficmort variable negatively affects the SDG score variable till the beginning of the second period, and from the 2nd periods it turned positive at the end of the 10 periods.

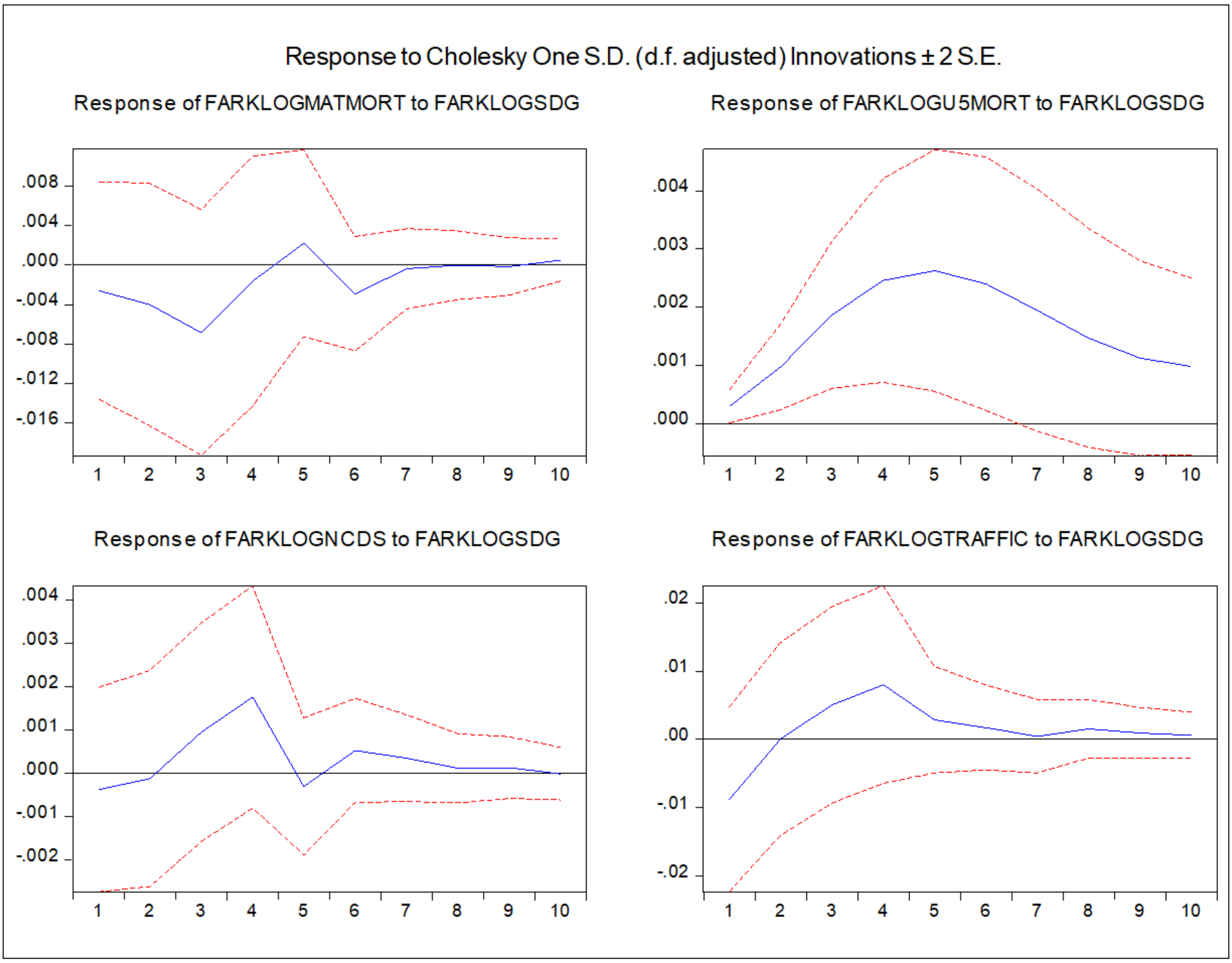

Figure 2. Effect of shock in mortality variables on SDGScore variable*
*Estimated under 100.000 monte carlo simulation.

DISCUSSION

Within the scope of this research, the relationship between health and development was investigated. In this context, the relationship between health indicators such as maternal mortality, mortality under the age of five, traffic mortality, NCD mortality, and the Sustainable Development Indicators Index score was examined. According to the questions determined in the study;

- **Q1:** What was the level of impact of mortality on sustainable development goals?

According to the results of the least squares analysis, a 1% increase in maternal mortality reduced the sustainable development index score by 0.021%; a 1% increase in u5mortality reduced the sustainable development index score by 0.037%; a 1% increase in NCD mortality reduced the sustainable development index score by 0.044%; a 1% increase in traffic mortality reduced the sustainable development index score by 0.016% ($p<0.01$).

- Q2: How did mortality affect sustainable development goals?

Co-integration tests, in which the long-term relationships between the variables were examined in the study, revealed that there was a long-term relationship between mortality and development indicators. Besides these results unidirectional Granger-type causality was determined i) from SDG score index towards u5 mortality ii) from NCD mortality towards SDG Score Index iii) from Maternal mortality towards NCD mortality iv) from NCD mortality towards Traffic mortality.

Additionally the variance decomposition results mortality explained the SDG score in the long term, and shocks in mortality affected the SDG score negatively. In light of these results, the main hypothesis of the study was accepted as "Sustainable development goals were related to mortality" and this effect was negative. Therefore, according to the empirical evidence obtained from the research, the increase in mortality decreased the SDG index score in the countries subject to the analysis.

SDG index score means development in a country and is related to the per capita income, education level, and improvements in the health status of the people of that country. Health is a factor that contributes to the development of human capital and directly affects economic growth. Good health indicates a high-value source of well-being around the world. Health is not only the absence of disease but also the capacity of the individual to develop his abilities and skills. Health reduces production losses due to diseases, reduces absenteeism from school, improves learning, and enables the use of financial resources allocated for treatment in different ways.[15] Ensuring the productivity of a healthy individual with a good education provides important contributions to the economic growth of that country and therefore to its development. In a healthy society, productivity increases, and economic growth is positively affected due to the good quality of human capital.[16] For example, malnutrition in the newborn and infancy periods negatively affects the child's chances of survival and social development. In the long term, this situation negatively affects the economic and cultural development of countries.[17] In the development of societies, premature deaths due to mother-infant-traffic accidents and chronic diseases affect the economies of the countries negatively and this situation has a negative impact on economic development. The literature stated that maternal–child health should be associated with the emerging issues of long-term development, human capital, and economic growth.[18] Also NCDs have a negative impact on individual health, family budgets, and national employment. It should also be noted that NCDs are closely linked to other SDGs.[6] For example, in the relationship between country income and child mortality, it is mentioned that child deaths are lower in high-income countries than in low-income countries, so the effect of country income on mortality rates is reduced. In other words, it is claimed that rich countries have longer and higher quality life expectancies and lower mortality rates.[19] Poverty was increasingly associated with poor health outcomes that include maternal mortality.[20] In a study evaluating the relationship between socio-demographic, maternal, obstetric, and neonatal factors associated with neonatal deaths, it was determined that reducing inequalities in maternal and newborn care will also reduce the mortality rate among the poorest families. If the current trend continues, it will take another 50 years for families in the poorest group to reach the 2030 Every Newborn Action Plan (ENAP) target.[7] In one study, since 1990, progress has been made toward SDG targets in Somalia (such as prolonging life expectancy, reduction in maternal and infant mortality), but it has also been emphasized that more improvements are needed in health systems to achieve better results.[21] Research from 33 Western Pacific countries demonstrates the importance of public health law in supporting the achievement of health-related SDGs.[22] From this perspective it is stated that reaching the goals determined by the sustainable development goals was effective on the health of individuals and the death rate was reduced and literature generally accepted that there was a sustainable greater effort needed to be improving health SDG.[21,23-25] Efforts for healthcare systems to reduce mortality include i) increasing the education of the society on healthy aging, prevention from accidents, protecting and improving maternal and child health, ii) providing individuals with healthy life skills to reduce chronic disease burdens, iii) ensuring universal health coverage globally, iv) strengthening health financing, v) reducing poverty, vi) evaluating indicator results with transparency, vii) health supporting and developing related public and private partnerships.

Limitations

In addition, the limitations of this study were the time dimension of this research (2000-2020), the countries covered in the research, the variables determined as the research subject, the type of indicator taken into account in the calculation of the variables (maternal mortality rate, under-five child mortality, NCD mortality, deaths coused from traffic).The method used was also evaluated as its limitations. It is thought that the results obtained from this research can be used for comparison purposes in future studies, and analysis with different countries, time periods, variables, and different methods will contribute to the literature.

CONCLUSION

According to the empirical evidence obtained from the research, the increase in mortality affects the SDG Index score in the countries subject to the analysis negatively. Mortality rates were a significant problem in all countries. A well-educated and healthy human capital structure is a basic requirement for the sustainable development of countries. The results of this research explain that long-term mortality rates account for approximately 10% of all sustainable development-related indicators, emphasizing that a healthy social structure is a fundamental requirement for the sustainable development of countries. Therefore, within the framework of the results obtained from this research, countries can prioritize health-related indicators among the targets to be prioritized in their evaluations of development goals.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was designed retrospectively with using secondary data so ethical approval was not required.

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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