

SUSTAINABLE DEVELOPMENT AND HAPPINESS: A MULTIDIMENSIONAL RELATIONSHIP ANALYSIS USING DATA FROM 95 COUNTRIES

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ABSTRACT

Sustainable development refers to the management of the Earth's resources to meet current needs without compromising the ability of future generations to meet their own needs. To achieve this, a set of goals and corresponding sub-goals have been established. This study aims to evaluate the relationship between sustainable development and subjective well-being. The research was conducted at the country level, focusing on 95 nations with consistent data for 2021. The study identified 12 variables and analyzed them within three models: Model I: Defined Subjective Well-Being (SWB) as the dependent variable and the SDG Index Score as the independent variable. Model II: Evaluated the impact of sub-goals (G1, G2, G3, G4, G5, G8, G9, G10, G11, G16) on the SDG Index Score by defining the SDG Index Score as the dependent variable and the sub-goals as independent variables. Model III: Assessed the influence of sub-goals on happiness, defining SWB as the dependent variable and the sub-goals as independent variables. The findings reveal a positive relationship between the SDG Index Score and SWB, indicating that improvements in the SDG Index Score have a beneficial impact on individuals' well-being. However, the analysis also shows that advancements in the goals of Ending Hunger and Quality Education negatively affect SWB. This outcome is interpreted as stemming from increased awareness and expectations for better living standards, driven by progress in these areas. On the other hand, improvements in Good Health and Well-Being, Gender Equality, and Decent Work and Economic Growth positively influence individuals' SWB levels. These results emphasize the multi-dimensional effects of sustainable development goals on subjective well-being and suggest targeted policy measures to optimize these outcomes.

Keywords: Happiness score, sustainable development, subjective well-being, health

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SÜRDÜRÜLEBİLİR KALKINMA VE MUTLULUK: 95 ÜLKE VERİSİYLE ÇOK BOYUTLU BİR İLİŞKİ ANALİZİ

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ÖZ

Sürdürülebilir kalkınma, doğal kaynakların mevcut ihtiyaçları karşılamak üzere kullanılması ile gelecek nesillerin kendi ihtiyaçlarını karşılama kapasitesinin tehlikeye atılmadan yönetilmesi anlayışına dayanır. Bu amacı gerçekleştirmek için, Birleşmiş Milletler tarafından belirlenen Sürdürülebilir Kalkınma Hedefleri (SKH) ve bunlara bağlı alt hedefler, dünya genelinde kalkınmanın yönlendirilmesinde temel bir çerçeve sunmaktadır. Bu çalışma, sürdürülebilir kalkınma hedeflerinin öznel iyi oluş üzerindeki etkilerini incelemeyi amaçlamaktadır. Araştırma, 2021 yılı itibarıyla veriye sahip 95 ülke üzerinden gerçekleştirilmiştir. Çalışmada, 12 değişken ele alınarak, bu değişkenler üç ayrı modelde analiz edilmiştir: Model I: Öznel İyi Oluş (SWB) bağımlı değişken olarak tanımlanmış ve Sürdürülebilir Kalkınma Hedefleri (SKH) Endeks Skoru bağımsız değişken olarak kullanılmıştır. Model II: SKH Endeks Skoru bağımlı değişken olarak ele alınmış ve alt hedefler (G1, G2, G3, G4, G5, G8, G9, G10, G11, G16) bağımsız değişken olarak incelenmiştir. Model III: Alt hedeflerin mutluluk üzerindeki etkisi değerlendirilmiştir; bu modelde Öznel İyi Oluş bağımlı değişken olarak, alt hedefler ise bağımsız değişken olarak yer almıştır. Elde edilen bulgular, SKH Endeks Skoru ile Öznel İyi Oluş arasında pozitif bir ilişki olduğunu göstermektedir. Bu durum, SKH Endeks Skoru'ndaki iyileşmelerin, bireylerin genel yaşam kaliteleri üzerinde olumlu etkiler yaratacağına işaret etmektedir. Bununla birlikte, Açlığın Sona Erdirilmesi ve Nitelikli Eğitim hedeflerindeki ilerlemelerin, Öznel İyi Oluş üzerinde olumsuz bir etki yarattığı gözlemlenmiştir. Bu bulgu, söz konusu alanlarda sağlanan gelişmelerin, bireylerde yaşam standartlarına dair farkındalık ve beklentilerin artmasına yol açtığını ve bunun da olumsuz bir etki oluşturduğunu göstermektedir. Buna karşın, Sağlık ve Kaliteli Yaşam, Toplumsal Cinsiyet Eşitliği, İnsana Yakışır İş ve Ekonomik Büyüme hedeflerindeki gelişmelerin, bireylerin öznel iyi oluş düzeyleri üzerinde olumlu etkiler yarattığı tespit edilmiştir. Bu bulgular, sürdürülebilir kalkınma hedeflerinin öznel iyi oluş üzerindeki çok boyutlu etkilerini ortaya koymakta ve bu etkilerin optimize edilmesi için hedefe özel politika önlemlerinin önemini vurgulamaktadır.

Anahtar Kelimeler: Mutluluk skoru, sürdürülebilir kalkınma, öznel iyi oluş, sağlık

I. INTRODUCTION

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In recent years, the connection between happiness and sustainable development has attracted increasing attention from both researchers and policymakers. Rather than focusing solely on economic growth, the academic literature now highlights the importance of policies aimed at improving the overall quality of life for individuals and communities. Various disciplines—including psychology, economics, and sociology—have contributed to a richer understanding of how happiness is defined, measured, and influenced.

Happiness is widely recognized as a multifaceted concept shaped by an interplay of genetic predispositions, psychological conditions, social interactions, economic circumstances, and environmental influences. While people often think of happiness as a fleeting sense of pleasure or a sudden boost in mood, in academic terms it refers to an individual's overall evaluation of their life quality. Over time, the idea of happiness has been linked to different values and conditions depending on historical periods and cultural contexts. From a scientific perspective Veenhoven (1997) defines happiness as a general positive evaluation of one's life. Similarly Diener (2000) introduces the notion of "subjective well-being" which encompasses life satisfaction, the frequency of positive emotions and the relative absence of negative experiences. The study of happiness has benefited from contributions across a range of academic areas, such as psychology, sociology, philosophy, neuroscience, and economics. Knowledge gained from these fields has been crucial in shaping approaches aimed at improving personal and collective well-being. Throughout history, the way happiness is understood has undergone notable changes. In earlier eras it was often regarded as a divine or spiritual blessing whereas in modern times it is more frequently linked to tangible and social measures such as income, social status and physical appearance (Kiraz, 2007; Diener et al., 2008; Durak and Alaca, 2019). Notably research aimed at uncovering the drivers and patterns of human happiness has broadened the scope of this field. For example Kahneman and Krueger (2006) highlighted that understanding happiness is highly relevant to economics, emphasizing its increasing significance in analyzing human behavior and well-being.

Research examining the relationship between income and happiness forms a foundational element of the literature on well-being. A landmark contribution in this area came from Richard A. Easterlin, who introduced the 'Easterlin Paradox,' showing that although per capita Gross National Product (GNP) tends to increase over time, the average level of happiness does not necessarily rise accordingly. This finding has profoundly influenced subsequent research in the field (Easterlin, 1995). By emphasizing the limited influence of economic growth on long-term happiness, Easterlin's research paved the way for numerous studies exploring the intricate relationship between financial circumstances and life satisfaction. Within this context, the investigation of happiness remains a crucial interdisciplinary field aimed at promoting both individual and collective well-being. A central focus within this body of work is the effect of income inequality on personal welfare and social cohesion. Scholars have approached this topic from a variety of perspectives, employing diverse methodologies to understand its implications. For instance a panel data study including 25 OECD countries between 1990-2014 years found that higher levels of income inequality are linked to greater differences in life satisfaction, and that both factors negatively affect perceptions of social security (Graafland and Lous, 2019). Analyzing responses from over 123,000 people, the study finds that higher inequality tends to lower individual happiness. The effect is more pronounced in Europe, particularly among the poor and left-leaning individuals, whereas in the US, the rich are more significantly affected. This study provides additional evidence that income inequality has a detrimental effect on individual well-being (Alesina et al., 2004). Similarly Biancotti and D'Alessio (2007) showed that income disparities can undermine social cohesion and contribute to feelings of insecurity within society. Verme (2011) presents evidence showing that greater income inequality tends to reduce individual well-being. Similarly, Luttmer (2005) demonstrates that people's happiness can decline when those around them earn significantly more. On the other hand Berg and Veenhoven (2010) suggest that in some cases, income inequality can have a positive effect on well-being by motivating individuals to aim for higher earnings. Other researchers, including Bjornskov et al. (2008), Blanchflower and Oswald (2004), Helliwell (2003), Stevenson and Wolfers (2008), Diener et al. (1993) and Appau et al. (2019), emphasize that the link between income inequality and well-being is complex and varies across different contexts. They also note that cultural values, social norms, and

regional characteristics play an important role in shaping this relationship. These variations highlight the need for further detailed research to better understand how inequality affects well-being in diverse settings.

Although the body of research on happiness is extensive, the influence of the Sustainable Development Goals (SDGs) on subjective well-being at the sub-target level has not yet been thoroughly or systematically investigated. Most existing studies concentrate on macro-level indicators such as income, health, and education, leaving the multidimensional effects of the SDGs on individual well-being—both positive and negative—largely unexplored. Limited empirical evidence suggests that SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action) may be negatively associated with subjective well-being (Pradhan et al., 2017; Kroll et al., 2019; Neve and Sachs, 2020). These findings highlight that sustainability initiatives do not automatically translate into higher happiness levels. In light of this, the present study employs an interdisciplinary approach—drawing on economic, social, and environmental dimensions—to investigate the nuanced and sometimes counterintuitive connections between selected SDG sub-indicators and subjective well-being.

Employing multivariate modeling to account for cross-country heterogeneity, the analysis highlights that the relationship between SDG progress and SWB is neither linear nor universally positive. Instead, it reveals that the same development efforts may yield varying—and at times even adverse—impacts on well-being depending on contextual factors. These findings challenge the prevailing assumption that SDG advancement uniformly enhances SWB, and underscore the importance of adopting more human-centered, adaptable, and context-sensitive development strategies. The study's original contribution lies in uncovering the paradoxical—or counterintuitive—effects of particular SDGs on individual well-being. By highlighting potential setbacks of sustainable development initiatives on real-life satisfaction, it offers practical insights for policymakers aiming to design holistic strategies that better align with genuine well-being outcomes.

II. METHOD

This research was cross-sectional in nature, and 95 countries with regularly available data for the year 2021 were included in the study. The countries used (sample size) were selected based on the availability of data during the research period. The data used in this study were obtained from (i) the World Happiness Database for the Life Ladder indicator, and (ii) SDG Index Score and SDG-related data from the sdgindex.org database. Statistical analysis was performed using the Eviews 10 Statistics software. Since secondary data were used in the study, no ethical approval was required. The countries examined in this study include the Albania, Argentina, Australia, Bangladesh, Belgium, Benin, Bosnia and Herzegovina, Brazil, Bulgaria, Cameroon, Canada, Chile, China, Colombia, Comoros, Costa Rica, Croatia, Cyprus, Denmark, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Estonia, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Haiti, Honduras, Iceland, India, Indonesia, Iran Islamic Rep., Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kenya, Latvia, Lebanon, Liberia, Lithuania, Madagascar, Malaysia, Maldives, Malta, Mauritania, Mauritius, Mexico, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Netherlands, Nicaragua, Nigeria, Norway, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Senegal, Sierra Leone, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Tanzania, Thailand, Togo, Tunisia, Türkiye, United Arab Emirates, United Kingdom, United States, Uruguay, Venezuela, Vietnam, Yemen. In the study, 12 variables were identified and analyzed within the framework of three (3) models. Explanatory details of the variables addressed in the research are presented in Table 1.

Life Ladder: The happiness life ladder is a method used to assess individuals' life satisfaction and is defined as a key component of the concept of subjective well-being. This approach evaluates how people perceive their lives by asking them to score their overall living conditions on a scale from 0 (lowest) to 10 (highest). It is commonly applied to examine how aspects such as financial stability, social connections, and personal freedoms influence life satisfaction, making the happiness ladder a trusted measure of subjective well-being (Helliwell et al., 2023).

SDG Index Score: The SDG Index Score provides a comprehensive measure of how well countries are advancing toward the 17 United Nations Sustainable Development Goals that relevant indicators, standardizes them on a 0–100 scale, and applies equal or weighted scoring to produce a composite value that reflects a country’s overall SDG performance. In the empirical analysis, the study focuses on the relationship between Subjective Well-Being and the overall SDG Index Score, along with a selected set of individual goals—specifically Goals 1, 2, 3, 4, 5, 8, 9, 10, 11, and 16. Goals 6, 7, 12, 13, 14, and 15 were excluded from the final models due to their statistical misalignment, as their inclusion either introduced multicollinearity or resulted in model instability and inconsistent parameter estimates. These exclusions were made to preserve the robustness, interpretability, and reliability of the multivariate estimations. The selected goals provided more consistent and theoretically meaningful associations with SWB across countries. The specific goals included in the SDG Index Score and used in this research are as follows:

G1-End Poverty goal has three targets aimed at eradicating poverty everywhere and for all people. G2-End Hunger focused on eliminating hunger and malnutrition and also promotes food security and sustainable agriculture across nine targets. G3-Good Health and Well-being comprising 17 targets, this goal aims to ensure healthy lives for all ages, reduce child and maternal mortality, and lower premature deaths from non-communicable diseases. G4-Quality Education seeks to provide inclusive and equitable education and support lifelong learning opportunities for everyone. G5-Gender Equality includes six targets to eliminate discrimination and violence against women and girls, while encouraging their full participation in all aspects of life. G8-Decent Work and Economic Growth consists of nine targets focused on promoting per capita economic growth and ensuring full, productive, and decent employment for all. G9-Industry, Innovation, and Infrastructure supports inclusive industrialization, increased industrial employment and GDP contributions, and the development of resilient infrastructure and innovation. G10-Reduced Inequality seeks to address disparities both within and among countries, through three targets that emphasize equal opportunities, the elimination of discriminatory policies and laws, and the reduction of economic and social inequalities. G11-Sustainable Cities and Communities consists of six targets to ensure access to safe, adequate, and affordable housing and basic services for all, while making cities and human settlements inclusive, safe, and sustainable. G16-Peace, Justice, and Strong Institutions includes 12 targets to reduce all forms of violence, establish peaceful societies, and strengthen institutions for sustainable development.

Table 1. Definition of Variables

Variables	Explanation	Unit	Abbreviation
Subjective Well-Being	t period Life Ladder between 0-10 points/Happiness point	Point	SWB
SDG Index Score	Retroactively calculated across time using time series data that was carried	Score	SDG
Goal 1	End Poverty	Score	G1
Goal 2	End Hunger	Score	G2
Goal 3	Good Health and Well-being	Score	G3
Goal 4	Quality Education	Score	G4
Goal 5	Gender Equality	Score	G5
Goal 8	Decent Work and Economic Growth	Score	G8
Goal 9	Industry, Innovation and Infrastructure	Score	G9
Goal 10	Reduced Inequalities	Score	G10
Goal 11	Sustainable Cities and Communities	Score	G11
Goal 16	Peace, Justice, and Strong Institutions	Score	G16

III. FINDINGS

Under this heading, the first phase was provided descriptive information about the variables subject to the research, and the second phase presents the analysis results of the models established within the scope of the study. Descriptive information about the variables analyzed was provided in Table 2.

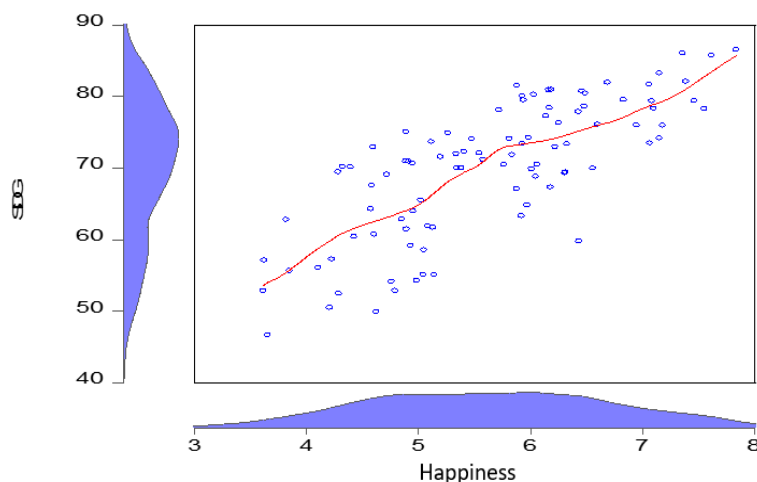
Table 2. Descriptive Analysis Results of Research Variables

	SWB	SDG	G1	G2	G3	G4	G5	G8	G9	G10	G11	G16
Mean	5.65	69.91	81.88	61.18	73.60	82.28	64.33	73.93	58.17	63.14	74.18	64.26
Median	5.77	70.95	96.36	61.72	79.02	89.71	67.76	74.36	54.70	70.39	80.41	63.14
Maximum	7.84	86.56	100.00	83.33	97.28	99.76	93.75	88.08	97.83	100.00	96.55	94.21
Minimum	3.61	46.61	2.27	28.59	31.68	31.66	13.06	43.34	10.26	1.00	27.41	32.62
Std. Dev.	1.03	9.41	25.42	8.93	18.81	19.06	17.28	9.14	25.26	26.74	17.17	15.71
Skewness	0.05	-0.48	-1.56	-0.57	-0.71	-1.09	-0.45	-0.65	-0.09	-0.49	-0.92	0.05
Kurtosis	2.23	2.43	4.59	3.80	2.36	3.04	2.47	3.36	1.90	2.11	2.81	2.11
Probability	0.31	0.08	0.00	0.02	0.01	0.00	0.12	0.03	0.09	0.03	0.00	0.20

Source: Prepared by the authors.

The relationships between the countries included in the study and the variables were presented in Figure 1. According to the graph, a positive relationship between the SDG Index Score and Subjective Well-Being was observed.

Figure 1. Relationship Between Subjective Well-Being and SDGs, 95 Countries, 2021



Source: Prepared by the authors.

3.1. Regression Models

In the context of this study, three models were established to evaluate the relationship between variables using the Ordinary Least Squares (OLS) method, a standard regression model. The mathematical functions of the models to be used in the analysis and the analysis results were as follows:

3.1.1. Regression Results- Model I.

In the first model, Subjective Well-Being was the dependent variable, while SDG Index Score was the independent variable. β_0 represented the coefficients of the independent variable, β_1 was the coefficients of the independent variable and ϵ_i denoted the error term (random factors not explained by the model), while i referred the observation number. The mathematical representation of the model was as follows:

$$SWB_i = \beta_0 + \beta_1 SDG_i + \epsilon_i$$

According to the test results, the independent variable explained 59% of the variance in the dependent variable, with an adjusted R² of 0.58, indicating a good model fit. Furthermore, the relationship between the variables was statistically significant at the 1% level (p < .001). A positive association was found between the SDG Index Score and Subjective Well-Being; specifically, a one-unit increase in the SDG score led to a 0.084-unit increase in SWB. Several diagnostic tests were conducted to assess the assumptions of the regression model. As shown in Table 3, the Durbin-Watson statistic (DW=2.03) and the Breusch-Godfrey LM test (p= .9621) indicated no autocorrelation. Homoskedasticity was supported by the Breusch-Pagan-Godfrey, Harvey, Glejser, and White tests, all of which yielded p-values greater than .05. Additionally, the Jarque-Bera test (p= .4767) confirmed the normality of residuals, while the ARCH test (p= .4440) indicated no autoregressive conditional heteroskedasticity. Partial correlation coefficients ranging from .691 to .782 suggested that multicollinearity was not a major issue. In summary, the regression model satisfied the key classical assumptions and demonstrated strong explanatory power and statistical significance (F-statistic, p < .01; R² = .59; Adjusted R² = .58).

Table 3. Model I Least Squares Test Results

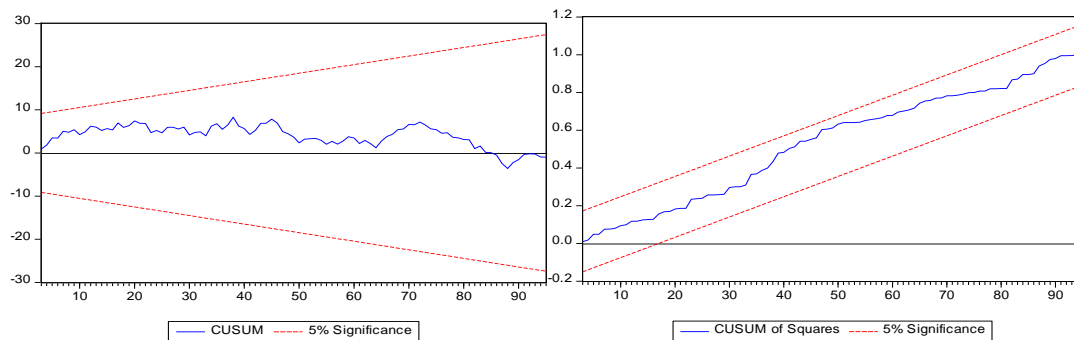
Dependent Variable	Independent Variable	Coefficient	Prob.	R ²	Adjusted R ²	F-Statistic	Prob(F-statistic)
SWB	SDG	0.084434	0.0000*	0.59	0.58	135.0874	0.0000*
	C	-0.255673	0.6190				

Durbin Watson: 2.03; Breusch-Godfrey Serial Correlation LM Test:0.9621; Breusch-Pagan-Godfrey: 0.9279; Harvey: 0.8903; Glejser:0.8194; ARCH: 0.4440; White: 0.1727; Partial Correlation: 0.782-0.691; JB Normality Test: 0.476671 *accepted at %1 level.

Source: Prepared by the authors.

In economic modeling, the CUSUM and CUSUM Square charts, which were used to assess whether a model operated with fixed parameters, served as effective tools for determining model stability. According to the figure, the parameters of Model I remained constant over time and exhibited no structural breaks. Therefore, the validity of Model I was confirmed, and no significant changes were detected in its parameters.

Figure 2. Model I CUSUM and CUSUM Square Test Results



Source: Prepared by the authors.

3.1.2. Regression Results- Model II.

In the second model, SDG Index Score was used as the dependent variable and SDG sub-objectives were defined as independent variables. In the model, SDG was the dependent variable, G1,G2,...,G16 were independent variables, β_0 was the constant term, $\beta_1, \beta_2, \dots, \beta_{16}$ were the coefficients of the independent variables, ϵ_i was the error term, i was the number of observations. The mathematical representation of the model was as follows:

$$SDG_i = \beta_0 + \beta_1 G1_i + \beta_2 G2_i + \beta_3 G3_i + \beta_4 G4_i + \beta_5 G5_i + \beta_6 G8_i + \beta_7 G9_i + \beta_8 G10_i + \beta_9 G11_i + \beta_{10} G16_i + \epsilon_i$$

According to the analysis, the explanatory power of the independent variable for the dependent variable was high, with an R value of 95% and an adjusted R² of 95%. The relationships in the model were statistically significant at the 1% level ($p < 0.000$). A one-unit increase in "End Poverty" (G1) was found to increase the SDG Index score by 0.089 unit; a one-unit increase in "End Hunger" (G2) was associated with a 0.094 unit increase in the SDG Index score; a one-unit increase in "Good Health and Well-being" (G3) resulted in a 0.1053 units rise in the SDG Index score; a one-unit increase in "Gender Equality" (G5) was linked to a 0.064 unit increase; a one-unit increase in "Decent Work and Economic Growth" (G8) corresponded to a 0.106 unit increase; a one-unit increase in "Reduced Inequality" (G10) was related to a 0.032 unit increase; and a one unit increase in "Peace, Justice, and Strong Institutions" (G16) led to a 0.096 unit increase in the SDG Index score. However, no significant relationships were found between the SDG Index score and the variables "Quality Education" (G4), "Industry, Innovation, and Infrastructure" (G9), and "Sustainable Cities and Communities" (G11). To evaluate the validity of the regression model, several diagnostic tests were conducted and the result were given in Table 4. The Durbin-Watson statistic (DW = 2.15) and the Breusch-Godfrey Serial Correlation LM test ($p = .3688$) indicated no presence of autocorrelation. Homoskedasticity was confirmed by the Breusch-Pagan-Godfrey ($p = .2476$), Harvey ($p = .1826$), Glejser ($p = .2818$), and White ($p = .1296$) tests, all of which yielded p-values above the .05 threshold. The ARCH test ($p = .2331$) further confirmed the absence of autoregressive conditional heteroskedasticity. In addition, the Jarque-Bera normality test ($p = .2496$) indicated that the residuals were normally distributed. Partial correlation coefficients ranged from .080 to .431, suggesting that multicollinearity was not a major issue. These findings collectively indicated that the regression model meet the classical linear regression assumptions and was statistically reliable.

Table 4. Model II Least Squares Test Results

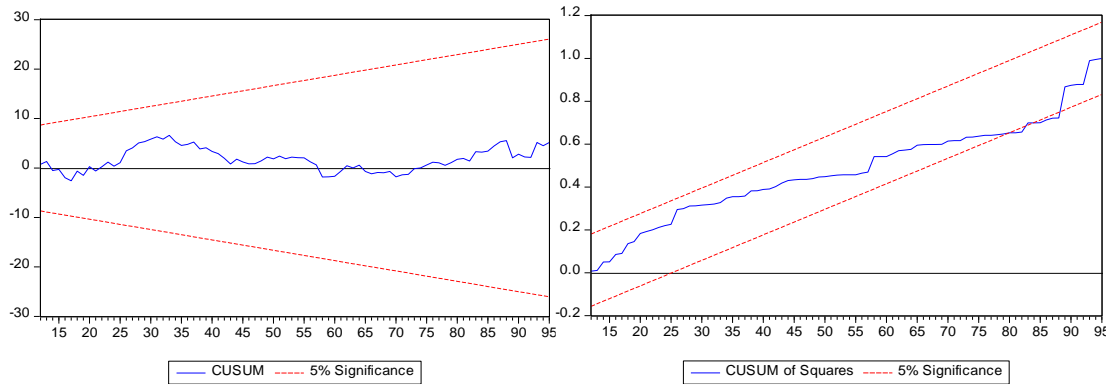
Dependent Variable	Independent Variable	Coefficient	Prob.	R ²	Adjusted R ²	F-Statistic	Prob (F-statistic)
SDG	G1	0.089433	0.0000*	0.95	0.95	195.8125	0.0000
	G2	0.094665	0.0043*				
	G3	0.105385	0.0099**				
	G4	0.036214	0.1032				
	G5	0.064458	0.0038*				
	G8	0.105759	0.0070**				
	G9	0.010107	0.6312				
	G10	0.032856	0.0039*				
	G11	0.050623	0.1056				
	G16	0.096227	0.0015*				
	C	21.49241	0.0000*				

Breusch-Godfrey Serial Correlation LM Test:0.3688; Breusch-Pagan-Godfrey: 0.2476; Harvey: 0.1826; Glejser: 0.2818; ARCH: 0.2331; White: 0.1296; Partial Correlation: 0.431-0.080; Durbin Watson: 2.15; JB Normality Test: 0.2496 * , **accepted at 1% and 5% level respectively

Source: Prepared by the authors.

In economic modeling, the CUSUM and CUSUM Square charts, which were used to assess whether a model operated with fixed parameters, served as effective tools for determining model stability. According to the figure, the parameters of Model II remained constant over time and exhibited no structural breaks. Therefore, the validity of Model II was confirmed, and no significant changes were detected in its parameters.

Figure 3. Model II CUSUM and CUSUM Square Test Results



Source: Prepared by the authors.

3.1.3. Regression results- Model III.

In the third model, Subjective Well-being was the dependent variable, while the SDG sub-goals were defined as independent variables. In this model, Subjective Well-being was the dependent variable, G_1, G_2, \dots, G_{16} were the independent variables, β_0 was the constant term, $\beta_1, \beta_2, \dots, \beta_{16}$ were the coefficients of the independent variables, ϵ_i denoted the error term, and i denoted the number of observations. The mathematical representation of the model was as follows:

$$SWB_i = \beta_0 + \beta_1 G_{1i} + \beta_2 G_{2i} + \beta_3 G_{3i} + \beta_4 G_{4i} + \beta_5 G_{5i} + \beta_6 G_{8i} + \beta_7 G_{9i} + \beta_8 G_{10i} + \beta_9 G_{11i} + \beta_{10} G_{16i} + \epsilon_i$$

According to the test results, the explanatory power of the independent variable in the dependent variable was $R = 76\%$, and the adjusted $R^2 = 73\%$, indicating a good level. The relationships between the variables and the established model were statistically significant at the 1% level ($p < 0.000$). A one-unit increase in G_2 , related to "End Hunger," decreased the SWB by 0.016 units. A one-unit increase in G_4 , related to "Quality Education," decreased the SWB by 0.014 units, while a one-unit increase in G_3 , related to "Good Health and Well-Being," increased the SWB by 0.0195 units. Similarly, a one-unit increase in G_5 , related to "Gender Equality," increased the SWB by 0.0243 units, and a one-unit increase in G_8 , related to "Decent Work and Economic Growth," increased the SWB by 0.0286 units. However, no significant relationships were found between the SWB and the variables G_1 ("No Poverty"), G_9 ("Industry, Innovation, and Infrastructure"), G_{10} ("Reduced Inequality"), G_{11} ("Sustainable Cities and Communities"), and G_{16} ("Peace, Justice, and Strong Institutions"). In Table 5 the regression model was evaluated using several diagnostic tests. The Durbin-Watson statistic (1.91) and the Breusch-Godfrey LM test ($p = .1906$) indicated no autocorrelation. Homoskedasticity was confirmed by the Breusch-Pagan-Godfrey ($p = .5169$), Harvey ($p = .7326$), Glejser ($p = .4186$), and White ($p = .5174$) tests. The ARCH test ($p = .1774$) showed no conditional heteroskedasticity. Residuals were normally distributed according to the Jarque-Bera test ($p = .2970$). Partial correlations (.628–.680) suggested no multicollinearity issues. Overall, the model satisfied the key assumptions of regression analysis and demonstrated statistical significance at the 1% level.

Table 5. Model III Least Squares Test Results

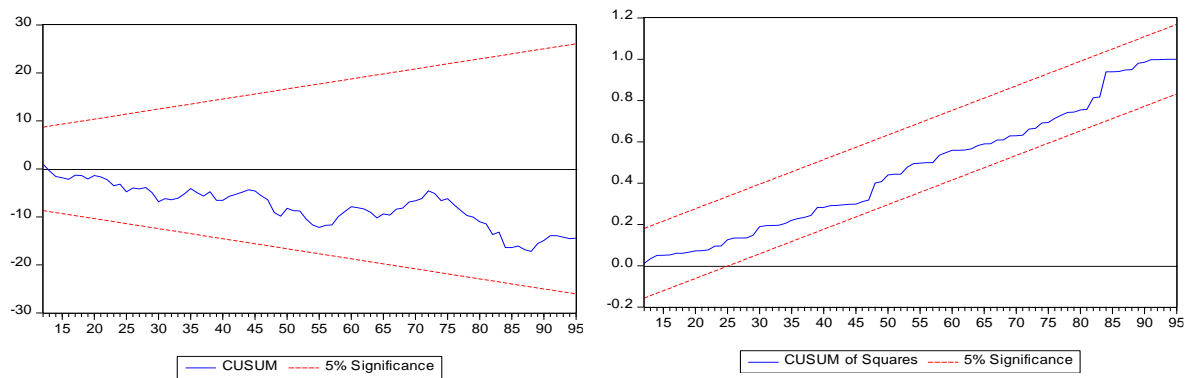
Dependent Variable	Independent Variable	Coefficient	Prob.	R ²	Adjusted R ²	F-Statistic	Prob(F-statistic)
SWB	G1	0.005804	0.2242	0.76	0.73	27.61340	0.0000
	G2	-0.015903	0.0627***				
	G3	0.019524	0.0646***				
	G4	-0.014083	0.0163**				
	G5	0.024271	0.0000*				
	G8	0.028602	0.0053**				
	G9	0.001302	0.8128				
	G10	0.001320	0.6491				
	G11	0.006576	0.4183				
	G16	0.001839	0.8107				
	C	1.425676	0.0168**				

Breusch-Godfrey Serial Correlation LM Test:0.1906; Breusch-Pagan-Godfrey: 0.5169; Harvey: 0.7326; Glejser: 0.4186; ARCH: 0.1774; White: 0.5174; Partial Correlation:0.680-0.628; Durbin Watson: 1.91; JB Normality Test: 0.2970 *, **, *** accepted at %1, %5, %10 level respectively.

Source: Prepared by the authors.

In economic modeling, the CUSUM and CUSUM Square charts, which were used to assess whether a model operated with fixed parameters, served as effective tools for determining model stability. According to the figure, the parameters of Model III remained constant over time and exhibited no structural breaks. Therefore, the validity of Model III was confirmed, and no significant changes were detected in its parameters.

Figure 4: Model III CUSUM and CUSUM Square Test Results



Source: Prepared by the authors.

IV. DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This research aimed to examine the relationship between the Sustainable Development Goals and individuals' subjective well-being. The study summarized the results obtained using three regression models to analyze the effects of various SDG targets on SWB. Table 6 presented the summary results of these models, showing whether each SDG target had a positive (↑), negative (↓), or no significant effect (-) on subjective well-being. While the study provided a detailed exploration of the potential impacts of each goal on subjective well-being, it also revealed how these interactions shaped broader development perspectives.

Table 6. Summary Table of Subjective Well-Being and SDG Analysis

SDG Goals	One Unit Increase	Subjective Well-being	SDG
G1- End Poverty	↑	-	↑
G2- End Hunger	↑	↓	↑
G3- Good Health and Well-being	↑	↑	↑
G4- Quality Education	↑	↓	-
G5- Gender Equality	↑	↑	↑
G8- Decent Work and Economic Growth	↑	↑	↑
G9- Industry, Innovation and Infrastructure	↑	-	-
G10- Reduced Inequalities	↑	-	↑
G11- Sustainable Cities and Communities	↑	-	-
G16- Peace, Justice, and Strong Institutions	↑	-	↑

↑: Positive impact ↓: Negative impact, - : No significant effect.

Source: Prepared by the authors.

G1-End Poverty: Reducing poverty contributes positively to the SDG Index Score by improving access to essential resources and financial stability, both of which play a key role in people's overall well-being. Studies show that increases in income can enhance life satisfaction, particularly when they allow basic needs to be met (Diener et al., 1993; Deaton, 2003; Diener and Seligman, 2004; Salahodjaev and Mirziyoyeva, 2021; Chegere 2024).

G2 - End Hunger: Progress in fighting hunger might unexpectedly negatively affect individuals' subjective well-being. This phenomenon may be linked to the "paradox of well-being," where increased awareness leads individuals to desire higher living standards (Easterlin, 1974). However, ending hunger directly increased the SDG Index Score because food security is central to SDG.

G3 - Good Health and Well-being: A healthy life enhances individuals' overall satisfaction and quality of life (Ngamaba et al., 2017; Tran et al., 2017). Access to healthcare and an extended life expectancy have significant effects on happiness and achieving health-related goals creates a strong positive impact on the SDG Index (WHO, 2001; Deaton, 2003).

G4 - Quality Education: Increased education levels may raise individuals' expectations of life and increase dissatisfaction with their current circumstances. This effect is attributed to the elevated standards held by more educated people (Clark and Oswald, 1996).

G5 – Gender Equality: Research indicates that empowering women and ensuring their equal participation in education work and decision-making processes positively influence subjective well-being and overall development (Acar, 1994; Acar, 2012; Duflo, 2012; Glick and Fiske, 2001). Therefore, gender equality remains a key element of sustainable development and an important contributor to life satisfaction at both individual and societal levels.

G8 – Decent Work and Economic Growth: Economic security is a key factor in subjective well-being, affecting both personal stability and social engagement. Access to stable jobs and sufficient income has been shown to boost self-confidence, foster social inclusion, and enhance overall life satisfaction (Acar, 1994; Karavdic and Baumann, 2014; Appau et al., 2019; Wirajing et al., 2023). From a policy standpoint, promoting decent work and sustained economic growth supports higher national SDG Index scores, emphasizing the importance of inclusive economic development for well-being.

G10 – Reduced Inequalities: Addressing inequalities can enhance individuals’ subjective well-being, though the impact depends on personal experiences and the societal environment (Ngamaba et al., 2018; Helliwell et al., 2020). Providing equitable access to income and opportunities is essential for sustainable development and serves as an important measure of SDG progress. Reducing disparities helps strengthen social cohesion and fosters a more inclusive sense of well-being across diverse population groups.

G16 - Peace, Justice, and Strong Institutions: The impact of strong institutions on subjective well-being may be limited when they do not directly affect daily life. However, increased stability and security can lead to indirect positive effects (Helliwell et al., 2019). Moreover, strong institutions are crucial for the long-term success of the SDG targets (Galtung, 1996; Sen, 1999; Collier et al., 2003).

The empirical evidence generated by this study showed that progress toward several Sustainable Development Goals exerted statistically significant—and substantively meaningful—effects on subjective well-being. In particular, advances in Good Health and Well-being (G3), Gender Equality (G5) and Decent Work and Economic Growth (G8) were positively and strongly associated with both individuals’ SWB and countries’ overall SDG Index values, underscoring the centrality of health, gender parity and inclusive growth to human flourishing.

While progress on End Hunger (G2) and Quality Education (G4) boosts a country’s aggregate SDG Index score, our panel estimates revealed a countervailing, short-run decline in SWB (Table 5). Viewed through Maslow’s hierarchy of needs (Maslow, 1943), the paradox surrounding End Hunger (G2) and Quality Education (G4) can be interpreted as a stage shift in motivational priorities. Once populations move beyond the physiological and safety tiers—thanks to improved food security and educational attainment—they turn their attention to higher-order needs such as belonging, esteem, and self-actualisation. These aspirations encompass dietary diversity, sustainable food systems, fair income distribution, and meaningful career prospects, demands that social and economic institutions cannot satisfy instantaneously. As a country’s SDG Index improves, our panel data analysis indicates a short-term reduction in subjective well-being. This phenomenon, known as the Tocqueville effect, occurs when noticeable improvements in living standards elevate public expectations faster than institutions or structures can adapt, temporarily lowering perceived life satisfaction (Davies, 1962).

Improvements in food security can raise people’s expectations for overall quality of life, leading to demands that cannot be immediately satisfied, which may cause a short-term decrease in subjective well-being (Kroll et al., 2019; Moallemi et al., 2022; Chegere, 2024). Once severe food insecurity is resolved, individuals tend to shift their focus from mere survival to pursuing a better and more fulfilling life. However, if social and economic systems fail to keep pace with these heightened expectations, a temporary decline in life satisfaction may occur (Clark et al., 2008; Chegere, 2024). A similar pattern is observed in the field of education, where increased access may lead to credential inflation and greater competition in the labor market, which can reduce perceived welfare despite actual progress. Rising educational attainment elevates individuals’ aspirations and their threshold for life satisfaction. When these heightened expectations are not matched by a society’s economic and structural conditions, feelings of relative deprivation can emerge. In particular, highly educated individuals who confront job insecurity, low wages, or recruitment practices that overlook merit may experience declines in life satisfaction and subjective well-being (Clark et al., 2008; Easterlin, 1995). The mismatch between the skills acquired through education and their social or economic returns can erode perceived social status, thereby amplifying dissatisfaction (Frey and Stutzer, 2002). This dynamic is especially pronounced in developing countries, where the rapid expansion of educational opportunities has not been matched by commensurate absorptive capacity in labour markets.

This study reveals that progress in certain SDGs may have unexpected and temporary adverse effects on SWB. In light of these findings, several policy recommendations are proposed. First, advances in G3, G5, and G8 should be reinforced, as the expansion of basic healthcare services, the empowerment of women, and inclusive labor market policies play a critical role in enhancing both SDG performance and SWB outcomes. On the other hand, progress in G2 and G4 can raise individual

expectations, which may cause temporary declines in satisfaction. To address this, food policies should emphasize not only food security but also increased dietary diversity and the development of sustainable food systems. Similarly, the expansion of education needs to be closely coordinated with labor market demands to ensure relevant employment opportunities. Any temporary declines in well-being should be addressed through targeted social protection programs. Moreover, subjective well-being metrics should be integrated into SDG monitoring, supported by systematic data collection to effectively assess policy impacts. Initiatives focusing on G10 (Reduced Inequalities) and G16 (Peace, Justice, and Strong Institutions) should emphasize fairness and transparency. Ensuring equitable income distribution, accountable governance, and inclusive decision-making is essential for improving public perceptions of welfare and promoting social progress.

This study has several limitations. International datasets may be limited in scope or accuracy, especially in developing countries, which can affect generalizability. The link between specific SDG targets and subjective well-being may vary across cultural and regional contexts. Since subjective well-being is based on personal perceptions, it may contain biases affecting reliability. The complex relationship between SDG progress and well-being, along with challenges in establishing causality, also poses limitations. Additionally, the data reflects a single point in time, and regression models are constrained by chosen parameters. Future research should use more comprehensive datasets and conduct cross-national comparisons to address these issues.

REFERENCES

- Acar, A. (1994). İşletmeler açısından özel işgören grubu olarak kadınlar. *İÜ İşletme Fakültesi Dergisi*, 23(1),123-136.
- Acar, A. (2012). *İktisadi faaliyetlerde kadınların üretici faaliyetlerinin "görünmezliği" sorunu*. In Journal of Social Policy Conferences No. 40195-202. Istanbul University.
- Alesina, A., Di Tella, R., & MacCulloch, R. (2004). Inequality and happiness: Are Europeans and Americans different? *Journal of Public Economics*, 88(9-10), 2009-2042.
- Appau, S., & Churchill, S.A., & Farrell, L. (2019). Social integration and subjective wellbeing. *Applied Economics*,51(16),1748-1761, doi:10.1080/00036846.2018.1528340
- Berg, M., & Veenhoven, R. (2010). *Income inequality and happiness in 119 nations: In search for an optimum that does not appear to exist*. In B. Greve (Eds.), *Social policy and happiness in Europe*. Cheltenham: Edward Elgar.
- Biancotti, C., & D'Alessio, G.,(2007). *Inequality and Happiness, ECINEQ WP 2007-75, Associazione Italiana per la Cultura della Cooperazione e del Non Profit*. Bank of Italy, Economic and Financial Statistics Department. available at SSRN: <https://ssrn.com/abstract=1011121> or <http://dx.doi.org/10.2139/ssrn.1011121>.
- Bjornskov, C., Dreher, A., & Fischer, J.A.V. (2008). Cross-country determinants of life satisfaction: Exploring different determinants across groups in society. *Social Choice and Welfare*, 30, 119–173. doi.org/10.1007/s00355-007-0225-4.
- Blanchflower, D.G., & Oswald, A.J. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics*, 88, 1359–1386. doi:10.1016/S0047-2727(02)00168-8.
- Chegere, M.J. (2024). *Exploring the Link Between Food Security and Subjective Well-Being using Tanzania High Frequency Phone Surveys*. World Bank Publication. <https://thedocs.worldbank.org/>

- Clark, A.E., & Oswald, A.J. (1996). Satisfaction and comparison income. *Journal of Public Economics*, 61(3), 359–381. doi.org/10.1016/0047-2727(95)01564-7.
- Clark, A. E., Frijters, P., & Shields, M. A. (2008). Relative income, happiness, and utility: An explanation for the Easterlin paradox and other puzzles. *Journal of Economic Literature*, 46(1), 95–144.
- Collier, P., Elliott, V.L., Hegre, H., Hoeffler, A., Reynal-Querol, M., & Sambanis, N.(2003). *Breaking the Conflict Trap: Civil War and Development Policy*. World Bank Publications-Books, The WBG. 13938.
- Davies, J.C. (1962). Toward a theory of revolution. *American Sociological Review*, 27(1), 5–19.
- Deaton, A. (2003). Health, inequality, and economic development. *Journal of Economic Literature*, 41, 113–158.
- Diener, E., Sandvik, E., Seidlitz, L., & Diener, M. (1993). The relationship between income and subjective well-being: Relative or absolute? *Social Indicators Research*, 28(3), 195–223. https://doi.org/10.1007/BF01079018.
- Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist*, 55(1), 34–43. doi.org/10.1037/0003-066X.55.1.34.
- Diener, E., & Seligman, M.E.P. (2004). Beyond money: toward an economy of well-being. *Psychological Science in the Public Interest*, 5(1), 1-31. doi.org/10.1111/j.0963-7214.2004.00501001.x
- Diener, E., Kesebir, P. & Lucas, R. (2008). Benefits of accounts of well-being for societies and for psychological science. *Applied Psychology: An International Review*, 57, 37-53.
- Duflo, E. (2012). Women empowerment and economic development. *Journal of Economic Literature*, 50(4), 1051-1079. doi:10.1257/jel.50.4.1051.
- Durak, N., & Alaca C. (2019). Fârâbî'de mutluluk tasavvuru ve eskatolojik boyutu, *Review of the Faculty of Divinity University of Süleyman Demirel*, 2(43), 5-23.
- Easterlin, R.A. (1974). *Does economic growth improve the human lot?* In P.A. David & M.W. Reder (Eds.), *Nations and households in economic growth: Essays in honor of Moses Abramovitz* (pp. 89–125). Academic Press.
- Easterlin, R.A. (1995). Will raising the incomes of all increase the happiness of all?, *Journal of Economic Behavior and Organization*, 27(1), 35–47.
- Frey, B. S., & Stutzer, A. (2002). What can economists learn from happiness research? *Journal of Economic Literature*, 40(2), 402–435.
- Galtung, J. (1996). *Peace by peaceful means: Peace and conflict, development and civilization*. International Peace Research Institute Oslo; Sage Publications, Inc.
- Glick, P., & Fiske, S.T. (2001). An ambivalent alliance: Hostile and benevolent sexism as complementary justifications for gender inequality. *American Psychologist*, 56(2), 109–118. doi.10.1037/0003-066X.56.2.109.
- Graafland, J., & Lous, B. (2019). Income inequality, life satisfaction inequality, and trust: a cross country panel analysis. *Journal of Happiness Studies*, 20(6), 1717-1737.

- Helliwell, J.F. (2003). How's life? Combining individual and national variables to explain subjective well-being 1166. *Economic Modelling*, 20 (2), 331–360. doi.org/10.1016/S0264-9993(02)00057-3.
- Helliwell, J. F., Layard, R., & Sachs, J. (2019). *World Happiness Report 2019*. Sustainable Development Solutions Network. <https://worldhappiness.report/ed/2019/>
- Helliwell, J.F., Layard, R., Sachs, J., & De Neve, J.E. (2020). *World Happiness Report 2020*. New York: Sustainable Development Solutions Network. Gallup World Poll.
- Helliwell, J.F., Layard, R., Sachs, J.D., De Neve, J.E., Aknin, L.B., & Wang, S. (Eds.). (2023). *World Happiness Report 2023*. New York: Sustainable Development Solutions Network. ISBN 978-1-7348080-5-6. <http://worldhappiness.report/>
- Kahneman, D., & Krueger, A.B. (2006). Developments in the measurement of subjective well-being. *Journal of Economic Perspectives*, 20 (1), 3–24. doi: 10.1257/089533006776526030.
- Karavdic, S., & Baumann, M. (2014) Positive career attitudes effect on happiness and life satisfaction by master students and graduates. *Open Journal of Social Sciences*, 2, 15-23. doi: 10.4236/jss.2014.28003.
- Kiraz, C. (2007). *Kuran'da Ahlak İlkeleri*. Emin Yayınları, İstanbul.
- Kroll, C., Warchold, A. & Pradhan, P. (2019). Sustainable development goals (SDGs): Are we successful in turning trade-offs into synergies? *Palgrave Commun.* 5, 140. | <https://doi.org/10.1057/s41599-019-0335-5>.
- Luttmer, E.F.P. (2005). Neighbors as negatives: Relative earnings and well-being. *The Quarterly Journal of Economics*, 120(3), 963–1002. <https://doi.org/10.1093/qje/120.3.963>.
- Maslow, A.H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370–396. <http://dx.doi.org/10.1037/h0054346>.
- Moallemi, E. A., Hosseini, S. H., Eker, S., Gao, L., Bertone, E., Szetey, K., & Bryan, B. A. (2022). Eight archetypes of Sustainable Development Goal (SDG) synergies and trade-offs. *Earth's Future*, 10, e2022EF002873. <https://doi.org/10.1029/2022EF002873>
- Neve, J.E.D. & Sachs J.D. (2020). The SDGs and human well-being: a global analysis of synergies, trade-offs, and regional differences. *Scientific Reports*, 10(1), 15113. doi:10.1038/s41598-020-71916-9.
- Ngamaba, K.H., Panagioti, M., Armitage, C.J. (2018). Income inequality and subjective well-being: a systematic review and meta-analysis. *Qual Life Res.* 27(3), 577-596. doi: 10.1007/s11136-017-1719-x.
- Ngamaba, K.H., Panagioti, M., Armitage, C.J. (2017). How strongly related are health status and subjective well-being? Systematic review and meta-analysis. *Eur J Public Health.* 1;27(5):879-885. doi: 10.1093/eurpub/ckx081. PMID: 28957478.
- Tran N.L.T., Wassmer, R.W. & Lascher, E.L. (2017). The health insurance and life satisfaction connection. *J. Happiness Stud.* 18, 409–426.
- Pradhan, P., Costa, L., Rybski, D., Lucht, W., Kropp, J.P. (2017). A systematic study of sustainable development goal (SDG) interactions. *Earth's Future*, 5, 1169–1179. <https://doi.org/10.1002/2017EF000632>.

Salahodjaev, R., & Mirziyoyeva, Z. (2021). The Link between food security and life satisfaction: Panel data analysis. *Sustainability*, 13(5), 2918. <https://doi.org/10.3390/su13052918>.

Sen, A. (1999). *Development as Freedom*. Oxford University Press.

Stevenson, B., & Wolfers, J. (2008). Economic growth and subjective well-being: reassessing the easterlin paradox. *Brookings Papers on Economic Activity*, (1), 1-102.

WHO.(2001).*Macroeconomics and Health: Investing in Health for Economic Development. Report of the Commission on Macroeconomics and Health*. Geneva. ISBN 92 4 154550 X (NLM class.: WA 30).

Wirajing, M.A.K., Nchofoung, T.N., & Nanfosso, R.T., (2023). Revisiting the inequality-well-being nexus: the case of developing countries, *Global Social Welfare*,doi.org/10.1007/s40609-023-00278-7

Veenhoven, R. (1997). The study of happiness: A bibliography. *Journal of Happiness Studies*,1(1),1-39.

Verme, P. (2011). Life satisfaction and income inequality. *Review of Income and Wealth*, 57(1), 111–137. <https://doi.org/10.1111/j.1475-4991.2010.00420>