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RESEARCH ARTICLE

Effects of Welfare Indicators on Economic Growth in Turkiye

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Abstract

Debates over economic growth generally focus on factor supply, especially capital accumulation, labor stock and skill, natural resources, and technological capacity. Quality of human life, as well as distribution of national income among citizens are evaluated in terms of their effects on growth performance, in this study. The relationship between economic growth, human development, and income distribution in Turkiye is analyzed with ARDL test using the data of 1990-2017 period. Findings indicate that the series are cointegrated. A long run relationship was determined between Gross Domestic Product per capita (GDP), and human development index (HDI) and the measure of income distribution, namely the Gini coefficient (GINI). Granger causality test indicates a unidirectional causality from HDI to GDP. Based on the long-run estimation results, it has been observed that there is a positive and statistically significant relationship between GDP and HDI, while there is a negative and statistically significant relationship between GDP and GINI, in the long-run.

Keywords: *Economic Growth, Human Development, Gini Coefficient, Turkish Economy.*
Jel Codes: *O11, O15, O47*

Refah Göstergelerinin Türkiye'de İktisadi Büyüme Üzerine Etkileri

Özet

İktisadi büyüme tartışmaları, genellikle faktör arzı ve özellikle sermaye birikimi ve teknolojik kapasiteye odaklanır. İnsan yaşam kalitesi ve milli gelirin vatandaşlar arasında dağılımı, bu çalışmada, büyüme performansına etkileri bakımından değerlendirilmektedir. Türkiye'de büyüme, insani gelişme ve gelir dağılımı arasındaki ilişki ARDL sınır testi yaklaşımı ve 1990- 2017 dönemi verileri ile analiz edilmektedir. Bulgular, seriler arasında eşbütünleşme ilişkisinin varlığını göstermektedir. Kişi başı GSYİH (GDP), İnsani Gelişme Endeksi (HDI) ve gelir dağılımı ölçütü (GINI) arasında uzun dönemli bir ilişki; Granger nedensellik testine göre, HDI'den GDP'ye doğru tek yönlü bir nedensellik tespit edilmiştir. Serilerin uzun dönem tahmin sonuçlarına göre, GDP ve HDI serileri arasında pozitif ve istatistiki olarak anlamlı; GDP ve GINI serileri arasında ise, negatif ve anlamlı bir ilişki olduğu görülmektedir.

Anahtar kelimeler: *İktisadi Büyüme, İnsani Gelişme, Gini Katsayısı, Türkiye Ekonomisi*
Jel Kodu: *O11, O15, O47*

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1. INTRODUCTION

Economic development includes structural change and socio-economic-political transformation accompanied by growth. In the studies on growth and development, especially capital accumulation, factor stock and the contribution of technological development come to the fore, while the factors considered in the human development index other than education and the effect of income distribution are neglected. Rather than economic growth, the concept of human development should be emphasized as the ultimate goal of economic activity. In this context, examining/determining the relationship between economic growth and human development will help policy makers establish development and poverty reduction strategies and ensure stable growth.

In the literature, there are few studies that analyze HDI, empirically, in terms of Turkiye. In these studies, Turkiye is generally evaluated within the analyzed group of countries. Some other studies focus more on the effects of HDI components on growth. These effects were mostly evaluated with causality analyses which did not distinguish between short and long term. In this study, which aimed to investigate the cointegration relations among GDP per capita, the Human Development Index (HDI) and the GINI distribution of income, the existence of a long-run relationship between Turkiye's 1990-2017 annual data and GDP, HDI and GINI was analyzed using the ARDL Bounds Test, and the short-term dynamics between the series were investigated. In accordance with this purpose, following the introduction, fundamental concepts, related literature, methodology and the model are presented; the ARDL test findings and the short and long-run analyses results related to the determination of a cointegration relationship among the variables are interpreted.

2. FUNDEMENTAL CONCEPTS

Economic growth follows the course of national income over time; It interacts with the factors of production categorized as labor, capital, natural resources and enterprise, and the technologies and dynamics that affect the productivity and contribution of these factors to elements of human development, such as education and health conditions. In this context, human development can be seen as loosening of the constraints based on the factors in question. Moreover, although human development represents a broader perspective, many of its elements coincide significantly with the more traditional concept of human capital. Therefore, to the extent that human development is necessarily associated with human capital and affects the economic growth of a country, human development is expected to have an impact on economic growth (Ranis, 2004).

The distribution of national income among factor owners or segments of society contributing to its formation has economic effects as well as sociological/political consequences such as sense of justice. While, on the one hand, income-related expenditure behavior forms the consumption/demand structure, on the other hand, it affects production, employment, sectoral development and therefore, investment preferences, total supply and growth performance. While the national income shares of factor owners are expressed with the concept of functional income distribution, the distribution of personal income reveals the share of equal segments of the population in national income and the inequality of income distribution is measured by the Lorenz Curve and Gini Coefficient, which are the most commonly used among different approaches. As the Gini Coefficient, which ranges between 0-1, gets closer to 0, it indicates that the income distribution is more equal.

In general, human development which includes common goals, measurement techniques and policies with economic growth (Chiappero-Martinetti et al., 2016: 224), is a concept based on a broad set of variables interpreted as the improvement which ensures individuals to live their choices in a longer, healthier and more qualified manner (Suri et al., 2011: 506). Unlike the concept of growth that focuses on national income size, the concept in question expanded the scope of the discussion including economic, social and political elements of life. Although income per individual is a key component of purchasing power and prosperity, indicators of human quality of life such as education,

health and life expectancy should also be taken into consideration. Empirical determination of the relationship between growth and human development index which meets this necessity is of particular importance.

3. LITERATURE REVIEW

In order to explain the relationship between economic growth and human development index, many studies have been conducted in which different econometric methods are applied and different countries, country groups and time intervals have been selected. It is seen that there are similarities between the empirical findings of these studies.

Ranis and Stewart (2002) analyzed the interaction of human development with growth in developing countries for the period 1960-2000. It was determined that human development led to economic growth while growth also contributed to human development, although not in a systematic way. Boozer et al. (2003) examined the relationship between human development and growth with data from 107 developing countries for the period 1960-2001, and found a positive and two-way relationship between economic growth and human development.

Shome and Tondon (2010) analyzed the relationship between human development index and growth in the ASEAN countries for the period 2000-2009; they found that human development and growth did not act together. Sharifi-Renanivd (2012) analyzed the relationship between human development and economic growth in the 1980-2010 period with the data of MENA countries to find that human development had a positive effect on growth. Ng'habi (2012) analyzed the relationship between economic growth and human development using multiple regression models with data from 40 countries in 2001; and determined that there was a positive and significant relationship between growth and human development.

Mustafa et al. (2017) analyzed the three-way relationship between economic growth, human development and openness to trade in 12 Asian countries for the 1970-2011 period; it was concluded that growth, human development and openness were positively and significantly correlated with each other. Koçak and Uçan (2018) analyzed the relationship between the human development index and rate of growth using the data of Turkiye and selected countries with high human development index (Germany, USA, Norway and Italy) covering the period 1990-2015 with panel data analysis. According to the findings of the study, there is a significant relationship between human development and economic growth.

Erdem and Çelik (2019) analyzed the relationship between human development and growth by using the data of 33 countries in the African continent for the period 1995-2017 with the panel ARDL method. According to the findings of the analysis, a positive and significant relationship was found between human development and national income variable. Balcı and Özcan (2019) analyzed the relationship between human development and economic growth using the data of OIC countries regarding the period 2005-2017 with panel data method; it was concluded that there was a significant relationship between these variables.

Roshaniza and Selvaratnam (2015) analyzed the relationship between human development index, growth and poverty rate in Malaysia for the period 1990-2012. According to the findings of the analysis, a negative relationship was found between human development index and growth while a positive relationship was found between poverty rate and growth in the long term.

With the data on Turkiye regarding the period 1981-2013, Şahin and Gökdemir (2016) investigated the short and long term dynamics that constitute the Human Development Index by using the variables of life expectancy, per capita GDP, enrollment rate in primary, secondary and tertiary education with the ARDL Bounds Test. The findings of the study show that the rate of enrollment in higher education and GDP positively affect life expectancy. Rivera (2017) investigated the

relationship between human development, economic growth and tourism for Ecuador; according to the findings of the analysis, it was concluded that tourism did not encourage human development; there was a positive and significant correlation between human development and growth, and that there was a one-way causality from growth to tourism.

Wang et al. (2018) analyzes the relationship between renewable energy, human development index and economic growth in Pakistan by using the 1990-2014 data and the Least Squares method. Drawing on the findings of the analysis, it was stated that growth had a negative effect while CO_2 emission had a positive effect on human development index.

4. MODEL AND DATA SET

The model which was created for the purpose of this study is given in Equation-1 in the form of linear estimation equation; the variables used and the data sources are shown in Table-1. The variables in Equation -1 were analyzed by taking their logarithm.

$$\ln GDP=\beta_0+\beta_1 \ln HDI+\beta_2 \ln GINI+\varepsilon_i \quad (1)$$

Table 1: Variables and Data Source

Variable name	Period	Source
GDP Per Capita (GDP)	1990-2017	World Development Indıcators (WDI)
Human Development Index (HDI)	1990-2017	World Development Indıcators (WDI)
Income Distribution Index (GINI)	1990-2017	The Standardized World Income Inequality Database(SWIID)

5. ECONEMETRIC METHOD

Cointegration tests are used to examine the long-term relationship between the series. Unlike other tests, the ARDL cointegration test does not require pretests for unit roots. As a result, the ARDL cointegration test allows analysis with variables consisting of I (0), I (1) or a mixture of both (Pesaran et al., 2001).

ARDL bounds test also enables the determination of short and long run coefficients. The unrestricted error correction model is shown in Equation-2.

$$\ln GDP = \alpha_0 + \sum_{i=1}^{m} \beta_{1i} \Delta \ln GDP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta \ln HDI_{t-1} + \sum_{i=0}^{p} \beta_{3i} \Delta \ln GINI_{t-i} + \delta_1 \ln GDP_{t-1} + \delta_2 \ln HDI_{t-1} + \delta_3 \ln GINI_{t-1} + \varepsilon_i \quad (2)$$

Here, the $\alpha, \Delta, \varepsilon_i$ represents the constant term, difference operator and error term. After estimating the regression equation in Equation-2, the long run relationship of the variables is detected through the F-statistic (Wald test) values (Nkoro and Uko, 2016). The hypothesis of the test is:

H_0: There is no cointegration relationship.

H_1: There is a cointegration relationship.

The calculated F statistic is compared with levels of significance derived asymptotically by Pesaran et al. (2001). If the calculated F statistic falls below the lower limit, then the H_0 hypothesis will not be rejected and it will be concluded that there is no cointegration. If the F-statistic exceeds the upper

limit, the H_0 hypothesis will be rejected and a cointegration relationship between the variables will be detected. Finally, if the F-statistic falls between lower and upper bounds, then the test is inconclusive. If a long-run relationship is detected between the variables, the next step is the estimation of long-run coefficients.

Equation-3 shows the ARDL model for estimating long-run coefficients among variables.

$$\ln GDP = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \ln GDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \ln HDI_{t-1} + \sum_{i=0}^{p} \alpha_{3i} \ln GINI_{t-1} + \varepsilon_i \quad (3)$$

After estimating the long-run coefficients among the variables, the diagnostic test results are also checked for the suitability of the model and a conclusion is reached regarding its suitability. When the relationship among the variables is examined, the ARDL bounds test is as in Equation-4:

$$\Delta \ln GDP = \alpha_0 + \sum_{i=1}^{m} \lambda_{1i} \Delta \ln GDP_{t-i} + \sum_{i=0}^{n} \lambda_{2i} \Delta \ln HDI_{t-i} + \sum_{i=0}^{P} \lambda_{3i} \Delta \ln GINI_{t-i} + \lambda_5 ECM_{t-1} + \varepsilon_i \quad (4)$$

In Equation-4, ECMt-1 refers to the error correction term. It is important that this coefficient is found to be negative and significant since it shows the ability of the system to return to long-term equilibrium after a short-term shock (Guan, et al., 2015).

6. ANALYSIS AND EMPIRICAL FINDINGS

6.1. Unit Root Tests

The ARDL test allows the series to have different stationarity levels; I (0) and I (1) (Pesaran et al., 2001). Before detecting the cointegration relationship, it is necessary to determine the stationarity degree of the variables. In this study, the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were used for this purpose. Table-2 shows the unit root test findings.

Table 2: ADF and PP Unit Root Test Results.

Variables		ADF		PP	
		Constant/ Fixed	**Constant/ Fixed+Trend)**	**Constant/ Fixed**	**Constant/ Fixed+Trend)**
LNGDP	Level	0.45	-2.19	0.54	-2.23
	First difference	-5.30*	-4.31*	-5.30*	-5.34*
LNHDI	Level	-3.38**	-3.57**	-3.38**	-3.57**
	First difference	-6.47*	-6.32*	-8.57*	-8,32*
LNGINI	Level	-0,01	-3.53**	0.141	-2.10
	First difference	-2.63***	-2.73	-2.68***	-2.82

Notes: Constant/Fixed**;** Critical values from MacKinnon (1996) are –-3.49, –-2.88 and 2.58at the 1%, 5% and 10% levels, respectively. Constant/Fixed+Trend;Critical values from MacKinnon are –4.04, –-3.45 and –-3.15 at the 1%, 5% and 10% levels, respectively.
*, ** ,*** statistical significance at 1%, %5 and 10% respectively

In Table-2, it is observed that the HDI series is stationary at level according to ADF and PP tests, and that the GDP and HDI series become stationary when the first difference is takesn.

The first step of the ARDL model is to determine the optimal lag length. Table-3 shows several criteria for determining the lag length.

Table 3: Determining the Optimal Lag Length

Lag Length	LR	FPE	AIC	SIC	HQ
0	NA	1.58e-08	-9.44	-9.302	-9.410
1	106.88*	1.61e-10	-14.04	-13.455*	-13.887
2	15.12	1.46e-10*	-14.18*	-13.152	-13.910*
3	5.95	2.260e-10	-13.85	-12.385	-13.467
4	6.37	3.37e-10	-13.68	-11.773	-13.179

Note: *Indicates the lag length selected by the criterion.

According to the findings in Table -3, the optimum lag length is selected as 2 among a maximum of 4 delays.

6.2.ARDL Bounds Test Results

If the calculated F statistic value of the series is greater than the lower I (0) and the upper I (1) limits, a cointegration relationship can be detected. According to the ARDL bounds test findings given in Table-4, the H_0 hypothesis was rejected as the F statistical value (5.613) calculated at 1% significance levelexceeded the upper limit value (5); therefore, it was concluded that there was a cointegration relationship among the series. In this case, there is a long-run relationship among GDP, HDI and GINI.

Table 4: ARDL Bounds Test Results

Model:LNGDP f (LNHDI, LNGINI)		
F-statistic	5.613 (0.000)	
Critical value for bounds test	I (0)	I (1)
%1	4.13	5
%5	3.1	3.87
%10	2.63	3.35
Statistics and diagnostics		
R^2	0.975	
Adj.R^2	0.970	

F-statistic	217.46 (0.000)
Breusch-Godfrey LM	0.287 (0.752)
Jarque-Bera Normality	1.218 (0.35)
RamseyReset	76.54 (0.000)

According to Table-5, the long-run estimation coefficients of HDI and GINI series are 1,200 and -6,570, respectively, and are statistically significant. There is a positive correlation between the GDP series and the HDI series, and a negative correlation between GDP and GINI. A 1% increase in GDP results in a 1.2% increase in GDP, while a 1% increase in GINI results in a 6.57% decrease in GDP.

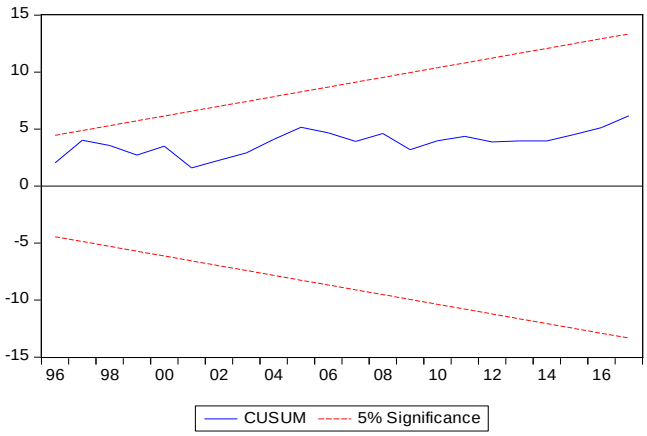
Table 5: ARDL The Prediction Model Estimates

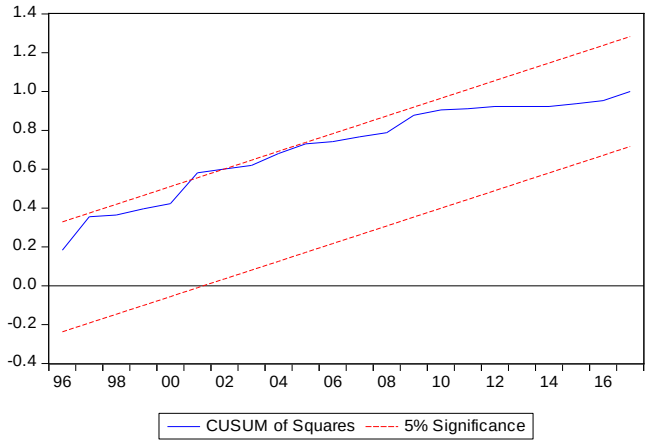
Dependent variable: LNGDP			
Variables	**Coefficient**	**t-statistic**	**Prob.**
D(LNHDI)	0.411	3.233	(0.038)
D(LNGINI)	-1.785	-1.129	(0.270)
CointEq(-1)	-0.486	-4.073	(0.005)
ARDL long-run results.			
LNHDI	1.200	2.930	(0.0078)***
LNGINI	-6.570	-11.56	(0.000)*

Note:*, ***, denote significance at 1% and 10%.

CUSUM and CUSUMSQ (Brown, et. Al., 1975; Bahmani, Oskooee, and Bohl, 2000) graphs (Graph-1) were used to control the stability of the ARDL model, estimation of long-term coefficients, and short-run dynamics of the variables. In Graph-1, it is seen that both CUSUM and CUSUMSQ statistics stay within the critical bounds of 5% significance level to confirm the stability of the variables. In other words, when the CUSUM and CUSUMSQ graphs are examined, it is observed that there is no structural break in the variables and the regression coefficients are found to be stable.

Graph 1: Cumulative Sum (CUSUM) and Cumulative Sum of Square (CUSUMSQ)





In order to investigate the short-run dynamics between the series, the ARDL Error Correction Model was estimated. According to the the findings presented in Table-6, a significant and positive correlation was found with GINI, while an insignificant correlation was detected with HDI. The coefficient of the HDI variable was estimated to be 0.228. In other words, a 1% increase in HDI results in a 0.22% increase in GDP.

Table 6: ECM The Prediction Model Estimates.

Variable	**Coefficient**	**t-Statistic**
D(LNGINI)	-0.569326	-3.302(0.765)
D(LNHDI)	0.228821	1.982(0.0595)**
Constant	0.025485	2.582(0.0167)**
$ECM_{(t-1)}$	-0.593911	-3.194(0.0040)
R^2(0.620)**Adj.R^2** (0.532)**F-statistic**4.351(0.014)		

Note: **, denote significance at 5%.

The $ECM_{(t-1)}$ coefficient is -0.593 which is negative and statistically significant at 5% level. Accordingly, 59% of short-term deviations are eliminated in the following period and long-run balance is reached quickly.

7. GRANGER CAUSALITY TEST RESULTS

According to the Granger causality test findings in Table 7, the hypothesis that "HDI has no effect on GDP" is rejected at a significance level of 10%. A one-way causality relationship from HDI to GDP has been detected; that is, the HDI affects GDP. A causality relationship could not be detected among the other variables.

Table 7: Granger Causality Test Results

Dependent variable GDP		
	χ2	**Prob.**
HDI	5.821508	0.0544
GINI	11.06434	0.0040
Dependent variable HDI		
	χ2	**Prob.**
GDP	0.058264	0.9713
GINI	2.262188	0.3227
Dependent variable GINI		
	χ2	**Prob.**
GDP	1.292967	0.5239
HDI	0.714431	0.6996

8. CONCLUSION

Main purpose of this study was to investigate the short and long-run relationships among GDP per capita, Human Development Index (HDI) and GINI coefficient, ie distribution of income using the ARDL Bounds Test. According to the results of the analysis, based on the annual data for the period of 1990-2017, there is a long-run relationship among GDP, HDI and GINI. A negative and significant long-run correlation was detected between GDP and GINI while a positive and significant long-run correlation was observed between GDP and HDI.

With the analysis of the error correction model, a positive and significant correlation was observed between GDP and HDI series in parallel with long-run coefficients. In contrast to the long-run coefficients, no significant correlation was found between GINI and GDP series for the short run. The estimation value of the error correction coefficient is -0.593 and it is determined that short-term shocks are eliminated in the long-run by 0.59% each year.

Although, a bidirectional causality may theoretically be expected, Granger causality test indicates a unidirectional causality from HDI to GDP. In particular cases, the composition of GDP has to be considered, in order to reveal possible reasons of this outcome. In other words, education, and health related results of GDP changes determines the contribution of GDP on HDI.From this point of view, a policy recommendation, addressing the necessity to improve the country's conditions regarding human development elements, suchas health and education, in terms of supporting a stable and sustainable growth process is worth sharing.

Unlike existing literature, this study, including GINI to the model, contributed to theliterature by determining the relationship between economic growth, human development and income distribution. Empirical results obtained are similar to those of Conceicao, et al. (2009), Maqinand Sidharta (2017), Grubaugh (2015), Erdem and Çelik (2019), and Rivera (2017).

Making use of findings we conclude that improvement in the human development index and a more equitable distribution of income support the growth performance of a country, that is to say, lead to higher growth rates. Policy makers will provide the necessary conditions for higher growth rate by

improving quality of life, and ensuring more equitable sharing of national income rather than focusing on growth rates based on quantitative assessment. More specifically, the inclusiveness of growth, as well as expenditures on education, health care, etc. and social approaches that will affect human development, and the fair distribution of income will also support growth performance.

Regarding the design and implementation of succesful policies on economic growth, it is crucial to adopt a comprehensive approach focusing not only to increase income per capita but also taking a more equitable distribution of income, access to education and health services, and improvement of life expectancy/quality, etc. into consideration.

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