The Role Of Fiscal Policies On Human Development : An Empirical Approach

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ÖZET━━━

Hükümetlerin öncelikli amaçlarından birisi ekonomik büyüme ile beraber insani gelişimi sürekli kılabilmektir. Bu çerçevede çalışmanın amacı vergilerin, kamu harcamalarının, gelirin ve altyapının (elektrik tüketimi) insani gelişimi üzerindeki etkisini 1998-2007 dönemlerinde 14 OECD ülkesi için ampirik olarak sınamaktır. Çalışmada panel birim kök, panel eşbütünleşme, panel FMOLS, panel DOLS ve panel vektör hata düzeltmeye dayalı nedensellik yöntemleri kullanılmıştır. Panel FMOLS sonuçlarına göre, insani gelişim üzerinde vergilerin negatif, kamu harcamaları ve gelirin pozitif etkisi vardır. Elektrik tüketiminin katsayısı istatistiki olarak anlamlı değildir. Panel DOLS sonuçlarına göre, kamu harcamalarının ve elektrik tüketiminin insani gelişim üzerindeki etkisi pozitifken, vergiler ve gelirin katsayısı istatistiki olarak anlamlı değildir. Nedensellik test sonuçlarına göre; uzun dönemde vergiler, kamu harcamaları, elektrik tüketimi ve gelirden insani gelişime doğru ve insani gelişme, vergiler, kamu harcamaları ve elektrik tüketiminden gelire doğru nedensellik ilişkisi elde edilmiştir. Çalışmanın sonuç kısmında insani gelişim düzeyi yüksek ülkelerde uygulanan kamu politikaları değerlendirilmiş ve çeşitli politika önerilerinde bulunulmuştur.

__Anahtar Kelimeler:__ İnsani Gelişme İndeksi, Maliye Politikaları, Panel FMOLs, Panel DOLS.

__JEL Sınıflaması:__ E62, H2, O15

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ABSTRACT━━━

One of the primary purposes of governments is to sustain human development and economic growth. In this context, the goal of the study is to test the impact of taxes, government expenditures, income and infrastructure (electricity consumption) on the human development empirically in the period of 1998-2007 for 14 OECD countries. Panel unit root, panel cointegration, panel FMOLS, panel DOLS and panel vector error correction based causality methods have been used in the study. According to panel FMOLS results, while taxes have a negative impact on human development, government expenditures and income have a positive impact on it. The coefficient of the electricity consumption is not statistically significant. We also find that government expenditures and electricity consumption have a positive effect on human development according to panel DOLS results, however the coefficients of income and taxes are not statistically significant. Causality test results show that in the long term, there are causality relationships from taxes, government expenditures, electricity consumption and income to human development and from taxes, government expenditures, human development and electricity consumption to income. As a result of these findings we evaluate the government policies that have been implemented in countries that have high human development level and make some policy suggestions in the conclusion section.

__Key Words:__ Human Development Index, Fiscal Policies, Panel FMOLs, Panel DOLS.

__Jel Classification:__ E62, H2, O15

I. Introduction

One of the basic subjects of economics is economic growth. Today, the main objective of all countries, irrespective of their level of development, is steady growth. Because, growth increases income level and the level of welfare as well. Only referring to the economic growth of a country is not an appropriate evaluation to accept the country as developed or less developed. Economically, many countries, that show efficient economic growth performances, have problems which have not been solved yet. For example, according to the data[**] during 1992-2012, China showed 10.3 % growth performance on average. Although it is an impressive performance, China's gini coefficient was 0.426 in 2002, and in 2009, it decreased to 0.421. According to these data, income inequality in China is continuing. Therefore, for the assessment of welfare for countries, we need more convenient indicators except economic growth and income. In accordance with these requirements, United Nations pressed the Development Programme in 1990. This report was prepared under the leadership of Pakistani economist Mahbub Ul Haq, it drew public's attention to the importance of human life quality and emphasized that in the center of development programmes, human should be taken into consideration instead of income. Because, according to Haq, high income does not mean to get rid of poverty and high life quality. Human-centered development policy which takes into account of the life quality of the bottom layer of society together with income policies should be applied (Mahbub Ul Haq, 1995). In this context, the first human development report that was published in 1990 focused on not only income but also on education and health. According to this report, human development is briefly a long, healthy and qualified life for people. Ensuring this will increase the welfare, the level of education, and health of individuals, thus individuals will make more rational decisions and choices. In other words, human development is an optimization. Development literature led its ultimate goal to human due to this report. According to Sen (2007), human development is the most widely accepted measure of welfare. In addition, human development contributes to sustainable growth by increasing individuals' abilities and productivity of works. According to Sen and Anand (1994), to have income and goods is not enough for people since income and goods are just tools and do not reveal the life expectations of individuals. For this reason, income is not a measure of standards of living per se. According to Fergany (2003), human development is the development of society and its all institutions. To ensure development, not only economic conditions but also social conditions should be developed.

An important point about the need to focus on human development is the role of the government. In terms of human development, sanitation, health care, fresh water usage, elementary education, adequate shelter, and clean environment are the ultimate goals of governments (Suescun, 2007). For a comprehensive level

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[**] The data was collected from World Bank.

of welfare, public goods and services are evaluated as an obligation. As a result of these services, in the long term, it is remarked economic yields together with human development will be obtained. According to Doryan (2001), if governments provide better education and health services for their citizens, human capital accumulation will increase, and this will affect the economy in a positive way in the long term. Gupta et al. (1998) mentioned that government spending on education and health sectors could bring positive effects on human capital, and this would cause an economy to grow and poverty to be reduced. Lucas and Romer (1988) and Romer (1990) stated that high levels of human capital would accelerate the technological advancement and economic development by making the labor force more innovative.

Keynesian economics imposes important functions to governments for economic growth and development. It is stated that without an active role of the government, no countries can achieve economic growth and development. Especially for a good long-term growth performance, government expenditures on education and health improve human capital. In addition, government expenditures cause accumulation of physical capital, and infrastructure expenditures cause positive externalities. Within the framework of this evaluation, it is understood that government policies, especially fiscal policies, do not only focus on creating revenue streams. Governments should provide all kinds of opportunities for citizens for contributing to production. It is required for governments to use tools such as government spending and taxation in this direction. However, in practice, the use of these policies varies according to development levels of countries.

In this context, the main goal of this paper is to test the impact of fiscal policy on human development empirically. For this purpose, we dealt with 14 OECD countries by utilizing annual data for the period 1998-2007. In the second part of the paper, the method of calculation of the human development index will be examined, and in the following part, the literature will be presented. In the fourth part, model and data set will be given, and in the fifth part, method and findings will be propounded. Finally, there will be a conclusion part.

II. Calculating Human Development Index

Although making quantitative measurements seems to be difficult for human development and social welfare, it is fundamentally based on United Nations Human Development Report (HDR). In this report, human development index is calculated by measuring various social indicators for each country. Indicators related to education, health, and income that are measured in various units are converted subunits in the range of 0-1. For this conversion, minimum and maximum values of each indicator are calculated (UNDP, 2010: 216). Afterwards, human development index is calculated by employing subunits that are obtained. Though the data of human development index has not been changed since 1990, United Nations has changed some indicators related to income, health, and education. These changes are shown in Table 1.

Table 1: Changes in Indicators of Human Development Index

Periods	Parameters	Indicators Used In The Calculation
1990-2009	Health	Life expectancy at birth
	Education	Adult Literacy Rate
		Gross Enrollment Ratio
	Income	PPP Adjusted GDP
2010-2012	Health	Life expectancy at birth (year)
	Education	Expected Years of Schooling
		Mean Years of Schooling
	Income	GDP Per Capita

Source: UNDP, Human Developments Reports 2013.

While one is calculating human development index (HDI), these indexes are used: i) life expectancy at birth index (LEBI); ii) Education index (EI). This index is divided into two indexes: expected years of schooling index (EYSI) and mean years of schooling index (MYSI). iii) Income index (II). Before 2010, human development index was calculated by these sub-indices using arithmetic mean of them. After 2010, this calculation method changed with geometrical mean of three sub-indices. The following equations show how to calculate the human development index:

The first equation shows that how to calculate each of sub-indices (dimension index). The values obtained in this manner are between 0 and 1. Maximum values are the highest values observed during the period 1980-2011, and minimum values represent approximately subsistence levels.

$$\text{Dimension Index} = \frac{\text{Current Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}} \quad (1)$$

Equations (2) and (3) show how to calculate life expectancy at birth index and income index,

$$\text{LEBI} = \frac{\text{Current Value}_{LEB} - \text{Minimum Value}_{LEB}}{\text{Maximum Value}_{LEB} - \text{Minimum Value}_{LEB}} \quad (2)$$

$$\text{II} = \frac{\log \text{Current Value GDP per capita} - \log \text{Minimum Value GDP per capita}}{\log \text{Maximum Value GDP per capita} - \log \text{Minimum Value GDP per capita}} \quad (3)$$

Education index is calculated by averaging geometric means of adults expected schooling index (ESI) and mean schooling index (MSI). Equations (4) and (5) show how to calculate these indices, and equation (6) shows the calculation of the education index.

$$\text{ESI} = \frac{\text{Current Value}_{LR} - \text{Minimum Value}_{LR}}{\text{Maximum Value LRI} - \text{Minimum Value}_{LR}} \quad (4)$$

$$\text{ESI} = \frac{\text{Current Value}_{SR} - \text{Minimum Value}_{SR}}{\text{Maximum Value SR} - \text{Minimum Value}_{SR}} \quad (5)$$

$$EI = \sqrt[2]{\text{Expected Schooling Index} \times \text{Mean Schooling Index}} \qquad (6)$$

After obtaining sub-indices, human development index is calculated by calculating the geometric mean of these indices. Equation (7) shows how to calculate human development index.

$$HDI = \sqrt[3]{\text{Life Index} \times \text{Education Index} \times \text{Income Index}} \qquad (7)$$

In table 2, for 2010 and later, the criteria that are used to calculate subindices which compose human development index are shown.

Table 2: Criteria Used in Measuring Human Development Index (2010 and later)

Indicators	Minimum Value	Maximum Value
Life Expectancy at Birth (year)	20	83.2
Expected Schooling Rate	0	20.6
Mean Schooling Rate	0	13.2
GDP per capita (ABD $)	163	108 211
Unified Index (Human development)	Geometric Mean	

Source: Adapted from UNDP, Human Developments Reports 2005-2013.

III. Literature Review

There are different opinions about which factors dominate human development in an economy. In the literature, it is discussed that how economic resources of countries will turn into the gain of human development, how limited resources should be allocated across sectors and how fiscal policies will affect economic development, and thus human development. In this context, literature has been divided into three groups. First group have researched the impacts of fiscal policies on human development. For example, Gupta et al. (1998) studied data from 1980 of 118 transition and developing economies. According to the study, it was seen that real health per capita and education per capita expenditures increased on average in developing countries, but they declined in the transition economies. In the study, it is stated that in many countries spending on primary education and health accelerates human development, and the benefits of social expenditure are distributed more fairly. Gomanee et al. (2005) examined the relationship between government aids and level of welfare. Representing the level of welfare, infant mortality rates and human development index indicators are used. In the study, 104 low-income and middle-income countries were examined by dealing with the period 1980-2000. Their paper concluded that while government aids increase level of human development, infant mortality decreases it. Suescun (2007) examined the impact of government expenditures on human development in 15 Latin countries and concluded that government expenditures affected economic growth, welfare, human development, and social progress in a positive manner. Additionally, it was stated that infrastructure expenditures had more effects on development compared to other government expenditures (education, health, transfers, etc.). Davies (2009) examined data belonging to 154 countries for the period 1975-2002 in order to analyse the relationship between government consumption spending and human development index. He found that government consumption spending effected the human development in a positive manner. Ali et al. (2012) make a study about impacts of government expenditures and democracy on human development. According to the results of the study,

while an increase in income per capita and education spending has positive effects on human development, current expenditures have negative effects. Additively, according to the study, democratic regime has a negative impact on human development. Nwakanma and Nnamdi (2013) examine the relevance between taxes and human development in the period 1970-2010. According to the results of the paper, while petroleum tax, income tax and consumption tax have positive relationships with human development, corporate tax has a negative relationship with it. The studies of the second group are on the relationship between public spending and economic growth. Results of these studies differ from sample countries, empirical methods, and periods. Barro (1991) observes the impact of human capital, government investment, and consumption spending on growth for 85 countries for 1960-1985. As a result of the study, public consumption spending has a negative effect, and public investment spending has a positive effect on growth. Heitger (2001) examined 21 OECD countries and found that there was a negative connection between total public spending and economic growth in 1960-2000. However, a positive relationship between public spending and growth in some studies was obtained. Alfranca and Galindo (2003) concluded that public spending affected growth in a positive manner. Similarly, Kelly (2007) examined the relationship between public spending and growth for 73 countries in 1970-1989 and found a positive relation between public spending and growth. In the literature, there are some papers that could not find any relationships between public spending and growth. For example, Grossmann (1988) could not obtain any relationships between public spending and growth. Studies based on the third group are about the relationship of infrastructure and human development. In these studies, electricity consumption is used on the behalf of infrastructure. Thus, related literature is evaluated on the relationship between electricity consumption and human development. Kanagawa and Nakata (2008) found a positive relationship between electricity consumption and social-economic variables. Martinez and Ebenhack (2008) researched the relationship between energy consumption and human development, and they concluded that there was a positive relationship between energy consumption and human development index. Mazur (2011) stated in least developed countries, especially such as China and India, electricity consumption was necessary to increase the level of welfare. Niu et al. (2013) analyzed the causality relationships between electricity consumption and human development for 50 countries in the period 1990-2009. According to the results of the study, there is a long-run bidirectional causality between electricity consumption and human development indicators.

IV. Model and Data Set

In this study, we aim at examining the relationship between fiscal policies and human development and deal with 14 OECD countries (United States, Austria, Australia, Germany, France, Holland, England, Sweden, Switzerland, Spain, Italy, Canada, Norway, Greece) by using annual data for the period 1998-2007. The primary reason for the limitation of the period is the accessibility of

data set. The second reason is that the calculation of the human development index changed after the year 2010.

For this purpose, the impacts of taxes, government expenditures, infrastructure and income on human development will be tested by using panel data analysis methods. The general form of the model that will be estimated is as follows:

$$D=F(Y, I, G) \qquad (8)$$

In the model above, D, Y, I, and G refer to human development, to economic growth, to corporate infrastructure and to fiscal policies, respectively. Econometric model of this general form is as follows:

$$HDI_{it} = \beta_{0i} + \beta_{1i}TAX_{it} + \beta_{2i}EXPEN_{it} + \beta_{3i}ELEC_{it} + \beta_{4i}GDP_{it} + \varepsilon_{it} \qquad (9)$$

In this model, HDI represents the human development index. TAX refers to total taxes as a percentage of GDP and EXPEN refers to government expenditure as a percentage of GDP. ELEC means electricity consumption per capita as a proxy for infrastructure and GDP means per capita GDP (current US $) as a proxy for income level. The natural logarithm is taken of all variables. Data that belong to human development were collected from Wu et al. (2010) and the data concerning other variables were collected from World Bank database.

V. Methodology and Findings

In this study, panel unit root, panel cointegration and panel causality methods are used to examine the impacts of government expenditures, electricity consumption, taxes and income on human development. In the framework of these objectives, 3 steps will be followed. Firstly, the stationarity of the series are tested by panel unit root tests. Secondly, cointegration relations are analyzed and long term cointegration parameters are estimated. Thirdly, causal relationships between variables are investigated.

A. Panel Unit Root Tests

Before a time series or a panel data analysis, stationarity of series need to be examined in terms of the reliability of the analysis. In this paper, Levin et al. (2002, LLC) test and IPS panel unit root test, that was developed by Im et al. (2003), are used.

The LLC panel unit root test originates estimating the following panel model:

$$\Delta y_{it} = \delta y_{it-1} + \sum_{L=1}^{pi} \theta_{iL} \Delta y_{it-L} + \alpha_{mi} d_{mt} + \varepsilon_{it}, \qquad m = 1, 2, 3. \qquad (10)$$

where Δ is the first difference operator, d_{mt} is the vector of deterministic variables, and α_m is the corresponding vector of coefficients for model m = 1, 2, 3. Thereby, $d_{1t} = \emptyset$ (the empty set), $d_{2t} = \{1\}$, and $d_{3t} = \{1,t\}$. The null hypothesis of $\delta = 0$ for all i is analyzed against the alternative hypothesis of $\delta < 0$ for all i. The rejection

of the null hypothesis shows a panel stationary process. The parameter δ is homogenous across i for LLC test whereas Im et al. (2003) recommend a panel unit root test allowing δ to vary across all i. Thus, the eqn (10) is re-written as follows:

$$\Delta y_{it} = \delta_i y_{it-1} + \sum_{L=1}^{pi} \theta_{iL} \Delta y_{it-L} + \alpha_{mi} d_{mt} + \varepsilon_{it}, \qquad m = 1, 2 \qquad (11)$$

While the null hypothesis is δ = 0 for all i, the alternative hypothesis is δ < 0 for at least one i. The rejection of the null hypothesis presents a panel stationary process.

Table 3: Panel Unit Root Test Results

Variable	LLC[a]		IPS	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
HDI	-0,971	-0,234	2,449	0,084
TAX	-7,854[b]	-7,828[b]	-2,204[c]	0,162
EXPEN	-3,111[b]	-1,243	0,268	-0,196
ELEC	-0,907	-0,659	-0,941	0,610
GDP	1,544	1,534	2,471	-0,834
ΔHDI	-3,003[b]	-3,604[b]	-2,188[c]	-2,017[c]
ΔTAX	-9,331[b]	-11,284[b]	-4,181[b]	-1,411[d]
ΔEXPEN	-6,587[b]	-5,932[b]	-3,147[b]	-1,393[d]
ΔELEC	-7,994[b]	-4,125[b]	-2,276[c]	-2,022[c]
ΔGDP	-6,485[b]	-12,604[b]	-3,875	-2,029[c]

[a] Newey-West Bandwidth selection with Bartlett Kernel is used for LLC test.
[b] Illustrates 1% statistical significance.
[c] Illustrates 5% statistical significance.
[d] Illustrates 10% statistical significance.

In Table 3, panel unit test results are shown. According to test results, variables are stationary in first differences. In this case, presence of a cointegration relationship between variables is supposed to be tested.

B. Panel Cointegration Analysis

To test the long term cointegration relationship between non-stationary variables, panel cointegration test that was developed by Pedroni (1999; 2004) are generally used in the literature. Pedroni developed 7 different test statistics to test null hypothesis that shows there is no cointegration relationship. Pedroni obtains these statistics from the residuals that are derived from panel cointegration regression. Four of these tests are composed of in-group statistics (panel-v, panel-ρ, semi-parametric panel-t and parametric panel-t) and the rest are composed of intergroup statistics (group- ρ statistics, semi-parametric group-t statistics and parametric group-t). These statistics are calculated as follows (Pedroni, 1999:660):

Panel v-Statistic: $T^2 N^{3/2} Z_{\hat{v}N,T} \equiv T^2 N^{3/2} (\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2)^{-1}$ (12)

Panel ρ-Statistic: $T\sqrt{N} Z_{\hat{\rho}N,T-1} \equiv T\sqrt{N} (\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2)^{-}$

$^1 \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}i)$ (13)

Panel t-Statistic: $Z_{tN,T} \equiv (\tilde{\sigma}^2_{N,T} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^2)^{-1/2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} (\hat{e}_{i,t-1}^2 \Delta \hat{e}_{i,t} - \hat{\lambda}i)$
(non-parametric)   (14)

Panel t-Statistic: $Z^*_{tN,T} \equiv (\tilde{s}^{*2}_{N,T} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{*2})^{-1/2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}^*_{i,t-1} \Delta \hat{e}^*_{i,t})$
(parametric)   (15)

Group ρ-Statistic: $T N^{-1/2} \tilde{Z}_{\hat{\rho}N,T-1} \equiv T N^{-1/2} \sum_{i=1}^{N} (\sum_{t=1}^{T} \hat{e}_{i,t-1}^2)^{-}$

$^1 \sum_{t=1}^{T} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}i)$ (16)

Group t-Statistic: $N^{-1/2} \tilde{Z}_{tN,T} \equiv N^{-1/2} \sum_{i=1}^{N} (\hat{\sigma}_i^2 \sum_{t=1}^{T} \hat{e}_{i,t-1}^2)^{-1/2} \sum_{t=1}^{T} (\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}i)$
(non-parametric)   (17)

Group t-Statistic: $N^{-1/2} \tilde{Z}^*_{tN,T} \equiv N^{-1/2} \sum_{i=1}^{N} (\sum_{t=1}^{T} \tilde{s}_i^{*2} \hat{e}_{i,t-1}^{*2})^{-1/2} \sum_{t=1}^{T} \hat{e}^*_{i,t-1} \Delta \hat{e}^*_{i,t}$
(parametric)   (18)

      If panel-v statistic takes positive and high value and the other statistics take negative and high value, null hypothesis of no cointegration relation will be rejected and it will be decided that there is a long term relationship among variables (Pedroni, 1999).

Table 4: Panel Cointegration Test Results

Test[a]	Intercept	Intercept and Trend
Panel v-Statistic	-1),822	-1,252
Panel rho-Statistic	2,583	2,695
Panel PP-Statistic	-4,051[b]	-13,724[b]
Panel ADF-Statistic	-3,506[b]	-10,897[b]
Group rho-Statistic	4,649	5,417
Group PP-Statistic	-8,313[b]	-11,937[b]
Group ADF-Statistic	-3,273[b]	-5,257[b]

[a] Newey-West Bandwidth selection with Bartlett Kernel is used.
[b] Illustrates 1% statistical significance.

      In Table 4, panel cointegration test results are shown. These result can be interpreted in the way that there is a relationship between variables in the long run

and ln HDI converges to its long-run equilibrium by correcting possible deviations from this equilibrium in the short run.

After the estimation of panel cointegration, the next step is to estimate long term cointegration coefficients. To that end, fully modified ordinary least squares (FMOLS) and panel dynamic ordinary least squares (DOLS) methods which are developed by Pedroni (2000, 2001) are applied. The panel FMOLS estimator can be described as below (Pedroni, 2001).

$$\hat{\beta}^*_{GFM} = N^{-1} \sum_{i=1}^{N} \hat{\beta}^*_{FM,i} \qquad (19)$$

where $\hat{\beta}^*_{FM,i}$ is the conventional FMOLS estimator carried out to its member of the panel. The associated t-statistic can be expressed as in (20).

$$t_{\hat{\beta}^*_{GFM}} = N^{-1/2} \sum_{i=1}^{N} t_{\hat{\beta}^*_{FM,i}} \qquad (20)$$

To derive the panel DOLS estimator, the following model is estimated (21).
where $-K_i$ and K_i are leads and lags. The panel DOLS estimator can be established as in (22).

$$\hat{\beta}^*_{GD} = N^{-1} \sum_{i=1}^{N} \hat{\beta}^*_{D,i} \qquad (22)$$

where $\hat{\beta}^*_{D,i}$ is the conventional DOLS estimator, applied to the ith member of the panel. The associated t-ratio can be reflected as given in Equation (23).

$$t_{\hat{\beta}^*_{GD}} = N^{-1/2} \sum_{i=1}^{N} t_{\hat{\beta}^*_{D,i}} \qquad (23)$$

Table 5: Panel Cointegration Coefficients (HDI is the dependent variable)

Variable	Panel FMOLS[a]	Panel DOLS[a]
TAX	-0,030[b]	0,005
	[-3.60]	[0,41]
EXPEN	0,010[c]	0,100[b]
	[2,62]	[4,58]
ELEC	0,031	0,048[b]
	[0,41]	[2,72]
GDP	0,041[b]	0,016
	[4,99]	[0,49]

[a] The values in parentheses are t-statistics.
[b] Illustrates 1% statistical significance.
[c] Illustrates 5% statistical significance.

In Table 5, FMOLS and DOLS panel results are depicted. Considering panel FMOLS results, coefficient of taxes (TAX) is negative, coefficient of public expenditures (EXPEN) is positive and coefficient of income (GDP) is positive. Accordingly, it is expected that %1 rise in taxes will decrease human development by %0,03, 1% rise in public expenditures will increase human

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development by %0,01 and %1 rise in income will increase human development by %0,04. Coefficient of electricity consumption is not statistically significant. With reference to results of panel DOLS, coefficients of public expenditures and electricity consumption are positive and statistically significant. In other words, rise that will take place 1% in public expenditures and electricity consumption, is expected to increase human development in the rate of %0,1 and %0,04 respectively. Coefficients of income and taxes are not statistically significant.

C. Panel Causality Analysis

Panel cointegration tests reveal that variables are related in the long term, however cointegration test does not give information about the direction of causality. Therefore, to determine the direction of relationship, vector error correction (VEC) model has been utilized. This model gives us information about both long and short term causality. Within this scope, VEC can be explained as follows (Apergis and Payne, 2009):

$$\Delta y_{it} = \alpha_{1i} + \sum_{k=1}^{q} \beta_{11ik} \Delta y_{it-k} + \sum_{k=1}^{q} \beta_{12ik} \Delta x_{it-k} + \lambda_{1i} \hat{\varepsilon}_{it-1} + \upsilon_{1it} \tag{24}$$

$$\Delta x_{it} = \alpha_{2i} + \sum_{k=1}^{q} \beta_{21ik} \Delta x_{it-k} + \sum_{k=1}^{q} \beta_{22ik} \Delta y_{it-k} + \lambda_{2i} \hat{\varepsilon}_{it-1} + \upsilon_{2it} \tag{25}$$

where Δ is the first-difference operator, q is the optimal lag length, $\hat{\varepsilon}_{it}$ is the residuals derived from the panel FMOLS estimation and υ is the serially uncorrelated error term. Short term causality relationship between variables has been analyzed by Wald statistic. Long term causality relationship has been tested by investigating statistical significance of the coefficient of the error term.

Table 6: Panel Causality Tests Results

	Short-run causality					Long-run causality
	ΔHDI	ΔTAX	ΔEXPEN	ΔELEC	ΔGDP	ECT(-1)
ΔHDI		1,035	0,985	1,007	3,326	-0,797[c]
		(0,792)	(0,804)	(0,799)	(0,343)	[-4,25]
ΔTAX	1,7786		0,195	9,132[d]	10,225[d]	-0,997
	(0,619)		(0,978)	(0,027)	(0,016)	[-0,56]
ΔEXPEN	0,951	3,826		10,051[d]	2,953	-0,218
	(0,813)	(0,280)		(0,018)	(0,398)	[-0,20]
ΔELEC	0,760	1,261	14,621[c]		3,451	-0,580
	(0,859)	(0,738)	(0,002)		(0,327)	[-0,72]
ΔGDP	4,558	1,943	1,881	8,088[d]		0,918[e]
	(0,207)	(0,584)	(0,597)	(0,044)		[1,75]

[a] The values in parentheses are prob-values.
[b] The values in brackets are t-statistics.
[c] Illustrates 1% statistical significance.
[d] Illustrates 5% statistical significance.
[e] Illustrates 10% statistical significance.

Granger causality test based on panel VEC results are shown in Table 6. There is a bi-directional causal relationship between government expenditures and electricity consumption in the short run. In addition, there is a unidirectional causal relationship from income to taxes, from electricity consumption to taxes and income. In the long term, there are causality relationships from taxes, government expenditures, electricity consumption and income to human development and from human development, taxes, government expenditures and electricity consumption to income.

VI. Conclusion and Policy Proposal

The goal of this study is to test the impact of fiscal policies on the human development empirically. In the context of this objective, this paper analyses the impacts of taxes (representing fiscal policies), government expenditures, electricity consumption (representing infrastructure) and income on human development for 14 OECD countries in the period 1998-2007. We utilized panel unit root and panel cointegration tests, panel FMOLS and panel DOLS estimators and panel causality test based on panel vector error correction model in this study. According to panel FMOLS results, while taxes have a negative impact on human development, government expenditures and income have a positive impact on it. The coefficient of the electricity consumption is not statistically significant. In addition, government expenditures and electricity consumption have a positive effect on human development according to panel DOLS results, however the coefficients of income and taxes are not statistically significant. Causality test results indicate that, in the long term, there are causal relationships from taxes, government expenditures, electricity consumption and income to human development and from taxes, government expenditures, human development and electricity consumption to income. In the short term, there is a bidirectional relationship between government expenditures and electricity consumption and unidirectional relationships are from income to taxes and from electricity consumption to both taxes and income.

Considering these results, it is seen that an effective fiscal policy can dominate human development and offer new ideas to propose new policy targets. In this context, to provide human development in parallel with economic level of development, not only income policies but also human centered development models are required for national economies. In other words, together with income policies, development policy that takes into account the quality of life and human centered development models are recommended to be applied. In order to ensure social development, not only economic conditions but also social conditions are needed to be improved. Therefore, while governments are implementing fiscal policies, they are recommended to make a point of increasing investment on social and cultural fields, enhancing quality of life of individuals, and giving priority to the human dimension of development. For example, according to United Nations Reports, which were published in the last decade, Norway, Canada, Sweden and Switzerland are the countries with the highest level of human development. The common feature in these countries is that there is an

important role of the government in human development and welfare According to Angell (2011), when government policies are evaluated as a whole in Norway, it will be seen that these policies are on the basis of social equality. In terms of achieving this objective, especially education system constitutes an important institution. For this reason, governments provide considerable funds for education institutions. In this way, investment on education system will contribute greatly on development of children who form the future of country by enhancing their ability. With the importance given to education, an efficient fiscal policy and dual tax system are implemented in Norway. Karakurt and Akdemir (2010) stated that in this system progressive tax was taken from labor income and a fixed-rate tax was taken from capital income. Thus, capital outflow is prevented, and significant amount of tax revenues are obtained. Thereby, for the redistribution of income welfare programs are implemented successfully. As a consequence, the dual income tax system in Norway is highly successful on the subject of without undermining economic development, providing high revenue and redistributing income (Oliver, 2012). Another sample country is Sweden. According to Thakur et al. (2007), Sweden is utilized as a modern welfare state, and the main reason for this situation is the policies that are implemented by the government. Government has played an active role in redistribution of income in Sweden. Governments develop the infrastructure by making significant investments in numerous fields and produce positive externalities. In addition, the state gives importance to public policy, especially to education and to health care. Today in Sweden, government has the most important role in providing employment in public and health fields**.** In other words, it appears that governments have a key role on human development.

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