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The effect of remittances, agriculture, FDI and economics growth on environmental quality in Türkiye

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Abstract

Economic growth is an important goal for nations; nonetheless, it is critical for nations survival that economic expansion does not jeopardize the viability of the ecological balance. This explains why contemporary discussions of the impacts of economic factors on environmental quality have become common in the international literature. In this study, we looked at how economic growth, agriculture, remittances, and foreign direct investments affect the environment in Türkiye, a country with a young population and a wealth of natural resources. The study used the yearly frequency data collection, which cover the years 1990-2019. Methods included the structural break unit root test developed by Zivot & Andrews in 1992, the structural break cointegration test developed by Gregory & Hansen in 1996, and the FMOLS coefficient estimator. According to the findings, remittances and economic growth have a negative impact on environmental pollution, whereas agriculture has a favorable impact on pollution. For foreign direct investments, no statistically significant link was discovered.

Keywords: Remittances, Environmental Quality, Türkiye

Jel codes: Q50



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1. Introduction

Increasing income and welfare of residents as a consequence of economic growth is something that every country aims to do in the short and long term. However, ensuring environmental sustainability is critical for a sustainable economy. The Kyoto Protocol (1997) and the Paris Climate Agreement (2015) are international agreements that focus on ensuring environmental sustainability. So, pollution and climate change have been an worldwide concern for a few decades. In fact, research on the effects of economic growth, foreign direct investments, financial development, information and communication technologies, education, foreign trade, agriculture, trade liberalization, ect. on environmental quality have been published in the past several decades (Destek Destek and Sinha, 2020; Lin and Xu, 2020; Pata, 2018; Raheem, et al. 2019).

Remittances have begun to be examined frequently among the issues impacting environmental quality in recent years by researchers. Remittances, like other economic actors and activities, are a significant factor for growth, particularly in developing countries (Brown et al. 2020). Remittances have various impacts on the economy. First of all, remittances are an important source of international finance. Remittances have positive effects such as poverty reduction, household welfare, the initiate of new economic activities, and the balance of payments. Furthermore, remittances help country's financial system by supplying funds and contributing to domestic investments. While remittances contribute to the economy in numerous ways, environmental damage may develop as a result of economic activities financing by remittances. While remittances contribute to the economy, environmental damage may emerge as a result of economic activity sponsored by remittances (Ahmad et al., 2019).

In this context, the purpose of this study is to illustrate the environmental effects of remittances, agriculture, foreign direct investments, agriculture and economic growth on environmental quality for Türkiye, which is developing, rich in natural resources and has an important opportunity for domestic and foreign investment. The study covered the years 1990 - 2019, and time series techniques with structural breaks were employed. Following the introductory section, the data set and method will be described in the second section, followed by the empirical findings in the third section, and finally the conclusion.

2. Data Set, Model and Method

This study investigates the effects of remittances, agriculture, foreign direct investments, agriculture, and economic growth on Türkiye's environmental quality. In the study, structural break time series techniques such as Zivot and Andrews' (1992) structural break unit root, Gregory and Hansen's (1996) structural break cointegration, and FMOLS coefficient estimator test were utilized. The study's data set covers the years 1990-2019, with annual frequency. Personal remittances, received (% of GDP), GDP (constant 2015 US\$), Foreign direct investment, net inflows (% of GDP), Agriculture, forestry, and fisheries, value added (constant 2015 US\$), and CO2 emissions (metric tons per capita) represent the model's data set. GDP and CO2 natural logarithms were taken and included in the model. Data was obtained from the World Bank.

Equation 1 represents the study's model:

$$\log CO2_t = \mu_t + \beta_1 REM_t + \beta_2 \log GDP_t + \beta_3 FDI_t + \beta_4 AGR_t + \varepsilon_t \quad (1)$$

Representative, CO2, CO2 emission; REM, personnel remittance; GDP, economic growth; FDI, foreign direct investment; AGR, agricultural; μ , constant term; ε , error term; β , coefficient.

Empiric Findings

The findings of the Zivot and Andrews unit root test with structural break are demonstrate in Table 1. The FDI is non-stationary in level according to Model C. The other all variables are observed to be stationary at the first difference, but not at the level for all models.

Table 1. Zivot and Andrews (1992) unit root test results

Series	Model	Lag length	t-Ist	TB
logCO2	Model A	0	-4.31	2006
	Model C	0	-4.12	2006
REM	Model A	0	-3.83	2001
	Model C	0	-4.23	2001
logGDP	Model A	0	-3.98	1999
	Model C	0	-3.89	1999
FDI	Model A	0	-4.83	2005
	Model C	0	-5.72***	2005
AGRI	Model A	0	-2.96	2010
	Model C	0	-4.41	2001
D(CO2)	Model A	0	-5.73***	2006
	Model C	0	-5.66***	
D(REM)	Model A	0	-5.20***	
	Model C	0	-5.36***	
D(logGDP)	Model A	0	-5.74***	
	Model C	0	-5.57***	
D(FDI)	Model A	0	-5.59***	
	Model C	0	-5.46***	
D(AGRI)	Model A	0	-4.67***	
	Model C	0	-4.97***	

Note: ***, %1 level of significance

Table 2 exhibits the structural break cointegration test results of Gregory and Hansen. A cointegration link was found in Models 1 and 2 at the 1% statistical significance level. The result of both models was the breaking date of 2011.

Table 2. Gregory and Hansen (1996) cointegration results

Dependent variable	Model	t-Ist	Time Break
logCO2	Model 2 (level shift)	-5.48***	2011
	Model 3 (level shift and Trend)	-5.32***	2011

Note: ***, %1 level of significance

After determining the cointegration relationship, the FMOLS technique was utilized to estimate the model's variable coefficients. Table 3 demonstrates the FMOLS findings. At the 1% statistical significance level, it is observed that remittances and economic growth increase carbon emissions. At the 1% statistical significance level, it revealed that agriculture contributed positively to environmental quality. There was no statistically significant effect of FDI.

Table 3. FMOLS coefficient results

Independent variables	Coefficient	t-Statistic	Prob.
REM	0.030***	1.524	0.007
logGDP	0.680***	1.728	0.000
FDI	0.003	-3.069	0.206
AGR	-0.327**	-8.526	0.025

R²:0.97
R²-adj: 0.96

Note: ***, %1 level of significance

3. Conclusions

In this paper, the impacts of remittances, economic growth, agriculture, and foreign direct investment on environmental quality in Türkiye were investigated using structural break time series methods from 1990 to 2019. According to the findings, while remittances and economic growth have a negative impact on environmental quality, agriculture has a positive impact on environmental quality. There was not a significant relationship detected between FDI and environmental quality. Remittances provide foreign currency, financing new initiatives, and provide additional advantages to the Turkish economy, similar to what they do in other developing countries. It is an important asset, however, the adverse effects on environmental degradation should be mitigated by environmental sustainability measures. These measures that reduce the adversely effects of economic activities on environmental quality should apply to the whole economy. Because remittances do not cause any impact on the environment on their own, they cause both environmental and economic effects by being channeled into various investments after they arrive domestically.

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