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Sustainable Development Goals and FDI – Case of Albania

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Abstract: *Sustainable Development Goals were adopted by countries in 2016, as a way to fight poverty, protect the planet and ensure sustainable development, while Foreign Direct Investments are inflows of investments that are very important for host countries, especially those in development. They enable the transfer of technology, create new jobs, provide inflows of foreign currency, etc. Their impact on the economic development of the host countries is very large and can also affect the realization of the SDGs.*

The purpose of this article is to analyze the impact of FDI on some SDGs in Albania. For this purpose, the ARDL model with data for the period 1999-2021 will be used. There are relatively few studies that have analyzed this relationship, and this article completes the existing literature on this topic. The results of the study can help in the design of policies regarding FDI that enhance rather than compromise the fulfillment of the SDGs.

1. INTRODUCTION

With the conclusion of the Millennium Development Goals program, the United Nations General Assembly introduced the 17 Sustainable Development Goals (SDGs), the purpose of which is to serve as a shared blueprint for peace and prosperity for people and the planet (United Nations, n.d.). The fulfillment of the SDGs will enable sustainable development, equality and justice, dignified working and living conditions, quality education, and environmental protection. The realization of most of these objectives is expected to be done by 2030, while there is no deadline for some of them. The SDGs are detailed in 169 targets, which are measured through 232 indicators, which will stimulate actions for the main issues of humanity and the planet (United Nations, 2015).

Goals from 1 to 3 aim to create conditions for a dignified life. They aim to eradicate all forms of poverty, improve food security, and promote sustainable agriculture, well-being, and health care for all people. Goals 4 and 5 aim to ensure quality and inclusive education as well as gender equality, promoting women's rights and combating discrimination. Improving hygiene conditions for a dignified life, ensuring access to clean water, waste management and ensuring access to renewable energy are the purposes of goals 6 and 7. The fulfillment of goals 8, 9 and 10 will ensure economic growth and dignified working conditions, sustainable industrialization and promotion of innovation and reduction of inequalities between countries, but also between different regions within the same country. Goals 11 to 15 are focused on building eco-sustainable cities and communities, sustainable production and consumption, undertaking actions to combat climate change and sustainable use of natural resources. Goal 16 aims to promote inclusive societies, ensure access to justice and build an effective system of accountability by public institutions. The fulfillment of the objectives requires commitment and cooperation from all countries in the world and this is also the purpose of goal 17.

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Understandably, the realization of the SDGs requires significant public and private sector investments. A very important source of financing, especially in developing countries, is Foreign Direct Investment (UNCTAD, 2014). FDI provides modernization, economic development, and employment (Demena & van Bergeijk, 2019; OECD, 2002). The purpose of this article is to analyze if FDI in Albania affects the fulfillment of goals 10 and 13. These goals have several indicators, but in this study, the Palma index will be used as an indicator of inequality and CO2 emission as an indicator of climate change. To our knowledge, there are relatively few studies that have studied the impact of FDI on the fulfillment of the SDGs in Albania, therefore this paper will complement the literature in this field.

2. LITERATURE REVIEW

Different researchers have analyzed the possible impact of FDI on income inequality, reaching mixed results. In a study in Egypt, Rezk et al. (2022) concluded that an increase in FDI during the period 1972-2017 was accompanied by a decrease in the Gini coefficient. Different specifications of the empirical model support the same conclusion, suggesting that Egypt should promote an open-door policy for FDI because this has the additional benefit of reducing income inequality. Lee et al. (2022), in a study of 37 countries during the period 2001-2015, studied the relationship between FDI and income inequality. They conclude that FDI helps in reducing income inequality, but they see this as related to financial development. After reaching a certain stage of financial development, the effect of FDI decreases. Yuldashev et al. (2023) also find a negative impact of FDI on income inequality, but they suggest that the effect of FDI is stronger when there is a high level of human capital. In a panel study of 16 African countries during the period 1980 to 2013, Kaulihowa and Adjasi (2018) found a U-shaped relationship between FDI on inequality. They suggest that FDI has a positive impact on income distribution, but this impact diminishes with the continued growth of FDI, so even though FDI promotes economic growth, this is not necessarily accompanied by a reduction in inequality. Using panel cointegration models, in a study of Latin American countries for the period 1980-2000, Herzer et al. (2014) found a positive impact of FDI on income inequality, presenting a policy dilemma for these countries. In a study of 29 less developed countries for the period 1970-1990, Sylwester (2005) found no significant relationship between FDI and income inequality. Wang et al. (2023) analyzed a dataset of 126 countries to highlight the channels through which FDI affects income inequality. Using a GLS model, they concluded that the effect of FDI inflows on income distribution depends on the economic development of the host countries. In emerging economies, FDI flows are accompanied by a reduction in income inequality distribution, while in developed countries the effect is the opposite: the increase in FDI flows results in an increase in inequality. Nguyen (2021) suggested that the impact of FDI on income depends on government performance. The author studied 24 developed countries, with a high evaluation of governance performance, and 37 developing countries, with a low evaluation of it. He concluded that the increase in FDI inflows is accompanied by an increase in income inequality in developed countries and a decrease in inequality in developing countries, but the increase in government performance narrows the income gap between different social groups in both categories of countries under study.

An issue that deserves attention is the impact of FDI on the environment. The increase in emissions due to them can undermine the economic benefits they bring, but on the other hand, new eco-sustainable technologies that are transferred through FDI can have a positive impact on the environment. This not-very-clear impact is supported by the results of studies, which have reached

mixed conclusions about the possible impact of FDI on the environment. Huang et al. (2022), in a study of the G20 countries, concluded that the increase in FDI inflows is accompanied by an increase in carbon emissions. However, this effect is mitigated in countries with high economic development and quality regulatory systems. Wang and Huang (2022), using panel data for East Asian countries for the period 2011-2020, concluded that in the short term, the increase in the current and previous levels of FDI is accompanied by an increase in CO2 emissions, while in the long term, this effect is insignificant. From a meta-analysis carried out on 65 previous studies on the effect of FDI on emissions, Demena and Afesorgbor (2020) found that the underlying effect of FDI on emissions is insignificant, close to zero. However, when the heterogeneity in these studies is considered, the results indicate a significant inverse relationship between FDI and emissions. The increase in FDI is accompanied by a decrease in emissions. The conclusion remains the same even when the analysis is done for countries at different levels of development as well as for different pollution. Tsoy and Heshmati (2023) study the effect of FDI on the environment on a global scale. In a study of 100 countries, with data for the period 2000-2020, using a dynamic panel model, they analyzed the possible impact of FDI inflows on the environmental performance index. The results of their study do not suggest a statistically significant relationship between them. Apergis et al. (2022) suggested that the effect of FDI inflows on the environment depends on the country of origin. Studying the impact of investments from OECD countries on carbon emissions in the BRICS countries, they reached mixed results: for a subset of OECD countries, they found a positive impact of FDI on carbon emissions, for another subset they found a negative impact, and for another group did not find influence. The authors suggest that the BRICS countries should make a ranking of the investing countries, according to the degree of damage to the environment that their investments cause in the host countries.

3. METHODOLOGY

The study of the possible impact of FDI on income inequality and CO2 emissions is done through the ARDL model, which is a suitable model for analyzing the relationship between variables that have different orders of integration. This model is used when there is a combination of variables I(0) and I(1), but not I(2). The ARDL model allows the dependent variable to be expressed as a lag function of itself as well as the current and lag values of explanatory variables.

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_1 \Delta Y_{t-1} + \sum_{i=0}^{n} \delta_i \Delta X_{t-1} + \theta_1 Y_{t-1} + \theta_2 X_{t-1} + \mu_t \quad (1)$$

where β_1 and δ_i are short-run coefficients, while θ_1 and θ_2 are long-run coefficients.

Two econometric models will be analyzed in this paper, one for the possible impact of FDI on income inequality and the second model for the possible impact on environmental quality:

$$\ln PALMA = f(\ln FDI, \ln TOT, \ln M/GDP, \ln GDPc) \quad (2)$$

$$\ln CO2 = f(\ln FDI, \ln EN, \ln TOT, \ln GDPc) \quad (3)$$

where:

- PALMA index is a proxy per income inequality[4]. The higher the value of the index, the higher the income inequality. The data to calculate this index is obtained from WID.

[4] In the absence of complete data for the GINI index, in this study the PALMA index is used, which is constructed as a ratio of income received by the richest 10% to income received by the poorest 50%, instead of

- CO2 emissions is a proxy for environmental quality. This variable shows emissions from fossil fuel use in industrial processes and product use, expressed as t CO2/capita. The data is from IEA-EDGAR.
- FDI inflow as % of GDP. The data for this variable is obtained from WDI.
- TOT is terms of trade, the ratio of total trade volume to GDP. An increase in TOT is expected to positively affect the reduction of income inequality (Cerdeiro & Komaromi, 2017).
- M/GDP is the ratio of broad money to nominal GDP, which is a proxy for financial development. This ratio shows the rate of monetization in developing economies. The high rate of monetization may be the result of financial underdevelopment, while the low rate indicates consolidated financial markets (De Gregorio & Guidotti, 1995). This variable can have a mixed sign. The data for this variable is obtained from WDI.
- GDPc is real GDP per capita PPP (constant 2017 international $). The data is from WDI.
- EN indicates a ton of oil equivalent per capita. The data is from Enerdata.

All variables are in log form, so their coefficients show elasticity. The dataset is for the period 1999-2021. Data is analyzed with the statistical package EView 12.

4. EMPIRICAL ANALYSIS

The ARDL method used in this study requires that the variables do not have an integration order higher than I(1). For this reason, all the variables in the model will be tested for stationarity through the ADF test, the results of which are given in Table 1.

Table 1. ADF test results

Variables	ADF test results	Integration order
D(lnPALMA)	-4.2201	I(1)
D(lnCO2)	-3.4157	I(1)
D(lnFDI)	-4.0214	I(1)
lnTOT	-4.4086	I(0)
D(lnEN)	-4.0366	I(1)
D(lnM/GDP)	-4.2313	I(1)
lnGDPc	-3.3067	I(0)

Source: Own calculations

The test results show that most of the variables become stationary in the first difference at a 5% level of significance, while two of them, lnTOT and lnGDPc are stationary at level. Since none of the variables has an order of integration higher than I(1), then we perform VAR and AIC for lag order as well as the ARDL test for cointegration for each model, the results of which are given in Table 2.

Table 2. ARDL bound-test results

	Lag order	F-statistic	Lower I(0)	Upper I(1)
Model of income inequality	2,0,1,2,0	4.9617	2.86	4.01
Model of environmental quality	2,2,0,0,1	9.9357	2.86	4.01

Source: Own calculations

It is noted that the F-values are statistically significant for both models at the 5% level, because they are greater than the upper bound value of 4.01, suggesting that there is a long-run association between variables in these models. Tables 3 and 4 give long-run coefficients for both models.

40% that it is in the original index.

Table 3. Income Inequality Model Long-run coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNFDI	-0.010540	0.012778	-0.824906	0.4270
LNEN	-0.809980	0.385393	-2.101700	0.0594
LNM/GDP	2.669112	1.159933	2.301092	0.0420
LNGDPc	-0.635912	0.394862	-1.610468	0.1356

Source: Own calculations

The results show that the financial development variable is statistically significant at the 5% significance level. This variable has a positive relationship with income inequality, suggesting that the increase of this variable will increase income inequality even more. The TOT terms of trade variable is statistically significant at the 10% significance level. The negative sign shows that the rate of trade volume is associated with the reduction of income inequality.

Regarding FDI, it is noted that in the long run, there is no relationship between FDI and income inequality because the p-value is greater than the significance level. We get the same conclusion from the analysis of the environmental quality model (Table 4). The FDI variable is statistically insignificant in the long-run relationship. Among other variables included in the model, EN is statistically significant and has a positive impact on CO2 emissions, so the increase in fossil fuel use is accompanied by an increase in CO2 emissions. Meanwhile, TOT is statistically insignificant for CO2 emissions, while GDPc is significant at the 10% level.

Table 4. Environmental Quality Model Long-run coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNFDI	0.003990	0.008233	0.484603	0.6375
LNEN	0.668839	0.172068	3.887060	0.0025
LNTOT	0.214380	0.136335	1.572453	0.1441
LNGDPc	0.193755	0.101445	1.909944	0.0825

Source: Own calculations

To evaluate the short-run relationship between the variables, we perform an Error Correction test for both models. Table 5 presents a summary of the short-run coefficients for the income inequality model. It is noted that the ECM term is negative and statistically significant, however, we do not find a short-term relationship between FDI and income inequality.

Table 5. Income inequality model short-run coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.754976	0.129881	-5.812820	0.0001
D(LNPALMA (-1))	-0.326832	0.159892	-2.044077	0.0656
D(LNTOT)	-0.153144	0.089115	-1.718504	0.1137
D(LNM/GDP)	0.118322	0.154934	0.763693	0.4611
D(LNM/GDP(-1))	-0.890351	0.257395	-3.459087	0.0053
CointEq(-1)*	-0.494308	0.084986	-5.816355	0.0001
R-squared 0.710554		Mean dependent var 0.002082		
Adjusted R-squared 0.614072		S.D. dependent var 0.043390		
S.E. of regression 0.026955		Akaike Info criterion -4.154324		
Sum squared resid 0.010899		Schwarz criterion -3.855889		
Log likelihood 49.62040		Hannah-Quinn criter. -4.089556		
F-statistic 7.364615		Durbin-Watson stat 2.814799		
Prob (F-statistic) 0.001145				

Source: Own calculations

Even the Error Correction term of the model for environmental quality is negative and statistically significant (Table 6). FDI at one lag affects CO2 emissions in the short run. The coefficient is negative and statistically significant at 5%.

Table 6. Environmental quality model short-run coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.399348	1.019718	-8.236931	0.0000
D(LNCO2 (-1))	0.474626	0.122144	3.885783	0.0025
D(LNFDI)	0.002110	0.005209	0.405040	0.6932
D(LNFDI(-1))	-0.014498	0.005214	-2.780729	0.0179
D(LNGDPc)	-0.992098	0.332182	-2.986611	0.0124
CointEq(-1)*	-1.132920	0.137646	-8.230659	0.0000
R-squared 0.838011		Mean dependent var 0.018902		
Adjusted R-squared 0.784014		S.D. dependent var 0.067725		
S.E. of regression 0.031475		Akaike Info criterion -3.844296		
Sum squared resid 0.014860		Schwarz criterion -3.545861		
Log likelihood 46.36511		Hannah-Quinn criter. -3.779528		
F-statistic 15.51976		Durbin-Watson stat 2.481710		
Prob (F-statistic) 0.000018				

Source: Own calculations

Both models in the study are tested for their stability, through the CUSUM test (cumulative sum of recursive residuals) and the CUSUM of squares test (cumulative sum of the square of recursive residuals). The CUSUM test is used to identify systematic changes in the coefficients in the model, while the CUSUM of squares is used to identify unexpected changes in the coefficients.

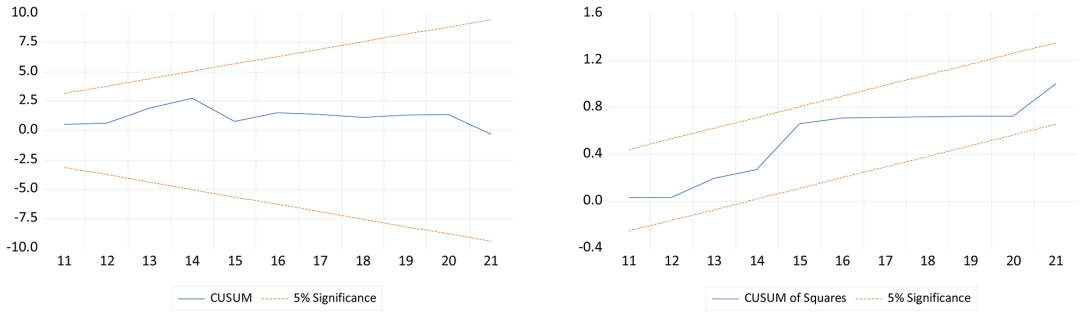

Figure 1. Income inequality model stability

Source: Own calculations

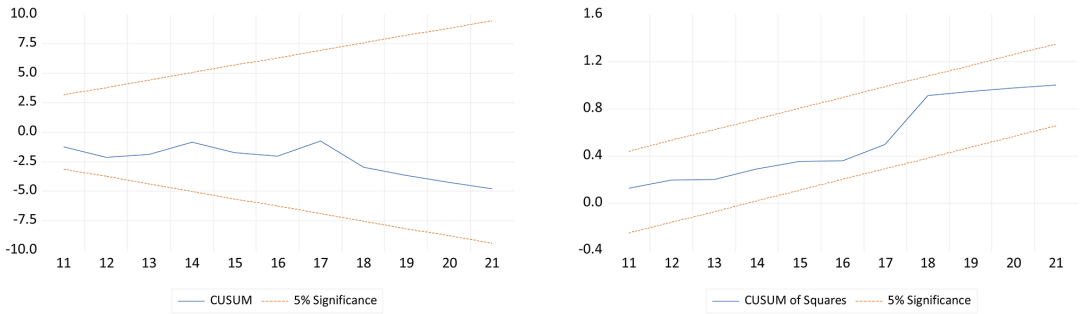

Figure 2. Environmental Quality model stability

Source: Own calculations

It is noted that in both models the coefficients are stable and consistent, so both models can be considered reliable.

5. FUTURE RESEARCH DIRECTIONS

In this study, the impact of FDI on only two indicators is studied. In the future, this study will be expanded, analyzing the possible impact of FDI on other indicators related to SDG no. 10 and 13, but also to other SDGs. Likewise, other variables will be included in the model, which was not possible in this paper due to the short time series. The authors aim to conduct a study on the possible impact of FDI on the SDGs for the Balkan countries.

6. CONCLUSION

The purpose of this study is to identify the possible impact of FDI inflow on the SDGs, specifically those no. 10 and 13. Each SDG has several targets, but in this paper, only two of them have been analyzed: the Palma index as an indicator of income inequality and CO2 emissions as an indicator of environmental quality related to SDG no. 13, climate change. In addition to FDI, the models also include Terms of Trade, Energy consumption, real GDP/capita, and Financial Development as explanatory variables. Since the variables have a mixed order of integration, the ARDL and ECM models were used to find out if there is a long-run or short-run relationship between them.

The results show that FDI has no impact on the inequality of income either in the short run or in the long run, while the variable with the greatest impact is financial development, which has a positive relationship with income inequality, i.e. the increase in the value of this variable, that is, financial underdevelopment emphasizes more inequality. This shows that Albania should apply policies to promote financial development in the country because this will positively contribute to the reduction of income inequality.

Regarding the impact of FDI on CO2 emissions, we do not find any significant relationship in the long run, while FDI at one lag has a short-run relationship with CO2 emissions. The variable with the greatest impact on emissions is EN. This shows that the country should design strategies and promote the use of eco-sustainable alternative energy sources in industrial processes, but also in the use of products, with the aim of reducing the use of fossil fuel.

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