

## THE CORRELATIONS OF INDICATORS OF EU PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT GOALS IN THE PERIOD 2000-2018

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**Abstract:** Not highlighted as important in the pre-pandemic period, the objectives of sustainable development seem more than ever the targets of international attention, especially in terms of preventing other similar or more serious pandemics such as COVID-19. The article, conducted on the 2000-2018 period, focuses exclusively on section 17 of the sustainable development goals allocated to the partnership for achieving these targets, carefully following the way in which the indicators presented by Eurostat as valuable for this section are correlated / connected. Analyzing Granger's causality, we note that the EU financing indicator to developing countries is determined by environmental tax revenues and public and private indebtedness. The article also highlights an analysis of the principal component taking into account the components of the indicator EU financing for developing countries. Thus, as expected, official development assistance and private flows play an important role in financing sustainable development.

**Keywords:** funding for sustainable development goals, EU and sub regional areas, empirical analysis.

**JEL classification:** C38, F34, F35, Q01

### 1. Introduction

In the COVID-19 context, the global partnership for sustainable development points out the need to attract resources from international sources for all the countries of the world that have lagged behind in implementing the goals of sustainable development, especially for developing countries. One of financing for sustainable development instrument, used even from the middle of the 20th century, is Official Development Assistance (ODA). According to European Commission (2021, pp.1) EU27 provided ODA, in 2020, in the amount of no less than €66.8 billion on a grant equivalent basis, or 0.5% of EU Gross National Income (GNI), representing, along with the amounts of other Development Assistance Committee (DAC) donors, 46% of the total global ODA. This suggests, that in the timetable of 2030 Agenda, EU can provide collectively the engagement made of 0.7% of GNI as ODA, based on the fact that only in 2020, the ODA grew by 0.09 of GNI compared with the year 2019 (European Commission, 2021, pp.1).

Although not an explicit subject of the article, the presentation of gross national income (GNI) evolution has a special importance regarding the evolution of ODA in the world and especially on the European continent, taking into account that most indicators (including indebtedness) recorded by the World Bank are obtained by reporting to GNI. Thus, in the chart below we see that for the regions selected in the study (EU27, the Euro area with 19 countries and Central and Eastern European countries including the Baltics) until 2008 GNI had an increasing trend followed by a deceleration until 2014 and a easy return by 2018. As we can see with the naked eye, there is a huge difference between the developed countries of the EU, all members of the euro area, and the countries from the old communist bloc, so that GNI at 2018, according to World Bank statistics, was almost 9 times smaller for CEB9 compared to euro area countries. The year 2020, marked by the outbreak and fierce manifestation of the COVID-19 pandemic, will probably also mean an abrupt collapse of GNI by proportions or even above the level of 2008.

Considering the connection between GNI and GDP, and following the evolution of public and private indebtedness over a slightly longer period (until 2020) in relation to GDP (see figure 2) we can conclude that the data reflect not only the increase of indebtedness, especially public one, but also the collapse of GDP, so implicitly GNI.

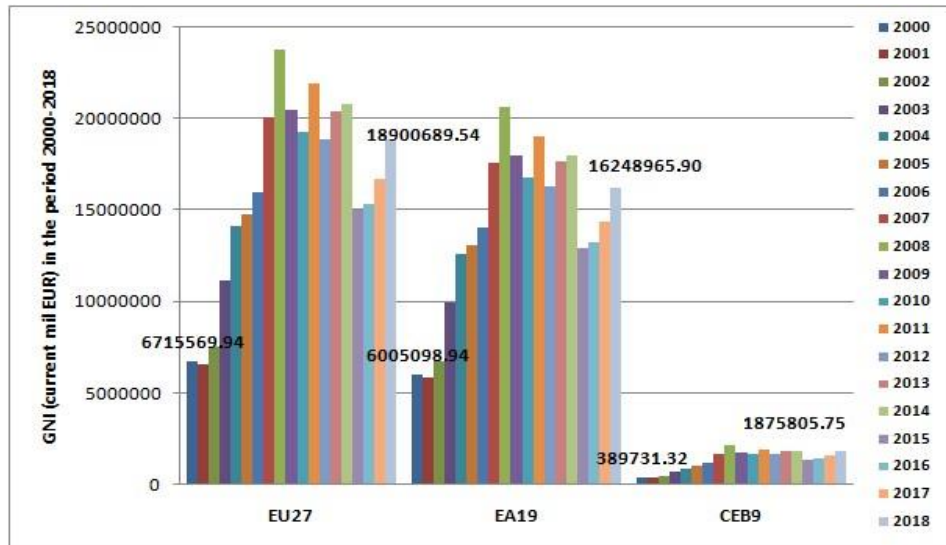


Figure 1. The evolution of GNI at EU27, EA19 and CEB9 levels in the period 2000-2018

Source: World Bank data, author’s calculations

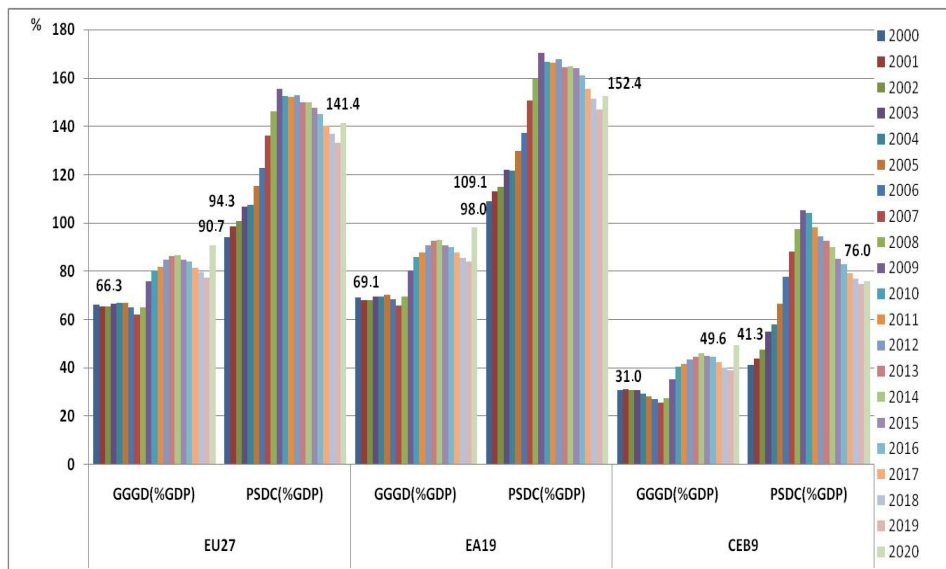
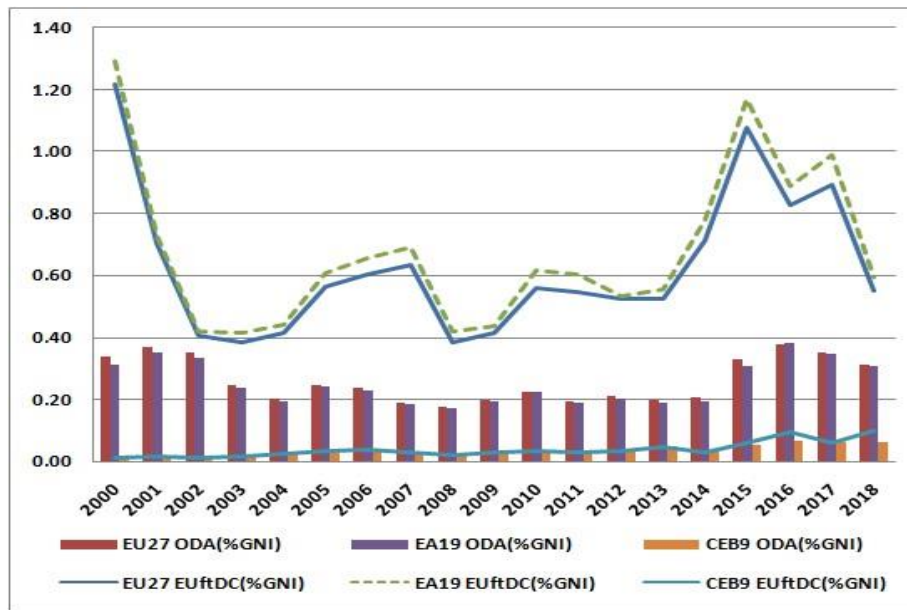


Figure 2. The evolution of public and private debt at EU27, EA19 and CEB9 levels in the period 2000-2020

Source: Eurostat data, author’s calculations

Regarding the evolution of financing for developing countries whose source is the EU, for the analysis period 2000-2018 (see figure 3), we note that whenever there were moments of economic collapse they were marked by dramatic reductions in the indicator, thus noting the period 2008-2009, the years of the global crisis outbreak, and the foreshadowing of the COVID-19 crisis. At the same time, it is noted that funding for developing countries is virtually non-existent as a contribution from Central and Eastern European and Baltic countries (CEB9). Equally, the evolution of ODA for the groups of countries analyzed seems relatively insensitive to the succession of economic cycles.

Beyond the evolution of ODA and funding for developing countries, the 17SDG's section includes a number of indicators, including public indebtedness, which outlines the EU's capacity to support partnerships. Given that public indebtedness suffers / increases in times of crisis, especially when there are global challenges, I have been introduced private indebtedness in the analysis, in order to better see how the elements of analysis correlate with each other.



**Figure 3. The evolution of EU financing to developing countries and official development assistance at EU27, EA19 and CEB9 levels in the period 2000-2020**

Source: World Bank data and Eurostat, author’s calculations

The article is structured as follows. The second section reviews the relevant literature, while the third section is reserved to present the methodology and data. The fourth section describes the results and discusses the empirical findings. At last, the fifth section is reserved for conclusions of the paper and presents some recommendations.

## 2. Literature review

Financing is generally a difficult subject, especially financing for sustainable development. In the IIED report (2002, pp.80), in the final chapter it is mentioned that “Rather than view it as a form of charity from one nation to another, the perception of the world as a single country invokes the idea of mutual commitment and responsibility. Thus, instead of focusing on how to mobilise cheap resources, it asks how to create a broad-based societal legitimacy for development finance.” But how much financing is needed is rather imprecise, according to UNDP(2018, pp.10), based on other studies (United Nations Intergovernmental Committee of Experts on Sustainable Development Financing , 2014), considering social needs, the annual cost of eradicating extreme poverty in all countries are about US\$ 66 billion annually, for infrastructure investments requirements amount to between US\$ 5 and 7 trillion annually, while global public goods needs are estimated at several trillion more per year. Also, the cost of inaction is difficult to estimate and the way in which it is added to the estimated initial costs.

Regarding the European Union, in the study of Lagoarde-Segot (2020, pp.20) it is documented the magnitude of the SDG finance gap in the EU and discussed some of the trade-offs faced by European policy makers, trade-offs that are the result mainly of the loanable fund theory (LFT), which calls for its replacement by the more realistic endogenous money theory of the post-Keynesian authors. Thus, Lagoarde-Segot (2020, pp.20) used a social accounting matrix transaction flows matrix as a grid to introduce a set of simple financial mechanisms (e.g. issuing of sovereign green bonds, greening of money creation by banks through a modification of the European Central Bank’s collateral framework, SDG lending certificates, changes in capital adequacy ratios and rediscounting policies), which would allow the release of funds required for SDG-related transformative investments.

The need for a paradigm shift and more substantial monetary involvement for funding for the SDGs are found in many studies. For examples, in Dafermos et al. (2018) it is analyzed, using a stock-flow-fund ecological macroeconomic model with global data and simulations for the period 2016–

2120, the effects of climate change damages on financial stability, on financial position of firms and asset price deflation, concluding with the fact that climate-induced financial instability might adversely affect credit expansion, exacerbating the negative impact of climate change on economic activity, thus the necessity of green corporate QE programme implementation. The support for financing is also presented in numerous reports. One of them is 2020 Multilateral Development Banks (MDBs) which points out for the section 17 of SDGs that MDBs use diverse approaches to help drive financing SDGs, establishing special funds to support the SDGs, helping to make policy and regulatory environments more conducive to attracting private finance, mobilizing private sector capital and supporting SDG-aligned thematic bonds. For example, for social aspects, Council of Europe Development Bank (CEB) issued five Social Inclusion Bonds, from which two bond issuances for €1 billion and \$500 million in 2020 dedicated to rising funding for projects related to COVID-19. Thus, we can conclude that funding for sustainable development is consistently addressed in the literature and that the latest studies and reports (inclusive United Nations, Financing for Sustainable Development Report 2021) point to the need to change the perspective and develop a set of tools more appropriate to current and future challenges.

### 3. Methodology and data

Current paper assesses empirically the correlations between the elements of the section 17SDGs – global partnership for sustainable development, and the implications or impact of the elements of the section to the financing for developing countries (EUftDC) using correlation, unit root test (Augmented Dickey-Fuller - ADF), regression and Granger (1969) causality test. For the components of the EUftDC, because the structure has modified, as natural, over the time, it has been performed a principal component analysis (PCA). The unit root test is used in order to examine the stationarity properties of the level and first difference of variables.

Mainly, the data source is Eurostat and for GNI, the World Bank, the period is 2000-2018, annual data. The data are treated as panel, sliding the information on three areas EU27, so without the Great Britain, euro area (EA19) with 19 countries and Central Europe and the Baltic with 9 countries (CEB9): Czech Republic, Hungary, Poland, Croatia, Romania, Bulgaria and Baltic states (Estonia, Latvia and Lithuania). So the EA19 has common point with CEB9 the Baltic countries, and the EA19 and CEB9 are part of EU27. It should be mentioned that the results, through a higher homogeneity given by this slide, reveal more intense correlations than if we had considered only the countries of analysis, individually, without overlapping information of groups or regions, as in this study. Therefore, the results should be viewed with caution and as revealing a number of general trends for groups or regions of EU; for other more detailed and accurate investigations future analyzes are needed. Also, the results must be interpreted with caution, because of the number of observations are still small (57).

### 4. Results and empirical findings

In this paper, it is assessed the correlations between indicators and the implication one over the others from the SDGs of the 17 section – partnerships for sustainable development. It has been used a sample set of data from Eurostat for EU27 countries, EA19 and CEB9. The sample covers the period 2000-2018. Apart from ODA which is the internal component itself for EUftDC, public indebtedness (GGGD, %GDP), environmental taxation (Etax, %TTR) and private indebtedness (PSDC, %GDP) prove strong correlations with EUftDC. The negative sign for Etax in connection with EUftDC, suggest that finance for developing countries is severely discouraged as taxation on environment increases, but this does not surprise what happens to finance for sustainable development in EU27 countries. This, subject would be assessed in other studies. The EU imports for developing countries (EUimpfDC, %of GNI) also show not so strong correlations with EUftDC and official development assistance (ODA, %GNI).

Table 1

**Correlation matrix between EU financing for developing countries, Official development assistance, EU imports from developing countries, General government gross debt, Environmental tax as a part o total tax revenue and private debt for the period 2000-2018**

	EUftDC (% GNI)	ODA (% GNI)	EUimpfDC (% GNI)	GGGD (% GDP)	Etax (% TTR)	PSDC (% GDP)
EUftDC (% GNI)	1					
ODA (% GNI)	0.8720	1				
EUimpfDC (% GNI)	0.3225	0.3640	1			
GGGD (% GDP)	0.8061	0.8006	0.1881	1		
Etax (% TTR)	-0.8064	-0.7870	-0.0220	-0.8748	1	
PSDC (% GDP)	0.6628	0.6172	-0.0110	0.9039	-0.8373	1

Source: Authors’ own research, using Eurostat and World Bank annual data and Excel data analysis soft.

But the correlation matrix does not show any causality, so in Table 2 are shown the results of the regression equation formulated as follows:

$$EUftDC = \beta_0 + \beta_1 ODA + \beta_2 EUimpfDC + \beta_3 GGGD + \beta_4 Etax + \beta_5 PSDC + \varepsilon \quad (1)$$

Where:  $\beta_i=0-5$  – are coefficients of the equations, EUftDC - EU financing to developing countries by financing source as % of GNI, ODA - Official development assistance, % of GNI, EUimpfDC - EU imports from developing countries by country income groups as % of GNI, GGGD - General government gross debt % of GDP, Etax - Share of environmental taxes in total tax revenues (% TTR), PSDC - Private sector debt, consolidated as % of GDP,  $\varepsilon$  – error term.

Table 2

**Results for regression equation for EU financing for developing countries depending on Official development assistance, EU imports from developing countries, General government gross debt, Environmental tax as a part o total tax revenue and private debt for the period 2000-2018**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.884330	0.548277	1.612927	0.1129
ODA__GNI__	1.394111	0.403517	3.454900	0.0011
EUIMPFDG__GNI__	0.043894	0.029367	1.494681	0.1412
ETAX__TTR__	-0.142665	0.064280	-2.219430	0.0309
GGGD__GDP__	0.002889	0.003485	0.828818	0.4111
PSDC__GDP__	-0.000646	0.001673	-0.386489	0.7007
R-squared	0.812851	Mean dependent var		0.446949
Adjusted R-squared	0.794503	S.D. dependent var		0.351329
S.E. of regression	0.159264	Akaike info criterion		-0.737208
Sum squared resid	1.293614	Schwarz criterion		-0.522150
Log likelihood	27.01043	Hannan-Quinn criter.		-0.653629
F-statistic	44.30197	Durbin-Watson stat		1.832316
Prob(F-statistic)	0.000000			

Source: Authors’ own research, using Eurostat and World Bank, annual data and Eviews11 soft

Analysing the value of the determination coefficient or R2, which is used to measure the intensity of the correlation between the endogenous variable and its determinants, it is observed that the value of 0.884330 is quite ok for the data used. At the same time, with respect to the adjusted R2, equal to 0.794503 at the sample level, it can be suggested that there is a relatively strong correlation between the variables in the model. The coefficients of independent variables are not significantly different from zero, only ODA shows somewhat better results.

The ODA (% of GNI) and Etax (% of TTR) have an associated probability or a p-value below

0.05, which confirms that for those indicators, the null hypothesis  $H_0$  can be rejected, which proposes those indicators for the model. Looking at the Durbin-Watson statistics, which tests the null hypothesis that the residuals from an ordinary least-squares regression are not autocorrelated against the alternative that they are, we are noticing that the value DW is over R2, which indicates that the regression performed is not spurious.

### 5. Conclusions and recommendations

Empirically, the paper aims at seeing for European Union countries (EU27, without United Kingdom), euro area (EA19) and the Central Europe and Baltic states (CEB9) correlations between the indicators of section 17 of Sustainable Development Goals, for the period 2000-2018. The data are sliding on the analysed regions, thus there are overlaps between analysed regions, the article capturing practically the maximum level of zonal homogeneity of EU. That is why, other analyses, starting from another way of systematizing the data, can lead to completely different results.

Thus, if we look at the situation of the EU financing to Developing Countries (EUftDC) correlated with the other indicators of the 17SDGs, we can observe that the correlation matrix shows that the intensity of the correlations is high in report to  $E_{tax}(\%TTR)$ ,  $GGGD(\%GDP)$  and  $PSDC(\%GDP)$ . ODA also has a strong correlation with the EUftDC, but official development assistance is even an internal component of total funding for developing countries. Also, addressing the regression equations, in a first phase, from all the indicators selected to explain the evolution of EUftDC, both ODA and  $E_{tax}$  (environmental taxes as a percentage of total tax revenues) stand out.

In the context of statistical availability, it would be interesting for the analysis to be extended in the future to the inflows of funds from other parts of the world on the EU (regardless of form, not only ODA), in order to achieve sustainable development goals.

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