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Are foreign direct investments a robust factor for sustainable development?

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Abstract. *Sustainable development has seen a world in globalization, but the latest major financial crisis has caused the withdrawal of much capital to countries of origin, so that more and more specialists recognize a certain process of deglobalization that is accelerated by Industry 4.0. The industry is reconfiguring and migrating from the Asian world to its countries of origin, producing modern, innovative and environmentally friendly technologies. Meanwhile, experts around the world are concerned with formulating economic theories and models that allow predictability, given that they are far behind as a result of the rapid pace of change in the global economy. Disruptive factors have emerged, while the deciding factor is looking for appropriate levers to continue to achieve sustainable development goals. Based on these premises, current analysis proposes to deepen the link between foreign direct investment and gross national income. The current analysis aims to highlight the close causal link that continues to exist between financial factor and sustainable development. This is an element of vulnerability, even for less developed countries as Romania. In the absence of other sources of funding and adequate measures from the decision-maker, the exploitation of resources and the implementation of activities in strategic sectors will continue to depend largely on the decisions taken by multinational companies, to the detriment of sustainable development objectives that the host country it has.*

Keywords: sustainable development, globalization, foreign direct investments, gross national income, deciding factor, investment factor.

Introduction

In the context of the growing tensions between the world's great powers, the acceleration of Industry 4.0 and unexpected events are leading to the fact that sustainable development goals are becoming increasingly difficult for countries in lower stages of development to achieve.

The world is moving towards a great divergence, after a period of globalization that has profoundly changed global economic policy. Reconfiguring relations between countries is fraught with risks, so trade and investment relations between the world's great powers have become difficult. Because of them, it is difficult, but not impossible, today to make collective progress on many of the global challenges that have been set in the goals of sustainable development, especially

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as Industry 4.0 has made a brutal debut in human history and unexpected events have diverted attention in another direction, under the impact of Covid-19 (UN, 2021) which showed us that we must be prepared to wait for the unexpected events, "black swan" (Taleb, 2010).

The concept of sustainable development has often been criticized, especially with regard to the use of natural resources, arguing that no non-renewable resource can be exploited sustainably "because any positive rate of exploitation will eventually lead to depletion of the Earth's finished stock. ”(Turner, 1988). There is a potential inconsistency between socio-economic development and environmental sustainability goals. Such a conflict would be extinguished if future policies and efforts shifted the focus from consumption-based growth to growth based on investment in human well-being (health, education) and green technologies (Spaiser et al., 2016).

Based on these premises, at macro and micro level, the concept of sustainable development has been supported and intensely debated, from a theoretical point of view, thousands of papers referring to the same definitions and thematic debates, placing the achievement of sustainable development goals in a definite time horizon, but at the same time uncertain. Most signatory states have formalized the concept of sustainable development by creating responsible institutions and a specific legislative framework, in which the concepts of sustainable development have been integrated, at least in writing, but few of them have taken concrete action to balance all of the basic pillars (social, economic, environmental and cultural).

For these reasons, this study aims to analyze the current state of achievement of sustainable development goals, from the perspective of one of the main determinants, the investment factor. In such a context, the data series that were chosen to develop an econometric model are foreign direct investment (FDI) and gross national income (GNI), whereas gross national income continues to be used to quantify the prosperity of the world's economies and the living standards of nations. The analysis of the resulting parameters is expected to indicate the direction of sustainable development.

Literature review

The concept of sustainable development has been developed mainly around the theme of depletable natural resources. The objectives adopted in the 2030 Agenda were to achieve a balance between economic, social, environmental and cultural factors. As can be seen, even the latest objectives that have been added to this agenda have taken into account the same principles based on the modern and rational exploitation of natural resources, with increasing living standards and environmental conditions. In order to meet sustainable development goals, public health must fight socio-economic and other inequalities (Carlisle and Hanlon, 2008). In fact, the Brundtland Report was also criticized for "promoting a business strategy for global development, with an ambiguous and insubstantial concept, with a public relations slogan attached" (O'Riordan, 1993); (Turner, 1993). Despite their shortcomings, the Sustainable Development Goals (SDGs) “set goals for all countries and allowed them to adapt to a national/local context, as opposed to the Millennium Development Goals, which specifically targeted poor and low-income countries without recognizes different national starting points and contexts ”(Fukuda-Parr, 2016). Recent studies (UN 2021, Jaiswal and Jayakumar, 2021, Nundy et al., 2021, Tonne, 2021, Wang and Huang, 2021) have highlighted the growing interdependence between the SDGs and the volatility of national policies in the face of economic challenges such as the COVID-19 crisis, which have reconsidered the importance of identifying and prioritizing specific factors and political responds nationwide, with significant effects on resilient development and robust growth (Elavarasan et al. 2022). More than a North-South aid agenda, “sustainable development goals are seen as a universal sustainable development

agenda - one that does not apply exclusively to low- and middle-income countries" (WILPF, 2017). Based on these premises, at macro and micro level, the concept of sustainable development has been supported and intensely debated, from a theoretical point of view, thousands of papers referring to the same definitions and thematic debates, placing the achievement of sustainable development goals in a definite time horizon, but at the same time uncertain.

Stewart et al. (2020) state that "social and political polarization is a major source of conflict in many societies [...] with consequences for growing inequalities and declining economies". Economic polarization (Bigoni et al., 2020) generates antisocial behaviors, which amplifies conflicts and moves investments to other destinations. We are in the age of post-globalization and the fourth industrial revolution is coming to transform production by unifying digital technologies, the Internet and conventional industry. Economic models and theories no longer seem to correspond to the current economic reality, especially if we take into account the protectionist policies that are beginning to be established by developed countries and the speed of new technologies that are conquering the world.

De Haan and colleagues have shown that financial development, financial liberalization, and banking crises have generated income inequalities (De Haan et al., 2018) and financial globalization can be positively associated with income inequality (Jaumotte et al., 2013). In this context, without adequate funding sources, appropriate economic models and strategies and without the appropriate involvement of the decision-maker, the idea is advanced that the achievement of the Sustainable Development Goals, under the conditions of Industry 4.0, could be put under a great uncertainty.

Looking from financial perspectives, studies show that the FDI decision starts from the size of the market, being one of the determining factors that is of great interest to investors, as the market will absorb the products and services that they will produce. Companies often refer to the GNI indicator, regardless of how it is expressed, as it is considered to be a "healthy" benchmark in the direct investment process, without sufficiently addressing the principles of sustainable development. But, economic development, as measured by gross domestic product (GDP) or gross national income (GNI), is not sustainable if it considers only the economic pillar.

However, the Global Footprint Network warns that more than 80% of the world's population lives in countries with ecological deficits, because "they use more resources than their ecosystems can renew." (Sustainable Development, 2017).

Romania is not far from these countries, given the way it knows how to transform the exploitation of natural resources into sustainable developments. Many foreign direct investments have targeted strategic areas and the gross exploitation of natural resources without too much added value. FDI companies came to contribute, in 2019 alone, to the trade deficit by about 40% of the total (imports - by about 70%; exports - by about 65%) with all the positive aspects of this type of investment on the balance of payments (NBR report, 2020). For these reasons, the Romanian sustainable development model must take into account as many aspects as possible related to the risks associated with foreign direct investment, and these aspects can be explained through specific econometric analysis.

Methodology

In view of the above, the current study aimed to highlight the close causal link that continues to exist *between foreign direct investment* and *gross national income*, a condition that may affect the direction of sustainable development. GNI is an important macroeconomic indicator, following the decision of the European Commission to use it to set the contribution quotas to the Community

budget and to assess the VAT contribution of each Member State. Internationally, gross national income continues to be used to quantify the prosperity of the world's economies and the living standards of nations instead of GDP. To use international comparisons, this indicator is expressed in foreign currency, either by using exchange rates or by a method of calming exchange rate fluctuations, called the Atlas method (used by the World Bank), or purchasing power parity/standard purchasing power[1]. Given the small number of variables that are used (GNI and FDI), this study is rather an exploratory type of research. In this context, even if foreign direct investment influences economic growth, the fact that they are more oriented towards the exploitation of natural resources in the destination countries and less towards the transfer of technology or knowledge, increases gaps in overal development levels, deepen inequalities and alters the natural environment delaying the sustainable development process.

In such a context, in this analysis, panel data were used for the 7 macro-regions from the global level, for the period 2009-2017, a period of time for which complete statistical data were found. As it is already known, complete global data is more difficult to collect. This analysis was deepened at the level of the 48 countries in the Europe and Central Asia Region, for the same period of time. For both, gross national income (GNI) and foreign direct investment (FDI), data were retrieved from World bank databese. The results may suggest to us the potential solutions that Romania must consider when the source of financing considers foreign direct investments.

According to statistical data for 2017, Figure 1 shows the distribution of gross national income across the seven macro-regions. The highest gross national income is recorded in the Pacific and East Asian countries, while the countries in sub-Saharan Africa are in last place.

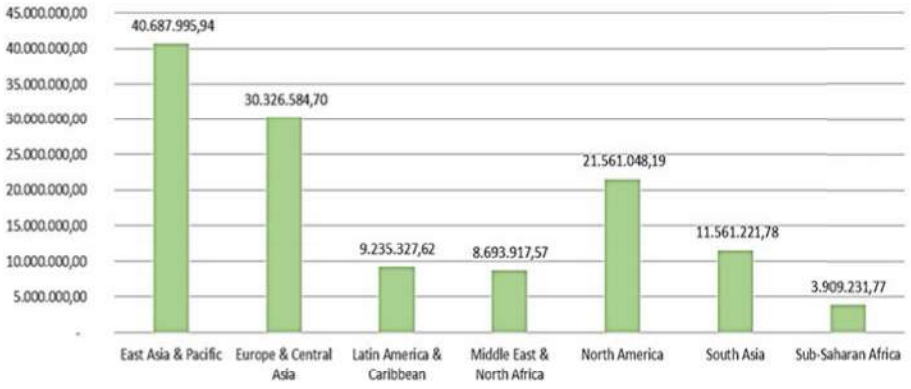


Figure 1. GNI by regions (PPP, million $)

Source: Authors' own research, https://databank.worldbank.org/home.aspx

At the end of 2017, as shown in Figure 2, it is noted that foreign direct investment follows the evolution of gross national income, with one exception for the Pacific and East Asian countries, which are ahead of the countries in Europe and Central Asia.

[1] For the accuracy of the results, in international comparisons, the purchasing power parity/standard purchasing power parity is used, taking into account the relative prices of goods and services in each country. It was found that using the purchasing power method, the gross national income is higher than that resulting from the Atlas method or the exchange rates (a finding for developing countries).

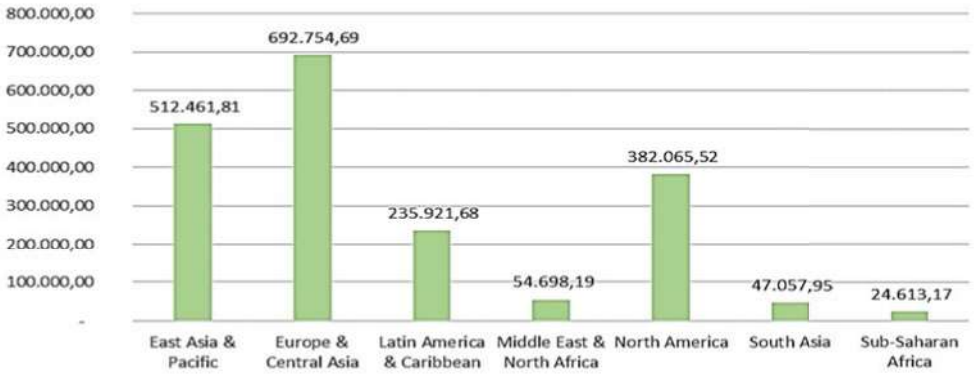


Figure 2. FDI by regions (million $)

Source: Authors' own research, https://databank.worldbank.org/home.aspx.

To choose an appropriate econometric model, graphs were constructed to show the link between the two variables - gross national income and foreign direct investment - based on the data in Table 1.

Table 1. GNI și FDI by regions, 2017 (million $)

Regiune	VNB (GNI) 2017	ISD (FDI) 2017
East Asia & Pacific	40.687.995,94	512.461,81
Europe & Central Asia	30.326.584,70	692.754,69
Latin America & Caribbean	9.235.327,62	235.921,68
Middle East & North Africa	8.693.917,57	54.698,19
North America	21.561.048,19	382.065,52
South Asia	11.561.221,78	47.057,95
Sub-Saharan Africa	3.909.231,77	24.613,17

Source: Authors' data processing from: https://databank.worldbank.org/home.aspx

From the analysis performed, it was found that the point clouds were located around straight lines, which confirms the existence of a connection between variables, of linear type.

The linear model is the simplest explanatory diagram of the dependence between two variables, and the analysis was limited only to the panel data of the two variables. According to the theory (Jula and Jula, 2019), the main advantage of panel analysis is that it allows greater flexibility in modeling the differences generated by individual behaviors. Panel data combines time series and cross-sectional data.

But, when analyzing a sample of panel data, the homogeneity/heterogeneity of the process that generates the data is tested, testing the equality of the coefficients in the studied model, but in individual dimensions. Thus, the specification test involves verifying that the theoretical model studied is perfectly identical for all regions in the sample, or on the contrary, there are elements specific to each region or each time interval.

In stage 1, we test the hypothesis of a perfectly homogeneous structure in which the constants α_i and the parameters of the exogenous variables β_i are identical, versus the alternative hypothesis, according to which the constants and parameters of the exogenous variables are different for at least two of the analyzed regions.

The second step is to test the equality of all k components of the β_i vector for all individuals. If the hypothesis of homogeneity of the coefficients is rejected, then the panel structure is rejected, because, at best, only the constants α_i could be identical between the different regions. If, on the contrary, the hypothesis of homogeneity of the coefficients β_i is accepted, the panel structure is retained and the testing, in a third stage, of the hypothesis regarding the individual dimension of the constants αi is followed.

The third stage of the procedure consists in testing the equality of the individual N constants α_i, under the hypothesis of the coefficients β_i common for all regions. If the hypothesis of homogeneity of the constants α_i is rejected, then a panel-type model with individual effects is obtained. If this hypothesis is accepted, then a perfectly homogeneous panel structure is reached. However, the presence of specific transverse or temporal effects can be captured and analyzed using fixed and random effects techniques. Thus, models containing effects in one or both dimensions may be specified, for example, a fixed cross-sectional effect, a random effect in the period size, or a fixed cross-sectional effect and a random effect in the period size. It should be noted that, however, those with random effects in both dimensions can only be estimated if the panel is balanced (each cross section has the same set of temporal observations).

In order to decide whether a Random Effect or Fixed Effect model is more appropriate, various tests can be performed, the information criteria associated with the models can be taken into account, or the economic context can be taken into account. It is suggested that all these methods should be considered, so that both models can be estimated and the best model can be chosen taking into account the information criteria and/or the economic context. If not, it can be said that observations are random extractions from a sufficiently large population - for example when conducting analyzes at the county, provincial level - it is often preferable to use a fixed effects model (Wooldridge, 2002). Standard errors are assumed to be independent and identically distributed after the individual effects have been removed. The model is also estimated assuming that the errors are homoscedastic. If the heteroskedasticity of the errors is present, the estimated coefficients will be shifted, being necessary to calculate the robust errors correcting the possible presence of the heteroskedasticity.

The most likely deviation from homoscedastic errors in the context of the data panel is due to individual-specific variances. When the errors are homoscedastic within cross-sectional units, but their variance is different between units, we are dealing with heteroskedasticity between groups. Another possible problem is the autocorrelation of errors. Several autocorrelation tests have been proposed in data panel models, but the one discussed by Wooldridge (2002) is particularly attractive because it is based on relatively few assumptions and is easy to implement.

For the present econometric model, β is expected to be positive, as economic theory recognizes the positive impact of foreign direct investment on the evolution of gross national income. Eviews10 was used to estimate the parameters. But, in this study we looked at the fixed effect of the cross-sectional dimension, as an important element that could allow us to formulate conclusions as relevant as possible.

Results and discussions

The verification of the stationarity of the data (taken from Table 2 and Table 3) showed that the GNI series are non-stationary, integrated of the 2nd order, symbolic, I (2), and the FDI series are stationary, in the model with individual fixed effects. Subsequently, the econometric model was estimated, without the use of techniques for fixed/random effects, both in the cross-sectional size and in the temporal dimension.

The resulting regression equation is as follows:
$d(GNI_{it}, 2) = 3724,5248 + 0,1044_i \cdot FDI_{it} + u_{it}$ (Ecuation 1)

It is found that the β parameter is positive, which confirms the hypothesis that the more foreign direct investment increases, the higher the level of gross national income.

Based on the statistics data in period 2009-2017, the analysis was deepened, using panel data for 48 countries of the Europe and Central Asia Region, keeping the variables of the regression model mentioned above. The data have been entered in the Eviews 10 application and the stationaryity of the data was verified and it was found that only at the first differentiation of the dependent variable, the GNI, (the difference between the value recorded at time t and that at time t-1), the series became stationary. For foreign direct investment, the series is stationary, without any differentiation.The verification of the stationaryity of the data showed that the GNI series are non-stationary, integrated of the 2nd order, symbolic, I (2), and the FDI series are stationary, in the model with individual fixed effects.

The presence of specific transverse or temporal effects can be captured and analyzed using fixed and random effects techniques. Models containing effects in one or both dimensions may be specified, for example, a fixed cross-sectional effect, a random effect in the period size, or a fixed cross-sectional effect and a random effect in the period size. It should be noted, however, that those with random effects in both dimensions can only be estimated if the panel is balanced, so that each cross section has the same set of temporal observations.

In this case, the econometric model was estimated, using the techniques for fixed effects, both in the size of the cross section and in the time dimension.

In fixed-effect models, the α_i error component can be correlated with x_{it} regressors, but the hypothesis that there is no correlation between x_{it} and the random component of error and t is still maintained.

The resulting regression equation is as follows:
$d(GNI_{it}) = 19181.8868 + 0.1808 \cdot FDI_{it} + \alpha_i + \beta_t + u_{it}$ (Ecuation 2)

where α_i - fixed specific effects in cross-sectional size (countries);
β_t - specific effects fixed in time;
u_{it} - the residues in the regression equation.

For the panel model with specific random effects of the links between GNI and FDI, the estimators calculated in this model are identical in sign and close in value to the estimators calculated in the fixed effects model. For both models, it is found that the α_i is positive for several countries (especially the richest countries) and β_t is negative for years 2012-2013. This confirms the hypothesis that the more foreign direct investment have been oriented to the countries of the origin, during the crisis.

This means that all the conclusions drawn from the analysis of panel econometric models remain valid. In this analysis, the data were obtained from a credible source, without errors, the chosen model is correct, the linear one, the determining factors have a sufficiently high effect and the errors seem to respect the standard assumptions.

Although foreign direct investment is considered to be a stable investment, helping to strengthen the economies of the destination countries, it has been noted that during the last

economic crisis, they have become vulnerable to global financial shocks. A number of changes have been generated between economic regions, states, industries and sectors of activity, many of the foreign direct investments being oriented towards sectors of activity of national interest, or in strategic areas. This aspect is also confirmed by the model. There is a positive fixed effect of the cross-cutting dimension for several G20 countries (UK, Italy, Germany and France). For the rest of the European Union, the fixed effect of the cross-cutting dimension is negative (with a few exceptions for Poland, Spain, even Romania). This confirms the contraction of foreign direct investment flows in the destination countries, by repatriating profits to the countries of origin, or even moving them to countries with much cheaper resources and labor.

This is also confirmed by the fixed effect of the size of the period. Thus, after the crisis of 2008, the situation seems to have recovered only since 2017.

For example, as a result of the last financial crisis, the profit reinvested by FDI companies in Romania was negative, covering losses, or being transferred to the countries of origin in the form of dividends. Only in 2015, the profit began to be reinvested in Romania, when Romania also gave up the IMF loan. It should be noted that in the period 2008-2014, Romania had to supplement the financing needs with loans from the IMF (NBR report, 2020).

In the midst of the severe pandemic crisis, the immediate impact on foreign direct investment was expected to be dramatic. According to the World Investment Report (UNCTAD, 2020), for 2020, decreases of up to 40% of direct investment flows were forecast, implicitly the decrease by over 50% of the profit reinvested by multinational companies, an aspect that was materialized in Romania. At the end of 2020, according to data published by the NBR report (2020), the flow of foreign investments reached 39.28%, totaling 2,033 million euros, compared to 5,173 million euros recorded in 2019.

The evolution of foreign direct investment in Romania confirms the results of the study and the importance of the investment factor for the sustainable development of the country.

Conclusions

The results confirm economic theory, both in terms of the positive aspects of the benefits of foreign direct investment and in terms of the negative aspects that reflect the weaknesses of the financing system. The positive impact of investment on the gross national income of countries is obvious, global growth and most developments have been based, for the last almost 40 years, mainly on these investment flows. However, the negative aspects and dangers arising from the withdrawal of investments to the destination countries or to other cheaper countries must also be recognized. Although multinational companies have led to the economic growth of many countries (China, Poland, Ireland), with the payment of primary income to the rest of the world (for example, in the form of dividends to the countries of origin of capital), foreign investment has generated negative differences between GDP and GNI There are very few countries where GDP is below GNI, these are usually the countries of origin of capital (for example, Switzerland, France and the Netherlands). The sustainable development requires the adoption of appropriate measures by the decision-maker at the national level, especially in less developed countries, with significant FDI flows to mitigate the negative aspects, mainly from the medium and long term perspective, not only on shortage economic perspectives (FDI flows target countries with cheaper human and material resources and/or comparatively more advantageous tax facilities) but also on environmental one (increasing CO2 emmisions)

The deciding factor is responsible for finding those levers to ensure continuity and resilience in the event of unforeseen events, be they natural disasters or globally propagated shocks.

There are many voices that say that the presence of foreign capital creates a certain dependence on the host economy development (Zaman et al., 2011, Zaman and Vasile, 2012) which could affect sustainable development, an aspect that the decision-maker must take into account when building a country's own development model to achieve optimal sustainable development.

An increasingly frequent approach to foreign direct investment through the exclusive perspective of investment returns could make local economies vulnerable, which should keep the decision-maker vigilant, when targeting strategic sectors and areas of national interest (IMF report, 2019).

From the analysis of the results recorded by the specific effects, we could formulate the hypothesis that the developed countries are oriented towards the path of sustainable development, having all the prerequisites to succeed because the financial resources belong to them.

Through the effects it produces on host countries, FDI must create a balance between negative externalities (environmental pollution, economic dependence on FDI companies policy, repatriation of profits in large proportions, increased risk of post (re) localization effects of FDI, etc.) and the positive ones (employment, exports, etc.), especially from the perspective of sustainability, given the fact that, globally, the adverse effects are accentuated (increase in CO2 emissions, persistence of work poverty, etc.). Given the briefly identified effects on the Romanian economy, future research will focus on comparative case studies on emerging countries from the new member states of the European Union.

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Appendix - Tables

Table 2. GNI by regions, 2009-2017 (million $)

GNI (million USD)	2009	2010	2011	2012	2013	2014	2015	2016	2017
East Asia Pacific	22784581	24911426	26950703	29116896	31317780	33617054	35696747	37910271	40687996
Europe Central Asia	21881482	22887867	24486920	25224305	26212713	27004070	27532921	28473922	30326585
Latin America Caribbean	7036555	7540627	8131902	8539841	8937951	9229644	8797812	8887596	9235328
Middle East North Africa	5886677	6216082	6536278	6921545	7229925	7568454	7889224	8410493	8693918
North America	15781143	16464884	17237045	18113520	18706841	19653796	20267249	20655171	21561048
South Asia	6204128	6736312	7241210	7769939	8376616	9129500	9911593	10725982	11561222
Sub Saharan Africa	2469726	2635900	2846940	3023634	3195802	3487609	3659068	3756443	3909232

Source: Authors' data processing from: https://databank.worldbank.org/home.aspx

Table 3. FDI by regions, 2009-2017 (million $)

FDI (million USD)	2009	2010	2011	2012	2013	2014	2015	2016	2017
East Asia Pacific	287730	496969	560586	517730	590851	632002	616477	530862	512462
Europe Central Asia	586088	692369	999841	882975	701162	508821	811341	1007484	692755
Latin America Caribbean	157340	228132	282416	287479	353572	268528	266751	252523	235922
Middle East North Africa	83844	87567	62347	63269	61052	52340	50902	55813	54698
North America	181944	293975	301557	299770	355234	315953	570586	528996	382066
South Asia	39495	31699	40646	27781	33525	40308	49667	50844	47058
Sub Saharan Africa	36662	32938	42876	39653	41504	42680	45634	31809	24613

Source: Authors' data processing from:https://databank.worldbank.org/home.aspx.