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Economic Growth Model and Foreign Direct Investment: Evidence from Albania

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Abstract

Background: A number of reasons are expressed about the importance of foreign direct investment (FDI) in developing countries. FDI increases the investment capital in the host country and transferring of new technologies, conducts the distribution and enlarges the economic productivity, improves the level of competitiveness and exports, develops new markets, etc. *Objectives:* In this research, the main objective is the economic growth (GDP) analysis in Albania affected by FDI flows and the other fundamental macroeconomic factors of growth/productivity. *Methods/Approach:* The data in this analysis are time series with quarterly frequencies from 1997 to 2018. The econometric model estimation is multifactor regression of the expanded Solow's model. Statistical approach base on logarithm and first-order stationarity. *Results:* Economic growth is a simultaneous phenomenon of FDI, domestic investment, the scale of economic openness (focusing on exports), the aggregate average salary, and the efficient use of public debt, especially external debt. *Conclusions:* FDI flows are the main factor in total economic productivity, and have a larger contribution to the gross domestic product than domestic investment, per unit invested capital, in Albania.

Keywords: FDI flows, Solow's model, economic growth

Introduction

Many economic theories have noticed different ways of how FDI inflows might give benefits to the host country. Even though these parts of economic theories and economic thoughts were real and proved by economical practice in different countries, the other part of the theories are not estimated due to the point of economic views and concepts related to states, regions, or the international economy. In the

research field worldwide, academics and institutions during the last two or three decades, the focus of their findings was about FDI and portfolios of these investments. If we wander to express the chronology of investment analysis and development, we notice three phases: (1) the linkage of economic theories and FDI; (2) the concept of doing business abroad except the origin country; and (3) the analysis of factors and effects with regard to FDI inflows. The first two phases involve the time horizon from the 60s to the 80s, while the third phase started in the 90s and continuous until nowadays.

These last years in Albania's economy, FDIs weight an account for nearly 10% of gross domestic products. According to Albanian's economic institutions are noticed many good effects such as increasing of the investment capital in the host country; transferring of new and novel technologies also and skills and knowledges about them like labor specializing; the distribution and growth of the economic productivity; improvement of the competitiveness level and exports; development of the new domestic markets; etc. On the other hand, the most important and crucial economic issue is the fact that FDI does not affect the level of public debt or does not create accrual debt in the economy. FDI inflows are like a tool with high efficacity for financing the trade deficit and national current accounts of the host country, especially when exists a large gap of trade deficit and many times with big problems.

These last years is developed a new theoretical approach to the negative effect of FDIs in the weak economy (host country with a smaller economy and trade positions). This phenomenon has caused many problems in developing economy with tight transactions in the international trades, because of big foreign investors have abused with dominant trade positions in the host country. In this case, it is worth mentioning the acquisition of concessions by these investors and that the government of the host country uses these investors as a major achievement in its policy agenda. Furthermore, these foreign investors blessed by the host country government, sometimes in an aggressive way use price transferring for the only reason to minimize fiscal payments.

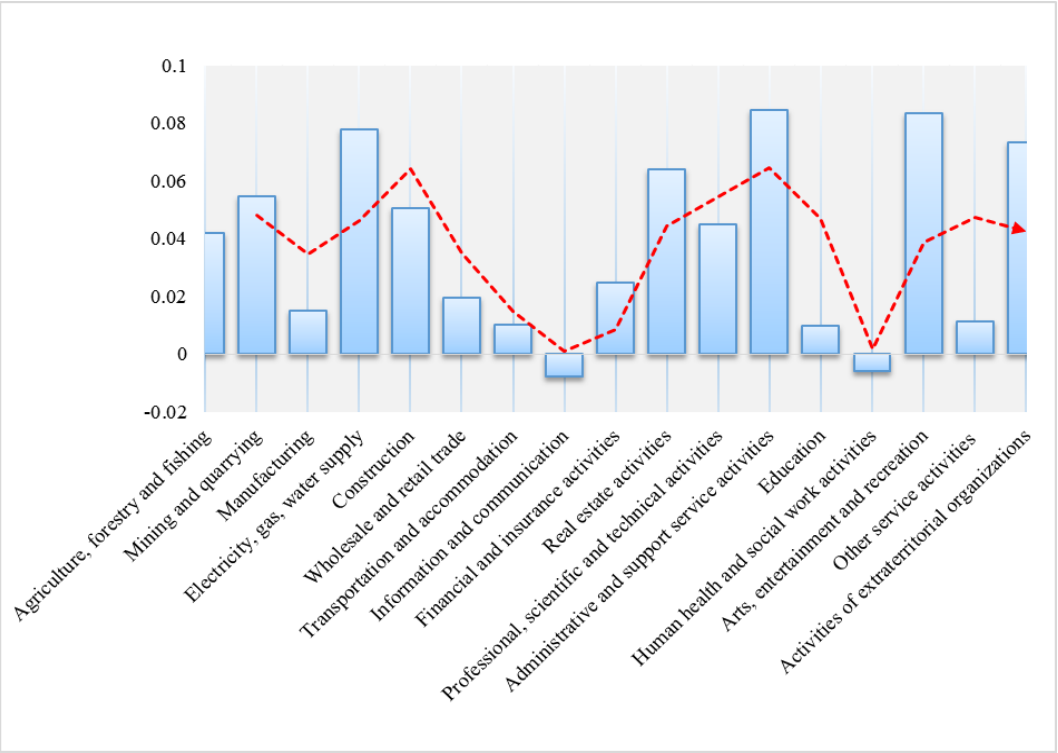
The aim of this study is to analyze the FDI inflows in Albania as a very important investment in this economy, but these flows during last years have had up and down with high volatility. In order to identify the existence of sustainability of FDI or not, Figure 1 shows the intensity of FDI inflows by economic sectors (time series data 2016-2019 with average quarterly frequency).

Figure 1 shows the volatility of FDI inflows and the marginal effect with high volatility, meanwhile, the intensity of inflows is declining or is taking a negative level in both economic sectors. In recent years, the analysis revealed that Albania as a host country is getting worse and worse especially in some sectors for attracting foreign investors.

Base on all over as mentioned above, this research will develop the effect of FDI inflows in the Albanian economic growth. The proceeding data are time series of macroeconomic indicators from 1997 to 2018 (with quarterly frequency). It will be

used the autoregressive model to get the best findings. In this study will be analyzed the elasticity of GDP related to FDI and other macroeconomic factors as the average salary, the economic openness, external public debt, domestic investment, remittances, and interest rate of the loan, etc. We highlight the fact that not considering the effect of covid-19 pandemic and FDIs into Albanian economic growth.

Figure 1. Intensity of FDI by Sectors (average 2016 – 2019)



Source: Authors' chart in Excel. Data from Bank of Albania.

Literature Review: FDI and its effect on economic growth (GDP)

A number of economic model and theories were approached by the economic researchers and the economic theorists, for explaining the main factors which achieve to increase economic growth and to identify the big differences of economic growth rates between different country incomes. To be more meaningful, it is needed to analyze these theories in two time-phases:

First phase: Neoclassical growth theory (1960-1990). This theory explains economic growth like e mathematical function of "labor", "capital", and "technology". The first model for this kind of evaluation was invented by Robert Solow (1957), who was a Nobel Prize winner. This macroeconomic model is valuable for discrete and continuous data, but the most using model is the discrete data version model. Lately,

Solow's model is mentioned with the name "exogenous growth" due to not analyzing internal correlations between production factors. According to exogenous growth theory, the model must consider the other factors as economies of scale, income growth, technological changes in the production process, etc.

Second phase: Modern economic growth theory (after the 90s). The variable "labor" in Solow's model shows the "labor force" related to only the basic capabilities of employees. The simplest way for taking into consideration the effect of human capital in economic growth in Solow's model is the involvement of this factor as a production factor. Many years later from the invention of Solow's model, the researchers Romer (1990), Mankiw, Romer, and Weil (1992), enhanced and enlarged the concept of growth theory by giving a modern usage with a new variable "foreign direct investment". Furthermore, these researchers declared that technological progress is the main force that affects economic growth in a country. According to their studies, FDIs are an account of capital invested in the host country, as well as major contributors to the import of new and advanced technologies in these countries. Also, exist many studies in favor of FDI and correlation with economic growth for host countries by estimating other extra factors which are derivated: the rise of human capital skills, the improvement of market competitiveness, etc. (Dunning, 1993; Borensztein et al, 1998; and De Mello, 1999; Blomstrom, Globerman, and Kokko, 2000).

Keller and Yeaple (2003) found out that existed a positive correlation with statistical significance between FDI and GDP of host countries. As a matter of fact, the main conclusion is a strong and positive correlation with statistical significance between FDI and economic sectors with more new technology in use. Taking this fact into account, as a consequence, FDI has a positive impact on growth productivities. In the same conclusion are and researchers Griffith, Redding, and Simpson (2003) who analyzed the growth dynamics of productivity in the United Kingdom for years 1980 - 1992 (analyzing the growth dynamics of productivity for international corporates). In addition to this, they concentrated on two mechanisms about how FDI inflows could affect the host country: (1) the level of economic growth; (2) the scale of domestic productivity.

The positive correlation with statistical significance between FDI and GDP of host countries exist in many studies, but with more impact in the government policies are:

- according to the study of Nair-Reichert and Weinhold (2001), the average value of FDI has a positive correlation with GDP with data from 24 developed countries;
- also, Choe (2003) in his study found out that FDIs have causality effect (with statistical significance) in the economic growth for 80 host countries (developed and developing economies);
- the same conclusion is Solomon (2011) who analyzed 111 host countries (developed and developing economies);

- when the host country is a small economy, like Albania, or Western Balkan states, FDI inflows are the major potential of economic growth (Lleshaj and Korbi, 2019).

However, according to Jurčić, Franc, and Barišić (2020) the institutional quality factors have not been important in determining FDI inflow per capita in Croatia

On the other hand, we can mention case studies that conclude the negative correlation between FDI with economic growth. For instance, researchers Aitken and Harrison (1999) found out this conclusion for the economy of Venezuela state. However, Hanson (2001), developed a research based on three case studies in different countries, and his conclusion was in favor of the weak or not statistical significance between FDI and GDP.

Methodology: The extended Solow's model and FDIs

The simplest function of macroeconomic growth by Solow's model is the output function Y = f(K, L), with K is denoted the capital in the economy, and L is denoted the labor force. This model assumes that the output function represents constant scale income. The basic Solow's model shows that capital accumulation cannot explain the increase in economic sustainability, because high savings rates in the economy lead to temporarily high economic growth, as well as, the economy is being approached the case in which capital and output are constant. This model after 1990 was expanded by including into the production function an endogenous variable which is technological progress that over time expands the productive capacities of the economy. In the modern concept, Solow's extended model includes endogenous effects, because of endogenous" economic growth models have been applied to see the effect of FDI on a host country's economic growth. According to the Cobb-Douglas function, it follows the extended Solow's model which has the following equation:

$$log(GDP_t) = \beta_0 + \beta_1 log(FDI_t) + \beta_2 log(DI_t) + \beta_3 log(AS_t) + \beta_4 log(IRL_t) + \beta_5 log(EO_t) + \beta_6 log(RPD_t) + \beta_7 log(R_t) + \varepsilon_t$$

Where β_1, β_2, ..., β_7 are respectively the elasticity of the dependent variable with respect to the independent variables and *t* is the time dimension of the series $t = 1, 2, ..., T$ and ε_t is the term of the model error . The description of the variable is in Table 1. Also, to evaluate the parameters β_i of the model will be used the ordinary least squares method (Gujarat and Porter 2009). In order to these estimations to offer conclusions with high statistical reliability (the best statistical confidence), the model will be tested for all the main assumptions of the Gauss-Markov Theorem: (1) the linearity must be according to the parameters β_i; (2) the mathematical expectation of the residuals is $E(\varepsilon_t) = 0$; (3) the residual variance ε_t is constant, $V(\varepsilon_t) = E(\varepsilon_t^2) =$ constant; and (4) the covariance $Cov(\varepsilon_i; \varepsilon_j) = 0$ and $Cov(x_i; x_j) = 0$ for each $i \neq j$, for every independent variables x_i.

Table 1. Description of Macroeconomic Variables, Time Series and Data Source.

Variables	Description	Data source
	Dependent variable:	
GDP	Gross Domestic Product (unit of measurement in ALL, at current prices).	**INSTAT (statistical database)**
	Independent variables:	
FDI	Foreign Direct Investment inflows (unit of measurement in dollars, at current prices, converted into ALL).	**Bank of Albania (www.bankofalbania.org)**
AS	Average salary in the economy, or labor cost (unit of measurement in ALL).	**INSTAT (statistical database)**
EO	Economic openness, or the size of foreign trade in relation to GDP. Economic openness = (import + export)/GDP, (unit of measurement in %).	**INSTAT (statistical database) Ministry of Finance (www.financa.gov.al)**
EPD	External public debt (unit of measurement in ALL).	**Ministry of Finance (www.financa.gov.al)**
DI	Domestic investment (unit of measurement in ALL).	**INSTAT (statistical database)**
R	Remittance flows in the economy (unit of measurement in ALL).	**Bank of Albania (www.bankofalbania.org)**
IRL	**Interest rate on loans of businesses in the economy (with a term of 12 months, unit of measure in %).**	**Bank of Albania (www.bankofalbania.org)**

Source: Variables selected by the authors.

In all regression models with time series data, they must take into account their stationarity. Estimating the stationarity of time series (i.e. the time series of values that has stochastic behavior) the two most commonly used tests are: the Augmented Dickey-Fuller (ADF) test (Dickey, et al., 1979) and the Phillips-Perron test (PP) (Phillips and Perron, 1988). A time series variable is stationary (i.e. stable) if its mean and variance are constant over time and the covariance between the two values depends only on the length of the time period that separates them and not on the time moments when they occur. Only after a time series is stationary is it accepted as a dependent or independent variable in a regression model (Hill, Griffiths, & Lim., 2010). According to ADF test, we test whether a time series of data is influenced by its initial value, by the trend of time or by both simultaneously. The conversion of a time series to stationary the method is realized with differences that are also tested. The basic equation of the ADF test with respect to constant and trend is:

$$\Delta X_t = \lambda_0 + \lambda_1 t + \lambda_2 X_{t-1} + \sum_{i=1}^{k-1} \beta_i \, \Delta X_{t-1} + \varepsilon_t$$

Where the time series X_t (the variable taken in the study) in the form of the first difference (integral of the first order) is $\Delta X_t = X_t - X_{t-1}$ in the period t; λ_0 is the constant

of the terms; *t* is the time trend; and *k* is the number of parameters being evaluated. Based on the above equation, is tested the null hypothesis: H_0: $\lambda_2 = 0$ (the series has a unitary root i.e. it is not stationary). Accepting or not of null hypothesis will be measured with the probability of statistical significance $p < 0.05$, according to the maximization of the greatest probability of occurrence (AIC). Also with the same statistical importance will be tested the return of a series by means of differences in stationary.

Empirical analysis and findings: Estimation of the Growth Model

According to the empirical analysis for the extended Solow's model in Albania, we identify the relationship of the dependent variable gross domestic product (GDP) with the independent variables shown in the table 2.

Table 2. Parametric Estimations of the Economic Growth Model in Albania.

Dependent variable: Δlog(GDPt)	Coefficient or model parameters	Probability of statistical significance
Constant	+ 0.0202	0.0001
Independent variables:		
Δlog(FDIt)	+ 0.0506	0.0004*
Δlog(ASt)	+ 0.4354	0.0109*
Δ2log(DIt)	+ 0.0855	0.0000*
Δlog(IRLt)	+ 0.3469	0.0674**
Δlog(EPDt)	- 0.2291	0.0003*
Δlog(Rt)	+ 0.0334	0.1354
Δlog(EOt)	- 0.2472	0.0000*
AR(1)	- 0.2653	0.0059*
Adjusted R2	0.6042	---
F-statistic	16.2631	0.0000*
Wald F-statistic	11.5193	0.0000*
Durbin-Watson stat	2.1390	---

Note: AR(1) is the first lag of the residual (error term of the model) for eliminating autocorrelation. Also, is noted: *) for statistical significance level of $p < 5\%$ and **) for statistical significance level of $5\% < p < 10\%$.

Source: Data proceeding in Eviews 11 by authors.

At first, through the ADF-test, time series were transformed into stationary (all series are first-order stationary except variable ID which is second-order stationary, appendix), and then these stationary series were used for parametric estimating of the economic growth model in Albania as following:

$$\Delta log(GDP)_t = 0.0202 + 0.0506*\Delta log(FDI)_t + 0.4354*\Delta log(AS)_t + 0.0855*\Delta^2 log(DI)_t + 0.3469*\Delta log(IRL)_t - 0.2291*\Delta log(EPD)_t + 0.0334*\Delta log(R)_t - 0.2472*\Delta log(EO)_t - 0.2653*\varepsilon_{t-1} + \varepsilon_t$$

According to the Fisher test, the model is statistically significant with significance level p < 1%. The model also has a satisfying determinant coefficient referring to real economies, with an adjusted value R^2 = 60.4%.

Table 3. Analysis of the Residual (Economic Growth Model).

The test	*Description*	*Test result*
Model function: Ramsey RESET-test	*This test estimates if the model function is appropriate or not. Null hypothesis: "the function of the model is logarithmic"*	*According to the Ramsey RESET test, the form of the model function is logarithmic (with statistical significance level p < 1%).*
Multicollinearity: VIF-test (Variance Inflation Factors)	*This test estimates if the independent variables are correlated with residual or error of model, ε_t. Null hypothesis: model does not have multicollinearity*	*According to the VIF test all independent variables are less than 10 d.m.th our model does not have multicollinearity. (this is explained by the use of time series differences to convert them to stationary).*
Autocorrelation: LM-test (Breusch-Godfrey)	*This test estimates if the residual of the model, ε_t, has or not serial correlation. Null hypothesis: model does not have autocorrelation*	*Doing the autocorrelation test with two-time delays (suggested by the test itself), it figures out that our model has waste autocorrelation. Ky autokorrelacion mund të rregullohet duke identifikuar korrelacionin e mbetjes witht me ε_{t-1}, d.m.th. me AR(1).*
Heteroskedasticity: Breusch-Pagan-Godfrey and Wald F-statistic	*This test estimates if the residual of the model, ε_t, has or not constant variance. Null hypothesis: model does not have heteroskedasticity*	*According to the test null hypothesis is rejected, so the model has heteroskedasticity. Eliminating this phenomenon is done by adjusting the standard deviation of the residual.*
Normality of the residual distribution ε_t: Jarque-Bera-test	*This test estimates if the residual of the model, ε_t, has or not normality distribution. Null hypothesis: the residual of the model has normality distribution.*	*According to the test null hypothesis is rejected. Albanian's economy analyzing by the variables mentioned in the model, has a problem with normality distribution of residual, this means that model is usable and valuable to forecast data up to mid-term.*

Source: The table summarizes the tests once they were proceeded EViews 11 by the authors. Note: AR(1) is the first lag of the residual (error term of the model) for eliminating autocorrelation.

This economic growth model has successfully passed all the criteria of creating efficient models according to the main assumptions of the Gauss-Markov theorem (table 3), so the model is statistically useful to explain the direction and strength correlation of the variables. Also, it has parameters and direction of correlation in relation to macroeconomic theories, as written in the empirical literature. This situation expresses that in general Albania's economy and its macroeconomic indicators have a trend like economies around the world, which shows the positive effect of FDI in the host country.

Further analyzing the model and its parameters, we have used t-test which estimates statistically significant positive correlations (with significance p < 5%) between gross domestic product and variables: foreign direct investment; the value of the average

salary; and domestic investment in the economy; as well as a weak positive correlation with statistical significance (with significance p < 10%) with the aggregate interest rate on loans of businesses in the economy. Whereas, gross domestic product in Albania has a negative correlation with statistical significance (with significance p < 5%) with the value of external public debt and the scale of economic openness. In addition to the findings of the econometric testing, the model does not have a statistically significant correlation between gross domestic product and the level of remittances. Also, the constant of the model is a statistic significant parameter (with significance p < 5%) which expresses the contribution of the technological progress level in Albania's economy. As we see the technological progress is a component of the production function that has always been affected by a very little positive impact on GDP growth, only average 2% of economic growth is caused by technological progress. In the following, we will analyze the contribution of each variable to GDP growth in Albania according to the extended Solow's model.

Capital Investment. The model estimates the fact that if foreign direct investment (FDI) will increase with 1% (under constant conditions of other variables) then GDP growth will increase by 0.05%. While, if domestic investment (DI) will increase with 1% then GDP growth will increase by 0.09%. There are two main economic reasons for this change: Firstly, the domestic investment (private and public) from 1993 to 2007 had had an average weight of capital or multiplicator about 11 times higher than FDI whereas from 2008-2018 it had an average weight of capital about 5 times higher than the FDI. In recent years, exist a decrease in the multiplicator of domestic investment and negative marginal investment higher than increasing FDI. As a result, for the same unit of capital invested, FDI has been more profitable for the Albanian economy than domestic investment. This conclusion proves one of the main hypotheses of this study: *"Foreign direct investments are a major factor in total productivity in the economy, and has a greater contribution to the gross domestic product than domestic investment, per unit of invested capital."* Secondly, FDIs in Albania have a positive impact on the level of employment, i.e. the number of employees (especially in the tailoring enterprises), having an "endogenous" impact on employment growth. As a result of the high informality of the Albanian employment market, measuring the "endogenous" effect of FDI on the number of employees and the unemployment rate has a high error (this is the reason why this effect was not measured by the model).

Average salary (AS). According to the model, if the aggregate average salary will increase by 1% (under constant conditions of other variables) then GDP growth will increase by 0.44%. The average salary tends to increase in the economy the level of disposable income and causing an increase of population well-being as well as increasing the level of total productivity in the economy. In the Albanian economy, the variable average salary has an important impact (i.e. GDP growth has a higher elasticity with the average salary level than any other variable in the model). So, one

of the government policies with a focus on economic growth should use the average salary as an effective mechanism.

Interest rate on loans (IRL). According to the model, if the interest rate on loans of businesses in the economy will increase by 1% (under constant conditions of other variables) then GDP growth will increase by 0.35%, although the correlation is weak. Lending has two destinations, consumption and investment. These also constitute some of the components of GDP calculation. But with a glance seems contradictory the positive link between the aggregate interest rate on loans and GDP. In this case, the deregulation of the credit market in the Albanian economy and the relationship with the cost of credit, basically should be seen through the monetary policies of the Bank of Albania. Bank of Albania from 1991/2 to 2000 has used direct monetary policy instruments by setting credit (rate) ceilings, then from 2001 to 2018 it has used indirect monetary policy instruments using the basic interest rates by decision of the Supervisory Council of Bank of Albania. Throughout the history of the Albanian banking system, privatization starting from 2003 to 2005, and the birth of many other commercial banks (with foreign capital), lending was directly influenced by commercial banks themselves. One of the main goals of the money supply and related to monetary policies has been the price stability or the inflation stability on the scale of 2-4% and especially in recent years 2-3%. This also shows the positive and statistically significant correlation of the lending interest rate with GDP.

External public debt (EPD). According to the model, if the external public debt will increase by 1% (under constant conditions of other variables) then GDP growth will decrease by 0.23%. According to publications of the Ministry of Finance, this external debt has been taken for the most part by the IMF and the World Bank. Funds provided by the World Bank have often been socially aimed at reducing poverty in the country. Another reason for the negative correlation of public external debt with GDP is the impact of the exchange rate, the devaluation of the ALL against the Euro and the USD has cost the public budget by increasing the cost of these debts.

Economic openness (EO). The model estimates the fact that if economic openness will increase with 1% (under constant conditions of other variables) then GDP growth will increase by 0.25%. External trade relations are not contributing positively to economic growth. This is explained by the dominance of imports compared to exports, for all the time taken in the study.

Remittance (R). The economic growth model for Albania expresses a positive correlation of remittances flows in the economy with GDP but not statistically significant. The value of remittances has a breaking point in the third quarter of 2007. From 1993 to the third quarter of 2007 there is a positive impact of remittances on GDP, with weak statistical significance (with $p < 10\%$). While, after the third quarter of 2007, remittances are statistically insignificant to affect GDP growth. Calculating the value of remittances for many years has had high economic informality (in transition years). A significant proportion of remittances are made in cash from the

physical movements of the migrants themselves. Last years, the importance of remittances in Albania's GDP has decreased, especially this is reflected in the devaluation of the ALL currency against the Euro and USD, coming as a continuous phenomenon of the effect of the global financial crisis 2008 and the real economic crisis that followed in the European Union (Greece and Italy are the most part of the Albanian emigrants), as well as by the increase in the emigration rate of Albanian families in different countries of the world.

Conclusion

In the first half of the last decade, the rate of change of foreign direct investments in Albania is high, while the intensity is decreasing or becoming negative in some economic sectors, making the host country a less attractive place for foreign investors from many origin countries. According to extended Solow's model, this study identified statistically significant findings as following:

FDIs are an important factor of economic growth for Albania and for the same value of invested capital, economic growth has a higher scale of elasticity related to FDIs than domestic investments.

According to extended Solow's growth model, during the period 1997-2018, the rate of technological progress (the constant of the model) has given a contribution of 2% of GDP growth. This is another reason for attracting FDI and to increase the rate of technological progress in the Albanian economy.

Economic growth in Albania is a simultaneous phenomenon of FDI, domestic investment, the scale of economic openness (focusing on exports), the aggregate average salary, and the efficient use of public debt, especially external debt. In addition to this argument FDIs have a direct impact on GDP, also have an endogenous positive impact on domestic investment, employment, etc.

Taking all statistical analysis, findings, and conclusions into account is very essential that central and local government institutions, funds and financial advisory institutions, and all stakeholders, may consider these findings of this scientific paper for different decision-making such as attracting foreign investors, salary level analysis, increasing the formalization of the economy, etc.

The main limitation of this study derives from the shortcomings of national institutional measurements and individual economic data by sectors. This limitation narrows the concept of the composition of the macroeconomic factor in economic growth. Also, the study did not use the method of finding endogenous and exogenous factors because the identification of instrumental sets is not very clear for the case of Albania, due to no clear economic evidence and policies with a time series effect. Such an analysis is also a challenge of ongoing studies in this field.

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