THE RELATIONSHIP BETWEEN DIRECT INVESTMENT AND GDP IN ROMANIA

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Abstract: According to the general theory, direct investment has many positive effects on the economy of a state. Romania has attracted a growing number of direct investments. Romania's economy is still marked by the transition from a closed to a market economy. Thus, the effects of communism are still felt today. However, it is making every effort to develop and provide its citizens with a better way of life in line with European norms. It is well-known that direct investments in a country creates opportunities for its economy and people. Various empirical studies have analysed the impact of direct investment on the GDP growth of a country. The present study explored the relationship between direct investment and Romania's GDP using bivariate VAR models. Granger causality principle was used to test the hypothesis that the volume of direct investments in the past explains the current GDP values and the current volume of direct investments. The study found that the rising trend in direct investments in Romania leads to the growth of GDP. The estimated VAR models for Romania provide evidence that increasing GDP results in increased direct investments in the country, reinforcing the idea that investors are sensitive to stable macroeconomic conditions. Subsequent research could also include a comparative study with European Union countries or the introduction of other variables such as inflation rate, unemployment rate, labor costs, etc.

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Introduction

Romania's current economy is a globalized economy impacted by the Covid-19. Both these factors are significant for the level of direct investments in a country. The direct investment significantly contributes to job opportunities, knowledge, transfer and increasing competition in the domestic market. Earlier, Romania was a part of the communist bloc and, during the 1990s, transformed into an open economy. However, it encountered various obstacles during the transition, like political instability and complex bureaucracy. Despite that, there were and still are many investors willing to invest in this country owing to its competitive strength of low labor cost. This paper aims to provide empirical evidence that direct investment plays a vital role in the economic growth of a country in transition in Eastern Europe. The study covers a long duration, starting from the economic crisis of 2007 to the Covid-19 and the most recent country's electricity crisis.

Literature review

According to the neoclassical model, direct investment contributes to a country's economic growth by increasing the volume of investments and their efficiency. In contrast, the endogenous model holds that direct investment provides economic security by tranferring advance technologies from developed economies to developing countries (Borensztein et al., 1998).

Authors like Borensztein et al. (1998) argued that direct investment positively affects on the economic growth if the recipient country has high human capital. In other words, a high level of employment skills can result in higher growth rates at a certain level of direct investment.

Balasubramanyam (1996) supported the hypothesis that direct investment is more important for the economic growth of exporting countries than the importing ones. In other words, direct investment's impact on a country is driven by its trade policy.

Bengoa and Sanchez-Robles (2003) positively correlated direct investment with the economic growth of a country, but with special considerations to human capital, economic stability, and liberalized markets of the beneficiary countries.

Curwin & Mahutga (2014) analysed the impact of FDI on post-socialist countries. The study concludes that direct investment hindered these countries' short-term and long-term economic growth. These researchers attributed their findings to a poor institutional environment and overwhelming the domestic markets with FDI in a quick span of time.

According to the research work discussed above, direct investments alone cannot positively affect the economic growth of a country without the intervention of other variables. Therefore, the present study has analysed the relationship between direct investments and GDP in Romania without intervening variables like the level of human capital, technological development, direct investments policy, etc.

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Data and methodology

This paper aims to examine the relationship between direct investment and Romania's GDP.

Data analysis has been done using the unit root test, the Granger causality test, and the bivariate vector autoregressive model (VAR) (Cicak and Soric, 2015).

Log differences are calculated to estimate the growth rates for both variables under study. Later, the Augmented Dickey-Fuller test will check the stationarities. Finally, Granger's causality principle will be used to test the hypothesis that the volume of direct investment in the past explains the current GDP and whether previous GDP values can help explain current direct investment values. Furthermore, the relationship between the chosen variables will be determined with the help of the VAR model.

Table 1 illustrates the variables used in the study.

Table 1: Variables of the study

Country	Period of time	Variables	Data source
Romania	2007 Q1-2021 Q3	Direct investment, million euro	National Bank of Romania, 2022
		GDP, million euro	Eurostat, 2022

Source: Author

The analysed time, 2007-2021, begins with an economic crisis and ends with a health crisis transformed into an economic crisis. Due to Covid-19, the world economies came to a halt and led to an energy crisis in Romania. During the lock-down most companies relieved or laid off their employees; consequently, electricity consumption was low. However, with the gradual opening of the economy, production has rebounded, energy demand has increased, and as a result, electricity prices exploded in the country.

Therefore, the Covid-19 pandemic triggered the electricity crisis in Romania. Initially, at the time of the declaration of a state of emergency, all activities could continue to provide access to electricity and the Internet. With the declaration of the state of alert in Romania, physical activities were permitted. As a result, high electricity demand from the companies culminated in liberalising the electricity market. Furthermore, in the absence of regulations, electricity prices have skyrocketed. There has also been an exponential rise in emission allowances and exceptionally high energy share prices were traded in the spot market

The decision to adopt the Delegated Act on including nuclear energy and natural gas in the European taxonomy was enforced at the European level. With the other member states, Romania consolidated its energy security through wise and balanced exploitation of energy sources. Investments in green energy are also being encouraged at the European level. Moreover, in Romania, it will be possible to use European funds, through the National Recovery And Resilience Plan and the Modernization Fund, worth "over 16 billion euros in areas such as renewable energy, coal replacement, nuclear energy, cogeneration, biofuel, modernization of energy infrastructure" (Ministry of Energy, 2022). Investment in the energy sector, especially in green energy, is currently being encouraged in the country. The pandemic has prompted governments to act immediately. Furthermore, the border war with Ukraine has forced the Romanian state to reduce its Russian gas imports. Therefore, it is also investing in gas exploitation in the Black Sea.

Results and Discussion

Stationarity, through the Augmented Dickey-Fuller test

Direct investments

To check the stationarity of data, a logarithm is calculated for the series of direct investments, and the ADF test (with / without trend) was applied. As a result, the following hypotheses are established:

Hypotheses:

H_0: Log direct investments has a unit root

H_1: Log direct investments has not a unit root

It is noticed that the series is not stationary with a p value greater than 0.05%. So, the test with a difference is applied.

Hypotheses:

H_0: D (Log direct investments has a unit root)

H_1: D (Log direct investments has not a unit root)

It is noticed that the series is stationary with a probability of 95%; p value below 0.05%.

GDP

Logarithm for the series of GDP was calculated and the ADF test (and with / without trend) was applied. Correspondingly, the following hypotheses are established to see if the series are stationary:

Hypotheses:

H_0: Log GDP has a unit root

H_1: Log GDP has not a unit root

It is observed that the series is not stationary with a p value greater than 0.05%. So the test with a difference is applied.

Hypotheses:

H_0: D (Log GDP has a unit root)

H_1: D (Log GDP has not a unit root)

It is noticed that the series is stationary with a probability of 95%; p value below 0.05%.

ADF test results:

Table 2 reports the results of to the ADF test.

Table 2: ADF test results

Variables	ADF test	Deterministic components of the model
Direct investments	No trend: -8.631331 with a prob. of 0.000 With trend: -8.541680 with a prob. of 0.000	Growth trend
GDP	No trend: -3.250425 with a prob. of 0.0224 With trend: -3.580313 with a prob. of 0.0410	Growth trend

Source: Author

Granger causality

Hypotheses:

H_0: past direct investment values do not help explain current GDP values

H_1: past direct investment values help explain current GDP values

And

H_0: past GDP values do not help explain current direct investment values

H_1: past GDP values help explain current direct investment values

First, the optimal number of lags to use are determined. It is decided that 3 tests: AIC (Akaike), SC (Schwarz) and HQ (Hannan-Quinn) will be used to determine this optimal number of lags.

Table 3 reports the results of Granger causality tests.

Table 3: Granger causality test results

The null hypothesis	No. of lags	$\chi 2$ test	p-value
Dlogdirect_investements does not Granger cause dloggdp	4	5.067965	0.2804
Dloggdp does not Granger cause dlogdirect_investments	4	9.318050	0.0536**

*** I will reject the null hypothesis with a prob of. 10%*

Source: Author

AIC, SC and HQ tests suggest 4 lags as optimum. The results of the Granger test show that GDP positively causes direct investment, with a probability of 0.0536% which is lower than the significance level of 10%. Given that there is only a statistically significant value for the second regression model, unidirectional causality is reported from GDP to direct investment.

Thus, during the analysed period, the level of GDP growth determined the increase of the level of direct investments in Romania. Pro-investment policies and preferential tax treatment attracted investors for direct investments in the country.

The VAR model

The relationship between log direct investment and log GDP will be analysed using the VAR model. The study uses variance breakdown analysis and impulse response functions.

Decomposition of variance

For calculating the variance decomposition, the variance-covariance matrix of the VAR residues are orthogonalised. Cholesky factorisation is used. In this factorisation, the order of the variables plays a key role and in the study it is based on the results of the Granger causality test.

Cholesky factorisation reveals the order of the variables as dloggdp followed by dlogdirect_investments.

Table 4 illustrates the results of the Analysis of Variance Decomposition.

Table 4: The results of the Analysis of Variance Decomposition

Period	Decomposition of GDP variance		Decomposition of direct investment variance	
	dloggdp	dlogdirect_investments	dloggdp	dlogdirect_investments
1	100.00	0.00	1.66	98.34
2	92.51	7.49	1.82	98.18
3	92.44	7.56	2.93	97.07
4	91.02	8.98	2.94	97.06
5	93.50	6.50	3.38	96.62
6	91.54	8.46	3.66	96.34
7	91.72	8.28	3.69	96.31
8	91.39	8.61	3.75	96.25
9	93.03	6.97	4.04	95.96
10	91.52	8.48	4.28	95.72

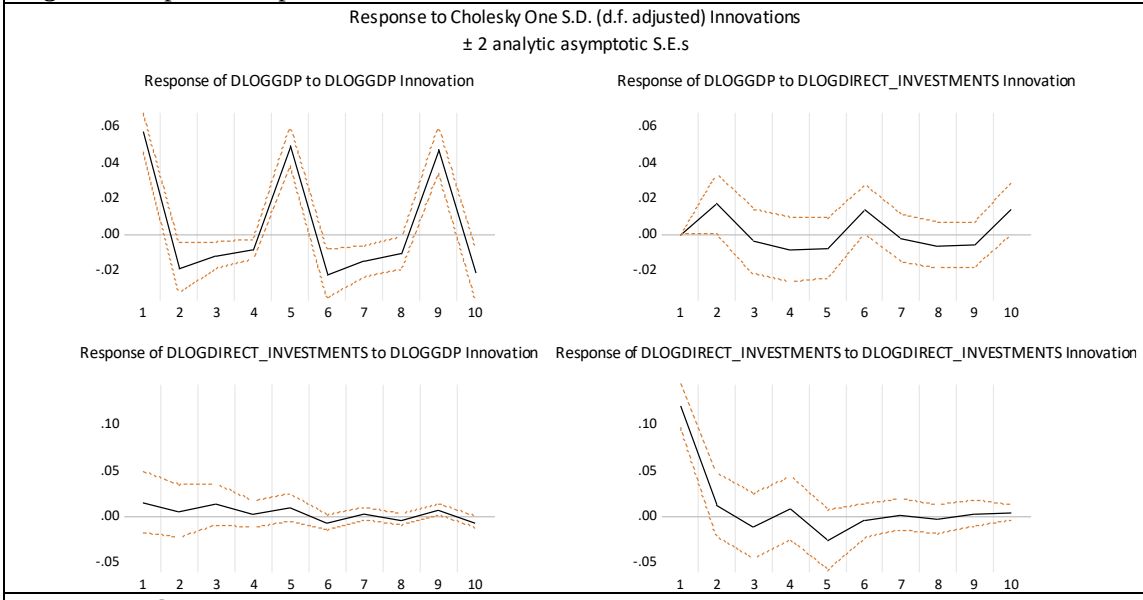
Source: Author

In the short run GDP is self-explanatory; other variables have no influence. According to the estimation results it is observed that there is one way positive causality from GDP growth rate to direct investment growth rate in Romania. Over time, direct investment has a positive influence, up to 8.98%, on its GDP, which stabilises at 8.48%, so it can be said that direct investment in Romania positively influences 8.48% of its GDP.

Impulse

This section presents the impulse response of one variable to the shock in another variable.

Figure 1: Impulse Response



Source: Author

Diagonally the response of GDP to a shock (impulse) can be observed.

The second graph represents the response of GDP in Romania to a boost in its direct investments. It is indicated that with an increase in direct investment, the GDP will also increase and vice versa. This

creates a growth trend for both direct investment and GDP. That is, a positive shock in dorect investment positively affects the GDP.

The third graph depicts the response of direct investment to a GDP shock. When GDP declines, direct investment also responds with a decline. In this way, it returns to a medium level.

Conclusions

Based on the empirical analysus, the study concludes that direct investments positively affect economic growth of Romania during 2007 Q1-2021 Q3. The analyzed time started with an economic crisis and endeds with a health crisis transformed into an economic crisis.

All countries in the world strive for economic growth, and capital is its fundamental source. Direct investment is a significant source of international capital. Previous studies have concluded that direct investment does not necessarily have an independent and positive impact on the GDP growth of a country. Generally, other variables like inflation, unemployment, development of the financial system, etc. intervene in the relationship between direct investment and GDP. The findings of the study concluded that just direct investments do have a positive impact on the growth rate in the GDP of Romania.

Finally it can be concluded that Romania has managed to attract a relatively large number of investors due to its relatively low cost of labor and a favourable investment climate.

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