

Models of Foreign Direct Investments Influence on Economic Growth. Evidence from Romania

Mihai Daniel Roman and Andrei Padureanu

Abstract—Last decades developing and emerging countries' priorities shifted towards international capital flows, as a complementary way to finance domestic economic growth. But also last years capital flows and their components are affected by domestic and global crisis that frequently destabilize both developed and developing economies. Central and Eastern Europe countries are looking for foreign direct investments as a critical component to solving capital deficit problem. But the causality relation between foreign direct investments and growth is not necessary unidirectional: several theoretical works argued that foreign direct investments is a direct result of growth but other studies show that foreign direct investments generate economic growth.

In our paper we propose to model the relationship between foreign direct investment and economic growth in transition countries, especially in Romania. We use a neoclassical model with Cobb-Douglas production functions to analyze the effects of FDI on Romanian growth, followed by a short term GDP prognosis. Our basic results show that Romanian economic growth was positively influenced by fiscal policy, FDI and also by adhesion to EU.

Index Terms—Foreign direct investments, economic growth, macroeconometrical model, prognosis.

I. INTRODUCTION

The most important world organizations (like IMF, WB, OECD or UNCTAD) consider control and long term interest as key word in FDI's evaluation and as source of foreign portfolio investments differentiation. One possible definition of FDI is: "FDI represent a long-term investment relationship between a resident entity and a non-resident one; it usually implies a significant degree of influence from the investor on the management of the direct investment enterprise in which he/she invested."

Conceptually, foreign direct investment supposes tangible or intangible actives internalization with some restrictions: economic agents are from different national spaces: investor are from origin country and direct investment is made in host

country; there exists a long term interest of investor; investor controls his investment.

There is not a common practice about FDI content. But, almost all authors and international organisms consider FDI flows the following: paid-up capital and the reserves related to a non-resident investor owning at least 10 percent in the subscribed share capital of a resident enterprise, the loans between this investor and the enterprise he/she invested in, as well as the reinvested earnings. FDI is not only from transnational companies, there are physical persons, investment funds or firms that are contributing to FDI flows. But transnational companies realize the majority of foreign direct investments especially by international mergers and acquisitions.

FDI's liberalization helps transnational expansion and increase industrial production in whole world. In this case FDI represents a market integration mechanism and also a link between national productive systems.

Central and Eastern Europe countries are looking for FDI as a critical component to solving capital deficit problem. Consequently, economic research identifies two different types of analysis: studies focused on growth financing capacity and studies focused on global impact of FDI on growth. Various results argued that FDI is a direct result of growth but other studies shows that FDI generate economic growth. It is a reality that countries with extended rates of FDI/ GDP had greater growth rates. Also, resources efficient allocation increase economic growth.

One question difficult to answer is if foreign direct investments (FDI) must be included in current account deficit sustainability level. FDI is more stable than financial flows due the fact that foreign investors have long term contracts. FDI also increase exports and improves external balance. In transition countries, dynamics of fiscal processes affect consumption, internal and foreign investments and growth.

In this context, in our paper we study the relationship between foreign direct investment and economic growth in transition countries, especially in Romania.

II. LITERATURE

Generally, banks efficiency gains at microeconomic level depend on managerial efficiency and on scale efficiency. FDI can increase managerial costs or profit efficiency by transferring banking managing systems from outside to national representatives or by transferring new banking technologies and products. At macroeconomic level, efficiency gains results from risks diversification, reducing transaction costs, efficient allocation and utilizing of financial resources, all this increasing banking system

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welfare and stability. An efficient banking system exists with a low profit rate depending on interest, so it is possible to intensify investments and increase economic growth.

Various authors argue there are several potential ways in which FDI can influence economic growth. In neo-classical growth models FDI increases the capital stock and finance capital formation contributing to economic growth. In this case the effects of foreign investments are the same as domestic capital influence. But these models predict only a short run effect on economic growth, due to the diminishing returns of capital. On the other hand, the new growth theory FDI is assumed to have a positive impact on economic growth both on short and long term (Herzer et al. [1]). They argue that FDI is more productive than domestic capital and related on spillover effects the impact of capital diminishing returns is low and economy continue to growth on the long run.

The causality relation between FDI and growth is not necessary unidirectional; causality can work on both directions. Standard economic theory offer explanations for FDI influence on growth. The reverse causality (i.e. from economic growth to FDI) is based on the process of "cumulative causation", that argue a long term process of economic growth based on the development of capital stock might create new economic activities, a higher demand from new consumer products that will attract an increasing level of FDI.

But theoretical literature suggests in a few papers that the positive relationship between FDI and growth is not necessary true. For example, Herzer et al. [1] argue if a FDI substantial "crowding out" investment from domestic sources, then it is possible to have a growth decelerating impact on recipient country.

Positive impact on FDI inflow on economic growth depend on various factors such as the human capital, the degree of trade openness, the depth of financial market or the income per capita level (see Aizenman and Noy. [2]).

Central and East Europeans financial markets indicates high levels of foreign proprieties (Domanski, [3]) that crucially influence FDI and domestic banking structure. But it is obvious that "foreign" does not reflect necessary a greater efficiency. Bonin [4] argue that privatized banks by endorsement was less efficient that other banks privatized by another methods. Domestic banks had competitive advantages due on local clients' previous contacts. From economies of scales foreign banks are not more efficient than domestic ones. That depends on modernizing expenses necessary to make viable purchased banks. Cost reduction will be effective only after a shortest or longest period.

Drakos [5] shows that after Central and East European's institutional reforms start a competition between national and foreign banks. Generally, new investors represent new competitors, so banks acquisitions increase competition by new policies applied by new owners. In national banks can resist to foreign banks competition then domestic market efficiency will be improved (Claessens, [6]). A negative effect of this type of competition is an increased level of financial market concentration. Mamatzakis [7] shows that increased countries monopolistic financial market from Central and East European's (in 1998-2002 period) reduce

efficiency growth. External shocks had also a negative effect on financial efficiency, especially due on restriction of foreign operations (contagious effect). Following Levine [8] greater financial sector efficiency will reduce transactional costs. If it is possible to quickly obtain reduced cost capital then companies increase development and growth.

Using a VAR model, Misztal [9] shows that foreign direct investments was one of the key factors which substantially influenced GDP growth in Romania during 2000-2009.

Using a production function approach employed with a panel data for 1992-2007 period, Verhorn and Vasarevici [10] obtains that FDI and domestic investment are statistically significant determinants of economic growth; as well as prudent fiscal and monetary policy in Central and East European countries.

Any case, FDI can improve financial market efficiency. Entire financial environment must improve efficiency, so interest rates decrease and national and foreign investments increase.

Mencinger [11] describe a negative relationship between growth rate and FDI level for some Central and East Europeans countries. Even his result is incorrect, that shows it is possible to obtain for some periods a not increasing effect of FDI on growth for Central and East Europeans Countries.

Uctum and Uctum [12] analyzed the crisis effects on capital flow components for Turkey economy. They find that FDI strongly reacts both to domestic and international crisis, while portfolios flows are more sensitive to global financial conditions.

Tekin [13] studied the relationship between FDI, real GDP and exports in Least Developed Countries for the period between 1970 and 2009 using Granger causality. He found in some LDC countries that FDI influences real exports and GDP but in other countries he establishes an inverse relationship.

III. THE MODEL

We start with a standard neoclassical production function in perfect competition and constant return to scale:

$$Y = AK^\alpha H^\beta L^{1-\alpha-\beta} \quad (1)$$

where: Y is production level (GDP level), A is a total productivity index (or an index of global productivity), K represent physical capital, H is human capital and L is used labour force, α represent capital elasticity and β represent human capital elasticity. We can rewrite equation (1) by intermediary of labour productivity, $y = Y/L$, capital-labour ratio, $k = K/L$ and human capital-labour ratio, $h = H/L$:

$$y = Ak^\alpha h^\beta \quad (2)$$

Using a cross intertemporal section and first difference logarithmical equation we found equation (3) (i is country index and t is time index):

$$\Delta \ln(y_{it}) = \Delta \ln(A_{it}) + \alpha \Delta \ln(k_{it}) + \beta \Delta \ln(h_{it}) \quad (3)$$

But how is possible to include FDI in equation (3)? We have three theoretical points of view describing relationship between growth and FDI. First one include FDI in physical capital, K (positively or negatively, depending on flows direction, Mankiw, [14]). Second one includes FDI in human capital due on new knowledge added by foreign capital. Third one argues that global productivity, A , is positively influenced by FDI. We suppose FDI influences global productivity especially, because financial capital does not affect directly physical capital or human capital. We suppose to have an exogenous component, (γ_{A0}) and also a direct influence of FDI:

$$\Delta \ln(A_{it}) = \gamma_{A0} + \gamma_{A1} \Delta \ln(FSFDI_{it}) \quad (4a)$$

$$\Delta \ln(A_{it}) = \gamma_{A0}^p + \gamma_{A1}^p FSFDI_{it} \quad (4b)$$

Replacing (4a) and (4b) in (3) we obtain two equations than can be tested. Equation (5a) describes FDI's temporal efficiency growth and equation (5b) describes permanent efficiency influence of FDI.

$$\ln(y_{it}) = \gamma_{A0} + \gamma_{A1} \ln(FSFDI_{it}) + \alpha \ln(k_{it}) + \beta \ln(h_{it}) \quad (5a)$$

$$\ln(y_{it}) = \gamma_{A0}^p + \gamma_{A1}^p FSFDI_{it} + \alpha \ln(k_{it}) + \beta \Delta \ln(h_{it}) \quad (5b)$$

Other instrumental variables that can be used to analyze growth are public sector dimension, inflation rate or trade openness.

Public sector dimension will be estimated by government consumption ratio in GDP (GC). Following Barro and Sala-i-Martin [15] government consumption are a good proxy to estimate political measures and also direct effects of unproductive public expenses. Other studies, (Roman et all, [16]) show that government consumption had a negative relationship with economic growth.

Other authors argue that transition economies are characterized by higher levels of inflation that negative influences growth, especially on restructuring debut. Higher inflation affects long term financial contracts so we obtain a negative relationship between inflation and growth. Khan and Senhadji [17] and also Wachtel [18] show there exist a limit level of inflation that influence relationship growth-financing. As a consequence, empirical studies on finance-growth in transition economies include inflation and FDI flows as control variables (see Mamatzakis [7] or Cotarelli, [19]) (relationship (6a) and (6b):

$$\ln(y_{it}) = \gamma_{A0} + \gamma_{A1} \ln(FSFDI_{it}) + \alpha \ln(k_{it}) + \beta \ln(h_{it}) + \phi_1 \ln(GC_{it}) + \phi_2 \pi_{it} \quad (6a)$$

$$\ln(y_{it}) = \gamma_{A0}^p + \gamma_{A1}^p FSFDI_{it} + \alpha \ln(k_{it}) + \beta \ln(h_{it}) + \phi_1 \ln(GC_{it}) + \phi_2 \pi_{it} \quad (6b)$$

These relationships represent our model's theoretical base. We expect γ , α , and β to be positive coefficients, ϕ_1 negative

and ϕ_2 with ambiguous sign (due on fact that FDI's effects are lagged).

Roman et all. [20] shows that for Romanian economy the relationship between human capital and economic growth was a negative one in transition period.

IV. FDI IN ROMANIAN ECONOMY

FDI's liberalization helps transnational expansion and increase industrial production in whole world. In this case FDI represents a market integration mechanism and also a link between national productive systems.

In order to analyze FDI's influence on Romanian growth rate we use the three models depicted in Section III.

Physical capital (K) is represented by tangible fixed assets, human capital (H) is represented by Romanian population, labour force (L) is represented by average number of employees, FSFDI is foreign direct investments, GC is government consumption and Y is GDP level. Data set covers the period 1990-2010 and the values are comparable, being expressed in 1990 prices (for physical capital, foreign direct investments, government consumption and GDP level, and human capital and labour force are expressed in millions persons).

The statistical survey conducted by the National Bank of Romania and the National Institute of Statistics in 2011 shows an oscillatory evolution of FDI (see Fig. 1).

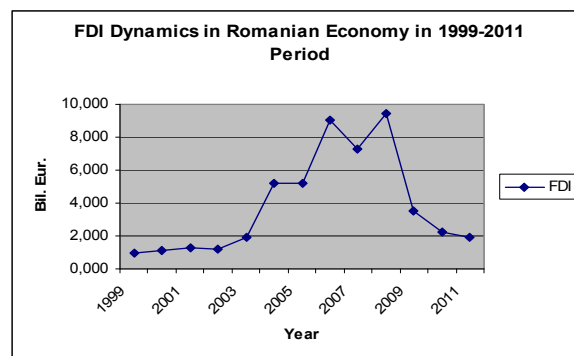


Fig. 1. Source: National Bank of Romania.

Regarding FDI evolution in Romania we can observe that during the first period (between 1990 and 1999 years) there was registered a very low amount of FDI. This disappointing evolution was influenced by a very slow and hesitating economic reform, including the privatization of the state sector. The specificity of the privatization process (mass privatization) was not favorable to FDI participation, and there was no national strategy towards attracting FDI. So, Romania missed the economic and political initially favorable conditions due to the hesitations of political will to reform the economy. Starting with 1999, the situation has changed and the stock of FDI started to ascend.

Large scale privatizations, positive changes in the business climate and the political decisions to reach NATO and EU were among the determinants of this new evolution trend. In this case the progress in fulfilling the criteria of adhesion to the EU has substantially contributed to the increase of the investors' confidence.

After a very good period (2003-2008 years) when FDI level reach over 9 billion Euros, starting with crisis period the FDI level decrease dramatically, at 3.55 billions Euros in 2009, 2.55 billion Euros in 2010 and 1.9 billion Euros in 2011. The FDI stock at end-2010 reached EUR 60.6 billion Euros, up 8.3 percent year on year.

The main causes of this dramatically FDI diminish were bureaucracy, high administrative costs, uncertain fiscal climate and the dimension of black economy are making Romania less attractive those neighborhood countries like Serbia, Bulgaria or Croatia. The sudden increase in value-added tax from 19% to 24% in July 2010 affected the cost and the profitability of foreign companies operating in Romania (and particularly firms using Romania as an export base).

Regarding the employee number evolution in analyzed period we can observe (see Fig. 2) a dramatically reduction between 1990 and 2011, from over 8 million persons in 1990 to a disappointing 4.16 million persons in 2011.

A very short period of recovery was registered between 2005 and 2008, years of significant economic growth.

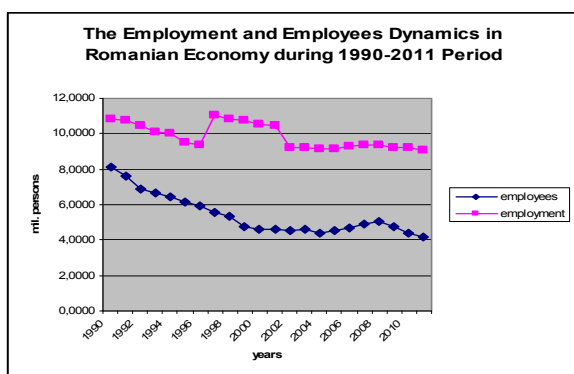


Fig. 2. Source: National Institute of Statistics, Romania.

The employment in Romania in the same period fluctuates between 10.84 million persons in 1990 and 1998 to 9.05 million persons in 2011.

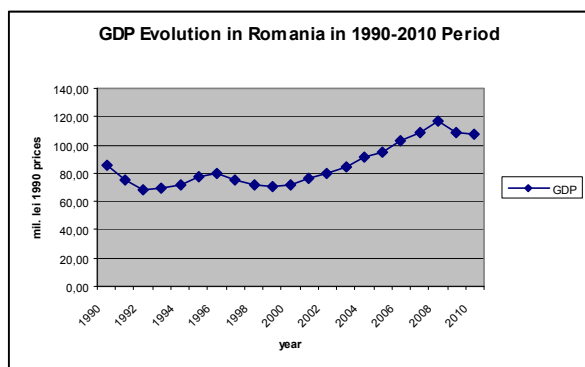


Fig. 3. Source: National Institute of Statistics, Romania.

Analyzing GDP evolution in Romania (see Fig. 3) we can observe the existence of two complete business cycles between 1990 and 2010. Between 1990 and 1992 the GDP rate was a negative one, followed by a spectacular recovery in 1993-1996 years. After 1996 start again a three-year period of recession followed by a long period of intensive growth (9 years with a 5.8 percent average growth rate). The

influence of global crisis was registered also in Romanian economy after 2009 year, with a large -7.1 percents diminish in 2009 and -1.3 percents reduction in 2010.

Starting on data Estimating production function (Eq. 1) (using E-views program) we obtained:

$$Y = 32.02 \cdot K^{-9.199} \cdot H^{0.114} \cdot L^{1.111}$$

So, labour and human capital contribution to GDP dynamics are positives ones, but unexpected, capital contribution is negative. This result is based especially on reevaluation of physical capital in analyzed period. We can observe also the most important influence on GDP evolution is labor contribution, with 1.11 %.

Second estimated relationship is Eq. (5a):

$$\ln(y_{it}) = 6.69 + 0.082 \cdot \ln(FSFDI_t) + 0.131 \cdot \ln(k_t) - 1.004 \cdot \ln(h_t)$$

Analyzing results we can observe that FDI and capital endowment (k_t) are positively correlated with GDP evolution, but human capital/labour ratio (h_t) is negatively correlated with GDP evolution. This result depends especially on Romanian population reduction in analyzed period.

Third estimated relationship is Eq. (6a):

$$\ln(y_{it}) = 2.425 + 0.078 \cdot \ln(FSFDI_t) + 0.0477 \cdot \ln(k_t) + 0.2004 \ln(h_t) + 0.7168 \cdot \ln(GC_t)$$

In this equation all factors are positively correlated with GDP evolution. Government consumption had a positive influence on GDP growth with 0.716 percent, the greater influence on all factors. Unexpected, for this model, FDI's influence on GDP is small, with only 0.078%, human capital/labour ratio (h_t) influence on growth rate was 0.2 percents, and the smaller influence was registered from capital endowment (only 0.04 percents)

All equations are significant and t-tests are relevant with a 95% probability.

Prognosis

Using previous equations we conduct a three-scenario prognosis to evaluate future GDP evolution. The three scenarios are an optimistic one, a pessimistic one and a medium evolution scenario, based on previous equations. Main hypothesis regarding our scenarios are described in Table 1.

TABLE I: VARIABLE VALUES FROM PROGNOSIS HORIZON

Scenario	Variables (growth ratio)				
	H %	K %	L %	FDI %	GC %
Optimistic	1	10	5	5	5
Medium	0	1	1	0	1
Pessimistic	-2	-3	-2	-5	-3

Legend: H- Human Capital; K - Physical Capital; L- Labour, GC - Government consumption

In pessimistic scenario we suppose that population follow trend line in last 20 years and decline by 2%, physical capital decline with 3%, labour decline with 2%, FDI decline with 5% and government consumption decline with 3% every year,

due on crisis conditions. GDP evolutions for three analyzed models are depicted in Table 2.

We can observe that all three models offer practically same evolution of GDP.

TABLE II: GDP DYNAMICS IN 2012-2015 PERIODS (PERCENT)

	Model 1 (4a)			Model 2 (5a)			Model 3 (6a)		
	OS	MS	PS	OS	MS	PS	OS	MS	PS
Period 2012-2015	2.68	0.98	-0.99	2.04	0.41	-0.8	4.65	0.96	-2.68

Legend: OS = Optimistic Scenario, MS = Medium Scenario, PS = Pessimistic Scenario

In optimistic scenarios we can observe GDP mean growth rates between 2.04 and 4.65%, in medium scenario we have very disappointing under 1% growth rates and in pessimistic scenarios we obtain for each model negative growth rates, from -0.8% to -2.68%.

V. CONCLUSION

Foreign direct investments are a dynamic source of GDP growth in emerging countries and an important source of financial support. Host countries developed faster and better based on cash-flows and direct foreign investments, but also due on new technologies, restructuring national sectors and increased productivity and efficiency. FDI can constitute at this moment a possible way to develop emerging countries and to reduce differences between developing countries and developed ones. Capital flows are influenced not only by country risk, but also from global and international factors and domestic economic and political conditions. Actual financial international crisis have a negative influence on global economy. We expect to find a reduction of foreign direct investments in any country and any possible way to invest.

Our models suggest importance of labor, capital and FDI flows for Romanian economy. Our scenarios shows that it is possible, due on bad national and international conditions, to reduce GDP growth rate to a disappointing average -2.68 % level in 2012-2015 period. If political and economical decisions will be appropriate ones, then it will be possible to obtain for next 4 years an average 4.65 % GDP rate increase.

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