ЕКОНОМІЧНИЙ АНАЛІЗ НА МАКРО- ТА МЕЗОРІВНЯХ

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THE ROLE OF FOREIGN DIRECT INVESTMENTS IN THE INNOVATION-DRIVEN GROWTH OF UKRAINE

Abstract
The paper presents growth determinants in Ukraine, with a focus upon qualitative features of capital inflows and empirical arguments in favor of knowledge-oriented domestic and foreign investments. Firstly, the features of capital flows in Ukraine are outlined. Secondly, the necessary theoretical framework to study the effects of FDI on economic growth is provided with the help of Romer dynamic macro model. Thirdly, the relationship between GDP growth and factors of innovative development is estimated. Author argues that increase of FDI into innovative spheres will facilitate the raise of productivity, technology development and the structural transformation of economy.

Keywords: FDI; innovations; economic growth.

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РОЛЬ ПРЯМИХ ІНОЗЕМНИХ ІНВЕСТИЦІЙ В ІННОВАЦІЙНОМУ РОЗВИТКУ УКРАЇНИ

Анотація
У статті представлено фактори економічного зростання, з урахуванням якісних особливостей потоків капіталу. Наведено емпіричні аргументи на користь залучення внітрішніх та зовнішніх інвестицій, зокрема прямих іноземних інвестицій, для активізації інноваційного розвитку в Україні. По-перше, представлено особливості потоків капіталу в Україні. По-друге, з допомогою динамічної макромоделі Ромера запропоновано теоретичні підходи до оцінки впливу ПІІ на економічний ріст. По-третє, проведено емпіричну впливу на ВВП факторів інноваційного розвитку. Автор стверджує, що збільшення прямих іноземних інвестицій в інноваційні сфери сприятиме підвищенню продуктивності, технологічному розвитку та структурним перетворенням всередені економіки України.

Ключові слова: ПІІ; інновації; економічний ріст.

Introduction

As the 2008-2009 financial crisis has made it clear, liberal capital markets have pros and cons of their own. With the globalization process being intensified since the beginning of 1990s, wide-scale liberalization of capital flows and large-scale abolition of capital controls create new opportunities to develop local financial markets and provide with numerous advantages, as intertemporal optimization of private and public consumption, attraction of FDI, pro-growth competition, technology transfers [1], more efficient management, productivity gains, anti-inflationary aspects [2]. However, these advantages should be weighted off against potential drawbacks, such as speculative activities on the stock markets [3], misallocation of investments (especially in the banking sector), government profligacy [4], overheating and real exchange rate overvaluation [5, p. 164].

Empirical results for CEE countries in general and Ukraine in particular are quite ambiguous. IMF experts obtained that investments (including FDI) are neutral in respect to output growth [6]. Mankowska and Din established that the FDI growth effects are quite different in the tradable and nontradable sectors [7]. Recent

paper by Demchuk and Zelenyuk is quite disappointing, as FDI inflows (mostly from offshore zones, including Cyprus in the first place) do not contribute too much to the efficiency, in line with regional patterns of alcohol and tobacco consumption [8]. Such an outcome is explained in part by the recycling of tax optimization capital inflows, but weak institutional environment (inefficient administrative capacities, close relationship between politics and business, corruption), so instead of output growth and consumption smoothing, capital flows has became the most important single cause of BOP crises and instability of GDP growth path. Ukraine's financial crisis of 2008-2009 has materialized murky predictions of possible macroeconomic problems caused by money overhung fuelled by excessive capital inflows [9, p. 67-76]. Combining with well-known economic problems in the Baltic States, it cannot but raise questions on feasibility of capital controls in transition economies.

The purpose of the paper is to study growth determinants in Ukraine, with a focus upon qualitative features of capital inflows and empirical arguments in favor of knowledge-oriented domestic and foreign investments. First of all, the mechanisms of the so-called "price spasms" are outlined. Second, necessary theoretical framework is provided. Third, the relationship between GDP growth and knowledge-intense factors is estimated.

1. Capital flows in Ukraine

The phenomena of capital flows in Ukraine could be explained in the simplest fashion as a phenomenon of the so-called "price spasm". At the beginning uncontrolled influx of capital and inadequate sterilization efforts, strengthened by profit-hungry bankers, effects of credit crunch, massive loss of deposits that respectively disorientated borrowers and depositors, distrusted the market and led to an increase of money supply. Thus, Ukraine as a country dependent on short-term capital flows in a weak institutional environment has become vulnerable of sudden stop of capital. Under these circumstances, both external and internal factors are playing their role, but the last ones became more significant. Demand-led inflation is further reinforced by the expectation of devaluation of national currency with the excessive liberalization of the foreign market, insufficient consideration of the risk by bankers, worsening of the current account, excessive absorption as one of the advantages of foreign trade, and low savings to only worsen the macroeconomic situation.

One of the most noticeable problems was the "bubble" real estate market and the balance sheet effect (liabilities and assets in dollars, and the flow of money in Euro.) These problems were the addition for increase in global rates, global liquidity crisis, "contamination effect" reverse moral hazard, as well as the immediate economic problems in the economically leading industrial countries.

"Victims" under these conditions were banks that suffered heavy deposit losses and failed to meet their obligations. Refinancing by the National Bank of Ukraine aimed at the "rescue" of the banks could not help, as the money has been siphoned off abroad. Therefore the prospects for troubled banks are rather bleak: nationalization or selling off.

Ukraine really suffered from a sharp reversal of capital flows, threatening liquidity in the banking system. Sudden stop in capital flows used to spur currency crisis. In turn, it is followed with a sharp decrease in consumption and an increase in savings for the debt repayment combined with reduction in the short-term investments, and, in most of the case, of foreign debt restructuring.

Ukraine is still struggling with the consequences of the financial crisis, experiencing deep economic downturn (see Pic. 1). Ukraine's government debt in 2014 amounted 41% of GDP, while its foreign exchange reserves dropped dramatically to 5624.56 USD Million in March 2015 [10]. Therefore capital controls (in favour of FDI) and new approaches to innovative-driven economic growth are crucial these days.
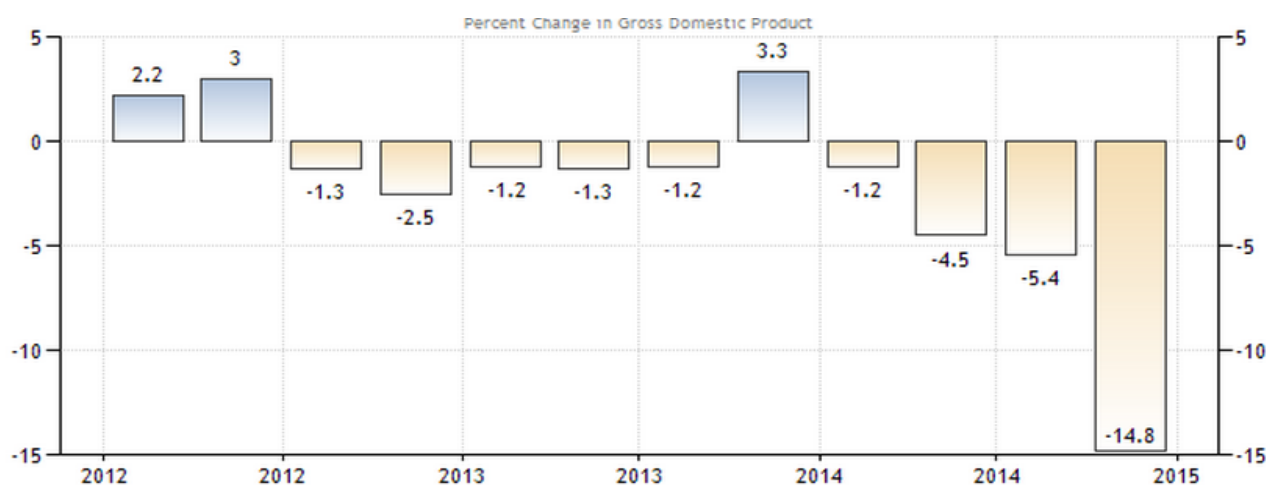
Pic. 1. Ukraine GDP annual growth rate (percent change in Gross Domestic Product) in 2012-2014

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2. FDI and economic growth: theoretical framework

Why should the priority be given to FDI? The era of information technologies and innovations opens new relations between economic development, FDI and human capital. In the knowledge economy, a human capital, especially intellectual capital, used to play a much bigger role compared to a traditional economy. In particular, formation of a subsistence level of the worker essentially depends on its creative abilities. The formal model explains the logic behind higher salary for workers.

P. Romer emphasized FDI's role in diffusing technology and its relationship to economic growth, and his dynamic macro model (1990) could be a good example to explore factors of knowledge production: work, the capital, an land (in a broad sense). Two sectors are presented in the model: the sector producing goods and services, and the sector producing new knowledge.

The model is described by the equations (1) – (4) as follows:

– production function

$$Y = K^{\alpha} \ (AL_Y)^{1-\alpha}, 0 < \alpha < 1 \tag{1}$$

– labor market equilibrium

$$L_Y + L_A = L \tag{2}$$

– production of new knowledge

$$\dot{A} = \overline{\delta} L_A \tag{3}$$

– average productivity of the knowledge sector

$$\overline{\delta} = \beta A^{\varphi} L_A^{\lambda - 1}, \delta > 0, 0 < \lambda < 1 \tag{4}$$

From equations (1.3) and (1.4), a function of the new knowledge production is obtained as:

$$\dot{A} = \delta L_A^{\lambda} A^{\varphi} \tag{5}$$

where *Y* is production of goods and services; *K* is a fixed capital; *L* is a total labor supply; L_Y is a labor supply used to production of the goods and services; L_A is a labor employed in the new knowledge sector; *A* is technology, knowledge and ideas; $\dot{A}$ is a growth rate of technologies, knowledge and ideas (new technologies, knowledge and ideas); α is a factor of production function of the goods and services; $\overline{\delta}$ is a average labor productivity in the knowledge sector (quantity of new knowledge per one researcher); δ, φ, λ are constants.

This equation shows that producing of new knowledge at the present time depends on quantity of researchers and the volume of knowledge. From the equation (5) it follows that for $\varphi > 0$, there is a positive knowledges' spillover in the future; if $\varphi < 0$, then the basic knowledge have been produced in the past, and in the future it could be more difficult to improve new knowledge.

In Romer's seminal work (1990) a specific factor of knowledge production at constant "effect of scale" is defined, if $\varphi = 1$, $\lambda = 1$:

$$\dot{A} = \delta L_A A. \tag{6}$$

That is how the equation of knowledge' growth rate is received:

$$\frac{\dot{A}}{A} = \delta L_A \tag{7}$$

Hence, in a stationary condition we obtain:

$$g_Y = g_A = \delta L_A \tag{8}$$

The equation (1.8) demonstrates, that in the long-run production of knowledge, measured as the number of scientists, is going to increases the rate of economic growth per capita. Thus, the government policies aimed at increasing the number of employees in R&D industries (for example, by subsidizing them), has a direct positive influence on rate of long-term economic growth.

3. Empirical results

The investigation of Ukrainian model for interdependence of GDP and other investments' factors could be measured by such indicators, as expenses for R&D, million hryvnas (*Expenses*), personnel's number of scientific

and technical work (*Personnel*), the share of firms that introduce innovations, in percent (*Firms*); innovative products realized (Products) [11].

The model 2SLS estimates for the 2004-2012 period are presented below:

$$GDP = 0{,}808*Expenses + 0{,}767*Personnel - 0{,}032*Firms - 0{,}481*Products$$
$$(7{,}299)^* \qquad (8{,}262)^* \qquad (-0.390) \qquad (-6.398)^*$$

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.808035	0.110694	7.299727	0.0000
C(2)	0.767308	0.092861	8.262998	0.0000
C(3)	-0.032995	0.084563	-0.390181	0.7039
C(4)	-0.481266	0.075211	-6.398919	0.0001

R-squared	0.966959
Adjusted R-squared	0.957947
Durbin-Watson stat	1.446130

The Durbin-Watson statistics at 1.44 is rather low, but it could be the outcome of a small sample. Adjusted R-squared at 0.95 shows that all independent variables determine the dynamics of the dependent variable. It is clear that an increase in the R&D expenditure and number of scientists contributes to the GDP growth. However, an increase in the number of innovative products has an opposite impact, running counter to the logic of knowledge-based growth.

The Granger test supports that expenses on R&D and number of scientists have an impact upon GDP at the statistically significant level. However the hypothesis of the reverse causality between two variables is not ruled out. The results have shown the tight relation in the spirit of the Romer dynamic macro model, as in the long-run production of knowledge (number of scientists) is to increase the rate of economic growth per capita. Thus, the government policies aimed at increasing the number of employees in science has a direct positive impact on the rate of long-term economic growth.

Table 1. The Granger causality test

Hypothesis	Lags			
	1	2	3	4
EXPENSES does not Granger Cause GDP	8,034	4.507	20,42	4,31
	(0.01*)	*(0.048*)*	*(0.003*)*	*(0.197)*
GDP does not Granger Cause EXPENSES	33,179	10,967	49,374	2,339
	(0.000*)	*(0.005*)*	*(0.000*)*	*(0.321)*
PERSONNEL does not Granger Cause GDP	14,247	20,501	4,71	0,638
	(0.00*)	*(0.000*)*	*(0.064***)*	*(0.685)*
GDP does not Granger Cause PERSONNEL	6,279	11,069	8,051	1,783
	(0.029**)	*(0.005*)*	*(0.023**)*	*(0.389)*
FIRMS does not Granger Cause GDP	2,842	1,65	0,562	0,341
	(0.295)	*(0.251)*	*(0.662)*	*(0.835)*
GDP does not Granger Cause FIRMS	0.295	0.471	1,252	1,471
	(0.597)	*(0.640)*	*(0.384)*	*(0.442)*
PRODUCTS does not Granger Cause GDP	6,385	2,701	1,489	0,648
	(0.028**)	*(0.216)*	*(0.324)*	*(0.681)*
GDP does not Granger Cause PRODUCTS	0.937	0,436	3,487	1,073
	(0.353)	*(0.661)*	*(0.106)*	*(0.534)*

Number of firms seems to be neutral in respect to GDP, while there are weak signs that PRODUCTS Granger cause GDP. That means that the share of firms that introduce innovations and produce innovative products do not influence GDP. As those two indicators are quite related, the results above could be interpreted that Ukrainian products are not competitive enough to produce significant impact upon the growth rate. Also, it is

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possible that profits of firms were not directed towards the development of domestic technologies and products but towards the adaptation of imported equivalents.

Conclusions

As capital flows can influence the growth dynamics in either way, positive or negative, the impact of capital flows liberalization is far from being straightforward. Present possibility of inefficient FDI argues in favor of their redirection into the knowledge-based sectors. According to the empirical estimates, Ukraine should invest more for the development of its research potential, with the universities becoming a catalyst for the Ukraine's economic growth. Also, Ukraine should be better off if not to decrease the investment into innovative activities, while pressing for better commercialization of them. More of FDI into innovative spheres should increase productivity, as well as accelerate technology developments and the structural transformation of economy.

References
1. *Dorsey, T., Tadesse, H., Singh, S., and Brixiova, Z. (2008). The Landscape of Capital Flows to Low-Income Countries. IMF Staff Papers, 51, 1-60.*
2. *Carstensen, K. & Toubal, F. (2004). Foreign direct investment in Central and Eastern European countries: a dynamic panel analysis. Journal of Comparative Economics, 32 (3), 3-22.*
3. *Gubskyy, B. (2003). Euroatlantychna integraciya Ukrainy. Kyyiv: Logos.*
4. *Gourinchas, P.-O., and Jeanne, O. (2006). The Elusive Gains From International Financial Integration. Review of Economic Studies, 73, 256, 715-741.*
5. *Oks. D., and van Wijnbergen, S. (1995). Mexico after the debt crisis: is growth sustainable? Journal of Development Economics, 47 (1), 155-178.*
6. *Havrylyshyn O., Izvorski I., van Rooden R. (1998). Zrostannya u perechidnych ekonomikach protyagom 1990-1997 rr. Ukraina na rozdorizi. Kyyiv: Fenix.*
7. *Mankowska N., Din J. (2001). The Relationship between Foreign Direct Investment and Trade Flows in a Transition Economy: The Case of Ukraine. Fostering Economic Growth in Ukraine. Kyiv: Alfa-Prynt.*
8. *Demchuk, P., and Zelenyuk, V. (2009). Testing differences in efficiency of regions within a country: the case of Ukraine. Journal of Productivity Analysis, 32 (2), 81–102.*
9. *Shevchuk, V. O. (2008). Platignyj balans, economichne zrostannya i stabilizacijna polityka. Lviv: Kalvaria.*
10. *Ukraine statistics, Trading Economics. (2015). Retrieved from: http://www.tradingeconomics.com/ukraine/indicators.*
11. *Science and innovations. (2015). Retrieved from: http://ukrstat.org/en/operativ/oper_new_e.html.*