FOREIGN DIRECT INVESTMENT AND ECONOMIC DEVELOPMENT OF TRANSITION COUNTRIES. THE CASE OF UKRAINE

by

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Abstract

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The positive influence of foreign direct investment on economic development of host country is widely known. One of the aspects of FDI is the existence of spillovers to host country. Various studies show that spillovers from foreign to domestic firms can be positive (increase in efficiency of production and etc.), or negative (market-stealing effect), or they appear difficult to be verified. The type of spillovers depends on various characteristics of the host country. The most important factors are competitiveness of host country markets and technological capacity of domestic firms. Presence and nature of spillovers can be investigated by using firm and industry level data in econometric models, which relate productivity of the host country firms without FDI to foreign presence in an industry measured as FDI in an industry weighted by an industry production. Other possible way to study the issue is to relate growth rate of productivity to lagged measure of foreign presence, as spillovers may need time to be materialized. Using these approaches I examine presence of spillovers from FDI in Ukraine's economy. The results of research suggest that spillovers from FDI positively affect labor productivity and growth rate of labor productivity of locally owned firms.

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Chapter 1

INTRODUCTION

Investment, particularly foreign direct investment (FDI) is considered to be one of the most important factors that influence economic growth and development of a country.

The entry of a foreign investor (mostly multinational corporation) is not simply import of capital in other country. FDI is one of the channels for international knowledge and technology transfer. This discussion is focused on multinational corporations (MNCs), because MNCs are the biggest investors and conduct significant amount of world R&D (Borensztein et al., 1998, p.116).

Technology transfer is considered to occur in the following way: in order to compete with more informed domestic[1] firms foreign investor should possess more advanced technology, managerial or marketing skills. Thus, locally owned firms may have opportunity to appropriate knowledge and technology developed by parent multinational company and transferred to the multinational's affiliates[2] in the host country. That is, " some firm-specific knowledge of the foreign owners may 'spill over' to domestic industry as domestic firms are exposed to new products, production and marketing techniques, or receive technical support from upstream or downstream foreign firms" (Aitken and Harrison, 1999, p.607).

[1] Note: terms "host country firm" and "locally owned firm" and "domestic firm" are synonyms for domestic firm without FDI. These terms are interchangeable here.

[2] Note: terms "multinational's affiliate" and "foreign firm" are synonyms for firm with foreign capital. These terms are interchangeable here.

Also, the entry of foreign companies' affiliates increases competition in local markets and forces the domestic firms to enhance their efficiency in order to protect their market shares and profits. These and other various externalities caused by FDI to the domestic firms are often called spillovers.

Spillovers may occur as the results of labor turnover from the multinationals' affiliates to the domestic firms, demonstration effect, rise in competition and technical support of suppliers and customers. Various studies show that existence of spillovers is not predetermined and not guaranteed but depends on some technological and economic factors. One of them is the difference between foreign and domestic technology level, the so-called technology gap. Economic literature suggests the larger the technology gap between home and host country, the larger is the potential for imitation of technologies, which induce economic growth. However, if the technology gap between foreign and local firms is too large, spillovers may not occur. This can be explained by the fact that technologies developed in more industrialized countries may be less suited for conditions in developing countries, because their implementation may require enormous expenditures. Other factors are value of underlying technology, competition in the host markets, etc.

Thus, knowledge and understanding of factors that determine spillovers are necessary for conducting policies that promote economic growth. This question is particularly important for Ukraine, the country scope of R&D in industry is insignificant and most of the enterprises do not have money to finance acquisition of technologies from abroad.

The structure of the paper is the following: Chapter 2 describes various types of literature sources about spillovers from FDI; Chapter 3 presents theoretical model of technology transfer; Chapter 4 discusses the situation in Ukraine; Chapter 5 contains data description, empirical model, results and suggestions for future research; and Chapters 6 is devoted to conclusions.

Chapter 2

LITERATURE REVIEW

It is widely believed that foreign investment has positive impact on the performance and growth of an economy, particularly transition economy. That is why careful study of international investment process is very important.

There are two theoretical models of international investors activity. First model is a model of horizontal activity, where the decision to expand abroad is made if additional fixed costs of setting up new plant is less than saving in variable costs on export activity. The second one is of vertical activity, where foreign investment decision is motivated by the difference in costs of factors of production. Distance and market size are very important factors which influence investment decision: adjusting for size of market, a significant part of capital is invested in countries with biggest markets; adjusting for distance, a significant part of capital is invested in countries which are close to home country (Shatz and Venables 2000).

As it was mentioned, foreign investments have positive impact on performance and growth of an economy, because they generate positive externalities by transferring new technologies, management techniques and so on. Various economic literature considers factors and settings which are necessary for the transfer of superior knowledge.

There are few sources that consider theoretical models of technology transfer. Findlay (1978) in his article develops a dynamic model of technology transfer through foreign capital from more to less developed countries. The author uses hypothesis that the rate of technological progress in less developed

region positively related with technology gap between this and more developed region. However, technology gap between them must not be too wide for hypothesis to hold. With help of his model he determines the long run steady-state ratio of technical efficiencies and the long run steady-state ratio of foreign to domestic capital.

Wang (1990) provides a kind of neoclassical model that relates economic growth, technology transfer and international capital flows. There are two regions: developed North and developing South. Technology transfer occurs via international capital flows from more to less advanced region. When South dismantles its capital control, steady-state growth rate of income increases, also it raises rate of technological diffusion, which decreases income gap between the regions.

Wang and Blömstrom (1992) develop model of strategic interaction between the MNCs' affiliates and the domestic firms. They use Findlay's relative backwardness hypothesis and also emphasize the importance of competition in host country industries. The more the competition MNCs' affiliates face from local firms the more advanced technology they need to bring in their production, and the more possibilities for spillovers are created.

Borensztein, De Gregorio and Lee (1998) present a model where FDI has significant impact on economic growth of developing countries via technology transfer. This model is based on the assumption that foreign investors operating on domestic market make adoption of new technology easier for local firms and thus promote technological progress and growth. However, in order to benefit from technology transfer domestic firms should have sufficient absorptive capability, i.e. a minimum threshold stock of human capital.

Saggi (2000) in his paper discusses the role of trade and FDI in transferring of technologies. He considers theoretical models as well as empirical studies

concerning the technological spillovers in order to investigate the ways in which such transfers and spillover are possible. Saggi (2000) indicates that domestic policy concerning foreign investment and domestic institutions has crucial importance for obtaining benefits from FDI. For example, without appropriate human capital and R & D investments, spillovers from FDI may not take place.

Several empirical studies consider the relation between presence of foreign capital in host country and productivity of domestically owned firms. The idea of such studies is to estimate the impact of FDI on productivity of domestically owned firms. They include the share of foreign presence (foreign share of the industry's employment, capital, production or value added) as one of explanatory variables in the equation of local firms production function. The results of these studies vary.

In some cases, there are found positive external effects (spillovers): Caves (1974) for Australia; Globerman (1979) for Canada; Blömstrom and Persson (1983) for Mexico; Sjöholm (1997), Blömstrom and Sjöholm (1999) for Indonesia.

However, other studies, for example Aitken and Harrison (1999), who studied manufacturing industry in Venezuela, found negative effect of FDI on the productivity of local firms.

Haddad and Harrison (1991) in their study of Moroccan manufacturing industry conclude that there are no significant transfers of new technology also due to the low absorptive capability of local firms.

Konings (2000) detects negative impact of foreign presence on domestic firms in case of Bulgaria and Romania. He explains it by the fact that positive effect from technological spillovers is overweighed by market-stealing effect,

that is, the entry of foreign investors increases competition in the local market and less efficient firms loose their markets shares.

Ponomareva (2000) considers the impact of FDI on productivity of the firms with the foreign capital and the domestic firms in Russia. She analyzes whether firms with FDI perform better than domestic ones, and if there are technological spillovers from these firms to domestic companies. The author shows that FDI has positive impact: firms with foreign capital have greater productivity than domestic ones. However, increase in number of firms with FDI in particular industry reduces productivity of domestic firms in the same industry (market-stealing effect). Positive spillovers are found only for the firms located nearby the companies with foreign investments.

Such different results suggest that existence of spillovers is not predetermined and not guaranteed but depends on some technological and economic factors. Blömstrom, Globerman and Kokko (1999) state that level of competition on host country markets and the technical capability of local firms are the main conditions influencing the scope and magnitude of spillovers.

Chapter 3

THEORY

3.1. Nature of the problem

Economic theory considers two approaches to investigate the effects of FDI on host country development. First approach is based on findings of trade theory. It predicts that capital inflow will increase marginal product of labor and decrease marginal product of capital and takes into account only direct effects of investment process: employment, return on inputs and so on.

Second approach is based on the theory of industrial organization. A firm investing abroad must possess some superior product, or technology, or management techniques in order to compete on foreign market. The largest and most powerful investors are multinational corporations. That is why the entry of MNC in host country market may influence domestic market conditions by diffusion of knowledge or affecting market structure. In other words, this approach focuses on indirect effects of FDI, or spillovers.

To examine the presence of spillovers the latter approach seems to be more appropriate.

According to the economic literature, spillovers occur as a result of the following factors:

- appropriation of technology by host country firms,
- the entry of a MNC increases competition in particular industry and forces host country firms to protect their share.

Considering the channels through which the spillovers may be materialized Blömstrom and Kokko (1997) suggests the following:

- Backward linkages – foreign firm linkages with local suppliers. A MNC may transfer techniques for inventory and quality control and standardization to them; provides technical assistance to increase their quality products; assists in purchasing inputs; and facilitates to set up better production equipment.

- Forward linkages. Foreign investor may contribute to the development of local distributors and sales network.

- Training of local employees. The transfer of technology from foreign investor to local firms may be realized trough training of local employees. Both technical as well as managerial skills obtained while working in MNC affiliate may spread to the local industries as former foreign firm's employees moves to local firms or start their own business.

- Demonstration and competition effects. More efficient conduct of a MNC may induce local firms to imitate behaviour of foreign competitors.

However, foreign presence is not always beneficial for local firms. Under some circumstances positive spillovers may not materialize. Some authors, for instance, Kokko (1994) states that MNCs may operate in such industries where either product or technology is very different from those of local firms. That is if technological gap is too big, there is too little scope for spillovers. The other case is when competition from firms with FDI forces some of local companies out of business. This is an example of negative spillovers from the foreign to the domestic firms.

3.2. Model

In order to investigate the role of FDI in the process of economic development of countries in transition I use a model of technology transfer developed by Borensztein, De Gregorio, and Lee (1998).

According to them, technical progress is the result of 'capital deepening' and takes the form of an increase in the number of varieties of capital goods available in an economy, as in Barro and Sala-i-Martin (1995, ch.6, p.213).

The economy produces a single product according to the following production function:

$$Y_t = AH_t^a K_t^{1-a} \quad (1)$$

where A stands for the exogenous state of nature, H represents human capital, and K is for physical capital, which is defined as an aggregate of different varieties of capital goods. The state of nature includes various technological and economical factors that tend to influence the level of productivity in the economy. Human capital is considered as a given endowment. Physical capital accumulation takes form of the increase in the number of varieties. In particular, the stock of physical capital is assumed to be "a composite of a continuum of varieties of capital goods" (Borensztein at al., 1998, p.118) and is defined by the following formula:

$$K = \left\{ \int_0^N x(j)^{1-a} \, d(j) \right\}^{\frac{1}{1-a}} \quad (2)$$

where x(j) represents variety of capital goods. N is the total number of varieties.

There are two types of firms-producers of capital goods in the economy: domestic and foreign firms. Foreign firms are investors from more developed country who brought their capital into domestic economy. The amount of varieties produced by the domestic firms equals n, and the one produced by foreign firms is n^*:

$$N = n + n^* \quad (3)$$

The domestic and foreign firms-producers of capital good rent them to firms-producers of final goods at a rate m(j). The demand for variety of capital goods can be derived from the optimality condition for profit maximization in production of final goods: Price of input=Marginal product of input, i.e. rental rate should be equal to the marginal productivity of the capital goods in the production of the final goods. Production of final goods can be described by similar production function for firm *i*:

$$Y_i = AH_i^{a} x(j)_i^{1-a} \quad (4)$$

Taking partial derivative with respect to *x(j),* the necessary condition is obtained:

$$m(j) = A(1-\alpha)H^{a} x(j)^{-a} \quad (5)$$

Borensztein at al. state that an expansion of capital goods varieties, i.e. the introduction of a new type of capital goods requires new technology for their production to be available. As a domestic economy does not conduct R&D necessary for development of such technology, then technology has to be adapted from more advanced country firms. This statement rests on the idea that in order to compete on the host market the foreign firms have to bring advanced knowledge as well as capital to the domestic economy. Then, this knowledge or technology can be adapted by the domestic firms.

The process of technology adaptation is assumed to be costly. It requires a fixed setup cost *(F)* before production of the new type of good takes place and constant maintenance cost per period of time.

The amount of fixed cost is assumed to be negatively related to the ratio of the number of foreign firms that produce capital goods in the domestic economy to the total number of firms (n^{*} / N).

This assumption is based on the idea that foreign firms bring advanced knowledge with capital to the host economy. Though this knowledge may be already available in other countries.

According to this model, by simplifying the process of adoption of the technology that is necessary to produce new capital goods varieties, foreign

direct investment is the main channel of international technology transfer and technological progress in domestic country.

Also, model anticipates the existence of a 'catch-up' effect in technological progress. 'Catch-up' effect is based on relative backwardness hypothesis: the larger is the technology gap between two countries the greater is pressure for change and the faster domestic country may 'catch-up' (Findlay, 1978, p.2).

'Catch-up' effect reflects the fact that it is cheaper to imitate already existing products than to create new ones. That is why there is an assumption about positive relationship between the setup cost and the ratio of the number of capital varieties produced domestically to those produced in the more advanced countries. (Varieties of capital goods that are produced in advanced countries are denoted by $N^{*)}$. Consequently, in the countries with lower N/N^* (higher technology gap) possibilities for adaptation and imitation are larger and the costs of adopting new technology is lower.

These assumptions are necessary to show that fixed setup cost function has the following form:

$$F = F(n^*/N, N/N^*), where \frac{\partial F}{\partial (n^*/N)} < 0 and \frac{\partial F}{\partial (N/N^*)} \quad (6)$$

Maintenance cost is interpreted as a constant marginal cost of production of x(j) equal to 1, and that capital goods depreciate fully.

In a steady state where the interest rate (r) is constant, profits for the production of a new variety of capital j are:

$$\Pi(j)_t = -F(n_t^*/N_t, N_t/N_t^*) + \int_t^{\infty} [m(j)x(j) - x(j)]\, e^{-r(s-t)} ds \quad (7)$$

Maximization of Eq. (7) subject to the demand Eq. (5) generates the following equilibrium level for the production of each capital good x(j):

$$x(j) = HA^{1/a}(1-a)^{2/a} \quad (8)$$

As it can be seen, x(j) is independent of time, that is, at every instant the level of production of each new good is the same.

Substituting Eq. (8) into the demand function Eq. (5), we derive the rental rate as a markup over maintenance costs:

$$m(j) = 1/(1-\alpha) \tag{9}$$

Under assumption of free entry for producers the rate of return *r* will be such that profits are equal to zero. Solving for the zero profits condition we obtain:

$$r = A^{1/\alpha} \varphi F(n^*/N, N/N^*)^{-1} H \tag{10}$$

where

$$\varphi = \alpha(1-\alpha)^{(2-\alpha)/\alpha} \tag{11}$$

Saving behaviour influences the process of capital accumulation, thus there is need for assumption about consumers' part of the economy. Individuals are considered to maximize the following standard intertemporal utility function:

$$U_t = \int_t^{\infty} \frac{C_s^{1-\sigma}}{1-\sigma} e^{-r(s-t)} ds \tag{12}$$

where *C* denotes units of consumption of the final good. Given a rate of return equal to *r*, the optimal consumption path is given by the standard condition:

$$\frac{\dot{C}_t}{C_t} = \frac{1}{\sigma}(r - \rho) \tag{13}$$

In a steady state equilibrium the rate of growth of consumption must be equal to the rate of growth of output *(g)*. Substituting Eq. (10) into Eq. (13), the following expression for the rate of growth of the economy is obtained:

$$g = \frac{1}{\sigma}\left[A^{1/\alpha} \varphi (n^*/N, N/N^*)^{-1} H - \rho \right] \tag{14}$$

Main implications of the model are as follows:

Foreign direct investment, measured by the fraction of products produced by foreign firms in the total number of products (n^* / N), is the main channel of international technology transfer and technological progress in the domestic economy. In order to compete on the host market the foreign firms have to bring advanced knowledge as well as capital to the domestic economy and the

domestic firms adapt knowledge or technology. It reduces the costs of introducing new varieties of capital goods, thus increasing the rate at which new capital goods are introduced.

The cost of introducing new capital goods is also smaller for less developed countries; i.e. countries that produce fewer varieties of capital goods than the advanced countries (countries with lower N/N^{*}) - enjoy lower costs of adoption of technology, and will tend to grow faster. Also, the effect of FDI on the growth of the economy depends positively on the level of human capital, i.e. the higher the level of human capital in the host country, the higher the effect of FDI on the growth rate of the economy.

Chapter 4

OVERVIEW OF THE SITUATION IN UKRAINE

The Ukrainian economy is characterized by several circumstances inherited from the past that negatively affect the level of its competitiveness. One of them is deterioration of capital. In the former USSR investment policy ensued from extensive way of economic development. The capital expanded not to raise its efficiency but to compensate its inefficiency by increase of productive capacity. The sectoral structure of investment had not been changed for a long time. More than half had been invested in industry; one-third – in agriculture; one-fifth – in transport, telecommunication, construction industry. Main part of industry capital had been invested in heavy industry and military-industrial complex. Consequently, there was lack of investment in other industries. As a result, deterioration of capital in manufacturing has increased from 25 to 50% and in some cases to 70% of the enterprise's capital stock for the last 25 years. This caused one of the most serious problems of Ukrainian economy - old and low-efficient manufacturing capabilities. As the consequence, Ukrainian products are characterized by high costs and low level of quality. It is clear that if these problems are not solved, Ukraine will not fulfil successful transition to the market economy and will not occupy desirable place among highly developed countries.

A lot of problems occurred during the process of transition. Economic recession and shortcomings of state economic policy caused significant downturn in investment activity. The enterprises could not accumulate investment resources because of hyperinflation (1992-1993). In addition, ambiguity of rights of ownership and decrease of financial discipline created

conditions for disinvestment and devastation of capital. Consequently, there is deficit of capital from the own sources of enterprises. Other sources, e.g. public savings, are unavailable because of lack of market mechanism for attracting them.

The other problems are poor management, imperfect market structure and so on. In the process of transition business environment changed considerably. However, some managers who obtained education in Soviet period do not possess the advanced knowledge of running business under market conditions. Also, some enterprises were created to satisfied demand of entire USSR and after gaining independence they became monopolists with excessive capacities, old technologies and other problems. Although, situation gradually improves, without external influence it may take much longer time than necessary.

Taking into account all these problems, transfer of technologies, know how, management techniques may be very useful for Ukraine in current situation.

At present foreign investors in Ukraine are primarily large multinational companies, which can allow themselves a high level of risk in investing in enterprises engaged in small-scale intermediary actions.

Table 1. The main forms of investments (1.01.2000)

Type of contributions	%
Pecuniary contributions	61,0
Contributions in form of movable and real property	25,4
Portfolio investment	10,9

Source: Derzhkomstat of Ukraine

In the recent years part of portfolio investment and contributions in form of movable and real property have decreased while pecuniary contributions have risen.

Table 2. Geographical structure of investment (1.01.2000)

Country	Amount of investment, $ mln	Share of investment,%
USA	629,3	17,5.
Cyprus	337,9	9,4
Netherlands	329,9	9,2
Russia	284,2	7,9
Great Britain	271,9	.7,5
Germany	226,8	6,3
South Korea	171,2	4,8
Switzerland	151,7	4,2.
Virgin Islands	151,5	4,2

Source: Derzhkomstat of Ukraine

These countries account for 71,1% of total FDI in Ukraine. However, it should be taken into account, that investment from Cyprus, Virgin Islands and Switzerland, which represent together the biggest source of FDI in Ukraine is actually investment from other countries. It might be that the large amount of this capital is from Ukraine, Russia and other FSU countries. This can be explained by the fact that these countries represents off-shore zones and investors use to hide the origin of their capital due to several reasons. For

instance, Ukrainian investors benefit in such a way from the status of foreign investor in Ukraine.

The foreign capital was invested in 7372 enterprises.

Table 3. The structure of investments according to type of enterprise ownership (1.01.2000)

Type of ownership	%
Enterprises of collective pattern of ownership	72,4
Enterprises that belong to foreign states	26,2
Enterprises of private ownership	0,7
Enterprises of state ownership	0,7

Source: Derzhkomstat of Ukraine

The main reasons to invest in Ukraine are vast market and high import barriers as survey revealed (Kudina, 1999). Although wages in Ukraine are lower than in other Eastern European countries, low labor costs were found insignificant reason to invest. This can be explained by the fact that such factors as lack of capital, poor management, excessive regulation make actual costs of production higher than in other countries.

Baranovsky (1998) found the following major shortcomings of Ukrainian investment climate:

- uncertainty of economic environment;
- ambiguity of legal system;

- political instability;
- difficulty of negotiating with government;
- high restructuring costs;
- problems in finding of suitable partner.

Ukraine has great economic potential in terms of attractiveness for foreign companies: rich natural resources, favorable geographic position, skilled and relatively inexpensive labor force, and big internal market. However, the total amount of direct investment in Ukrainian economy is $3716,3 mln (1.10.2000) or $76 per capita, which is one of the lowest numbers among the countries of East and Central Europe with transition economies.

Therefore, Ukraine obtains not as much foreign direct investment as it need, consequently it should use all opportunities to get as much benefits as possible.

Chapter 5

EMPIRICAL STUDY

5.1. Data

Ukraine has been independent only 10 years, which is why its time series are very short and the implications of the theoretical model cannot be examined using country-level time-series data. However, using firm-level panel data on Ukrainian industrial enterprises I can investigate the effect of FDI on performance of the local firms without foreign capital, i.e. existence of spillovers from FDI.

Firm level panel data is from the Ukrainian Industrial Enterprise Survey data set collected by EERC Research Center. Sample contains information about 122 firms for 1998 and 1999 years. Firms belong to the following industries: heavy industry (metallurgy, energy, chemical and coal industries), machine building, wood processing, construction materials, light industry and food processing. They are located in the following regions: Kiev, Odessa, Lviv and Kharkiv oblast. These firms do not have foreign capital. Data for 1999 is deflated by producer price index from Ukraine Statistical Yearbook (1998).

5.2. Model and estimation technique

The indirect impact of FDI on the economy, that is the impact of FDI spillovers, can be considered as the relation between existence of spillovers and the performance of domestic firms in Ukraine. In other words, there is the following question to answer: Does Foreign Direct Investment create spillovers for the domestic firms in the form of a rise or a decline of their productivity?
This question may be transformed in the following hypotheses:

H_0: There are no spillovers.
H_1: FDI creates spillovers to Ukrainian enterprises.

To test these hypotheses, I use a version of model applied by Sjöholm (1997) in his analyses of effects of FDI on productivity in Indonesia. Sjöholm follows the tradition of Caves (1974), Globerman (1979), Blömstrom and Persson (1983), and Kokko (1994) and proposes to estimate labor productivity in domestic enterprises as a function of such factors:

$$\frac{VA}{L_{fit}} = f\left(\frac{I}{L_{fit}}, SCALE_{it}, FDI_{it}, Z\right) \quad (1)$$

VA/L_i is value added per employee;
I/L_i is investment per employee;
SCALE is scale of firm's production;
DFI is share of gross output produced by firms with FDI in an industry, proxy for foreign presence in an industry;
Z is a set of additional variables that have impact on labor productivity.
All variables are estimated in log forms.

As some data are not available for this model, it should be modified taking this into account.

Instead of value added per employee I propose to use value of production per employee as variable for labor productivity. Instead of investment per employee bookkeeping value of capital assets per employee is considered to control for capital intensity. Scale is measured as a ratio of a firm capital to an average firm capital in an industry. DFI, foreign presence variable can be measured as flow of FDI in an industry weighted by the industry production The performance of firms in different industries may be influenced by various factors: specific industry regulations, government policies of national producer protection, factors that affect demand for industry exports like

foreign legislation, antidumping investigations, etc. Z is set of dummy variables included to control for industry specific effects following Estrin and Rosevear (1999) and Ponomareva (2000).

The model taking into account available information is the following:

$$\frac{Y_{it}}{L_{it}} = f\left(\frac{K_{it}}{L_{it}}, DFI_{it}, SCALE_{it}, Z_i\right) \quad (2),$$

where t is index for time and i is for firm,

Y/L_{it} is a value of firm production per worker;

K/L_{it} is amount of firm capital per worker;

$SCALE_{it}$ is scale of firm's production;

DFI is foreign presence in an industry, it can measured as FDI in an industry weighted by the industry production,

Z is a set of dummy variables to control for industry specific factors, where indj=1 if a firm belongs to industry j, and it is 0 otherwise. j=2…6.

Thus, the main equation to estimate is the following:

$$\log\frac{Y_{it}}{L_{it}} = a_0 + a_1 \log\frac{K_{it}}{L_{it}} + a_2 SCALE_{it} + a_3 DFI_{it} + \sum_{j=2}^{6} b_j indj_i + e_{it} \quad (3)$$

According to the economic theory, coefficient for capital per employee is expected to be positive. Scale variable is included to control for returns to scale, if there are positive returns to scale, the coefficient will be positive too. The larger foreign presence in an industry tends to create the larger potential for spillovers. If technology transfer effect dominates competition effect spillovers will be positive. In this case the coefficient for DFI is expected to be positive too.

This is a pooled regression where time series for 2 years are combined with cross-section observations for 122 firms. To deal with heteroscedasticity problem, estimation is conducted by applying GLS method. The other

problem in such type of research is endogeneity, as foreign capital is usually invested in firms that are more productive and FDI in turn tends to increase firm productivity. Sample contains firms without foreign capital only, which should decrease potential endogeneity of labor productivity and FDI. Also, as indicated by Sjöholm (1997, p.3): "…there is identification problem in examining levels of productivity, as it is likely that foreign firms locate in highly productive sectors. One might then for instance conclude that there are positive spillovers from FDI even if such do not exist". He suggests using growth rates of productivity instead of levels as possible way of avoiding this problem. In accordance with this recommendation, I examine the following model:

$$g_{y_i} = \alpha_1 g_{k_i} + \alpha_2 DFI_{i1998} + \alpha_3 Scale_i + e_i \quad (4),$$

where g_y is growth rate of firm value of production per employee in 1999,
g_k is growth rate of capital per employee in 1999,
DFI_{it-1} is proxy for foreign presence in previous period, measured as flow of FDI in an industry weighted by the industry value of production,
Scale is scale of firms in 1999,
e_i is error term.

Other than in previous model DFI variable allows to take into account consideration that there may be a lag between introduction new technology by firms with FDI and its appropriation by domestic firms. "By using different model specifications we are less likely to draw conclusions from fragile results"(Sjöholm, 1997, ibid).

5.3. Results

Results of estimation of equations (3) and (4) are reported in Table 4.

Table 4. Results of the regressions

	Regression 1 (1998-1999)	Regression 2 (1998-1999)	Regression 3 (1999)
Variables	$\ln \frac{Y}{L_{it}}$	$\ln \frac{Y}{L_{it}}$	Growth rate of value of production per worker in 1999
Constant	0.692038 (2.813654)***	0.568473 (2.593265)***	
$\ln \frac{K}{L_{it}}$	0.483694 (30.676597)***	0.395568 (27.467933)***	
Growth rate of capital per worker			0.898788(6.589878)***
$Scale_{it}$[3]	-0.039468 (-2.316781)**	-0.042036 (-2.542345)**	
$Scale_{i,1999}$[4]			-0.064291(-.940357)
DFI_{it} - ratio of FDI to an industry production[5]	0.000173 (3.571286)***	0.000168 (3.493624)***	
DFI_{i1998} - ratio of FDI to an industry production in 1998[6]			3.83E-11(1.887469)*
Ind2		-0.564973 (-1.987394)*	
Ind3		-0.713498 (-2.274573)**	
Ind4		-0.035745 (-1.624306)	
Ind5		-0.372935 (-1.163941)	
Ind6		0.638699 (1.997354)**	
R^2	0.247068	0.259156	0.424038
Observations	244	244	122

Note: It is t-statistics in parentheses. *,**,*** indicate 10%, 5% and 1% level of statistical significance respectively.

As can be seen from the table, coefficient for DFI_{it} is positive and statistically significant at 1%, coefficient for DFI_{i1998} is also positive and statistically significant at 10% level. Consequently, we cannot accept H_0 at respective levels of significance in all three estimations. Thus, we may conclude that

[3] The coefficient of correlation between capital per labor and scale variables is -.44.

[4] The coefficient of correlation between growth rate of capital per worker and scale variable is -.21.

[5] The coefficient of correlation between log value of production per worker and DFI_{it} is .17.

[6] The coefficient of correlation between growth rate of value of production per worker and DFI_{i1998} is .19.

there are some positive and statistically significant spillovers from foreign to domestic firms without FDI, however their size is very low. Negative coefficient for scale variable, which is significant at 5%, suggests that small and medium scale enterprises may be more productive than large enterprises Also scale is insignificant in growth rate equation, which may indicate that productivity of large enterprises does not tend to grow faster than productivity of small and medium scale enterprises. Dummy variables are significant only for food and wood processing and machine building industries. It seems to be that the specific conditions in food industry are favorable to labor productivity, while in wood processing and machine building the effect is opposite.

5.4. Discussion of results

This research suggests that there are positive spillovers from FDI in Ukraine. This result is different from those obtained in several studies of some transition countries. In CEE countries such as Czech Republic (Djankov and Hoekman, 1998), Poland, Romania and Bulgaria (Konings, 2000) spillovers were not found or they found to be negative.

The discrepancy of results may be due to the difference in characteristics of foreign sectors of economies. Some of these countries were quite successful in implementation of market reforms, which created favorable investment climate. That is why all these CEE countries are characterized by much more significant amounts of FDI per capita than Ukraine. Information about FDI per capita is presented in Appendix A1. Their foreign sector of economy is extensive and well developed which may lead to situation when locally owned firms face considerable competition from firms with foreign capital. Konings (2000, p.15) suggests that market-stealing effect, when inefficient firms without foreign capital loose market share due to foreign competition, may dominate technology transfer effect and this results in overall negative effect from FDI to domestic enterprises in some of these countries. Situation in

Ukraine is quite different, for example, joint-stock ventures are accounted only for 2.5% of industrial output in 1998 (Main Indicators of Enterprises Performance for different industries of Ukraine's economy for 1998).

Finding that small and medium scale firms tend to be more productive can be explained by the fact that Ukraine inherited from the FSU a lot of enterprises with excessive number of workers, with big outdated stock of capital and frequently with old-fashioned technologies. Restructuring of such enterprises takes time and is not always efficient. Most of these enterprises do not have money to buy new technologies and equipment

5.5. Suggestions for future research

Most of weaknesses of this research are generated by data constraints.

1) Sample size should be increased in order to better reflect actual situation.

2) If industry price indexes are available, it is better to use them instead of aggregate producer price index.

3) Value added per employee is considered to be more appropriate measure of labor productivity. This should be taken into account in future research.

4) Technological spillovers require a minimum amount of technological capacity of domestic firms to be materialized. Technological capacity of firms depends on several factors that should be added to the model:
   - quality of labor employed, for instance, proxied by ratio of skilled to unskilled labor;
   - R&D spending;
   - patent fees, etc.

5) Industry specific characteristics like capital intensity and competition are also important. However, due to lack of data I could include only dummy

variables to control for differences in characteristics of industries. These factors should be also taken into account in future research.

Chapter 6

CONCLUSIONS

This paper studies influence of foreign direct investment, which is important channel of technology transfer, on performance of locally owned firms in transition economy of Ukraine.

I use labor productivity calculated as value of production per worker as measure of firm performance. The question that is addressed in this work is: Does FDI generate spillovers to locally owned firms expressed in terms of rise or decline their labor productivity?

The issue is examined by using firm-level data for Ukraine for 1998 and 1999 years. The results of regressions suggest that there are positive spillovers, but their size is very small. This finding differs from results obtained in studies of Czech Republic (Djankov and Hoekman, 1998); Poland, Romania and Bulgaria (Konings, 2000) where spillovers were not found or they found to be negative.

The discrepancy of results may be due to difference in characteristics of foreign sector in these countries and Ukraine. All these CEE countries have more developed foreign sector of economy than Ukraine. This may lead to situation when inefficient firms without foreign capital loose market share due to foreign competition. This market-stealing effect may dominate technology transfer effect and this results in overall negative effect from FDI to domestic firms in these countries.

The other finding of this work is that large enterprises tend to be less productive than small and medium scale ones. This may be due to the fact that a lot of them still have excessive amount of workers, big outdated stock

of capital and rather old-fashioned technologies. Only further restructuring can change the situation.

Further research on this topic should be conducted taking into account specific characteristics of firms that influence their absorptive capacity – capability to benefit from foreign presence by adopting new foreign technologies and business practices.

Conducting appropriate policies can increase scope of spillovers. One possible way to do it is to facilitate creation of more favorable investment climate. This may lead to rise of foreign sector and potential of spillovers may expand as well. The other way is to promote absorptive capacity of the economy. This can be done by encouraging R&D spending and investments in human capital.

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APPENDICES

TABLE A1. FDI PER CAPITA IN CEE COUNTRIES AND UKRAINE IN 1996

Countries	FDI per capita, USD
Hungary	1450
Poland	300
Czech Republic	700
Romania	100
Bulgaria	100
Ukraine[7]	28

Source: Gavryluk, O. (1998), *Capital flows to CEE countries during transition period*, ''Finances of Ukraine'', #7

[7] For comparison, FDI per capita in Ukraine in 2000 is $76. It is still much less than these countries had 4 years ago.

A2. THE LEGISLATURE FRAMEWORK OF FOREIGN INVESTMENT ACTIVITY IN UKRAINE

Two interesting documents summarize Ukrainian legal framework for foreign investment: "Information about legislative framework of foreign investment process in Ukraine" prepared by Ministry of Economy and "Ukraine: Legal Framework affecting Foreign Investment" prepared by Ukrainian Trade Mission (NY Office).

The main law that determines conditions under which investment of foreign capital is conducted is The Law On Foreign Investing Regime adopted in March 1996. This law defines an enterprise with foreign investment as any type of organizational form created in accordance with Ukrainian legislation where the foreign investment in the charter fund is at least 10%.

Permitted types of foreign investment are the following:

- foreign currency;
- reinvested Ukrainian currency;
- any type of movable or immovable property, together with any rights associated therewith;
- shares, bonds, other securities or corporate rights;
- monetary or contractual receivables guaranteed by a first class bank;
- intellectual property rights;
- rights to carry out economic activities, including rights to natural resources.

The law guarantees that foreign investment cannot be nationalized. The state bodies have no the right to confiscate the foreign investments, The law

establishes for the foreign investors in Ukraine a national regime, that is, the equal conditions with the domestic investors. If legislative norms protecting foreign investment are changed, foreign investors will be treated in accordance with old legislation for 10 years. Foreign investors will obtain compensation in case of losses because of inappropriate activity of state institutions. Foreign investors are guaranteed the right of repatriation abroad, in foreign currency, of their revenues and profits.

Foreign investors pay taxes and duties in accordance with Ukrainian legislation as well as domestic investors. The Law On the Taxation of the Profits of Enterprises cancelled the five-year tax holiday available to Ukrainian enterprises with foreign investment in accordance with Decree On the Regime of Foreign Investment of the Cabinet of Ministers of Ukraine, dated June 5, 1993. However, enterprises that were registered before or on January 1, 1995 retained the right to the holiday. The law established a basic corporate tax rate of 30%. However, the tax for profits gained from intermediary activities is 45% and on profits from lotteries, casinos, etc. the tax is 60%. As well as Ukrainian entrepreneurs, foreign investors are required to pay a total of 51% in payroll taxes in connection with their employees: 37% to the pension and social security funds, 12% to the Chernobyl fund and 2% to the employment fund.

A3. DATA DESCRIPTION

TABLE A3.1 DISTRIBUTION OF FIRMS AMONG INDUSTRIES

Industry	Percentage of firms belonging to an industry
Metallurgy, energy, chemical industry, coal industry	9
Machine building	27
Wood processing	7
Construction materials	14
Light industry	14
Food processing	29

Source: Author's calculations.

TABLE 3.2 DISTRIBUTION OF FIRMS AMONG REGIONS

Region	Percentage of firms belonging to an industry
Kiev	28
Lviv	30
Kharkiv	33
Odessa	8

Source: Author's calculations.