

THE EFFECT OF FOREIGN  
DIRECT INVESTMENTS ON  
FIRM PERFORMANCE IN  
UKRAINE

by

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A thesis submitted in partial  
fulfillment of the requirements for the  
degree of

Master of Arts

Kyiv-Mohyla Academy

2001

Approved by \_\_\_\_\_  
Chairperson of Supervisory Committee

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Kyiv-Mohyla Academy

Abstract

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All countries are eager to attract as much foreign investments as possible. At the same time FDI may have not only positive, but also negative effects on the economy. Positive effects are associated with technology transfer, efficient allocation of resources, and training of domestic workers. At the same time entrance of foreign firms could lead to decrease of labor productivity at domestic firms, which is a negative effect. The main purpose of the paper is to estimate direct and indirect effects of FDI. First, the research tests for direct influence of foreign direct investments on firm's performance, which is estimated as labor productivity and export. FDI notably increases both labor productivity and export volumes. Second, we look for spillover or indirect effects. There is statistical evidence that level of FDI in certain region-industry increases non-FDI firms performance indicators measured by labor productivity and volumes of export.

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## ACKNOWLEDGMENTS

I wish to express gratitude towards Prof. Lutz for his insightful suggestions and guidance through this thesis writing. I am also grateful to Inessa Love of Columbia University and Prof. Lehman for their extremely helpful advice in the empirical part. I also want to express my appreciation to Prof. Konieczny and Prof. Gardner for comments on the theoretical part and to EERC Research Center to providing the data. Finally, I wish to thank all EERC MA students, and in particular Julia Demyanyk, Dmytro Ostanin and Yuriy Gorodnichenko for their help and support during this thesis development.

## GLOSSARY

**Economies of scale:** reduction in minimum average costs resulting from through increases in the size (scale) of plant or equipment.

**Foreign Direct Investments:** all kinds of valuables that are directly invested by foreign investors into objects in order to receive profits (revenues) or reach social effect.

**Herfindahl-Hirschman Index:** the sum of the squared market shares of each firm in the industry

**Home country:** a country where the base office of the international corporation is settled.

**Horizontal merger:** a merger of firms that compete within the same industry combine

**Host country:** a country, where international corporation establishes its subsidiaries.

**Hostile takeover:** a change in the ownership of a corporation despite opposition by the original managers or owners.

**Joint venture:** joint ventures are enterprises established primarily to pool assets of different owners and are of mixed-type ownership.

**Investment decision.** The decision to build, buy, or lease plant equipment or to start or expand a business.

**Multinational corporation (MNC).** A company with operations in several countries, headquarters of which is owned by the capital of more than one country and its subsidiaries situated in different countries.

**Vertical merger:** a firm buys its supplier or vice versa.

## *Section 1*

### 1. INTRODUCTION

Attracting of Foreign Direct Investments (FDI) is one of the most essential issues in reformation and modernization of the Ukrainian economy. Due to a substantial technological lag in comparison to developed countries, Ukraine needs foreign capital that could provide new technologies, new methods of management and also promote development of domestic investments. The experience of developed countries shows that investment boom starts with adaptation of new technologies, brought with foreign capital. Dyker (1999) emphasizes the ways, through which FDI improve economic performance of the host countries:

- Integration of host country economy into global economy;
- Increase in the aggregate level of investment
- Transfer of hard technology (technology of product and process)
- Transfer of soft technology (management, marketing methods)
- Networking and subcontracting with domestic firms

At the same time, Ukrainian level of FDI per capita is far below that of some transition countries, in particular the Czech Republic, Hungary or Poland. For instance, only the USA invested 10 times more in the Polish economy than in the Ukrainian one<sup>1</sup>. Such negligible volumes of FDI could be explained by discouraging investment climate, presently created in Ukraine, and also suspicious attitude toward foreign investors from government and managers of some enterprises. Some investors think countries ex ante do not want attract FDI. "... CEE countries were also unwilling to attract too much FDI. In transition economies, FDI has typically meant not green field investment, but the purchase of existing assets, usually during privatization of state-owned enterprises. Selling state assets to foreigners is often seen as selling the family

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<sup>1</sup> From the presentation of the US ambassador Steven Pifer in NaUKMA, 2000.

silver and encounters widespread political resistance”, (Sinn and Weichenrieder, 1997).

At the same time, Ukraine has a substantial economic potential, which is utilized adequately. The main reasons for investing in Ukraine are:

- lack of competition from the domestic firms
- cheap labor
- potentially large consumer market

Despite these advantages, foreigners are reserved about investing in Ukraine. Nowadays, the Ukrainian economy really needs inflows of foreign capital, because of suspension of investment financing from government budget and the lack of enterprises funds. Among other problems the following should be emphasized:

- poor legislative framework
- unanticipated changes in taxation
- equipment deterioration
- political instability

All (mentioned above) leads to Ukraine being ranked “B-“ by Moody’s Company (Infobank, 2001), which is one of the lowest ranks in Europe.

Nevertheless, Ukraine still attracts FDI through the following activities:

- creation of joint venture firms (including sale of stock to foreigners),
- creation of free economic zones

While attractiveness of FDI is an important issue for every country we should not forget about different spillovers that FDI could cause. As a rule, FDI gives raise to positive externalities. However, we cannot unambiguously assert these effects of FDI in transition economies, and in Ukraine in particular. As a rule, transition changes the way economy operates, leading to unexpected results. Therefore FDI can bring both positive and negative externalities. Negative spillovers could in the form of a raise in monopoly power of MNCs, which in order to avoid competition from a Ukrainian firm, acquire and close it.

In our paper we examine the effects on technology transfer and spillovers deriving from FDI intensity. More specifically, we survey two problematic

questions, using unpublished Ukrainian micro data. Firstly, do establishments with FDI differ in terms of performance level? Secondly, are there any beneficial spillovers on firms that have not received FDI? We anticipate that foreign establishments have comparatively higher levels of performance and domestic establishments benefit from spillovers.

The data used in this research consist of 292 firm characteristics for 1998-99 and cover Odessa, Kyiv, Kharkiv and Lviv regions. The firms belong to 7 industries according to specification of EERC Research Center<sup>2</sup>.

We tackle the issue econometrically using panel data technique. The first and second model tests whether FDI influence on labor productivity and export is positive or not. According to the obtained results, firms with FDI have higher labor productivity and volumes of export. In the third and fourth models we test firms' benefits from FDI vicinity. We find a positive spillover effect on labor productivity and export volumes for non-FDI firms.

The paper is organized as follows. The next section overviews theoretical background of the work that includes literature review, model development and issues on the role of FDI in transition countries and Ukraine. In section 3 we describe data, econometric models and discuss the results. Conclusions and suggestions for future research are in the last section.

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<sup>2</sup> I do thank EERC Research Center for providing the data.

## *Section 2*

### 2. THEORETICAL BACKGROUND

#### 2.1. Literature review

Industrial Organization theory provides us with different approaches to studying the direct and indirect effects of FDI on host countries. Direct FDI effects measure the difference in firm performance between firms with and without FDI. Indirect effects are spread through specific channels and “examine different aspects of the interaction between MNCs and host country residents that are plausibly related to FDI spillovers” (Blomström, Globerman and Kokko, 1999).

##### 2.1.1. Direct effects of FDI

Estimating direct effects, Blomström (1989) investigates differences in labor productivity, capital-labor ratio, wage level and profitability of firms with and without FDI. He finds that “... foreign subsidiaries in general exhibit higher labor productivity and capital intensity than Mexican manufacturing units of a similar size at the same four-digit industry. Foreign firms also seem to pay higher wages.” This is explained by a higher labor and capital quality at foreign companies. However, such indicators as the share of labor remuneration in value added and profits per unit of capital are lower in foreign firms. Blomström explains it by the fact that foreign companies cover their profits to avoid some taxes. Finally, pointing to the imperfection of his data, he concludes “Although our results indicate differences in performance between foreign and domestic production units in the Mexican manufacturing industry, we are unable to show that these hypotheses are significantly different from zero”.

Ponomareva (2000) studies direct FDI effects in Russia focusing on whether FDI firms perform better than domestic ones. She uses the datasets from State Statistic Committee of Russia mostly on energy, fuel and foodstuff production industries. A number of firms are situated in the central region, near natural resources or metal processing centers. She develops an econometric model where output depends on employment, capital, economy of scale, minimum efficiency scale, existence of FDI, industry and region. The author's does not confirm a significant influence of foreign majority ownership, so that firms with the prevailing share of foreign capital do not show a better performance. Furthermore, the study finds that output in plants with FDI is higher than that of domestic ones.

Similar research is conducted by Konings (2000) for Poland, Bulgaria and Romania. He finds that "foreign firms perform better than firms without foreign participation only in Poland. In Bulgaria and Romania, no robust evidence is found of positive foreign ownership effect". The author explains this by the time lag needed by firms to restructure and effect on performance productivity. According to Konings, Poland is advanced in the transition process comparing to Bulgaria and Romania.

In another study at the macro-level Mykytiv (2000) analyzes influence of FDI on economic growth in Ukraine is estimated. The author agrees that FDI is commonly linked to the technological progress in the country, because of the transfer of new technologies and inputs in innovations. This, in turn, is the basis of argument that enterprises with foreign investments exhibit a higher labor productivity comparing to domestically owned manufacturing. Mykytiv also argues that FDI is positively correlated with exports, since foreign investors often adopt export-oriented policy. It prompts competition among local enterprises and spreads new competitive technologies. Mykytiv (2000) develops a simultaneous model for the economy of Ukraine and uses the Error-Correction Model to explain long-term trends. However, he finds no significant results for the FDI influence on economic growth. These neutral results may be the result of inadequate country statistics.

## 2.1.2. FDI spillovers.

### *Technology Transfer*

Describing indirect FDI effects, Blomström and Kokko (1997) discuss transfer and technology diffusion from multinational companies to host countries, as well as prevalent ownership of commercial technologies by multinational companies. They consider theoretically the main technology transfer channels such as:

- Contribution to efficiency of domestic firms
- Introduction of new know-how
- Transfer of techniques for inventory and quality control

Glass and Saggi (1998) develop a model in which international technology transfer occurs through different channels. They evaluate the role that FDI plays in technology transfer promotion. FDI is the most important channel of international technology transfer. They argue that a faster flow of FDI to the host country increases the rates of innovation, imitation and international technology transfer. They also emphasize imitation as a source of technology transfer. Finally, they suggest that rates of innovation and imitation remain the same and FDI generate level effect only.

The technology transfer channel is also theoretically analyzed by Blomström (1987). He concludes that "... such a transfer is a central activity of MNCs, and this may stimulate domestic firms to hasten their access to a specific technology".

Ponomareva (2000) examines the impact of technological spillovers from FDI on domestic enterprises. She mentions a positive effect from FDI spillovers and concludes, "The effects [of FDI spillovers] depend on host country and host industry characteristics and the policy environment in which the multinationals operate". The author mentions an intra-region transfer of know-how and technology and finds that "domestic firms located nearby multinationals benefit from this vicinity".

Kinoshita (2000) examines the effect of technology diffusion from FDI in explaining the total factor productivity growth. She uses unpublished firm-level data of the Czech manufacturing sector for period of 1995-98. She finds that both foreign joint ventures and foreign presence in the sector do not have significant effects on productivity. The author finds that “the rate of technology spillovers varies greatly among sectors. In oligopolistic sectors such as machinery, there exists a significant rate of spillovers from having a large foreign presence” and no spillovers in more competitive food, textile, wood and chemical industries.

### *Competition*

As for competition effects, Blomström (1987) describes it as an increase in competition when multinational companies enter the host country markets. According to Blomström, greater competition leads to a more efficient market structure. The author argues that the Herfindahl index could be a proxy for the estimation of this effect. However, this explanatory variable is not significant. He explains this by the fact that “due to underdevelopment, Mexico is a relatively small economy, but a highly protected one”. In other words, domestic firms are legally protected from losing their market shares by MNCs.

Blomström and Kokko (1997) also examine the influence of international companies on the performance of the host country, as well as the effects on competition and industry structure in the host countries. They conclude that FDI contributes to productivity growth and exports in host countries, yet the exact nature of correlation between foreign and domestic firms could vary among industries and countries: some industries are more protected by government, some are less protected.

Ponomareva (2000) stresses the fact that competition with foreign firms forces domestic companies to protect their market share and profits. In contrast to the previous study, she finds negative effects. She concludes, “increases in foreign ownership negatively affect the productivity of wholly domestically owned firms in the same industry”.

Similarly, Konings (2000) finds no spillovers effects in Poland, but there are negative spillovers in Bulgaria and Romania. He explains that "... increased competition from FDI dominates technological spillovers to domestic firms. It suggests that inefficient firms will lose market share due to foreign competition, which in long run should increase the overall efficiency of an economy".

Furthermore, Kinoshita (1998) tries to decompose spillover effect into competition, training, foreign linkages and demonstration effects<sup>3</sup>. The author uses the survey data for 468 manufacturing firms in China between 1990-1992. She finds that the catch-up effect (spillovers) is "more important for domestically owned firms than for foreign firms, which rely on the import of intermediate goods". The author concludes that "Chinese local firms have survived increased competition due to the entry of more advanced foreign firms and have accomplished rapid growth because of this".

#### *Training of labor and management*

Blomström (1989) mentions that the training spillover channel can be a result of worker training by foreigners investing in human capital that spreads not only on foreign but also on domestic firms. "In Mexico ... many managerial people in large locally owned firms started their career in a MNC, and management practices may in this way be substantially improved in domestic firms". However, he does not estimate this hypothesis empirically.

Moreover, Kinoshita (1998) finds worker training an important source of productivity growth. However, it has some particularities. Domestic firms being afraid to lose their market shares, train their workers. Kinoshita suggests, "This might have facilitated the process of intra-industry spillovers from foreign investments". At the same time foreign-owned firms are unlikely to invest in the education of local workers. On the contrary, they

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<sup>3</sup> See findings on training, foreign linkages and demonstration effects below

“tend to maintain product quality by improving intermediate goods from their home countries and by transferring managers from their headquarters”.

*Foreign linkage effect*

Blomström and Kokko (1997) distinguish backward linkage and forward linkage effects. A backward linkage occurs during interaction between multinational companies' branches with suppliers. The authors suggest that backward linkage is associated with MNCs assistance in establishing production facilities by suppliers, increasing quality of raw materials and training of management. A forward linkage is associated with consumer-MNC relationships. This channel is less evident than the previous one, and Blomström and Kokko mention insignificance of the forward linkage effect.

Similarly, Kinoshita (1998) also included foreign linkages proxy, but finds statistically insignificant coefficients.

*Demonstration effect*

Transferring of new technologies and innovations could be adopted via simulating them. According to Blomström, Globerman and Kokko (1999), “The successful introduction of new production techniques and new products reduces the subjective risk surrounding the adoption of the innovation and should, therefore promote its adoption more widely throughout the population of potential adopters in the host country”

Blomström and Kokko (1997) suggest it as an important channel of spillovers. They suggest, “...pure demonstration effects often take place unconsciously ... and often intimately relates to competition”.

Kinoshita (1998) determines the demonstration-imitation effect: when domestic firms observe activity of their multinational firms they start to imitate or copy in order to become more productive.

Thus, we can see that the issue of FDI and spillovers is highly appealing for research. FDI has direct and indirect impacts. Direct FDI effects measure difference in firm indicators between firms with and without FDI. Indirect effects are spread through specific contacts between MNCs and domestic firms. There are five main indirect effects found in relevant literature. The technology transfer effect appears when domestic firms receive new technologies and know-how for lower costs from MNCs. The catch-up effect simply means that foreign firm catches up the share of local market or domestic firm loses its market share. The competition effect arises when entrance of foreign firms forces domestic firms to act more efficient in order to save their profits and shares. The foreign linkage effect appears when foreign owned companies use services supplied by local firms. The training effect is a situation when foreign firms provide training for their workers and managerial staff, which in future can be hired by domestic firms.

## 2.2. Model development

As we can see from the previous section, there are two main subtopics of the FDI issue:

- FDI influence on firm's performance
- Spillover estimation

Recently developed empirical models estimate two effects either simultaneously [Ponomareva (2000), Konings (2000)] or separately [Kinoshita (1998), Blomström (1989)].

One of the earliest econometric models for estimation of FDI influence was developed by Magnus Blomström (1989) in his Mexican manufacturing sector research. He estimates labor productivity as an indicator of firm's performance<sup>4</sup>. The model is:

$$y_d = f(KL^d, H, SCALE^d, AD, (LQ_1, LQ_2), FS), \text{ where}$$

$y_d$  - value added in domestically owned private plants divided by total employees in these plants.

$KL^d$  - the ratio of total assets to the total number of employees

$SCALE^d$  - measure of scale

$AD$  - average effective working day

$LQ_1$  - ratio of white-collar workers to blue-collar workers

$LQ_2$  - measure of labor quality

$H$  - Herfindahl index

$FS$  - share of employees in industry's total employment in foreign plants

Among factors influencing firm performance Blomström uses capital intensity, quality of labor force, market structure, economy of scale and foreign presence. The last is estimated as the share of employees in an industry employed in foreign plants. As a proxy of capital intensity Blomström employs the ratio of total assets (book value) to the total number of employees in the domestically owned plants. Moreover, he suggests, "Labor productivity may also differ across plants because of scale

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<sup>4</sup> Blomström would prefer to use the ratio of net output to an index of total factor inputs, but cannot do it because of unavailable data.

economies”. Diseconomies of scale are represented by the ratio of the gross production of the largest plants in industry to gross production of an average privately owned Mexican plant. The quality of labor force is estimated by two variables. First, it is a ratio of white-collar to blue-collar workers for an industry. Second, it is the error term “e” in the regression  $LQ_1 = a + b * FS + e$ . The Herfindahl index, which is used as a measure of concentration in market structure, is calculated as the sum of the squared market share of all firms in the industry. Variable AD corrects for the possibility of systematic differences in holidays, strikes, etc., in order to receive a better estimation of labor productivity.

A similar approach is developed by Ponomareva (2000) in her research on FDI spillovers in Russia. She estimates both FDI and spillover effect simultaneously. She also uses firm’s output as a performance indicator, which depends on capital, labor, economy of scale, FDI spillovers, FDI presence and minimum efficiency scale. The model is:

$$\ln(out_{ij}) = a_0 + a_1 * \ln(emp_{ij}) + a_2 * \ln(cap_{ij}) + a_3 * mef\_sc_j + a_4 * scale_{ij} + a_5 fdi_{ij} + a_6 spill_j + e_i$$

where, i – firm index

j – industry index

out – output

emp – employment

cap – capital

scale – economies of scale

mef\_sc – minimum efficiency scale

fdi – dummy variable for FDI

spill – spillover variable

e – error term

Capital stands for fixed assets at the beginning of the year. Labor denotes average annual employment. Like in the previous model, Ponomareva uses a scale variable, but it is measured as an establishment’s production over the average production in the industry. Minimum efficiency scale is estimated as median output over average output in the industry. This variable characterizes the distribution of firms in the industry. The FDI dummy

variable is valued 1 if a firm has FDI and 0 otherwise. Finally, a spillover variable is estimated as the share of output in an industry accounted for the foreign firms in total output.

Like Ponomareva in the previous model, Konings (2000) also estimates both FDI and spillovers effect. He constructs a similar log-linear production function:

$$y_{it} = \mathbf{a}_t + \mathbf{a}_1 k_{it} + \mathbf{a}_2 l_{it} + \mathbf{a}_3 m_{it} + \mathbf{a}_4 \mathbf{h}_t + \mathbf{a}_5 FDI_t + \mathbf{a}_6 FDI \mathbf{h}_t + \mathbf{a}_7 Spill_t + \mathbf{e}_{it}$$

where,  $i$  – firm index,  $t$  – year index.

$y_{it}$  – log output

$k_{it}$  – log of capital

$l_{it}$  – log employment

$m_{it}$  – log of material inputs

$\mathbf{h}_t$  - time varying factor

$FDI_t$  – share of firm hold by foreigners

$FDI \mathbf{h}_t$  – interaction of foreign ownership and time trend

spill – sector level spillover variable

$e$  – error term

Compared with the previous model, Konings adds log of material inputs. He also includes a time varying factor, which measures common aggregate shocks in production for example technological progress or other unobserved factors, and an interaction variable of foreign ownership and a time trend variable, which proxies foreign ownership influence on both level and growth of productivity. For the FDI variable Konings uses the fraction of shares held by foreign investor, and spillover variable is represented by the share of output accounted for by foreign firms in total output at the two-digit NACE sector level.

There is also research that estimates spillover effects separately. Magnus Blomström(1989) supports the idea that “[t]echnical progress can be studied by observing changes in the best-practice technology between two periods. The more rapid the technical progress has been, the faster the frontier has moved”. That is why he uses relative changes in labor productivity in the

best practice plants within each industry between 1970 and 1975 as a representative for technological growth. The model is:

$$e = f(\Delta y, H, MG, FS),$$

where  $\Delta y$  - technical progress

H – Herfidahl index

MG – market growth

FS – foreign ownership share

e – efficiency index

Blomström defines the market growth variable as the relative growth of employment in each industry. He identifies a company under foreign ownership if at least 15 percent of a company is foreign owned. Finally, the Herfidahl index represents market structure. The dependent variable  $e$  is estimated in two stages. “First, the efficiency frontier is obtained by choosing the size class within each four-digit industry showing the highest value-added per employer”. Second, Blomström finds the ratio of industry average<sup>5</sup> to the value found at the first stage.

Thus, previously developed models, which estimate influence of FDI and its spillovers on firm’s performance, can be subdivided into all-effects estimations and separate-effects estimations. In most models, change in added value or in output depend on FDI or spillover variable and on additional control variables such as capital, labor, economy of scale, quality of labor force, minimum efficiency scale, etc. Having considered mentioned above, we develop our own models, which are described in section 3.

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<sup>5</sup> Estimated as ratio of total value added in each industry to the total number of employees.

### 2.3. FDI in transition countries

Transition countries are characterized by a need for foreign investment, especially FDI. Below we describe the main features of investment climates in Poland, Czech Republic, Hungary and Russia.

The Czech Republic differs from some Eastern European countries by macroeconomic stability, well qualified labor and anticipated political environment. According to CzechInvest<sup>6</sup>, the Czech agency for attraction FDI, all sectors of economy are opened to a foreign presence. The Czech government developed a standard package of incentives for manufacturing investments in 1998. Incentives are offered for investors who invest \$10 million in manufacturing through the creation of a new firm. The package consists of duty free import of equipment, delays in value added tax payment, training grants and additional incentives after reinvesting. Moreover, the Czech government has created a sophisticated legal environment based on commercial code, banking law and tax code.

According to CzechInvest data, the Czech Republic attracted the total of US\$19.3 billion of FDI in 1991-1999. Germany was the largest foreign investor and contributed US\$5.0 billion (26.2 %). The second largest investor was Netherlands with US\$4.6 billion (24.0 %). Austria and the USA follow with US\$2.3 billion (11.8%) and US\$1.7 billion (9.0%), respectively. The introduction of investment incentives resulted in a significant increase of FDI in 1998. As for industrial allocation, the most attractive are financial services (US\$3.0 billion or 15.8%), wholesale trade (US\$2.7 billion or 13.8%), non-metallic mineral products (US\$1.5 billion or 8.0%) and post and telecommunications (US\$1.2 billion or 6.4 percent).

In Poland foreign investments also play a considerable role. According to the U.S. Department of State<sup>7</sup>, all political parties and social groups support any actions for FDI attractions in all spheres of the Polish economy except

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<sup>6</sup> Available at web-site <http://www.czechinvest.org>

<sup>7</sup> Available at web-site <http://www.state.gov>

agricultural land. The Polish government has approved a comprehensive legal framework that protects property rights and investments, provides equal treatment for both domestic and foreign firms and allows repatriation of profits abroad. Legislative environment is based on Commercial Code, Law on Economic Activity, The Law on Companies with Foreign Participation and others. The amount of FDI attracted in Poland has been increasing since 1991 (PAIZ, 2000). For instance, cumulative FDI in 1998 was \$27,279.6 million, and in 1999 - \$35,170.8 million. The reasons are the capacity of Polish markets, skilled work force and low labor costs. Total FDI in Poland reached USD 38.9 billion in 2000. German and US companies invested US\$ 6,007.3 million (17.3 %) and US\$ 5,152.9 million (14.7%), respectively. Other large investors are France (11.1%), the Netherlands (9.2%) and Italy (9.1%). The most attractive industries for investing are financial services (22.4%), food processing (13.1%), transportation equipment (12.5%), trade and repairs (9.7%), non-metal goods (5.9%), construction (5.5%) and transport, storage and communications (5.4%)

According to the U.S. Department of State, Hungary attracted over US\$ 23 billion of FDI from 1989 to 2000, which is a significant share of all FDI invested in Central and Eastern Europe during this period. The current economic and legal environment encourages FDI in all areas of the private economy. There are four main types of FDI in Hungary: establishment of a new business, joint venture; privatization and portfolio investment, or participation in capital raising. The major investing countries are USA, Germany, France, Austria, and the Netherlands, followed by Italy, Sweden, Great Britain, Switzerland, Japan, and Canada. In 1999, 55 percent of all FDI was invested in manufacturing, followed by telecommunications (15%), energy (13%), banking/finance (6%), and commerce (6%).

According to the U.S. Department of State, "the Russian economy has shown strength recovering from the August 1998 financial crisis, and real growth in the economy has helped spur limited new investment from both domestic and foreign investors. Many problems persist, however, including

chronic difficulties in the overall investment climate and a weak commercial banking sector. President Putin's government has shown a strong interest in attracting foreign investment and has promised to enact structural changes that would improve the environment for investors. However, most of these key steps have yet to be enacted."

Among the different problems existing in Russia, crime is one of the most viable concerns of foreign and domestic businesses, particularly those dealing with large amounts of cash and goods. "Much crime is tied to commercial activity, and many Russian entrepreneurs report that they must pay kickbacks and protection to stay in business. Furthermore, foreign investors have identified corruption as a pervasive problem, both in the number of instances and in the size of bribes sought." (U.S. Department of State).

Cumulative FDI from 1992 to 1999 totals about \$US 16 billion. Among the largest investors are the following countries<sup>8</sup>: Germany - \$US 6,946 million (23.7%), USA - \$US 6,349 million (21.7%), UK - \$US 3,628 million (12.4%), Cyprus - 3,440 million (11.8%) and France - \$US 3,249 (11.1%).

The most attractive for FDI Russian industries in 1999 were: the fuel industry \$US 1,700 million (17.8%), trade and catering \$US 1,622 million (17.0%), consulting services \$US 1,481 million (15.5), food industry \$US 1,415 million (14.8), transport and communication \$US 521 million (5.5%).

Eastern and Central European countries could roughly be subdivided according their FDI attractiveness as more attractive (Poland, Czech Republic and Hungary) and less attractive (Russia, Ukraine). Thus, geographic factor also plays a great role in investor's decision.

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<sup>8</sup> In cumulative terms

## 2.4. FDI in Ukraine

The collapse of the Soviet Union in 1991 created 15 independent states. One of those countries is Ukraine, which had a land area of 604,000 square kilometers (232,000 square miles) and a population of about 50 million. “In the 1980s, Ukraine produced 16-18 percent of Soviet industrial output and 23-24 percent of Soviet agricultural output: in 1989 it produced 34 percent of Soviet steel, 23.5 percent of coal, 46 percent of iron ore, 56 percent of sugar and 36 percent of TV”, (Yegorov, 1999).

It was supposed that Ukraine be highly attractive for FDI. Ukraine had cheap but at the same time skilled labor and available raw materials. However, investors were not in a hurry. FDI per capita in 1995 in Ukraine was only US\$13, while in Hungary it was US\$1017 and in the Czech Republic US\$575.

Despite business recession, equipment deterioration, instability of macroeconomic situation and other causes foreign investors slowly but gradually invest in Ukraine, except in areas prohibited by law. Government, financial intermediaries and firms with FDI actively operate in the investment market. The government provides formal rules or legislation environment at both national and local levels, though officials are often interested in political power and private benefit. As for informal rules, “...corruption follows directly from the degree of discretion officials have in granting approvals for private business. Unofficial payments have to be made at all stages of the licensing and permissions process” (Kudina, 1998).

Another actors in the market are financial intermediaries or security brokers, who act as agents for investors. They compete at the investment market supplying consulting services. KINTO Investments and Securities, Alpha Capital, Dragon Capital are leaders at the market. “The leading Ukrainian securities company, KINTO Investments and Securities, was formed with a substantial contribution from Wasserstein Parella of the US and European Privatization and Investment Corp. In turn, KINTO has created a number

of daughter companies, which operate on the Ukrainian equity market” (Yegorov, 1999).

Foreigners mostly invest through creation of own firms (for example, Cargill’s new seed processing plant in the Donetsk Region) or buying equity (For example Irish CRH, which bought controlling interest of cement plant in the Khmelnytsky Region). Foreign investment has the following forms:

- Foreign exchange
- Domestic currency (reinvesting)
- Any movable and immovable property
- Equity
- Corporate rights
- Immaterial assets (know-how, software)

Investments in Ukraine are formally regulated by laws and other legal acts. The following laws should be emphasized:

- The Law “On Foreign Investing Regime”, dated March 19, 1996
- The Law “On Foreign Investments” dated March 16, 1992
- The Law “On State Program of Encouraging Foreign Investments in Ukraine”, dated December 17, 1993
- Cabinet Resolution on a Foreign Investment Regime, dated May 20, 1993;

The main features of Law “On Foreign Investing Regime” are:

- Registration requirement of foreign investments with local authorities
- Regulation of types of foreign investments
- Privileges for foreign investors
- Guarantees for profit repatriation
- Exemption of custom duties for foreign contributions to statutory fund.

In order to attract more investors, there are provisions on legislature changes in Law “On Foreign Investments”:

- Foreign investors are guaranteed protection against changes in legislature for 10 years
- Guarantees against illegal nationalization
- Compensation and reimbursement of foreign investors losses (nationalization)

- Guarantees if investment activity is terminated (repatriation of profits and invested assets).
- Guarantees for profit repatriation
- State registration and control for foreign investments

The law “On State Program of Encouraging Foreign Investments in Ukraine” describes ways to attract more FDI into agriculture, light, fuel, medicine, chemical and transport industries.

However, these laws cannot fully clarify ambiguity in the FDI legal environment. The government can issue and an unanticipated amendment in the middle of year, when plans for most companies’ development are already established. Moreover, numerous cases of corruption and bribery are apparently not conducive to the attraction of FDI.

According to the official statistical office, Derzhkomstat, FDI in Ukraine has reached the total of \$3.25 billion since 1992. The United States has invested \$589 million and has become the largest investor; the Netherlands follows with \$301 million. Other big investors are Russia (\$288 million), Great Britain (\$243 million), and Germany (\$229 million)

The most important for FDI industries are machinery (13% of total FDI), and food industry (21%). Domestic trade also plays a significant role in FDI attraction (16%) (Derzhkomstat, 2000).

According to the Institute of Reforms (2000) there are many differences in FDI attractiveness by regions<sup>9</sup>. Kyiv City is the most attractive region in Ukraine. It has a comparatively developed transport and communication systems, infrastructure, financial institutions. The average salary in Kyiv is twice than the average in Ukraine. As on June 2000, \$1.2 billion were invested in the city, 32,9% from the USA, 16.5% from Cyprus, 9.8% from Austria, 6.8% - Hungary and 4.2% from Switzerland.

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<sup>9</sup> The ranking of investment attractiveness is based not only on investment but also on economic, infrastructure, social regional features.

The second in the ranking of investment attractiveness (Institute of Reforms, 2000) is the Donetsk region. As of July 2000, due to the creation of free trade zones “Donetsk” and “Azov” and attractive economic situation investors, contributed to the Donetsk region \$293.5 million. Dnipropetrovsk, Lviv, Zaporizhia and Kharkiv could also be named as leaders. These regions attracted \$184.33 million, \$125.85 million, \$218.00 million and \$88.86 millions, respectively. Next group is the “followers”. It consists of the Odessa (\$190.12 million), Kyiv excluding the city (\$302.9 million), Poltava (\$211.12 million) regions, and the Crimea Republic (\$150.1 million). Each of these regions attracted a significant amount of FDI but because of various reasons<sup>10</sup> lags behind the leading regions. Chernivtsi (\$8.16 million), Zakarpattja (\$81.73 million), Mykolaiv (\$44.87 million), Lugansk (\$30.25 million), Ivano-Frankivsk (\$37.64 million), and Kherson (\$32.19 million) regions are included in the “main” group. The regions of this group have variegated indicators. For example the Ivano-Frankivsk region has ranked 13<sup>th</sup> in the stocks parameter, but there is no regional company listed in PFTS, the Ukrainian index. The group of “outsiders” is characterized by an undeveloped business infrastructure and consists of Chernigiv (\$46.78 million), Vinnytsja (\$17.06 million), Rivne (\$44.79 million), Ternopil (\$19.65 million), Khmelnytsky (\$14.67 million), Sumska (\$34.56 million), Kirovograd (\$17.96 million), and Cherkasy (\$103.60 million).

Thus, on the one hand Ukraine could potentially be attractive to foreign investors. It is possible to earn huge profits. On the other hand, it is extremely risky to put money into Ukrainian firms due to political instability and vulnerable legislature.

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<sup>10</sup> For example the Odessa region does not have a developed financial infrastructure, its level of production significantly depends on companies such as Odessa refinery or Ukratnafta in the Poltava region.

## *Section 3*

### 3. EMPIRICAL PART

As we can see from the previous part, FDI and spillover issue has substantial theoretical background. Unfortunately, nobody has ever researched the topic in Ukraine. Having stated the main question of paper “Does Ukraine benefit from FDI?” we test for direct and indirect FDI effects on labor productivity and export volumes. In our research we use unpublished firm level data from the EERC Research Center.

#### 3.1. Data description

The data used in this research consist of two EERC Research Center datasets. The first includes micro-level information on fixed assets, labor force, sales, export, import, barter operations, and industry-region information. The second contains information on FDI presence in certain firms.

To present such variables as capital we could use different estimations of fixed assets. According to a theoretical study (Ponomareva, 2000), the balance sheet value could be the best proxy for capital, since it reflects real capital capacities of the firm. All data are constant 1998 prices, converted using producer price index from the UEPLAC(2000) web site<sup>11</sup> (See Table 1).

There are 292 observations for manufacturing firms for 1998 and 1999. 25% of them have some FDI. A firm is assumed to have FDI when<sup>12</sup>:

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<sup>11</sup> Available at <http://www.ueplac.kiev.ua>

<sup>12</sup> Firms unwillingly report on FDI availability. Therefore, the EERC Research Center used questionnaires about changes in FDI in order to find the FDI existence in companies

- They had changes in FDI during last period
- They had foreign ownership<sup>13</sup>

The dataset covers Lviv, Kyiv, Odesa and Kharkiv regions, which represent West, Center, South and East of Ukraine, respectively. Regional distribution with frequencies and percentages is described in Table 2. As can be seen from the Table 2, the share of Kyiv, Lviv and Kharkiv regions is 30% each, while the share of Odesa region is 10%. This may be explained by the fact that Ukrainian South is less industrialized than central or eastern areas, and the fact of unwillingness of Odesa region's managers to take part in EERC survey.

Table 1. Statistic characteristics of variables used in research.

Variable	All firms		FDI firms	
	Mean	Std. Dev.	Mean	Std. Dev.
Balance value of fixed assets, UAH 1998	17324.32	54366.9	5904.55	12853.74
Sales, UAH 1998	5026.05	15245.07	3353.26	7379.38
Import, UAH 1998	902.15	3525.32	1548.95	3914.26
Production, UAH 1998	5169.32	15474.25	3948.94	10837.29
Labor, workers	457	1019	255	508
Export, UAH 1998	852.12	3801.31	1136.95	4246.77

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<sup>13</sup> We assumed that firms with foreign ownership should have FDI in either material or at least non-material form.

The dataset covers 7 industries. Most of the firms are involved in food industry (25%) or in metal processing (20%). A large number of firms do not identify themselves with any particular industry (22%). The industry distribution of firms is summarized in Table 3.

Table 2. Region distribution of firms.

Region	All firms		FDI firms	
	Frequency	Percentage	Frequency	Percentage
Kyiv region	88	30.14	22	30.14
Lviv region	90	30.92	26	35.62
Kharkiv region	89	30.48	22	30.14
Odesa region	25	8.56	3	4.10

Table 3. Industry distribution of firms

Industry	All firms		FDI firms	
	Frequency	Percentage	Frequency	Percentage
Metallurgy	24	8.22	5	6.85
Metal processing	58	19.86	8	10.96
Wood and Paper	15	5.14	5	6.85
Construction materials	26	8.90	5	6.85
Light	30	10.27	9	12.33

Food	74	25.34	18	24.66
Others	65	22.26	23	31.51

The ownership structure of available data is depicted in Table 4. A significant share of firms (36%) constitutes an unspecified form of ownership<sup>14</sup>. Workers own 17% of firms in the sample. Other physical entities are either retired persons or those who bought shares during certificate auctions.

Some firms with foreign ownership were added to the original dataset in order to increase the sample of firms with FDI<sup>15</sup>.

Table 4. Ownership distribution of firms<sup>16</sup>

Ownership	Frequency	Percentage
Workers	49	16.78
Managers	13	4.45
Government	7	2.40
Other physical entities	27	9.25
Other Ukrainian companies	29	9.93
Other foreign companies	61	20.89
Other	106	36.30

<sup>14</sup> See in appendices: A4. Questionnaire. Total information about enterprise in appendices, question #3.

<sup>15</sup> Total amount of added firms is about 45.

<sup>16</sup> On the basis on major ownership.

### 3.2. Econometric models used

The main aim of the thesis is to estimate the influence of FDI on firm's performance and find the region-industry spillover effect. In order to estimate the former effect, we develop the following analytical model:

$$P_{it} = f(K_{it}, L_{it}, Industry_i, REGION_i, FDI_i, OWNERSHIP_i, Scale_{it}) \quad (1)$$

where  $i$  – index for firm and  $t$  – index for year

$P_{it}$  – firm performance, estimated as labor productivity or export volume

$L_{it}$  – labor that is the quantity of workers in the firm,

$K_{it}$  – capital stock or the balance value of fixed assets,

$Scale_{it}$  – economy of scale proxy, estimated as the ratio of firms production to the average production in industry

$INDUSTRY_i$  – industry, one of seven industries according to specification of the EERC Research Center,

$OWNERSHIP_i$  – type of ownership, one of types of ownership according to specification of the EERC Research Center,

$REGION_i$  – region, where the firm is situated,

$FDI_i$  – a dummy variable that shows the existence of FDI.

The dependent variable, i.e. performance, could be estimated in various ways. The ideal representation is value added or value added per worker. However, due to data restrictions sales, production, barter, export and import, we decided to use the Hausman specification test to check for a correct econometric specification<sup>17</sup>.

Econometric models used are shown below.

**Model 1.** Labor productivity is assumed to be a performance indicator and our model is:

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<sup>17</sup> See results appendices: A3. Hausman specification tests.

$$\ln \frac{Y_{it}}{L_{it}} = const + \mathbf{a}_1 \ln \frac{K_{it}}{L_{it}} + \mathbf{a}_2 FDI_i + \sum_{r=1}^3 R_r REGION_{ri} + \sum_{s=1}^6 S_s INDUSTRY_{si} + \sum_{d=1}^6 O_d OWN_{di} + \mathbf{e}_{it} \quad (2)$$

where

$FDI_i$  is a dummy variable taking the value 1 if the firm has ever had foreign direct investments, and 0 otherwise.

$REGION_i$ ,  $INDUSTRY_i$  are dummies, which specify an industry and region, respectively. For region dummies Odesa region is the base and  $R_1$  denotes Kyiv region,  $R_2$  – Lviv region and  $R_3$  – Kharkiv region. Unspecified industry is the base for industry dummies and other dummies are:  $S_1$  – metallurgy,  $S_2$  – metal processing,  $S_3$  – wood and paper industry,  $S_4$  – construction materials industry,  $S_5$  – light industry and  $S_6$  – food industry.

$OWN_{oi}$  – are dummies that determine type of ownership. Unspecified kind of ownership is the base for ownership dummies. We denote  $O_1$  – workers ownership majority,  $O_2$  – management,  $O_3$  – state,  $O_4$  – other physical entities,  $O_5$  – other Ukrainian companies and  $O_6$  – other foreign companies.

Our Hypotheses for the model 1 are the following:

**$H_0: \hat{\mathbf{a}}_2=0$ : FDI does not affect labor productivity**

**$H_1: \hat{\mathbf{a}}_2>0$ : FDI has a positive influence on labor productivity**

We anticipate the rejection of our  $H_0$ .

**Model 2.** Performance is measured by export volume. Theoretically, if a firm exports more, it has comparative advantage, which is a positive fact. The second model is the same as model 1, but we add economy of scale proxy, estimated as the ratio of firm's production to the average production in industry: We also use capital and labor variable separately instead of labor productivity.

$$\ln Exp_{it} = const + \mathbf{a}_1 \ln K_{it} + \mathbf{a}_2 \ln L_{it} + \mathbf{a}_3 FDI_i + \sum_{r=1}^3 R_r REGION_{ri} + \sum_{s=1}^6 S_s INDUSTRY_{si} + Scale_{it} + \sum_{d=1}^6 O_d OWN_{di} + \mathbf{e}_{it} \quad (3)$$

Hypotheses for model 2:

**H<sub>0</sub>:  $\hat{\mathbf{a}}_3=0$ : FDI does not affect export volumes,**

**H<sub>1</sub>:  $\hat{\mathbf{a}}_3>0$ : FDI has a positive influence on export**

We anticipate the rejection of H<sub>0</sub>.

Endogeneity is a problem associated with models 1-2. It is typical in Ukraine that firms with FDI have higher labor productivity and firms with larger labor productivity attract more FDI. In other words, foreigners make Ukrainian firms to operate more efficient and the best firms also attract FDI. The same links can be traced between FDI and export. Firms with FDI have larger volumes of export and conversely large volumes of export magnetize FDI.

In order to solve this problem we used the 2 stage methodology. While FDI is highly correlated with export, the latter, in turn, is not closely correlated<sup>18</sup> with labor productivity. Therefore, we construct the following measure:

$$probit(FDI_i) = const + \mathbf{a} \ln EXP_{it} + \mathbf{e}_{it} \quad (4)$$

and then, using the GLS in order to avoid heteroscedasticity problem:

$$\ln \frac{Y_{it}}{L_{it}} = const + \mathbf{a}_1 \ln \frac{K_{it}}{L_{it}} + \mathbf{a}_2 \widehat{FDI}_i + \sum_{r=1}^3 R_r REGION_{ri} + \sum_{s=1}^6 S_s INDUSTRY_{si} + \sum_{d=1}^6 O_d OWN_{di} + \mathbf{e}_{it} \quad (5)$$

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<sup>18</sup> R<sup>2</sup> =0.15

Thus, we estimated the real effect of FDI on labor productivity. Similarly, export is estimated as an indicator of firm performance:

$$probit(FDI_i) = const + \mathbf{a} \ln \frac{Y_{it}}{L_{it}} + \mathbf{e}_{it} \quad (6)$$

$$\begin{aligned} \ln Exp_{it} = & const + \mathbf{a}_1 \ln K_{it} + \mathbf{a}_2 \ln L_{it} + \mathbf{a}_3 \widehat{FDI}_i + \sum_{r=1}^3 R_r REGION_{ri} + \\ & \sum_{s=1}^6 S_s INDUSTRY_{si} + Scale_{it} + \sum_{d=1}^6 O_d OWN_{dt} + \mathbf{e}_{it} \end{aligned} \quad (7)$$

We anticipate that FDI has a positive effect on firm's performance estimated as labor productivity or export.

In **models 34** we investigate whether a firm that does not receive FDI benefits from FDI in other firms in its industry-region. In other words, we want to estimate the influence of FDI intensity, which is represented as a share of investment in a certain region-industry, on performance of firms that do not have FDI.

There is a less potential for “endogeneity”<sup>19</sup>, as we do not expect the productivity of firms that do not receive any FDI to be affected by the proportion of FDI in other firms in their industry-region. It is not likely that FDI in the industry-region should somehow be correlated with the labor productivity of firms that do not get any FDI. To control for unobserved heteroscedasticity we use the GLS in models 3-4.

**Model 3** We use the labor productivity as a measure of firm performance, and the model is:

$$\ln \frac{Y_{it}}{L_{it}} = const + \mathbf{a}_1 \ln \frac{K_{it}}{L_{it}} + ISPIL_{sdi} + \sum_{d=1}^6 O_d OWN_{dt} + \sum_{s=1}^6 S_s INDUSTRY_{si} + \mathbf{e}_{it} \quad (8)$$

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<sup>19</sup> I thank Inessa Love from Columbia University for clarifying this point.

We do not include regional dummies because of insignificance their coefficient. The spillover variable is the percentage of FDI in region multiplied by percentage of FDI in industry of non-FDI firm.

Thus, the Hypotheses for the model 3 are:

**H<sub>0</sub>:  $\delta > 0$ : FDI intensity causes negative or no externalities**

**H<sub>1</sub>:  $\delta = 0$ : FDI intensity increases labor productivity of Non-FDI firms**

We anticipate the rejection of H<sub>0</sub>

**Model 4.** We use export as a proxy for firm's performance. The model is:

$$\ln Exp_{it} = const + \alpha_1 \ln K_{it} + \alpha_2 \ln L_{it} + ISPIL_{sdt} + \sum_{d=1}^6 O_d OWN_{di} + \sum_{s=1}^6 S_s INDUSTRY_{si} + e_{it} \quad (9)$$

Our hypotheses are:

**H<sub>0</sub>:  $\delta = 0$ : FDI intensity causes negative or no externalities**

**H<sub>1</sub>:  $\delta > 0$ : FDI intensity positively influences export volumes of non-FDI firms**

We anticipate the rejection of H<sub>0</sub>

### 3.3. Analysis of results

In order to test all four hypotheses we tested 4 models. Our findings for the hypotheses testing are described in tables 5-8. Model 1 is estimated as variations of Equation 5. We test for FDI impact on labor productivity.

Table 5. Regression results for the FDI effect on labor productivity.

	$\ln \frac{Y_{it}}{L_{it}}$	$\ln \frac{Y_{it}}{L_{it}}$	$\ln \frac{Y_{it}}{L_{it}}$	$\ln \frac{Y_{it}}{L_{it}}$
<i>constant</i>	3.110221 *** (.3798949)	3.36888*** (.6094581)	3.797782*** (.5813996)	3.361068 *** (.6017184)
$\ln \frac{K_{it}}{L_{it}}$	-.0321387 (.0954852)	-.0958973 (.0990565)	-.0777378 (.0874039)	-.0483727 (.0878096)
<i>FDI</i>	.7544024*** (.1440682)	.7314491*** (.1436722)	.8042352*** (.137226)	.7737273*** (.1398052)
<i>Kyiv region</i>		.1963453 (.4919964)	.0382721 (.4099749)	.0755219 (.4087269)
<i>Lviv region</i>		-.5243072 (.5092676)	-.3578108 (.4218442)	-.3236778 (.4304532)
<i>Kharkiv region</i>		-.00652 (.5054732)	.0584154 (.4184861)	.1697789 (.420667)
<i>Metallurgy industry</i>			-.0532733 (.3458821)	.1002837 (.3539814)
<i>Metal processing</i>			-1.2091*** (.2727451)	-1.105147*** (.2791934)
<i>Wood and paper</i>			.2423589 (.5650992)	.069621 (.5597583)
<i>Construction materials</i>			-1.748438*** (.6451326)	-1.8427 *** (.661591)
<i>Light industry</i>			-.9461021*** (.3357283)	-1.122641*** (.3374742)
<i>Food industry</i>			.8116791*** (.3107219)	.8844425 *** (.3141468)
<i>Workers ownership</i>				(.5302774) .3298891
<i>Managers</i>				.6611196 (.4943387)
<i>State</i>				.0459265 (.4322602)
<i>Physical entities</i>				.4110196 (.3146988)
<i>Ukrainian companies</i>				-.371814 (.3498654)
<i>Foreign companies</i>				.5729147 ** (.2739975)
$R^2$	0.0671	0.1121	0.4654	0.5010

In parentheses are standard errors; \*, \*\*, \*\*\* mean 10%, 5% and 1% significance level respectively.

It could be concluded from Table 5 that FDI influence is positive and significant for all model variations. Moreover, regional dummies are not significant that suggests no significant difference among Kyiv, Kharkiv, Odesa and Lviv regions. As for the industry dummies, labor productivity is lower in metal processing ( $S_2$ ), construction materials ( $S_4$ ) and light industry ( $S_5$ ) and higher in food industry ( $S_6$ ). Among ownership dummies, only the foreign ownership dummy is significant and has a positive impact. Foreign owned firms have higher labor productivity. So, we could suggest that our zero hypothesis is rejected statistically.

In order to test our second hypothesis we estimated the model from Equation 7. The results are in Table 6. The FDI dummy is significant and positive, which suggests that  $H_0$  is econometrically incorrect. Expansion in the export volume depends on labor. Regional variables are not significant, which could signify the absence of regional differences. Light industry ( $S_5$ ) firms have higher export volume. This could indicate that light industry is more export-oriented than others, because it is labor intensive and Ukraine has cheap and high-skilled labor. The coefficients of other industry dummies are not significant.

Further, we look for the ownership effect. Only two dummies, for the state ( $O_3$ ) and foreign ownership ( $O_6$ ), are significant. Export orientation of foreign owners can be explained by the fact that production in Ukraine is less expensive than in some other countries due to cheap, high-skilled labor and tax privileges. The significance of state ownership could be a result of government subsidies. Moreover, state-owned companies could have direct and indirect advantages. Direct advantages could be explained through tax holidays, while indirect advantages could imply cheaper prices for gas, electricity and utilities, which are subsidized by government.

Table 6. Regression results for the FDI effect on export.

	$\ln Exp_{it}$	$\ln Exp_{it}$	$\ln Exp_{it}$	$\ln Exp_{it}$
<i>constant</i>	746.0346*** (123.3835)	739.6532*** (128.3026)	952.2325*** (166.672)	844.6346*** (163.6355)
$\ln K_{it}$	-.065302 (.1685712)	-.0754216 (.177256)	.0375476 (.17749)	.0927884 (.1679689)
$\ln L_{it}$	1.053925*** (.2556936)	1.059116*** (.2603795)	.8663591*** (.2800036)	.9558322*** (.2707489)
<i>FDI</i>	46.0487*** (7.622021)	45.65519*** (7.92957)	58.7844*** (10.30754)	52.22984*** (10.11333)
<i>Kyiv region</i>		.1402472 (.7403931)	.0381235 (.734901)	-.1492532 (.6920088)
<i>Lviv region</i>		.00934 (.7729364)	-.0672211 (.758352)	-.4810016 (.7283313)
<i>Kharkiv region</i>		.0473668 (.7619232)	-.1459191 (.7497495)	-.4511203 (.7099927)
<i>Metallurgy industry</i>			.2150633 (.6217436)	.3292866 (.6009516)
<i>Metal processing</i>			.7478811 (.5235675)	.789942 (.4958547)
<i>Wood and paper</i>			.4667229 (1.011058)	.315329 (.9461807)
<i>Construction materials</i>			.1945991 (1.184627)	.725286 (1.143566)
<i>Light industry</i>			1.660828 *** (.6113901)	1.410261 ** (.5931065)
<i>Food industry</i>			-.9703221 * (.5672528)	-.8042281 (.543708)
<i>Scale</i>			-.0026378 (.0595256)	-.0159139 (.0576004)
<i>Workers ownership</i>				.0152263 (.5693204)
<i>Managers</i>				.0744125 (.8567416)
<i>State</i>				1.135162 (.7350317)
<i>Physical entities</i>				.5281672 (.5320371)
<i>Ukrainian companies</i>				.9791046 (.5998799)
<i>Foreign companies</i>				2.082235*** (.4919346)
$R^2$	0.3202	0.3215	0.4126	0.5036

In parentheses are standard errors; \*, \*\*, \*\*\* mean 10%, 5% and 1% significance level respectively.

Finally, we test for spillovers influence on non-FDI firm's performance. Model 3 is described by equation 8. We estimate FDI intensity (spillover) effect on non-FDI firms performance, measured as labor productivity.

According to the results in Table 7, the spillover variable (FDI intensity) is positive and significant at the 1% level. We could suggest that positive FDI spillovers exist, but their effect is comparatively low because of small volume of FDI in Ukraine. Furthermore, firms owned by other Ukrainian companies ( $O_5$ ) operate worse than firms with other ownership types. This

could be explained by competition. Business rivals buy shares each other to have better access to raw materials Non-FDI firms have lower labor productivity in metal processing ( $S_2$ ) and wood industries ( $S_3$ ). At the same time, the metallurgy industry ( $S_1$ ) creates positive externalities.

Table 7. Regression results for the spillovers effect on labor productivity.

	$\ln \frac{Y_{it}}{L_{it}}$	$\ln \frac{Y_{it}}{L_{it}}$	$\ln \frac{Y_{it}}{L_{it}}$	$\ln \frac{Y_{it}}{L_{it}}$
<i>constant</i>	.8387315 *** (.2503692)	.9339324 *** (.2723761)	.8037184 *** (.2917585)	.7770575 *** (.2837662)
$\ln \frac{K_{it}}{L_{it}}$	.1707783 ** (.0788923)	.17281 ** (.0795979)	.2292445 *** (.0755159)	.2267631 *** (.0753785)
<i>spillover</i>	.0029564 *** (.0007592)	.0029796 *** (.0007643)	.0022251 *** (.0007798)	.0023776 *** (.0007746)
<i>Workers ownership</i>		-.2742787 (.2454183)	-.155701 (.2276825)	
<i>Managers</i>		.0620174 (.4177473)	.1221477 (.3963747)	
<i>State</i>		-.2565311 (.5136659)	.4522285 (.4829886)	
<i>Physical entities</i>		.0554883 (.2879311)	.0297117 (.2631004)	
<i>Ukrainian companies</i>		-.5306005* (.3026857)	-.5987747** (.2797578)	
<i>Foreign companies</i>		.7990214 (.9661738)	.0781827 (.8985468)	
<i>Metallurgy industry</i>			.5885331 * (.3363792)	.5185387 (.334257)
<i>Metal processing</i>			-.7742763*** (.2774144)	-.8045659*** (.2710271)
<i>Wood and paper</i>			-.8716325** (.4409653)	-.8462005** (.4235343)
<i>Construction materials</i>			-.0539755 (.3273139)	-.1288253 (.3251478)
<i>Light industry</i>			-.4108193 (.3406818)	-.4664606 (.3348827)
<i>Food industry</i>			.7299265 (.2758278)	.6428868 (.2670187)
$R^2$	0.0898	0.1091	0.2734	0.2504

In parentheses are standard errors; \*, \*\*, \*\*\* mean 10%, 5% and 1% significance level respectively.

Finally, our model 4 where performance is estimated as export volumes is in the Equation 9.

The results of the model are depicted in Table 8. The spillover variable is statistically significant which implies the rejection of  $H_0$  for the model 4. The coefficient by spillover variable is low and smaller less than the coefficient of the labor variable, which is also significant. While industry

dummies are not significant, firms owned by state ( $O_3$ ) and other physical entities ( $O_4$ ) do benefit from the type of ownership.

Table 8. Regression results for spillovers influence on volumes of export.

	$\ln Exp_{it}$	$\ln Exp_{it}$	$\ln Exp_{it}$	$\ln Exp_{it}$
<i>constant</i>	-1.986797* (1.081524)	-2.522509 ** (1.050605)	-2.167826** (1.012107)	-2.589027 (1.160966)
$\ln L_{it}$	1.174555*** (.1607732)	1.169415*** (.1585468)	1.164557 *** (.1541413)	1.22317 *** (.1694424)
<i>spillover</i>	.0029216 * (.0016981)	.0028104** (.00142)	.0028077 * (.0014433)	.0032366* (.0017117)
<i>Workers ownership</i>				.3753603 (.610116)
<i>Managers</i>				.7417539 (.9254058)
<i>State</i>		1.190222 (.7258599)		1.324532* (.7662441)
<i>Physical entities</i>		1.051411* (.5439513)		1.233253** (.5864281)
<i>Ukrainian companies</i>		.8572546 (.6658557)		1.129888 (.7260139)
<i>Metallurgy industry</i>	.7174181 (.7039667)	.9029099 (.5839055)	.9589779 (.5877421)	.4705539 (.7169181)
<i>Metal processing</i>	-.3159037 (.5702525)			-.6071945 (.5736704)
<i>Wood and paper</i>	.9759838 (2.033107)			1.248586 (2.006702)
<i>Construction materials</i>	-1.185085 (1.168831)			-1.144203 (1.191918)
<i>Light industry</i>	.7235154 (.7583744)	1.064151* (.6428224)	.9691074 (.6497758)	.5397828 (.7755485)
<i>Food industry</i>	-.283287 (.7596769)			-.550465 (.7884481)
$R^2$	0.3659	0.3932	0.3535	0.4082

In parentheses are standard errors; \*, \*\*, \*\*\* mean 10%, 5% and 1% significance level respectively.

#### 4. CONCLUSIONS AND SUGGESTION FOR FUTURE RESEARCH

The issue of FDI and spillovers is highly appealing for research, because FDI could have not only positive, but also negative externalities. FDI also has direct and indirect impacts. Direct FDI effects measure differences in firm indicators between firms with and without FDI. Indirect effects are spread through interactions between foreign and domestic firms. There are five main indirect effects found in relevant literature: technology transfer, catch-up, competition effect, foreign linkage effect and training effect.

Using unpublished micro-level annual data for 292 firms during 1998-99, we test for statistical significance of FDI impact on labor productivity (Model 1) and export volume (Model 2). Furthermore, we investigate spillover effect in Models 3-4.

The results reported in the paper imply that the presence of FDI has a positive influence on both labor productivity and exports. Regional variables are not significant that could imply the absence of differences for Kyiv, Kharkiv, Odesa and Lviv regions. There is also a small spillover effect that signifies positive impact of FDI environment on such non-FDI firms' labor productivity and export volumes. Hence, small volumes of FDI cannot have much influence on performance.

As for industry dummies in Model 1, firms from metal processing, construction materials and light industry have lower, while enterprises in food industry have higher labor productivity. We can suggest from model 2 that light industry companies export more than firms from other industries. According to Model 3, metal processing and wood industries have lower labor productivity for non-FDI firms than others industries. At the same time, metallurgy industry creates positive externalities.

Among ownership dummies in Model 1 and 2, foreign ownership dummies are significant and have a positive impact. Export orientation of foreign owners can be explained by a greater efficiency of foreign owners. The significance of state ownership in Model 2 could be a result of government subsidies, tax privileges or other policies. According to Model 3 results, firms owned by other Ukrainian companies operate worse than firms with other types of ownership.

Despite popularity in other transition countries, the topic of the effect of FDI on firm performance is rarely described in Ukrainian applications. As for the future research, ideally, it would be challenging to assess the effects of FDI volumes on firm performance. Moreover, the sample of 292 firms may not accurately describe the real situation and it is important to expand the sample. Also, it would be advantageous to estimate the effects of industry and regional spillovers separately. Finally, output per worker and export could not be the best indicators of firm's performance. We expect value added and value added per worker to be the better measures.

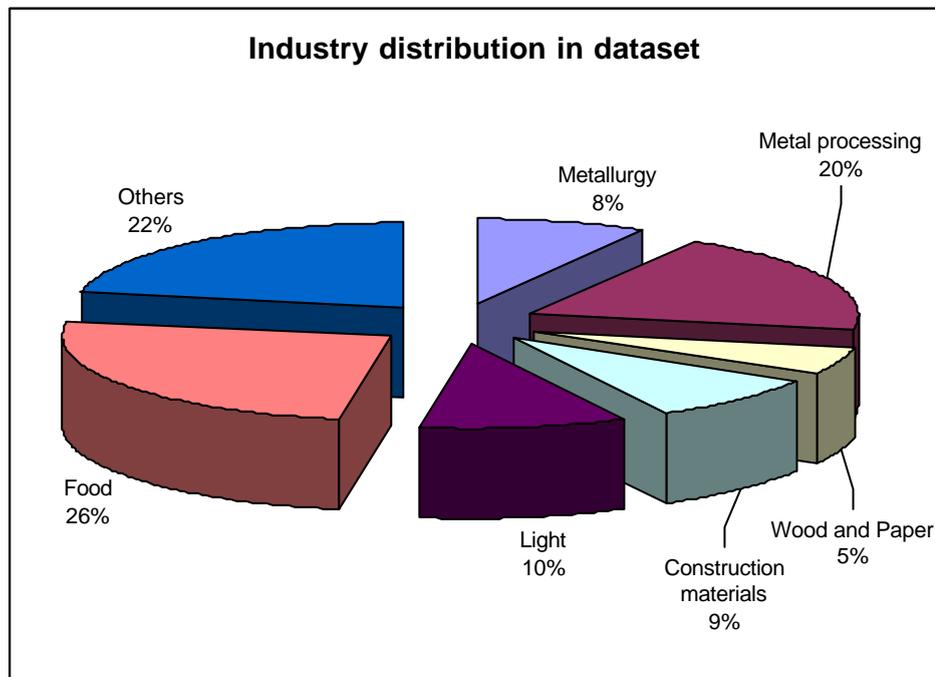
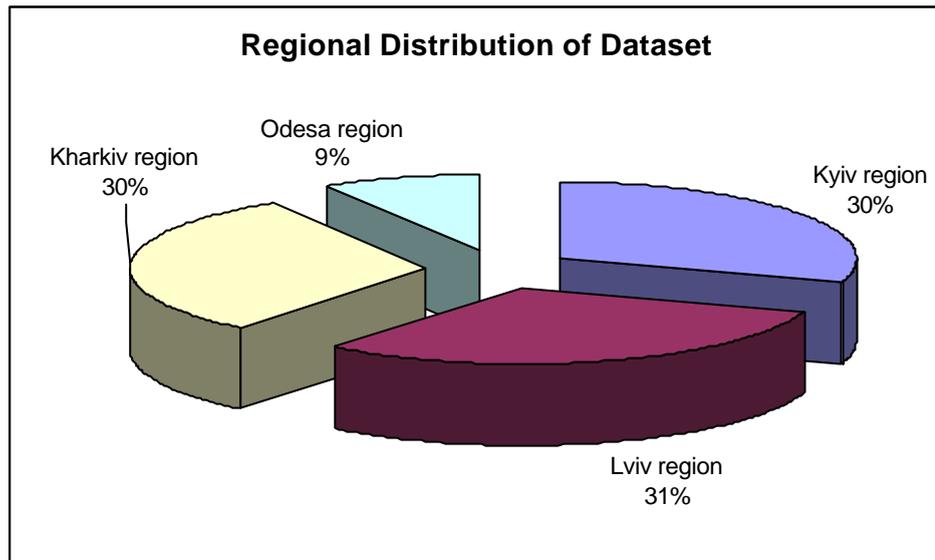
## WORKS CITED

- Blomstrom Magnus. 1999. "Internationalization and Growth: Evidence from Sweden", *Stockholm School of Economic Working Paper No. 375*.
- . 1989 "Foreign investment and Spillovers", Routledge.
- , Ari Kokko. 1997. "How Foreign Investment Affects Host Countries?", *The World Bank Policy Research Working Paper*, No.1745.
- , ----, and Steven Globerman. 1999. "The Determinants of Host Country Spillovers from Foreign Direct Investment: Review and Synthesis of the Literature". *Stockholm School of Economic Working Paper No. 339*.
- Davies, Howard. 1977. "Technology Transfer Through Commercial Transactions", *Journal of Industrial Economics*, Vol. 26, No. 2, pp.161-175.
- Djankov, Simeon, Hoekman Bernard. 1998. "Avenues of Technology Transfer: Foreign Investment and Productivity Change in Czech Republic", *Center for Economic Policy Research, Discussion Paper*, No.1883.
- Dyker, David A.. 1999. Foreign Direct Investment and Technology Transfer in the Former Soviet Union", *Cheltenham, U.K. and Northampton, Mass.: Elgar; Distributed by American International Distribution Corporation, Williston, Vt.*
- Estrin S. Rosevear A. 1999. "Enterprise performance and ownership: The case of Ukraine", *European Economic Review*, 43 pp.1125-1136.
- Findlay, Ronald. 1978. "Some Aspects of Technology Transfer and Direct Foreign Investment", *The American Economic Review*, vol.68, No.2, pp.275-279.
- Glass Amy Jocelyn and Kamal Saggi. (1998) Intellectual property rights and Foreign Direct Investments. *Mimeo.* Ohio State University.
- Green, William H. 2000. *Econometric Analysis*. Prentice Hall.
- Grossman, G., and Helpman, E. 1991a. *Innovation and Growth in the Global Economy*. MIT Press.
- Gujarati, Damodar N. 1995. *Basic Econometrics*, Mc Graw Hill, Inc.
- Johnson, Jack and John DiNardo. 1997 *Econometric Methods*. McGraw-Hill.
- Herasymenko, V. 2000. "Foreign Direct Investment and its Role for Transition Countries", *materials of international conference "Crossborder Capital Flows in Transition Economies"*, *mimeo., EERC-Kyiv*.
- Institute of reform (2000). *Áêíîì³ ÷ í³ ãñ: ðáéòèíã³ íáãñðèö³ éí¿ ìðèááéèèãñð³ ðãã³í³ã Óèðà¿èè ó 1-ìó ï³ãð³ ÷ ÷³* 2000 ðíéó. Vol 4.
- Jensen, Richard, Marie Thursby. 1987. "A Decision

- Theoretic Model of Innovation, Technology Transfer, and Trade”, *Review of Economic Studies*, vol.54, No.4, pp.631-647.
- Kinoshita, Yuko. 1998. Technology Transfer through Foreign Direct Investments, *mimeo., CERGE*
- \_\_\_\_\_. 2000. R&D and Technology Spillovers via FDI: Innovation and Absorptive Capacity, *mimeo., CERGE*
- Konings, Josef. 2000. The Effects of Foreign Direct Investments, on Domestic Firms: Evidence from Firm Level Panel Data in Emerging Economies. *Center for Economic Policy Research, Discussion Paper, No.2586.*
- Kudina, Alina. 1999. “The Motives for Foreign Direct Investment in Ukraine, *Master’s Thesis, mimeo., EERC-Kyiv.*
- Loo, Frances Van.1977. “The Effect of Direct Foreign Investment on Investment in Canada”, *Review of Economics and Statistics*, vol.59, No.4, pp.474-481.
- Markusen, James, Rutherford F. Thomas, David Tarr. 2000. “Foreign Direct Investment in Services and Market for Expertise?”, *NBER Working Paper*, No.W7700
- Mykytiv, A. 2000. “Does Foreign Direct Investment Have Positive Impact on Economic Growth in Transition Economies? A Cross-Country Study”, *materials of international conference “Crossborder Capital Flows in Transition Economies”*, *mimeo., EERC-Kyiv.*
- Oleksiv, M. 2000. “What Factors Affect Foreign Direct Investment Flow in Ukraine”, *materials of international conference “Crossborder Capital Flows in Transition Economies”*, *mimeo., EERC-Kyiv.*
- Ponomareva, N. 2000. “Foreign Direct Investment in Russia: Effects on Productivity”, *materials of international conference “Crossborder Capital Flows in Transition Economies”*, *mimeo., EERC-Kyiv.*
- Ramachandran, Vijaya.1993. “Technology Transfer, Firm Ownership, and Investment in Human Capital”, *Review of Economics and Statistics*, vol.75, No.4, pp.664-670.
- Sinn, Hans Werner and Weichenrieder Alfons 1997. Foreign Direct Investment, Political Resentment and the Privatization Process in Eastern Europe, *Economic Policy: A European Forum*; 0(24), April 1997, pp177-98.
- Yegorov Igor, 1999. Foreign direct investments in Ukraine: First results, *Tendencies and Prospects*, *Foreign Direct Investments and Technology Transfer in the Former Soviet Union*. pp.155-188
- The Law of Ukraine “On Foreign Investments”. 1992,
- The Law “On The Foreign Investing Regime”, 1996,
- The Law “On The State Program of Encouraging of Foreign Investments in Ukraine”, 1993,

## APPENDICES

### A1. Graphs



## A2. Stata 6.0 do-file program

```
use "e:\stata\panel.dta", clear
log using e:\stata\results.log, replace
iis eerc
tis year
/*Variables*/

gen lnk=log(bfa) /*Capital:*/
gen ln1=log(lab) /*Labor*/
gen spil=rinv*ispil/* FDI intensity : %industry*%region*/
gen lny_1=log(y/lab) /*Production per worker*/
gen lns_1=log(a/lab) /*Sales per worker*/
gen lnk_1=log(bfa/lab) /*Capital per worker*/
gen lbar=bar/a /*% of Barter*/
gen lexp=log(exp) /* Export*/
gen lexp_1=log(exp/lab) /* Export per worker*/
gen exp_s=exp/a /* % of export in sales*/
egen scale1 = mean(y), by (i1-i6)
gen scale = y/scale1 /*Economy of Scale:*/

/*Hypothesis 1*/
xtprobit fdi lexp
predict fdi_n, xb
xtreg lny_1 lnk_1 fdi_n r1-r3 i1-i6 o1-o6, re
xthaus
xtreg lny_1 lnk_1 fdi_n, re
xtreg lny_1 lnk_1 fdi_n r1-r3, re
xtreg lny_1 lnk_1 fdi_n r1-r3 i1-i6, re

/*Hypothesis 2*/
xtprobit fdi lny_1
predict fdi1_n, xb
xtreg exp_s lnk ln1 fdi1_n r1-r3 i1-i6 scale o1-o6, re
xthaus
xtreg exp_s lnk ln1 fdi1_n, re
xtreg exp_s lnk ln1 fdi1_n r1-r3, re
xtreg exp_s lnk ln1 fdi1_n r1-r3 i1-i6, re
xtreg exp_s lnk ln1 fdi1_n r1-r3 i1-i6 scale, re

/*Hypothesis 3*/
xtreg lny_1 lnk_1 i1-i6 o1-o6 spil if fdi==0, re
xthaus
xtreg lny_1 lnk_1 spil if fdi==0, re
xtreg lny_1 lnk_1 o1-o6 spil if fdi==0, re
xtreg lny_1 lnk_1 i1-i6 spil if fdi==0, re

/*Hypothesis 4*/
xtreg lexp ln1 i1-i6 spil if fdi==0, re
xtreg lexp ln1 i1 i5 o3-o5 spil if fdi==0, re
xtreg lexp ln1 i1 i5 spil if fdi==0, re
xtreg lexp ln1 i1-i6 o1-o5 spil if fdi==0, re
xthaus
log close
```



### A3.2. Hausman specification test for Model 2.

```

R-sq:  within = 0.0063          Obs per group: min =      1
        between = 0.2132         avg =      1.8
        overall = 0.2009         max =      2
Random effects u_i ~ Gaussian   Wald chi2(19) =    71.78
corr(u_i, X) = 0 (assumed)     Prob > chi2 =    0.0000

```

exp_s	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lnk	-.034229	.038994	-0.878	0.380	-.110656	.0421979
lnl	.1006678	.0599572	1.679	0.093	-.0168461	.2181818
fdil_n	3.592282	1.787189	2.010	0.044	.0894569	7.095108
r1	-.0100571	.1532398	-0.066	0.948	-.3104016	.2902873
r2	.1496963	.1549547	0.966	0.334	-.1540094	.453402
r3	-.0783437	.146822	-0.534	0.594	-.3661096	.2094222
i1	-.0429657	.1591218	-0.270	0.787	-.3548387	.2689074
i2	.0285692	.1287305	0.222	0.824	-.2237378	.2808762
i3	-.0286531	.1861884	-0.154	0.878	-.3935757	.3362695
i4	-.0427706	.1515755	-0.282	0.778	-.3398531	.2543118
i5	.6408093	.1502053	4.266	0.000	.3464123	.9352062
i6	-.1661267	.1166942	-1.424	0.155	-.3948432	.0625898
scale	-.0368867	.0193662	-1.905	0.057	-.0748439	.0010704
o1	-.1890413	.1168057	-1.618	0.106	-.4179762	.0398937
o2	-.0783898	.2076067	-0.378	0.706	-.4852914	.3285118
o3	.7473159	.2625794	2.846	0.004	.2326697	1.261962
o4	.1578111	.1339226	1.178	0.239	-.1046724	.4202947
o5	.0147235	.1367398	0.108	0.914	-.2532815	.2827286
o6	.2566897	.1210695	2.120	0.034	.0193978	.4939816
_cons	58.1132	28.99299	2.004	0.045	1.287987	114.9384
sigma_u	.5100323					
sigma_e	.42710261					
rho	.58780519	(fraction of variance due to u_i)				

#### Hausman specification test

exp_s	---- Coefficients ----		
	Fixed Effects	Random Effects	Difference
lnk	-.1477823	-.034229	-.1135532
lnl	.0220697	.1006678	-.0785982
fdil_n	4.420467	3.592282	.8281843
scale	-.0756615	-.0368867	-.0387748

Test: Ho: difference in coefficients not systematic

```

chi2( 4) = (b-B)'[S^(-1)](b-B), S = (S_fe - S_re)
        = 1.99
Prob>chi2 = 0.7368

```





# Ukrainian Industrial Enterprise Survey '2000

## A4. Questionnaire. Total information about enterprise

### À. Ownership

#### 1. Specify the ownership of your enterprises

1. State-owned enterprise
2. Non-state owned enterprise, but it was state-owned before (till (year))
3. Non-state owned enterprise, it has never been state-owned

#### 2. Specify the legal form of your enterprise

1. Closed joint stock company
2. Open joint stock company
3. Cooperative
4. Partnership
5. Collective enterprises
6. Leased enterprise
7. Individual ownership
8. Joint venture
9. Other (please, specify)

#### 3. If your enterprise is a joint stock company of any type, how are the shares distributed among the shareholders?

workers	%
managers	%
government	%
other physical entities	%
other Ukrainian companies	%
other foreign companies	%
other	%

### B. Size of enterprise

1. What was the number of workers on floor in \_\_\_\_\_ ? \_\_\_\_\_
2. What was the number of workers on forced leave in \_\_\_\_\_ ? \_\_\_\_\_

### C. Industry

#### What portion of your output belongs to the following sectors of industry?

- 1 \_\_\_\_\_ metallurgy, energy, chemical industry, coal industry
- 2 \_\_\_\_\_ machine building
- 3 \_\_\_\_\_ wood processing
- 4 \_\_\_\_\_ construction materials
- 5 \_\_\_\_\_ light industry
- 6 \_\_\_\_\_ food processing
- 7 \_\_\_\_\_ printing
- 8 \_\_\_\_\_ other

#### Please, mention four main types of output produced by your enterprise:

- à. \_\_\_\_\_
- á. \_\_\_\_\_
- â. \_\_\_\_\_
- ã. \_\_\_\_\_

#### D. Average Per Sent of Capacity Utilization in 1999 \_\_\_\_\_ %

#### E. How did FDI change in 2000 compared to 1999?

1.	increase	0.	The same	-1.	Decrease	4.	Never received FDI	5.	DK
----	----------	----	----------	-----	----------	----	--------------------	----	----