

Effects of Regional FDI Concentration on Enterprise Performance in Russia

We examine performance of Russian medium-sized enterprises during the period 2001-2005. Our panel dataset includes more than 10000 enterprises (with turnover between \$20 and \$80 mln. rubles) which operate in 28 industries (68 sub-industries) and are situated in 87 regions.

The objective of this paper is to analyze determinants and effects of regional FDI concentration in Russian economy. We investigate the dynamic pattern of FDI inflow in various sectors of Russian economy and estimate the effect of FDI concentration in Russian regions. Our hypothesis is that FDI concentration positively affects enterprise productivity. The range of variables affecting firm productivity and profitability includes industry dummy, market structure indicators, FDI, age of the firm, investment decisions.

Our basic results are the following. FDI spillovers and agglomeration effects arising from geographical concentration of FDI are not the same for foreign and national firms; these effects can strengthen each other. The main determinants of FDI in Russia have been presence of oil and gas, agglomerations, market size, transit nature of a region, and protection of investors by local legislation. Since recently the main determinants have been investor protection by local legislation and presence of oil and gas (dominating factor). Estimation of FDI inflows into Russian region with Herfindal-Hirschman index for the period 2000-2006 revealed high and growing regional FDI concentration in Russian economy. The empirical investigation revealed positive external effect of spatial FDI concentration in an industry in a city as well as negative impact of FDI concentration in a resource sector in a city on the regional economy.

First we analyze the dynamics and structure of FDI in Russia, then we carry out empirical investigation of regional FDI concentration in Russia and analyze the obtained results.

Key words: FDI, agglomeration, regional development, economic effectiveness

1. Introduction

One of the typical features of the world economy in the end of 20 – beginning of 21 century is increase in the volume and speed of international migration of capital, mainly in the form of FDI. The volume of FDI in the world economy grew more than 27 times during recent 25 years - from 55 bln. US dollars in 1982 to 1.5 trl. US. dollars in 2007. The same time volume of export increased little more than 6 times during the same period.

Russia has remained the major recipient of FDI in Central and Eastern Europe for five years. According to 'Rosstat' In 2007 FDI inflow into Russia doubled and reached 27.797 bln. US. dollars. Along with significant volumes of FDI inflows in Russia one should pay attention to highly heterogeneous investment environment. During recent ten years ten regions – leaders in receiving FDI attracted 80% of the total FDI flows into Russian economy. Therefore it is relevant to investigate regional concentration of FDI in Russia, to point out factors, determining

regional attractiveness for foreign investors, and carry out empirical analysis of effects arising from this concentration.

The objective of this paper is to analyze determinants and effects of regional FDI concentration in Russian economy. We set the following tasks:

1. To analyze the main FDI effects;
2. To define the main determinants of regional FDI concentration in Russia;
3. To carry out empirical investigation of regional FDI concentration effects in Russian economy.

Data

To analyze the situation with attracting FDI and their concentration in the Russian regions we used statistical data of Federal Service of State Statistics and UNCTAD data. For analysis of regional FDI concentration effects we applied databases of journal 'Expert' and Unified state register of enterprises and organizations (EGPIO).

Literature

While considering FDI concentration in a certain location it is reasonable to take into account both agglomeration effects and effects arising from FDI. Below we present a brief review of approaches to research of FDI (determinants and effects) and agglomeration.

Classical and neoclassical theory of international trade (Ricardo, Heckscher-Ohlin-Samuelson considered FDI relatively insignificant for analysis of international trade. R. Caves drew attention to the fact that FDI can be analyzed in the framework of general equilibrium (L. Walras) due to its fundamental feature – transfer of a number of resources; thus Ricardo-Viner model is suitable for analysis of FDI considered as specific resource (Caves R.E., 1971, Brecher R.A., Findlay R., 1983; Srinivasan T.N., 1983; Neary J.R., Ruane F.P., 1988). In 1980s theoretical works appeared where FDI were analyzed in the framework of imperfect competition, increasing returns to scale and consumers' preference of diversity (Helpman E., 1984; Markusen J.R., 1984)¹.

According to the established approach to the theory of FDI, based on the eclectic concept by J. Dunning (1990) the main factors determining size of FDI carried out by an enterprise can be subdivided into three groups: (1) ownership advantages or 'O-advantages'; (2) internalization advantages or 'I-advantages'; (3) location advantages or 'L-advantages', defined by the nature of local markets attracting FDI (Buckley P.J., Casson M., 1991, p. 31-59). Lim (2001) summarizes the findings of different authors, saying that the FDI determinants are distance/transport costs,

¹ Kadochnikov S.M. (2003) Pryamie zarubezhnie investitsii v sovremennoi teorii mezhdunarodnoi trgovli: osnovnie rezultati. Vestnik Sankt-Peterburgskogo Universiteta. Seriya 5 'Ekonomika'. Vypusk 1 (# 5).

size of the host market, agglomeration effects, factor costs, fiscal incentives, business/investment climate, trade barriers/openness.

Research of FDI effects demonstrated that TNCs can enhance effectiveness in an industry². Markusen and Venables (1999) point out that FDI may affect a host economy through many different channels. Two of these channels are *product market competition*, through which multinationals may substitute for domestic firms, and *linkage effects*, through which multinationals may be complementary. Blomstrom, M., A. Kokko (2003) assumed that the possibility of technological transfer is one of the reasons why governments of countries – FDI recipients aim at attracting FDI. Markusen (1995) claimed that TNCs possess capital in the form of specific knowledge; they spend a lot on research and development and produce technologically complex goods. FDI inflow allows local firms to profit in case level of technological development of these companies is close to the level of TNC³. Technology transfer effect depends on investment into learning and R&D by local firms in order to absorb knowledge⁴. Researchers point out importance of human capital (which can be measured as educational attainment) in absorbing FDI spillovers (Lloyd-Ellis and Roberts, 2002). Social capital (political and institutional development) is also described as an important factor for benefiting from FDI (Bleaney and Nishiyama, 2002; Bevan and Estrin, 2000; Hall and Jones, 1999).

As for the growth effects of FDI, Balasubramanyam (1996) subdivides research on growth theory into post-Keynesian growth models, where the role of savings and investment in promoting growth is emphasized (Harrod-Domar type models), neo-classical models emphasizing technical progress (Solow type models), and new (endogenous) growth models emphasizing the role of R&D, human capital accumulation and externalities (Romer-Lucas type models). Borenstein et al. (1998) conclude that FDI contribute to economic growth only when a host country has a sufficient absorptive capability of the advanced technologies.

Analysis of FDI in CEE countries takes into account traditional determinants of FDI and determinants specific for these countries. In case of Russia it is presence of oil and gas; it is also development of reforms and measures of government for improving investment climate in the regions. Determinants of FDI in Russia were studied by Brock, G. (1998), Broadman, H., Recanatini F. (2001), Iwasaki, I. Suganuma K. (2005), Ledyaeva, S., M. Linden (2006), Lukashin Y., L. Rakhlina (2006). Ledyaeva, S. (2007) carried out empirical analysis of FDI

² Blomstrom, M., A. Kokko (2003) The economics of foreign direct investment incentives, Working Paper No. 9489, Cambridge, Mass.: National Bureau of Economic Analysis. P.10.

³ Lipsey R.E. (2002), Home and Host Country Effects of FDI, Working Paper No. 9293, National Bureau of Economic Research, P.50.

⁴ Kathuria V. (2000) Productivity spillovers from technology transfer to Indian manufacturing firms, Journal of International Development, Vol. 12, P. 364.

inflows determinants for Russia during transitional period (1996-2005). FDI spillovers for Russian economy have been analyzed by Kadochnikov S., Ledyaeva S., Lukashin Y., Rakhlina L., Yudaeva K.

While studying FDI concentration we assume simultaneous presence of two types of effects: FDI spillovers and agglomeration effects. Therefore we will briefly discuss the results of agglomeration research. The review of literature devoted to agglomeration was done by J. M. Quigley (1998) and W. Bekele and R. W. Jackson (2006).

Classical agglomeration theory (Marshall, 1890; Weber, 1929; Ohlin, 1933; Hoover, 1937) draws our attention to the fact that concentration of enterprises in a certain location or certain industry leads to growth of enterprise productivity. While within early classical agglomeration theories productivity growth is explained by increase of city or industry size, later approaches aim at defining mechanism of this effect. Such mechanisms can be provided by interrelation with other firms (later theories of classical school), social and cultural relations (flexible specialization school), presence of environment favouring formation and dissipation of knowledge and innovation (regional innovation systems), competing with other firms and cooperation with different institutional structures (Porter's approach), or knowledge spillovers (dynamic externalities approach). The majority of researchers find empirical evidence of positive impact of enterprise concentration on the productivity growth of enterprises⁵.

Among recent works devoted to agglomeration effects in Russia is research by K. Gonchar (2008). She concluded that allocation of enterprises is a significant factor of their competitiveness. Features of territories which turned out to be especially important were revealed effects of agglomeration economy and level of regional integration into global economy. Those are factors which can be affected by government policy. Important policy advice developed in this paper is also improvement of infrastructure and transportation network in order to promote communication between agglomeration center and smaller towns, thus allowing them to benefit from agglomeration effects⁶.

Possible results of simultaneous presence of agglomeration effects and FDI spillovers are technology transfer effect, effect on wages and effect on host-country institutions. FDI spillovers affect only firms functioning in the same location as the firm with FDI, whereas agglomeration effects have an impact on productivity of all firms within agglomeration – both national and foreign firms; possible negative effects for TNCs caused by spillovers can be balanced by agglomeration effects.

⁵ Bekele G. W., R. W. Jackson (2006). Theoretical perspectives on industry clusters. Research paper 2006-5. Regional Research Institute. West Virginia University, Quigley J. M. Urban diversity and economic growth. Journal of Economic Perspectives. Volume 12, Number 2. – P. 127-138.

⁶ Gonchar K. (2008) Aglomeratsionnie effekti i konkurentosposobnost' promishlennosti. Seria 'Konferentsii ekonomicheskogo fakulteta UrGU. – P. 37.

Results

Our main results are the following:

1. FDI spillovers and agglomeration effects arising from geographical concentration of FDI are not the same for foreign and national firms. These effects can strengthen each other.
2. The main determinants of FDI in Russia have been presence of oil and gas, agglomerations, market size, transit nature of a region, and protection of investors by local legislation. Recently the main determinant is investors' protection by local legislation and presence of oil and gas (dominating factor).
3. Estimation of FDI inflows into Russian region with Herfindal-Hirschman index for the period 2000-2006 revealed high and growing regional FDI concentration in Russian economy.
4. The empirical investigation revealed positive external effect of spatial FDI concentration in an industry in a city as well as negative impact of FDI concentration in a resource sector in a city on the regional economy.

Next section is devoted to the dynamics and structure of FDI in Russia. Section 3 is devoted to empirical investigation of regional concentration of FDI in Russia and to the analysis of the obtained results. The conclusion follows.

2. Dynamics and structure of FDI in Russia

From the beginning of 1990s the amount of FDI increased in the transitional economy of Russia. This tendency was the result of rejecting centralized planning system and opening the economy with large potential for the global market. Significant interest of foreign investors towards Russian economy is based on improving main macroeconomic indicators (economic growth rate, size of external debt, inflation rate, etc.) and favourable situation with oil prices in the world.

FDI in Russia became possible starting from 1987. One can single out three stages of FDI dynamics in Russia: 1987-1997, 1998-2002, 2003 until present time. These stages are explained by different levels of foreign investment and by different structural characteristics of investment flow during different periods⁷. Unlike the first two periods the third period starting from 2003 is characterized by increasing FDI flows into our economy. During this period government measures were aimed at lowering foreign investment risk.

⁷ Kadochnikov S. M. (2002) *Pryamie zarubezhnie investitsii: mikroekonomicheskii effect blagosostoyaniya*. SPb.: Ekonomicheskaya shkola. - P. 178.

Changes in industrial structure of FDI during 1995-2006 were caused by the market reforms of the Russian economy, strengthening orientation of foreign investors on internal market and crises within financial sector of Russian economy in the end of 1990s.

Foreign investors continue their careful policy in Russia, regardless the tendency for lowering investment risk and increased rating of Russia by international rating agencies. They tend to work within highly profitable industries with fast turnover. First of all, it is industries producing export products of high demand (resources, energy, metallurgy) and industries with high non-satiated consumer demand (food industry).

In the Table 1 industrial structure of FDI is presented.

Table 1

Industrial structure of FDI in Russia in 1995-2006

№	Branch of Industry	1995-1997	1998-2002	2003-2006
1	Industry, including:	42	49	74
2	Energy sector	0	0.23	1
3	Fuel industry	8	20	35
4	Ferrous metallurgy	2	1	9
5	Non-ferrous metallurgy	2	1	7
6	Chemistry and oil-chemistry	2	2	5
7	Machine-building and metal-working industry	3	5	6
8	Woodworking industry	4	4	4
9	Construction materials	1	1	1
10	Light industry	1	1	1
11	Food industry	19	13	5
12	Agriculture	0	1	1
13	Construction	5	2	1
14	Transport	1	10	6
15	Trade and public catering	13	20	11
16	Wholesale trade	1	1	1
17	General commercial activity aimed at facilitating market operations	10	5	1
18	Financial, credit, insurance, pension	21	1	1
19	Other industries	7	8	4

Calculated based on data collected by the Federal Service of State Statistics, <http://www.gks.ru/>

Analysis of industrial structure shows that the fastest rate of FDI growth is present in fuel industry. Thus resource orientation of FDI is strengthening, which is not favourable for modernization of national economy.

Let us turn now to regional concentration of FDI in Russia. Ten regions – leaders in FDI inflows receive 80% of total FDI inflows. The regions constantly among the leaders are Moscow, Moscow region, Sakhalin region, Krasnodar region, Leningrad region and Tyumen region. It is evident that several regions possess clear advantages in attracting FDI compared to other regions. Thus it is worth finding the main determinants of FDI in Russia. Table 2 below shows 10 leaders among regions – recipients of FDI in 1995-1998, 1999-2002, 2003-2006.

Table 2

**Ten regions - leaders in attracting FDI
during 1995-1997, 1998-2002, 2003-2006**

Region	Volume of accumulated FDI, mln. US dollars 1995-1998		Volume of accumulated FDI, mln. US dollars 1999-2002		Volume of accumulated FDI, mln. US dollars 2003-2006	
	Volume (%)	Rating	Volume (%)	Rating	Volume (%)	Rating
Moscow	1 949 (47.6)	1	5 636 (40.9)	1	10 931 (29.4)	2
Moscow region	508 (12.4)	2	1 328 (9.6)	4	3 957 (10.6)	3
Sakhalin region	422 (10.3)	3	1 815 (13.2)	3	12 915 (34.7)	1
St. Petersburg	303 (7.4)	4	699 (5.0)	6	Not among 10 leaders	
Krasnodar region	242 (6.9)	5	1 990 (14.2)	2	788 (2.1)	8
Leningrad region	282 (5.9)	6	703 (5.1)	5	834 (2.2)	7
Novosibirsk region	143 (3.5)	7	Not among 10 leaders		Not among 10 leaders	
Samara region	94 (2.3)	8	344 (2.5)	9		
Tyumen region	78 (1.9)	9	591 (4.2)	7	2 172 (5.8)	5
Sverdlovsk region	74 (1.8)	10	354 (2.6)	8	Not among 10 leaders	
TOTAL	4 095 (100)					
Yamalo-Nenetsky AO			334 (2.4)	10	714 (1.9)	9
TOTAL			13 794 (100)			
Omsk region	Not among 10 leaders		Not among 10 leaders		3254 (8.7)	4
Lipetsk region					1162 (3.1)	6
Novgorod region					483 (1.3)	10
TOTAL					37 210 (100)	

Calculated based on database 'Regions of Russia' collected by Rosstat

Thus we can conclude that significant determinants of FDI for Russia during different periods have been presence of oil and gas (Sakhalin and Tyumen regions and Yamalo-Nenetsky Autonomous Region), presence of agglomeration advantages (Moscow, Moscow region, St. Petersburg, Leningrad region), the level of industrial development, market size and advantages of large cities (Novosibirsk, Samara, Sverdlovsk regions), benefits of transit region (Krasnodar region) and protection of investors by the local legislation (Novgorod region). Concerning dynamics of determinants, the greatest increase was in the presence of natural resources as FDI determinant, besides there is positive growth in significance of investor protection measures.

These conclusions concerning ten regions – leaders in attracting FDI are in line with the results obtained by Bradshaw (2002). He pointed out the following five types of regions, attractive for FDI: (1) Moscow region and Moscow as controlling centre for the national economy (2) regions – industrial and financial centres (such as St. Petersburg, Leningrad, Samara, Sverdlovsk and Novgorod regions, Krasnodar region) (3) regions possessing large sea-ports (such as St. Petersburg, Leningrad region, Krasnodar region); (4) regions, rich in natural resources (Tyumen and Sakhalin regions, Yamalo-Nenetsky Autonomous Region) and (5) regions, where import-substitution industries benefited from ruble devaluation in 1998 (according to Bradshaw, mainly Moscow and Moscow region)⁸.

Starting from 2003 until present time lack of balance in FDI across territories is reflected in regional investment climate estimation by many analytical agencies (such as ‘RA-Expert’). Russian regions significantly differ according to relation of investment risk and investment potential. They cover nearly all groups of investment attractiveness. It leads to high regional concentration of FDI inflows into Russian economy.

Using database ‘Regions of Russia’ collected by Rosstat we calculated Herfindal-Hirschman index for regional concentration of FDI in Russia in 2000-2006. Dynamics of the index is the following: 2000 – 19%, 2001 – 17%, 2002 – 29%, 2003 – 30%, 2004 – 20%, 2005 – 21%, 2006 – 27%. FDI inflows into Russian economy are characterized by high concentration. The value of HHI index for the period under consideration is changeable, but the last value in 2006 demonstrates growth of this indicator. Thus the main FDI inflow is aimed only at several regions of Russia (Moscow, Moscow region and Sakhalin region).

In the next section we will present the results of empirical analysis of FDI regional concentration effects.

⁸ Bradshaw, M. (2002), The Changing Geography of Foreign Investment in the Russian Federation, Russian Economic Trends, Vol. 11, No. 2, P. 33-41.

3. Empirical Analysis of FDI Regional Concentration Effects in the Russian Economy

While studying the FDI impact on the country's regional economy we consider two types of effects, arising from foreign direct investment: direct and external effects (spillovers).

Direct FDI effects are changes of a number of key indicators of foreign companies, which carry out FDI. It can be such indicators as labour productivity, volume of production, wages of employees etc. External FDI effects are expressed as changes of these indicators among the domestic companies of the host country. These effects arise due to the impact of foreign companies on this sector. Direct effects are substantial for host countries if foreign sector in these economies is large (for example, in Hong Kong). In case foreign companies' output is relatively low compared to domestic companies, external effects from FDI inflow are more important. In the Russian economy the output of companies with FDI is significant, but much less than the output of domestic companies. Therefore it is relevant to study external effects.

The variety of potential benefits from FDI for a host country often arises along with negative effects. Direct effects from FDI are usually positive, because companies generally carry out FDI, hoping to benefit from potential gains which arise from these activities. On the other hand, external effects often have contradictory nature. Positive external effects are growth of labour productivity within domestic firms, improvement of production technologies, improvement of local personnel qualification etc. Along with them there are possibilities of negative FDI impact on national sector, such as crowding out of domestic companies by more effective foreign firms resulting into dependence on foreign producers. Contradictory effects of foreign direct investment on host country welfare make research of this issue relevant.

As we have mentioned above, investment environment in Russia is heterogeneous. In fact separate regions of Russia can be considered as separate small countries, especially as size of many regions is comparable to that of small states, for instance, within Europe. In this context analysis of external effects and regional FDI concentration in Russia becomes an interesting research task.

Database of medium-sized business in Russia was used to study external effects from regional FDI concentration. The reasons for such choice are the following. Firstly, Russian business is heterogeneous. It is medium-sized business that is influenced by companies with FDI, because they work in the most competitive segment of economy. Secondly, large Russian enterprises possess a significant market share. They actively use their monopoly power and rely on strong administrative resource often profiting from favourable attitude of local authorities. One can expect that if to include these enterprises into the database, the results may become substantially biased.

Thus, we have set the task to estimate how FDI concentration in the region affects productivity of companies in this region. For this purpose we used database of journal “Expert” covering medium-sized companies of Russia in 2005. The category ‘medium-sized business’ implies companies with annual revenue ranging from 140 to 1400 mln. rubles (without value added tax). The database contains the following data on enterprises: belonging to an industry, belonging to a region, revenue, book value of fixed assets.

For our purposes we excluded companies based in Moscow from our studies, because their indicators compared to other companies are ‘outliers’. We also excluded companies, based outside of large cities, because if to consider them, it becomes technically difficult to determine FDI concentration in the particular place where they are based. In case of large cities, one can determine FDI concentration and agglomeration effect arising from it. Thus we received a sample covering 3223 enterprises.

In order to fulfill the task we had to single out the enterprises with FDI among the 3223 businesses chosen by us. For this purpose we used database EGRPO (ЕГРПО) – Unified State Register of Enterprises and Organizations, which contains information about founders of companies. Each founder has a OKFS (OKΦC) – All-Russian Classifier of Industrial Organizations code, determining a type of owner and a code OKPO (OKΠO) – All-Russian Classifier of Ownership Form - of organization which he owns.

The companies with FDI are companies where owners have OKFS (OKΦC) codes 21, 22, 23 and share of foreign ownership no less than 25%. As a result we found out that among the 3223 companies 706 are enterprises with FDI.

Table 3

Comments on using OKFS (OKΦC) codes for determining foreign owner

Code	Type of ownership
20	Foreign ownership 21 + 22 + 23 + 24 + 27
21	International organizations’ ownership
22	Foreign countries’ ownership
23	Foreign legal entities’ ownership
24	Ownership of foreign citizens and persons without citizenship
27	Mixed foreign ownership

Total factor productivity is a variable reflecting effectiveness of companies. Due to absence of necessary data, indicator generally used for estimation of external effects from FDI is

labour productivity⁹. However, in our database the number of employees is absent, because from 2002 this information is confidential. Thus we use enterprise productivity as an indicator of effectiveness. Companies' revenue for 2005 is used as a dependent variable reflecting companies' productivity. We controlled for companies' size via the indicator of fixed assets in the year 2005 (book value).

Explanatory variables in our model are the following:

1. *Capital*. The value of capital as a production factor influences enterprise effectiveness. The more capital is used for a certain output the less is enterprise effectiveness. As a measure of capital value we use book value of fixed assets.

2. *Quality of institutional environment*. We have chosen financial sector variable, quality of business environment regulation measures and degree of freedom of trade which reflect quality of institutional environment.

3. *Competition measure*. According to Porter, competition within cluster stimulates firms to improve their competitiveness, resulting into improved productivity. We use competitiveness index calculated by organization 'OPORA'.

4. *Period of enterprise presence on the market*. We assume that period during which enterprise is working on the market or age of enterprise can have a positive impact on enterprise effectiveness. According to the concept of knowledge transfer and regional innovative systems of agglomeration theory the most important factor of enterprise success is an opportunity to use localized – non-formalized knowledge. During the time of its functioning an enterprise can accumulate such knowledge.

For the purposes of our research we include into regression variables reflecting FDI concentration in the economy. Impact of these variables on effectiveness is very important for our research. These variables are:

1. *Concentration of enterprises with FDI in a city*. According to classical agglomeration theory, concentration of enterprises with FDI in a city leads to urbanization effect. We use total revenue of enterprises with FDI in a city, mln. rubles.

2. *Concentration of enterprises with FDI in an industry*. According to classical agglomeration theory, concentration of enterprises with FDI in a city leads to localization effect. We use total revenue of enterprises with FDI in an industry, mln. rubles.

3. *Concentration of enterprises with FDI in a city in resource sector*. Nearly 35% of FDI is concentrated in the resource sector. This parameter is estimated using total revenue of enterprises with FDI in 2005 multiplied into the share of resource industries in regional output, mln. rubles.

⁹ Kadochnikov S. M. (2002) *Pryamie zarubezhnie investitsii: mikroekonomicheskii effect blagosostoyaniya*. SPb. Ekonomicheskaya shkola - C. 224.

In Table 4 we present brief description of our explanatory variables and expected sign of coefficients.

Table 4

List of variables used in the regression, their description and expected sign

Variable	Description of variable	Expected sign
fdipq_city05	total revenue of enterprises with FDI in the city in 2005, mln. rubles;	+
fdipq_city05_syr = fdipq_city05*syr	multiplication of total revenue of enterprises with FDI and share of resource industries in the output of the region where the enterprise is located;	+/-
fdipq_i05	revenue of enterprises with FDI in the industry, where the enterprise being considered belongs, mln.rubles;	+
cred_org3s	the number of lending agencies in the region;	+
konkur5o	competitiveness index in the region (calculated by the organization 'OPORA');	+
podderr5o	index of small business support by government (calculated by the organization 'OPORA');	+
ogrtorgn9g	index of limited trade (price regulation) (calculated by the organization 'OPORA');	-
d_year	year of firm's creation;	+
os05	fixed assets, mln rubles	+
os_old05	share of old (2001) fixed assets;	-

Compiled by authors

Dependent variable – pq05 – revenue of a medium-sized enterprise

We add industry dummy variables and organizational structure dummy variables in order to improve explanatory power of the regression.

oao – dummy for open joint stock companies

syr – dummy for resource industries

serv – dummy for service industries

infra – dummy for infrastructure industries

man_exp – dummy for export oriented processing industries

Thus we have constructed the following equation for estimation of FDI concentration impact on companies' productivity in a region:

$$Pq05 = \beta_0 + \beta_1 fdipq_city05 + \beta_2 fdipq_city\sim r + \beta_3 fdipq_i05 + \beta_4 cred_org3s + \beta_5 konkur5o + \beta_6 podderr5o + \beta_7 ogrtorgn9g + \beta_8 oao + \beta_9 d_year + \beta_{10} os05 + \beta_{11} os_old05 + \beta_{12} syr + \beta_{13} serv + \beta_{14} infra + \beta_{15} man_exp + \varepsilon_0$$

Results of OLS estimation are presented in the Table 5 below.

Table 5

Regression results

Independent variables	Coefficient	t - statistics
fdipq_city05	.0012412	2.44
fdipq_city~r	-.0072771	-4.12
fdipq_i05	.0008832	3.07
cred_org3s	3.935669	2.25
konkur5o	1.869385	2.24
podderr5o	-1.824993	-2.20
ogrtorgn9g	103.187	2.10
oao	119.9597	3.15
d_year	.2439464	6.76
os05	.1977226	7.63
os_old05	.1567308	1.27
syr	999.2132	7.52
serv	-141.7931	-2.08
infra	96.06098	2.01
man_exp	364.0898	3.94

Observations 3223

R2 = 0.4610

Source: authors' calculations based on data collected by journal 'Expert' using statistical software STATA

Explanatory power of the model is 46%. It means that the chosen factors explain 46% of the variation in medium-sized firms' productivity in 2005.

We have come to the following conclusions. Indicator of old fixed assets (2001) in the total cost of fixed assets does not significantly affect productivity. Age of enterprise positively affects revenue; it is connected to accumulation of localized non-formalized knowledge. Increase of lending agencies number in the region has a positive impact on productivity of all enterprises in the regions. An unexpected result is a negative impact of local government measures for small business support on enterprise productivity; it can be explained by low quality of such measures in the majority of regions. Another unexpected result is positive affect of limited trade index (price regulation) on productivity; it can be explained by the fact that the majority of trade regulation measures are directed on the industries of strategic importance, such as resource

industries¹⁰. Our regression revealed that competition positively affects productivity of an enterprise; competition stimulates enterprises to improve technologies and work more effectively, in line with Porter's ideas.

The main results of the regression are the following:

1. Presence of positive external effect on the domestic companies from regional concentration of FDI. We received the result that in case total revenue of enterprises with FDI in the city increases by 1 bln. rubles, the revenue of a medium-sized enterprise in this city increases by more than 12 mln. rubles other conditions being equal.
2. Positive effect is also observed for concentration of enterprises with FDI in an industry. If total revenue of enterprises with FDI in an industry increases by 1 bln. rubles, revenue of a medium-sized enterprise in this city will increase by more than 8 mln. rubles.
3. An unexpected result is negative effect of FDI concentration in the city within a resource sector on enterprise productivity. Increase of total revenue of enterprises with FDI in the resource sector by 1 bln. rubles results into decrease of revenue for a medium-sized enterprise by more than 72 mln. rubles.

4. Conclusion

Summarizing the results of our inquiry into regional concentration of FDI in Russia and its effects we will draw the following conclusions.

Empirical analysis of regional concentration effects was based on the idea of combination of two effects – agglomeration effects and FDI spillovers. Regression demonstrated that the following factors, singled out based on agglomeration theory have positive impact on enterprise productivity: number of lending agencies and limited trade as institutional environment factors, competition as a market factor and the year of enterprise foundation as an indicator of accumulated knowledge about market, concentration of enterprises with FDI in a city, concentration of enterprises with FDI in an industry. Negative effect on enterprise productivity was demonstrated by local government measures aimed at small business support and concentration of enterprises with FDI within the resource sector in a city.

The following results of econometric estimation were received. Firstly, we revealed positive urbanization and localization effects. Secondly, analysis of FDI in resource sector demonstrated presence of large negative impact of regional FDI concentration in resource sector on regional economy.

¹⁰ Example of such measures is obligation to sell all output of extracting enterprises participating in the project 'Sakhalin-2' only to 'Gazprom'.

These results lead us to conclude that in spite of its growing importance foreign investment has not yet become the factor favouring sustainable growth of Russian economy and enhancing its competitiveness. Their quantity and quality in certain sectors do not meet investment potential and need of the country. Significant share of FDI in Russia is not associated with development of high-tech industries.

Effective use of FDI within national economy may become an important factor of accelerating economic growth and increasing productivity of national enterprises. However, FDI can also strengthen resource orientation of economy, which has a negative impact on productivity in economy as a whole. In this situation development of government policy in the field of attracting FDI has a growing importance; it should define industrial and territorial priorities, including access of foreign capital into 'strategic' industries.

Firstly, from our analysis it follows that FDI into resource industries should not be promoted, because their high concentration leads to decrease of regional economy productivity.

Secondly, regional risks associated with local legislation are becoming an important factor of FDI inflow in Russia in the recent years. It means that local authorities should pay special attention to this matter in order to attract FDI. However, they should also elaborate measures for protection and support of favourable investment climate which will have positive response from business community.

Thirdly, market size and large cities presence have also been important factors for attracting FDI into Russia in the recent years. Thus growth and urbanization allow cities to attract foreign investors. As our analysis revealed, FDI can help large cities to become leaders of economic development in Russia. Besides, neighbouring regions can benefit from FDI inflow as well. In this sense regional policy may be aimed at strengthening connections inside agglomerations, development of transport infrastructure and promotion of cooperation policy among neighbouring regions.

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