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MARKET-SEEKING FDI IN RUSSIA?
AN EMPIRICAL STUDY OF
LOCATIONAL FACTORS AFFECTING
THE REGIONAL DISTRIBUTION
OF FDI ENTRIES**

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This paper conducts an empirical study of the factors that affect the spatial distribution of foreign direct investment (FDI) across regions in Russia; in particular, this paper is concerned with those regions that are endowed with natural resources and market-related benefits. Our analysis employs data on Russian firms with a foreign investor during the 2000-2009 period and linked regional statistics in the conditional logit model. The main findings are threefold. First, we conclude that one theory alone is not able to explain the geographical pattern of foreign investments in Russia. A combination of determinants is at work; market-related factors and the availability of natural resources are important factors in attracting FDI. The relative importance of natural resources seems to grow over time, despite shocks associated with events such as the Yukos trial. Second, existing agglomeration economies encourage foreign investors by means of forces generated simultaneously by sector-specific and inter-sectoral externalities. Third, the findings imply that service-oriented FDI co-locates with extraction industries in resource-endowed regions. The results are robust when Moscow is excluded and for subsamples including only Greenfield investments or both Greenfield investments and mergers and acquisitions (M&A).

Keywords: foreign direct investment, location, regional development.
JEL Classification: F23, R11, Q34.

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1. Introduction

This paper studies the spatial distribution of foreign direct investment (FDI) across regions in Russia and compares the roles played by the two most significant advantages of regions in Russia—natural resources and market-related benefits.

The Russian experience with FDI provides a compelling empirical setting for academic research for several reasons. Russia has only recently emerged as a large recipient and investor of FDI, which has contributed to significant changes in the global distribution of FDI. According to [UNCTAD, 2011], the portion of Russian inward FDI stock in relation to GDP grew from 1.4% to 24.8% during the period between 1996 and 2011. These figures show that Russia is gradually accelerating its integration into the world economy, and FDI is among the primary modes of integration. The Russian share of global inward FDI flow is higher than the country's share of global exports or imports—3.5% of FDI compared to 2.9% of world merchandise exports and 1.8% of imports⁴.

Russia leads the European transition economies as host and home country for recent FDI inflow; in 2010, Russia accounted for 75.6% of the total inflow to 17 European transition economies [UNCTAD, 2012]. However, despite receiving the lion's share of accumulated FDI in transition economies, FDI's role in developing Russia remains minimal. According to a study by [UNCTAD,2011] that analyzed the global effect of FDI on economic development during 2011, Russia ranks 66th of 79 economies.

Another striking feature of FDI in Russia is its great spatial diversity inside the country, which is higher than the spatial diversity of general economic indicators (see Figures 1 and A1 in the Annex). The geographic distribution of FDI in Russia shows that only a few locations have managed to become integrated into the world economy through trade and investment. Chief among these locations are regions with natural resources and large urban agglomerations in the Western part of the country, which are sufficiently supplied with gateway infrastructure, human capital and local markets of significant size. In total, 77.6% of FDI inflow in pre-crisis 2007 was concentrated in three locations—the city of Moscow, the island of Sakhalin and the Moscow region [Finansi Rossii, 2010, p.370]. Remote and thinly populated regions without natural resources face challenges in attracting investments and remain cut off from globalization opportunities. However, it is far from obvious what determines the location decisions of foreign investors inside Russia. Do these factors consist of the large and growing local consumer market, access to natural resources or new business opportunities arising from privatization of remaining state property—including improved access to certain business sectors—ahead of accession to the WTO in 2012?

⁴ See WTO (2012) and UNCTAD (2012).

At first glance, the aggregate statistics of inward FDI across sectors show that primary resources were the leading attraction for FDI, despite existing regulations; in 2007, before the crisis, more than half of FDI inflow went to the mining and quarrying sectors, although this share was later passed by manufacturing, wholesale trade, and real estate. The dramatic increase of Russian FDI inflow in the 2000s was mostly driven by the oil and gas industries and the corresponding price dynamics in these sectors, which have remained at the top position of the accumulated stock of FDI in Russia (see Table A1 in the Annex). However, when the number of entrants and market share is considered, the automotive industry has recently moved to the top. According to [Ernst & Young, 2011, 2012], approximately 12% of FDI transactions between 2007 and 2011 were conducted in the automotive industry, an industry in which the FDI market share reached 14% in 2011; non-metallic mineral production attracted 8% of the projects, garnering a market share of 7%.

The high concentration of FDI inflow related to natural resources does not necessarily translate into locational advantages for resource-rich regions. Several factors seem to indicate that caution is warranted in making this assumption. First, access to foreign capital is seriously regulated in the resource sectors, and there is much reason to talk about an unwelcoming environment—as opposed to an unattractive environment—for FDI in the resource sector.

Second, caution is advised because a substantial part of FDI in the extraction industries is financed from redirected Russian capital. The estimated share of redirected investments in total accumulated FDI stock ranges from 30% [UNCTAD, 2012] to 70% [Ivanov, 2011]. For example, no new major acquisitions or large investments by foreign firms in the Russian oil industry were reported to have taken place in 2008, the year that FDI inflow to Russia reached its peak. According to [UNCTAD, 2009], the large amount of FDI inflow was mainly caused by Gazprom's financial services affiliate in the Netherlands, which was channeling money back into the Russian energy industry. The outbreak of the financial crisis in 2008 might have led to an increase in the importance of market-related factors, because regions with oil and gas deposits were subject to losing their advantages with declining oil prices, whereas non-resource industries are typically less vulnerable to such cyclical fluctuations.

While FDI from tax-haven economies leads to an overestimation of the total stock of “real” FDI, indirect foreign investment, which are channeled through Russian affiliates and therefore through local accounts, tends to reduce the estimated level of inward investment and the number of FDI firms in Russia.

In this paper, we address the following research questions:

- Are foreign investors attracted by high returns from natural resources, particularly fuel and energy resources, or is the large and growing demand in Russia a more important

determinant for investment decisions? How has the combination of these attractions changed over time, particularly if we control for price dynamics and deviations in the institutional context? Do these determinants differ between industrial and service FDI?

- How important is the regional market structure? If existing agglomerations generate cost savings and productivity gains for local firms, do they attract new foreign entrants? Are Marshall-Arrow-Romer (MAR) externalities of specialization or Jacobs' externalities of diversification at work?
- Does resource-seeking FDI crowd out or stimulate FDI in other sectors when the location decision of foreign investors is explained? Is resource endowment a curse or blessing for regions trying to attract FDI?

The paper is organized as follows. In section 2, we survey existing theories and the empirical literature that seek to explain FDI location decisions. In section 3, we describe our data and present descriptive statistics for the key variables included in the analysis. Section 4 provides a discussion of the econometric strategy. The findings are presented in section 5, and section 6 follows with the conclusion.

2. Theory and literature

The forces that drive firms to invest abroad have historically been complicated; the theories that explain these forces are equally complicated. In a survey of the literature, [Faeth, 2009] notes that there is no single theory of FDI but a variety of theoretical models (9, according to her) attempting to explain the location decisions of multi-national enterprises (MNEs); many factors have been the subject of empirical studies. [Hayter, 1997] identified the following three groups of theories as guiding the analysis of location decisions: (1) neoclassical theories that focus on the profit-maximizing and cost-minimizing goals of MNEs and their corresponding cost determinants, such as the agglomeration economy, proximity, and human capital; (2) institutional theories that assume profit and cost factors are affected by different economic agents; and (3) behavioral theories that focus on the individual preferences of foreign owners, including previous experiences. For our paper, which focuses on the effects of resource- and market-seeking FDI in Russian regions, the following two theoretical constructs are particularly relevant: classic trade theory that explains FDI location by the importance of lower wages and sites rich in natural resources (Heckscher-Ohlin model), on one hand, and the “new” trade theory that highlights economies of scale and agglomeration externalities, on the other.

In our analysis, we have benefited from the so-called eclectic paradigm—the OLI (ownership-location-internalization) framework suggested by [Dunning, 1977, 1993]. This

model offers a combination of explanations for FDI decisions related to country, region, industry and firm-specific qualities. A territory would have locational advantages to host FDI if it offers cost advantages for production factors, natural resources, access to protected markets and acceptable market size and structure. In this context, locations endowed with natural resources are attractive because they allow MNEs to exploit and export primary materials by making use of their abilities to outperform local companies technologically and by coordinating their complementary assets and other competencies. In total, [Dunning, 1993] recognizes the following four families of reasons explaining FDI location: resource-seeking (including natural resources, but also labor and infrastructure resources), market-seeking (particularly in markets with trade barriers), efficiency-seeking (low-cost advantages) and strategic-asset seeking (highly developed technological and R&D competencies).

In the following, we will examine the factors in detail used by the existing literature to explain FDI location, which we will test empirically in this paper.

Market size as a determinant of FDI location

The connection between market size and FDI is well established in the literature; large countries attract more FDI than their smaller counterparts, or as [Harris, 1954] put it, producers tend to choose sites with good access to markets. [Bergstrand and Egger, 2007] developed a theoretical model for FDI decision making; they show that a gravity explanation captures horizontal determinants for FDI firms looking for local demand as a motivation, while cost advantages (vertical FDI) may be captured by additional controls. Many empirical studies have found significant and positive effects associated with market size (see e.g. [Head et al. 1999]). Moreover, market size determines the tendencies of specialized firms to locate complementary assets and establish linkages to other firms in the site.

The assumption that market size attracts FDI has almost been taken for granted in recent papers. However, when our unit of analysis is a region rather than a country, the results expected are not obvious because many MNEs, as a rule, would be interested in a national rather than a regional market when making the decision to invest, and regional size may not matter. The resource-seeking focus could also make export-oriented multinationals pay less attention to local markets. For example, [Dinda, 2010] reported that FDI inflow to Nigeria is resource-seeking FDI and that market size has no role. In addition, we may expect that size effects may not “work” because of the increased mobility of production factors and demand between regions when compared to countries. Conversely, with respect to Chinese FDI inflows, [Amiti and Javorcik, 2008] show that access to regional markets and suppliers is more important for the entry decision than access to the rest of the country particularly when

there is relatively strong market fragmentation because of underdeveloped transport infrastructure and informal trade barriers.

So far, the empirical testing of the market-seeking hypothesis on Russian data shows mixed results. The majority of empirical papers reports positive effects associated with regional market size in Russia (see e.g. [Brock, 1998; Broadman and Recanatini, 2001; Iwasaki and Suganuma, 2005; Ledyeva and Linden, 2006; Kayam et al., 2007; Ledyeva, 2009]. Conversely, [Manaenkov, 2000] reports that market size is irrelevant for the decision of FDI to enter into a region, finding that the “gravitation model” is not robust and that regional size heightens the attractiveness for FDI only if the sample includes Moscow. He reports that the major attraction for FDI in a region is the expected regional market share.

Markets structure as a determinant: agglomeration economies

In addition to market size, a growing literature in economic geography stresses the importance of aspects of the local industrial structure for foreign investors—the agglomeration economies, geographical proximity, and production factors pooling. As [Krugman, 1998] put it, firms want to concentrate production (because of economies of scale) near markets and suppliers (because of transport costs), but access to markets and suppliers is best where other firms locate (because of market-size effects).

If existing agglomerations generate cost savings and productivity gains for local- and foreign-owned firms, they may attract new foreign entrants that decide to establish themselves within existing agglomerations. Several factors may be at work. The literature considers the positive benefits of localization economies from the agglomeration of firms in the same industry supplying similar good or services (MAR externalities⁵), and/or urbanization economies generated by the spatial concentration of firms supplying different goods and services (Jacobs externalities⁶). Another advantage of agglomerations is based on less-asymmetric and less-costly information for FDI [Mariotti and Piscitello, 1995].

With respect to the agglomeration of foreign investors themselves, some papers suggest that FDIs tend to agglomerate even more than domestic investments [Shatz and Venables, 2000]. [Head et al., 1999] observe that investors from the same home country choose to agglomerate more often than investors from different countries do. Moreover, [Halvorsen, 2012] shows that agglomeration of FDIs is positively associated with investment size when the FDIs originate from the same home country.

Some papers have explored the specificity of the agglomeration effects on FDI in transition economies. [Disdier and Mayer, 2004] find that the agglomeration effects are

⁵ See [Glaeser, Kallal, Scheinkman and Shleifer, 1991].

⁶ See [Jacobs, 1969].

lower in Central and Eastern European countries than in Western Europe. In a comparative study of FDI location determinants, [Campos and Kinoshita, 2003] find that FDI inflows to 25 transition economies are linked to institutions, natural resources, agglomeration economies and labor costs.

The empirical literature reports mixed results with respect to the effects of specialization and diversification. For example, for FDI into Italian provinces, [Bronzini, 2007] shows that specialization and sector density at the regional level attract foreign investors, while there is no evidence that FDI inflows are drawn by sectoral diversification. [Pelegrín and Bolancé, 2008], who use Spanish data concerning five manufacturing industries, report that regional agglomerations are important magnets for FDI, although the power of agglomeration effects depends on specific industry traits; FDI in cost-oriented industries is driven by natural resources, while FDI in sectors with high levels of linkage prefer those regions with high concentrations of manufacturing activity. Studies on transition economies show that urbanization externalities have either no effects or negative effects on FDI location across countries [Hilber and Voicu, 2010].

Proximity and Neighborhood

In the literature, proximity is often understood as a reflection of transaction costs related to production in remote sites; the longer distance may deter FDI [Bloningen et al, 2007]. However, the distance could serve as a selection mechanism in which only larger investments will be implemented in more remote locations [Halvorsen, 2012], or distance may be neglected if natural resources are targeted. We measure proximity in two ways; first, by the distance between the capital of the region and the capital of the investor's country of origin and, second, by the distance between the major regional city and Moscow.

Another important spatial motivation for FDI originates from the fact that scale economy, specialization and diversification are not necessarily limited by regional administrative borders. The economic activity of the surrounding territories should not be neglected. To capture this effect, some authors measure investment in neighboring regions or countries [Bobonis and Shatz, 2007]. [Coughlin and Segev, 2000] use a spatial error model to analyze FDI determinants in 29 Chinese provinces and conclude that an FDI shock in one province has positive effects on FDI in nearby provinces.

Natural resource endowment

Natural resource endowment is usually understood as a benefit that countries and regions use to attract FDI. Taking advantage of the availability and price of natural resources has recently driven FDI in developing countries and affected the distribution of FDI inflows between countries or regions within countries [Dunning, 1998]. In this respect, Russia is not

unique; the statistics prove that the mining and quarrying industries accounted for 20-50% of annual FDI inflow between 2006 and 2009, and resource-rich regions stay at the top of accumulated per capita FDI stock (Figures A1 and A2 and Table A1 in the Annex).

However, this view has not gone unchallenged. The existing literature, based mostly on cross-country analyses, concludes that the role played by the location of natural resource deposits in determining location choice for multinationals is not simple and varies by country, depending on complementary conditions such as infrastructure, institutions and regulation of access. [Faeth, 2008] shows that most empirical works prove that market size, transportation costs and trade barriers increase FDI, while factor endowment is only relevant in selected cases. [Asiedu, 2006] finds natural resources to be a significant determinant for FDI to sub-Saharan African countries.

In the literature that has reported irrelevance or even negative effects of natural resources on FDI location choice, the paper by [Mina, 2007] is one of the most cited. This article reports a negative association between oil potential (expressed in terms of oil reserves), oil utilization (expressed in terms of oil production), and FDI inflow to six Gulf countries. [Assunção et al. , 2011] analyze the effect of natural gas, oil and coal reserves on the location decisions of multinationals in 125 economies and show that these resources are not determinants of FDI location.

Natural resources are taken for granted as the necessary condition for the FDI location for resource-seeking FDI. Nevertheless, literature has emerged arguing that locations endowed with natural resources may receive more resource-seeking FDI but less non-resource-seeking FDI than other sites. This problem is termed the “resource curse”, reflecting a possible distortion of FDI allocation between tradable and non-tradable sectors. Some papers associate the problem of the crowding out of non-resource FDI with the Dutch disease, i.e., when non-resource sectors decline after fuel and energy generate increased revenue [Corden and Neary 1982]. This assumption has been supported in several empirical papers, such as [Poelhekke and van der Ploeg, 2010], who show that subsoil assets boost resource FDI but crowd out non-resource FDI. The authors observe that resource abundance in general has a negative effect on aggregate FDI, giving rise to the curse. They also find that doubling the oil price leads to a 10 percent fall in non-resource FDI.

Conversely, [Bruno and Sachs, 1982] suggest that increasing wealth in the tradable sectors leads to a rise in demand for other goods and services. The net effect of the energy sector is to reduce long-run production costs of other tradables and to improve the economy's terms of trade on final goods. For our paper, this theory explains how demand for non-tradables that is induced by energy exports can be satisfied by FDI. Co-location of FDI may

also be at work; [Kolstad and Villanger, 2008] report a strong correlation between FDI in manufacturing and FDI in producers' services, such as finance and transportation.

The importance of the crowding-out hypothesis in the Russian regions is not clear. When we regress on the number of FDIs entering the regions, we may expect both crowding-out and stimulating effects. Crowding out may exist because only large and powerful companies are able to cover the costs associated with accessing remote locations with a weak infrastructure. These investments would be large in size but small in number. Furthermore, the Russian regional growth pattern depends in large part on the dynamics of the oil price. Thus, market demand in the resource-rich regions may grow through redistributed oil revenues. If this is true, stimulation effects are more likely to be at work rather than deterring effects, particularly in sectors associated with distribution.

Time also matters if we compare resource- and market-seeking FDI location choices for countries and regions that only recently opened for trade and investment. As [Dunning, 1998] notes, resource- and market-seeking FDI are typically initial investments, followed by efficiency- and strategic-asset-seeking FDI at a later stage.

Empirical papers on the Russian regions more or less agree about the relevance of natural resource endowment as a location determinant. [Kayam et al., 2007] analyze additions to fixed capital investment by foreign firms as the measure of FDI and find that FDI in a region depends on spatial market size and natural resources. However, [Ledyeva, 2009] reports that the link between resources and FDI in the regions is traceable only since the 1998 economic crisis. We did not find papers that test co-location and the resource curse theory on Russian data.

To sum up, existing theories and empirical studies do not offer clear predictions and decisive findings for our research questions about whether FDIs into the Russian regions have a natural resource or market-seeking nature and whether these investments follow a competition or co-location pattern. The novelty of our study is defined by the use of the most recent fully populated micro-establishment data and by considering the sectoral, regional, and temporal dimensions of FDI.

3. Data and construction of the sample

This paper employs firm level data drawn from the RUSLANA Database provided by Bureau van Dijk. Cross-sectional microdata for individual plants have certain significant advantages over regional statistics of FDI flows and stocks because they open windows to analyze what and where multinational firms actually produce and trade [Lipsey, 2007]. Employment and sales data of FDI firms in Russia remain better indicators than investment, but

these figures are not always available. However, the location of FDI firms in Russia is not an easy subject for outside verification. There are reasons why the data used in this paper are not immune from manipulation and why some figures should be regarded with caution.

Firms report nominal locations driven by strategies, which are determined by taxation, government relations, legal affairs, and so forth, while production facilities may be located in other regions. This leads to overestimating the concentration of foreign firms in Moscow, which looks as if it is the center for the mining and oil extraction industries because it hosts a large share of the headquarters of these sectors' companies. In total, Moscow hosts 51% of Greenfield FDI⁷ in Russia. Therefore, we must test the robustness of our results by excluding Moscow in a subsample.

Over the period of our analysis (2000-2009), several regions have reported unexpected and drastic short-term growth of FDI, which may be attributed either to the short-lived specific advantages granted to selected regions (such as to the resource-rich Magadan oblast in the 1990s and the internal offshore in Kalmykia and Chukotka in the 2000s) or to the investment projects of large companies processed through offshore affiliates. The business practice of Russian firms to conduct commercial deals through foreign jurisdictions and established chains of ownership is another source of distortion. As [Yakovenko, 2012] notes, 57% of Russian companies implement practically all their commercial deals through the establishment of foreign holdings that control Russian subsidiaries. The respondents to the survey reported the inadequacy of domestic legislation and dissatisfaction with the judicial system as the main reasons for using foreign legal systems. Furthermore, barriers of entry into strategic sectors (accounting for 42 sectors in new FDI regulations drafted in 2012) should also be considered when estimating location factors. In particular, foreign entry is regulated in the oil and natural gas, metals, chemicals and certain service sectors.

The original data source used in this paper contains information about individual enterprises, including ownership structure. The latter allows us to identify firms that are owned by a foreign investor. A Russian enterprise is included in the sample if at least one foreign investor holds a minimum of 10% of the enterprise's shares/voting rights. The available data covers the period between 2000 and 2009. The starting year of our analysis coincides with the onset of a period of remarkable growth, and the last year is in the middle of the economic crisis.

The firm-level data contain information on the location and sector of the foreign affiliate in Russia, the date of investment and the investor's home country. Each enterprise with a foreign investor is located in one of 81 Russian regions. We have excluded the republics of Chechnya

⁷ A Greenfield investment is defined as a start-up investment in new facilities. See e.g. Kogut and Singh (1988).

and Ingushetia from the sample because regional statistics for these regions are not available. The RUSLANA Database contains information on sectors and follows the European Union's NACE 1.1. classification. In this analysis, we focus on the mining industry and industrial production (NACE 1.1. Code 10-37), electricity, water and gas supply (NACE 1.1. Code 40-41), wholesale, retail trade, transportation (NACE 1.1. Code 50, 51, 52, 60-64), financial intermediation, real estate and business services (NACE 1.1. Code 65-74) sectors.

To capture the time dimension of each investment, the investment decision is proxied by the date of incorporation of the Russian enterprise in the local register of commerce. Furthermore, it is assumed throughout the analysis that the investment decision was taken one year prior to the registration to control the endogeneity related to the investment itself. This step has been applied in the majority of location choice studies [Spies, 2010].

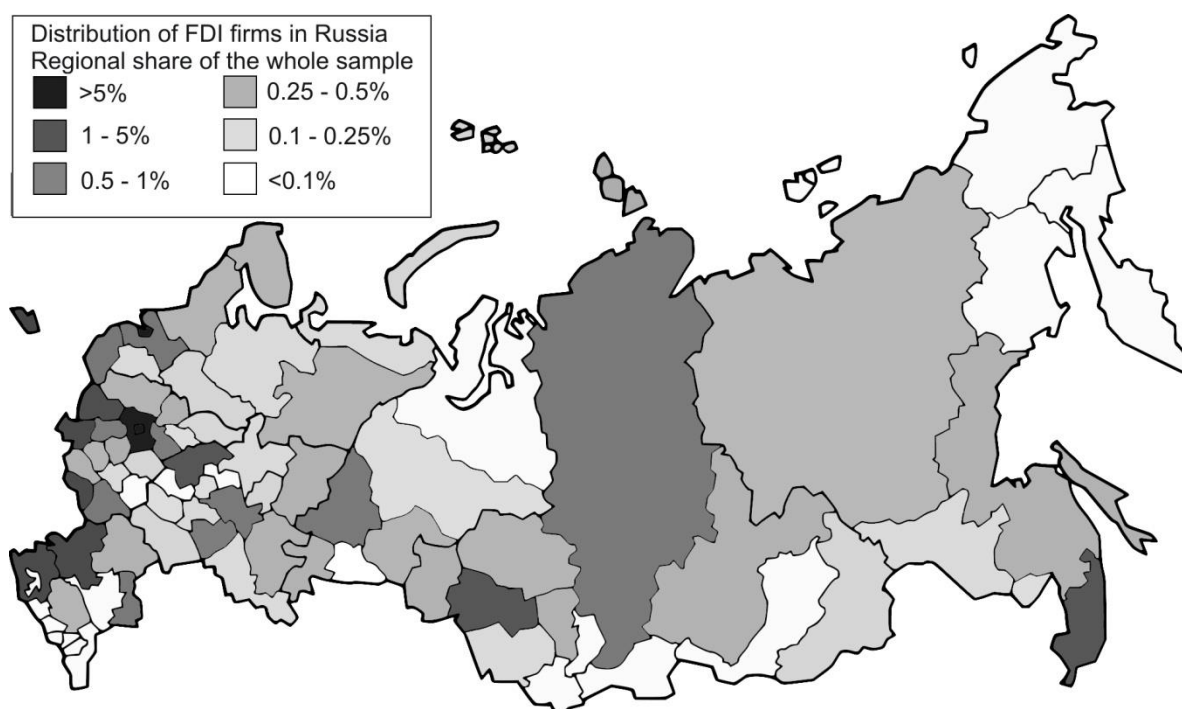
After collecting the full data set covering 15,086 investments (firms with FDI), we have introduced two filters to cope with the problem of offshore tax havens and financial hubs and with the uncertainty about the entry date of firms created through M&A transactions. In our sample, more than one-third of the investors are located in offshore financial hubs, and we have strong reasons to believe that many of them represent re-directed capital of Russian origin. This figure is fully consistent with the macroestimation provided by UNCTAD (2012). A location strategy of these companies can hardly be termed a FDI location decision. Thus, we exclude 5,473 enterprises from the sample by using the official list of offshore countries generated by the Russian Ministry of Finance.

Furthermore, we focus our analysis on Greenfield investments and control the results for the full sample including both types of investment, Greenfield and M&A. Although RUSLANA does not indicate whether an investment was a newly established plant or a take-over of an existing firm (M&A), a FDI firm is considered a Greenfield investment if the subsidiary is completely owned by one foreign investor. For Greenfield investments, the entry date is consistent with the date of incorporation; for M&A deals, this measurement is not necessarily the entry date. Only in the event that the company changed its name after an M&A deal and re-registered itself may we safely assume that the entry date is consistent with the date of incorporation (re-registration). Moreover, Greenfield firms are more likely than firms created through M&A to make independent location decisions, and these decisions would more accurately consider regional location factors. As [Dunning, 2000] and [Harzing, 2002] note, Greenfield FDIs usually face higher entry costs.

Our sample includes 6,404 Greenfield firms and 9,778 investments if M&A are included. Their distribution across regions and sectors is shown in Figures 1 and 2. The map and descriptive statistics demonstrate strong regional concentration of FDI when we measure the

number of firm entries; the top three regions (Moscow, St. Petersburg and the Moscow region) host 62% of the total number of FDI firms and 66% of Greenfield firms. This is remarkably higher than the combined contribution of these three leading regions to the Russian GDP, which measures at only 27.8%. However, many firms are only registered in Moscow (with its 47% share of total investments and 51% share of Greenfields), while the production plants may be located elsewhere. Thus, the spatial concentration of FDI in the federal capital might be biased upwards.

Figure 1: Spatial distribution of FDI firms in the sample: FDI firms in the region as a percentage of the total number of foreign firms in the country



Source: Sample data, Greenfield and M&A investments are taken into account

Another observation is the persistent economic division between the Western and Eastern parts of the country. If we consider the Ural Mountains as the dividing line between these regions, only 9% of the investments are located in the Eastern part of the country.

Border regions enjoy an advantage compared to inland territories in terms of FDI location. Moreover, border regions host remarkably more investments from the countries with which they share a border than from more distant places. For example, 85% of the investments in the Smolensk region, which is located at the border of Belorussia and is ranked fourth among Russian regions with almost 5% of the total number of Greenfield investments, are operated by Belarusian owners. This is also true for the regions of Belgorod (77%) and Bryansk (87%). These strong bilateral relations seem not to rely solely on geographical proximity but on path

dependencies as well. In the Far East, Primorsk Territory is relatively more attractive than other locations for Chinese investors.

The distribution of FDI firms across sectors (Table 1) shows that the majority of Russian inward FDI is attributed to the service sector; more than 80% of foreign investments are registered in the service sector, which is dominated by investments in the wholesale trade. Our data do not allow us to control this figure for the size of the inflow. The official statistics for the sectoral distribution of FDI inflows (see Table A1 in the annex) report that the inflow was allocated more or less equally between industry and services in 2009, suggesting that, as should be expected, service firms are smaller than industrial entities.

Table 1: Distribution of FDI firms across sectors

Sectors	Entire period (2000-2009)		Between 2000 and 2003		Between 2004 and 2009	
	% from the total number of firms in the sample	No. of obs	% from the total number of firms in the sample	No. of obs	% from the total number of firms in the sample	No. of obs
Industry	19.7	1264	22.6	505	18.9	795
- extraction industry (Nace1 10-14)	0.8	51	0.9	20	0.7	31
- manufacturing (Nace1 15-37)	18.9	1209	21.7	485	18.2	764
Services	80.3	5140	77.4	1729	81.1	3411
- wholesale trade (Nace1 51)	45.5	2911	42.3	946	46.7	1965
- other services (Nace1 40-74 excl. 51)	35.9	2299	35.0	783	34.9	1466

Source: Sample data

The spatial distributional pattern is similar for both industry and services, with a strong concentration of foreign firms in the Western border regions and Moscow. Nevertheless, a Pearson's Chi-Square-test for an identical distribution of both subsamples may be rejected. The largest difference between the subsamples is found in the capital of Moscow, which accounts for 54.9% of service investment compared to 34.8% of industrial FDI.

Construction of the sample

We split the sample of 6,404 Greenfield firms into five subsamples with respect to temporal, spatial and sectoral dimensions. To account for the spatial concentration of FDI in Moscow, we check whether the results remain stable when investments located in Moscow are excluded. Sectoral differences are accounted for by splitting the sample into industry and service FDI. To check whether investment factors have changed over time, we divide the sample into two time-related subsamples; the 2003 Yukos trial serves as a threshold. Finally, in one

specification, we extend the sample by M&A investments, whereas offshore investments are excluded throughout the entire analysis.

The 2003 Yukos trial deserves additional attention. On the one hand, this event presented a change in the Russian investment climate and questioned the regime of property protection. Thus, we might expect that foreign investors would be less enthusiastic about investments in Russian natural resources and that resource-rich regions would be disadvantaged as FDI destinations after the trial. On the other hand, the expected profits from the export of natural resources were spurred by the increasing prices of natural resources and reduced barriers to FDI prior to the WTO accession. Therefore, it is not clear whether these advantages outweighed the deterioration of the property protection regime evidenced by the Yukos trial.

Dependent and explanatory variables measures

Our dependent variable of interest is the region that a foreign investor chooses as a location site. Each investment (firm with a foreign owner) in the data set is counted 81 times (one for each region), modeling the location decision for each investment, whereas the location decision is captured by a dummy variable.

For the empirical analysis, we link the firm-level data described above with regional data obtained from the yearbooks published by the Russian statistical agency “Regions of Russia”, the electronic database www.gks.ru, the Federal agency on natural resources (ROSNEDRA), and from UNCTAD statistics.

Because our paper tests locational determinants driven by market-seeking or resource-seeking factors, the set of explanatory variables can be split into three groups: access to natural resources, market potential, and regional control variables that most likely interact with the resource- or market-related determinants.

Natural Resources

The effect of natural resources as a factor pulling investment is measured by several variables. The first variable captures the regional availability of natural resources coming from the Federal agency on natural resources. This database contains information about seven different natural resources distributed across the regions, including oil, natural gas, rare earth-metals, quartz, platinum, diamonds and rock crystal. These natural resources are available in 32 of the 81 regions. First, we check whether the availability of at least one of these commodities increases the likelihood of FDI location in the region by constructing a dummy variable for the availability of natural resources. Second, we distinguish between two groups of resources by creating a dummy for fuel and energy, on one hand, and a dummy for the availability of the other natural resources listed above, on the other. This distinguishes between export-oriented energy

sectors and other resource endowments. The attractiveness of regions endowed with natural resources may also depend on price dynamics. Therefore, we include the third variable for natural resource endowment that captures the annual average oil price from UNCTAD sources. We set the oil price at zero for all regions that are not endowed with any of the natural resources described above. This approach controls for the oil price effect in regions with natural resources and assures the necessary variability of the explanatory variable across the alternatives.⁸

Market pull factors

The estimates of market pull factors are based on the assumption that foreign investors may be attracted by the size of the local economy and by its dynamics and positive agglomeration externalities. We measure the local market size by the regional gross domestic product (GRP—in fixed prices from the year 2000) and population density, while market growth is accounted for as GRP growth rates in constant prices.

However, the regional scale of the economy may not be limited by nominal administrative borders. [The World Bank, 2008] reports significant spillovers of growth from neighboring regions in Russia between 1999 and 2004. Therefore, we include a variable in the analysis that captures the accumulated GRP of neighboring regions that share a land border with the considered region.

Market pull factors may be also attributed to agglomeration forces that generate profit, cost and productivity advantages for locations. Following the recent economic geography literature surveyed above, we introduce variables that quantify several measures of agglomeration forces.

First, we include the geographical proximity between the investor and the affiliate, which is measured by the Euclidean distance between the capital of the investor's country and the major city in the host region. The transportation distance from the regional major city to the federal capital of Moscow⁹ is used as a control variable for trade costs and the remoteness of the region. Furthermore, we add the average temperature in January to control for the region's accessibility, which is influenced by difficult climate.

Second, the model contains measures of agglomeration forces that reflect how economic activity is organized in regions—Marshall-Arrow-Romer (MAR) externalities of specialization and Jacobs externalities of diversity. The MAR externalities are measured by a specialization index that is determined by the share of employees in the sector of investment s compared to the total regional employment figure. Jacobs externalities are expressed by the Herfindahl Index,

⁸ If the price of oil were equal across all regions of the sample, the oil price variable would not have any variance across the alternatives. In this case, the oil price would not contribute anything to the regression.

⁹ Because there are no road connections from Sakhalin, which is an island, to Moscow, we calculated this distance by adding the geographical distance to the closest region (Khabarovsk Territory) to the transportation distance of this region to Moscow.

$herf_r$, as a diversity indicator capturing the variety of available supplier inputs in region r over 54 sectors:

$$herf_r = \sum_{s=1}^S \left(\frac{emp_{rs}}{\sum_{j=1}^S emp_{rj}} \right)^2 \quad (1)$$

Other Regional Control Variables

Finally, we control for certain regional factors that might influence the location decisions of foreign investors or interact with the factors discussed above. Average monthly wage rates for the region are included to capture the regional variation of the cost and skill level of the workforce. Openness to trade, which may encourage export-oriented FDI, is computed as the ratio of imports plus exports to the gross regional product (GRP). The correlation coefficients between the openness to trade measure, the availability of natural resources and the geographic location of the region indicate that trade openness is higher in regions with access to the sea, whereas the availability of the natural resources and direct land borders do not seem to have a strong effect on regional trade activity. These relationships are confirmed by t-tests for mean differences of trade openness for the corresponding subgroups (see Table A3 of the Annex).

Table 2. Selected economic characteristics of the sample Russian regions, depending on resource availability and market size

	Groups of regions depending on the natural resource endowment		Groups of regions depending on the market size	
	With resources	Without resources	GRP above average	GRP below average
Number of greenfield FDIs	561	5843	4,772	1,632
Number of greenfields and M&A	928	8,850	7,108	2,670
GRP growth dynamics, %	0.28 (0.03)	0.31 (0.05)	0.32 (0.03)	0.30 (0.05)
Population density, people/sq.km	10 (13)	349 (1,685)	1,034 (2,938)	25 (22)
Average wage, RUR	8,128 (3,316)	6,865 (4,094)	9,518 (5,277)	6,588 (3,174)
Herfindahl index	0.08 (0.03)	0.08 (0.02)	0.07 (0.02)	0.08 (0.03)
Specialization index	0.02 (0.01)	0.2 (0.01)	0.03 (0,01)	0.02 (0.08)
Av. January temperature, grad	-15.4 (6.8)	-8.7 (9.0)	-12.1 (7.8)	-11.2 (8.5)
Average proximity to home of FDI, km	4,972.2 (3,008.0)	3,958.7 (3,070.7)	4,151.1 (2,866.6)	4,418.4 (3,143.4)

Source: sample data. Standard deviation in brackets

Because the factors of interest are natural-resource and market-related determinants, we present the mean statistics of selected explanatory variables across groups of regions endowed and not endowed with natural resources, on one hand, and for regions that report GRP above and below the country average, on the other (Table 2).

The descriptive statistics provide an unclear picture about our factors of interest. On the one hand, resource-endowed regions host only a small fraction of all investments, and their growth dynamic is slightly worse than the rest of the sample. Furthermore, resource-rich regions are extremely cold and remote locations with an average population density 35 times lower than the rest of the sample. On the other hand, they do not differ in their degree of specialization and diversity, but the average wages are almost 20% higher than in regions not endowed with natural resources. The picture of market-related groups is less tangled; regions with market sizes larger than the country's average host significantly more foreign firms; they are growing faster, report higher wages and have higher population densities; and they are more specialized and diversified than regions with smaller markets.

In summary, it appears that foreign investments, if measured by the number of entrants, are highly concentrated in spaces and heterogeneous across sectors. Economically larger regions host more FDI. Resource-endowed regions are disadvantaged by distance, climate, labor costs and low-growth dynamics. Does this really indicate that market size and agglomerated structure lead as location factors for foreign investors in Russia?

Table 3: Variables included in the analysis

Variable	Definition	Source
natural_res	Dummy for deposit of natural resources	ROSNEDRA
other_res	Dummy for deposit of rare earth-metals, quartz, platinum, diamonds and rock crystal	ROSNEDRA
oilgas	Dummy for deposit of energy carriers (oil and/or gas)	ROSNEDRA
oilprice	Annual Average Oil Price / UK Brent	UNCTAD
grp	Regional gross domestic product in fixed prices from 2000	ROSSTAT
grp_growth	Annual growth rate of GRP	ROSSTAT
grp_neighbor	Aggregate GRP of neighboring regions—only direct land borders	ROSSTAT / own calculation
special	Share of employees working in the sector of investment s	ROSSTAT
herf	Herfindahl-Index	ROSSTAT
lnwage	Average monthly wage rate in rubles	ROSSTAT
Indist	Euclidean distance between capital of investing country and major city of the region	Own estimation
Indist_trans	Transportation distance from regional major city to Moscow	ROSSTAT
lnpopdens	Population density	ROSSTAT
reg_tempjan	Average temperature in January	ROSSTAT
int_integration	Ratio of imports plus export to GRP	ROSSTAT

4. Model and research design

In this analysis, we focus on the determinants of the foreign investor's locational decision about investing inside Russia. In this framework, we assume that the foreign firm has previously decided to invest in Russia, and we neglect the firm's decision to choose Russia as a destination country. Thus, the foreign investor chooses the region r from all alternative regions $r \in R$ in the Russian Federation because it promises to maximize the firm's profit. The basic model underlying the regression was designed from the literature, making use of the profit-

maximization approach described by [Head and Mayer, 2004]. Their model employs the Dixit-Stiglitz model of monopolistic competition, in which [Dixit and Stiglitz, 1977] link the production cost function of a profit-maximizing firm with the utility-maximizing demand function of a representative individual. The new economic geography [Krugman, 1991] advanced the Dixit-Stiglitz model by considering the effect of agglomeration externalities between firms, which can emerge either from labor market specialization, knowledge-spillovers and intra-sectoral supplier linkages (MAR externalities), on the one hand, and/or from a diversified economic structure (Jacobs externalities), on the other.

We expect that the location choice for region r in sector s depends on the demand for good x in markets $m \in \mathcal{R}$, its price p , costs c and the imposed taxes t^{10} .

$$\pi_{rs} = (1 - t_r) \sum_{m=1}^M [(p_{rs} - c_{rs}) x_{rs}] \quad (2)$$

The optimal demand and optimal price for good x can be obtained by a two-step maximization based on a constant elasticity of substitution (CES) function. For the turnover function, it is assumed that the investor can only serve the plant location r and its neighboring regions, which is indicated by a dummy variable ϕ_{rm} and the corresponding market access, MA_m . Furthermore, we assume that the costs of production, c_{rs} , depend on transaction costs between the investor and the subsidiary occurring from the distance between the investor's home country and the region of investment, d_r , the remoteness of the region, r_r , the access to natural resources, n_r , and the productivity factor, A_{rs} . This productivity factor depends on the skill-level of the work force, E_r , and on agglomeration variables such as the sectoral specification, S_{rs} , and the economic diversity, H_r , in region r . Finally, by taking logs, the profit function may be transformed into the following log-linear empirical function, with the coefficient vector, β , and the error term, e_{rs} :

$$\begin{aligned} \ln \pi_{rs} = & \beta_0 + \beta_1 \ln \left(\sum_{m=1}^M \phi_{rm} MA_m \right) + \beta_2 \ln d_r + \beta_3 \ln r_r + \\ & \beta_4 \ln n_r + \beta_5 \ln E_r + \beta_6 \ln S_{rs} + \beta_7 \ln H_r + e_{rs}. \end{aligned} \quad (3)$$

The profit function described above is the basis for the empirical framework. In the literature, a discrete choice model, such as the conditional logit model, best fits the investigation of the location choice of the foreign investor. As [Spies, 2010] notes, the profit for each alternative region is unobservable and must be expressed implicitly by the information about

¹⁰ Because the tax sovereignty of the most important taxes belongs to the federal level, these taxes do not vary across regions. Thus, the effect of the tax rates will be ignored for the ongoing notation.

regional characteristics and about the location decisions of investing firms. Empirically, location decisions are based on a stochastic utility maximization process with a deterministic part, which is given by the product of alternative-specific regressors, z_{rs} , and the corresponding coefficient vector, β , and a stochastic and unobservable part represented by an error term, ε_{rs} , such that:

$$\pi_{rs} = z'_{rs} \beta + \varepsilon_{rs}. \quad (4)$$

Following the assumption described above, a foreign investor chooses the region r , which exceeds the expected profits of all the other regions $l \in R$, with $l \neq r$. In the empirical framework, the chosen region takes the value of one while the remaining regions are denoted with a zero. Finally, the deterministic part of equation (4) predicts the probability for the choice of region r from all alternatives for each investment decision [Train, 2009]:

$$P_{rs} = \frac{\exp(z'_{rs} \beta)}{\sum_{l=1}^R \exp(z'_{ls} \beta)}. \quad (5)$$

5. Results

The conditional logit regression results are reported in Tables 4 and 5. We use the acronyms defined in Table 3.

The results reported in Table 4 contain six specifications. In the first column, we report the results of the baseline regression, which includes all variables that are used throughout our analysis. In columns (2) and (3), we replace the dummy for natural resources with more detailed variables to distinguish between oil and gas and other resources. In comparison to column (2), we additionally control for the oil price in the specification of column (3). Columns (4), (5) and (6) investigate whether the Yukos trial in 2003 changed the factors influencing FDI to the Russian regions.

The results reported in Table 5 contain five specifications. Columns (7) and (8) contain the regression results for sectoral subsamples resulting from the split of the sample into FDI for the industrial and service sectors. In column (9), we present a detailed investigation on market-seeking factors. The last two specifications check whether the results are robust by including M&A investments in column (10) and by excluding investments located in Moscow from the Greenfield investment sample in column (11).

Table 4: Natural resource endowment as an incentive to invest in a region

	Baseline	NR 1	NR 2	Pre Yukos	Post Yukos	Interaction of natural resources with time dummy	
						Pre Yukos	Post Yukos
	(1)	(2)	(3)	(4)	(5)	(6)	
Natural Res.	0.281*** (0.063)						
oil_gas		0.158** (0.076)	-0.105 (0.151)	0.060 (0.136)	0.215** (0.092)	0.013 (0.113)	0.229*** (0.085)
Other Resource		0.245*** (0.070)	0.248*** (0.070)	0.375*** (0.124)	0.188** (0.086)	0.225*** (0.080)	0.284*** (0.097)
oil price			0.005** (0.003)				
lnGDP	0.646*** (0.049)	0.643*** (0.050)	0.636*** (0.050)	0.593*** (0.099)	0.615*** (0.058)	0.639*** (0.050)	
special	5.618*** (0.455)	5.613*** (0.455)	5.628*** (0.456)	7.268*** (0.783)	5.123*** (0.564)	5.621*** (0.456)	
herf	-8.678*** (1.489)	-8.645*** (1.500)	-8.880*** (1.505)	-20.84*** (4.164)	-8.768*** (1.643)	-8.819*** (1.504)	
lnwage	-0.146 (0.130)	-0.157 (0.137)	-0.115 (0.138)	0.334 (0.240)	-0.174 (0.182)	-0.135 (0.139)	
lnDist	-2.020*** (0.044)	-2.019*** (0.044)	-2.020*** (0.044)	-1.908*** (0.076)	-2.100*** (0.055)	-2.021*** (0.044)	
lnDist_trans	-0.042** (0.019)	-0.044** (0.020)	-0.042** (0.020)	-0.069* (0.036)	-0.041 (0.025)	-0.043** (0.020)	
lnpopdens	0.210*** (0.017)	0.212*** (0.017)	0.213*** (0.017)	0.219*** (0.031)	0.217*** (0.021)	0.213*** (0.017)	
reg_tempjan	-0.003 (0.007)	0.000 (0.007)	0.001 (0.007)	0.024* (0.013)	-0.010 (0.008)	-0.000 (0.007)	
int_integration	0.121*** (0.025)	0.117*** (0.025)	0.112*** (0.025)	0.049* (0.029)	0.086 (0.091)	0.114*** (0.025)	
Investments	6404	6404	6404	2234	4170	6404	
Log-Likelihood	-14630.7	-14630.3	-14628.2	-4907.10	-9685.58	-14628.64	

Conditional Logit Estimation. Dependent variable: Enterprise's location choice for region r among 81 oblast regions. Standard errors in parentheses. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dummy variables for federal districts are not shown in the table.

Table 4 presents our results for resource endowment as a determinant of location decision. All columns control for market-related effects. We observe that natural resources appear dominant in our baseline regression (column 1 of Table 4). Thus, the resulting signs and significances agree with the assumptions made earlier. Column (2) of Table 4 confirms that the resource endowment result is robust to controlling for oil and gas and other natural resources separately. In column (3) of Table 4, we examine whether the results persist when we additionally control for oil prices. We find that the dummy on fuel and energy becomes insignificant and that the price of oil has a positive and significant effect on the location decision. Thus, we might suggest that foreign investors are attracted to resource-rich regions by the mixture of resource endowment and the price dynamics. Because oil prices have risen more than fourfold during the period of our analysis, we might suggest that the results capture time effects.

An obvious problem with estimating the equations discussed above is the probability that the mixture of resource-related determinants change over time because the government altered regulations and conditions for doing business in resource-related sectors, in addition to changes in commodity prices. To address this issue, we consider the Yukos trial. In columns (4-6) of Table 4, we test whether the positive and significant association between the decision to invest and the resource endowment discussed above has changed over time by splitting the sample. In column (4), we include only investments undertaken before the Yukos trial in 2003, and the regression results in column (5) include only investments implemented after 2003. In column (5)—after the Yukos trial—we observe a significantly positive effect for oil and gas endowment, which differs from the subsample with investments undertaken before 2003 in column (4). Other natural resources generate positive and significant effects on the decision to locate investment in a region in both periods of analysis.

Column (6) of Table 4 is based on specification (2) but uses the interaction of both natural resource dummies with a dummy indicating whether the investment was made before or after 2003. The results are similar to the ones reported in columns (4) and (5), confirming that access to regions endowed with oil and/or gas has become more important over time despite the Yukos trial. Thus, we may conclude that FDI firms have adjusted their location decisions in resource-rich regions in response to positive price dynamics and in anticipation of profits rather than because of increased political uncertainties and changes in the regulatory regime.

Remarkably, we did not find evidence that endowment with fuel and energy resources attracted foreign investors in the early 2000s, when prices were relatively low. Moreover, we will show in the next table that the positive effect of natural resources on the attractiveness of resource-rich regions to host FDI may be partly explained by co-location of service-oriented FDI rather than by investments directly linked to the mining industry.

Table 5 first examines the co-location effect by splitting the sample into observations limited either to industry- or service-oriented FDI. Columns (7) and (8) show that both types of natural resources have a significantly positive effect on service FDI, which indicates that service FDI co-locate with the extraction industry in resource-rich regions; conversely, the distinction between energy resources and other resources may be ignored. For manufacturing FDI, the effect of energy resources is insignificant, whereas the effect of other resources is significantly positive. This result suggests that industry-oriented FDI co-locate in regions endowed with non-energy resources instead of in regions endowed with fuel and energy. The remaining coefficients predominantly do not show any difference between service and manufacturing FDI except for the effect of the distance to Moscow; it is irrelevant for service FDI, whereas the significant

negative sign of distance for industry-oriented FDI suggests that proximity to Moscow increases the attractiveness of a region for industrial FDI.

Table 5: Factors of co-location and market potential.

	Industry	Services	Market	Plus M&A	Greenf. Excl. Moscow
	(7)	(8)	(9)	(10)	(11)
Natural Res.			0.261*** (0.064)	0.278*** (0.048)	0.341*** (0.066)
oil_gas	0.004 (0.148)	0.224** (0.090)			
Other Resource	0.287** (0.124)	0.228*** (0.085)			
lngdp	0.650*** (0.101)	0.639*** (0.057)	0.655*** (0.051)	0.697*** (0.038)	0.606*** (0.050)
lngrp_growth			-1.084*** (0.209)		
lngrp_neigh			0.015 (0.013)		
special	14.56*** (1.694)	2.821*** (0.554)	5.601*** (0.456)	6.113*** (0.367)	9.343*** (1.158)
herf	-19.54*** (3.370)	-5.546*** (1.680)	-8.752*** (1.526)	-10.15*** (1.173)	-9.511*** (1.796)
lnwage	-0.118 (0.269)	-0.199 (0.161)	-0.145 (0.134)	-0.466*** (0.103)	0.136 (0.137)
lndist	-1.837*** (0.091)	-2.080*** (0.050)	-2.029*** (0.044)	-1.910*** (0.034)	-2.290*** (0.049)
lndist_trans	-0.135*** (0.039)	-0.038 (0.023)	-0.045** (0.019)	-0.075*** (0.014)	-0.068** (0.031)
lnpopdens	0.097*** (0.033)	0.271*** (0.021)	0.207*** (0.017)	0.168*** (0.013)	0.208*** (0.018)
reg_tempjan	-0.005 (0.014)	0.000 (0.008)	-0.001 (0.007)	0.012** (0.005)	-0.008 (0.007)
int_integration	0.087* (0.047)	0.134*** (0.029)	0.166*** (0.026)	0.102*** (0.019)	0.131*** (0.030)
Investments	1264	5140	6404	9778	3132
Log-Likelihood	-3610.25	-10931.96	-14614.2	-23920.80	-10081.91

Conditional Logit Estimation. Dependent variable: Enterprise's location choice for region r among 81 oblast regions. Standard errors in parentheses. Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dummy variables for districts are not shown in the table.

The observed co-location pattern leads us to conclude that part of the positive effect of natural resource endowment reported in Table 4 may be explained by co-location of service-oriented FDI to the resource-endowed regions instead of by the sole influence of investment in the extraction industry. In this respect, we did not find any evidence that resource endowment negatively affects investments to non-resource manufacturing and services. On the contrary, our analysis shows that FDI linked to distribution sectors is attracted to resource-rich regions, suggesting co-location patterns as opposed to patterns of crowding out.

Tables 4 and 5 also show that market size and structure affect FDI location decisions. As predicted, the size of the markets measured by the regional gross domestic product (GRP) is positively significant throughout all model specifications. When we extend the notion of the regional scale economy to consider the market size of neighboring regions in column (9), we find that the effect of the aggregate GRP of directly neighboring regions is insignificant, while the effect of the GRP growth rate is significantly negative. This may result because economically weak regions were much more likely to exhibit high growth rates than advanced regions over the last decade. Moreover, the number of FDI entries remains low in poorer regions, implying that the growth rate captures characteristics of these areas rather than the economic effect of dynamics. As an analogue to the findings of [Amiti and Javorcik, 2011] for China, our results suggest that the Russian economy is characterized by distinct market fragmentation and that direct market access is a major force for the attractiveness of a region to host FDI. Existing agglomerations encourage foreign investors throughout the entire analysis. Localization externalities measured by the specialization index that captures the same-sector concentration strongly affect the decision of a foreign firm to become established in the given region. Urban externalities measured by sectoral diversity, which is proxied by the Herfindahl index, also appear to significantly benefit a region.¹¹ These findings suggest the simultaneous effects generated by MAR externalities of sector-specific agglomeration forces and inter-sectoral Jacobs externalities of diversification.

When considering the differences of the estimates with respect to the period before and after the Yukos trial, the magnitude of the diversification coefficient shrinks, whereas the majority of the remaining coefficients remain relatively stable. A Hausman test, which compares the estimates between the subsamples, reports a Chi-Square-Test statistic of 158.58 with 18 degrees of freedom and rejects the hypothesis that the coefficients are not exposed to a systematic difference.

The other regional control variables are predominantly stable across the specifications shown in Tables 4 and 5. The coefficients of the average monthly wage rate (which serves as a proxy for the skill level of the regional workforce) and the average temperature in January are predominantly insignificant. The coefficients of the distance to the investor, the proximity to Moscow, the population density and the international integration of the region are predominantly significant and consistent with expectations.

In column (10), we report the estimation results of the sample extended by M&A. All coefficients are highly significant, which partly refers to the increased sample size of nearly

¹¹ As with equation (1), a high degree of economic diversification coincides with a low value of the Herfindahl-Index. Thus, the significantly negative sign of the Herfindahl-Index suggests the positive effect of economic diversification.

10,000 investments and 80,000 observations. Compared to the other specifications, the effects of the explanatory variables remain predominantly unchanged except for the coefficients of the wage rate (negative) and of the temperature in January (positive), which turn both significant.

In column (11), investments located in Moscow are excluded from the sample to test the robustness of the results with respect to a possible bias of observations in the city of Moscow. Compared to the baseline regression in column (1), there is no change in the significance of the coefficients of the explanatory variables. Thus, the qualitative results of this specification confirm the robustness of the analysis.

8. Concluding remarks

In this paper, we have examined the effect of various regional qualities on the decision of foreign firms to enter and invest in the Russian regions. Our motivation is that recent growth of FDI inflows to Russia is most likely one of the largest exogenous shocks to the hosting regional economies. Moreover, a major concern of the Russian government regarding the inflow of FDI is the assumption that FDI prefer natural resources and avoid higher-value-added industries and services. We use novel microestablishment data with linked regional statistics to test our hypotheses on market-seeking and natural-resource-seeking determinants of FDI location.

The primary and significant findings of this study are threefold. First, we conclude that one particular theory is not able to explain the geographical pattern of foreign investments in Russia. A combination of determinants is at work. Market-related factors—in particular market size—and the availability of natural resources are determined to be important. The relative importance of resource endowment seems to grow over time, despite shocks associated with events such as the Yukos trial. Second, existing agglomeration economies encourage foreign investors with simultaneous forces generated by sector-specific and inter-sectoral externalities. Third, the findings imply that service-oriented FDI, in particular, co-locates with extraction industries in resource-endowed regions. Thus, the expectations of crowding out effects in line with the Dutch disease, which guide policy, are most likely exaggerated. Moreover, the natural resource attraction in this context is likely to be overestimated, because resource-rich regions seem to attract non-resource FDI by their relative wealth and growing demand instead of by the restricted possibility to directly invest into mining and quarrying. Remarkably, cross-country studies of FDI stocks also report a strong correlation between FDI in manufacturing and FDI in producers' services, such as finance and transport

Foreign investors do not select regions with lower labor costs. Contrary to the theoretical predictions, our analysis showed that lower labor costs are either irrelevant or negatively associated with FDI entry. This finding is partly consistent with the previous findings of

Manaenkov (2000), who reported that human capital quality is a more important location determinant in Russian regions than labor costs. Furthermore, we do not find evidence that fast-growing regions are attractive for investors.

We have confirmed the dynamic nature of FDI choices in Russian regions. Earlier studies, such as Ledyeva (2009), report that endowment with natural resources began to influence regional FDI significantly positively only after the economic crisis of 1998. Other papers (Broadman and Recanatini, 2001, Casoglione et al, 2012) also found that the composition and power of FDI determinants have changed over time.

Finally, the limitations of our approach should be considered. We have previously discussed why certain data should be accepted with caution. In addition, acquisitions as an entry mode deserve further and more thorough study, most likely in a comparative perspective with Greenfields. The fact that the full sample, including Greenfield investments and acquisitions, demonstrated almost identical results to the Greenfield investments only does not necessarily indicate that both have identical location ideas, because it is given that the literature reports gaps in entry cost and post-entry profit margins among these forms of FDI [Georgopoulos, Preusse, 2009]. Our research may be extended to estimations on the sample, which will be able to capture the actual entry date of new acquisitions, thus allowing us to find differences in the location decisions of Greenfields and M&As. Furthermore, the assumption that the investor has previously decided to invest is restrictive, but this assumption is necessary for our empirical setting if we investigate only FDI in Russian regions.

Another line of extension may be to more deeply investigate the resource curse argument. We found that resource-rich regions are more likely to attract service-oriented FDI. Nevertheless, we do not know how this finding may be understood in the context of the recent literature, which insists that the natural resource curse is linked to socially sub-optimal rent-seeking activity and corruption [Brueckner, 2010]. It would be interesting to determine whether our finding stands when we control for this sub-optimal rent-seeking behavior at the regional rather than country level of analysis.

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Annex

Table A1. Distribution of FDI stock and FDI inflow across selected sectors

	Accumulated stock at the end of 2009		FDI inflow 2006		FDI inflow 2007		FDI inflow 2008		FDI inflow 2009	
	\$US mln	%	\$US mln	%	\$US mln	%	\$US mln	%	\$US mln	%
FDI inflow. Including	109,022	100.0	13,678	100.0	27,797	100.0	27,027	100.0	15,906	100.0
Mining and quarrying	24,780	22.7	4,521	33.1	13,933	49.8	4,979	18.4	3,175	20.0
Manufacturing industries	37,095	34.0	2,602	19.0	4,101	14.7	5,918	21.9	4,104	25.8
Construction	2,678	2.5	271	2.0	891	3.2	958	3.5	744	4.7
Wholesale, retail, repair	11,311	10.4	840	6.1	3,256	11.6	3,994	14.8	3,518	22.1
Transport and communication	4,270	3.9	379	2.8	591	2.1	1,282	4.7	480	3.0
Finances	5,674	5.2	1,502	11.0	1,123	4.0	1,713	6.3	634	4.0
Real estate	17,514	16.1	3,210	23.5	3,273	11.7	5,043	18.7	2,739	17.2

Source: Russian Statistical Agency. Finansi Rossii, 2010, pp.358-364

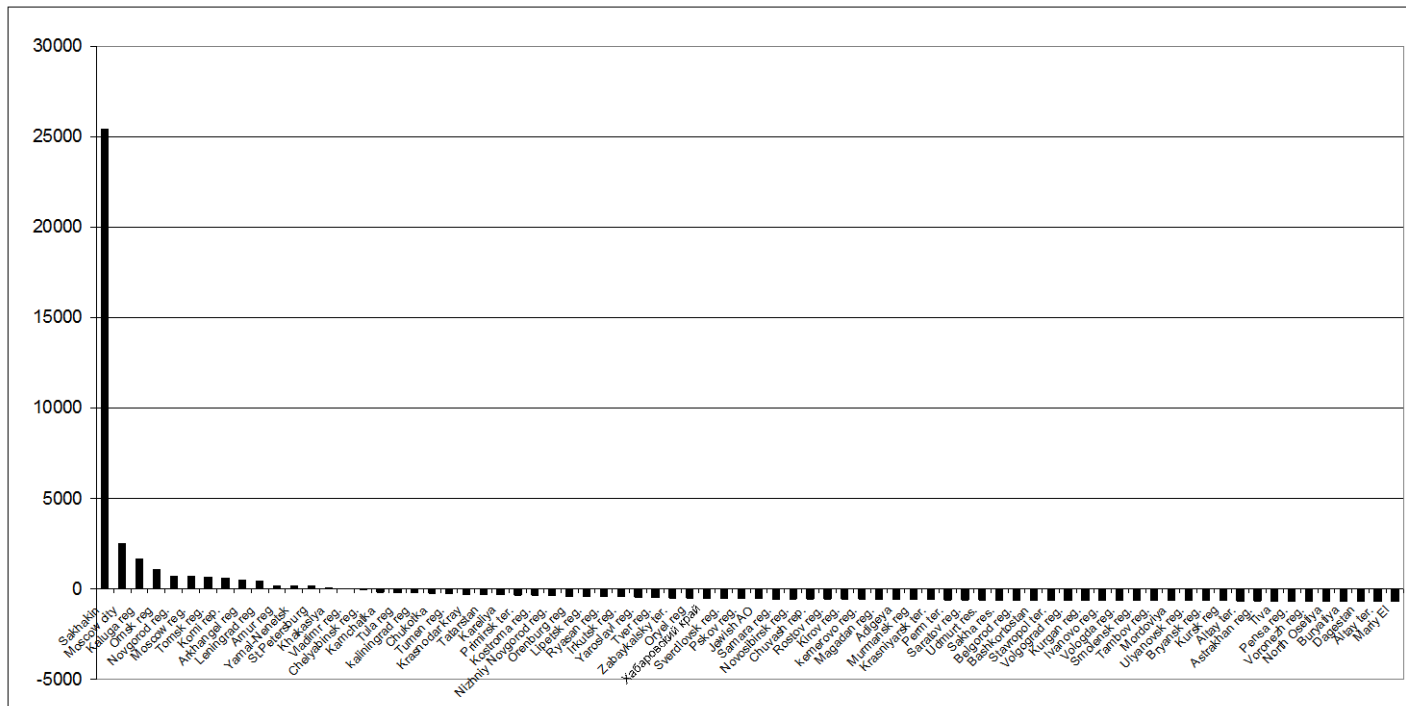
Table A2. Correlation coefficients of explanatory variables

	Nat. Res.	Othe res.	Oil gas	Oil Price	GRP	GRP growth	GRP neigh..	special	herf	wage	Dist to inv	Dist to Moscow	Pop. dens	Temp Jan	Intern a integr
Nat. Res..	1.000														
Otheres.	0.803	1.000													
Oil gas	0.566	0.132	1.000												
Oil Price	0.502	0.118	0.888	1.000											
GRP	-0.001	-0.008	0.066	0.104	1.000										
GRP growth	-0.008	-0.065	0.057	-0.036	-0.042	1.000									
GRP neigh..	0.145	0.095	0.255	0.343	0.239	-0.150	1.000								
special	-0.009	0.019	-0.042	-0.035	0.296	0.015	0.014	1.000							
herf	0.120	0.013	0.136	0.163	-0.085	-0.031	-0.095	-0.201	1.000						
wage	0.170	0.093	0.216	0.339	0.413	-0.243	0.419	0.020	0.104	1.000					
Dist to inv	0.149	0.178	0.026	0.027	-0.006	-0.011	-0.088	-0.053	0.042	0.072	1.000				
Dist Moscow	0.339	0.400	0.076	0.067	-0.102	-0.053	-0.129	-0.047	0.162	0.236	0.451	1.000			
Pop. dens	-0.134	-0.110	-0.074	-0.066	0.622	0.054	-0.069	0.353	-0.101	0.092	-0.022	-0.134	1.000		
Temp Jan	-0.389	-0.449	-0.181	-0.133	0.015	0.009	-0.122	0.048	-0.097	-0.250	-0.323	-0.686	0.108	1.000	
Intern a integr	-0.079	-0.040	-0.054	-0.092	0.006	0.355	-0.178	0.099	-0.227	-0.151	0.001	0.012	0.182	0.041	1.000

Table A3. Correlation coefficients of international integration and geographic characteristics

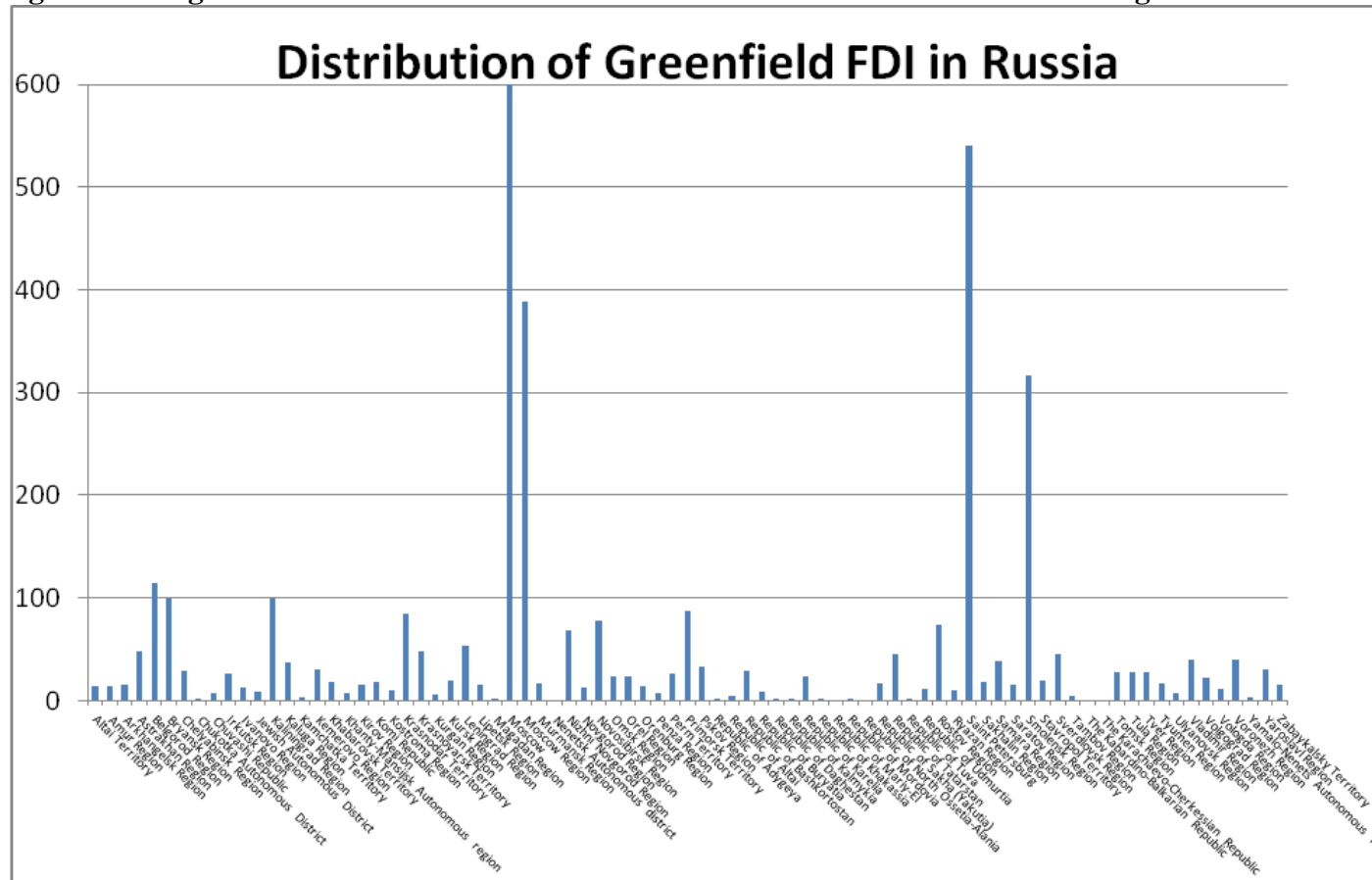
	Intern. integration	Natural Resource	Seaport	Direct landboarder
Intern. integration	1.000			
Natural Resource	-0.079	1.000		
Seaport	0.137	0.297	1.000	
Direct landboarder	-0.021	-0.045	-0.060	1.000

Figure A1. Regional disparity: per capita FDI stock accumulated between 2000 and 2010, relative to national average, US \$ per person



Note: Only regions with non-zero FDI stock are exhibited. The average FDI per capita stock during 2000-2010 in Russia was \$ US 714 .

Figure A2. Regional distribution of the number of Greenfield FDI across Russian regions



Source: Sample data

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