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MICROECONOMIC ANALYSIS OF INVESTMENT STRATEGIES OF
FOREIGN COMPANIES IN RUSSIA IN THE CONTEXT OF THEIR FOREIGN
TRADE ACTIVITIES

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SUMMARY

This working paper is devoted to identifying patterns of spatial and sectoral distribution of foreign direct investment enterprises in the Russian Federation and to developing recommendations for optimizing the strategy of attracting foreign direct investment to the Russian Federation.

In the framework of the study, the following methods were applied: the method of macroeconomic modeling, evaluation of econometric models, as well as logical, systemic, comparative, economic and statistical analysis. Statistical data at the enterprise level were used from the «RUSLANA» and «SPARK-INTERFAX» databases.

The results of the study allows to point out some characteristic features of the spatial distribution of foreign enterprises, which must be taken into account when forming a picture of preferences of foreign investors and the policy of attracting foreign investors to Russian regions.

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INTRODUCTION

In recent decades, the structure of world production has undergone dramatic changes. Transnational corporations (TNCs)¹ have become the most important players. These companies in the new conditions found it optimal to break the production process into stages, placing each of the stages in locations, for one reason or another, most suitable for these industries. Together, all this has led to a significant increase in cross-border flows of goods and capital. Since foreign direct investment (FDI)² is often viewed as a strong stimulant for the economic growth of the host country, the world has intensified competition between countries to attract stages of global production chains. In fact, this was expressed in the emergence of a separate type of economic policy, the purpose of which is to persuade foreign investors to organize production in a given country. As a result, specialized investment promotion agencies have been established in many countries and regions of countries, the main purpose of which is to reduce information barriers for foreign investors.

¹ According to the data given in [57], the share of sales of TNCs in world GDP in 2014 exceeded 50%, while in 1990 this figure did not exceed 25%.

² Despite the fact that empirical studies confirm this thesis only for developed countries, while the effect on developing countries is ambiguous and may depend on specific conditions

In the case of geographically extended countries, the regions of which differ significantly in their characteristics, the decision to invest becomes much more complex: the investor needs to make a choice of a specific location of production within the country. Under simplified conditions, namely in the presence of perfect information, in the absence of any barriers to the movement of capital, and in the absence of other systematic differences between foreign and domestic firms, the spatial distributions of these two groups of enterprises should approximately coincide. In other words, domestic and foreign investors should be guided by the same set of factors when making investment decisions, and should consider these factors in a similar way. Obviously, the above prerequisites are not met in practice; as a result, already at the stage of preliminary data analysis, one can point out significant interregional differences in the share of foreign enterprises in the economy. This indicates that the set of factors that determine the decisions of foreign investors regarding investment in the Russian economy may differ from the similar set of factors for domestic investment. Failure to take this circumstance into account can lead to the systematic ineffectiveness of the policy aimed at attracting foreign investment to Russian regions. Therefore, from a practical point of view, it is extremely important to identify a set of factors that attract foreign investors, as well as to quantify the differences in the susceptibility of these factors between foreign and domestic investors.

Most studies of the distribution of FDI, both at the country and regional levels, are based on official statistics from statistical agencies or central banks. However, there are significant reasons to believe that traditional FDI statistics are imperfect and often do not reflect the real picture. This encourages the use of alternative methods for estimating FDI, such as the use of enterprise microdata. Such data will make it possible to build alternative estimates of FDI stock in Russia, including by industry, constituent entities of the Russian Federation and FDI source countries, and will also allow taking into account the exact location of the enterprise in order to apply modern methods for identifying agglomeration effects, which, as some studies show, along with fundamental characteristics of regions, can significantly affect the distribution of enterprises across regions. To identify the degree of this influence, as well as the differences in the importance of the mentioned factors for the decision of foreign and domestic investors, is the main goal of this work.

1 Problems of foreign direct investment statistics

1.1 International practices for accounting for foreign direct investment

The IMF Guide on the Conceptual Framework of the Balance of Payments (IMF Guide) [1] defines direct investment as a category of international investment in which economic entities that are residents of one country express a long-term interest in economic entities that are residents of another country. The phrase "long-term interest" means the existence of a long-term relationship between the direct investor and the conditional company (enterprise), as well as the significant influence of the investor on its management. Direct investment includes not only the initial transaction establishing a direct relationship between the investor and the entity, but also all subsequent transactions between them and their subsidiaries, whether incorporated or unincorporated.

The concept of direct investment presented in the IMF manual is based on the vision of the OECD presented in its original publications entitled "The OECD Benchmark Definition for FDI", published in 1992. The IMF's concept of FDI is much broader than that of the System of National Accounts (SNA) about foreign-controlled home businesses. In the SNA, this distinction (as well as the distinction between public and private enterprises) is made in different accounts because of the potential analytical utility of identifying differences between subsectors of enterprises, such as value added, investment, employment, etc. However, a comparison in the financial accounts of the balance of payments of direct investment enterprises on the one hand, with foreign-controlled home enterprises on the other hand, does not tell the whole story, primarily because the two types of enterprises serve different purposes. The IMF concept proves that the main distinguishing feature of direct investment is the significant influence of the investor, which contributes to the effectiveness of management. While the main and distinctive purpose of enterprises controlled by foreign residents is control.

The benefits obtained from FDI, where the investor is directly involved in the management of the enterprise, are very different from the benefits of portfolio investment, where the investor does not have any significant influence on the activities of enterprises. From the investor's point of view, most enterprises are a certain link in transnational or international production, the overall profitability of which depends on the benefits of access to various resources localized in different countries. Thus, direct investment investors may receive additional benefits in addition to the basic income that may accrue on the capital they invest (for example, the possibility of receiving management fees or other types of income). However, such additional benefits can be expected only after a certain time. On the contrary, portfolio investors are primarily concerned about the security of their capital, the likelihood of appreciation and the resulting return. The decisions of portfolio investors are separate in relation to specific projects.

Such investors assess the prospects for each particular project they may invest in based on short-term changes in the financial markets and may move their capital frequently in response to changes in the prospects of the projects they are considering.

1.1.1

Enterprises with foreign capital

Taking into account the difference presented earlier between different types of foreign investment, the IMF classifies enterprises with foreign capital as corporate or unincorporated organizational forms of business in which a direct investor who is a foreign resident owns > 10% of the shares or the right to vote. Foreign-owned enterprises include subsidiaries (foreign capital reaches >50%), associates (foreign capital reaches <50%), affiliates (fully incorporated), and companies directly or indirectly owned by a direct investor. Subsidiaries in this respect can also be defined as majority affiliates. In the SNA, foreign-owned companies also include their subsidiaries and affiliates, but associated companies may or may not be included in the category of foreign-owned companies, depending on the quality assessment of foreign control by a particular country. In addition, in some cases, state-owned enterprises may also be treated as foreign-owned enterprises in the SNA.

At the same time, the 10% criterion proposed by the IMF in different countries is taken into account on the basis of very subjective approaches. First, if a direct investor owns <10% of the shares (or no shares at all) or voting rights, but at the same time has significant influence in the management of the enterprise, then such an enterprise is included in the category enterprises with foreign capital. Secondly, if an investor owns >10%, but does not have significant influence in the management of the enterprise, then such an enterprise is not counted as an enterprise with foreign capital. It is worth noting that such subjective approaches are not recommended by the IMF, and countries that follow them should take into account the total volume of transactions for international comparison.

Most enterprises in the foreign capital category are branches or subsidiaries that are wholly or predominantly owned by non-residents, or those in which the majority of voting shares are held by a single direct investor or group. There are quite a few enterprises that are on the controversial line of determining the presence of foreign capital.

The IMF is also encouraged to classify so-called Special Purpose Vehicle/Entity (SPV/SPE) as foreign-owned enterprises if they meet the above criteria. Regardless of structure (e.g. holding company, public company, regional headquarters) and purpose (e.g. administration, currency risk management, investment financing facilitation), SPEs are for the most part an integral part of the foreign company network as their transactions are linked with other foreign companies. However, SPEs that are established for the purpose of acting as a financial

intermediary (as in the case of banks and other financial intermediaries such as securities dealers) have very limited transactions that can be considered foreign investment. Regardless of the purpose of using SPE companies, as well as compliance with IMF recommendations, the indicators of their transactions must be separately determined to comply with the agreed international statistical components of the World Bank (English International Comparison Program).

Special relationships may exist between enterprises operating in different countries. They may have a single board of directors, a high degree of corporate policy coordination, or pooled resources, in the absence of any ownership, equity interest that would indicate direct investment. If transactions between such enterprises are considered by individual countries as direct investment, then these enterprises should be considered as special purpose enterprises (SPVs) referred to in the previous paragraph.

Investors making direct investments may be individuals; incorporated or unincorporated private or public enterprises; related groups of individuals or businesses; governments or government agencies; property, trust or other entities that own (as described above) businesses in countries in which they are not resident. The influence of associated groups of persons or enterprises through the combined ownership of >10% shareholding on the management of the company is similar to the influence of a single private investor with the same degree of ownership.

Investment capital is considered to be the capital that is directly or through related enterprises provided by an investor to an enterprise located in a foreign jurisdiction, or the capital received by an enterprise from an investor that is a resident of a foreign state. The party accepting investments refers to investment capital as financial resources directly provided by a foreign resident, as well as funds provided by foreign enterprises associated with this economic agent. However, the country of origin of the investor refers to the export of investment capital only financial resources provided by a particular investor. Loans, guarantees and other funds received from any other sources are not included in investment capital.

The components of investment capital are share capital, reinvested earnings and other capital associated with various intra-group financial transactions. It is taken into account according to the principle of directionality. Share capital includes equity in affiliates, subsidiaries and associates, and other contributions to equity, excluding unrecorded preference shares, which are treated as debt securities and are included in direct investment and other equity. Reinvested earnings consist of the direct investor's share (in proportion to direct equity participation) of profits not distributed as dividends to subsidiaries or associates and profits of affiliates not transferred to the direct investor. If such income is not determined, all income of the branch is

considered to be conditionally distributed. Since retained (reinvested) earnings lead to an increase in investment capital in subsidiaries and branches, these incomes are included in investment capital transactions in amounts equal to the corresponding entries reflected in income from direct investments.

Other forms of investment capital (or intercompany debt transactions) cover the borrowing and lending of funds, including debt securities and vendor loans, between investors on the one hand and subsidiaries, affiliates and associates on the other. Borrowings and loans from both subsidiaries and investors are reflected in receivables and payables in intercompany accounts and liabilities, respectively. Unlike direct and portfolio investments, other investments (loans and borrowings) do not distinguish between short-term and long-term investments.

However, there may be cases of reverse investment when a company with foreign capital shows interest in the enterprise of its investor. Such reverse investment can be considered as compensation for the capital invested by the investor. The recipient country records such investments in its reports as FDI imports, regardless of whether these are reverse (reverse) investments or forms of equity participation. The country of origin of reverse investments records them as FDI exports. Reverse investment in the form of other instruments in their country of origin should be treated as direct investment abroad in the form of other capital. When the equity interest is >10% in both directions, two direct investment links are established. Such transactions are recorded as direct investments and liabilities in both directions.

Intercompany transactions by affiliated banks (custodian institutions) or affiliated financial intermediaries (such as securities dealers), including special purpose vehicles that act as financial intermediaries, are treated as investment capital and are limited to transactions involving permanent debt (debt capital, representing a fixed share), and in the case of branches, fixed assets. Deposits, other assets and liabilities related to the normal banking operations of depository institutions and financial intermediaries are classified as portfolio or other investments, as the case may be. Stocks of foreign assets and liabilities of banks and other financial intermediaries (international investment position) should be considered in parallel.

Transactions through special purpose vehicles (except as previously discussed) are included in investment capital transactions and the related assets and liabilities are covered by the direct investment position.

Investment capital transactions include those that create or terminate investments, as well as those that serve to maintain, expand or reduce investments. Therefore, the acquisition of >10% of the shares of a foreign entity, or the right to vote in the management of that entity, by a non-resident individual or legal entity with no prior equity interest in an existing resident entity, should be treated as a direct investment. If a non-resident owns <10% of an enterprise's shares as

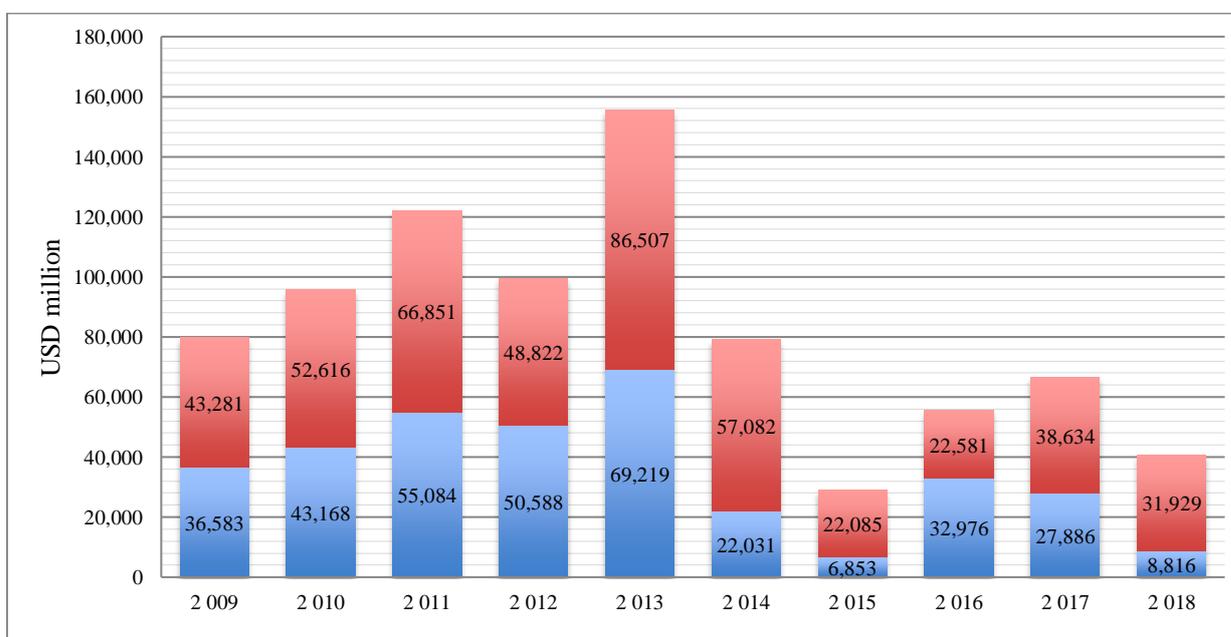
a portfolio investment and subsequently purchases additional shares, which increases its share to >10% in direct investment, only the purchase of additional shares is treated as a direct investment transaction. Previously acquired assets that were not previously reflected in the balance of payments should be reflected in the reclassification from portfolio investment to direct investment in the international investment position.

1.2 Methodology for accounting for foreign direct investment of the Bank of Russia

1.2.1

Statistics on FDI inflows to Russia

The largest volume of FDI inflows in 2018 was recorded since the first quarter (7.8 billion USD) (see Figure 1). In the second quarter, inward FDI declined to \$2.38 billion. The lower level of investment inflows, in particular, was affected by the decision of the Turkish Makyol to refuse to participate in the construction of the Central Ring Road in the southeast of Moscow [2]. Nevertheless, among the factors supporting investment activity in the first half of the year, one can single out the attraction of \$ 1 million by the photo application Prisma to the new Capture Technologies project from the American funds of General Catalyst, KPCB [3], the purchase of the Chinese Fosun International in May 2018, 20% of the Russian agricultural platform Prod.Center [4], as well as the acquisition by the Russian-German Chamber of Commerce of an office with an area of over 1000 sq. m in the Fili Grad business center (the deal amounted to 3.5 million euros) [5].



Note - compiled by the authors according to the Central Bank of the Russian Federation, 2019.

Figure 1 - Foreign direct investment flows in Russia in 2009 - 2019

The third quarter is characterized by a net outflow of FDI abroad, which can be partly

explained by the completion of transactions for the sale by American investors of shares in companies associated with O. Deripaska, such as En +, UC Rusal and GAZ Group [6], [7]. However, FDI inflows were again recorded in the fourth quarter (up to USD 1.42 billion).

The EU countries have traditionally become the largest investors in Russia. At the same time, Germany became the most representative European investor. Currently, more than 2.6 thousand German enterprises operate in Russia, the total volume of FDI of which exceeded 3.2 billion euros in 2018 [8].

1.2.2

Attracting FDI to the regions

At this point in time, FDI is distributed extremely unevenly across the territory of the Russian Federation. The distribution of FDI depends on the gross regional product (GRP) of the Russian regions. According to the Ruslan database, at the beginning of 2019, out of 36.5 thousand Russian enterprises with a foreign owner, a large share of them accounted for such regions as Moscow, the Moscow Region, St. Petersburg and the Leningrad Region.

In this regard, a separate priority of the Russian Government is to attract FDI to the peripheral regions of Russia. In particular, in 2018 the Government took measures to attract FDI to the Far East as part of the reduction of investment barriers in the region. Thus, one of the measures was the simplification of the visa regime for citizens of the Asia-Pacific countries through the use of electronic visas. First of all, this will concern those countries that are interesting for Russia in terms of investment [9].

1.2.3

International practices in the statistics of the Central Bank of the Russian Federation

Currently, there is a single methodological framework, which is mainly used by the EU and EAEU countries to determine and record FDI in national accounts. Thus, the central banks of the EU countries and the EAEU introduced the requirements provided for by the IMF Guidelines on the balance of payments and the international investment position (BPM-6 / BMD-6) [10].

It follows the general economic concepts set out in the System of National Accounts 2008 (2008 SNA) as well as the OECD reference definition of foreign direct investment (BPM-4/BMD-4) [11].

According to the IMF and OECD definitions, foreign direct investment (FDI) reflects the purpose of obtaining a long-term interest by an entity resident in one economy (direct investor) in an enterprise that is resident in another economy (direct investment enterprise). The continued interest is associated with a long-term relationship between the direct investor and the direct investment enterprise and a significant degree of influence on the management of the latter. The

degree of influence is measured by the share of a direct investor in 10% or more of the capital of the company.

The BPM6 uses the asset/liability principle as well as the directional principle to provide information on FDI volumes, as well as information on principal debt. The asset/liability principle is used for balance of payments purposes and international investment position (IIP) determination. The directionality principle, which is defined according to the direction of the relationship with foreign direct investment (domestic, foreign direct investment in the reporting economy, and foreign outward investment), is the principle used in the Coordinated Direct Investment Survey (CDIS), which ensures the completion of national FDI statistics [12]. For the purposes of this study and for all Russian FDI statistics, the directional principle recommended by BPM6 is used.

The principle of directionality is the main rule for the analysis of FDI and in the case of the OECD. This rule applies to direct foreign investment of the respondent country abroad and direct investment of non-residents in the respondent country. The main international institutions that publish FDI data (Eurostat, OECD, UNCTAD) also follow the directional principle. This principle is also applied in many academic databases on FDI, such as WIIW [13].

1.2.4

Methodological features of the OECD

Most EU FDI statistical systems comply with the OECD standards for FDI statistics, which are reflected in the BMD-4 reference definition of foreign direct investment (FDI) and set the global standard for FDI statistics. It is fully comparable to BPM-6. The basic concepts and definitions applicable to cross-border investments are fully consistent with those established by BPM6. These standards introduce new reporting methods for financial performance for private equity, taking into account the impact of globalization and changing funding models for multinational enterprises (MNEs). The OECD defines for the first time a chapter on the economic activities of MNEs, as well as a chapter on the use of FDI statistics.

The main advantage of the OECD FDI statistics collection methodology is the disaggregation of FDI data by Special Purpose Enterprises (SPEs) and Resident Companies presented in BMD-4. This makes it possible to identify FDI associated mainly with the physical presence of resident companies and exclude SPEs. The idea is that SPEs (ie companies owned by foreigners with no economic activity and most of whose assets are foreign shareholdings) can often distort FDI statistics. First, SPE transactions inflate FDI flows out of and into the country in which they are located. Second, SPEs can statistically distort the geographic distribution of FDI across countries, as they may appear to receive investment from countries whose investors simply transfer capital through SPEs.

However, only a few EU member states publish data on FDI flows and stocks, excluding SPEs. Eurasian countries do not disaggregate FDI data by Special Purpose Enterprises (SPE)* and resident companies. However, national data on foreign direct investment from EU countries show that most of the mutual flows of foreign direct investment from Russia, on the one hand, and France, Germany and Italy, on the other, are associated with the physical presence of the investor. The same trend was observed for Ukraine, Azerbaijan and Kazakhstan in the case of Germany and France as investment partners.

1.2.5

Disadvantages of FDI statistics in Russia

Russian FDI statistics do not fully comply with the requirements of the IMF BPM6 Guidelines. In particular, there is no significant part of the indicators characterizing financial derivatives, namely, financial derivatives in bank operations (except for foreign exchange market instruments). Secondly, full coverage of transactions with financial assets that are carried out by resident households outside the Russian Federation is not provided. Thirdly, the statistics do not include non-cash settlements of resident individuals on accounts opened with foreign banks, as well as the movement of other forms of financial assets of residents abroad. Fourth, there is incompleteness of data on the category of "reinvestment of income" (information from publications of financial statements of companies, the list of which may not be complete). This causes the absence of corresponding output data in the balance of payments and the international investment position.

1.3 Advantages and limitations of using FDI statistics at the enterprise level

Foreign investment is the most sensitive part of investment in the economy as a whole, which, in turn, is considered as a leading indicator of the state of the economy.

Portfolio investment is the investment of capital in foreign securities that do not provide the investor with the rights of actual control over the investment object. They are an easier and therefore more common way to raise funds. The value of portfolio investment far exceeds the scale of the international movement of direct investment. For 2001-2018 the total volume of accumulated world portfolio investments increased from 12.7 to 57.5 trillion US dollars (their share in world GDP - from 37.9% to 67.9%), while investments in shares increased from 5.2 to 29.2 trillion USD, into long-term and short-term debt - from 6.4 to 24.8 trillion USD and from 1.1 to 3.5 trillion USD, respectively (Table 1). According to UNCTAD data, the volume of global accumulated attracted foreign direct investment (FDI) over the same period changed from 7.5 to 32.3 trillion US dollars [14].

Table 1 - Dynamics of world portfolio investments in 2001-2018, trillion US dollars

Types of investments	2001	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018*
The total amount of portfolio investments, incl.	12,7	26,1	40,6	39,4	43,7	48,1	48,9	50,3	52,3	61,8	57,5
in shares	5,2	10,6	15,6	14,5	17,0	20,8	22,3	23,3	24,7	31,7	29,2
into debt obligations	7,5	15,4	25,0	24,9	26,6	27,3	26,6	26,9	27,6	30,1	28,3
of them: long-term	6,4	13,5	21,9	22,0	23,7	24,3	23,6	23,9	24,7	26,6	24,8
short-term	1,1	1,9	3,1	3,0	2,9	3,0	3,1	3,1	3,0	3,6	3,5
Ratio of total portfolio investment to world GDP**, %	37,9	54,8	61,5	53,8	58,5	62,6	62,0	67,3	69,1	77,1	67,9

Note

1. * – data for the middle of the year;
2. ** - at the exchange rate.
3. Source: based on [15], [16].

The purpose of direct investment is to obtain not only long-term profits, but also a significant say in the management of the enterprise. In most definitions, having a direct investment relationship is defined as holding 10% of common or voting shares. According to the Reference Definition for Foreign Direct Investment (FDI) developed by the Organization for Economic Cooperation and Development (OECD), direct investment is “a category of international investment made by a resident in one country (a direct investor) with the aim of realizing its long-term interest in an enterprise (an enterprise - recipient of direct investment) that is a resident of a country other than the country of location of the direct investor” [17]. The main motive for a direct investor is to exert a certain influence on the management of the FDI recipient enterprise, which often translates into control over its activities. The presence of this motive is the main distinguishing feature of foreign direct investment from international portfolio investment.

Direct investment can play the role of an active stimulator of economic growth. Many countries are interested in attracting FDI to their economies in order to modernize existing or create new enterprises, maintain an equilibrium in the balance of payments, and increase the competitiveness of the economy. At the same time, the positive effect of direct investment for developed countries is practically not disputed in the economic literature, while the results of studies for developing countries are less clear.

From the point of view of doing business, there are three types of foreign direct investment: horizontal, vertical and complex.

Horizontal FDI (horizontal FDI) is an investment made by a home country company in an enterprise of a similar production and technological type and level abroad. This type of investment is also called market-oriented, and the main motive for their implementation is access to foreign markets, due to the need to reduce costs, for example, those associated with transport costs and trade barriers (customs tariff and non-tariff restrictions) [18].

Vertical FDI (vertical FDI) or resource-oriented investments refers to international companies that divide the production process vertically (into production stages) in a geographical aspect. Vertical reverse FDI (backward vertical FDI) involves the acquisition or creation of an enterprise in another country as its own supplier of production factors - raw materials, labor, etc. An example of this kind of investment is a car company receives a controlling stake in a tire manufacturer or becomes the owner of a rubber plantation. In the case of forward vertical FDI, foreign affiliates of MNCs / TNCs are created, standing in the value chain after the parent company, which in this case acts as a supplier of components / components necessary for foreign production. Such FDI also brings the parent company closer to the overseas market by investing in a sales network that promotes, markets and maintains its own products (for example, Toyota buys a car dealership in America).

The main differences between market-oriented FDI and resource-oriented FDI are presented in the table below (Table 2).

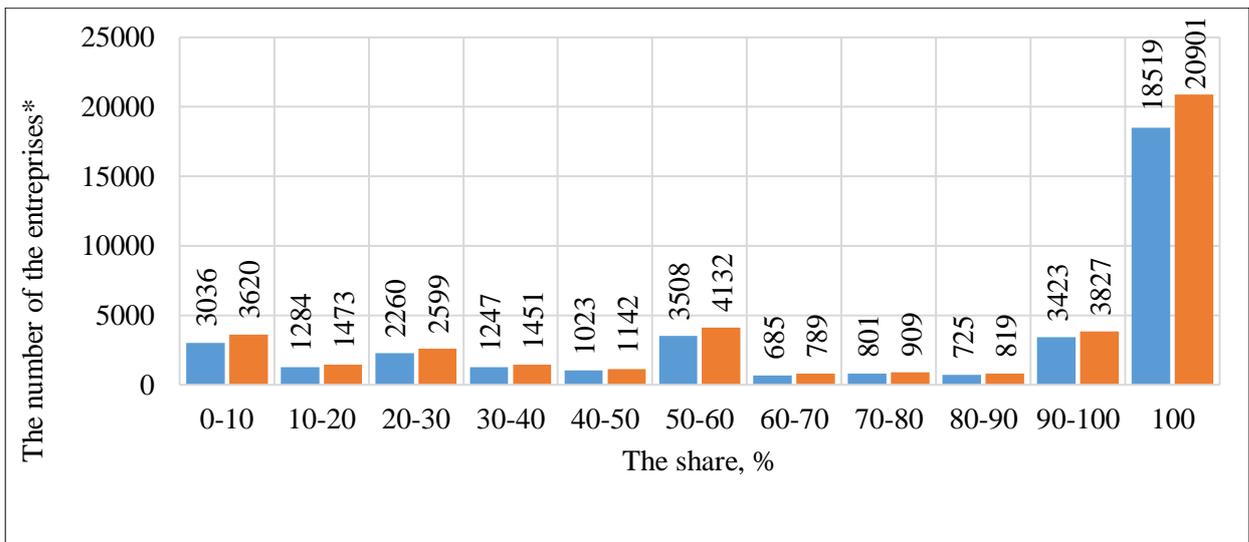
Table 2 - Main characteristics of horizontal and vertical FDI

Характеристики	Горизонтальные (рыночно-ориентированные) ПИИ	Вертикальные (ресурсно-ориентированные) ПИИ
Причины, мотивы и цели	Доступ на новые (зарубежные) рынки; Высокие транспортные расходы и торговые барьеры	Дешевые факторы производства
Ответ на вопрос	Как осуществить сбыт продукции на зарубежные рынки	Как лучше минимизировать издержки

Note - based on [19].

The purpose of platform FDI (Platform FDI) is access to the market or resources not only of the target country of investment, but also of third countries. Such investments are made in order to optimize costs. They are typical for countries located in the same region or are members of a regional (integration) grouping. Complex-vertical platform FDI have signs of vertical investments, export-platform investments - both market-oriented and resource-oriented FDI.

According to the data obtained from the RUSLAN DB, the majority of Russian enterprises (over 75%) are wholly owned or controlled by an established foreign shareholder - the global ultimate owner (GCU). Enterprises with a share of foreign capital in the range of 10-50% make up about 15% of the total number of enterprises with a foreign shareholder (see Figure 2).



Note:

1. * - excluding subsidiaries.
2. Source: based on [20].

Figure 2 – Number of Russian enterprises with foreign GCS

Most of the enterprises with foreign GCS (36,531 in total) are located in four constituent entities of the Russian Federation: two federal cities - Moscow and St. Petersburg - as well as in the Moscow and Leningrad regions. In the sectoral context, they are represented mainly by service sector enterprises. In the geographical structure of enterprises with foreign GCS, there are four groups comparable in size: the EU, Cyprus, offshore jurisdictions and other countries.

In 2017, Russian enterprises with foreign GCS accounted for about 11% of Russian exports (or \$42 billion) and 38% of Russian imports (or \$86 billion). The proportion of exporters and importers among enterprises with foreign GCS is higher than among enterprises with a Russian owner. Enterprises with GCS from the EU to a large extent stand out in terms of involvement in foreign trade activities (see table 3).

Table 3 - The degree of involvement of Russian enterprises with foreign GCS in foreign trade activities

Country (group of countries) GCS	Share of exporters	Share of importers	Share of exporters and imporeters
Russia	0,8%	1,8%	0,4%
Cyprus	6,4%	10,3%	3,5%
Offshore	5,5%	10,4%	4,1%
EU	17,8%	39,9%	15,5%
Other countries	2,5%	5,6%	1,7%

Note - based on [20].

The structure of exports of FDI enterprises with GCS from Cyprus and offshore is more similar to the structure of exports of companies with GCS from Russia, and in the structure of

their imports the share of capital goods is less than for Russian enterprises (see Table 4).

Table 4 - The structure of exports of Russian enterprises with foreign GCS by countries and categories of goods, depending on their purpose

Country GKS	Indefinite class		Consumer goods		Capital goods		Intermediate goods	
Russia	20,6%	1,5%	2,1%	23,9%	2,7%	35,1%	74,6%	39,5%
Cyprus	28,3%	0,3%	1,6%	28,9%	0,6%	22,9%	69,5%	47,9%
offshore	20,2%	0,2%	1,8%	37,8%	0,4%	19,2%	77,5%	42,8%
EU	3,8%	7,6%	7,9%	28,4%	6,8%	26,5%	81,5%	37,6%
Other countries	5,6%	8,2%	9,5%	27,4%	2,8%	22,7%	82,1%	41,6%

Note - Source: compiled by the authors based on [20].

Enterprises with foreign GCS are, on average, twice as efficient as enterprises with Russian GCS in terms of labor productivity.

The revenue per employee of an enterprise with GCS from the EU is on average significantly higher than at enterprises with GCS from Russia (by 2.3 times), and enterprises with GCS from Cyprus and offshore are superior in terms of labor productivity to enterprises with Russian GCS by 2 and 1, 8 times, respectively.

Примечание – составлено на основе [20].

2 Approaches to modeling firms' decisions about foreign direct investment

2.1 Theoretical approaches to modeling foreign direct investment decisions

There are several models for foreign direct investment by firms. One of them, the monopolistic advantage model [21], states that a foreign investor will make foreign direct investment in the local market only if he has monopolistic advantages, since he is in a knowingly less advantageous position than the local producer. The monopolistic advantages of a foreign investor may be associated with imperfect competition in the local market, the availability of unique technology, easy access to borrowed capital, economies of scale in production, the availability of benefits from the state, etc. The product life cycle model [22] assumes the presence of four stages of production:

- monopoly production and start of export;
- the emergence of a similar product from competitors and their sale in the markets of their countries;
- entry of competitors with a similar product to the markets of third countries;
- entry of competitors to the market of the pioneer country.

Already at the second stage, a pioneering company can decide on investments to extend the life cycle of its product and level out foreign competitors in the markets of their countries. The internalization model [23] implies that, formally, foreign direct investment is part of intracompany transfers between subdivisions of international corporations. In addition, firms prefer to invest directly rather than export or enter into management contracts, because in this case, transaction costs are significantly lower. The Marxist model of foreign direct investment suggests that the motive for FDI is the desire of large companies to export capital abroad. At the same time, FDI monopolies have advantages over local producers due to their technological, production and financial strength.

The most complete theoretical model of FDI is the eclectic model [24], which incorporates many of the postulates of the models described above. According to the eclectic model, a firm enters into foreign direct investment when three conditions are met simultaneously:

- the firm has specific advantages over local producers;
- more efficient use of resources in the country of destination of investments, for example, due to the cheapness of production factors, economies of scale, benefits from the state, etc.;
- the firm has the advantages of internalization, i.e. it is more profitable for it to use these advantages in the country of destination of investments than to export goods and knowledge to it.

R. Aliber [25] was a serious critic of the eclectic paradigm. According to Aliber, the key attribute of an MNC is not the fact that it participates in foreign production, but that it finances at least part of this production in its own national currency. Thus, it is primarily interested in the export of direct investment as a means of financing foreign investment, and not as a channel through which the enterprise transfers non-financial resources between countries and controls the use of such resources after they are transferred. Rather, the uniqueness of an MNC lies in its ability to dominate its geographically dispersed assets in different currencies and thereby exploit structural or transactional weaknesses in international capital and foreign exchange markets.

However, it cannot be said that Aliber's thesis is incompatible with the eclectic paradigm. The fact that firms, due to their presence abroad, may be able to express their assets and goods in different currencies may give them a competitive or specific advantage over foreign firms. This advantage will be all the more pronounced the greater the degree of structural or transactional failure in international capital markets and/or exchanges. However, these benefits alone are not sufficient to explain the volume or distribution of FDI. For example, expected returns (other than those arising from the internalization of imperfect financial markets) do not depend on the locations in which investments are made and on the ability of MNEs to appropriate economic rents by internalizing non-financial markets.

Another critic of the eclectic paradigm is Kojima [26], whose theory of foreign direct investment is an extension of neoclassical trade theory to cover cross-border transactions with intermediate products (eg technology, management skills, etc.). It is primarily a normative theory that sees MNCs as a tool by which the comparative trade advantage of nation-states can be better developed. Hence his prescription that the home country should invest abroad in sectors that require intermediate (but internationally mobile) products; but it is necessary can be combined with non-mobile resources in which the host country is relatively well endowed. In this case, FDI acts as a catalyst for trade and as an arbitrator for improving the international distribution of economic activity. Kojima criticizes the eclectic paradigm for being too business-oriented and argues that it has limited application for policy making in the sending or receiving country. However, many of the normative implications of the eclectic paradigm are entirely consistent with Kojima's recommendations. This is especially true for resource-based investment and import substitution, where the export of MNCs of intermediate products to countries best suited to participate in further value-added activities either circumvent artificially imposed barriers to trade or better promote the dynamic comparative advantage of participating countries.

The following is a theoretical model in which the price of intermediate goods plays a decisive role in determining a firm's incentives to FDI [27].

Two segmented markets are considered: domestic (h) and foreign (f). Domestic and foreign firms produce final goods y . To produce one unit of final good, one unit of intermediate good (or service) z is required. Let unit selling costs of good y be defined as t . Clearly, these trade costs favor FDI over exports. The (inverse) demand curve for final good y in country j is $p_j = \alpha_j - x_j$. The intermediate good z is also produced by the monopolist in each country. The price of the intermediate in country j is w_j . Producers of intermediate goods in the model are called suppliers, and producers of final goods are called downstream firms or simply firms. The model is a three-stage game. In the first stage, firms simultaneously decide how to serve the market abroad: each of them can sell abroad either through exports or by producing goods abroad through FDI. Further, domestic and foreign suppliers choose their prices simultaneously. Finally, firms choose the quantity to produce, and consumption occurs. Firms are assumed to supply intermediate product z locally—when exporting, the firm buys the intermediate product from a supplier in its own country, while in FDI it receives it from a foreign supplier. This local source assumption reflects the idea that inward FDI in the production of the final good creates demand for the local supplier. This demand effect may be one of the reasons why many countries impose local content requirements on multinational corporations.

The production of most manufactured goods requires a few intermediate goods, many of which are only marginally tradable. The underlying model is that manufacturers obtain some intermediates locally due to policies or restrictions. Production almost always requires some non-traditional resources. As long as tradable intermediates complement those supplied locally, the effects in the model will persist. More generally, for effects to be significant, suppliers of intermediate products must have some bargaining power, and the end product in question must be an important source of demand for intermediate goods. Let the output supplied by firm i in market j be x_{ij}^k , where $i \in \{h, f\}$ denotes a local and foreign firm, and $j \in \{h, f\}$ denotes a domestic or foreign market. Superscript k , where $k \in \{\varepsilon\varepsilon, \varphi\varphi, \varepsilon\varphi, \varphi\varepsilon\}$ denotes the mode by which two firms serve two markets. For $\varepsilon\varepsilon$, both firms export; at $\varphi\varphi$, both firms carry out FDI; at $\varepsilon\varphi$ ($\varphi\varepsilon$), the domestic (foreign) firm exports, while the foreign (domestic) firm engages in FDI. Although this is often observed in practice, in the proposed model no single firm decides in favor of simultaneous exports and FDI.

In intra-industry trade, both firms export to each other's markets and consume intermediate goods from suppliers in their own country. Cournot competition implies that

$$x_i^{\varepsilon\varepsilon} = \sum_j x_{ij}^{\varepsilon\varepsilon}, \text{ where (1)}$$

$$x_{ij}^{\varepsilon\varepsilon} = \frac{\alpha_j - w_j - w_{-j} - \tau}{3} \quad (1)$$

Since one unit of intermediate goods is required per unit of final good, and all intermediate products are used locally, the quantity produced by firms is equal to that produced by suppliers. The two suppliers simultaneously choose their prices to maximize their respective profits: $v_j = w_j x_j^{\varepsilon\varepsilon}$. The first order condition for producer j is: $w_j = \alpha w + 2w_j - \tau$, where $\alpha w = \alpha_h + \alpha_f$ is the size of the world market.

While suppliers do not directly compete with each other, they do compete indirectly. The price charged by each supplier directly affects the costs of any firm, and therefore affects its market share. For example, if a domestic supplier increases its price, the value of the domestic firm increases and it loses market share to the foreign firm. As a result, the demand curve faced by the foreign supplier increases its price (although it does not correspond to the increase in the prices of the domestic firm).

Simultaneous solution of the first order conditions of two suppliers gives the equilibrium price of the intermediate good (2):

$$w_j^{\varepsilon\varepsilon} = \frac{\alpha_w - \tau}{6} \quad (2)$$

Although intermediate products are not traded and supplied locally, and market sizes may vary from country to country, in bilateral exports the equilibrium price of the intermediate product is the same in both countries. Processors sell in both markets, so the derived demand curve faced by suppliers is the same in both markets. The equilibrium profit of a domestic firm is determined by the following formula (3):

$$\pi_j^{\varepsilon\varepsilon} = (p_h - w_h^{\varepsilon\varepsilon})x_{hh}^{\varepsilon\varepsilon} + (p_f - w_h^{\varepsilon\varepsilon} - \tau)x_{hf}^{\varepsilon\varepsilon} \quad (3)$$

Next, we consider the case when both firms export, but the domestic firm is evaluating the possibility of investing in a foreign market.

A domestic firm will be motivated to invest if the difference between its profits from FDI and exports is positive, provided that its competitor continues to export. (4):

$$u_h \equiv \pi_h^{\varphi\varepsilon} - \pi_h^{\varepsilon\varepsilon} \quad (4)$$

The derived demand faced by the domestic supplier is derived from the output produced by the domestic firm in the domestic market. (5):

$$x_h^{\varphi\varepsilon} \equiv x_{hh}^{\varphi\varepsilon} = \frac{\alpha_h - 2w_h + w_f + \tau}{3} \quad (5)$$

while the derived demand curve faced by the foreign supplier is derived from the output produced by the foreign firm (for both markets) as well as the output produced by the domestic firm through FDI (for the external market). Suppliers set their own prices in order to maximize their own profits and first order conditions for the domestic market: $4w_h = \alpha_h + w_f + \tau$, and for foreign suppliers this condition is: $8w_f = 2\alpha_f + w_h - 2\tau$. First-order conditions imply upward slope

response functions: an increase in the price charged by one supplier causes another to raise the price. These first-order conditions are easily solved for finding equilibrium prices for an intermediate good.

Given the symmetry of markets, FDI by a domestic firm leads to an increase in the price of an intermediate good in both markets. The profit of the foreign supplier rises due to foreign direct investment of the domestic firm, while the profit of the domestic supplier may increase or decrease. The profit of the foreign firm falls.

FDI creates a discrepancy in the price of an intermediate product in the two markets. The decision of a domestic firm to move production abroad shifts the demand curve faced by the foreign supplier and shifts the demand curve faced by the domestic supplier. The changing demand conditions faced by suppliers suggest that the price of an intermediate product in the domestic market should fall, so why is it rising instead? In addition to the demand effect described above, FDI also has a policy effect, which works as follows. The demand effect shifts the foreign supplier's response function outward, causing the foreign supplier to raise the price. But since the price of the domestic supplier is an increasing function of the price of the foreign supplier, the domestic supplier also raises his price despite the decline in demand for his product. The foreign supplier benefits more from increased demand and a higher equilibrium price. Whether or not a domestic supplier will lose from FDI depends on whether the demand effect or the policy effect dominates. An increase in the price of an intermediate product worsens the position of the foreign firm by increasing its value. The domestic firm anticipates the impact of its FDI decision on the price of the intermediate product in both markets and takes this impact into account when making this decision. As the volume of the external market increases, the price of the intermediate increases faster than that of the domestic intermediate, which weakens the one-sided incentive for FDI. Let the formula (6)

$$w^{\varphi\varepsilon} \equiv \frac{w_f^{\varphi\varepsilon}}{w_h^{\varphi\varepsilon}} = \frac{5\alpha_h - 7\tau + 8\alpha_f}{9\alpha_h + 6\tau + 2\alpha_f} \quad (6)$$

describes the foreign price in relation to the domestic price of an intermediate good. With unilateral foreign direct investment, the relative price of a foreign intermediate good rises sharply in the foreign market.

Demand-driven FDI effects determine this property, which is central to the model. The demand for a foreign intermediate good is related to the sales of the foreign firm in both markets and the domestic firm's sales in the foreign market, while the demand for the domestic intermediate good

comes only from the domestic firm's sales in the domestic market. Thus, as the size of the foreign market increases, the demand for the foreign intermediate increases relative to the demand for the domestic intermediate. The resulting increase in the relative price of the foreign intermediate affects the incentives for FDI for both firms.

Another premise of the model is that a firm from a country with a smaller market has a stronger unilateral incentive for foreign direct investment. FDI can be in the interest of a firm for two reasons. First, through FDI, savings on trade costs are achieved. Second, as the foreign intermediate becomes relatively more expensive, foreign direct investment by the domestic firm causes a greater increase in the value of the foreign firm, whose exports to the domestic market are reduced as a result. In other words, outward FDI can help a firm protect its territory by acting as a cost-increasing strategy. A firm that exports to a larger market has a stronger incentive to save trading costs and also benefits more from the cost effect of FDI, so it has a stronger one-sided incentive to FDI.

Wealth is expressed as the sum of the profits of the domestic firm, the domestic supplier of intermediate goods, and consumer surplus. (7):

$$\omega_j^{\varphi\varepsilon} \equiv \pi_j^{\varphi\varepsilon} + v_j^{\varphi\varepsilon} + cS_j^{\varphi\varepsilon} \quad (7)$$

Domestic consumers lose out on FDI because of the strategic effect on the supply market – as both suppliers increase their prices, downstream firms reduce output, and the price of the final product increases.

The third premise of the model is as follows. When markets are symmetrical, foreign direct investment by a domestic firm leads to higher prices in the domestic market, and also to higher prices abroad if the market is large enough. The level of well-being inside the country is declining, while the level of well-being abroad is growing. In addition, global wealth is declining compared to the situation of bilateral exports.

Bilateral FDI increases competition between firms compared to unilateral FDI because firms avoid trading costs. It can be expected that this increased competition will contribute to the growth of prosperity. However, this is not entirely true, since FDI increases competition in the market for final goods, but reduces competition in the market for intermediate goods. Bilateral FDI protects suppliers in both countries from competing with each other, as two firms receive the output destined for each market from a supplier in that market. On the contrary, when exporting, suppliers of intermediate goods are forced to compete indirectly with each other, since their choice affects the competition between sellers.

Thus, compared to unilateral FDI by a domestic firm, bilateral FDI increases wealth at home, reduces wealth abroad, and reduces global wealth.

2.2 Empirical approaches to identify patterns in foreign direct investment

An extension of the eclectic FDI model described above is the work of Cottaridi et al. [28] by taking into account the institutional factors of the FDI destination country. Greece is used as the country of consideration due to low competitiveness and unfavorable business environment, political corruption, weak institutions and a weak tax system. The relevant reports indicated that tax rates in Greece in all categories are among the highest in Europe [29]. Over the past 15 years, not only in Greece, but also in many countries of the early European Union, there has been a deterioration in institutions, with the worst declines occurring in Greece, Italy and Spain.

The authors argue that the regulatory framework in both the home country and the host country is relevant to firms originating in developed countries [28]. This statement is consistent not only with traditional institutions, but also with neo-institutional theory. Thus, weaknesses in domestic regulation are shaping the reaction of investors in developed markets to internationalization through foreign direct investment (as in emerging economies) in search of effective and/or legal regulatory frameworks abroad. In this internationalization, reliable rules for potential investors are very important. Thus, one testable hypothesis is that host country regulatory quality is highly positively associated with FDI from firms originating in developed countries that face regulatory deficiencies in their own country.

Moving abroad entails transaction costs due to the institutional environment of the host country; consequently, firms are willing to work in the local economy [30] to obtain the necessary knowledge [31]. Previous presence in the host country includes a unique set of resources and capabilities [32], which subsequently affects the implementation of FDI [33]. The firm's pre-existing operations in the host market are included in the model as an ownership advantage (O), which reflects the degree and quality of engagement with local institutions. The logic is this: firms facing adverse regulation in their home country choose to expand FDI in search of a secure regulatory environment. Once internationalized, they exploit the sensitive cultural and institutional aspects of the host country's economy, which reduces transaction costs. All knowledge gained from the previous presence of MNCs in the host country is considered as an advantage in transactions $[(O)]_t$. The benefits of a firm may include knowledge of institutions, among others, since familiarity and alignment with institutions can reduce coordination and other transaction costs [34]. Empirical work has identified previous foreign experience as an important factor in internationalization. However, these studies either did not distinguish between international actions (be it FDI, exports, etc.) or studied developing countries such as China [35]. Moreover, the existing research has not taken into account the discussion of the development of benefits by increasing knowledge about institutions. In other

words, given the initial motivation of firms to move abroad through FDI, developing such advantages in host countries through institutional knowledge and alignment with institutions is critical for investors.

Research provides evidence that their presence can be determined by the institutions of a particular location (L). In particular, research has shown that, since strong institutions in the host country may enable firms to acquire sufficient knowledge of the local market [35] and the information necessary for their activities [36], the dependence of the firm on a pre-existing presence in the country may not affect investors [35]. However, the authors of the reviewed paper question these findings and suggest the opposite effect: in the context-specific setting of unfriendly rules in the home country, well-designed rules of potential host country markets help to increase further opportunities for risk-taking by reducing information asymmetries and regulatory uncertainty associated with investment projects [28]. This regulatory host context further reinforces the benefits accumulated by pre-existing local firms. On a more analytical level, the suggestion is that investors from developed markets with specific regulatory challenges choose to internationalize to avoid these issues, seeking to seek secure regulatory conditions abroad. Once they have made an investment decision, they begin to accumulate knowledge about the host country and develop their advantages, which further reduces the coordinating and operational costs [34], thereby providing a stronger incentive for FDI. So, the second hypothesis is that knowledge of the host country, accumulated as a result of prior presence, is strongly and positively associated with FDI from firms originating from developed countries that face regulatory deficiencies in their own countries, and this effect is the higher, the higher the level of regulatory quality of the host country.

Another significant L-factor is corporate taxation, which is part of the regulation. It has been found that corporate taxation, although highly relevant and well studied in empirical research, is ignored in empirical work on the eclectic paradigm. The host country location advantage, which translates into a favorable tax environment, can be translated into an ownership advantage in the sense that MNCs may already enjoy certain ownership advantages, such as corporate income tax avoidance schemes [37]. Corporate taxation and the tax treatment of foreign corporate income are likely to influence differences between pre-tax and post-tax FDI rates of return [38], increasing or decreasing the benefits associated with ownership. Despite numerous studies, the empirical study of the relationship between the tax environment and FDI is not conclusive. The authors of this article explore the role of corporate taxation as a special L-advantage, which is closely related to the overall institutional quality of potential host countries [39]. The political and administrative feasibility of levying certain taxes may depend on specific economic conditions, which may influence the scope and direction of government activities [40],

such as the modernization of institutions. It is also possible that, in the presence of regulatory deficiencies, firms may use legal loopholes to reduce their tax burden if they believe the cost is excessive. In this vein, institutions and taxation are closely related because tax revenues can contribute to better institutions. Conversely, weak regulation can lead to tax evasion, especially if firm owners perceive existing institutions as unfriendly.

Although the empirical literature has examined in detail the effects of taxation on international investment using various methodologies [41], none of these studies have considered the combined effect of taxes and the quality of institutions on foreign investment. It is assumed that investors from troubled countries, faced with poor institutions and high taxation, seek better regulation and lower tax rates abroad. If they can overcome regulatory gaps by operating in host countries with established regulatory environments where they can easily follow the “rules of the game”, these firms will be willing to accept higher corporate tax in the host country. Available international reports have shown that where a higher tax burden corresponds to well-developed institutions in the host country, there is attractiveness for business, competition from countries with relatively low taxes that do not have such advantages no longer seriously influences the choice of location, i.e. • low taxation cannot compensate for a weak or unattractive institutional environment for foreign direct investment. Thus, the final hypothesis is that lower host country corporate tax rates are positively associated with FDI from firms originating in developed countries that face regulatory deficiencies or high taxation, but this effect is lower at higher levels of host regulatory quality. countries.

The study under consideration was conducted on a sample of Greek MNCs. The different sectors of Greek MNEs and countries of destination are taken into account, as well as the time when the investment took place. Given the rather long time span of ten years, the authors were able to identify the specific strategic motivations of firms in Greece, but these motivations generalize to similar developed markets with the particular disadvantages in FDI that the developing country literature predicts. Three subsets of variables proposed by the eclectic paradigm are used, but most of them are the motives of multinational firms. Therefore, the advantages of ownership and location are taken into account. The dependent variable measures the total capital stock of each parent company abroad, either for a new affiliate or an established company registered with the Bank of Greece. One set of explanatory variables includes firm-specific variables O (ownership advantages), in particular transactional advantages O_t (before knowledge of the market as knowledge of formal and informal institutional norms). The second set of variables looks at location benefits L, focusing on corporate taxation and institutional quality.

Benefits of owning O

Transactional advantage $[(O)]_t$ is a key variable resulting from the production capacity already existing in the market (PRIOR). Therefore, our key variable includes the number of branches already established at each location of the parent MNC as a special advantage of O_t for collecting information about institutions and tacit knowledge. Among other significant advantages, firm size is a clear advantage for transactions. It is expected that the larger the firm, the greater their internationalization. The logarithm of total assets (SIZE) is used to account for the size of a firm. The advantages of financial assets can also reinforce multinationality. MNCs have various options for raising capital. Therefore, higher leverage is expected to have a mixed effect on FDI decisions. The explanatory variable uses short-term and long-term debt in relation to equity as a measure of leverage (LEV). Gross profit margin is a profit margin that indicates a firm's operating efficiency as well as its pricing policy. The higher the gross profit, the more efficiently companies can organize their resources needed for foreign activities. Therefore, a positive effect of the gross profit margin (EFF) on the international investments of companies is expected.

Benefits of location L

Within the advantages of location, the role of corporate taxation and the regulatory context is most interesting. The role of taxation (TAX) is fixed through the corporate tax rates of host countries. A composite index is used that captures overall regulatory freedom (REG) as a measure of regulatory conditions. It also uses the index of economic freedom published annually by The Heritage Institute and The Wall Street Journal. This particular index was chosen because it covers a wide range of regulatory aspects related to other measures such as the International Country Risk Guide or the Governance Indicators. In particular, the Economic Freedom of the World reports annually on measures and ranks countries on five important dimensions: government size; legal structure and enforcement of property rights; access to safe money; freedom of trade internationally; and labor, credit and business rules. These five dimensions include ten quantitative and qualitative factors that are weighted equally (freedom of corruption, freedom of property rights, financial freedom, freedom of trade, freedom of business, freedom of investment, freedom of labor, freedom of finance, monetary freedom, and the size of government). Each of the ten points of economic freedom in these categories is scored on a scale from 0 to 100. The country's overall score is determined by averaging these ten points of economic freedom with an equal weight assigned to each indicator. A higher score represents the openness of the economy to international business, strong market institutions, ease of doing business, and financial and fiscal policies.

Traditional L-variables

While emphasis is placed on corporate taxation and institutional quality among the L-variables, it is also necessary to take into account economic factors that are widely used in FDI activities. A direct relationship between a country's market size (MARKET) and FDI has been the most widely tested hypothesis in previous studies on the determinants of FDI [42]. Economic openness (OPEN) is defined as the share of total trade in relation to a country's total GDP and describes a country's competitiveness in terms of international trade and country dependency. Trade openness can also measure the national regulatory and control environment in host countries. Labor costs are often considered negatively related to FDI inflows, especially for efficiency-oriented FDI. However, if higher labor costs are associated with higher labor quality (and hence higher productivity), i.e. if this reflects the availability of skilled workers, then labor costs will have a positive relationship with FDI. ; this relationship is particularly relevant for knowledge-intensive FDI. Thus, the model includes the average wages characteristic of host countries (WAGES). A relatively high interest rate (IRATE) in the host country has a positive effect on domestic FDI, but the direction of the effect can be reversed if foreign investors are dependent on host capital markets for FDI.

The data used for Greek OLS covers the decade from 2001 to 2010. Each parent firm may invest in more than one subsidiary, either in the same country or in different host countries; therefore, each investment year consists of several entries. Most of the companies in the sample that invest abroad are in the manufacturing industry, with the majority in food and beverage, tobacco and textiles, apparel and leather goods. Greek firms partner with subsidiaries in 66 countries, including distant or culturally distant countries such as Japan, Hong Kong, Brazil and South Africa. The global economic crisis, which began in the US in 2007 and spread to Europe in 2008, undoubtedly affected investment projects or led to the reinvestment of income in some directions. Contrary to the existing literature indicating that the Greek outward FDI of the manufacturing sector is mainly concentrated in the neighboring small economies of the Balkan region [43], the data show that in addition to food processing enterprises that do invest in neighboring Balkan economies, firms in the heavy industries (plastics and metalworking) are located in larger countries such as Spain, the UK and Romania.

The empirical model used to test our hypotheses is the following equation (8):

$$OFDI_{it} = \alpha + \beta_1 O_{it} + \beta_2 L_{it} + \mu_{it} + \varepsilon_{it} \quad (8)$$

where the dependent variable measures FDI stock *i* in year *t*. *O* includes the ownership benefits described above; *L* includes location variables; μ_{it} is a fixed effect; and ε_{it} is white

noise. Moreover, i represents the parent firm investing abroad, and t represents time, i.e. 2001–2010

Fixed effects regressions were evaluated based on the Hausman specification test. The standard robust error method was used to account for problems arising from heteroscedastic residuals; multicollinearity was tested by the variance of the inflation factor (VIF). The means of the variables were centered for more meaningful results. Thus, the coefficient for one variable is preserved at the mean value of the other variable and vice versa. Sustainability tests were carried out through sectoral analysis. The first test was carried out for the entire sample, which includes all sectors. However, the telecommunications and financial sectors are driven by very different motivations; and to test for possible distortions caused by these specific sectors, the models were tested by excluding these sectors. In addition, since the manufacturing sector makes up a significant share of the total sample, the models were estimated for the manufacturing sector separately, and the same was done for the trading sector, which also makes up a significant share of the sample.

So, the main interest is related to three specific variables: prior existence in the local environment (transactional advantage), taxation and institutional quality. The obtained coefficients are stable in all models. Empirical results confirm the first hypothesis put forward. The quality of host regulation becomes extremely important at the 1% significance level. The findings regarding the institutional conditions of the Greek MNCs are consistent with the results of studies using the same data regarding the regulatory conditions, i.e. the database of economic freedom. The quality of host country regulation is very important for firms originating in developed countries trying to avoid internal regulatory shortcomings.

The results obtained also speak in favor of the second hypothesis put forward. Among the benefits of ownership, knowledge gained from previous exposure to the host economy is consistently positive and statistically highly significant, and this effect becomes even stronger as the quality of the host country's regulatory environment improves. It turns out that the better the institutions, the more important the prior existence is for the investments of firms facing problematic regulation in developed domestic markets. In addition, the third hypothesis put forward also received support. The reduction in taxation is very important and has a positive effect on FDI, as expected. The results support the contention that corporate taxation should not be neglected in empirical research, including the benefits of ownership and location within an eclectic paradigm, but instead taxation should be among the key variables, especially for companies originating from developed countries with unique conditions. such as high corporate tax rates. In addition, the results point to the deterrent role of taxation norms. It appears that for companies in developed countries facing both weak institutions and high taxation, a robust

regulatory context greatly motivates investors by reducing their overall cost functions so that they are willing to accept higher tax rates in the host economy. Therefore, in the case of countries such as Greece, where both regulation and taxation are two of the main barriers to investment, having a strong host country regulatory environment is critical to expanding companies' activities abroad and emerging from adverse investment conditions at home.

For the services sector, the results diverge from the overall results across the sample in terms of the importance of regulatory conditions and host country taxation. However, the deterrent effect of taxation still remains at 5%. In addition, the reinforcing influence of the host country's regulatory environment on knowledge gained from previous activities still remains. That marginal effects are no longer significant may be due to the highly differentiated nature of the service sector, covering financial firms (eg banks), hotels and transport.

The hypothesis that the quality of regulation amplifies the positive effects of the benefits that previous presence entails is not supported for the manufacturing sector; the cumulative effect in this sector is negative, as the higher the quality of a country's legal and regulatory framework, the less reason to rely on existing connections and knowledge. For manufacturing plants For example, both prior knowledge and institutions are important, but they are likely to be less important if the legal and regulatory environment is sufficiently robust. For the rest of the variables, the results are in line with the general assumptions.

The paper [44] examines FDI from 85 developing countries to 35 developed countries for 2009–2014 to answer the question about FDI motives and the impact of the institutional environment. The focus is on knowledge-based assets such as human capital, research, technology, and creative output, as the availability of these assets varies greatly between developing and developed countries, and the literature specifically points to knowledge-related aspects when describing the motives for seeking the assets of firms from developing countries. countries [45].

The study tested five hypotheses:

- 1) Higher holdings of knowledge-based assets in developed countries attract more FDI from developing countries;
- 2) Weaker protection of intellectual property rights in a developed country attracts more FDI from developing countries;
- 3) The relationship between knowledge-based assets and the level of protection of intellectual property rights in developed countries negatively affects FDI from developing countries. Strong knowledge-based assets are more valuable as a local factor if the acquisition of these assets is facilitated by weak protection of intellectual property rights. In other words, only

if there are attractive knowledge-based assets, weak protection of intellectual property rights becomes a favorable factor for sustainable knowledge-oriented FDI;

4) Higher holdings of knowledge-based assets in a developing country adversely affect the relationship between developed country knowledge-based assets and FDI from developing to developed country;

5) Higher holdings of knowledge-based assets in a developing country adversely affect the relationship between intellectual property protection in a developed country and FDI from developing to developed country.

The estimated logarithmic model looked in accordance with the following formula (9):

$$FDI_{ijt} = \gamma_1 HostKBA_{t-1} + \gamma_2 HostIPR_{t-1} + \gamma_3 (HostKBA_{t-1} * HostIPR_{t-1}) + \gamma_4 (HostKBA_{t-1} * HomeKBA_{t-1}) + \gamma_5 (HostIPR_{t-1} * HomeKBA_{t-1}) + X_{ijt-1}\beta + \varepsilon_{ij} \quad (9)$$

where the dependent variable is the logarithm of the flow of FDI from a developing country to a developed country in year t ; γ_1 , γ_2 , γ_3 , γ_4 and γ_5 are the coefficients of interest; X_{ijt-1} is the vector of control variables, β is the vector of other parameters, ε is the error. KBA variables are responsible for knowledge-based assets, IPR - for the protection of intellectual property rights. The authors use a quasi-fixed effects specification that controls the country of origin by using a dummy indicator for each FDI country, which also controls for unobserved heterogeneity. However, host country dummy's are not used because they have a significant effect on FDI host country variables, and the loss of degrees of freedom is greater when the number of countries is greater than the number of periods. Dummy's are included to account for potential structural changes. Since the dependent variable, converted to logarithm, only accepts positive numbers, the tobit specification is used for the evaluation. An additional benefit of this specification is that it allows for consistent estimates of regression coefficients when the dependent variable values are often zero.

As noted above, the dependent variable is the logarithm of annual FDI inflows from a particular developing country to a particular developed country. As for the explanatory variables, the knowledge-based assets of the origin and host countries are approximated by the Global Innovation Index published by Cornell University, INSEAD and the World Intellectual Property Organization. The score reflects the overall technological and innovation environment in a country, covering aspects such as human capital, research, market and business complexity, and creative outcomes. Regarding the regulation of intellectual property rights in the host country and the country of origin, the World Economic Forum annually examines the state of intellectual

property rights in different countries through a survey of executives. The results are published as part of the Global Competitiveness Report. Respondents are asked to rate their country's intellectual property protection and anti-counterfeiting measures on a 7-point Likert-type scale (1 = weak and unenforced, 7 = strong and enforced). The advantage of using this measure is that it reflects the perceptions of executives who are ultimately responsible for making decisions about entering foreign markets.

As one of the control variables, the logarithmic values of gross domestic product (GDP) per capita, population and GDP growth are used to control the market size of the host country. The search for natural resources is another motivation that stimulates FDI, so the ratio of exports of ores and metals to exports of goods from the host country is also used. In addition, infrastructure development is an important determinant of the attractiveness of countries as investment destinations, so data on the number of fixed and mobile phones per inhabitant are used as an indicator for the development of general infrastructure. The next control variable is a dummy variable equal to 1 if sending and receiving countries fall into the same group (civil, social) and equal to 0 if they fall into different groups according to the degree of development of law. Also used as a control dummy variable is the existence of a common colonial past between the country of origin and destination of the investment. The use of different taxation regimes in countries can serve as an incentive for cross-border financial flows, so the model uses a dummy variable for host countries such as Cyprus, Ireland, Luxembourg, Malta and Switzerland with a value of 1 (for other countries - a value of 0). Finally, the model controls for geographic distance, "institutional distance" and cultural differences (which were not included in the final version of the model) between the FDI host country and the FDI host country.

The results of the estimates obtained are presented in Table 5. In all specifications, the first hypothesis is not rejected. Developed countries with a large stock of knowledge-based assets are a more attractive FDI destination for firms from developing countries.

Table 5 - Results of tobit regression of various specifications

Variables	(a)	(b)	(c)	(d)	(e)
KBA Host	11,2572** (3,670)	14,4396** (4,589)	11,6196** (3,712)	11,8951** (3,857)	17,2546** (5,207)
IPR host	-38,5945** (-6,603)	-47,8183** (-7,568)	-39,1456** (-6,607)	-38,1698** (-6,534)	-49,6614** (-7,782)
KBA Host*IPR Host	–	-54,0626** (-4,045)	–	–	-57,1062** (-4,236)
KBA receiving*KBA sending	–	–	-6,8150 (-0,586)	–	-25,4299 (-1,756)
IPR receiving*KBA sending	–	–	–	35,9723* (1,987)	72,9498** (3,211)
Host country GDP growth	2,3603 (1,142)	2,1164 (1,039)	2,3560 (1,141)	2,3340 (1,129)	2,0354 (1,002)

Variables	(a)	(b)	(c)	(d)	(e)
Host country population	4,4469** (12,147)	4,6380** (12,597)	4,4661** (12,146)	4,3514** (11,807)	4,5334** (12,272)
GDP per capita in the host country	12,7598** (8,831)	11,0925** (7,444)	12,7155** (8,786)	12,9263** (8,937)	11,1271** (7,472)
Natural resources of the host country	-4,9200** (-6,204)	-4,0196** (-5,005)	-4,9031** (-6,178)	-5,0155** (-6,316)	-4,0674** (-5,072)
Infrastructure in the host country	35,6660** (9,353)	40,1552** (10,030)	35,8801** (9,360)	34,6609** (9,038)	39,2184** (9,791)
tax regime	1,2058 (0,816)	2,4205 (1,612)	1,2381 (0,837)	1,0703 (0,723)	2,3740 (1,579)
KBA of sending country	-7,2152 (-0,913)	-7,4824 (-0,948)	-6,8890 (-0,869)	-9,1109 (-1,145)	-10,2600 (-1,287)
Sending country IPR	-1,0500 (-0,195)	-1,2532 (-0,233)	-1,0826 (-0,201)	-1,1110 (-0,207)	-1,5501 (-0,289)
Sending country infrastructure	14,1916** (3,862)	13,8622** (3,782)	14,1354** (3,844)	13,9721** (3,802)	13,1521** (3,580)
Institutional distance	-9,8212 (-1,783)	-8,2244 (-1,478)	-9,5757 (-1,733)	-11,6525* (02,086)	-10,8612 (-1,925)
Geographic distance	-8,1961** (-7,250)	-8,3641** (-7,459)	-8,1961** (-7,251)	-8,1020** (-7,164)	-8,1825** (-7,304)
colonial past	3,9090* (2,027)	3,4661 (1,800)	3,8988* (2,021)	4,1080* (2,129)	3,7954* (1,970)
Number of observations	11589	11589	11589	11589	11589

Note

1. * - the significance of the coefficient at the 5% level;
2. ** - the significance of the coefficient at the 1% level.
3. The p-value is given in brackets.
4. Source: based on [44].

Also, all specifications do not reject the second hypothesis. Weaker IPR protection in the host developed country has a positive effect on FDI inflows from developing countries, at statistically significant levels below 1%. Model (b) also tests the interaction between host country assets and the protection of host country intellectual property rights (third hypothesis). This hypothesis is also not rejected in those specifications in which the corresponding variable is included. Clearly, high-tech assets and weaker IPR protection in the host country combine to attract more FDI from developing countries. Model (c) presents results regarding the interaction between host country assets and home country assets (fourth hypothesis). However, this hypothesis has not been confirmed. According to the regression results, assets in the sending country do not significantly dampen the tendency of developing country companies to invest in developed countries with higher levels of asset backing. Model (d) tests the interaction between the protection of the intellectual property rights of the host country and assets in the sending

country (fifth hypothesis). This hypothesis is not rejected. Developing country firms with large assets are less likely to seek out host countries with weak IPR protection.

Thus, foreign direct investment flows from developing countries become larger to those developed countries that have a large stock of assets and relatively weak protection of intellectual property rights, and this effect is stronger if these two factors coincide. Importantly, the finding that the availability of knowledge-based assets in developed countries is the driving force behind FDI inflows from developing countries provides strong support for Dunning's concept. Notably, this does not mean that other motives, such as the search for a market or natural resources, or institutional escapism, do not play any role in such investments, but rather that the availability of knowledge-based assets is a potential part of several factors that influence on the situation in the country. It is also noteworthy that weaker protection of intellectual property rights in developed countries leads to an increase in FDI flows from developing countries. It seems that firms do not necessarily want to limit themselves to outright acquisition of assets through mergers and acquisitions or formal collaborations, but rather seek to retain learning opportunities without the consent of the original asset owner.

3 Definition Database for empirical research and analysis of foreign direct investment at the micro level

3.1 Description of data sources and methodology for calculating indicators

To study the spatial distribution of FDI in Russia, it is proposed to use information from the RUSLANA database. This data source contains information on more than 9 million Russian enterprises operating in the last 10 years. The database contains information about the industry affiliation of enterprises, geographic location, financial reporting data and the average number of employees, as well as information about the company's shareholders, global and domestic ultimate owners (GKS and DKS, respectively). In this study, FDI enterprises are considered to be enterprises, the SCS of which is a foreign person (individual or legal entity). It is assumed that this approach will partially solve the problem of "fictitious" investments.

It should be noted that this definition differs from the definition recommended for use by the OECD Reference Definition for Foreign Direct Investment [17] and the IMF Balance of Payments and International Investment Position Manual [46], used, in particular, by the Bank of Russia. According to the IMF and OECD definitions, an FDI enterprise is an enterprise in which a foreign investor owns at least 10% of the voting shares (or equivalent voting rights) in a direct investment enterprise. In turn, data analysis shows that in the vast majority of cases, the share of foreign residents in enterprises with foreign capital participation is more than 50%. In this regard, only very limited differences should be expected between the standard definition of an FDI enterprise and the definition used in this paper.

For the analysis, the data of the database "RUSLANA" are used (see Figure 10).

An important advantage of the RUSLAN DB compared to official statistics in the study of the spatial distribution of FDI in Russia is the ability to identify the presence of companies in the regions, including through company branches. FDI is often misattributed to regions in official statistics. For example, according to the Central Bank of the Russian Federation, one of the largest recipients of FDI in the "mining" industry is Moscow, while it is obvious that such industries are absent in Moscow. Additional benefits of using microdata include the ability to combine information with data from the GTD database, which will additionally allow tracking the foreign trade activities of FDI enterprises, as well as the ability to separately calculate regional and sectoral indicators for a variety of domestic and foreign firms. The last advantage is especially important in the case when the causal relationship between the indicators under consideration can be directed in both directions.

Only manufacturing enterprises are involved in this study. The choice in favor of this particular sector of the economy is a fairly standard practice in economic studies of the behavior of firms at the micro level and is explained by several main reasons. First, the activities of

manufacturing enterprises can be carried out almost anywhere, while the activities of extractive industries and agriculture may require specific natural resources. For this reason, the geographical location of the extractive industry, as well as agricultural industries, is mainly related to the presence or absence of the necessary natural resources. Secondly, the result of the activities of the manufacturing industries in most cases are tradable goods, which, unlike, for example, services, can be delivered to almost any location. In turn, service sector enterprises are largely consumer-oriented, since in most cases services are consumed directly at the place of production of this service. In general, the activities of manufacturing enterprises are most consistent with the classical concept of a firm used in theoretical models, therefore, it is precisely such enterprises that are preferable for analysis.

The second important condition for the inclusion of an enterprise in the study was the availability of accounting data. Open data from the statistical register of enterprises and accounting data suggest that, on average, less than half of enterprises in Russia submit financial statements to Rosstat.

The indicators reflecting the intensity of the presence of foreign investors in the regions are the number of FDI enterprises, the size of their fixed assets and the number of employees. Using the size of fixed assets of FDI enterprises as a measure of the participation of foreign investors in the economy is a fairly common practice in micro-level research. In this case, the FDI flow for a given year can be calculated as the difference between fixed assets in year t and $t-1$, but adjusted for depreciation.

Figure 11 demonstrates the comparability of data based on the proposed methodology and data on the volume of investments made by TOYOTA in a plant near St. Petersburg. According to the company's press release, at the end of 2017 investments in the plant amounted to 27 billion rubles. [47] An estimate using the approach described above, taking into account the industry average depreciation rate, leads to a fairly close value (26.1 billion rubles). The discrepancies can be attributed to the use of the industry's depreciation rate, as well as the fact that part of the investment could be directed to intangible assets.

The main disadvantage of microdata is their relatively low relevance. At the time of this study, the most recent data available was 2017. However, due to a number of reasons, it can be assumed that the features of the spatial distribution have not undergone significant changes to date.

The work also uses other sources of data. Input-output tables are used to determine the intensity of links between industries. Since 2017, Rosstat has been publishing up-to-date data in the format of such tables, but the level of detail in these tables does not allow one to fully judge the closeness of technological ties between industries, since in the breakdown presented, most of

the output of manufacturing industries is used for further production by the source industry itself. Under these conditions, any indicator reflecting the technological proximity of industries will be deliberately biased in favor of the source industry. Therefore, this study proposes to use an alternative approach, namely, to carry out calculations using data from input-output tables for the US economy in 2012. These data are broken down by more than 400 sectors of the economy in the BEA USA classification at the level of 6 digits, of which about 230 branches belong to the manufacturing industry. The RUSLAN DB also contains information about the belonging of a Russian company to a particular NAICS code, however, this information is presented at a level of detail of 4 characters. Therefore, input-output tables have been aggregated to the level of 4-digit codes in the BEA classification, which in most cases correspond to the same 4-digit NAICS code. The result of this aggregation is an input-output table for 225 industries, 80 of which are manufacturing.

In addition, various sources of data on Russian regions were used. First of all, these are the official data of Rosstat. The list of variables derived from this source includes the GRP of the region, the labor force, and the density of paved roads. The paper also uses the data of the rating of investment attractiveness of Russian regions by RAEKS-Analitika [48], which represent some integral assessment of the characteristics of the region that can influence investor decisions. A distinctive feature of this rating is the presentation of results in the "attractiveness-risk" format. Further, it will be shown that the rating values quite clearly correlate with the number of enterprises in the region, both domestic and foreign.

To measure the quality of education in a region, the Region Educational Complexity Index (HEDI) is used. The methodology for constructing this index is based on the principles of calculating the economic complexity of goods [49], which, in turn, are based on the values of the indices of revealed comparative advantages of countries. When constructing, the disciplines (faculties) taught in regional universities are considered as goods, the average USE scores required for admission to this faculty act as an analogue of export volumes, Russian regions act as an analogue of countries. The construction methodology assumes that a higher value of the index corresponds to a higher quality of education in the region.

For a preliminary demonstration of the presence of agglomeration effects, it is proposed to use various measures of the number of enterprises weighted by the degree of technological proximity as independent variables. In essence, this indicator reflects the number of enterprises in the region, with more weight given to the number of enterprises in industries that are most closely related technologically to the industry in question. At the same time, technological proximity in this case means three different values. Let us discuss the calculation methodology based on the data of the input-output tables and the meaningful meaning of each of them.

The first measure reflects the degree of vertical links between industries and is calculated as the average of two indicators: the share of output of the industry in question, which is used by industry i as intermediate consumption; the share of the output of industry i used as intermediate consumption by the industry in question. The greater the value of this indicator, the more industries use each other's products in production, one of the industries is a pronounced consumer of the products of another industry and vice versa. In [50] and [51], this indicator is referred to as “vertical production links” (vertical production links). It is assumed that the enterprises of a pair of industries, other things being equal, will be located closer to each other if these vertical production links between these industries are stronger, which is in fact equivalent to the proximity of buyers and sellers.

The second measure is the degree of closeness of the sectoral distribution of output and industries i and j used by other industries as intermediate consumption. In other words, this measure reflects the extent to which two industries are similar in terms of the distribution of their products to other industries. It is appropriate to designate such a measure as “forward proximity of intermediate consumption” . Four approaches are used to directly calculate the proximity of intermediate consumption patterns: the sum of the squares of the difference between the respective shares; the sum of the modules of the difference of the corresponding shares; maximum difference of the corresponding shares; correlation between respective shares. It is assumed that two industries, other things being equal, are located closer to each other if these industries are focused on a close circle of buyers of their products.

The third measure is referred to as "backward proximity of intermediate consumption". In contrast to direct proximity, reverse proximity reflects the degree of proximity between the structure of intermediate consumption of sectors i and j . Similarly to the direct proximity of intermediate consumption, it is assumed that two industries are located closer to each other, other things being equal, if these industries are oriented towards a close range of suppliers of intermediate goods.

Finally, as a measure of the proximity of the structure of labor for a given pair of industries, it is proposed to use indicators whose construction methodology is similar to the methodology for constructing the “inverse proximity of intermediate consumption”. When constructing, data were used on the shares of occupational workers in industries by NAICS industries for the US economy. [52]

3.2 Description of primary data sources

In total, the sample contains about 188 thousand enterprises of the Russian manufacturing industry, of which only about 4 thousand enterprises have a well-known foreign SCS. At the same time, if offshore and Cypriot residents are not included in the number of foreign SSCs, then

the number of FDI enterprises in the manufacturing industry is reduced to 2359. However, it is proposed to use just this approach, since it allows minimizing the impact of fictitious FDI, which in fact represent Russian capital through third countries. Since the number of domestic enterprises significantly exceeds the number of foreign ones, the erroneous addition of enterprises with GCS from offshore companies to the group of domestic enterprises can only slightly correct the estimates of the effects studied in this work. At the same time, the erroneous inclusion of enterprises with GCS from offshore companies in the group of foreign enterprises can significantly affect the estimates.

The distribution of domestic and foreign enterprises by manufacturing industry is presented in Table 6. The distribution is presented for the three variables considered - the number of enterprises, the total size of fixed assets and the total number of employees. These data allow us to say that, on average, the intensity of the presence of foreign investors in a certain industry is co-directed with the presence of domestic enterprises in this industry. The largest number of foreign enterprises is observed in the food industry, which is also one of the leaders in terms of the number of domestic enterprises.

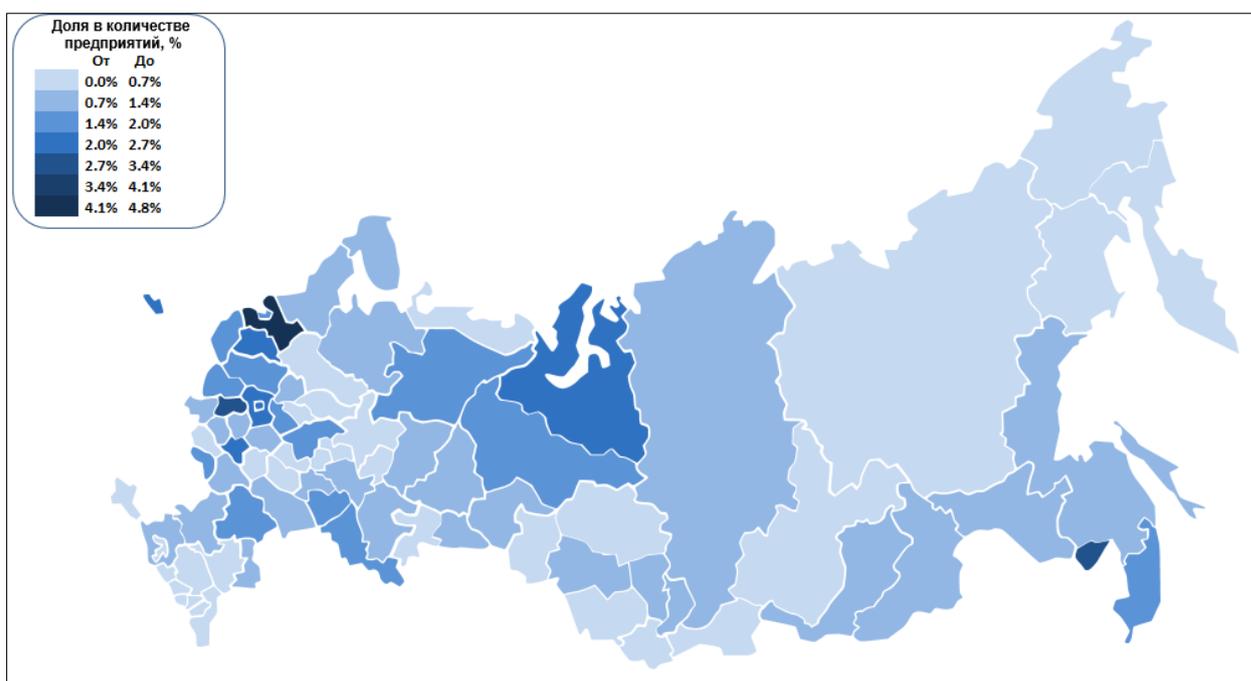
Table 6 - Distribution of the number of manufacturing enterprises, total fixed assets and the total average number of employees by industry, 2017

OKVED2 Code	Name of industry OKVED2	Number of domestic enterprises	Aggregate volume of fixed assets of domestic enterprises, billion rubles	Aggregate average number of employees of domestic enterprises	Number of foreign enterprises	Aggregate volume of fixed assets of foreign enterprises, billion rubles	Aggregate average number of employees of foreign enterprises
10	Food production	22182	1901	789764	308	152	76451
11	Beverage production	3984	117	105628	134	79	35283
12	Manufacture of tobacco products	116	2	2352	11	28	10523
13	Textile production	4201	38	79599	36	6	3283
14	Manufacture of wearing apparel	8652	23	130409	21	3	902
15	Manufacture of leather and leather products	1281	17	41068	11	0	241
16	Woodworking and manufacture of articles of wood and cork, except furniture, manufacture of articles of straw and plaiting materials	14201	243	176130	104	59	8613
17	Manufacture of paper and paper products	2484	125	99010	66	38	9175
18	Printing and copying of information media	9337	39	77832	48	4	4204
19	Production of coke and oil products	731	1645	90760	9	2	228
20	Manufacture of chemicals and chemical products	5879	907	186055	147	80	20982
21	Production of medicines and materials used for medical purposes	1395	88	61523	68	30	12886
22	Manufacture of rubber and plastic products	11926	135	212398	159	86	18322
23	Manufacture of other non-metallic mineral products	15649	555	381424	158	148	24415
24	Metallurgical production	2234	734	247225	70	180	49102
25	Manufacture of finished metal products, except for machinery and equipment	21089	253	335774	129	12	8180

OKVED2 Code	Name of industry OKVED2	Number of domestic enterprises	Aggregate volume of fixed assets of domestic enterprises, billion rubles	Aggregate average number of employees of domestic enterprises	Number of foreign enterprises	Aggregate volume of fixed assets of foreign enterprises, billion rubles	Aggregate average number of employees of foreign enterprises
26	Manufacture of computers, electronic and optical products	5494	270	217655	101	8	12477
27	Production of electrical equipment	5647	111	199178	83	34	23817
28	Manufacture of machinery and equipment not included in other groups	10001	241	303588	244	59	27613
29	Manufacture of motor vehicles, trailers and semi-trailers	2057	159	143851	160	166	37991
30	Manufacture of other vehicles and equipment	1571	290	269776	32	11	8240
31	Furniture manufacture	10607	34	116002	29	3	3301
32	Manufacture of other finished products	4955	23	69943	41	5	1102
33	Repair and installation of machinery and equipment	22383	114	298495	190	6	10627
	Total	188056	8064	4635439	2359	1199	40795

Note - Source: authors' calculations

In support of the thesis that foreign investors and domestic entrepreneurs differently take into account certain characteristics of the location when making investment decisions, there are stable differences in the share of FDI enterprises in the total number of enterprises between regions. In general, for the Russian economy, this value is about 1.2%, however, in some regions, extremely low and extremely high values of this indicator can be observed. The second conclusion that the data in Figure 3 allows us to draw is the visual detection of spatial patterns. Namely, regions in which the share of FDI enterprises is relatively large are in many cases adjacent to regions in which the share of enterprises is also relatively large. For example, the following clusters can be distinguished - the central, northwestern, mining regions of the north of Siberia, the Far East, as well as the cluster adjacent to Kazakhstan from the northwest. At the same time, a number of neighboring regions of the Volga region, southern Siberia and the Far East are distinguished by a relatively weak presence of foreign investors. This may indicate the presence of agglomeration effects in the spatial distribution of enterprises.

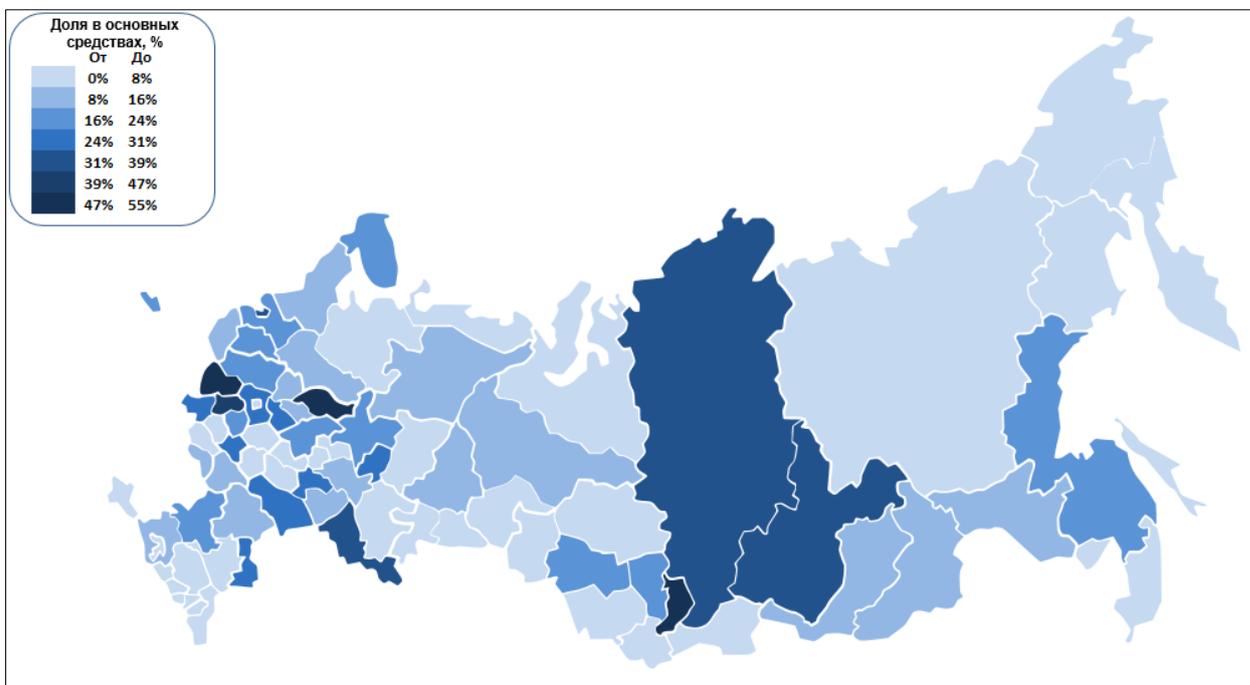


Note - Source: authors' calculations.

Figure 3 - Shares of the number of enterprises with foreign GCS in the total number of enterprises in the region, manufacturing industry, 2017

Differences in the intensity of the presence of foreign investors in the region are even more pronounced if the measure of the intensity of the presence of foreign investors is not the number of FDI enterprises, but the total amount of fixed assets of FDI enterprises (Figure 4). As discussed earlier, this indicator can be seen as a proxy for FDI stock in the region. It can be seen that in some regions, which are distinguished by a fairly large share of FDI enterprises in the number of enterprises, the share of fixed assets of these enterprises is relatively low. The

opposite is also true: in a number of regions of the central part of Russia, as well as regions of the Siberian Federal District, manufacturing FDI enterprises account for a significant share of the total fixed assets of manufacturing enterprises. This may indicate high barriers to entry for foreign investors in these regions, resulting in only very large projects being implemented.



Note: Source - authors' calculations.

Figure 4 - Shares of fixed assets of enterprises with foreign GCS in the total volume of fixed assets of enterprises in the region, manufacturing industry, 2017

The revealed differences in the shares of foreign enterprises in the total number of enterprises may be a consequence, among other things, of differences in the sectoral structure of the regional economies. For example, if a certain region has a comparative advantage in the production of a certain product, but at the same time, for some reason, foreign investors are not inclined to outsource such production to other countries, then a smaller presence of foreign investors, all other things being equal, should be expected in this region. An example of such a situation is the relatively lower propensity of transnational corporations (TNCs) to FDI in labour-intensive industries. Paul Antras [53] draws his attention to this empirical fact in relation to American TNCs, in addition, experts from the Asian Development Bank point to this circumstance [54]. The Russian data are also consistent with this hypothesis, as shown in Figure 14: the share of foreign enterprises in the industry is on average larger in more capital-intensive industries. At first glance, this empirical result may seem counter-intuitive, since the conventional view of FDI is to locate labour-intensive stages of production in low-wage countries. However, in reality, the low share of foreign enterprises in the industry does not mean that these industries are less embedded in global value chains. The low share of foreign

enterprises in the industry in this case may be the result, among other things, of the fact that TNCs prefer to purchase products from these industries from independent suppliers, while these independent suppliers themselves are located in locations that differ in certain advantages.

In order to demonstrate the importance of the existing sectoral structure of the region's economy in the ability to attract foreign companies, let's consider a dependence similar to that shown, but in the context of Russian regions.

This figure also visually shows a positive correlation between the indicators, and the hypothesis that the coefficient in the corresponding regression equation is equal to zero is rejected at the 5% level. This suggests that, on average, the share of FDI enterprises is larger in regions where the average capital intensity of production is higher. Taken together, these observations indicate that the analysis of the regional distribution of enterprises should be carried out taking into account the characteristics of industries. In other words, it is necessary to take into account the average propensity of foreign residents to invest in this industry.

3.3 Study of the spatial patterns of the formation of the distribution of manufacturing enterprises

To study the factors that determine the spatial distribution of enterprises in the Russian manufacturing industry, it is proposed to use the approach used in [51], with some modifications. Specific differences in approaches will be explained as the research methodology is presented.

The first step of the methodology is the evaluation of an econometric model of the dependence of the number of enterprises in a region-industry on various characteristics of the region and industry. Since the characteristics of industries for the purposes of this work are only of secondary interest, moreover, it seems quite difficult to specify a complete set of industry characteristics that affect the propensity of foreign and domestic agents to invest, it is proposed to take into account industry differences by including fixed effects on industries in the econometric model. The general view of the model proposed for evaluation can be presented in the following form:

$$n_{jr} = \beta_0 + \beta X_r + \sum_j \alpha_j + \epsilon_{jr}, \quad (10)$$

where n_{jr} is the number of firms in industry j in region r ; β_0 is a constant; X_r – vector of characteristics of region r ; β is the vector of estimated coefficients for the characteristics of the region; α_j - individual effects on the industry.

The design of the econometric model in [51] is somewhat different from the design of model (6). First, in [51], the authors consider the number of enterprises in the context of "host country - sending country - industry", while in this paper, in fact, the dimension "receiving region - industry" is considered. The main advantage of the approach of the authors of [51] is the ability to describe in more detail the dependence of the number of foreign enterprises in a given

industry in a given region. In particular, this makes it possible to include variables in the model that reflect the level of trade barriers between countries, thereby taking into account, for example, the motive of “jumping trade costs” and other characteristics specific to FDI source countries. However, such an approach, by its design, will not allow jointly studying the factors affecting the distribution of the number of domestic and foreign enterprises and, therefore, statistically testing hypotheses about the equality of certain parameters in the model for choosing foreign and domestic investors. In fact, the authors assume that fundamental location advantages contribute equally to the decision of both foreign and domestic investors, and estimate the location advantage model only based on the distribution of foreign enterprises. At the same time, at the second step of the procedure, the values predicted on the basis of the estimated model are aggregated to the dimension of “host country-industry”. Since the main purpose of this paper is precisely to test the hypothesis of differences in the susceptibility of the distribution of enterprises to regional factors, and since there is no variation across the host country in the data used, it was decided to abandon this rather restrictive assumption. Instead, this paper uses a model of the dependence of the number of enterprises on various factors jointly for two types of enterprises: domestic and foreign. Differences in sensitivity to factors are modeled through cross-terms of the relevant variables and dummy variables on whether firms belong to one of the two types mentioned above. Similar to [51], this study uses a Poisson model with fixed effects on the industry. Fixed effects on the industry also differ depending on the type of firm under consideration. This clarification is important in light of the results of the primary data analysis, which indicated that foreign investors are systematically less likely to invest in relatively less capital-intensive industries. In fact, this approach assumes that the average intensity of investment in a given industry is different for domestic and foreign investors, moreover, there are differences between the intensity of investment between industries. Taking into account the above additions, the estimated econometric specification can be generalized in the following form:

$$n_{jr,f} = \beta_0 + I[f]\beta X_r + (1 - I[f])\beta X_r + \sum_j I[f]\alpha_j + \sum_j (1 - I[f])\alpha_j + \epsilon_{jr}, \quad (11)$$

where $I[f]$ is an indicator equal to 1 if $n_{jr,f}$ is the number of foreign firms in industry j in region r , 0 if $n_{jr,f}$ is the number of domestic firms in industry j in region r . By construction, model (11) assumes heterogeneity by type of firms (domestic or foreign) for all estimated coefficients. This approach makes it possible to statistically test hypotheses about the equality of coefficients for different types of firms.

Model (11) is estimated using the pseudo-maximum likelihood method; the details of the method are described in [55]. The evaluation results using a different set of explanatory variables

are presented in Table 7. Column (1) shows the results of the model evaluation using only two explanatory variables - the region's investment potential index and the investment risk index. Both factors are statistically significantly related to the number of firms in the industry-region, and all coefficients have the expected signs. The data suggest that the regional distribution of foreign companies is more sensitive to both regional risk factors and regional factors of investment attractiveness. We note the rather high explanatory power of the model: about 81% of the variation in the variable being explained is explained by a combination of sectoral fixed effects and investment risk and attractiveness indices.³

Table 1 – Assessment of the model (11) results

Variable	(1)	(2)	(3)
	Number of firms in an industry-region	Number of firms in an industry-region	Number of firms in an industry-region
Domestic #ln(GRP per employee)		0.225***	0.0727
		(0.0539)	(0.0497)
Foreign # ln(GRP per employee)		0.593***	0.505***
		(0.107)	(0.104)
Domestic#ln(Number of employees)		0.859***	0.275***
		(0.0353)	(0.0434)
Foreign # ln(Number of employees)		0.420***	-0.270**
		(0.0793)	(0.110)
Domestic#HEDI		0.0978***	-0.00395
		(0.0255)	(0.0242)
Foreign#HEDI		0.191***	0.117*
		(0.0524)	(0.0622)
Domestic#ln(Internal distance)		0.162***	-0.0385
		(0.0384)	(0.0319)
Foreign# ln(Internal Distance)		0.175*	0.0290
		(0.104)	(0.0925)
Domestic# ln(External distance)		-0.0572***	-0.0284*
		(0.0193)	(0.0162)
Foreign# ln(External distance)		0.0841**	0.127***
		(0.0360)	(0.0334)
Domestic#ln(Road density)		0.0267	0.0142
		(0.0180)	(0.0149)
Foreign#ln(Road density)		0.162***	0.115***
		(0.0406)	(0.0368)
Domestic#(Investment risk index)	-7.021***	-1.336***	-0.290
	(0.272)	(0.300)	(0.291)
Foreign#(Investment risk index)	-11.49***	-4.057***	-4.094***
	(0.661)	(0.651)	(0.772)
Domestic#(Index of investment potential)	0.158***		

³ The reduced model, in which only fixed effects on industries and firm type act as explanatory variables, has an explanatory power in terms of pseudo-R² of the order of 61%. This indicates that the values of the regional investment attractiveness rating help to further explain the 20% variation in the dependent variable. In turn, in the model without fixed effects, the index values explain about 50% of the variation in the data..

	(1)	(2)	(3)
Variable	Number of firms in an industry-region	Number of firms in an industry-region	Number of firms in an industry-region
	(0.00609)		
Foreign#(Index of investment potential)	0.189***		
	(0.00717)		
Domestic #ln (weighted by the intensity of technological links, the number of enterprises)			0.746***
			(0.0363)
Foreign # ln (weighted by the intensity of technological ties, the number of enterprises)			0.763***
			(0.0865)
Constant	5.197***	-3.191***	0.101
	(0.0668)	(0.748)	(0.684)
Fixed effects on "Domestic#industry"	ДА	ДА	ДА
Fixed effects on "Foreign#industry"	ДА	ДА	ДА
Number of observations	10,367	10,295	10,295
Pseudo-R2	0.8108	0.8608	0.8846

Note

1. Robust standard errors are indicated in parentheses; *** p<0.01, ** p<0.05, * p<0.1;
2. Source: authors' calculations.

Columns (2) and (3) of Table 7 show estimates of equations in which the investment potential index is replaced by a set of region characteristics. Among the estimates presented in column (2), most of the estimates are statistically significantly different from zero and have the expected signs. On average, the number of firms in an industry-region is larger in regions with a large GRP per employee, and the hypothesis of equal coefficients for domestic and foreign firms is rejected. Similar conclusions can be drawn with regard to the statistical relationship between the number of people employed in the region and the number of enterprises of both types. A remarkable result should be recognized as a pronouncedly greater relationship between the number of foreign enterprises and the index of educational complexity in comparison with a similar relationship for domestic enterprises. Also, the number of foreign enterprises is statistically more related to the external remoteness of the region, road density and investment risk indices compared to the number of domestic enterprises.

Column (3) additionally includes a variable that to some extent reflects agglomeration effects - the logarithm of the number of enterprises weighted by the intensity of technological ties in the industry-region. The evaluation results indicate that this indicator is statistically significantly related to the number of enterprises in the industry under consideration, while the hypothesis of equality of coefficients for domestic and foreign enterprises is not rejected.

At the second step of the procedure, it is supposed to evaluate the model of the dependence of indicators of the geographical concentration of enterprises depending on various variables. The general view of such a model can be written as follows:

$$agglomeration(T)_{ij} = \beta_0 + \beta_{lc}(fundamentals_{ij}) + \beta_{agg}Z_{ij} + \epsilon_{ij}, \quad (12)$$

where i and j are industries in the NAICS classification (4 digits); $agglomeration(T)_{ij}$ is a measure of the concentration of enterprises in sectors i and j in relation to each other; $fundamentals_{ij}$ - an indicator that reflects the advantages of the fundamental characteristics of the location; Z_{ij} is a vector of characteristics of a pair of industries i and j , reflecting the technological proximity of this pair of industries. Let us discuss each of the specification indicators (12) in detail.

Duranton-Overman indices are used in the economic literature as a measure of geographic concentration [56]. In essence, the index reflects the distribution of pairwise distances between groups of enterprises. The greater the proportion of pairwise distances is close to zero, the more geographically concentrated the considered set of enterprises is recognized. In the original work of Duranton and Overman, concentration was studied within a certain group of enterprises, in particular, enterprises in a certain industry. However, the approach can also be used to measure the relative proximity of enterprises in one industry to enterprises in another industry. This is how the Duranton-Overman approach is used in [50] and [51].

In the original work by Duranton-Overman, as well as in [50] and [51], the kernel density estimate is used to estimate the distance density. At the same time, the authors of [51] point out that the calculation of kernel density estimates turns out to be very costly in terms of computation time and note that they obtained qualitatively similar results when using a simple histogram-based estimation of the density distribution of pairwise distances. In this paper, it is also proposed to use the histogram as an estimate of the distribution density. Similar to [50] and [51], when constructing a histogram, no more than 2000 enterprises from each industry are taken into account, selected randomly.

In contrast to [50] and [51], this paper proposes to calculate the index of geographical concentration of a pair of industries separately for foreign and domestic companies, but in relation to all companies in the industry. More precisely, in [50] and [51], under the agglomeration index for a certain value of the boundary distance T , the following value was meant:

$$agglomeration(T)_{ij} = \sum_{\tau=1}^T \max(f_{ij}(\tau) - \bar{f}_{ij}(\tau), 0), \quad (13)$$

where $f_{ij}(\tau)$ is a kernel estimate of the density of pairwise distances between enterprises in industries i and j at point τ ; $\bar{f}_{ij}(\tau)$ is the value of the upper bound of the global 95%

confidence interval for the kernel density estimate. Concisely, the index (13) shows to what extent the distribution of pairwise distances between enterprises in industry i and j is statistically different from some "reference" distribution. For each point τ for which a kernel density estimate is available, intermediate values are calculated that are the difference between the kernel density estimate and the value of the upper bound of the 95% confidence interval, and if this difference is positive, then it is included in the final index value obtained as the sum of the intermediate values. In [50] and [51], the agglomeration index is built separately for foreign and domestic enterprises. In fact, the authors implicitly assume that foreign companies, if they are driven by the desire to locate in locations with more pronounced agglomeration effects, take into account proximity only to foreign companies. However, it is more realistic to assume that both domestic and foreign firms in industry i take into account the location of all enterprises in industry j , regardless of whether the enterprises in industry j are domestic or foreign. This assumption should be regarded as more general than that used in [50] and [51].

The second modification of formula (13) when calculating the agglomeration index for enterprises in the territory of the Russian Federation is to exclude from consideration the boundaries of the confidence interval for the kernel density estimate. In [50] and [51], this confidence interval was built on the basis of 5% and 95% quantiles of the values of the kernel estimate of the distribution density obtained from numerical simulations. The simulations consisted in repeating 1000 times for each pair of industries i and j random selection of I (the number of enterprises in industry i) and J (the number of enterprises in industry j) enterprises from the set of all manufacturing enterprises and estimating the distribution density of pairwise distances. With the same number of enterprises in industries, these intervals should be asymptotically equivalent to each other, since they are built on the basis of the same set of observations. In other words, differences between industry pairs within the 95% confidence interval are due only to differences in the number of firms in the industry. Instead of constructing boundaries of confidence intervals, in specifications of the form (12) it is proposed to take into account fixed effects on each industry:

$$agglomeration(T)_{ij} = \beta_0 + \beta_{lc}(fundamentals_{ij}) + \beta_{agg}Z_{ij} + \sum_i \alpha_i + \sum_j \alpha_j + \epsilon_{ij}. \quad (14)$$

where α_i and α_j are the fixed effects on the respective industries. It is assumed that some industries, *ceteris paribus*, due to various unobservable factors, may be closer on average to enterprises in other industries. In addition, the fixed effect on the industry will actually act as a control on the number of enterprises in the industry and, consequently, on the boundaries of the confidence interval. This approach will significantly reduce the amount of necessary calculations.

Thus, the agglomeration index with cutoff T used in this paper is the total share of pairs of enterprises in sectors i and j , the distance between which is less than T , in the total number of pairs of enterprises in the industries under consideration:

$$agglomeration(T)_{ij} = \sum_{\tau=1}^T hist_{ij}(\tau), \quad (15)$$

where $hist_{ij}(\tau)$ is the share of pairwise distances between enterprises in industries i and j in the interval $(\tau-\epsilon; \tau+\epsilon)$ in the total number of pairwise distances between enterprises in industries i and j . The weighted analogue of the index (15) is calculated in a similar way: instead of the share of pairwise distances between enterprises in sectors i and j , a weighted share is used.

The explanatory variable ($fundamentals_{ij}$) is constructed similarly to the agglomeration index, however, when constructing, weights are used that are the values of the number of enterprises of a given type in a given industry in a given region predicted based on model (11) ($(n_{(jr,f)})$). This construction means that pairs of enterprises are given more weight if these enterprises are located in industries of regions in which, according to the model, due to fundamental factors, the number of enterprises should be larger. In fact, by construction, the distribution of pairwise distances is artificially “skewed” in favor of those enterprises that, according to the model of fundamental factors (11), are in the industries of regions with values of fundamental characteristics corresponding to a larger number of enterprises. In essence, the variable constructed in this way will reflect the “expected” distribution of enterprises, based only on the model of fundamental location characteristics (11).

In order to use the results of estimating model (11) at the second step of the procedure, namely, to construct a measure of the fundamental characteristics of location as an explanatory variable in the equation for the measure of concentration of enterprises, in the specification estimated at the first step, if possible, the inclusion of explanatory variables in X_r should be avoided reflecting primarily agglomeration effects. An example of such variables is the number of enterprises in other industries in the region, especially in related and technologically related industries. Otherwise, in the variation of the explanatory variable constructed for the second step by construction, there will be a variation associated with agglomeration effects, which can lead to the problem of multicollinearity. Therefore, to construct the predicted values, it is proposed to use the model estimates displayed in columns (1) and (2) of Table 7.

The characteristics of a pair of industries i and j Z_{ij} , reflecting the technological proximity of a given industry pair, include the following indicators described earlier: vertical production links, direct and reverse proximity of intermediate consumption, and a measure of the proximity of the labor structure in the context of professions of this industry pair.

The results of evaluating the model (14) are presented in Table 8. The variables were previously converted into a standardized form so that the values of the coefficients were

comparable to each other. Coefficient estimates indicate that the greatest contribution to explaining the variation in the degree of proximity of both domestic and foreign enterprises is made by fundamental factors of location, while various measures of technological proximity of industries make a relatively small contribution to this variation. On average, the enterprises of industries with a greater direct and reverse proximity of intermediate consumption are located closer to each other. In fact, this means that agglomeration effects are observed from the presence in the immediate vicinity of enterprises that consume a similar set of intermediate goods and enterprises that supply their products to a similar set of enterprises. This result turns out to be qualitatively stable with respect to the boundary distance of the index. At the same time, the effect of vertical production links and the proximity of the labor structure is not observed at short distances and is not observed for foreign companies.

In order to statistically identify differences in the relationship between the agglomeration index and the considered explanatory variables for domestic and imported enterprises, it is proposed to evaluate the following econometric specification:

$$\Delta agglomeration(T)_{ij} = \beta_{\Delta 0} + \beta_{\Delta lc}(fundamentals_{ij}) + \beta_{\Delta agg}Z_{ij} + \sum_i \alpha_i + \sum_j \alpha_j + \epsilon_{ij}. \quad (16)$$

where $\Delta agglomeration(T)_{ij}$ – the difference between the agglomeration index (15) for foreign companies and the agglomeration index (15) for domestic companies. The construction of the specification (16) assumes that the estimated coefficients reflect differences in the relationship between explanatory variables and concentration levels of enterprises in a given industry pair between domestic and foreign enterprises.

The results of evaluating the model (16) presented in Table 9 indicate that statistically significant differences in the formation of concentration are observed only for the variables “fundamental location characteristics”, “reverse proximity of intermediate consumption” and “proximity of labor structure” (at relatively short distances). It is noteworthy that the coefficient $\beta_{\Delta lc}$ turns out to be insignificant for the variable $fundamentals_{ij}$ based on the predicted values of the number of domestic companies, and is statistically significant for the variable based on the predicted values of the number of foreign companies. In substance, this means that location fundamentals for domestic firms have approximately the same effect on the concentration of domestic and foreign firms. In turn, if these factors are taken into account on the basis of the model of fundamental location characteristics for foreign enterprises, then the effect on the concentration of foreign companies is greater than the effect on the concentration of domestic companies. Thus, along with differences in susceptibility to individual characteristics of regions, foreign companies differ in concentration susceptibility to these characteristics.

At the same time, other things being equal, foreign companies prefer less proximity to companies in industries with a similar labor structure compared to domestic enterprises. On the one hand, a larger labor market means greater opportunities to find a suitable employee, on the other hand, an increased level of competition for labor resources. The evaluation results indicate that the second effect is relatively stronger among foreign firms compared to domestic firms.

Finally, it should be pointed out that despite the significance of the coefficient for the variable “inverse proximity of intermediate consumption”, the sign of the coefficient is reversed depending on which of the fundamental location variables is included in the model: based on the expected distribution of domestic or foreign companies. This may be due to bias in estimates caused by missing explanatory variables. In particular, as noted earlier, location fundamentals for domestic firms do not fully explain the variation in concentration for foreign firms. As a result, the absence of a variable leads to a bias in the estimate. Based on the results of evaluating the model with the inclusion of fundamental factors of the location of foreign enterprises, it can be said that, on average, the concentration of foreign enterprises is less sensitive, all other things being equal, to the benefits from the proximity of industries with a similar structure of intermediate consumption..

Table 8 - results of estimation of the model (14) of agglomeration indices for domestic (O) and foreign (I) companies

Dependent variable: $agglomeration(T)_{ij}$								
Variable	$T = 50$	$T = 50$	$T = 200$	$T = 200$	$T = 400$	$T = 400$	$T = 600$	$T = 600$
	O	I	O	I	O	I	O	I
$fundamentals_{ij}(O)$	0.0391***		0.0540***		0.0610***		0.0590***	
	(0.000706)		(0.000887)		(0.00107)		(0.00123)	
$fundamentals_{ij}(I)$		0.0529***		0.0792***		0.0923***		0.104***
		(0.00125)		(0.00194)		(0.00253)		(0.00340)
Vertical production connections	1.08e-05	-0.000145	0.000158**	0.000194	0.000383***	0.000277	0.000452***	0.000392
	(6.18e-05)	(0.000134)	(7.94e-05)	(0.000213)	(0.000131)	(0.000306)	(0.000137)	(0.000314)
Reverse Proximity of Intermediate Consumption	0.000549***	0.000817***	0.000855***	0.000913***	0.000730***	0.000819**	0.000898***	0.000207
	(9.15e-05)	(0.000191)	(0.000102)	(0.000265)	(0.000144)	(0.000363)	(0.000147)	(0.000371)
Direct proximity of intermediate consumption	0.000262***	0.000358**	0.000392***	0.000646***	0.000736***	0.000783***	0.000924***	0.000696**
	(6.09e-05)	(0.000159)	(7.92e-05)	(0.000223)	(0.000111)	(0.000281)	(0.000125)	(0.000292)
Proximity of labor structure	9.65e-05	-0.000146	0.000287**	4.46e-05	0.000549***	0.000709	0.000491***	0.000968**
	(9.46e-05)	(0.000214)	(0.000115)	(0.000300)	(0.000180)	(0.000450)	(0.000167)	(0.000428)
Constant	0.0448***	0.0592***	0.0919***	0.121***	0.168***	0.196***	0.254***	0.288***
	(5.55e-05)	(0.000144)	(6.84e-05)	(0.000184)	(8.84e-05)	(0.000223)	(9.60e-05)	(0.000236)
Fixed effects on the industry	ДА	ДА						
Number of observations	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006
R2	0.973	0.937	0.978	0.951	0.976	0.951	0.977	0.961

Note

1. Robust standard errors are indicated in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

2. source: authors' calculations;

Table 9 - results of model estimation (16) for the difference between agglomeration indices of domestic (O) and foreign (I) companies

Dependent variable: $\Delta agglomeration(T)_{ij}$								
Variable	$T = 50$	$T = 50$	$T = 200$	$T = 200$	$T = 400$	$T = 400$	$T = 600$	$T = 600$
	O	I	O	I	O	I	O	I
$fundamentals_{ij}(O)$	0.000596		-0.00385*		-0.00590***		-0.0132***	
	(0.00175)		(0.00199)		(0.00213)		(0.00235)	

<i>fundamentals_{ij}(I)</i>		0.0400***		0.0536***		0.0642***		0.0685***
		(0.00112)		(0.00163)		(0.00182)		(0.00212)
Vertical production connections	3.96e-05	-7.28e-05	0.000255	1.20e-05	0.000390	5.48e-05	0.000378	2.33e-05
	(0.000161)	(0.000149)	(0.000233)	(0.000177)	(0.000275)	(0.000203)	(0.000312)	(0.000237)
Reverse Proximity of Intermediate Consumption	0.000741***	-0.000503**	0.000811***	-0.000784***	0.000938**	-0.00119***	0.00131***	-0.00121***
	(0.000258)	(0.000204)	(0.000303)	(0.000228)	(0.000370)	(0.000271)	(0.000445)	(0.000335)
Direct proximity of intermediate consumption	-0.000326*	-0.000108	-0.000273	8.38e-05	-0.000273	0.000107	-0.000492	-8.13e-05
	(0.000188)	(0.000143)	(0.000254)	(0.000191)	(0.000302)	(0.000219)	(0.000336)	(0.000244)
Proximity of labor structure	-0.000948***	-0.000669***	-0.000967**	-0.000654**	-0.00107**	-0.000603*	-0.000703	-0.000285
	(0.000307)	(0.000220)	(0.000381)	(0.000267)	(0.000448)	(0.000310)	(0.000550)	(0.000400)
Constant	0.0145***	0.0145***	0.0235***	0.0235***	0.0289***	0.0289***	0.0268***	0.0268***
	(0.000191)	(0.000138)	(0.000231)	(0.000164)	(0.000266)	(0.000188)	(0.000292)	(0.000213)
Fixed effects on the industry	ДА	ДА	ДА	ДА	ДА	ДА	ДА	ДА
Number of observations	6,006	6,006	6,006	6,006	6,006	6,006	6,006	6,006
R2	0.807	0.898	0.815	0.907	0.843	0.921	0.844	0.917

Note

1. Robust standard errors are indicated in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

2. source: authors' calculations;

Table 9 - results of model estimation (16) for the difference between agglomeration indices of domestic (O) and foreign (I) companies

CONCLUSION

Most experts agree that in order to achieve sustainable and relatively high growth rates of the Russian economy, it is necessary to ensure a sustainable growth in the productivity of factors, in particular labor. One of the possible ways to achieve this goal is to attract foreign investment in the economy. In addition to the fact that these investments in themselves mean an increase in the stock of capital in the economy and, consequently, an increase in labor productivity, numerous studies show that FDI is carried out by the most productive firms and foreign affiliates of foreign companies often also have an increased level of productivity compared to domestic competitors.

This study allowed us to point out some characteristic features of the spatial distribution of foreign enterprises that should be taken into account when forming a picture of foreign investors' preferences and policies for attracting foreign investors to Russian regions. First, the region's success in attracting foreign capital largely depends on the current sectoral structure of the region's economy. Regions with a predominance of relatively labor-intensive industries are, on average, less likely to be the object of investment by foreign residents. This does not mean that it is not necessary to stimulate the development of these industries. This only means that foreign companies prefer to interact with such enterprises as agents independent of them, therefore, in order to ensure the sustainable export-oriented development of such enterprises, it is first necessary to lower barriers to foreign trade, while lowering barriers to FDI and measures to attract foreign investors will be a priori less effective.

Secondly, the distribution of foreign companies is somewhat more sensitive to the level of education in the region, the development of transport infrastructure, the region's remoteness from foreign markets, as well as the risks of investing in the region's economy. Note that this result does not mean that in order to attract, other things being equal, a larger number of foreign investors to the regions, it is necessary first of all to influence the factors listed above. This result indicates that the susceptibility of foreign investors to these factors is, on average, greater than that of domestic investors.

Thirdly, this study showed that statistically significant differences in the manifestation of agglomeration effects between domestic and foreign firms are observed in terms of the general labor market. At the same time, the spatial distribution of foreign companies is more influenced by the fundamental characteristics of the region. It can be said that both domestic and foreign enterprises gravitate to locations where the concentration of component suppliers or buyers is greater, as well as to locations where there is a high density of enterprises using a similar set of components and a similar labor structure, which is evidence in favor of positive externalities from the increased concentration of industries.

In general, this study confirms some of the conclusions of previous studies on the study of the spatial distribution of economic activity and allows us to get an idea of the patterns of spatial distribution of Russian enterprises, including foreign ones. This information may be useful in developing a policy for attracting foreign investors to Russian regions.

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