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## **Russia Takes Part in the Globalisation via Her Investments Abroad**

### **Some Evidence on the Foreign Activities of the Major Russian Corporations**

International conference «Post-Communist Economic Growth», March 20-21, Moscow

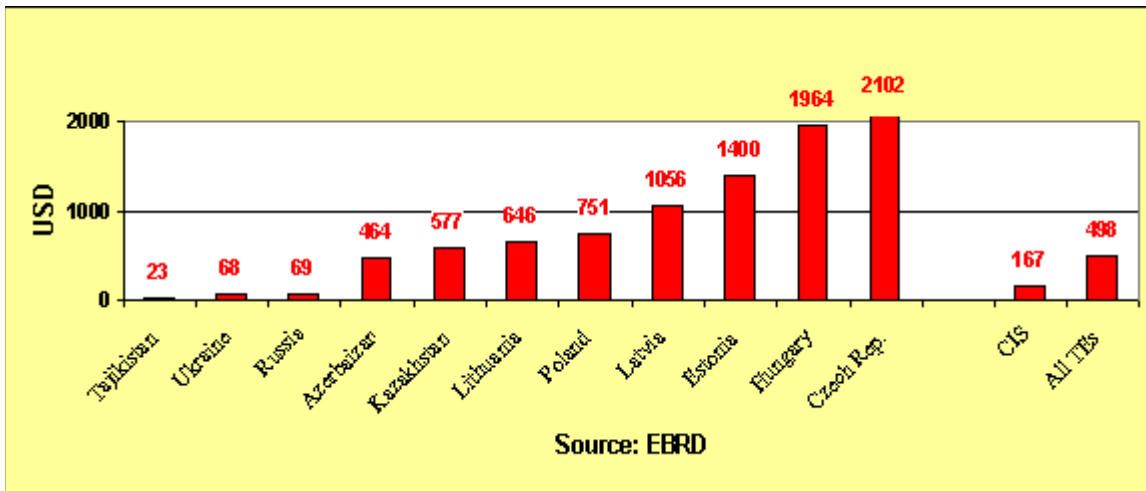
#### **1. FOREIGN DIRECT INVESTMENT FLOWS TO AND FROM**

##### **RUSSIA**

Foreign firms have clearly become more active in their operations in the transition economies (TEs) since the mid-1990s. According to the UNCTAD (2001), the foreign direct investment (FDI) inflow to all TEs was USD 7 billion in 1994, whereas six years later the FDI inflow exceeded USD 25 billion. By the beginning of 2001, the FDI inward stock in the former centrally planned economies amounted to over USD 150 billion [1].

Poland, Hungary and the Czech Republic cover a half of the transition economies' FDI inward stock. Russia with her giant natural resources and 146-million-population i.e. approximately 2,5 times the combined population of these three Central East European countries (CEEC) has been able to gather FDI worth less than USD 20 billion i.e. just as much as Hungary with 10 million citizens and modest natural reserves.

FDI per capita figures are even less flattering for the CIS and Russia, in particular. According to EBRD (2001), the cumulative net FDI inflow during 1989-2000 to Russia was only USD 70, whereas the corresponding indicator for the CIS was USD 170 and USD 500 for all TEs. The most attractive TEs in terms of cumulative net FDI per person are the Czech Republic, Hungary, Estonia, and Latvia. All of them have managed to collect over USD 1000 per citizen; the Czech Republic over USD 2000 (see Table 1) [2].



**Table 1. Cumulative Net FDI per Capita in Selected Transition Economies (1989-2000)**

The FDI inflow analysis suggests that foreign companies have not entered Russia and the CIS to the same extent they have penetrated the CEEC. If Western corporations have not entered Russia and the CIS as intensively as the CEEC, what is the opposite direction of the FDI flows i.e. to what extent the investments have flown from the East towards the West?

Direct investment outflow from transition economies abroad is still modest when compared to investment inflow to TEs. The outward FDI stock of the transition economies is just some USD 20 billion i.e. almost 15% of the inward FDI stock. This ratio is the highest in Russia - 60%. The outward FDI stock of Russia amounted to almost USD 12 billion in the beginning of 2001. With this figure, Russia makes up clearly over half of the transition economies' total outward FDI stock (see Table 2) [3].

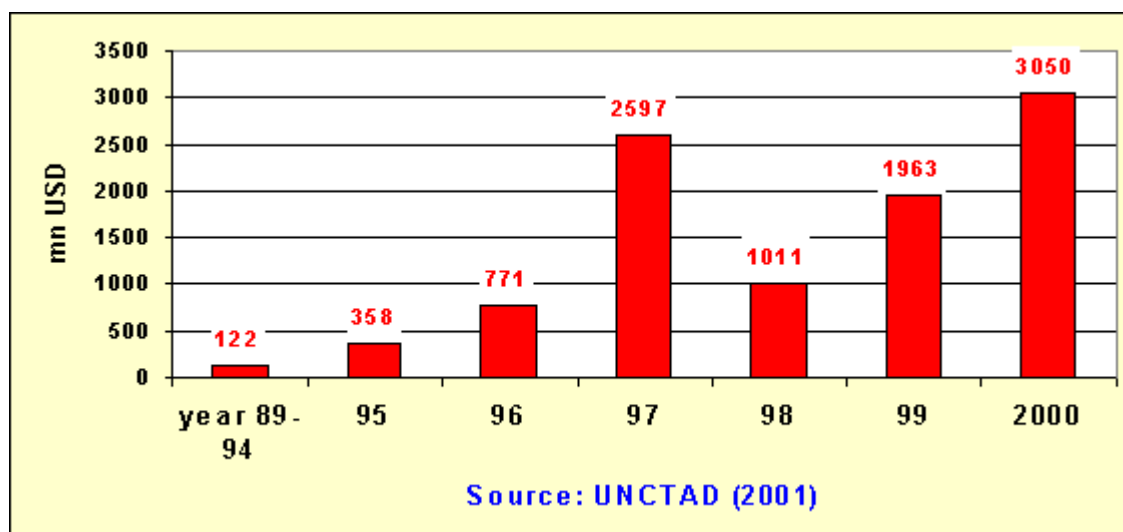
**Table 2. Outward and Inward FDI Stocks of Transition Economies  
by the End of 2000 (USD billion)**

	<b>Outward FDI stock</b>	<b>Inward FDI stock</b>	<b>Outward/Inward FDI stock ratio (%)</b>
<b>All transition economies</b>	<b>19.8</b>	<b>150.3</b>	<b>13</b>
Commonwealth of Independent States (CIS)	12.5	41.9	30
Central and East European countries (CEEC)	7.3	108.4	7
<b>Some selected transition economies</b>			
(ranked by the amount of the outward FDI stock)			
Russia	11.6	19.2	60
Hungary	2.0	19.9	10
Poland	1.5	36.5	4
Croatia	1.1	4.9	22
The Czech Republic	0.8	21.1	4
Slovenia	0.7	2.9	24
Azerbaijan	0.7	4.5	16
Estonia	0.4	2.8	14
Slovakia	0.3	4.9	6

Source: Author's calculations on the basis of UNCTAD data, 2001.

The recorded FDI outflow from Russia has multiplied since the mid-1990s. In fact, the FDI outflow in 2000 was almost 10-fold the amount five years earlier. The recorded FDI outflow from Russia exceeded USD 3 billion in 2000. The growing FDI outflow suggests that the financial position of

some Russian companies has significantly improved, making them increasingly interested in expanding abroad. The outflow is expected to increase along with more active participation of Russia in the globalisation (see Table 3).



**Table 3. Recorded Annual FDI Outflow from Russia**

In this context, it should be stressed that recorded FDI covers only a small part of total capital outflow from Russia abroad: capital flight, which represents the core of Russian capital outside Russia, has to be taken into account in trying to reach an accurate estimate of outflows. A rough calculation shows that during the period 1994–1998 recorded annual FDI outflow was, on average, only 8% of capital flight (see Table 4).

**Table 4. Recorded FDI Outflow, Capital Flight and Russia's Exports**

(USD billion)

	1993	1994	1995	1996	1997	1998
<b>1999</b>						
<b>2000</b>						
Recorded FDI outflow	0.1*	0.1	0.4	0.8	2.6	1.0
2.1						
3.0						
Capital flight	n.a.	15.0	7.5	26.0	11.0	21.0
**						
25						21
Exports	59.7	68.1	81.3	88.4	86.7	73.9
74.3						
105.2						
FDI outflow/capital flight	...	0.7%	5.3%	3.1%	23.6%	4.8%
10.0						
12.0%						
FDI outflow/exports	0.2%	0.1%	0.5%	0.9%	3.0%	1.4%
2.8%						
2.9%						

\*1988–1993 annual average. \*\*EIU, 2001.

Sources: IMF, 2001; UNCTAD, 2001; Bank of Finland, 2001; authors' calculations.

This article aims at answering to the following questions: (1) how has the internationalisation of Russian corporations evolved; (2) where has the Russian FDI landed; and (3) which corporations are behind the FDI outflow from Russia. In order to answer to the aforementioned questions, the research describes foreign operations of Russia's most internationalised corporations, and discusses the role of their foreign activities in integrating Russia with the global economy.

## 2. EVOLUTION OF RUSSIAN CORPORATIONS' EXPANSION ABROAD

Bulatov (1998, 69–70) aptly describes the early stages of internationalisation of Russian corporations as follows: "*Russian firms started to invest abroad in the last decades of the 19th century. Capital was exported primarily to China and Persia, as well as to Mongolia. During the period 1886-1914, Russian capital exports amounted to about 2.3 billion roubles (equivalent to \$33 bn at 1996 prices). Between the two World Wars, the Union of Soviet Socialist Republics did not withdraw all outward investment, although it radically diminished it. To support trade with Turkey, Iran, Afghanistan and Mongolia, a whole net of trading companies was established and operated in those traditional partner countries. Trading affiliates in Western Europe were added later. Also, various banks, transport, insurance and other types of firms were established abroad with Soviet capital. In the post-war period, the number of companies abroad increased somewhat.*"

Even if the number of Soviet business units abroad grew after the Second World War, their numbers remained modest. It is important to divide the international operations of Soviet enterprises into two main categories: (1) Soviet companies in socialist countries and (2) Soviet companies in non-socialist countries.

***Soviet companies in socialist countries:*** Covert resistance from small countries in the Council for Mutual Economic Assistance (CMEA) towards intensifying collaboration with the Soviet Union, as well as various economic difficulties, kept inter-enterprise co-operation rather modest. By the mid-1980s, only a handful of CMEA joint enterprises with Soviet participation had been established. Matejka (1988) names eight CMEA joint enterprises with Soviet participation: the Ulan-Bator Railway (activity: railway network, location: Mongolia, year of establishment: 1949), Wismut AG (uranium mining, GDR, 1954), Erdenet (copper mining, Mongolia, 1973), Mongolsovtsvetmet (gold mining, Mongolia, 1973), Petrobaltic (prospecting Baltic petroleum and gas, Poland, 1975), Interlichter (Danube-Maritime freight, Hungary, 1978), Robot (scientific co-operation, Czechoslovakia, 1985), and Bulgarian-Soviet Enterprise (manufacture of electronic components, Bulgaria, 1986).

Perestroika expanded foreign trade rights in the USSR. As a consequence, the number of CMEA enterprises with Soviet participation multiplied. Already by 1990, at least 175 Soviet-owned joint ventures were registered in the European CMEA countries: 68 in Poland, 50 in Hungary, 38 in Bulgaria, 21 in Yugoslavia and four in Czechoslovakia (Cheklina, 1991).

***Soviet companies in non-socialist countries:*** Operations by Soviet companies were also rare in non-socialist countries. USSR firms had around 30 subsidiaries in developing countries and 116 subsidiaries in OECD countries at the end of 1983. Most of them (over 60%) operated in current EU member states. For example, nine Soviet-owned enterprises were established in Finland, including Suomen Petrooli (oil trading), Teboil (petrol stations), and Konela (sales of Soviet automobiles). Only five were registered in the USA: the Amtorg Trading Corp. in New York, Morflot America Shipping Inc. in Clark, the Marine Resources Co. in Seattle, Sovfracht Ltd in New York and Belarus Machinery Inc. in Milwaukee (Zaleski, 1986; McMillan, 1987).

The overwhelming majority of Soviet subsidiaries in the West operated on markets for oil, metals, timber, chemicals, machinery and vehicles. In addition to export promotion, Soviet subsidiaries

serviced foreign-trade activities of the USSR, operating in transportation, banking and the insurance business. Soviet organisations were also active abroad in tourism and travel (Hill, 1986).

Soviet parent companies usually had majority ownership of their Western-based units. The Soviet parent company had a majority stake in nine firms out of ten. Pursuing majority ownership was a natural investment strategy, since Soviet corporations wanted to maintain direct control over their business activities rather than acting as a profit-seeking investor.

The number of main Soviet corporations abroad was less than 500 before the dissolution of the USSR. Despite their modest number, they played an important role in supporting Soviet exports. They were selling about 40% of Soviet oil and oil product supplies abroad, 60% of timber, paper, and cellulose exports and more than 50% of exports of civilian-use manufactured goods (Sokolov, 1991a; 1991b). In evaluating the role of Soviet enterprises abroad, it is important to remember that their operations were not motivated by business logic alone. Soviet firms abroad also served the aims of the USSR's foreign policy (Hamilton, 1986).

### 3. WHERE HAS THE RUSSIAN EAGLE LANDED

At the end of the 1980s, less than 500 Soviet enterprises operated abroad. A decade later, a multitude of Russian companies had been established beyond Russian borders. Already in the mid-1990s the Russian Ministry of Internal Affairs reported that some 60 000 firms with Russian capital are registered in international taxation havens. It is generally believed that huge amounts of Russian capital have ended in the Bahamas, Cyprus, the Virginia Islands or other liberal locations of the globe. Besides these liberal destinations, thousands more Russian firms have been set up elsewhere.

For example in Finland, over 1500 joint-stock companies with Russian management participation had been registered by the beginning of 2001 (Jumpponen, 2001). Cumulative Russian FDI in Finland was USD 260 million compared with a lower figure of USD 230 million for Finnish FDI in Russia (Liuhto & Jumpponen, 2001).

Goskomstat data indicate that the overwhelming majority of the Russian direct investment in 1999 went to the USA and the EU, especially in the UK (see Appendix 1). Goskomstat offers much lower figures for Russian investments in ex-socialist states than some Western sources. For example, PlanEcon Report (2001) suggests that at least 1/3 of the Russian FDI has landed in the former socialist block (see Table 5).

According to a preliminary investigation, some USD 1.3 billion of Russian capital has been placed in Poland. Russia with her 3%-stake is the 10th largest investor in Poland. The five biggest foreign companies in Poland are: (1) France Telecom (USD 3.20 billion), (2) Fiat (1.69), (3) Daewoo (1.55), (4) Citibank (1.30), and (5) Gazprom (1.25).

Gazprom has equity investments at least in two Polish companies: Gas Trading and Europol Gaz. The overwhelming majority of Gazprom's investments in Poland have been placed in Europol Gaz. Gazprom holds a 48%-stake of Europol Gaz. This company owns the gas pipeline, Yamal-Europe, inside the Polish territory.

Besides Gazprom, hundreds of smaller Russian firms have been registered in Poland. Almost 170 companies with Russian ownership were founded in the year 1999 alone. Despite their large number, the total investment into these companies was only USD 63 million in 1999. With this sum, Russia covered only 0.13% of the total foreign direct investment flow into Poland in that particular year (CSO, 2000).

Bulgaria and Ukraine have attracted together almost USD 500 million. The biggest single investments in these countries have been laid in the gas and oil industry. For example, Lukoil, the biggest Russian oil company, has bought an oil refinery both in Bulgaria and Ukraine.

Russian investments in the Baltic States exceed USD 150 million. The Russian eagle has found the most comfortable nest in Latvia, where most of Russian capital has landed. Russian corporations have invested approximately USD 100 million in Latvia. The three biggest Russian investments in Latvia are: (1) Latrostrans (Investor: Transneftprodukt; Investment: USD 62 million; Field of operation: transit of oil products), (2) Latvijas Gaze (Gazprom; USD 19 million; gas supply), and (3) Lukoil Baltija (Lukoil; USD 15 million; transit of oil products and their trade). These three investments cover over 90% of the Russian FDI in Latvia.

Russian energy companies have also been active in other Baltic States. Lukoil is the biggest Russian investor in Lithuania. It has invested some USD 25 million to Lithuania through Euro Oil Invest, an investment company based in Luxembourg. Correspondingly, Gazprom is eyeing a stake in the Lithuanian gas company. Moreover, both Lukoil and Yukos are aiming at acquiring a stake in Mazeikiu oil refinery. Should one of them be able to acquire a 26%-stake of Mazeikiu oil refinery, the total Russian FDI in Lithuania will jump from the current level 20 million close to USD 100

million.

Energy companies are behind the majority of the Russian FDI also in Estonia. The biggest Russian investor is Gazprom, which holds almost one third of the Estonian gas company, Eesti Gaas.

Besides equity stakes in the Baltic States, Gazprom is eyeing gas companies all over Central Eastern Europe and the CIS. Gazprom aims at buying new stakes of Central East European gas companies (for example SPP in Slovakia and MOL in Hungary) or increasing its share in companies, where it already possesses a foothold (for example Latvijas Gaze in Latvia).

**Table 5. Russian FDI Stock in Selected Transition Economies in 2000**

Target country [4]	Russian FDI stock (USD mn) (%)	Share	Rank among investor countries
Poland	1 172	2.8	10.
Ukraine	314	8.1	4.
Bulgaria (as of Sep./2001)	205	4.7	9.
Latvia	100	7.3	5.
Hungary (as of 1999) *	53	0.6	12.
Estonia	39	1.4	10.
Lithuania	23	1.0	16.
Slovakia (as of Sep./2001)	9	1.6	
Romania (as of Sep./2001)	4	0.05	
Slovenia (1996-2000)	1	0.04	28.

\* The figure comprises the FDI inflow from all the ex-USSR.

Sources: Hunya & Stankovsky, 2001; Liuhto, 2002b; national sources.

As the research is at its initial stage, the researcher is not able to provide a comprehensive picture on the foreign nests of the Russian eagle. A further study concerning Russian investments in the CIS might contribute to the knowledge of the Russian outward FDI. Such an investigation might reveal that significant Russian investments can also be found in Azerbaijan, Kazakhstan and Turkmenistan. Moreover, a closer investigation on the Russian business expansion in the current EU member states and EU applicant countries would show to what extent the Russian enterprises have already been integrated into the enlarging European Single market.



#### 4. WHO ARE BEHIND THE RUSSIAN BUSINESS EXPANSION

### ABROAD

UNCTAD (2001) provides a list of the largest non-financial transnational companies based in Central and Eastern Europe. Three Russian companies, namely Lukoil, Primorsk Shipping Company and Far Eastern Shipping Company, are on the list. In fact, Lukoil was ranked the largest transnational corporation based in ex-socialist countries by its assets abroad. Its assets abroad exceed USD 3 billion. Foreign assets of the other two Russian companies are considerably smaller, less than USD 300 million (see Table 6).

**Table 6. 25 Largest Non-Financial Transnational Corporations Based in**

**Central and Eastern Europe (ranked by foreign assets, 1999)**

Corporation	Country	Industry	Assets		Sales		Employment	
			(USD mn)		(USD mn)		(employees)	
			Foreign	Total	Foreign	Total	Foreign	Total
Total								
<b>1. Lukoil Oil Co. 000 120 000</b>	<b>Russia</b>	<b>Petroleum &amp; gas</b>	<b>3 236.0</b>		<b>8 422.0</b>	<b>4 642.0</b>	<b>10 903.0</b>	<b>10</b>
2. Latvian Shipping Company	Latvia	Transportation	459.0	470.0	191.0	191.0	1 124	1 748
3. Hrvatska Elektroprivreda	Croatia	Energy	296.0	2 524.0	10.0	780.0		15 877
4. Podravka Group	Croatia	Food & pharmac.	285.9	477.1	119.4	390.2	501	6 898
<b>5. Primorsk Shipping Co.</b>	<b>Russia</b>	<b>Transportation</b>	<b>256.4</b>	<b>444.1</b>	<b>85.3</b>	<b>116.5</b>	<b>1 308</b>	<b>2 777</b>
6. Gorenje Group 6 691	Slovenia	Domestic applian.		236.3	618.1	593.3	1 120.6	590
<b>7. Far Eastern Shipping Co.</b>	<b>Russia</b>	<b>Transportation</b>	<b>236.0</b>	<b>585.0</b>	<b>134.0</b>	<b>183.0</b>	<b>263</b>	<b>8 873</b>
8. Pliva Group	Croatia	Pharmaceuticals	181.8	915.9	384.7	587.6	2 645	7 857
9. TVK Ltd *	Hungary	Chemicals	175.4	553.2	248.9	394.3	927	5 225
10. Motokov	Czech Rep.	Trade	163.6	262.5	260.2	349.1	576	1 000
11. Skoda Group Plzen	Czech Rep.	Diversified	139.1	973.4	150.7	1 244.5	1 073	19 830
12. Atlanska Plovidba	Croatia	Transportation	138.0	154.0	46.0	46.0		509
13. MOL Hungarian Oil & Gas	Hungary	Petroleum & gas	126.3	3 131.0	582.4	3 129.6	833	20 684
14. Krka	Slovenia	Pharmaceuticals	120.7	447.0	209.0	283.0	429	3 218
15. Adria Airways	Slovenia	Transportation	116.3	129.2	103.4	104.6	19	597
16. Petrol	Slovenia	Petroleum & gas	90.4	574.9	105.7	924.4	75	2 356

17. Slovnaft *	Slovakia	Petroleum & gas	82.8	1 367.1	627.5	1 035.7	119	7 540
18. Zalakeramia	Hungary	Clay product	69.0	125.0	39.0	64.0	2 022	3 066
19. Matador	Slovakia	Rubber & plastics	51.9	305.0	34.0	203.4	5	3 878
20. Malev Hungarian Airlines	Hungary	Transportation	43.3	206.3	274.1	367.5	49	3 162
21. KGHM Polska Miedz 28 300	Poland	Mining		34.0	1 266.0	265.0	1 155.0	25
22. Croatia Airlines	Croatia	Transportation	29.9	288.6	60.2	77.9	39	842
23. Elektrim	Poland	Diversified	21.0	1 228.0	42.0	874.0	62	26 475
24. Petrom National Oil Co.	Romania	Petroleum & gas	19.0	2 970.0	211.0	2 041.0	67	82 054
25. Intereuropa	Slovenia	Trade	16.0	168.0	17.0	136.0	511	2 103

\* TVK and Slovnaft have been taken over by MOL.

Source: UNCTAD, 2001.

Lukoil is the largest Russian oil company in terms of production. Even though a significant share of the company's oil reserves are located abroad, only a small percentage of oil production occurs outside Russian borders. However, production abroad is growing rapidly. The company has been purchasing stakes in foreign oil fields, especially in the Caspian Sea region and in Egypt. Besides participating in development of oil fields, Lukoil has acquired controlling stakes in foreign refineries (in Bulgaria, Romania, and Ukraine).

Lukoil has expanded its sales to foreign markets, since prices of oil products are considerably higher outside Russia. Currently, some 40% of the company's production is exported. In addition to exports, oil production and refining abroad, Lukoil has also been involved in retailing petroleum outside Russia. At the end of 2000, Lukoil acquired the US company, Getty Petroleum Marketing. This was the first step by Lukoil towards US expansion and also the first time when a Russian firm acquired a publicly traded US company. The acquisition of Getty shows that Lukoil not only orients towards post-socialist markets. In July 2001, Lukoil acquired a Canadian exploration and production company, Bitech Petroleum, which has operations in Colombia, Egypt, Morocco, and Tunisia. Currently, Lukoil is eyeing a stake in Hellenic Petroleum, a Greek oil company (see Appendix 2).

According to UNCTAD, Primorsk Shipping Corporation is the second most transnational Russian firm after Lukoil. Primorsk Shipping Corporation has a fleet of 45 tankers and one dry-cargo vessel, 30 of which are registered in Cyprus and Singapore. The third most international Russian enterprise, Far Eastern Shipping Company, has around 100 vessels, registered both in Russia and abroad. The company has agencies in Australia, China, New Zealand, North America, and the UK.

It is likely that more Russian corporations would appear on the list if they disclosed all their assets abroad. The point of describing foreign operations of the 15 biggest Russian exporters is precisely to try and fill such gaps in the list (see Appendix 3). The biggest Russian company missing from the list is indisputably Gazprom. The company has equity investments in approximately 20 countries. The major stakes of Gazprom abroad are listed in Table 7.

Gazprom's equity investments outside Russia have mainly been conducted to support the

corporation's exports and to improve its position in the global gas business. Gazprom is the world's biggest natural gas exporter, exporting almost 175 billion cubic meters (bcm) of gas to over 25 countries. Its five most important target markets, namely Germany, Ukraine, Italy, France and Belarus, account for over 60% of the company's exports. In 2000, Gazprom's exports amounted to over USD 15 billion (Liuhto, 2002a).

Yukos is Russia's biggest exporter, after Gazprom and Lukoil. Yukos does not export only, but it has already started activities abroad. In October 2001, Yukos acquired a stake in a British-Norwegian engineering firm, Kvaerner, and purchased its London-based subsidiary, which is involved in engineering services in on-shore oil and gas projects. In addition, Yukos took over Kvaerner Process Technology's units in France, Italy, Switzerland and the UK. Even before the acquisition of a stake in Kvaerner, Yukos already had subsidiaries in the Baltic States and in the USA. In the Balkans, Yukos has been working with a Croatian company, Jadranski Naftovod, to modernise the Adria pipeline.

The third largest Russian oil company, Surgutneftegaz, produced 40 million tonnes of oil in 2000. The company also has around 500 petrol stations in Russia. Although the company currently has only domestic subsidiaries, Surgutneftegaz is heavily focused on exports, which represented almost 80% of total company revenues in 2000.

Besides exports, Tyumen Oil Company (TNK) has also other activities abroad. TNK acquired the Lishichansk refinery in Ukraine through its subsidiary, TNK-Ukraina, in 2000. TNK also owns a filling station chain in Ukraine. TNK has signed an agreement with Petrol (Slovenia) to co-operate in marketing oil products in Bosnia-Herzegovina, Croatia, Macedonia and Yugoslavia.

**Table 7. Major Equity Stakes of Gazprom in Europe**

Country		Stake (%)	Activities
<b>Austria</b>	GHW	50	Gas trading
<b>Belarus</b>	Belgazprombank	35	Banking
	Brestgazoapparat	51	Gas equipment manufacturing
<b>Bulgaria</b>	Topenergo	50	Gas trading and transport
<b>Estonia</b>	Eesti Gaas	31	Gas trading and transport
<b>Finland</b>	Gasum Oy	25	Gas transportation and marketing
	North Transgas Oy	50	Construction of a pipeline under the Baltic Sea
<b>France</b>	FRAgaz	50	Gas trading
<b>Germany</b>	Ditgaz	49	Gas trading
	Verbundnetz Gas	5	Gas transportation and marketing
	Wingas	35	Gas transportation and storage
	Wintershall Erdgas Handelshaus	50	Exclusive trader until 2012 for all the gas exported by Gazexport (Russia)
	Zarubezhgas Erdgashandel	100	Gas trading
<b>Greece</b>	Prometheus Gaz	50	Marketing and construction
<b>Hungary</b>	Borsodchem	25	Petrochemicals
	DKG-EAST Co. Inc.	38	Oil and gas equipment manufacturing
	General Banking and Trust Co. Ltd.	26	Banking
	Panrusgas	40	Gas trading and transport
	TVK	14	Petrochemicals
<b>Italy</b>	Promgaz	50	Gas trading and marketing
	Volta	49	Gas trading and transport

<b>Latvia</b>	Latvijas Gaze	16	Gas trading and transport
<b>Lithuania</b>	Stella-Vitae	30	Gas trading
<b>Moldova</b>	Gazsnabtransit	50	Gas trading and transport
<b>Netherlands</b>	Peter-gaz	51	Gas trading
<b>Poland</b>	Europol Gaz	48	Gas transport
	Gas Trading	35	Gas trading
<b>Romania</b>	WIROM	25	Gas trading (controlled through Wintershall Erdgas Handelshaus)
<b>Slovakia</b>	Slovrusgaz	50	Gas trading and transport
<b>Slovenia</b>	Tagdem	8	Gas trading
<b>Turkey</b>	Gamma Gazprom	45	Gas trading
<b>Ukraine</b>	Druzhkovskiy zavod gazovoi apparatury	51	Gas equipment manufacturing
	Institut Yuzhniigiprogaz	40	...
<b>United Kingdom</b>	Interconnector	10	Gas pipeline from Bacton (UK) to Zeebrugge (Belgium)
<b>Yugoslavia</b>	JugoRosGaz	50	Gas trading and transport
	Progress Gas Trading	50	Gas trading

Source: UNCTAD, 2001.

Rosneft, a state-owned oil company, already participated in international operations during the Soviet era. In Ukraine, the company manages a quarter of the Black Sea Kherson oil refinery under a two-year agreement with existing shareholders KazakhOil and Alians. In Kazakhstan, Rosneft has agreements with Texas-based First International Oil Corporation (to explore oil fields) and with Florida-based Itera (to form an oil and gas extracting holding). Rosneft operates a petrol station network in Bulgaria and Romania jointly with the Russian-Belarus company, Slavneft.

In June 2001, Rosneft signed a contract with Colombia's state oil company Ecopetrol and two other Colombian companies to launch oil extraction at a block in southern Colombia. In Algeria, Rosneft has made a similar agreement with a local state-run oil company Sonatrach on development of an oil field. In Iraq, Rosneft has signed an agreement to develop oil fields, but implementation depends on the United Nations sanctions policy. Rosneft is expected to launch projects also in Sudan.

In summer 2001, Slavneft signed a joint-venture deal to develop an oil field in Sudan. The production sharing agreement with the government is to be signed before the end of 2001. Also, Slavneft has been screening possibilities for participating in projects in Iran, where it has already been involved in maintaining oil wells. The company has also signed a co-operation agreement in Iraq, although it is restricted by the UN sanctions. Slavneft, which co-ordinates Russian oil deliveries to Slovakia, intends to acquire filling stations in the country.

Tatneft has activities in exploration, development and production of crude oil and petroleum products as well as refining and marketing. Tatneft's export markets include former Soviet republics and EU countries, such as Germany and France. Tatneft has a representative office in Iraq, where the company carries out oil drilling. Tatneft is expected to launch projects also in Sudan.

The other Russian major oil companies, Sibneft and Bashneft have been less active in internationalisation, except for export activities. Both companies currently export some 30% of their oil production. Table 8 summarises main operations of Russian oil majors abroad.

**Table 8. Selected Operations of Russian Oil Majors Abroad**

**(in order of appearance in the text)**

<b>Company</b>	<b>Markets</b>	<b>Operations</b>
<b>Lukoil</b>	Azerbaijan, Egypt, Iraq, Kazakhstan	Oil production
	Bulgaria, Romania, Ukraine	Oil refining
	Azerbaijan, Baltic States, Czech Republic, Kazakhstan, Moldova, Ukraine, US	Petroleum retailing
	UK	Sales office
	Various countries	Oil exports
<b>Yukos</b>	Croatia	Pipeline project
	Latvia, US	Marketing
	Various countries	Oil exports
<b>Surgutneftegaz</b>	Various countries	Oil exports
<b>TNK</b>	Ukraine	Oil refining
	Ukraine	Petroleum retailing
	Various countries	Oil exports
<b>Rosneft</b>	Algeria, Colombia, Iraq, Kazakhstan	Oil production
	Ukraine	Oil refinery management
	Bulgaria, Romania	Petroleum retailing
	Various countries	Oil exports
<b>Slavneft</b>	Bulgaria, Romania	Petroleum retailing
	Iran	Maintaining oil wells
	Sudan	Oil production
	Various countries	Oil exports
<b>Tatneft</b>	Iraq	Oil production
	Various countries	Oil exports
<b>Sibneft</b>	Various countries	Oil exports
<b>Bashneft</b>	Various countries	Oil exports

Although oil and gas corporations dominate Russian outward FDI, also some Russian metal companies have expanded operations abroad. Alrosa is one of the world's leading diamond mining companies, with one fifth of world raw diamond output and total revenues of USD 1.6 billion in 2000. In the Soviet era, the company operated as the state's diamond monopoly. In 1992, Alrosa was re-established to explore and mine diamond fields and to sell rough diamonds. In addition to its exports, Alrosa has representative offices in Angola, Belgium, Israel and the UK. In Angola, Alrosa is an equity partner in the Catoca diamond mine, which produced diamonds worth USD 150 million in 2000. The company has expressed interest in expanding its operations further in Africa, namely in Botswana, Namibia and Tanzania.

Norilsk Nickel accounts for a major chunk of global production of nickel, palladium, platinum and other rare and semi-precious metals. In October 2000, the firm formed a joint venture, Norgem, with the Belgian company Sogem to sell Norilsk's cobalt products. Norgem was registered in Belgium with Norilsk Nickel taking a 51%-stake. In Cuba, Norilsk Nickel has agreed to invest some USD 300 million to complete a nickel ore plant, which the USSR started to build in 1983. Recently the company announced that it is setting up a joint venture with a Canadian company, Argosy Minerals, to study co-operation in eastern Australia.

Russia is the fourth largest steel producer in the world and 60% of output is exported. Severstal is the largest Russian steel producer. The company has expanded its sales, especially in North America and Asia, focusing particularly on export of specialised and value-added steel products in order to avoid anti-dumping disputes.

Russian Aluminium was formed in 2000 by integration of several smelters and aluminium plants in Russia. The conglomerate produces about 70% of primary aluminium in Russia. Asia has become the main market of Russian Aluminium, taking 50% of exports. The USA takes 30% and Europe the remaining 20% of exports. In Ukraine, Russian Aluminium owns three-quarters of the Nykolayiv aluminium plant. The corporation has contracted to build another plant in Ukraine, the Pervomaysk plant, during the next three years. In Guinea, the company has signed a deal to manage a local bauxite plant for 25 years and develop the large Dian-Dian bauxite deposit. Russian Aluminium has also purchased a refinery in Romania and operates in Armenia via a joint venture.

Over 75% of output from the Novolipetsk Metallurgical Combine (NLMK) is exported to the Middle East, North America, Europe, South-East Asia and China. Besides exports, NLMK has expressed interest in international co-operation. NLMK also has plans to participate in the restructuring of Poland's steel industry. Table 9 summarises foreign operations of the most international Russian mining and metallurgical companies.

**Table 9. Selected Operations of Major Russian Metallurgical Companies Abroad (in order of appearance in the text)**

<b>Company</b>	<b>Markets</b>	<b>Operations</b>
<b>Alrosa</b>	Angola	Diamond exploration
	Angola, Belgium, Israel, UK	Representative office
	Various countries	Exports
<b>Norilsk Nickel</b>	Belgium	Marketing joint venture
	Cuba	Building a nickel plant
	New Caledonia, New Guinea	Ore plant

	Various countries	Exports
<b>Severstal</b>	Various countries	Exports
<b>Russian Aluminium</b>	Romania	Refinery
	Armenia, Ukraine	Aluminium production
	Guinea	Bauxite, aluminium production
	Various countries	Exports
<b>NLMK</b>	Various countries	Exports

5. BUSINESS EXPANSION ABROAD SUPPORTS RUSSIA'S

OVERALL GLOBALISATION

International economic ties provide benefits to all the parties involved, which none of them would be able to gain by acting alone. In addition, economic integration is an effective way of building international stability. Examination of FDI inflow to Russia makes it clear that foreign direct investments have not been able integrate Russia as closely as the CEEC into Pan-European economic collaboration. Modest FDI inflow to Russia is mainly due to the harsh business environment there: deficient business legislation, inconsistent execution of laws, heavy bureaucracy, and high corruption have kept potential foreign investors outside Russian borders.

If foreign firms have not succeeded in integrating Russia with global business, Russian corporations, via their outward FDI, have integrated their country with foreign markets more intensively than companies of any other transition economy. Statistical data suggest that Russian corporations have expanded not only in the West but also in CEEC and the former Soviet republics.

Particularly strong expansion towards ex-CMEA countries has created some suspicions about the ultimate goal of integration, focused on whether expansion of Russian companies abroad will lead to greater integration of Russia in the global economy or to new block building. Figure 1 clarifies the alternatives.

Figure 1. Two Extreme Scenarios of Expansion by Russian Corporations Abroad

Scenario A Globalising Russia

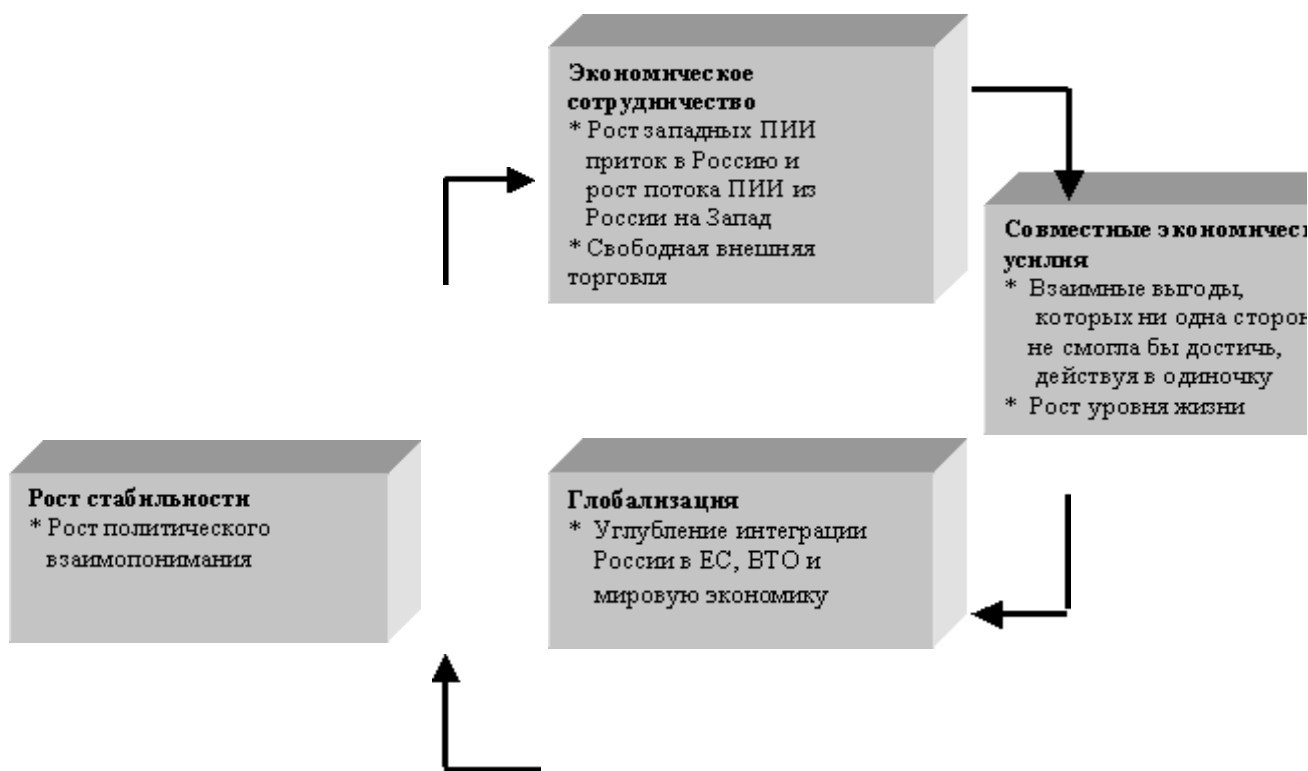
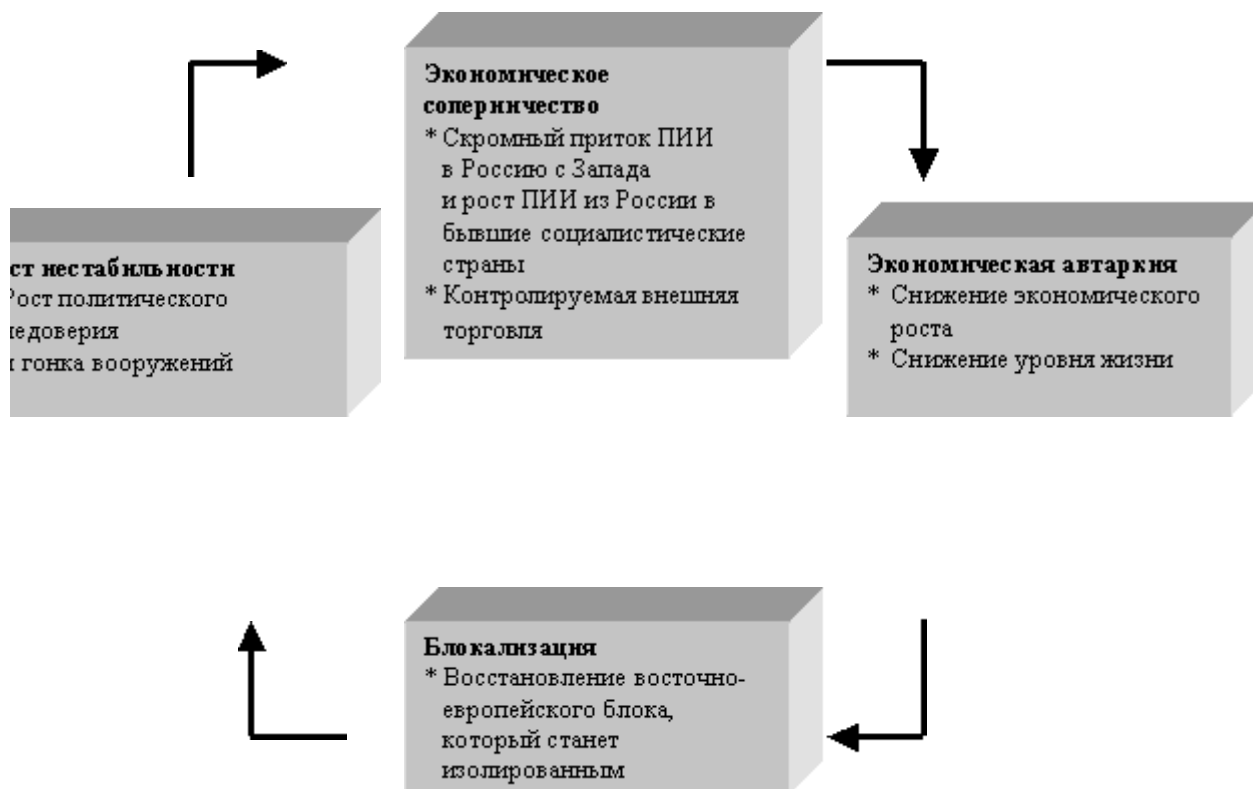


Figure 1. Continued



## Scenario B

## 'Blocalising' Russia



The figure presents the two extreme possible outcomes of expansion abroad by Russian corporations. If business objectives dominate their internationalisation strategies, Russian corporations will easily find an appropriate niche in the Pan-European and the global business.

Through Russian investment in the current and enlarged EU, Russia would benefit directly from the advantages of enlargement. Moreover, Russian investment in the EU would support EU-Russian trade. Increasing EU-Russian trade would bring Russia closer to the cooperation of the Western nations, which in turn would ultimately strengthen stability in Europe and beyond.

It can be concluded that with more active participation in the global business Russian corporations can prepare the Russian economy for the approaching WTO membership. Moreover, the activities of Russian companies in the enlarging EU market facilitate the building of the Common European Economic Space between Russia and the EU [5].

## References

- Bank of Finland (2001) *Russian Economy, The Month in Review 5/2001*, Institute for Economies in Transition, Bank of Finland, Helsinki.
- Bulatov Alexander (1998) Russian Direct Investment Abroad – Main Motivations in the Post-Soviet Period, *Transnational Corporations* 7/1, pp. 69–82.
- Cheklina Tatiana (1991) Joint Ventures in Eastern Europe, *Foreign Trade* 8, pp. 25–27.
- CSO (2000) *Unpublished statistics on foreign direct investments in Poland by the end of 1999*, Central Statistical Office of Poland.
- EBRD (2001) *Transition Report 2001*, European Bank for Reconstruction and Development, London.
- EIU (2001) Russia, Country Report, Economist Intelligence Unit, London.
- Expert-RA (2001) [www.raexpert.ru](http://www.raexpert.ru).
- Goskomstat (2000) Rossiya i strani mira, Statisticheskii sbornik, Moskva.
- Hamilton Geoffrey (ed.) (1986) *Red Multinationals or Red Herrings? The Activities of Enterprises from Socialist Countries in the West*, Pinter, London.
- Hill Malcolm (1986) Soviet and Eastern European Company Activity in the United Kingdom and Ireland, In *Red Multinationals or Red Herrings? The Activities of Enterprises from Socialist Countries in the West*, Geoffrey Hamilton (ed.), Pinter, London, pp. 17–87.
- Hunya Gabor & Stankovsky Jan (2001) *Foreign Direct Investment in Central and East European Countries and the Former Soviet Union*, WIIW–WIFO Database, June.
- IMF (2001) *World Economic Outlook 2001*, International Monetary Fund, Washington.
- Jumpponen Jari (2001) 'Made in Russia' in Finland – Some Preliminary Findings, In *East Goes West – The Internationalisation of Eastern Enterprises*, Kari Liuhto (ed.), Lappeenranta University of Technology, Lappeenranta, pp. 223–232.
- Liuhto Kari (2002a) *Russian Oil and Gas - A Source of Integration*, Lappeenranta University of Technology, Lappeenranta.
- Liuhto Kari (2002b) *Russian Direct Investments in Poland*, In *Business in Poland*, Ed. by Kari Liuhto, Lappeenranta University of Technology, Lappeenranta.
- Liuhto Kari & Jumpponen Jari (2001a) International Activities of Russian Corporations - Where Does Russian Business Expansion Lead, *Russian Economic Trends*, 10/3-4, pp. 19-29.
- Matejka Harriet (1988) More Joint Enterprises within CMEA, In *Planned Economies, Confronting the Challenges of the 1980s*, Hardt John and Macmillan Carl H. (ed.) Cambridge University Press, Cambridge, pp. 171–189.
- Macmillan Carl H. (1987) *Multinationals from the Second World, Growth of Foreign Investment by Soviet and East European State Enterprises*, MacMillan Press, London.
- PlanEcon Report (2001) *Various issues*.
- Sokolov Sergei (1991a) Companies Set Up Abroad with Soviet Capital, *Foreign Trade* 10, pp. 15–17.
- Sokolov Sergei (1991b) Sovetskii kapital za rubezhom, *Ekonomika i Zhizn* 14, p. 1.
- UNCTAD (2001) *World Investment Report 2001*, United Nations, New York.

Zaleski Eugene (1986) Socialist multinationals in developing countries, in *Red Multinationals or Red Herrings? The Activities of Enterprises from Socialist Countries in the West*, Geoffrey Hamilton (ed.), Pinter, London, pp. 156–184.

Various articles in numerous business reviews and Internet sources.

## Appendix 1. Where has the Russian capital landed?

### Annual investment outflow from Russia (USD thousand)\*

	1995	1996	1997	1998	1999	
<b>TOTAL</b>		<b>216 122</b>	<b>141 509</b>	<b>447 068</b>	<b>982 622</b>	<b>7 683 485</b>
<b>CEEC</b>						
Albania		...	...	...	...	...
Bosnia and Hercegovina		...	...	...	...	...
Bulgaria		3	99	0.1	11 031	...
Croatia		...	...	1 907	1 907	...
Czech Republic		...	6	...	...	513
Estonia	...	475	...	604	...	...
...						
Hungary		55	...	...	241	22 391
Latvia		...	25	...	...	0.1
Lithuania		199	...	...	...	...
Poland		1 294	40	...	...	1 415
Romania		68	...	...	...	...
Slovakia		...	...	...	...	...
Slovenia		170	...	...	...	...
<b>EU</b>						
Austria		143	...	...	1 364	27 364
Belgium		5 809	5 382	233	3 049	4 472
Denmark		16	6	...	1956	210
Finland		351	349	...	3886	980
France		...	...	...	...	...
Germany		167 200	2 865	191 615	166 431	525 795
Great Britain	1 553	26 230	157 584	...	150 353	...
Greece		22	1 382	417	42	12 372

Ireland	6 408	258	1516	176	...
Italy	9 544	75	...	257	279
Luxembourg	...	...	85	...	...
Netherlands	...	50	20	...	296 739
Portugal	...	...	...	...	...
Spain	...	8	...	...	...
Sweden	...	...	649	...	39 058
<b>Selected other countries</b>					
China	1 490	...	26	1 725	2 997
Cyprus	...	8 158	21	181	18 677
Switzerland	7 388	1081	1 043	88	15 732
US	4 368	76 507	75 243	764 515	6 274 667

*\* Goskomstat data indicates that only a minority of Russian investment has ended up in transition countries, whereas the findings of some Western researchers refer that a much larger share has landed in these countries.*

Source: Goskomstat, 2000.

**Appendix 2. Industry Structure in the Russian Oil and Gas Market**

	Reserves	Production	Ownership division		
			2000 Government	Management	Minority
<b>Gazprom</b> , million tonnes of oil equivalent*	29,427.7	474.4	40	25	35
Oil, million tonnes	627.7	9.8			
Gas, billion cubic meters	32,000.0	516.2			
<b>TNK</b> , million tonnes of oil equivalent	2,895.6	38.5	0	100	0
Oil, million tonnes	2,631.9	36.1			
Gas, billion cubic meters	293.0	2.6			
<b>Lukoil</b> , million tonnes of oil equivalent	1,934.3	70.0	17 **	23	60
Oil, million tonnes	1,836.0	67.5			
Gas, billion cubic meters	109.2	2.8			
<b>Yukos</b> , million tonnes of oil equivalent	1,919.6	53.7	0	84	16
Oil, million tonnes	1,520.9	52.1			
Gas, billion cubic meters	443.0	1.8			
<b>Surgut</b> , million tonnes of oil equivalent	1,108.1	50.5	0	60	40
Oil, million tonnes	784.2	40.1			
Gas, billion cubic meters	359.9	11.5			
<b>Tatneft</b> , million tonnes of oil equivalent	881.1	25.0	33	32	35
Oil, million tonnes	864.0	24.4			
Gas, billion cubic meters	19.0	0.7			
<b>Sidanko</b> , million tonnes of oil equivalent	788.4	10.2	0	94	6
Oil, million tonnes	718.2	9.3			
Gas, billion cubic meters	78.0	1.0			
<b>Sibneft</b> , million tonnes of oil equivalent	717.3	17.4	0	88	12
Oil, million tonnes	671.6	17.0			
Gas, billion cubic meters	50.8	0.5			
<b>Itera</b> , million tonnes of oil equivalent	n.a. 16.2	0	100	0	

Oil, million tonnes	n.a.	0.3			
Gas, billion cubic meters	226.3	17.7			
<b>Rosneft</b> , million tonnes of oil equivalent	4,079.5	17.2	96	0	4
Oil, million tonnes	1,573.0	13.0			
Gas, billion cubic meters	2,785.0	4.7			
<b>Slavneft</b> , million tonnes of oil equivalent	331.0	12.6	87 **	0	13
Oil, million tonnes	286.0	12.0			
Gas, billion cubic meters	50.0	0.6			
<b>Bashneft</b> , million tonnes of oil equivalent	374.9	12.1	65	0	35
Oil, million tonnes	365.0	11.8			
Gas, billion cubic meters	11.0	0.3			

\* Note: one billion cubic meters of natural gas equals 0.9 million tonnes of oil equivalent.

\*\* The government plans to privatise 6% of Lukoil and 20% of Slavneft in 2002.

Sources: EBRD (2001) & Sagers (2001) & Liuhto (2002)

**Appendix 3. Russia's Top 50 Exporters \***

Name	Industry	Exports (USD mn)	
		2000	1999
1. <b>Gazprom</b>	<b>Oil and gas industry</b>	<b>15933.1</b>	<b>10409.4</b>
2. <b>Lukoil</b>	<b>Oil and gas industry</b>	<b>5713.8</b>	<b>2931.0</b>
3. <b>Yukos</b>	<b>Oil and gas industry</b>	<b>5247.5</b>	<b>2548.2</b>
4. <b>Tyumen Oil Company (TNK)</b>	<b>Oil and gas industry</b>	<b>3477.5</b>	<b>1236.3</b>
5. <b>Tatneft</b>	<b>Oil and gas industry</b>	<b>2629.5</b>	<b>953.4</b>
6. <b>Norilsk Nickel</b> <b>1835.5</b>	<b>Non-ferrous metallurgy</b>		<b>2246.9</b>
7. <b>Russkiy Aluminii</b>	<b>Non-ferrous metallurgy</b>	<b>2161.6</b>	<b>2451.1</b>
8. <b>Surgutneftegaz</b>	<b>Oil and gas industry</b>	<b>1700.5</b>	<b>750.6</b>
9. <b>Sibneft</b>	<b>Oil and gas industry</b>	<b>1699.9</b>	<b>950.1</b>
10. <b>Rosneft</b>	<b>Oil and gas industry</b>	<b>1294.5</b>	<b>752.6</b>
11. <b>Severstal</b>	<b>Ferrous metallurgy</b>	<b>1067.1</b>	<b>875.5</b>
12. <b>Slavneft</b>	<b>Oil and gas industry</b>	<b>1018.1</b>	<b>480.1</b>
13. <b>Alrosa</b>	<b>Non-ferrous metallurgy</b>	<b>877.4</b>	<b>730.3</b>
14. <b>Novolipetsk Metallurgical Combine</b>	<b>Ferrous metallurgy</b>	<b>866.0</b>	<b>619.0</b>
15. <b>Bashneft</b>	<b>Oil and gas industry</b>	<b>858.7</b>	<b>639.9</b>
16. <b>Magnitogorsk Metallurgical Combine</b>	<b>Ferrous metallurgy</b>	<b>849.2</b>	<b>679.0</b>
17. <b>ONAKO</b>	<b>Oil and gas industry</b>	<b>681.6</b>	<b>413.5</b>
18. <b>Sidanko</b>	<b>Oil and gas industry</b>	<b>662.3</b>	<b>331.7</b>
19. <b>Itera</b>	<b>Oil and gas industry</b>	<b>657.1</b>	<b>1252.5</b>
20. <b>TVEL</b>	<b>Engineering</b>	<b>571.0</b>	<b>362.0</b>
21. <b>Moscow Oil Company</b>	<b>Oil and gas industry</b>	<b>529.4</b>	<b>-</b>
22. <b>Siberia-Urals Aluminum Company</b>	<b>Non-ferrous metallurgy</b>	<b>506.4</b>	<b>506.1</b>
23. <b>Evrzholding</b>	<b>Non-ferrous metallurgy</b>	<b>470.8</b>	<b>264.3</b>
24. <b>Bashneftekhim</b>	<b>Chemical and petrochemical industry</b>	<b>442.8</b>	<b>427.7</b>



25.	Uralskaya GMK	Non-ferrous metallurgy	424.3	298.7
26.	Nizhnekamskneftekhim	Chemical and petrochemical industry	225.4	-
27.	Antey Concern	Engineering	403.4	236.0
28.	Ilim Pulp Enterprise	Wood, timber and pulp industry	340.0	250.0
29.	AvtoVAZ	Engineering	335.7	155.1
30.	Metalloinvest	Ferrous metallurgy	257.6	188.3
31.	Akron	Chemical and petrochemical industry	222.2	229.2
32.	Oskol Electrometallurgical Combine	Ferrous metallurgy	213.1	179.7
33.	RAO UES	Electrical power	212.3	185.7
34.	Volgograd Aluminum	Non-ferrous metallurgy	189.9	174.6
35.	Salavatnefteorgsintez	Chemical and petrochemical industry	180.2	93.6
36.	Sibur	Chemical and petrochemical industry	179.3	0.2
37.	Polarnoye Siyaniye	Oil and gas industry	169.1	28.8
38.	Ammophos	Chemical and petrochemical industry	168.1	196.7
39.	Lebedinsky GOK	Ferrous metallurgy	166.6	31.6
40.	Tolyattiazot	Chemical and petrochemical industry	165.8	81.9
41.	Aviastar	Engineering	155.2	67.2
42.	VSMPO	Non-ferrous metallurgy	155.0	131.9
43.	Volga	Wood, timber and pulp industry	151.6	149.1
44.	Kristall	Engineering	141.2	181.5
45.	Yakutugol	Coal industry	140.4	130.2
46.	Kondopoga	Wood, timber and pulp industry	137.3	113.9
47.	Interkhimprom	Chemical and petrochemical industry	125.6	51.9
48.	Arkhbum	Wood, timber and pulp industry	113.5	73.1
49.	Syktvykar LPK	Wood, timber and pulp industry	110.0	
76.6				
50.	Kuibyshevazot	Chemical and petrochemical industry	102.6	66.7

\* Companies discussed in this article are in bold.

Source: Expert-RA, 2001.

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[1] The inward direct investment stock of all TEs was only slightly bigger than that of Spain alone (USD 142 billion).

[2] EBRD gives the FDI stock data on the net basis, and hence, its figures are considerably lower than data offered by UNCTAD or Vienna Institute for International Economic Studies (WIIW). According to EBRD, the cumulative FDI inflow to Russia is some USD 10 billion, whereas UNCTAD indicates that the FDI stock in Russia is some USD 20 billion. WIIW suggests that the FDI inward stock of Russia is USD 23 billion. Russian sources report sometimes even higher FDI figures than WIIW due to fact that they misleadingly include portfolio investments and foreign loans into the FDI inflows.

[3] The outward direct investment flows from transition economies are still modest compared with the developed Western economies. For example, the outward direct investment stock of Ireland, the least active investor among the EU countries, is USD 16 billion. Correspondingly, the UK is the most active investor with her outward investment stock totalling USD 900 billion. The USA has the biggest outward direct investment stock in the world, almost USD 1250 billion i.e. over 100 times bigger of the respective figure for Russia (UNCTAD, 2001).

[4] Russian investments in the Czech Republic are very modest. During January-September 2001, FDI inflow from Russia to the Czech Republic was only USD 0.27 million i.e. only 0.01% of the total FDI inflow.

Russian companies have also indirectly invested to many transition economies. Russian corporations may sometimes be detected behind significant investments from Cyprus, Panama, or Luxembourg to transition economies.

[5] Though the president of the WTO Michael Moore stated in January that Russia's membership could be reality already in the middle of 2003, Russia's vice-minister of economy Maksim Medvedkov, the leader of the Russian negotiation team is less optimistic. Russia has to implement many changes, like reform of the Russian customs operations, reducing custom tariffs and cutting subsidies, before the WTO membership can be gained. Correspondingly, the planning of the Common European Economic Space has just started last year. Even if these goals cannot be accomplished overnight, they clearly show that Russia is opening towards the West i.e. she seems to follow the globalisation scenario presented in Figure 1.