

Roots of Russia's Economic Dilemmas: Liberal Economics and Illiberal Geography

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ONE OF THE STRIKING ASPECTS of Russia's economic course in the 1990s is the dearth of capital investment, both foreign and domestic. Investment is an essential requirement if Russia is to experience a sustained economic recovery from the shocks of Soviet disintegration and the often incoherent economic policies pursued in the early post-Soviet years. By any standard—for example the levels of foreign direct investment going into the East Central European countries or the capital requirements of reversing the general obsolescence of Russia's transport, communications and even mining infrastructures—the Russian economy is starving for direct capital investment. Why has this been the case? A widespread view has it that uncertainties about political stability and legal and administrative reliability have scared off investors from a risky Russian market and caused them to look elsewhere. While we are far from wishing to contest this interpretation, it may not go far enough in explaining the hesitancy of investors to commit to substantial, long-term projects in the Russian Federation. Even were Russia to establish effective and impartial public institutions, there would remain for many investors significant hurdles in the form of the unusually high costs of production in Russia, especially for large-scale infrastructure projects and the development of distant Siberian regions. This article advances the thesis that there are specifically Russian aspects of economic geography, in the form of severity of climate, distance (including the dislocation of population as compared to natural resources) and the preponderance of costly land transport over cheap sea transport, that tend to make the costs of production in Russia a multiple of what they are almost everywhere else in the world. Under these circumstances, the Russian state must play a central role in economic development if Russia is to develop as a civilisation, as distinct from certain raw materials enclaves.

The article examines the infrastructure crisis facing the Russian economy after a decade of cumulative capital depreciation, the scale of investment requirements over the next decade, and the ways in which geographical factors impinge upon the costs of production and the decision to invest. In the conclusion, an essentially Keynesian approach will be applied to the problem of Russian economic development in an increasingly liberal international political economy.

TABLE 1

IMPACT OF 70% DEVALUATION OF THE RUBLE (AUGUST 1998) ON CAPACITY TO SERVICE EXTERNAL DEBT

	<i>GDP (\$ billion)</i>	<i>GDP growth (%)</i>	<i>Debt service as % of GDP (\$)</i>
1997	436	+ 0.4	6.2
1998	278	- 4.6	11.8
2000	198	+ 7.0	14

The magnitude of Russia's economic contraction

Russia produces 17% of the world's crude oil, 25–30% of its natural gas (with more reserves than the rest of the world combined) and 10–20% of all non-ferrous, rare and noble metals; it is the second largest producer of brown coal, third in timber logging, fourth in production of electric energy, cast iron, steel, iron ore, cereals and meat, fifth in black coal and mineral fertilisers etc.¹ In such areas of production and in reserves of gold, silver, diamonds, platinum, chromium, nickel, tin, lead, zinc, copper and bauxite, Russia is regularly among the top five in the world.² Unfortunately, Russia's economic performance has not lived up to the promise of its resource endowment. From 1990 through 1998 the Russian economy was mired in a depression far greater than that which struck the capitalist world in the 1930s,³ and even today the country has little prospect of participating in the global market as a competitive industrial or post-industrial economic power. With a dollar gross domestic product⁴ half that of the Netherlands (i.e. ca. \$198 billion in 2000) and a foreign trade turnover similar to Denmark's, Russia's exports are dominated by the sale of oil and gas and are virtually non-existent in other, value added sectors. (As a result of the August 1998 financial crash, which saw a 70% devaluation of the ruble, the dollar value of Russia's GDP is estimated to have declined from \$436 billion in 1997 to \$278 billion by the end of 1998.⁵ Relatedly, the ratio of Russia's foreign debts to its dollar GDP increased from 28% in January 1998 to nearly 90% in 2000.⁶ Annual debt service as a percentage of dollar GDP increased from 6.2% in 1997 to 11.8% in 1998 and is estimated at 13.9% in 2000.⁷ No wonder the Russian government has been seeking some way to avoid servicing its inherited Soviet-era debt. Table 1 summarises this situation.

The consequences of Russia's decade-long economic decline have been dramatic, not only for Russia's internal condition but also for its international standing. By the end of the 1990s China, which had more than doubled its national income during the decade after having doubled it also in the 1980s, was beginning to approach and perhaps even to exceed Russia in several indicators of economic development. Consider the comparisons in Table 2. Even were these trends not to continue, the 1990s would have witnessed one of the most astounding changes in the economic balance of power to have taken place between two major countries in such a short period of time.

The capital depreciation of Russia

A key indicator of Russia's economic prospects lies in the possibility of injecting

TABLE 2
SOME ECONOMIC COMPARISONS BETWEEN CHINA AND RUSSIA

	<i>China</i>	<i>Russia</i>
Foreign direct investment (1999) (\$ billion)	40	2.89
Gross domestic product, 2000 (\$ billion)	1,062	198
GDP per capita (\$)	840	1,360
GDP per capita (PPP) (\$)	4,700	4,660
Foreign exchange reserves (\$ billion)	167	28
Foreign debt/GDP (%)	17.7	75
GDP 1999:1990	2:1	1:2
Main exports	Machinery and transport	Raw materials

Sources: *Financial Times Survey*. *China*, 13 November 2000; Economist Intelligence Unit, *Country Forecast*. *Russia* (July 2000).

massive amounts of capital investment in order to repair, maintain and develop the country's industrial, transport and communications infrastructure.⁸ Without such investment, Russian Prime Minister Mikhail Kasyanov has stated, Russia 'will remain in the backyard of the world economy'.⁹ Yet in spite of Russia's privileged position in many natural resources, human capital and wage structure, capital investment in Russia in the late 1990s was less than a fifth of the 1990 level.¹⁰ No doubt using 1990 as a base year may exaggerate the subsequent decline, given the disproportionate place occupied by investment, especially military-related investment, in the Soviet economy. Even so, the consequences of the capital drought that has afflicted the country since then are dramatic enough: the capital stock of the country is rapidly wearing out. The average age of industrial equipment in 1995 was 14.1 years, compared with 10.8 in 1990, 9.5 in 1980 and 8.5 in 1970. Just 9.7% of industrial equipment in 1996 (versus 10.9% in 1995) was less than five years old, compared with 26.6% in 1992, 29.4% in 1990, 35.5% in 1980 and 40.8% in 1970. Fully 23% of the capital stock of industry was older than 20 years in 1995, compared with 10.8% in 1990, 9.5% in 1980 and 8.4% in 1970.¹¹ To take another gauge, the rate of renewal of fixed capital stock was 6.9% in 1990 versus 1.0% in 1998. Only in the fuels and food sectors did the capital replacement rate reach as high as 2%.¹² Research and development declined from 1.03% of Russian GDP in 1991 to 0.32% in 1997 (as against a G-7 norm of 2–2.5%).¹³ Table 3 summarises this situation.

The implications of this draining of Russia's productive substance are dramatic: whereas a team of Russian economists recently prepared a best-case scenario in which Russia might attain its 1990 GDP around 2008, these figures and the trends they reflect suggest that even their worst-case scenario—in which Russia attains its 1990 GDP in 2015—may be optimistic.¹⁴ President Putin himself is on record as stating that Russia would need 15 consecutive years of growth at 8% per annum to enable the Russian economy to attain the current per capita income level of Portugal. To give some specific figures, in autumn 2000 economists were estimating that Russia required \$50 billion per year for the modernisation of the capital stock.¹⁵ If we break

TABLE 3
INDICES OF THE RUSSIAN CAPITAL INFRASTRUCTURE

<i>(A) Average age of industrial equipment (years)</i>	
1995	14.1
1990	10.8
1980	9.5
1970	7.5
<i>(B) Equipment less than five years old (%)</i>	
1996	9.7
1995	10.9
1991	26.6
1990	29.4
1980	35.5
1970	40.8
<i>(C) Industrial equipment older than 20 years (%)</i>	
1995	23
1990	10.8
1980	9.5
1970	8.4
<i>(D) Rate of renewal of fixed capital stock (% p.a.)</i>	
1998	1.0
1990	6.9
<i>(E) Research and development as % of Russian GDP</i>	
1996	0.32
1991	1.03

down Russia's investment requirements by sector, we shall have a better sense of the urgency of the problem and the scale of investment required if Russia is to have any chance of developing its economy in a comprehensive and balanced way in the decade to come.

Much of the Russian railway system, which accounts for 73% of all freight moved in Russia (when measured in terms of tons/km), is considered by Western observers to be in 'very poor repair'. On the highways, 'poor road quality' means lower truck speeds and thus higher transport costs, which can often reach 50% of the costs of production. Some 40% of Russia's villages cannot be reached on tarmac roads, while there are no Western-type highways in the whole country. Russia's ports are generally in a 'poor state of repair', while the Russian maritime fleet is the oldest in the world. Fully half of Russia's electricity generation and distribution network, as well as the industry's fixed assets, are past the end of their intended productive lives, the consequence being that 'Russia could face serious supply squeezes by the middle of the decade. Electricity generation threatens to become a major constraint on growth'.¹⁶ Indeed, summing up the indicators of the condition of Russia's economic infrastructure—including electricity generation, quality of ports, the cost and availability of office space, retail and wholesale distribution networks, general technological endowments, railways and roads—the Economist Intelligence Unit forecast in July 2000 that 'in none of these areas is major progress expected in Russia in the forecast period' (through 2004).¹⁷ Even in the critical oil and gas sector, which typically earns half of Russia's hard currency export receipts and accounts for as much as two-fifths

TABLE 4
OIL AND GAS TRENDS

(A) <i>Average volume of exploratory drilling in the oil and gas sector (million metres p.a.)</i>	
1999	1.16
1994–1998	1.4
1990	5.3
(B) <i>Oil production (million tons)</i>	
1999	305
1998	303
1989	462
1988	569

of the federal government's budget revenue,¹⁸ the average volume of exploratory drilling in the 1994–98 period was 1.4 million metres per year, compared with 5.3 million metres in 1990; the figure for 1999 was 1.16 million metres, about one-fifth of the 1990 level, a figure that corresponds to the depreciation of the Russian capital stock across sectors. As existing oil fields are depleted and fewer new ones are coming into production, Russian oil production continues to decline, as it did from 569 million tons in 1988 and 462 million tons in 1991 to 303 and 305 million tons in 1998 and 1999 respectively.¹⁹ Annual investment of \$10–11 billion is required in the oil sector alone, compared with \$2–4 billion in the 1990s.²⁰ By contrast, Russian oil companies have been quite active in Western investment markets. Lukoil, for example, has opened 1300 petrol stations in the United States under the Getty name, and through the Italian firm Avanti it has completed the purchase of 700 petrol stations in Europe and is contemplating the purchase of several refineries in the United States and the Czech Republic. The state controlled company Slavneft saw \$1.3 billion revenue in 2000 from its joint venture with a Belgian partner in Belgium.²¹ Table 4 summarises this situation.

Under these circumstances, Russia's short to medium-term economic prospects are highly constrained. A decade or more of neglect of infrastructure cannot easily be made good. For example, in 2000, in response to the rise in world oil prices, Russian producers decided to increase production significantly. Yet they could at most squeeze an extra 20 million tons of production (about 7% of total production), mainly by opening old wells that had been mothballed. Only Russia's Far Eastern oil fields can significantly compensate for the long-term decline in Russian production but a decade and a half of neglect by the state has constrained this avenue seriously.²²

The capital requirements for the recovery and development of Russia's economic infrastructure are thus massive. In the oil and gas sector, the typical cost of bringing a new field upstream is \$8–10 billion. Unified Energy Systems, the state electricity monopoly, requires \$30–50 billion in capital investment over the next decade but currently has no plans for investing in generating equipment in 2001 owing to \$5 billion in unpaid bills.²³ Vladimir Ushakov of Alstom, which sells power stations, calculates that Russia needs to invest \$7 billion per year over the next 15 years to repair and replace increasingly worn out power stations; in 1999 just \$1 billion was invested.²⁴ Some of the consequences may be seen in the widespread collapse of the

power infrastructure in Arctic Russia and the Far East, where in mid-January 2001, amidst temperatures of -4°F degrees Fahrenheit (i.e. -20°C), there were daily 15-hour power cuts.²⁵ Anatolii Chubais, head of Unified Energy Systems, stated that the cause of the energy supply crisis in the city of Artem was the destruction of the municipal energy system: 'Locking attachments and materials of non-ferrous metals have been stolen. The pipelines are run down. They have been hit by the freezing temperatures. The heating units lack essential parts. The basements in buildings are partially flooded'.²⁶ Approximately \$40 billion in capital investment in the telecommunications industry is required over the next decade.²⁷ Comparable sums would have to be invested in the railway system, the ports, the oil and gas complex etc. To give one more particular, in late June 2001 the Prime Minister, Mikhail Kasyanov, proposed that the sum of \$75 billion be invested in the foreseeable future in Russia's decrepit and overburdened highway network.²⁸

These sums would appear in principle to be within the capacity of the Russian state to start financing, in light of the current world price of oil (ca. \$25–30 per barrel versus \$14 to produce a barrel of West Siberian crude), a current account surplus of nearly \$30 billion or 15% of dollar GDP, a large foreign trade surplus (\$60 billion in 2000), \$3–4 billion in foreign arms sales per year,²⁹ as well as several hundred billion dollars in Russian capital secreted in foreign bank accounts. Indeed, to some extent, this has been happening, as 1999 saw a 4.5% increase in gross fixed investment—the first time that there had been an increase in gross investment in the 1990s—with an apparent increase of over 15% in 2000. Several points are worth noting, however: first, these are increases from a very low level, one determined by the unprecedented depression that Russia suffered in the 1990s. Gross fixed investment for 1999, at 248 billion rubles (measured in 1995 rubles), amounts to approximately \$920 million at the contemporary exchange rate, or about 2% of Russia's actual capital requirements for that year. If we include foreign direct investment (FDI), perhaps \$3–5 billion can be added to that figure for a total sum of domestic and foreign investment of \$4–6 billion, less than 15% of Russia's capital requirements (assuming that those are in the area of \$50 billion per year). In the words of Economic Development and Trade Minister German Gref, the current volume of FDI 'is absolutely insufficient for accomplishing the tasks facing the country'.³⁰

Second, the sectors that are attracting the most capital investment are food, trade and catering and transport (69% of total investment in 1999 and 80% of all FDI) and, to a lesser extent, fuels and power. Public sector infrastructures that are critical for private sector economic development (e.g. ports, highways, railways, domestic aviation, public buildings, the education system etc.) remain poor orphans even within a relatively impoverished investment climate. Third, most of this recent investment is derived from firms' internal resources, which in Kasyanov's view is simply not enough.³¹ The banking system has yet to be reformed and made into a viable source of venture and investment capital for the country's enterprises. In the words of a recent IMF report, the Russian banking system is 'an accident waiting to happen'.³² Finally, Western investment experience in Russia has been less than satisfactory: Western oil companies have experienced at least \$10 billion in costs and losses in the 1990s, according to energy specialist Thomas Walde of Dundee University,³³ while Western direct investment in Russia has been a fraction of investment in countries

TABLE 5
INDICES OF FOREIGN DIRECT INVESTMENT

<i>(A) Foreign direct investment, 1990–1998 (\$ billion)</i>	
Russia	10
Hungary	16
Poland	20
<i>(B) Foreign direct investment as a % of GDP</i>	
East Central Europe	4.6
Russia	1.6
<i>(C) Foreign direct investment stock per capita (\$)</i>	
Russia	136
Hungary	1908
Czech Republic	1587
Poland	797

like Hungary, Poland and the Czech Republic (\$10 billion for Russia versus \$20 billion in Poland and \$16 billion in Hungary).³⁴ In East Central Europe FDI equals 4.6% of GDP versus 1.6% in Russia. FDI stock per capita in 1999 was \$1908 in Hungary, \$1587 in the Czech Republic, \$797 in Poland and \$136 in Russia.³⁵ Table 5 summarises this situation.

Moreover, Russian enterprises have invested significantly more capital abroad, typically in short-term instruments of less than three months duration, than foreigners have been investing in Russia (\$7.66 billion versus 4.78 billion, respectively, for the first half of 2000).³⁶ This is quite apart from the question of illegal capital flight, which is conservatively estimated by the Russian Security Council at more than \$20 billion in 1998 and more than \$30 billion in 1999 and 2000, respectively.³⁷

What, then, are the conditions that would trigger the upsurge of capital investment—private and public, Russian and foreign—that is required in order to underwrite and sustain a Russian economic recovery?

Enabling conditions of Russian recovery: politics versus geography?

It is almost a truism among Western and even most Russian observers that the root causes of Russia's prolonged economic decline in the 1990s and the chief barriers to Russian economic development in the future lie in the political and administrative sphere, i.e. 'high levels of political uncertainty', and consequently high degrees of political risk for investors, reams of burdensome and contradictory regulations, at all levels of government, an uncertain and volatile legal environment, unstable ownership rights, excessive taxation, poor corporate governance, corruption etc.³⁸ In the words of The Economist Intelligence Unit, 'institutional ineffectiveness remains the main constraint on improving Russia's performance'.³⁹ In this view, political stability, rule of law and sound money would enable Russia to reap the benefits of several factors that would appear to work in favour of a rapid and substantial Russian economic recovery, such as reserves of underemployed labour, raw materials and plant and equipment; productivity gains from new market sectors; shifts from defence to consumer production; and substantial reserves of domestic savings, mainly in dol-

lars.⁴⁰ As someone who has written extensively and early on the ‘crisis of the Russian state’,⁴¹ I shall not dispute that the establishment of a system of state administration capable of performing the requisite tasks of governance, especially the provision of public goods, is a necessary precondition for Russian economic development. Without doubt, the precipitous collapse of the authority of the CPSU in 1990 and 1991 and the difficulties that Russian leaders have faced since then in establishing a state that can adequately perform the minimal functions of government have seriously constrained Russia’s ability to implement a consistent and effective economic policy of *any* colouration. These irreducible tasks of governance include raising sufficient tax revenue to fund the agencies and activities of the state, namely:

- (a) exercising an effective monopoly on the use of force for public purposes;
- (b) enforcing the law and public order;
- (c) policing the frontiers;
- (d) suppressing, or better yet deterring, secessionist rebellion;
- (e) regulating the macro-economy; and
- (f) honouring the fiduciary obligations of the state, at home and abroad.

The difficulties that the Russian state has experienced throughout the 1990s in fulfilling these tasks of governance have tended to undermine the government’s ability to manage the unprecedentedly complex and interdependent factors implied by the idea of the transition from communism to capitalism. One enduring consequence of state failure in Russia, apart from the general incoherence of various economic ‘reforms’, has been capital flight and reluctance to invest directly in the country, which has propelled the obsolescence of the capital stock described in the previous section. This lack of investor confidence, combined with the lack of interest of the state, has allowed key elements of Russia’s economic infrastructure—ports, roads, railways, the electricity grid, telecommunications, even to some extent the oil sector—to deteriorate to the point where they are close to physical collapse as integrated national systems. Russia’s economic future, indeed whether there is a future for Russia at all as we have known it in recent centuries, depends centrally on whether substantial sums of investment capital can be committed to the salvation, maintenance and development of Russia’s industrial, transport, communications and energy infrastructure. Throughout the mid-1990s Russia’s credit risk has been ranked by the *Economist* as higher than that of the Ivory Coast, Kenya and Nigeria and just barely below that of Iraq.⁴²

Yet it is at least debatable whether the stabilisation of the political system and the development of the legal system are sufficient conditions to trigger the magnitude of investment needed to develop Russia as a whole, as distinct from privileged raw materials enclaves within it. First, the question of the state cannot be separated from the kind of state that we are speaking about (e.g. liberal or social democracy) and the relation of that state to a particular political-economic environment (e.g. liberal or state capitalism) and the inevitable gradations between these respective poles. Second, the investment decision is shaped by the simple question: invest in what, over what period of time in order to derive acceptable revenues in relation to the costs of production? In this respect, the costs of production are influenced not simply by the political and legal uncertainties involved but by all factors that determine the costs of

doing business, including those related to economic geography. Because the investment decision involves a guess, however calculated, about the future, political stability and legal reliability are essential. Yet because this decision involves profits, it also entails a guess about the ratio of revenues generated by production compared with the costs of production.

Those costs of production in Russia tend to be fairly high, quite apart from the question of Soviet legacies of inefficiency. In short, the combined and mutually reinforcing impact of (a) the severity of Russia's climate, (b) the vastness of the Russian space and (c) the predominance across this bi-continent of expensive land transport over cheap sea transport means that in most areas of the Russian economy the intrinsic and irreducible costs of infrastructure, as of production itself, are two to three times as expensive as almost anywhere else in the world. Consequently, it is questionable whether Russia can develop as an entire socioeconomic unit under predominantly liberal market auspices: an administratively strong and interventionist state even in a market-based economy—one that protects Russian industry and directs resources from profitable (mainly natural resource-based) sectors to unprofitable but vital sectors and regions (e.g. Arctic and Siberian settlement)—is an essential prerequisite to Russian welfare, as the typical costs of production will not normally be assumed by private investors with free access to the world's generally more attractive investment possibilities. In other words, to what extent does economic geography make Russian economic development incompatible with the free movement of capital?⁴³

We shall not advance an argument of strict geographical determinism. The Russian economy experienced the fastest growth rate in the world in the several decades before 1914 and modernised sufficiently, if brutally, to survive the Nazi onslaught and harrass the United States for nearly half a century. Russia has thus modernised when it has been open to the West and when it has been closed to it; it has also modernised in the presence of the market and without it. Yet in each of these cases, the Russian state—in one case a mercantilist state,⁴⁴ in the other a monopolist state—played a decisive role in framing the modernisation process. More to the point, Russia has never developed under conditions of free movement of capital and possibly cannot do so.

Why not? The three mutually interacting factors of economic geography mentioned above—severity of climate, distance (including the growing dislocation between population and natural resources) and predominance of expensive land over cheap water transport—have sustained the case for the state in Russian economic development.⁴⁵ First, Russia cannot be compared with Canada, an analogy often made by those with a passing knowledge of geography and by many Russian intellectuals themselves.⁴⁶ Russia's climate is the most severe in the world, with the exception of Mongolia's. That severity is measured not by the coldness of the winters but by the contrast between the length and coldness of the winters and the brevity and heat of the summers in Russia's continental climate. By contrast, Canada, though a large country with an ostensibly northern location, has a small population (about a fifth the size of Russia's), excellent river and other transport possibilities that provide easy access to the world's oceans, with a moderate climate where the bulk of the population lives. That is, 80% or so of the Canadian population lives within a

two-hour drive of the US border, making Canada economically speaking the northernmost periphery of the richest country in the world. The industrially developed parts of Canada correspond to the climate of Rostov *oblast'* or Krasnodar *krai*, in Russia's deep south, although the Canadian climate is more humid. In this respect, economic geography favours Canada immensely over Russia. Still, it is interesting to note that the productivity of Canadian farming is roughly comparable with that of the later Soviet period (ca. 20 centners per hectare versus 70–80 centners per hectare in northwestern Europe), that Canada employs (like the Soviet *sovkhos*) industrial-scale farming as a rule, and that in those areas like Edmonton and Winnipeg, where the climate is colder than in Moscow, the economy (as in much of Russia) is devoted mainly to raw materials extraction (i.e. timber and petrochemicals).⁴⁷ Thus, in terms of climate, Russia should be compared with Mongolia and perhaps north-central Canada, not the Canada which is geographically and economically integrated with the United States.

The second factor of economic geography that Russians contend with is their country's size, i.e. not simply the vast expanse of territory spanning eleven time zones but the discrepancy between the main population centres, still in European Russia, and the location of Russia's treasure of natural resources, which are predominantly located in Asiatic and Siberian Russia. As Bate has observed, 'the location of resources for industry of sufficient scale to sustain long-term development is generally far removed from the main markets of European Russia. The cost of resource development in ever more remote frontier regions simply compounds the cost of overcoming distance'.⁴⁸ Distance itself thus becomes a kind of cost of production under these circumstances. Moreover, the size of the country combined with the low population density means that per capita costs of public infrastructure tend to be higher than elsewhere. To give one instance, the density of Russia's road network is measured at 25 km per 1000 km², versus 1000 km of road per 1000 km² in Western Europe (and 800 km of road per 1000 km² in the United States).⁴⁹ Moreover, the severity of Russia's climate, as measured by the extremity of annual temperature fluctuations, combined with the preponderance of clay soils that tend to trap moisture near the surface, make Russia's roads highly vulnerable to potholes and buckling, thereby magnifying the costs of maintenance throughout a transcontinental landmass.⁵⁰ Yet the hindrance of distance is magnified by the third geographical factor, which is that, owing to the south-north flow of most of Russia's rivers and the difficulty of access to the world's oceans, land transport predominates over sea transport. As every student of military logistics knows, the latter is vastly cheaper than the former.⁵¹ In Russia, land transport tends to be five times as costly as sea transport.⁵² (In 1998 railways and trucks carried 834 and 584 million tons of merchandise traffic respectively, versus 36 and 93 million tons for ship and river traffic respectively, i.e. a ratio of 11:1.⁵³ Indicatively, whereas fully 51% of Western Europe lies within 200 km of the sea, this is true for only 2% of European Russia.)⁵⁴ Taken together, these three constants of Russian economic geography—an extremely severe climate, vast distances between resources and consumers, and costly means of transport over these distances—mean that, as a rule, the costs of production in Russia, especially for large-scale infrastructure projects, tend to be several times higher than in almost any other country in the world.⁵⁵ Reinforcing the problem, the disintegration

TABLE 6

PRODUCTIVITY OF AGRICULTURAL LABOUR,
1991 (VALUE ADDED PER WORKER, \$)

Netherlands	41338
Finland	37803
USA	29544
Norway	26586
Canada	25153
Japan	17253
South Korea	7384
Hungary	3508
Poland	1210
Indonesia	545
Thailand	504
Russia	476

of the Soviet Union saw the centre of gravity of the Russian state shift further northwards in terms of both landmass and population (if we compare the USSR with the Russian Federation): the geographical centre of the USSR was 57°25' north compared with 60°25' north for the Russian Federation, while the population centre shifted from 52° north in the USSR to 55°30' north in the Russian Federation.⁵⁶ (Recall that the northern border of the continental United States runs along the 49° north parallel from Minnesota to Washington state.) In the mid-1990s, for example, the average costs of production in Russia were 2.8 times higher than in Japan, 2.7 times higher than in the United States, 2.3 times higher than in France, Germany and Italy, and twice as high as in the United Kingdom, and this with a labour force working at a small fraction (in dollar terms) of average wages in these countries.⁵⁷

The argument can be illustrated by any number of sectors in the Russian economy. Most famously, the productivity of Russian agriculture in terms of value added has historically been much lower than in Western Europe.⁵⁸ Poor soil, unreliable rainfall and brief growing seasons tended to keep Russian agriculture near the subsistence level in pre-modern times and to perhaps one-third (at best) the productivity of Central European farming. Relatedly, whereas in Western Europe in the 16th–18th centuries the work of several dozen peasants was required to support one soldier or official, in Russia the labour of several hundred was needed.⁵⁹ If anything, the destruction of the peasant culture during Stalin's catastrophic collectivisation campaign of the 1930s lowered the productivity of Soviet agriculture further: it was not until after 1953 that 1913 levels of per capita agricultural production were attained and in the 1990s, with the collapse of state subsidy, the productivity of Russian farming fell from a Soviet-era high of 20 centners per hectare to 14 between 1992 and 1997 (compared with 70–80 in northwestern Europe). The low marginal productivity of most Russian farming has historically hindered the development of agricultural surpluses which in West European countries sustained the rise of a reasonably prosperous peasant and yeoman farmer class, the development of trade and cities and the associated infrastructure of modernity captured under the rubric of 'civic capital' and 'civil society'.⁶⁰ This is dramatically illustrated in Table 6, outlining the relative

productivity of agricultural labour in several countries in the last year of the Soviet Union, as measured in value added (in dollars) per agricultural labourer.⁶¹

In the energy and related areas comparable economics apply. Consider that permafrost covers 59% of the territory of the Russian Federation (i.e. 10 million km²), extending continuously from Arkhangel in the northwest through the Russian Far East. Rocks and permanently frozen soil can attain considerable thickness, ranging from a few metres to 500 metres in Western Siberia and up to 1000–1500 metres in Yakutia (Sakha). There are about seven months of continuous frost in this region. As Radvanyi has noted, ‘this requires sophisticated construction techniques to avoid the effects of thermal conduction induced by the construction of buildings or pipelines on permafrost soils’.⁶² Building and fitting out oil and other infrastructure in Siberia and the Russian North, where most of the new energy and other mineral reserves are located, is unimaginably expensive by prevailing global practice. A barrel of West Siberian crude oil thus costs ca. \$14 to produce, versus \$4 for Kuwaiti crude and US oil drilled from the Gulf of Mexico, ca. \$10 for North Sea crude, and a projected \$16 for oil drilled from the Alaskan wilderness preserve, suggesting, in spite of higher costs to observe environmental restrictions in Alaska, that the extremity of Arctic and sub-Arctic conditions makes Russian (as with Alaskan) oil intrinsically expensive compared with other producers and exporters.⁶³

Under these climatic conditions basic construction costs are in general higher than elsewhere: thicker walls require more massive foundations, all of which multiplies the basic costs of production. (For example, a typical Russian one-storey house is equivalent to a three-storey English house in terms of construction materials used, not because Russian labour is more wasteful—even if it is—but because English houses cannot be lived in under Russian conditions.) Moreover, depreciation costs are higher since buildings are also shorter-lived in the Russian climate. As a result, construction costs of all kinds are generally two to three times more expensive in Russia than in Western Europe.⁶⁴

The intrinsically high costs of Russian oil production are compounded by the general obsolescence of Russian drilling technology, which is still largely based on a turbo-drill technology developed before World War II. The turbo-drill, which uses high pressure water and mud injections to soften the soil, does not rotate and can be made with relatively low quality steel. Drilling below 3000 metres requires rotary drills, demanding higher quality steel from domestic or foreign producers. The stagnation of the Russian steel industry and the paucity of foreign investment have seen Russian oil production continue to fall throughout the 1990s. In many regions there are more repair brigades than production brigades in the field. As Bater notes, new ‘fields discovered tend to be smaller, and almost by definition in more remote and hostile environments, and therefore are more costly to tap’.⁶⁵

Relatedly, Russia expends three to four times as much energy as do Western Europe, South Korea, Japan and Australia to produce a given level of economic output, and 60% more than the United States. No doubt, as in all of these areas, there is room for greater efficiencies. But there are also limits. Thus it takes about four tons of heating fuel to heat a typical Moscow flat for four persons during a year that includes a seven-month ‘heating season’ (as against the seven-month growing season in my home state of Virginia); this would cost about \$2000—well above the average

annual dollar Russian wage—at world market prices. Were Gazprom and the oil companies to insist on world market prices for their products, most of Russia would not survive the winter. The same holds true for electricity: on purely market grounds, why should Russian electricity producers supply to Russians at all, given that the domestic price has been 1–2 cents per kilowatt hour as against 12–15 cents in most of the rest of the world? Fully 80–90% of the cost of mining Siberian gold is defined by expenditure on energy, the infrastructure of which was established under decidedly non-market Soviet auspices. Likewise, the mining of copper and nickel in Norilsk is dependent upon nearby gas installations, without which prices would become unsustainably high. The 80% of Russia's massive energy reserves that are made up of coal may be unrecoverable under market conditions: there is simply no profit to be made. In a dramatic but by no means atypical case, while Russia possesses huge deposits of bauxite—in the Kolyma Peninsula, near Volkhov, and in the Urals region—under free market conditions it is cheaper to purchase bauxite in Tunisia and Guinea and ship it to the Altai region to produce aluminum.⁶⁶

From this point of view, it is perhaps not entirely coincidental that the initial 'development' costs for coal, gold, silver, diamonds etc. in such locales as Vorkuta, Magadan, Yakutia and elsewhere in the Russian north were borne by slave labour under the economic jurisdiction of the NKVD. According to the 1941 'State Plan of the Development of the National Economy of the USSR', a copy of which landed in the famous Smolensk Archive, now housed in the Hoover Institution at Stanford University, 18% of Soviet capital investment that year, apart from transport and the armed forces (for which no data were given) fell within the responsibility of the NKVD (i.e. 6.81 billion rubles out of 37.65 billion rubles in all). According to Gosplan chief Nikolai Voznesensky (himself to fall victim to a purge later in the decade), the NKVD's capital investment responsibilities came to 12% of a total national investment pool of 57 billion rubles. In the field of construction, the NKVD was responsible for 17% of all production, exploiting over 1.17 million forced labourers for that purpose. In timber, the NKVD share of total national production was 12% although, importantly for our purposes, in northern regions the percentage was much higher: in Arkhangelsk *oblast'* 26%, in Khabarovsk *oblast'* and the Karelo-Finnish republic each more than 33%, in Murmansk *oblast'* more than 40% and in the Komi Autonomous *Oblast'* more than 50%. Virtually all of Soviet gold production was administered by the NKVD, which governed huge territories like Kolyma toward that end, while the NKVD was to produce 150 000 tons of chrome out of a total Soviet production of 370 000 tons, 5.3 million tons of coal, 250 000 tons of oil and 82 million bricks in Khabarovsk *oblast'* and Primorsky *krai* alone.⁶⁷ In the end, it remains unclear 'whether or not this pool of forced labour—civilian, prisoner of war or simply criminal—ever really contributed to the national economy more than it cost to supervise and support ...'.⁶⁸

Long after the death of Stalin and the end of the mass terror, Siberian economic development was mainly subsidised by the Soviet government, i.e. by other, economically more viable regions of Russia. For example, in the mid-1970s Vladimir Putin, now President of Russia, earned 1000 rubles for one-and-a-half month's work in the Komi Republic, north of the Urals. By contrast, the average doctor or teacher could expect to earn 180 rubles in the same period of time, a discrepancy of more than 5:1.⁶⁹

Market economics and Arctic development simply do not mesh well, as Canada's Arctic North (as well as Alaska), with a population density one-fiftieth that of the Russian Federation, testifies.⁷⁰

Conclusions

What conclusions may be drawn from the above analysis? First, on strictly liberal market grounds, most of the Russian economy should be declared bankrupt. As Ericson has observed, 'a large proportion of [Russian] firms in any industry, and all firms in some basic processing industries, are nonviable in the most basic sense—they can never produce goods that could sell for more than the cost of production'.⁷¹ By 1998 nearly 49% of Russian enterprises were operating in the red (under admittedly opaque Russian accounting practices).⁷² One indication of the impact of market logic on the Russian economy may be seen in the fact that, while using non-market (largely physical) indicators the Soviet economy of the mid-1980s is now estimated at about one-third of that of the United States, application of market (i.e. value-based) criteria placed the Russian gross domestic product at just 2.5% of that of the United States in 1993, just two years after the Soviet collapse.⁷³ Hedlund has written in this regard:

No mental transformations conceivable would have solved the problems of what to do with derelict, value destroying industries; with resource extraction in places where nature precludes all sense of profitability; or with urban concentrations north of the Arctic Circle, which under any remotely economically rational regime would never have been put there in the first place.⁷⁴

Second, taking geography seriously highlights the enormous difference between geologically existing resources and economically available resources.⁷⁵ It is the huge initial costs of development associated with Siberian investment, in the context of the political and legal uncertainties, that have deterred foreign and Russian investors from paying for new systems of production as opposed to depleting the stocks of Soviet-era investment (and investing their money elsewhere).⁷⁶ And even then, the physical inaccessibility of much of Russia's oil and gas reserves means that they are, in the words of one Russian economist, 'no more accessible than methane from Jupiter'.⁷⁷ Where massive, outdoor infrastructure is not concerned, as for example in the computer and especially the software industry, climatic and geographical factors clearly apply much less if at all. Here there is no intrinsic reason why Russia should not be a worldwide software leader. But here institutional considerations prevail: i.e. rampant software piracy, while of obvious short-term benefit to the impoverished Russian consumer (who can pay \$1 but not \$20 for a CD), raises impossible economic obstacles to the development of a legitimate, native Russian software industry. The inability of the Russian state to contain software piracy places Russia at a clear competitive disadvantage compared with India, which has even lower labour costs, more widespread use of English, placement of a myriad of Indian executives in US companies, and the aid of the government. The barrier of legal and administrative uncertainty remains whatever the degree of climatic and geographical influence upon the costs of production.⁷⁸

Third, under these circumstances, it is clear that liberal economic premises have

much less applicability to Russia's circumstances than the famous Washington Consensus of the 1990s presumed. Russia as a whole cannot be developed economically without the state. This is not the same thing as saying that there is no place for the market in the Russian economy. But in a liberal world economic order, why should capital automatically flow to a Russia whose costs of development are typically two to three times higher, even with cheap and relatively skilled labour, than almost anywhere else in the world? It is hard enough to envisage how Russia can develop with its existing 'quasi-market'⁷⁹ and in the presence of the corrupt and criminalised state that prevails today. As Gustafson has observed, 'the quasi-stabilisation we see in Russia today, founded on what remains of the Soviet inheritance, is not viable over the longer run, because it cannot generate growth and prosperity'.⁸⁰ But it would appear implausible to imagine that even an efficient and incorruptible Russian economy and public sector could thrive under strictly liberal auspices, without a state structure and state policies designed to compensate for the many inherent disadvantages that Russia faces as a result of its economic geography. There is plenty of room to debate the kinds of state policies and their relationship to the market economy—e.g. the degree of tariff protection, the most beneficial currency valuation,⁸¹ industrial policy and the inevitable subsidy as well as investor guarantees that this implies,⁸² redistribution across classes, sectors and regions, the degree of free movement of goods in relationship to the free movement of capital (i.e. open versus closed capital accounts), the relative importance of ownership (state or private) versus competition among enterprises,⁸³ special economic zones and so on.⁸⁴

At a minimum, some combination of a weak ruble, targeted protectionism, production-sharing agreements for foreign investors and a legal basis for trading in land that could collateralise Russian land holdings to stimulate domestic mortgage, loan and insurance markets would seem to be required to encourage substantial direct investment in Russia and the prospects of a sustained recovery. Here there is little distinction between Russian and non-Russian capital: holders of capital, whatever their nationality, can no longer be coerced into financing Russian development. Instead, they must be persuaded to do so. Tools of persuasion, in addition to those just mentioned, must include clear, stable and enforceable property rights and transparent corporate governance. Yet two questions remain: in an increasingly liberal world economic order, characterised not only by free movement of goods but free movement of capital, is it possible for the Russian state (a) to offer the massive (and essentially neo-colonial) concessions needed to induce large-scale capital investment in Russia's decaying economic infrastructure, and (b) to enforce (as does the Chinese government) essentially mercantilist controls on the movement of capital? If the answer to either of these questions is no, then two final questions arise: (1) To what extent does a liberal world need Russia at all? (2) Indeed, to what extent can historical Russia exist in a predominantly liberal world order?

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¹ Martin Wolf, 'Price of forgiveness', *Financial Times*, 11 August 1999, p. 10.

² For an overview of Russia's natural resource endowment see V. D. Andryanov, *Rossiia v mirovoi*

ekonomike (Moscow, 2000), pp. 6–10; and Yu. N. Gladkin, V. A. Dobroskok & S. P. Semenov, *Sotsial'no-ekonomicheskaya geografiya Rossii* (Moscow, Gardariki, 2000), pp. 117–156.

³ See V. S. Bard, *Investitsionnyye problemy Rossiiskoi ekonomiki* (Moscow, Ekzamen, 2000), pp. 211–221, for a thorough discussion of the problem of Russian economic decline and how to gauge it. Judging by physical production in the construction and consumption areas, and comparing 1997 with 1985, the decline has been massive: production of excavators fell by five-sixths, of bulldozers by six-sevenths, of steamrollers by seven-tenths, of cement by two-thirds and of concrete materials by five-sixths; oil and gas condensate declined by two-fifths; in the consumer area, production of meat fell by one-third, of sausage products by half, of butter by more than half, of cheese and related dairy products by three-fifths, of eggs by a quarter and of sugar by about a quarter (Bard, pp. 218–219). A widespread view that smaller declines in electricity generation reflect less dramatic real declines in overall output overlooks the minimum level of electric power needed for any production at all. Electric power is in effect much less sensitive to recession and depression than is industrial and consumer production (Bard, p. 213).

⁴ Valuing the Russian GDP at the official exchange rate (as opposed to Purchasing Power Parity—PPP—estimates) understates the actual extent of economic activity in Russia but it is an accurate gauge of the economy's capacity to service its hard currency external sovereign debt, which is estimated at \$148 billion in early 2001. Thus, if we calculate Russia's GDP per capita at the prevailing exchange rate, it is \$1360 for 1999, while in PPP terms it is \$4660, or more than three times as high; gross GDP in PPP terms for 2000 would be ca. \$700 billion versus ca. \$200 billion in dollar exchange rate terms. Actual GDP may be somewhat higher in light of the significant volume of unregistered economic transactions. Still, while Russia's shadow economy may account for as much as 40% of all transactions, it is generally agreed that the unofficial economy involves much more distribution than production. See Economist Intelligence Unit, *Country Forecast. Russia* (July 2000) and Bard, *Investitsionnyye problemy*, pp. 211–212.

⁵ *Financial Times Annual Survey. Russia*, 30 April 1999, p. 1.

⁶ *The Journal of Commerce*, 26 July 1999; Economist Intelligence Unit, *Country Profile. Russia 2000*, p. 22 and Economist Intelligence Unit, *Country Forecast. Russia* (July 2000), appendix.

⁷ *Ibid.* and Andryanov, p. 184.

⁸ Hans-Hermann Höhmann & Christian Meier, 'Conceptual, Internal, and International Aspects of Russia's Economic Security', in Alexei Arbatov, Karl Kaiser & Robert Legvold (eds), *Russia and the West. The 21st Century Security Environment* (Armonk, NY, M.E. Sharpe, 1999), p. 83.

⁹ RIA news agency, Moscow, in Russian, 1127 gmt 22 November 2000.

¹⁰ See Bard, pp. 154–234, for an excellent overview of the Russian investment crisis in its various dimensions.

¹¹ M. Ts. Mkrtchyan *et al.*, *Sostoyanie i protivorechiya ekonomicheskoi reformy* (Moscow, Ekonomika, 1998), p. 175; Jean Radvanyi, *La Nouvelle Russie* (Paris, Armand Colin, 2000), p. 145; Bard, pp. 187–198.

¹² Radvanyi. The centrality of the fuels and energy sectors may be gauged by the fact that in 1999 they constituted 35% of Russian GDP, 12% of industrial employment, 45% of the country's capital stock, 42% of state budget revenue and 46% of exports (Radvanyi, p. 149).

¹³ Efim S. Khesin, 'The Intersection of Economics and Politics in Russia', in Arbatov, Kaiser & Legvold (eds), p. 100; and Thane Gustafson, *Capitalism Russian-Style* (Cambridge, UK, Cambridge University Press, 1999), pp. 221–224.

¹⁴ Mkrtchyan, p. 185.

¹⁵ Masaaki Kubonwa (Hitotsubashi University, Japan), 'FDI and Capital Flight in Russia', paper presented to the 2000 National Convention of the American Association for the Advancement of Slavic Studies, Denver, 11 November 2000.

¹⁶ Economist Intelligence Unit, *Country Forecast. Russia* (July 2000), pp. 29–30. Also available at www.eiu.com.

¹⁷ *Ibid.*, p. 30.

¹⁸ Khesin, p. 111; Radvanyi, p. 149.

¹⁹ *Ibid.*, p. 38; A.P. Parshev, *Pochemu Rossiya ne Amerika* (Moscow, Krymskii Most, 2000), p. 64; Radvanyi, p. 148.

²⁰ Gustafson, *Capitalism Russian-Style*, p. 223.

²¹ Milana Davydova, 'Accelerated Capital Flight', *Segodnya* (Moscow), 16 March 2001, from WPS Monitoring Agency, at www.wps.ru/e_index.html. In general, Russian companies invested \$15.154 billion in property abroad in 2000, compared with \$4.43 billion foreign direct investment in Russia for that year. In 1999 the ratio was \$8.38 billion in Russian capital directly invested abroad compared with \$4.26 billion invested in Russia. See also Daniel Bases, 'Russia Creates Cautious Investor Optimism', *Reuters* (New York), 16 March 2001.

²² *Rossiiskaya gazeta*, 30 March 2001.

²³ Radvanyi, p. 42.

²⁴ 'Russia's Infrastructure . Crumble, Bumble', *Economist*, 2 September 2000.

²⁵ *Washington Post*, 23 November 2000; *International Herald Tribune*, 16 January 2000, p. 8.

²⁶ The illegal export of non-ferrous metals has become a major crisis affecting Russia's power and transport infrastructure. Of Russia's 700 000–750 000 tons of non-ferrous scrap metal exported each year (at ca. \$1000 per ton), only half is genuine scrap metal. The other half represents stolen rail track, copper overhead power lines etc. From 1995 to 1998 the export of copper scrap jumped from 28 600 tons to 365 000 tons, while that of aluminum leapt from 11 900 tons to 367 500 tons. Theft from power lines resulted in 700 cases of non-fatal electrocution throughout Russia in 1999 and more than 500 deaths from electric shock. *Nezavisimaya gazeta*, 18 November 2000; *Moscow Times*, 27 May 2000, pp. IV–V.

²⁷ Economist Intelligence Unit, *Russia. Country Profile 2000*, p. 17. Tom Ashead, of Troika Dialog, a Moscow investment bank, estimates that Russia needs to spend \$6.5 billion to end the 6.5 million-long waiting list for telephones, \$9 billion to digitalise the telephone system and \$6.5 billion to modernise the long-distance system. Currently, less than \$500 million per year is spent on infrastructure development in Russian telecoms. 'Russia's Infrastructure . Crumble, Bumble', *Economist*, 2 September 2000.

²⁸ 'Russia to Repair Roads', *International Herald Tribune*, 29 June 2001, p. 2.

²⁹ The figure for 2000 is \$3.7–3.8 billion, as reported in *Wall Street Journal*, 24 January 2001.

³⁰ *Business Review* (Moscow), September 2000, p. 57.

³¹ RIA news agency, Moscow, in Russian, 1127 gmt 22 November 2000.

³² Andrew Jack, 'IMF mission leaves Russia with no agreement', *Financial Times*, 23 November 2000, p. 2.

³³ 'Oil Change', *Economist*, 21 September 2000. Also at www.economist.com.

³⁴ Radvanyi, p. 227. The rest of foreign investment in Russia was constituted by portfolio investment (2–5% of the total per year) and credits (50–60%). The city of Moscow, with ca. 8% of the country's population, has been the recipient of 50–70% of all foreign investment in Russia.

³⁵ Economist Intelligence Unit, *Country Forecast. Russia* (July 2000), p. 40. Also at www.eiu.com. See also Stefan Hedlund, *Russia's 'Market' Economy. A Bad Case of Predatory Capitalism* (London, UCL Press, 1999), p. 8.

³⁶ Interfax News Agency, Moscow, in English, 1120 gmt 30 August 2000.

³⁷ *Rossiiskaya gazeta*, 17 November 2000. The 1999 estimate breaks down as follows: non-return of foreign exchange earnings: \$2.3 billion; non-receipt of goods or non-return of advance payment on imports: \$3 billion; transfer of advance payments for fictitious import contracts for the provision of services: \$5.5 billion; export of cash dollars in Xerox boxes and the like: more than \$12 billion (the figure for 1998 was \$21.6 billion); transfer of rubles to correspondent accounts in Russian banks: indefinite; non-receipt in Russia of foreign exchange earnings from the sale of goods in 'duty free zones' like the Black Sea area: indefinite. *Economist*, 13–19 January 2001.

³⁸ See the interview with Dmitrii Vasil'ev, Executive Director of the Institute of Corporate Law and Corporate Governance in Moscow in *The Russia Journal*, 3–9 February 2001; also Andryanov, p. 158.

³⁹ Economist Intelligence Unit, *Country Forecast. Russia* (July 2000), p. 9.

⁴⁰ Gustafson, *Capitalism Russian-Style*, pp. 224–225.

⁴¹ Allen Lynch, 'The Crisis of the State in Russia', *International Spectator* (Rome), April–June 1995, pp. 21–34.

⁴² Andryanov, p. 188.

⁴³ This question was first broached publicly by Joseph Stiglitz, chief economist of the World Bank, in a report issued in April 1999. Stiglitz contrasted the implications of open capital accounts in Russia versus closed capital accounts in China for each state's ability to shape its economic environment during the transition from comprehensive central planning. For a discussion see Peter Reddaway & Dmitri Gliniski, *The Tragedy of Russia's Reforms: Market Bolshevism against Democracy* (Washington DC, US Institute of Peace, 2001). See also Shinichiro Tabata, 'The Great Russian Depression of the 1990s: Observations on Causes and Implications', *Post-Soviet Geography and Economics*, 41, 6, 2000, pp. 389–398.

⁴⁴ In 1913 Russia had the highest tariff walls of any major European state. James H. Bater, *The Soviet Scene. A Geographical Perspective* (London, Edward Arnold, 1989), p. 26.

⁴⁵ For an overview of the impact of geography on Russia's historical development see Richard Pipes, *Russia Under the Old Regime* (London, Penguin Books, 1995), pp. 1–24; see also Radvanyi, *La Nouvelle Russie*, pp. 31–54.

⁴⁶ Yu. N. Gladkin *et al.*, *Sotsial'no-ekonomicheskaya geografiya Rossii* (Moscow, 2000), p. 90.

⁴⁷ Parshev, p. 45. At the same time, Canadian agricultural productivity per worker is incomparably

higher than Russia's, at more than \$25 000 in value added per worker in Canada versus less than \$500 in Russia in the early 1990s. See Andryanov, p. 26.

⁴⁸ Bater, p. 209.

⁴⁹ *Ibid.*, p. 234.

⁵⁰ Alexander Rubtsov, 'One Must Know How to Build Roads in Russia', at the Internet site *strana.ru*, 28 June 2001.

⁵¹ W. Scott Thompson, 'The Persian Gulf and the Correlation of Forces', *International Security*, 7, 1, Summer 1982, pp. 157–180, following on earlier work published by Albert Wohlstetter in *Foreign Affairs* (1967).

⁵² Bard, p. 282.

⁵³ Radvanyi, p. 200.

⁵⁴ Gladkin *et al.*, p. 96.

⁵⁵ Bard, pp. 282–283.

⁵⁶ *Ibid.*, pp. 90–91.

⁵⁷ Parshev, pp. 117–118. Costs of production were calculated in terms of fuel and electricity, raw materials, pay and depreciation.

⁵⁸ Gladkin *et al.*, pp. 89–98.

⁵⁹ Parshev, p. 392. Also L.V. Milov, *Vserossiiskaya pakhota i osobennosti rossiiskogo istoricheskogo protsessa* (Moscow, Rosspen, 1998), expanding upon L.V. Milov, 'Prirodno-klimaticheskii faktor i osobennosti rossiiskogo istoricheskogo protsessa', *Voprosy istorii*, 1992, 4–5, pp. 37–56.

⁶⁰ For provocative thoughts along these lines see Ryszard Kapuscinski, *Imperium* (Paris, Feux Croises/Plon, 1994, French translation from the Polish by Varonique Patte), p. 339.

⁶¹ Andryanov, p. 26. Possibly employing a different calculus, and no doubt influenced by the prevailing artificially high exchange rate for the Soviet ruble (almost parity against the US dollar), *Economist* estimated that in 1987 Soviet agricultural labour productivity was one quarter of that of Western Europe and one-eighth of that of the United States. 'The Soviet Economy', *Economist*, 9–15 April 1988, p. 9.

⁶² Radvanyi, p. 40; and Gladkin *et al.*, p. 94.

⁶³ www.worldwildlife.org/arctic-refuge/goerold_paper.pdf. The average cost for all US oil, including Alaskan, is about \$4 per barrel.

⁶⁴ Parshev, pp. 54–56; and Gladkin *et al.*, p. 89 and *passim*.

⁶⁵ Bater, pp. 203–204.

⁶⁶ Parshev, p. 77.

⁶⁷ Merle Fainsod, *How Russia is Ruled* (Cambridge, MA, 1963), pp. 459–460.

⁶⁸ Bater, pp. 218–220. Similarly, Kapuscinski wonders at the distortions to the Soviet steel industry, and the economy at large, created by the omnipresence of barbed wire along the vast border, around the camps, closed installations etc. See his *Imperium*, pp. 94–95.

⁶⁹ Pierre Lorrain, *La mystérieuse ascension de Vladimir Poutine* (Monaco, Editions de Rocher, 2000), p. 121.

⁷⁰ Gladkin *et al.*, p. 109.

⁷¹ Richard E. Ericson, 'Economics and the Russian Transition', *Slavic Review*, 57, 3, Fall 1998, p. 622.

⁷² Radvanyi, p. 146; and Bard, p. 212. Bard notes that another 30% of firms are on the verge of the red while just 20% of firms are significantly profitable, even in the face of widespread tax evasion.

⁷³ Andryanov, pp. 6–7.

⁷⁴ Hedlund, p. 13.

⁷⁵ Gladkin *et al.*, p. 118 and *passim*.

⁷⁶ *Ibid.*, p. 114: 'It is clear today that, under market conditions, many of the gigantic Soviet-era construction, production and mining projects, which were undertaken, literally "at the end of the world", could never have been carried out at all in light of the enormous capital investment requirements as well as their unprofitability'. See also Bard, p. 281.

⁷⁷ Parshev, p. 62.

⁷⁸ Ashlee Vance, 'From Russia with Code', *Infoworld*, 16 March 2001, at www.bisnis.doc.gov; John Baroli, 'Russia Takes Advantage of Brain Power at Home', *International Herald Tribune*, 28 May 2001, p. 12. Russian programme outsourcing totalled \$110 million in 2000, versus \$6.3 billion forecast for India in 2001.

⁷⁹ Aleksandr Nekipelov, 'Kvazirynok kak rezul'tat rossiiskikh reform', *Pro et Contra* (Moscow), Spring 1999, pp. 5–27; for an outstanding analysis of Russia's large barter economy see Clifford G. Gaddy & Barry W. Ickes, 'Russia's Virtual Economy', *Foreign Affairs*, 77, 5, September/October 1998, pp. 53–67.

⁸⁰ Gustafson, p. 9.

⁸¹ A point emphasised by Shinichiro Tabata, 'The Great Russian Depression', p. 397.

⁸² For an analysis of the prospects of such arrangements in Russia see 'Oil change', *Economist*, 21 September 2000; for President Putin's endorsement of the concept see Interfax News Agency, Moscow, in English, 0756 gmt 3 September 2000.

⁸³ Gustafson, pp. 50–51.

⁸⁴ See Bard, pp. 142–153 and 327–337 for an essentially Keynesian analysis and model of Russia's economic challenges.