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The Center for Research on
International Financial and Energy Security

CRIFES

CRIFES Working Paper Series

Russia after the Global Financial Crisis

Clifford G. Gaddy and Barry W. Ickes

March 23, 2010

(forthcoming, Eurasian Geography and Economics)

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The Center for Research on International Financial and Energy Security

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INTRODUCTION

Well over a year and a half into the global economic crisis, it is still not clear how events will ultimately play out. It has been an dramatic time for all countries, including Russia. Prior to the start of the crisis many in Russia thought that they were "decoupled" from what happened in the leading industrial economies. But the Russian economy was hit hard. The world financial crisis and the bursting of the asset bubble presented Russia with a double shock. Oil prices collapsed, which had a huge direct impact. And capital was withdrawn from Russia in the flight to safety. Both of these shocks were primarily due to events abroad. It is important to stress this point, since some observers have argued that Russia's crisis is home grown. It is not. Russia's structures and policies have determined how the shock played out in Russia, but the shock itself was external.

On the surface, this is similar to what happened a decade earlier, as oil prices in 1998 plunged in response to the Asian Crisis of the previous year and Russia suffered a financial crisis with near-catastrophic consequences, including a two-fold real devaluation and a default on domestic debt. But the current crisis differs significantly from the one ten years ago. Then, Russia's inability to deal with its own fiscal crisis allowed the external shock to have the particular effects it did. In 2008 Russia was fiscally prepared for an external shock, something that spared Russia from a much worse outcome than it might otherwise have suffered. Still, there have been some serious effects. It is important to sort out which are transitory and which are likely to last.

In this article we will describe the causes and consequences of the crisis in Russia. But our main purpose is to focus on the fundamental factors that explain these developments, and which allow us to understand Russia's economic future—both the structure of the economy and the policies that the leadership will pursue in light of the lessons they draw from recent events. We organize our analysis around three fundamental points.

- First, the crisis has reminded us of how thoroughly dependent Russia is on oil and gas. Looking at the period before the crisis, during the crisis, and now in the rebound, the picture is unambiguous. Very few important developments, positive or negative, cannot be traced back to fluctuations in the volume of wealth—the rents—that accrue to Russia from these resources. This dependence will continue.

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- Second, Russia is *addicted* to the resource rents. This is a point distinct from the first. Our concept of addiction means more than dependence alone. Addiction refers to a specific condition in which there is an imperative to allocate rents to the backward production structure that Russia inherited from the Soviet Union. Addiction's most pernicious feature is that it is self-reinforcing, which means that it continually deepens and reproduces backwardness and inefficiency in the Russian economy.
- Third, Russia, like all resource abundant economies, has a specific system of management of its resource rents. Because of the overwhelming importance of the rents in Russia, the rent management system is key to the entire political economy. Fundamental changes in the political economy of Russia are necessarily changes to the rent management system. In its history Russia has had a number of distinct systems. For the past 80 years they have all been inseparably linked to the phenomenon of addiction mentioned above. Russia's current system was designed and implemented by Vladimir Putin and his closest associates. We refer to it as Putin's Protection Racket. This is a concept we will explain in some detail below. But we can note already here that despite the name this is not purely an exploitative scheme. Rather it is a mutual defense pact that benefits all participating parties. It has proven to be robust in the crisis and is likely to continue.

In the following we will expand on each of these points, showing how the three factors—rent dependence, rent addiction, and rent management—were manifested before and during the crisis. We will conclude by asking how each was affected by the crisis and how they might look in the future. We will argue that Russia's experience is more than just oil and gas dependence. Many countries have this. What makes Russia unique is the combination of resource dependence with addiction and its specific rent management system.

OIL AND GAS DEPENDENCE

Oil and gas have shaped Russia since the first discoveries of oil in Baku in the nineteenth century.[2] These resources were of critical importance for the Soviet economy. From early on, the fact that oil and gas were domestically produced allowed the command economy to develop without the imperative of a balance of payments constraint to limit waste and inefficiency. More recently, the discovery of oil in large amounts in Western Siberia in the early 1970s, together with the sharp rise in world prices that raised the value of the new Soviet oil, altered the course of the Soviet Union. And the collapse of oil prices in the mid-1980s had just as dramatic an impact.

The importance of oil and gas to the political economy of Russia, as well as its behavior and influence in the world, is suggested by studying the fluctuation of resource rents over time.[3] Figure 1 shows the aggregate oil and gas rents (in real terms) from 1970 to the present and demarcates eras

[2] The first oil well to be mechanically drilled anywhere in the world was in Baku in 1846, 12 years before Drake discovered oil in Pennsylvania. Large scale production in Baku started in 1872. It was in those Baku oil fields that Josef Stalin got his start as a revolutionary, so to speak.

[3] It is important to understand why we emphasize rents rather than income or profits from oil production. Rents are much larger than income as they include not only formal profits but also excess costs of extraction and other forms of informal rent distribution that normally are considered costs. The distribution of rent thus has a much larger impact on the economy than just the income from oil and gas production. See the Appendix A for more discussion of the notion of rent and rent-sharing.

by their respective leaders.[4] In the 1970s rents became abundant and rose sharply. This was also a period of Soviet expansionism.[5] In the early 1980s rents began a nearly 20-year decline. During those two decades, the Soviet Union collapsed under Mikhail Gorbachev as rents deteriorated. Newly independent Russia under Boris Yeltsin experienced the lowest oil prices of the century, combined with a collapse in production. Consequently, Russia was more dependent on the West in this period. Beginning in 1999, rents revived. At first, rents were rising but were still not close to their 1970s level. Russia began to pay back some of its foreign debts and started to build some reserves. As oil prices soared, and rents reached historic highs, Russia's reserve growth accelerated and Russia began to reassert its will in international affairs.

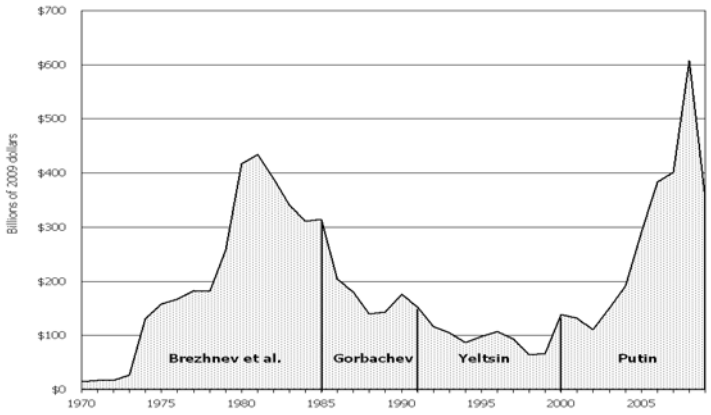

Fig. 1: Soviet (1970-1990) and Russian (1991-) oil and gas rents.

We do not mean to imply that Russian history has been mechanistically determined by resource rents. But the message of Figure 1 is that any examination of the Russian economy ought to take oil and gas as its starting point. If nothing else, this crisis is a reminder of that fact. During the boom that preceded the crisis the importance of oil and gas was to some extent hidden from view by the rapid growth in virtually every sector in the economy, not just oil and gas and related industries that supplied inputs to or performed services for the resource sector. Also apparently unconnected sectors such as retail trade, real estate, telecommunications, and others saw their sales, profits, and share prices rise sharply. Some observers argued that this was evidence of the emergence of a non-oil economy.[6] But the abrupt collapse of oil prices in the summer of 2008 made it hard to ignore how dependent these other sectors had been on the high oil prices.

One obvious way to see the importance of oil to the Russian economy is the correlation between oil prices and stock prices. The benchmark RTS (Russian Trading System) stock market

[4] All figures in the paper are based on the authors' calculations. Their sources and methodology for the figures and other data cited in the text are explained in Appendix B, "Note on Data Sources and Methods."

[5] Of course Brezhnev et al. had access to all Soviet rents, not just those from Russia alone. On the other hand, the claimants to those rents were also much more numerous.

[6] Thus, in June 2008, Peter Rutland could write that "Russia has a diversified economy with a substantial manufacturing sector…. The non-tradable sector of the Russian economy (construction and services) has been booming and the OECD and World Bank estimate that oil and gas accounts for half of the growth since 1999 (which means that non-energy sectors account for the other half)." Rutland (2008: 3). This was the seeming consensus at the time, though Rutland followed with the observation that "only time will tell if this optimistic interpretation of the sustainability of the Russian economic boom is correct."

index has tracked the oil price for the past ten years, but never more closely than in the most recent 18 months. See Figure 2. The oil price reached record heights in the summer of 2008, collapsed by about 70 percent by the end of the year, and since then has risen back to a price roughly half of what it was at the peak. The RTS index followed the same path.

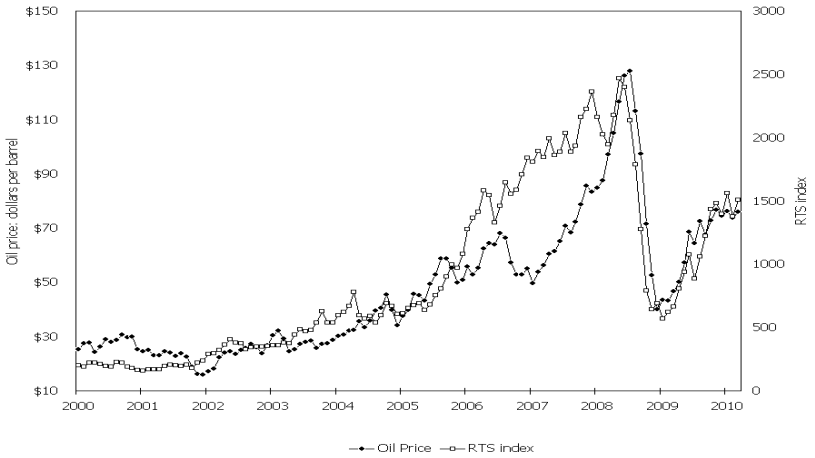

Fig. 2: Russia's stock market and the world oil price, 2000-2009.

One might object that since such a large share of the index's value is from oil and gas companies, it is not surprising that it is strongly correlated with the oil price. In fact, as of the fourth quarter of 2009, oil and gas companies accounted for only slightly more than half of the index. Sectoral indices for the non-oil and gas industries have behaved largely the same as oil and gas. Perhaps even more persuasive evidence for the "everything is oil" argument we are making is in Figure 3, which shows the annual sales revenues of Russia's largest (by sales) companies *outside the oil and gas sector*, matched with the annual average oil price.

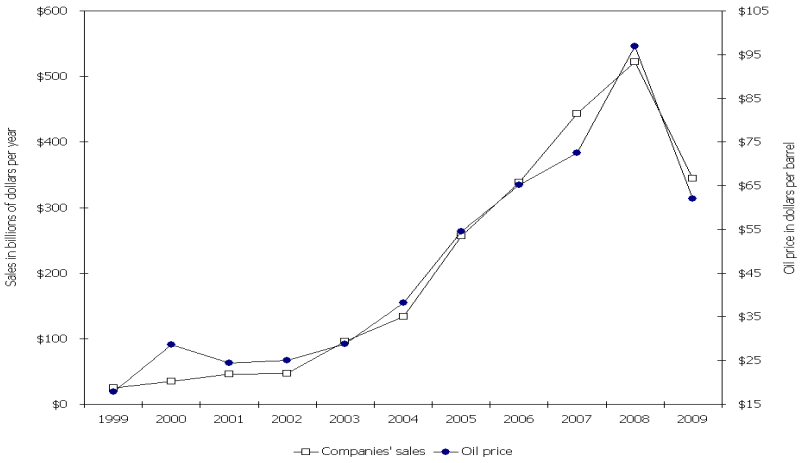

Fig. 3: Annual sales revenue of Russia's top 100 non-oil and gas companies and the world oil price, 1999-2009.

Not only financial indicators but also the physical economy followed the oil price. The relationship between oil prices and the production of railway freight cars is an example. As is evident

in Figure 4, the pattern is again the same. At first, more and more of these cars are produced each year as oil prices are on the rise. Output plummets as oil prices collapse in the summer of 2008. Then, as soon as the oil price rises again, freight car production rebounds.

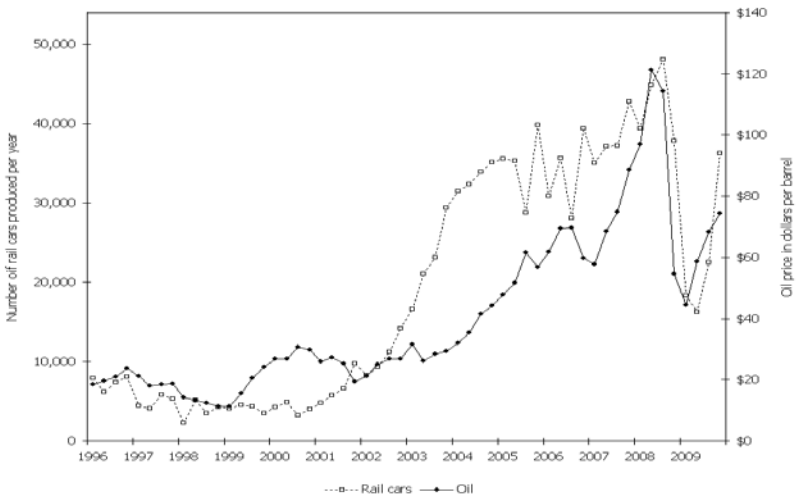

Fig. 4: Railway freight car production and the world oil price, 1996-2009.

Household incomes, consumption, and retail sales were other indicators that followed the oil price up, down, and then up again. The rise in oil prices led to an eight-year long boom in consumer spending. Retail sales grew at nearly 11 percent a year in real terms. While oil prices were rising, the growth in retail sales was considered by many to be an independent source of economic growth—and a sign of the success of "economic diversification." When oil prices collapsed in 2008, however, retail sales collapsed as well. The dependence of the latter on the former became evident as the oil price regime switched. (See Figure 5.)

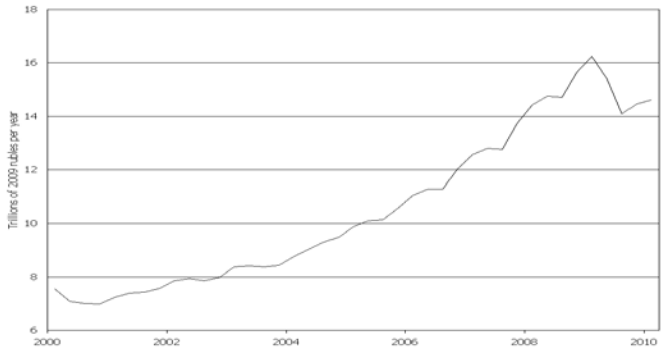

Fig. 5: Retail sales, 2000-2009.

One particular result of the spending boom was the expansion of sales of imported goods, especially of high-end consumer goods. Personal automobiles were the starkest example. Auto imports grew from five billion dollars in 2004 to over 30 billion dollars in 2008—a rate nearly twice as fast as all other imports. The foreign share of the Russia car market (measured by number of vehicles), which had risen from 6 percent in 1999 to 35 percent in 2004, climbed further to around 65 percent by mid-2008. By value, imports accounted for 8 percent of the Russian automobile

market in 2000, 54 percent in 2004, and around 80 percent by mid-2008. But when the oil price fell, imports followed.[7] Figure 6 shows how close the relationship was between the value of Russia's imports and the world oil price.

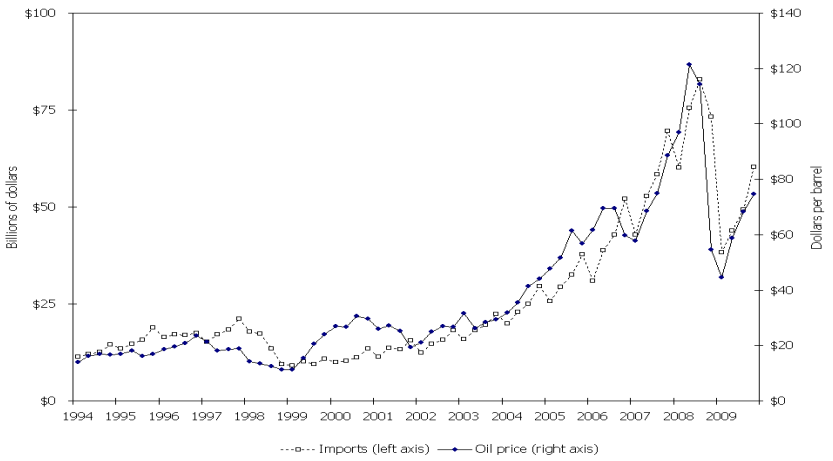

Fig. 6: Russia's imports and the world oil price, 1994-2009.

It might be natural to think of the spectacular growth in Russia's retail sector as evidence of a bubble. Consumption was unsustainably high and collapsed with the crisis. But that would miss the point. The central problem was that these tendencies were dependent on the level of oil prices. High oil prices and export earnings led to rapid growth in Russian incomes. Real wages and incomes almost tripled from mid-2000 to mid-2008.[8] Increased consumer spending was a natural response to the rising incomes. The growth in imports followed as a further consequence, since Russian carmakers were unable to satisfy the sharp increase in demand. Consumption in Russia did not grow because of expectations of high future incomes but rather because high oil prices generated rapid income growth. Spending was thus consistent with fundamentals. The problem is that Russian fundamentals were dependent on oil prices remaining high. If prices came down, so would consumption and imports. That is precisely what happened.

These observations about the retail boom apply to almost everything in the Russian economy in recent years. There was a boom, and the boom at its height approached near-euphoria. But it was not a bubble. Bubbles are based on illusory value. The wealth that accrued to Russia was anything but illusory: it was real value being transferred from oil and gas consuming nations. That meant that the acceleration in economic growth in Russia in the period prior to July 2008 was based on fundamentals—the prices of Russia's key commodities were exceptionally high and were expected to continue to stay there. This is a fundamental factor for the Russian economy, not a self-sustaining movement based on expectations of future prices. The key point, however, is that when oil prices collapsed, so did the fundamentals of the Russian economy.

[7] ROSSTAT data. See Appendix B.

[8] Measured in constant (2009) rubles, the economy-wide average wage rose from about 6,700 rubles a month in the second quarter of 2000 to over 19,000 in the second quarter of 2008. Real incomes followed the same trend. ROSSTAT data. See Appendix B.

Government Policies

Looking at the charts in the preceding section, it is easy to say that households should have exercised more restraint during what was obviously only a temporary windfall. But that is with the wisdom of hindsight and ignores the fact that at the time there was a virtual consensus that oil prices would continue to stay well above $100 a barrel. In that light it is important to note that the Russian government behaved more prudently than its citizens during the boom. It pursued a number of sensible policies, especially in the early years. The most important were aimed at collecting rent to the federal center. To this end, Putin and his closest and most important associate in this endeavor, Alexei Kudrin, implemented fiscal reforms, especially improvements in tax administration.[9] Their first priority, however, was to decrease Russia's sovereign debt.[10] They inherited a foreign debt of over $130 billion, which they began reducing as soon as Putin entered office. But it was the boom in oil prices that began in early 2004 that allowed them to in effect fully retire the government's foreign debt. In January 2005 Russia paid off the entire balance of its debt to the IMF—three and a half years ahead of schedule. Russia at the same time began to build reserves, in the form of foreign currency assets accumulated in an oil stabilization fund based loosely on the Norwegian model and in international exchange reserves more broadly. The currency reserves grew by $55 billion in 2005, $120 billion in 2006 and $170 in 2007, bringing the total to nearly $600 billion by mid-2008. Only China and Japan had more.[11]

A comparison over time of the paydown of the government's foreign debt and the simultaneous buildup of its foreign exchange reserves is informative. See Figure 7. It was in the second half of 2004 that the foreign exchange reserves exceeded the external public debt for the first time in the history of the Russian Federation. Thus, the boom in oil prices allowed Putin to eliminate Russia's sovereign debt and enhance its financial independence. These were major achievements, and, as we discuss below, the collapse of the oil price in the summer of 2008 did not wipe out all those gains.

[9] See Gaddy and Gale (2005) on the tax reforms.

[10] Management of Russia's government debt has been in Kudrin's hands continuously since the spring of 1997, when finance minister Anatoliy Chubais appointed him first deputy minister. As Kudrin indicated in a very early public statement in his new capacity, his main priority was to avoid at all costs any debt that carried political conditionalities, that is, loans from foreign governments and international financial institutions. ("Yevroobligatsii pomogut nam," 1997).

[11] Data on foreign debt and reserves from Bank of Russia. See Appendix B.

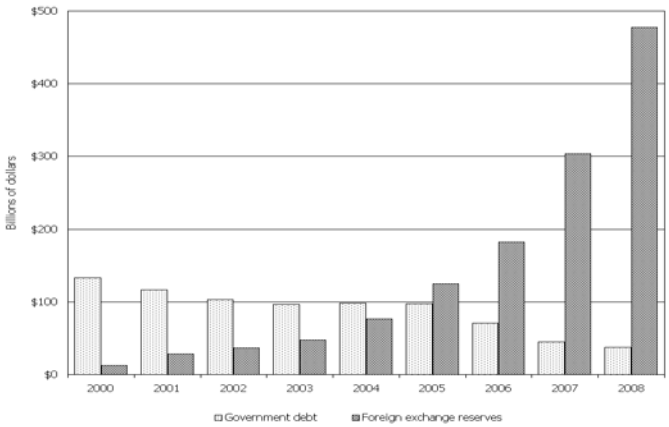

Fig. 7: Reversing the leverage: Russia's foreign debt and reserves, 2000-2008.

Private Sector Debt

Not all of Putin's policies to manage the windfall proved equally successful. While public foreign debt was being paid down, private sector debt began to grow sharply in 2003. By 2005 it had reached $106 billion, and by the end of 2006 it was $176 billion.[12] In fact, private sector debt was rising faster than public sector debt was falling, with consequences that only became apparent when the global crisis ensued.

The debt build-up had begun with a sensible policy. The idea was to recycle the country's surpluses and encourage foreign capital inflows. Rory MacFarquar advanced the thesis that Russian private sector borrowing offset balance of payment surpluses.[13] The assumption was that foreign capital would be invested better than domestic capital. The Russian authorities held large stocks of foreign financial assets (U.S. Treasury securities) that acted as "collateral" for private capital inflows. This was a recycling phenomenon, not unlike the case of China (Bretton Woods II).[14] The belief that high oil prices would persist, combined with low interest rates abroad, made foreign borrowing attractive. Over time, however, the process led to an overextension of lending and to a deterioration of the collateral that was held. The system became more vulnerable to sudden stops of capital inflows. This is what happened to Russia in the summer of 2008.

The basic story, then, is the following. Oil prices improved Russia's credit standing. This fueled capital inflows, further causing the RTS index to rise. As long as oil prices remained high, this process continued. But it is crucial to note that these capital inflows were *not* an independent cause of the boom, since without the high oil prices there would be not have been a large private capital inflow. This was demonstrated quite decisively in the crisis, beginning in July 2008 when oil prices plunged.

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[12] Data from Bank of Russia. See Appendix B.

[13] MacFarquar (2009).

[14] See Dooley, Folkerts-Landau and Garber (2003). A key difference, however, is that the household savings rate in China was much higher than in Russia, and the financial system in China is more controlled, especially with regard to capital flows. These differences made Russia more sensitive to a sudden stop than China. This difference did not seem important when capital was flowing in. Another key difference was that much less of the private capital inflow in Russia took the form of foreign direct investment compared with China.

It is instructive to consider the counterfactual of a global credit crunch combined with high oil prices. How would Russia have been affected in this case? A temporary shock due to de-leveraging might have hit Russian banks and the RTS. But it is hard to believe this could be anything more than a temporary shock, as with high oil prices Russia would have been a great buying opportunity (as it proved to be once oil prices did partially recover). It is the confluence of the credit crunch and the oil price collapse that caused Russia to fall into crisis.[15] What had begun as a sensible process to deal with institutional deficiencies in the Russian financial system ended up creating more systemic risk.[16]

The Illusions of "Diversification"

One of the alleged policy failures of the Russian leadership is the failure to "diversify" the economy so as to reduce its dependence on oil and gas. For many, it appears to be axiomatic that Russia's oil and gas dependence is bad. When the economy suffered so badly in the global financial crisis, calls for diversification intensified. If Russia had been less dependent on oil and gas, it was argued, it would have experienced less of a shock from the international financial crisis.[17] This is not clear. Eastern European economies that are not oil exporters also suffered dramatically from the crisis. Ukraine (which one can think of as Russia without oil and gas) and Hungary were compelled to turn to the IMF for bailouts—a fate Russia avoided thanks to the large dollar reserves it was able to build up precisely because it was a large petroleum exporter.

Disregarding for a moment the experience of other economies, let us suppose that Russia had undertaken a diversification program in 2000. What is the likelihood that this would have resulted in success by the summer of 2008? Over that period, 2000-2008, the increase in annual export earnings from commodities was more than 20 times greater than the increased yearly income from manufacturing exports.[18] The magnitude of investment that would have been required to even come close balancing those shares is mind-boggling. How could such a program of diversification have been financed if Russia had not focused on exporting oil?

Further, where would investment have been targeted in the hypothetical ideal diversification effort? One must think hard about the meaning of diversification. To have helped, the performance of the "new" sectors would had to have had fluctuations uncorrelated with oil and gas. Sectors that are positively correlated would not have significantly dampened fluctuations in income flows. It is not clear where investment could have been channeled to achieve the desired effect. Consider that every single non-oil sectoral index in the benchmark Russian stock market, the RTS, fell more than the oil and gas sector index after the market's mid-2008 peak. The oil and gas index fell 68 percent from peak to trough, but the overall RTS index fell by 76 percent. The telecom and consumer goods indexes fell by around 80 percent, and the manufacturing and financial sectors by over 90 percent.[19]

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[15] This is evident in the subsequent movement in RTS and oil. RTS and oil jointly recover before the credit crunch and the world recession have ended.

[16] One important result of these capital inflows was a bubble in real estate, especially in Moscow.

[17] A typical statement to that affect came in the authoritative "Annual Threat Assessment of the Intelligence Community of the United States," presented in February 2010: "Turbulence in global energy markets was a painful reminder to Moscow of the Russian economy's overdependence on energy, dramatizing the need for constructive steps toward economic modernization and diversification" (Blair, 2010).

[18] In 2008 Russia earned $365 billion more from commodities exports than it had in 2000. Its annual income from exports of manufactures of all kinds, including arms, grew over that period by only $17 billion. ROSSTAT data. See Appendix B.

[19] Data from RTS. See Appendix B.

Had Russia devoted more investment funds to expanding its retail sector or to manufacturing capacity, it is likely that the shock to GDP from the world crisis would have been even larger.

To argue that Russia needs to move away from its dependence on oil and gas because its economy performed so poorly in 2009 is to ignore the context. The depth of the Russian market crash was indeed dramatic. But it is easy to focus only on the downside. One needs also to remember how much Russia gained during the boom: incomes rose, retail sales grew, consumption rose, and reserves rose. Perhaps the most instructive comparison is to compare Russia's performance to that of the other so-called BRIC countries (the BRICs are Brazil, Russia, India, and China). Figure 8 shows each country's cumulative GDP growth in constant US dollars from 1999 to 2009. It is apparent that while Russia may have suffered most dramatically from the global financial crisis, it also grew much faster than the other BRICs prior to that. Even with the very large fall in output, Russia is still ahead of where it would have been had it grown as fast as any of the other BRICs throughout the period. This is worth repeating: even with the large contraction of GDP that resulted from the global recession, Russia is still significantly richer in 2010 than it would have been had it grown at a rate as fast as the next fastest BRIC since 1999.

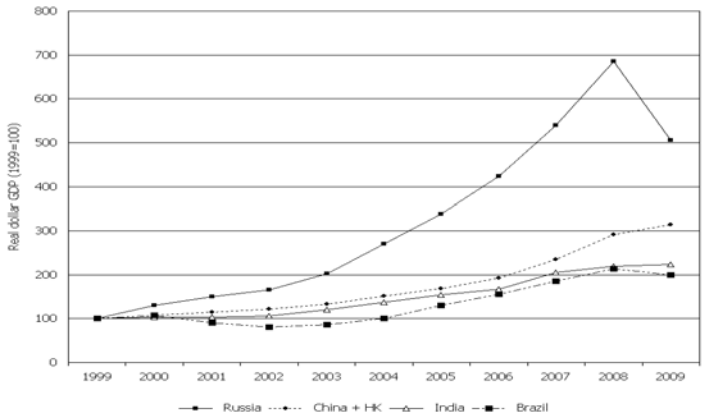

Fig. 8: GDP growth in the BRICs, 1999-2009.

Russia clearly would not have gained from having "diversified" away from energy in 1999. Why then is there such an insistence inside and outside Russia for economic diversification? For an economist this makes no sense. It is clear that the goal of capital allocation is efficiency, not diversification for its own sake. Diversification is a means of reducing risk. The keys to economic efficiency are specialization, division of labor, and comparative advantage. These are the fundamental concepts of economics. In particular, trade brings the biggest gains when countries export the products they produce better than others. As Steven Landsburg relates in his book, *The Armchair Economist*:

> [There] are two technologies for producing automobiles in America. One is to manufacture them in Detroit, and the other is to grow them in Iowa. First you plant seeds, which are the raw material from which automobiles are constructed. You wait a few months until wheat appears. Then you harvest the wheat, load it onto ships, and sail the ships eastward into the Pacific Ocean. After a few months the ships reappear with Toyotas on them.
>
> International trade is nothing but a form of technology.[20]

[20] Landsburg (1995). As Landsburg notes, he is retelling this argument from David Friedman.

For Russia, which is endowed with abundant energy resources, substituting oil for wheat suggests an efficient way for that country to produce automobiles.[21]

The only economic argument for diversification stems from considerations of risk. Owing to the volatility of the oil price, income streams will vary, as they have done over the past four decades in Russia.[22] But that simply means that the relevant question to ask is: How do you best manage your revenue from oil so as to smooth the flow? The accepted wisdom is: create a petroleum fund. Russia did just that. Some forty percent of gross export revenues were channeled into its various petroleum funds. Moreover, the government acted properly with these funds. It did not invest inside Russia. It put the funds it in foreign securities, because the point of such a fund is to diversify risk. Had it instead used the funds for domestic investment, Russia would be in an even more serious position today.

The persistence of the calls for diversification in Russia in the face of such arguments against it suggests other motives. We think two in particular seem to be in play. The first is prestige. The idea that an economy based on commodities exports is "primitive" and more dependent on outside powers is a longstanding one in Russia. It has become a staple in recent statements by President Dmitry Medvedev.[23] When Russians today complain that owing to their dependence on oil and gas their country is in effect nothing but a "raw materials appendage of the global economy," they are echoing a phrase that originated with Josef Stalin. He made it notably at the Bolsheviks' 14th Party Congress in 1925.[24] While prestige seems to have a lasting appeal to Soviet and Russian leadership, there is a second, more practical and more important motive for advocating diversification: it is to justify various schemes for rent redistribution.[25] The principle involved is usually simple: Define your own preferred activity or industry as desirable or even critical in a non-oil and gas future for Russia, and thereby legitimize your claim on current oil and gas rent flows. The diversification debate in today's Russia is thus largely a debate by and among rent-seekers.

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[21] For those who still insist on the perils of the so-called resource curse, we recommend the study by Alexeev and Conrad (2008). They show just how hard it is to find any such phenomenon in real data. As they demonstrate, resources are a blessing not a curse.

[22] In addition to variability of income flows, price uncertainty creates another risk for Russia as well, namely, the risk that large-scale investments in oil and gas production undertaken in the expectation of one price regime (high prices) may turn out to be unprofitable if the price level drops. We return to this topic in the section, "The Future of Rents."

[23] Medvedev's recent speeches and writings are replete with negative allusions to Russia's dependence on its commodities sector. In his September 2009 article, "Go, Russia!," for instance, he bemoans Russia's "primitive economy based on raw materials," calls for Russia to free itself from "its humiliating dependence on raw materials," and lists as the country's number one social ill its "habit of existing by virtue of its exports of raw materials, in effect exchanging them for finished products." (Medvedev, 2009).

[24] "Thus it follows that we must build our economy in such a way as to prevent our country from being turned into an appendage of the world capitalist system, prevent it from being included in the general system of capitalist development as its auxiliary enterprise, ensure that our economy develops not as an auxiliary shop of world capitalism but as an independent economic entity that relies principally on the domestic market" (Stalin, 1954).

Of course to Stalin oil and gas production was anything but primitive. His concern was not the presumed lack of prestige of a dominant resource sector but the more fundamental fear that any dependence of Russia (the Soviet Union) on the global economy would leave it vulnerable to its capitalist enemies. Consequently, the only protection was complete autonomy—autarky. Russia needed to be self-sufficient. Stalin rejected efficiency for the sake of security.

[25] This is not just a Russian malady. We have calls for "green" jobs and ethanol production in the United States.

To sum up: Yes, Russia is dependent on oil and gas. But there is no compelling reason to believe that Russia is "overdependent" on those resources. They have been and will continue to be the source of tremendous wealth. The problem is how the rents are used. And in Russia's case, they are misused. To understand how, we must turn to our second theme, addiction.

RENT ADDICTION

Many countries earn rents from resources. But what makes Russia different is the addiction to these rents. Addiction is the key phenomenon that explains how the financial crisis was manifested in Russia, and it is the most important factor shaping the future of the Russian economy.[26] Let us begin by noting that we use the term addiction in a very specific sense. Our usage is quite different from any casual use of the term. Moreover, Russia's addiction is not any form of consumption-related dependence.[27] It is the result of structural changes in the nature of the economy brought on by the accumulation of rents. Addiction refers to a condition in which there is an imperative to allocate rents to maintain and expand specific production sectors of the economy, notably those that the Russian economy inherited from its Soviet predecessor.

The addictive nature of the economy has its roots in the Soviet period, with its emphasis on "production for production's sake." As rents grew, they were increasingly claimed by the inefficient production sectors.[28] Those sectors used the rents in system-altering ways—expanding production capacity, hiring new workers, building new plants and even whole new cities—that heightened the need for even more rents in the future and made withdrawal of rents exceptionally costly. This is why the term addiction is appropriate. The structural changes create characteristics similar to medical notions of addiction: tolerance, that is, an ever increasing demand for the addictive substance; withdrawal, the painful reaction to denial of the substance; and, as a result, willingness to sacrifice for the addiction.

It is rent addiction, not resource dependence per se, that is most responsible for the backwardness of the Russian economy. In fact, addiction *requires* stagnation. It works only if factors of production are kept as immobile as possible. Human capital immobility in particular is a key element in Russia's addiction. Addiction can be described as using people as hostages to claim rents. Hostages enforce addiction. If the economy were a point (without spatial dimensions) or if mobility costs were absent, then hostage taking would be ineffective and addiction through production would not work.[29] When the enterprise director or governor argues that production must be maintained at his factory, otherwise all the workers and their families will suffer, implicit in that argument is that it would be impossible for the workers to find jobs in other sectors or regions.

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[26] Gaddy & Ickes (2009).

[27] One way to think about this is to compare the classic U.S. example of wasteful pork-barrel spending, the so-called Bridge to Nowhere that was planned to be built in Alaska at a cost of $398 million. Notice that this would have been a one-time expenditure. That is, once the bridge was completed it would no longer be a drain on the treasury. Compare this with an investment to build or expand a factory that produces equipment at a loss. It is not just the investment itself that is wasteful. The investment establishes a perpetual claim on future rents. If the subsidies to this factory are cut off, then the factory will close and the jobs will be lost. The difference then is that the boondoggle creates no lasting claim on rents; the investment in production does.

[28] As we discuss below, in the Soviet economy the natural ways to use rents—fuel a consumption boom or hold in Swiss bank accounts—were simply not feasible.

[29] This goes back to Evsey Domar's (1970) thesis about the origins of serfdom: the tsar awards land to the nobles for their (military) service. But the land is worthless without peasants to farm it. Hence the need to tie people to the land.

Lessened mobility was a major negative effect of addiction during Russia's post-2000 expansion. Consider the difference between migration trends in addicted Russia and other countries in the boom and in the recession. In a normal (non-addicted) economy, people are more mobile during a boom. More jobs are available, and people are themselves wealthier and therefore better able to afford the cost of migration. In a recession, by contrast, migration slows. (This has been the case in the United States in the current recession, where there has been a notable decline in mobility). But in Russia mobility was high during the low-rent period of the 1990s. Then, in the Putin (oil boom) period, mobility declined despite strong GDP growth and a big increase in household income. Figure 9 shows that the migration rate in the low-rent period of 1993-1999 was 39 percent higher than in boom period of 2000-mid-2008.)

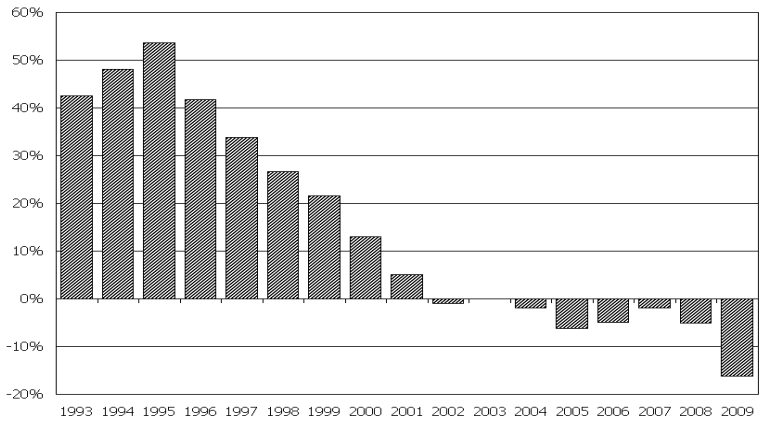

Fig. 9: Annual internal migration relative to the average of 2000-2008Q2.

During a rent boom in an addicted economy, the behavior of both the enterprise directors (regional governors) and the workers (residents) reinforces immobility. For the directors, the greater the rents, the more valuable the hostages (their workers). Therefore, the more important it is to limit mobility. More rent allows directors/governors to expand production capacity and hire more workers. That is self-reinforcing, since the expanded capacity strengthens claims on rents next period in order to maintain capacity utilization rates. The workers, meanwhile, have less incentive to migrate or invest in new occupational skills since jobs are now available in the dinosaur factory.[30]

Withdrawal in an Addicted Economy

In a boom addiction impedes change. It means missed opportunities. It consolidates the backward sectors. This reinforces the legacy of misallocation inherited from the Soviet period. But the more serious negative effects of addiction come in the bust cycle. The key here is that the misallocation that comes from addiction is not self-correcting. Mistakes are made in allocation in market economies all the time. But in the nonaddicted economy, the market corrects the mistakes, albeit often with pain and dislocation. Addiction, by contrast, leads to self-sustaining misallocation. The addicts grow in the boom and yet do not disappear in the bust.

One important reason why it is so difficult to correct misallocation in the rent-addicted economy is because the misuse of rents is opaque. In the Soviet economy the price system ensured

[30] This suggests that a way to weaken addiction is to increase mobility. Invest in education, health, and other forms of human capital, to give people more options.

that the use of rents obscured any notion of whether value was being created. Moreover, when rents are distributed addictively through production, the routine nature of this process obscures reality. This distinguishes misallocation through addiction from the inefficiencies that are typically associated with resource windfalls in nonaddicted economies. In many countries, a windfall can lead to excessive spending in the form of extravagant investment projects and the like. This extra spending that the windfall facilitates may change mentality and consumption behavior as long as the windfall is present. But when the windfall disappears, reality asserts itself, if only delayed. The projects financed by the windfall are simply terminated as the funds run out. The very language used in such cases is telling. After the bust, if not before, the unsustainable projects are commonly referred to as "boondoggles," "showcase projects," "pyramids," and so on. Such labels indicate that the objects of the spending are seen as anomalous. They stick out. Everyone knows when and under what circumstances they were built. That is not the case in addiction, where the rents are channeled into production. When the rents dry up, it is not so obvious what was the excess. In most cases, the windfall was spent simply to do more of what was being done before, only now perhaps on a grander scale. Often, the extra spending was not concentrated to a specific project, a specific region, or specific groups in the population.

The preceding discussion means that addiction made the boom and its subsequent collapse more problematic for Russia than a similar-sized consumption bubble would have been. Here is the reason why. Imagine an oil producer identical to Russia without addiction that receives a windfall from high oil prices. Because there is no addiction, the excess income would not be used to expand capacity in backward production sectors. Assume instead that it is spent on imported consumption goods. When oil prices collapse, the consumption boom ends. In an addicted economy, on the other hand, it is not at all clear which producers are operating solely due to rent accumulation. Moreover, during the period of rent growth the number of claimants increases. In Russia's rent-addicted economy, a large part of the windfall had been invested in the production sector, and much of that was for purchase of new equipment abroad. But the key thing is that rather than investing to replace old obsolescent plants, investment merely added to total capacity. As a result, the number of claimants to the rent increased. This made it more difficult to implement policies to adjust to the end of the boom.[31]

Adjustment in consumption is natural—it must fall as income falls. This is painful, but it is relatively straightforward. Adjustment is very different in addicted production sectors. Rather than restructure enterprises or shut down production, the primary adjustment takes the form of shrinking of output while preserving capacity. In other words, because of the specific, addictive nature of the Russian economy, much of the rent that was invested, rather than being consumed, ended up being used counterproductively. It helped preserve the so-called dinosaur industries. Depending on how skillfully the addicts were in claiming the rent during the windfall, they were then better positioned to "recover" after the collapse. That is because the adjustments they made during the boom give them an advantage to claim rents in the future. [32]

The best example of this in Russia is the railroad industry. Look again at the relationship between freight car production and the oil price presented in Figure 4. The rebound in oil prices has generated a recovery in freight car production as well. The role of the railroad sector in distributing

[31] Roland Nash (personal communication) has suggested another important reason for reduced structural adjustment in this crisis. He points out that in an economy with inadequate institutions (in terms of market efficiency) banks are reluctant to push debtors into bankruptcy because of the difficulty in recovering collateral through the courts. Consequently, they are more likely to engage in rolling-over debts. This could be beneficial if the crisis is external and it prevents over-reaction. While it would be good for short-run macro, it is bad for long-run productivity.

[32] This is the return on their investment in relational capital.

rent to the addicts is a story in itself. The railroad monopoly, Russian Railways (*Rossiyskiye Zhelezhnyye Dorogi, RZhD*) itself directly employs around one million people, spread across the country. But its more important role is as the main, and often only, customer for some of the largest Soviet-era heavy manufacturing plants in the country, including the rail car producers. Those producers behaved in paradigmatic addictive fashion during the boom. Between 2002 and 2008, while overall manufacturing employment in Russia shrank by 15 percent, the freight car producers expanded the number of their employees by 43 percent (nearly 70,000 workers). They increased physical production capacity by 73 percent.[33] Neither the payrolls nor the plant were reduced in the crisis, and as soon as the rents began flowing again, thousands of new cars were being ordered from the plants. This despite the fact that *RZhD* and other operators already had far more cars than they needed—at one point nearly 300,000 more.[34]

In a rent-addicted economy, a resource boom filters into the economy through production. Rent addiction intensified over the period of the boom preceding the global crisis. It did not disappear when rents collapsed in late 2008 and early 2009. It remains a major problem for the future of the Russian economy.

RENT MANAGEMENT SYSTEMS

Why does Russia suffer from addiction and others do not? We need to understand how addiction evolved in Russia. This will require introducing our third theme: the system by which the rents are managed. The crucial issue for any resource abundant economy is how to control the flow of the rents. We refer to such a system as the "rent management system," or RMS.[35] The purpose of the RMS is to prevent the dissipation of rents. If the RMS is weak, then rents will be appropriated at the source of production. If the RMS is centralized and powerful, rents will flow upwards to the leadership.

Systems of rent management can differ in several ways. We designate an RMS as strong when rent allocation takes place according to given rules. We refer to it as weak when rents are grabbed. Notice that this is not the only way in which RMS's differ. An RMS can be centralized, as in the case of Stalin's Soviet Union, or decentralized, as in the Yeltsin's Russia or as it is organized in Alaska today.[36] Further, RMS's can be formal or informal.[37] Interesting combinations can arise. As we discuss below, Putin's Russia has an RMS that is strong and centralized but with important elements of informality.

In the Soviet economy the RMS had to take a particular form.[38] Rents could not be transformed into consumption on anywhere near the scale on which they were earned. Nor could they easily be shifted to private accounts abroad. This was simply impossible in a controlled

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[33] Data on freight car production sector from ROSSTAT. See Appendix B.

[34] See the interview with top rail freight executive Salman Babayev (Stolyarev, 2009).

[35] Every resource abundant economy has an RMS, but in many economies it will have little complexity. For example, in a bandit-type state the leader may simply appropriate all the rents for personal luxury, a la Mobutu in Zaire. In any case, the RMS governs the allocation of rents.

[36] Consider a pure market economy with the rule of law enforced and private property in oil production. The rents from producing oil will accrue to the owners of the deposits. If the laws are enforced the owners will appropriate all the rents. Thus, the RMS in this case will be strong, formal, and decentralized. Notice that there was no specific organization of the RMS in this case, but nonetheless rules enforce who gets the rents.

[37] We discuss this more fully in Gaddy and Ickes (forthcoming, chapter 1).

[38] In a Soviet-type economy there is almost nothing to discuss but the use of rents.

economy. Thus the use of rents in a Soviet system was constrained in some ways that differ from non-planned economies. The primary use of rents in the Soviet-type economy was in production. What else could you do with rents but build factories, industries, cities, canals, and railways on permafrost? But with a price system that was opaque, those involved in the production of these monuments could naturally believe they were performing valuable services to the economy.

This was the primary source of addiction to resource rents: it stems from the limited uses to which rents could be employed in a Soviet-type economy.[39] Leaders who controlled these rents used them to produce things that enhanced their stature or authority in the Soviet state. Once these activities were underway, however, they had to be continually fed with more resources as they were not actually value producing. Addiction was thus costly for the leadership as it led to a future drain on rents.

Leaders face another problem in collecting rents. They need to prevent rents from being absorbed at the production level or along the path of collection to the center. We refer to this loss as dissipation. Dealing with dissipation has been a recurrent problem in both the Soviet period and in the Russian economy. In the Stalinist period the RMS utilized terror to minimize dissipation of rents. But while terror is an effective means of deterring dissipation, it is harmful to the production of rents. Terror inhibits risk taking and initiative. Over time the benefit-cost ratio of terror may shift. Beria clearly recognized that this had happened when he shut down the Gulag after Stalin's death.

After Stalin's death the RMS was altered primarily by the reduced employment of terror.[40] The constraints on rent usage, however, were not changed. Consequently, addiction continued apace. Moreover, the decline in the use of terror meant that rent dissipation also intensified. A larger share of the rents remained at lower levels in the hierarchy. Had this process continued unabated, the Brezhnev regime might have been severely squeezed. But starting in 1970 the Soviet Union experienced a sharp upturn in the production of rents. The greater flow of rents allowed the Soviet leadership to use resources to prop up Eastern Europe and to engage in military buildups and adventurism. At the same time, however, the increase in dissipation that resulted from the weakened RMS led to more addiction.

Under Gorbachev the RMS grew even weaker as economic reforms further loosened the center's control over the use of rents. At the same time, the production of rents declined as oil prices collapsed. It was this dual hit of lower rent production and a weakened RMS that fatally weakened the Soviet state and led to its collapse in a process akin to a bank run.[41] The Soviet state had insufficient resources to prop up its East European allies, or to maintain the flow to addicts.

The collapse of the Soviet system of central planning led to a serious transformation of the rent management system. It now became possible for individuals—eventually called oligarchs—to amass personal fortunes and for capital to flee abroad. The RMS under Yeltsin was spectacularly ineffective in restraining rent dissipation. The fundamental conception underlying the market economic reforms of the 1990s was that the rule of law would constrain the owners of rent producing assets. The rents would accrue to the owners, but the state could obtain its share through taxation. The problem is that the "inverted funnel" nature of the Russian economy (that is, that the overwhelming share of value created in the economy originated in such a small number of

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[39] This is a central irony of the Soviet system. Had there been less ideological and command limitations on looting on a mass scale, rents would have been consumed or saved in Swiss bank accounts. Wasted from the view of Soviet production, perhaps, but non-habit forming.

[40] Terror was certainly not eliminated, but the frequency of use was reduced and recurrent purges essentially *ceased*.

[41] We model this in Gaddy and Ickes (forthcoming). See the appendix to chapter 2.

concentrated sectors) allowed the asset owners to buy protection against the state and the RMS and to prevent the state from collecting its share of rents.[42]

The collapse of the RMS under Yeltsin had two important consequences. The first was "the dog that did not bark." Given that rents had collapsed, one might have assumed that the loss-making enterprises would disappear. Cut off from the rents that ensured their survival, and facing incredibly poor prospects for recovery, the transformational recession that accompanied economic reforms was precisely the point where most observers expected these dinosaurs to die off. But they did not die off. They proved remarkably proficient at postponing extinction. They were addicted to the rents and they suffered the withdrawal symptoms associated with a cutoff, but they managed to hold on. The manner in which they did this led to what is referred to as the virtual economy.

The second development related to the new asset owners, the oligarchs, and it would eventually lead to a completely new RMS in Russia. The asset owners' problem was that while they were effective at protecting their rents from the state, they were at a greater risk from each other and from a potentially hostile public. Yet the very weapons that they used to *individually* protect themselves from the state's efforts to restrain their dissipation made the state ineffective at providing protection for property owners. Therefore, the weakness of the RMS and the chaotic infighting among the oligarchs created a need for a new system that could protect them from each other and allow them to continue to produce rents. The challenge for the oligarchs was how to create such a system among themselves. This was a problem that they were ultimately unable to solve on their own. Their dilemma was that if any one of the oligarchs became powerful enough to provide such protection, he would be a threat to all the others.[43] The oligarchs' internal struggles culminated in the so-called Bankers War of the summer of 1997, an episode that left no doubt that the oligarchs were on the verge of mutual destruction. An outsider was needed, but despite the best efforts of Anatoly Chubais the state was ineffective at mediating their battles. Chubais's removal in January 1998 in the fallout from the Bankers War left the system even weaker than before. The weak RMS, combined with very low oil prices, resulted in a state that could not command resources and led to the August 1998 crisis.

Putin was, however, able to solve the problem and create a new RMS. His particular rise to authority in Russia—the offices he held once he arrived in Moscow—allowed him to accumulate the means to create this new system.[44] His timing was fortunate because oil prices, and thus rent production, were about to begin a long period of increase. The system that Putin created we refer to as Putin's Protection Racket, but it is important to understand that this system was not primarily a system of extortion. Rather, it was a mechanism for ending the conflict among the oligarchs while restoring the capacity of the center to collect rents.

The story of how Putin established himself at the center of this new RMS is too complex to be explained in full in the present article. Here we focus on the nature of the RMS that Putin did establish. We describe elsewhere the path of his ascension to this position and the process by which

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[42] Of course most observers both inside and outside of Russia also failed to recognize the importance of resource rents to the Russian economy, and thus overestimated the potential of conventional economic reforms to transform Russia.

[43] The dilemma is a classic one among elites competing for wealth and/or power. One is reminded of the struggle for predominance among mafia families during the Castellammarese War that only ceased in 1931 with the creation of the National Commission by Charles "Lucky" Luciano. The commission adjudicated disputes among families and thus ended their wars. See, for example, Raab (2005, 33-36) and Dickie (2004, 229).

[44] The failure of Chubais to create a functional RMS suggests that authority was not a sufficient tool to create it. Putin managed to accumulate the key asset necessary, the monopoly of financial information.

it occurred.[45] The secret to his system centers on monopoly control of financial information. It is typical to think of a monopoly of force as the chief weapon in a protection racket. But the oligarchs had their own security forces. Financial information that could be used to take down an oligarch can be even more powerful than physical violence. Prior to Putin the oligarchs were busy collecting such information on each other. But Putin, who had collected this information while heading various agencies once he reached Moscow in 1996, made a deal with them. They would accept his monopoly on the information weapon (and hence agree to refrain from using the weapon against each other), and he would maintain their relative positions and allow them to continue to earn. The state would collect rents, and they would cease trying to buy protection against the state. As long as they followed his rules they could successfully earn. And as we show elsewhere, Putin has been scrupulous at following his side of the bargain.

THE FUTURE

Now that we have explored the role hitherto of the three key factors—Russia's dependence on its oil and gas rents, its addiction to the rents, and its system of management of the rents—it is time to turn to the future. We will ask how each factor emerged from the crisis and how it might evolve in the years ahead. These are the lasting keys to understanding Russia's economy, its politics, and even its international policies. Other issues are ephemeral. We will examine first the addictive nature of the economy, then the rent management system, and finally the rents themselves.

The Future of Addiction

Neither during the boom nor during the bust was Russia successful in reducing addiction. It is not surprising that Putin has not challenged the addicts in the crisis period. The regime has shown extraordinary concern for social stability, particularly by protecting jobs, that has led to more caution towards the addicts than ever. The attention given to the need to preserve employment in company towns—monotowns, in the Russian parlance—is illustrative. He also refrained from directly challenging the addicts during the boom. However, there was a point when he did seem to recognize the danger of runaway addiction and attempted to reign in extremes. He used a couple of different approaches. One was aimed at restraining the short-term growth of the rents at the margins. That tactic was somewhat successful but rather ineffectual. The other approach was more ambitious, since it intended to channel rents to non-addicted claimants. But it turned out to produce even worse results, as it backfired in the thoroughly unanticipated global financial collapse.

Restraining rents. We discussed the policies of prioritizing use of the rents for paying down Russia's foreign debt and building up reserves. The urgency of these clear priorities in the early years of Putin's tenure as president meant that the growth of rents was viewed as strictly positive. With the sharp rise in oil prices in later years, however, rent began flowing into Russia at a rate that was no longer as simple to manage as before. The looming threat was that Russia would repeat the experience of the Soviet Union in the 1980s after the first and second oil shocks, when the explosion in rents had led to a new wave of addiction and rent dissipation. To avoid that outcome and therefore curb rent growth in an environment of soaring prices Putin sought to use tax

[45] See Gaddy and Ickes (forthcoming) and our forthcoming working paper, "The Development of Putin's Protection Racket."

and other policies to induce companies to limit the quantity of oil they produced. The policies did restrain output, but the overall effect on rents was marginal, since prices continued to soar.[46]

Redirecting rents. To the extent that a rent-addicted economy remains closed to outside investment a growth in rents will lead to a rise in the ratio of addicted to nonaddicted enterprises. The addicts dominate rent-allocation by virtue of their connections with government and the rent producers (that is, by virtue of their successful investments in "relational capital"). Putin thought he could combat this and manage addiction in the face of the rent explosion by utilizing Western banks to channel the funds back into Russia for investment by non-connected institutions. (This is "the MacFarquar thesis" that we discussed earlier in the section on "Private Sector Debt.")

Putin was mostly correct in his assumption that the Western institutions would not invest in addicts. What he failed to anticipate was that they would invest in Russia as they did everywhere else—in bubble related activities—and thus make Russia susceptible to the worldwide financial crisis. This was exacerbated by Putin's unwillingness to let them invest in the oil and gas sector, the one sector where more investment would have led to more rent production rather than dissipation. As a result, Russia got a disastrous outcome when the adverse shock proved to be not low oil prices but a worldwide financial crisis resulting in an outflow of private capital.[47] Russia proved more sensitive to this type of shock than would have been the case had it followed a more insular financial strategy in the boom years, that is, had there been more investment in addiction.

Would then Russia have been better off with more of the windfall allocated to addicts than to bubble activities? In the short run, perhaps one could make such a case. But in the long run Russia is better off having lost wealth in the bubble investments than it would have been if the same amounts had been invested in addicted sectors. Reinforcing addiction is not merely a loss for today; it also increases the probability of losses tomorrow owing to the value-subtracting activities of the addicts. But the main point is that neither alternative—speculative losses nor increased addiction—is good. The better strategy would have been to channel as much of the windfall as possible into the rent-generating sector and into non-addicted sectors. The problem, of course, is that without the simultaneous success of both of those goals, this strategy, too, would have backfired. Generating more rent without restraining the addicts would have made the problem worse.

Russia's experience with addiction through its latest bust-boom-bust cycle emphasizes the point that Russia cannot just "grow out of" addiction. The addicts grew during the boom, and the crisis has only reinforced their relative position. Addiction has to be tackled head on.

The Future of the Rent Management System

Did the system work in the crisis? Is there any reason to think it cannot continue? This is a "lessons learned" story. Putin tries to learn from history. The crisis has been a major historical event. It is unthinkable that he would not ask about what worked and what did not, and why.

Putin's RMS is a mixture of a system of protection racket and protection service. Its robustness is based on the fact that it is a mutually advantageous deal between Putin and the oligarchs. It is therefore useful to ask how well the system performed for both parties to the Deal. From the oligarchs' standpoint, the system did indeed work. The oligarchs all survived, and without redistribution of assets. The peace was preserved. In view of the magnitude of the shock to their aggregate wealth and to every one of their corporate empires, that is a remarkable fact and one that is hard to explain without the protection racket thesis.

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[46] Gaddy and Ickes (2009) examines this effort by Putin to curb rent addiction.

[47] Of course oil prices decreased as well, but this was a result of the global financial crisis, not the cause of it.

Putin bailed out the oligarchs. He protected them from creditors. The exchange rate policy pursued by the Central Bank of Russia was largely about just that. In the last quarter of 2008 Russia spent around $100 billion of its foreign exchange reserves to keep the ruble's value up as the oil price plummeted. Figure 10 shows the effect: between October 3 and December 19 the oil price fell by 64 percent, while the ruble lost only 6 percent against the dollar. This gradual devaluation gave the large Russian corporations time to adjust to the shock. Putin was fulfilling his side of the bargain: providing protection.

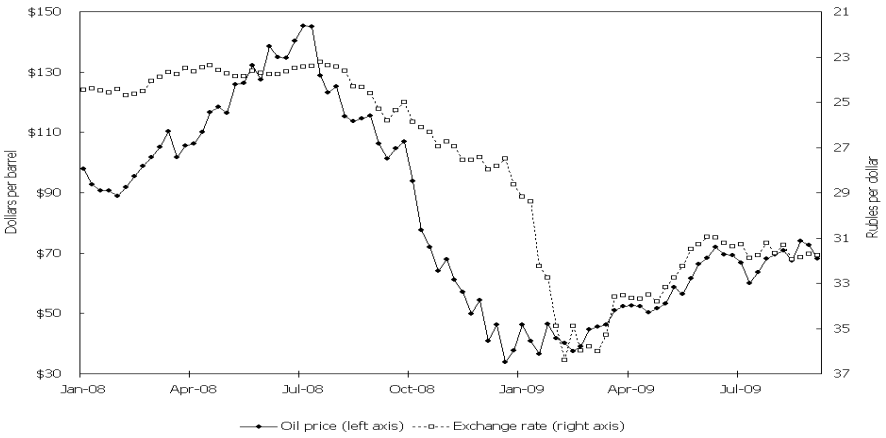

Fig. 10: The ruble-dollar exchange rate and the world oil price.

And how does it look from Putin's vantage point? Have the oligarchs lived up to their commitments? They certainly have remained loyal. If anything, the crisis has bound them more closely to Putin. But another part of the Deal was that they not only pay their formal taxes but their "informal taxes" as well, that is, that they share the rents. Here is where Putin has been much more vocal in his criticism of the oligarchs than ever before. The Pikalyovo incident in the summer of 2009 is the best-known case. In June 2009 Putin flew to the small company town of Pikalyovo in Leningrad Oblast to chastise Oleg Deripaska in person for not paying wages on time in a factory he owned there.[48] Video clips of Putin publicly humbling the man who was one of the country's wealthiest individuals were posted on the Internet and viewed by hundreds of thousands.[49] The public pressure by Putin has only escalated since the Pikalyovo episode. On February 24, 2010, at a meeting on investment in the electric power sector, he went so far as to single out by name a quartet of top oligarchs—Vladimir Potanin, Leonid Lebedev, Mikhail Prokhorov, and Viktor Vekselberg—for failing to live up to commitments to invest in the sector. As he put it, they are "not doing what they promised to do." Then, addressing them directly, he continued:

> I have known all of you for many years; in essence, we have been working jointly. Let me repeat that during the difficult conditions of the crisis we have made every effort to support you in the various directions of your business. The crisis is waning. It's not yet over, but it's on its way. I repeat, we agreed to meet you half-way in this area as well. We postponed the

[48]See, for example, Barry (2009).

[49] The official transcript of the June 4, 2009, meeting, as well as a 47-minute long video version, are on Putin's government website: http://premier.gov.ru/eng/visits/ru/6111/events/4295/.

> deadlines for investments. There will be no more such adjustments of schedules. Please focus your utmost attention on meeting your commitments.[50]

Even if there is much of the quality of a stage-managed spectacle to these episodes, there is a serious issue here. Putin needs the oligarchs now to shoulder more of the burden, that is, share more of the rents. His putting pressure on the oligarchs does not signify unhappiness with the Deal itself. The pressure is intended rather to force the oligarchs to perform as intended. They must keep to the Deal, and thus they have to pull their weight.[51]

Putin's criticism is essentially about rent-sharing. His bluster in this regard signifies a deeper point. More than frustration, Putin is coping with an inherent weakness of informal rent distribution under conditions when rent flows vary over time (as they are bound to do in the case of oil and gas rents). Informal rent distribution is an awkward mechanism for smoothing distribution of uneven rent flows. When rents are collected formally, you can build up a rainy day fund (for instance, Russia's stabilization funds). But how do you do that with informal rents, which are most typically distributed in kind? Obviously you cannot, so informal rent distribution is more likely to fall in a downturn. An obvious corrective in terms of future policy is to shift to more formal rent collection—that is, to tax companies more and build up stabilization funds more than before. But this is costly because informal rent distribution is much more flexible for the leadership. Hence, Putin is left with no alternative but to browbeat the oligarchs to contribute more.

Having said all this, there is no evidence yet that Putin wants to abandon the system. More important, there is no indication that he can leave it. Putin is a hostage of this system as much as the oligarchs are. They are sitting on the same powder keg.

The Future of Rents

The final issue to discuss is the future of the resource rents themselves. In the short term the volume of rents available to Russia is almost entirely a question of the oil price. The quantities of oil and gas produced adjust much more slowly. Yet both prices and quantities will be important for assessing the volume of rents in the medium term, say until 2025 or 2030.

The Oil Price. The basic question is whether the world has entered a new price regime. The most authoritative agencies seem to think so. The just-released report of the United States Energy Information Agency (EIA), its "Annual Energy Outlook 2010," assumes in its reference scenario that world oil prices will climb to almost $113 a barrel in today's prices by 2030 and $122 by 2035.[52] While such a forecast might seem unexceptional in light of the high prices of the past few years, a view of the long historical perspective should suggest how revolutionary such forecasts are. See Figure 11. The EIA's price scenario implies *an average price* for the period of 2010-2030 of $95 a barrel. That is more than two-and-a-half times higher than any previous 20-year period in history.

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[50] "Prime Minister Vladimir Putin chairs a meeting on investment in the power industry," http://premier.gov.ru/eng/visits/ru/9472/events/9480/.

[51] Other members of Putin's team play their roles as well. In his web manifesto, "Go, Russia!" of September 2008, President Medvedev (2009) seemed to adopt a highly critical tone. He claimed the oligarchs were not really productive. This idea was repeated by Vladislav Surkov in an interview in February 2010 (Glinkin and Kostenko, 2010). The oligarchs, he said, did not produce the wealth they have; they were merely allotted fruits of the joint labor of the Soviet people. Is this populist tone serious? It's not likely.

[52] EIA data. See Appendix B.

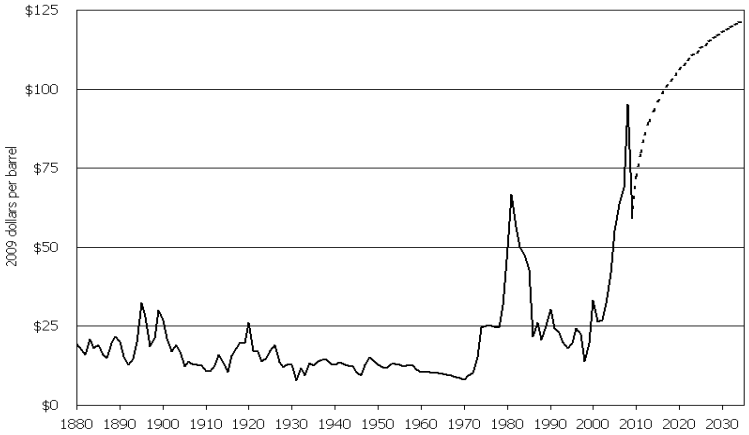

Fig. 11: The world oil price, 1870-2009 (actual) and 2010-2035 (EIA forecasts).

The most recent forecasts by the International Energy Agency (IEA) are quite similar to those of the EIA. The reference scenario in their "World Energy Outlook 2009" (released in November 2009) implies an average price for 2010-2030 of around $96 a barrel in 2009 prices.[53]

Let us suppose that we are in a new price regime as implied by these benchmark estimates from agencies like the EIA or IEA. What does this imply about the political economy of Russian resource dependence? Figure 12 illustrates how Russia's resource rents would evolve under the EIA's reference price scenario for the world oil price.[54] The implications for Russian resource wealth are staggering. On average, for the next 25 years, Russia would enjoy a rent flow greater even than in the historically anomalous boom year of 2008.

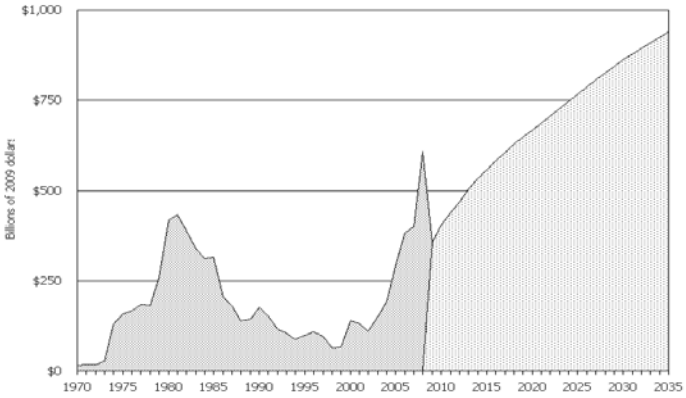

Fig. 12: Soviet/Russian oil and gas rents, 1970-2009 (actual) and 2010-2035 (based on EIA oil price forecasts).

[53] IEA, "World Energy Outlook 2009 Fact Sheet," page 6, "Energy Price Assumptions." "In the Reference Scenario ... the average IEA crude oil import price ... is assumed to reach $87 per bbl in 2015, $100 per bbl by 2020 and $115 per bbl by 2030 (in year-2008 dollars)."

[54] The chart also uses the EIA's forecasts of Russian oil and gas output to 2035. See Appendix B.

If Russian policymakers were to put faith in this scenario, the folly of Russia's diversifying away from oil and gas would be self-evident. The correct policy would clearly be to maximize income flows by investing more in oil and gas to take fullest possible advantage of the rising prices. It is true of course that the price path—and therefore the rent path—would not be as smooth as shown in Figure 12. The EIA does not forecast year-to-year volatility of prices, only a steady trajectory. Price volatility has been increasing in recent years, and it is likely to grow even more. That volatility presents a problem for Russia, but it is solvable. It depends on the management of the rents.

Russia's bigger problem is not high-frequency volatility but the fundamental uncertainty of the price level over the longer term. And here, one has to question the realism of the EIA and IEA price forecasts, not only from the standpoint of energy economics per se, but from that of the global economy and global financial balances.[55] It is not just a question of Russia but the world as a whole. Russia would not be the only country in the world earning such historically unprecedented volumes of rents. All oil and gas producing countries would receive massive transfers from the industrialized countries, and from emerging economies that are not energy producers. The non-energy world would become net deficit countries for the foreseeable future. Could the global economy adjust to such a rapid reversal of fortune? The implications of these oil price forecasts for the distribution of world wealth—not to mention the adjustments in exchange rates, trade flows, and patterns of capital flows they would entail—make us skeptical about the robustness of this scenario.

What Russia has to consider as a matter of utmost strategic importance, then, is the possibility that we have *not* at all entered such a revolutionary new period in world oil as the current consensus would suggest. What if oil prices return to the historic pattern?

Investment in Future Oil. In the medium to longer term, the quantity of oil and gas produced becomes a key issue for maintenance of the rent flow. This requires investment in new reserves, primarily located in Eastern Siberia. Development of these new reserves raises a whole new cost dimension. The eastern oil is in regions that are colder, more remote, and geologically more complex. Obtaining the new reserves requires large, non-discrete investments. Because the investments are irreversible, Russia is exposed to a huge risk if prices return to low levels. If Russia cannot diversify this risk, it will not be able to make the investments necessary to sustain current levels of production. This point is central to thinking about Russia's future relationship with the global economy.

We can think of Russia's energy future and its relationship to the rest of the world in the following way. Consider the effects on Russia and on the rest of the world if, in the one case, Russia chooses to limit its investment in its oil and gas sector, thus allowing future output to fall, and, in the second case, if Russia undertakes—on its own—the large investments required to expand its output over the longer term. In each of these two scenarios, there will be two possible futures, depending on what happens in the rest of the world. This produces four possible combinations of futures for Russia and for the rest of the world. For instance, if Russia allows its output to decline in a world in which global demand and supply are such that prices return to the historically low price regime, this means that Russian resource rents would shrink to a very low level. For Russia, this is an unambiguously bad future. But the implications for the rest of the world are not so clear, since the hypothesized decline in world prices can be due to various causes: rapid development of alternative fuels (good), greater energy efficiency leading to reduced demand for oil and gas (good), continued or deepening of the world recession (bad), and so on.

[55] The energy economics argument against the EIA/IEA's price scenarios is obvious: these unprecedentedly high prices would induce massive investment in new energy sources, including both conventional and unconventional oil and gas and nonhydrocarbon alternatives, and so on.

In a different future scenario Russian output might fall without any other demand or supply shifts globally. In this case the world energy balance would suffer and the EIA/IEA scenarios of a new price regime would come true. Since Russia's rent flow is much more sensitive to changes in price than in quantity, this scenario would be likely to be a net positive for Russia.

Analogous arguments can be made for the case where Russia does commit to invest in expanding future output. If Russia invests, but the world price is low, Russia is a big loser. The world, on the other hand, wins from Russia's increased supply (which it can purchase at low prices). If Russia invests and if the world price is as high as in the EIA/IEA forecasts (or even higher), Russia will reap huge rewards, while the rest of the world (save a few other exporters) will suffer from the high prices.

These scenarios may be easier to trace using a payoff matrix that shows the two price scenarios (low price = LP, high price = HP) and two possible future output levels for Russia (low output = LO, high output = HO).

	LP	HP
LO	Bad for Russia Good or bad for World	Good for Russia Bad for World
HO	Bad for Russia Great for World	Russia rules the World Bad for the World

Fig. 13: Payoffs with no risk diversification.

The important point of the payoffs in Figure 13 is that with no risk diversification the interests of Russia and the "World" differ. The states where Russia is better off are those where the "World" is worse off and vice versa. When there is no diversification, interests diverge.

Now let us use the payoff matrix to analyze what happens when the risk of investing in high output is shared between Russia and the rest of the world (Figure 14). We imagine that risk is shared by diversifying the ownership of production, perhaps through Western investment in Russian oil production.[56] Obviously this case is only relevant in the high output cases. In the diversification case the risk of a persistent price shock is shared between Russia and the "World." Therefore, there is a convergence of interests.

[56] For example, Western firms could invest in Russian oil production or purchase equity in Russian oil firms (this is a hypothetical). If prices are high the rest of the world would thus share in the benefits via its ownership of oil production assets.

	LP	HP
HO	Shared low gains for Russia and World	Shared high gains for Russia and World

Fig. 14: Payoffs with risk diversification.

It is obvious that in a world of uncertainty, risk sharing leads to better outcomes for all parties. In our analysis we have considered risk sharing that takes the form of investment in production. One might argue that the same outcome could be achieved with investment in claims against incomes, rather than in oil output, that is, in state-contingent assets. In other words, the "World" could buy securities that pay off in the state (HO, HP) and sell securities that pay off in the state (HO, LP). Russia would be on the other side of the transaction, and risks could thus be hedged financially. Financial diversification may be an alternative means of achieving a convergence of interests.[57]

Russia will remain part of the global economy because of its dependence on oil and gas and its role as an exporter. Attempts to diversify into other sectors are not a practical solution in this situation. It is how Russia chooses to share the risks involved in future oil development, and the opportunities that the outside world provides for such risk sharing, that will determine the nature of Russia's relation with the global economy. If the relationship between Russia and the West remains only that of seller to buyer, then integration will be minimal, Russia will bear all the risk of reserve expansion, and it will consequently be less likely to expand reserves. Global energy security will be weakened. Russia will have little incentive for cooperative behavior in general.

A positive development would involve sharing the risk with Western oil companies. At the same time, Russia would be able to diversify its income risk by investing in global assets (for instance, a sovereign wealth fund). Such an outcome would tie Russia's interests more closely with the global economy. This would lead to more reserve expansion and future rents, enhance global energy security, and provide an incentive for Russia to cooperate more fully with the global economy.

CONCLUSION

Our discussion has ranged over a broad area. It may be useful to summarize the main points that we have developed in the preceding pages. Let us begin with our assessment of the performance of the Russian economy in this crisis. This is largely a matter of the time period one

[57] One might argue that there is an enforcement problem associated with state-contingent assets. If oil prices are high the producing countries may renege on their obligation to make the higher payments that they are obligated to. But it is not clear that this problem is any greater than that associated with expropriation of investment. (The trials and tribulations of the British-owned resource company Lena Goldfields between 1908 and 1929 is the classic cautionary tale for foreign investors in Russia.) Producing countries could try to re-write contracts in periods of high oil prices. Indeed, to the extent that financial diversification is associated with producers holding wealth in foreign countries, the likelihood of reneging on financial contracts is probably lower than with "real" expropriation.

considers. From the middle of 2008 to the end of the year and early into 2009, Russia plunged deeper than nearly any other major economy in the world as measured by indicators of total output, industrial production, or stock market values. It has since rebounded strongly in some respects. Yet, if we take a longer view, we must also recognize how much the Russian economy grew in the years before the crisis. We see that over the past five or ten years, even with the negative effect of the current crisis, Russia has outperformed all other countries, including the other fast-growing BRIC countries.

Both sides of the phenomenon described in the first point—the pre-crisis boom followed by the huge collapse—have the same cause, namely, Russia's dependence on world oil markets. Russia grew thanks to oil; Russia fell because of oil. This dependence on the flow of rents from oil (and gas) dates back for decades. These recent shocks, positive and negative, are by no means the first and will not be the last.

What has distinguished this shock from others in the past, however, is that Russia was better prepared this time. Today's Russian leaders have learned lessons from the past. The late Soviet regime enjoyed a period of high rents followed by a period of very low rents. But it managed the rents poorly and ended up so deeply in debt to Western governments that it sacrificed its financial—and in effect, ultimately, its political—sovereignty. Vladimir Putin and his associates concluded from that negative experience that financial and fiscal health were essential to restoring Russia's full sovereignty. The Putin regime made it a priority to use the oil windfall of 2000-2008 to pay off the country's foreign debt and build reserves for the future. Its foreign exchange reserves, which grew to become the third largest in the world, played a critical role in protecting (primarily) Russia's financial sovereignty and (secondarily) the welfare of its citizens. The current crisis has thus, in the mind of the leadership, vindicated and reinforced the policy of fiscal conservatism and extreme self-insurance. It is highly likely that the leaders will stick to these policies.

Another policy that is likely to remain is the system of management of the oil and gas rents, the institution we refer to as Putin's protection racket. The deal that Putin concluded in 2000 with the exclusive club of owners of the country's major resource industries survived the crisis. Putin protected them against the biggest external threat they faced since he came to power, as he also protected them against each other in a situation in which they were most vulnerable to challenges from within the club. However, the main reason the protection racket system will remain is not because it worked but simply because neither Putin nor the oligarchs dare abandon it or even attempt to alter it; they are all hostage to the system.

One policy that Russia did not pursue in Putin's eight years before the crisis was to diversify away from oil. That was not a policy failure, as some have suggested, but a positive result. Russia would have been more vulnerable, not less, to the global recession if it had seriously attempted a so-called diversification effort prior to the crisis. And public rhetoric notwithstanding, Russia is not likely to reduce its dependence on oil and gas any time soon. As a result, Russia's future will continue to depend overwhelmingly on what happens with the world's oil and gas markets. Beyond that assertion, it is perhaps possible only to rule out the extreme scenarios for Russia. On the one hand, only a combination of an extended period of very low oil prices and poor policy in managing its finances will produce a Russia as poor and weak as it was in the 1990s. Otherwise, oil rents can continue to bring Russia great wealth for years to come.

The problem for Russia is not its dependence on oil; rather, it is that Russia remains addicted to oil. The main purpose of this paper has been to show that these statements are different. Russia's oil and gas give it an unmatched source for generating wealth. It is not generation of wealth that is problematic but its use. The problem is how to restrain the addiction to the ensuing rents. Even under the most optimistic scenario for oil prices (and therefore rents), Russia's growth will be constrained by the same factors that shaped the impact of this crisis. The inefficient sectors and companies that we have described as addictive will lay claim to an inordinate share of the rents. The

problem for Russia is how to move away from addiction within the confines of the rent management system that Putin has created. There are no signs that Putin, or anyone else, has seen how to solve that problem.

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APPENDIX A: RENT AND RENT-SHARING

Rent. The textbook definition of resource rent is that it is equal to economic profit, that is, revenues minus economic, or opportunity, costs (including depreciation of fixed assets and a "normal" return on capital). In simpler terms, it is the revenue received from sale of the resource minus the cost of producing it.

In applying the notion of rent in the Russian case, however, we make adjustments owing to two special considerations. First, to the extent that resources are not used efficiently, the actual revenue received from sale of the resource is not the same as the true market value. In order to treat rent as a genuine opportunity cost measure, we use the world market value of oil and gas as the relevant price. Second, the cost of extraction in the Russian context is not necessarily the same as it would be in an efficient market economy. It is in fact our thesis that excess costs are a primary channel of rent sharing (see below). We therefore distinguish between the "natural" cost of production and the reported cost. By natural we mean the cost that would be incurred if the industry were organized efficiently—that is, the cost of production that would be incurred in a competitive market with free entry. Only the natural cost, not the reported cost, should be deducted from total revenue in order to calculate rent.

The key question is how to estimate the natural cost of extraction. In Gaddy & Ickes (2005) we discussed the issue of how to estimate the natural cost at length. There we used an estimate of $8 per barrel of oil and $18 per thousand cubic meters for natural gas. One important conclusion that we noted in that article is that estimates of rent are relatively robust to uncertainty about costs. Indeed, a doubling of the cost of production led to only a 10 percent decline in our peak estimate of rents. Given that the volatility of prices is orders of magnitudes greater than that for costs we do not think that our estimates for costs lead to serious problems in estimating rents.

Rent-sharing. In Gaddy & Ickes (2005) we describe how aggregate rents in Russia are distributed among various claimants in society. There are five main subcategories of rent, reflecting channels of distribution, or "rent-sharing." They are: (1) excess costs of extraction of the resource; (2) subsidies for use of the resource in consumption or production; (3) taxes levied on the producers and consumers of the resource and prescribed by law (formal taxes); (4) various forms of payments, in cash or in kind, that resource-owners make to governments, to government officials personally, or to groups within the community, which are not required by law but are de facto compulsory (informal taxes); and (5) profits retained by the owners. The figure below, reproduced from Gaddy and Ickes (2005), is a schematic illustration of the components of rent.

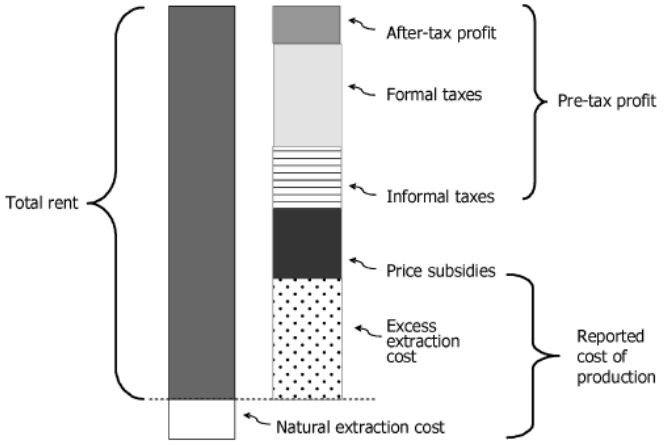

Fig. 2. Total value and its components.

Fig. 15. Total value and its components.

APPENDIX B: DATA SOURCES AND METHODS

The principal sources of data for this article are the following:

ROSSTAT: Russian Federal State Statistics Service. [www.gks.ru]

TsBSD: Tsentral'naya Baza Statisticheskikh Dannykh (Central Statistical Database) of ROSSTAT, a publicly accessible online interactive database. The database is only in Russian. [www.gks.ru/dbscripts/Cbsd/DBInet.cgi]

CBR: Central Bank of Russia.[www.cbr.ru]

RTS: "Russian Trading System" Stock Exchange [www.rts.ru]

BEA: Bureau of Economic Analysis, U.S. Department of Commerce [www.bea.gov]

EIA: Energy Information Administration, U.S. Department of Energy [www.eia.doe.gov]

IMF: International Monetary Fund, [www.imf.org]

Fig. 1. Soviet (1970-1990) and Russian (1991-) oil and gas rents.

As explained in Appendix A, rent is calculated as quantity produced times market price less cost of extraction. Quantities of oil and gas for 1970-1990, which are for the USSR, are from the statistical annuals of the USSR, *Narodnoye khozyaystvo SSSR*, various years. Quantities of oil and gas for 1991-2008 are from TsBSD. Quantities of oil and gas for 2009 are from ROSSTAT [www.gks.ru/bgd/regl/b09_01/IssWWW.exe/Stg/d12/2-1-3-1.htm].

Oil prices for 1985-2009 are from IMF, "IMF Primary Commodity Prices", world price of crude oil, [www.imf.org/external/np/res/commod/index.asp]. Prices for 1970-84 are from EIA, U.S. Crude Oil Imported Acquisition Cost by Refiners (Dollars per Barrel) [tonto.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=r1300____3&f=a]

Gas prices for 1985-2009 are from IMF, "IMF Primary Commodity Prices", "Russian Natural Gas, in Germany" [www.imf.org/external/np/res/commod/index.asp]. Gas prices for 1970-84 are from EIA, "Natural Gas Wellhead, Import Prices" [www.eia.doe.gov/emeu/aer/txt/ptb0607.html].

All prices are converted to 2009 dollars using the BEA's U.S. GDP deflator, "Implicit Price Deflators for Gross Domestic Product"

[www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&ViewSeries=NO&Java=no&Request3Place=N&3Place=N&FromView=YES&Freq=Year&FirstYear=1947&LastYear=2009&3Place=N&Update=Update&JavaBox=no#Mid]

Fig. 2. Russia's stock market and the world oil price, 2000-2009.

The stock market value is the RTS dollar-denominated index at mid-month, at [www.rts.ru/ru/index/rtsi/]

The oil price is the average monthly price for Brent from EIA. [tonto.eia.doe.gov/dnav/pet/hist/rbrteW.htm] Both series are current dollar prices.

Fig. 3. Annual sales revenue of Russia's top 100 non-oil and gas companies and the world oil price, 1999-2009.

1999-2008 data are from *Ekspert* magazine's annual rankings, 2000-2009, "Rankings of Russia's largest companies by sales volume." [www.raexpert.ru/ratings/expert400/]. The 2009 figure is an estimate calculated by the authors from a sample of corporate third-quarter and full year reports. Current dollar values.

Fig. 4. Railway freight car production and the world oil price, 1996-2009.

The oil price is from EIA and is the average price of Brent each quarter in current dollars. [tonto.eia.doe.gov/dnav/pet/hist/rbrteW.htm]

Freight car production is from TsBSD and is the average annual rate of cars produced for each quarter (sum of actual monthly output for the quarter times four).

Fig. 5. Retail sales, 2000-2009.

Retail sales are annual rates by quarter. Data are from TsBSD. Seasonally adjusted by authors. Current ruble values are adjusted for inflation by the authors using the Russian consumer price index, also from TsBSD.

Fig. 6. Russia's imports and the world oil price, 1994-2009.

Data on imports are from TsBSD and are quarterly averages of monthly data in current dollars.

The oil price is from EIA and is the average price of Brent each quarter in current dollars. [tonto.eia.doe.gov/dnav/pet/hist/rbrteW.htm]

Fig. 7. Reversing the leverage: Russia's foreign debt and reserves, 2000-2008.

Data on Russia's public foreign debt and international reserves are beginning of year values in current dollars and are from CBR, "External Sector Statistics."

Fig. 8. GDP growth in the BRICs, 1999-2009.

Dollar GDP data are from IMF, World Economic Outlook Database, October 2009, "Gross domestic product, current prices U.S. dollars". [www.imf.org/external/pubs/ft/weo/2009/02/weodata/index.aspx]

All prices are converted to 2009 dollars using the BEA's U.S. GDP deflator, "Implicit Price Deflators for Gross Domestic Product" (see reference in Fig. 1, above). Values are then converted to an index with 1999 = 100 for each country.

Fig. 9. Annual internal migration relative to the average of 2000-2009.

Data on the number of migrants within the borders of Russia each year are from TsBSD.

Fig. 10. The ruble-dollar exchange rate and the world oil price.

The ruble-dollar exchange rate is the rate at the end of the trading week from Oanda, "Historical Exchange Rates." [www.oanda.com/currency/historical-rates]

The oil price is the end of week price for NYMEX Light Sweet Crude Oil Futures Prices from EIA. [www.eia.doe.gov/emeu/international/crude2.html]

Fig. 11: The world oil price, 1870-2009 (actual) and 2010-2035 (EIA forecasts).

The historical oil price is from EIA, "U.S. Crude Oil Wellhead Acquisition Price by First Purchasers (Dollars per Barrel)." [tonto.eia.doe.gov/dnav/pet/hist/f000000__3a.htm]

The forecasted oil price is from EIA, "Annual Energy Outlook 2010." Year-by-Year Reference Case Tables (2008-2035), Table 1. Total Energy Supply and Disposition Summary, Imported Crude Oil Price. [www.eia.doe.gov/oiaf/aeo/index.html]

All prices are converted to 2009 dollars using the BEA's U.S. GDP deflator, "Implicit Price Deflators for Gross Domestic Product" (see reference in Fig. 1, above).

Fig. 12. Soviet/Russian oil and gas rents, 1970-2009 (actual) and 2010-2035(based on EIA oil price forecasts).

Historical data are as for Fig. 1, above.

Oil price forecasts are as for Fig. 11, above. Gas price forecasts are assumed to follow the same trend as for oil.

Quantity forecasts for oil are from EIA, "Annual Energy Outlook 2010." Scenario: aeo2010r (Reference Case). Table 21. International Petroleum Supply and Disposition Summary. [www.eia.doe.gov/oiaf/aeo/aeoref_tab.html]

Quantity forecasts for gas are from EIA, "International Energy Outlook 2009" (released May 2009), Table G2. World Conventional Liquids Production by Region and Country, Reference Case, 1990-2030. [www.eia.doe.gov/oiaf/ieo/index.html] .Gas production is assumed to continue to grow at that same rate from 2031-2035.