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THE IMPACT OF THE FALL OF THE SOVIET UNION ON THE RUSSIAN  
OIL INDUSTRY

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## **ABSTRACT**

Russia is the world's second-largest oil producer and its largest gas producer. This has been the case historically as well, even as the industry was hampered by problems that all centralized economies faced, including soft budget constraints, lack of incentives for managers to perform well, and poor communication between the central government and field operations in Siberia. Several oil crises resulted from these issues and the Soviet Union fell in the early 1990s, partly as a result of inefficiencies plaguing the oil industry. Oil companies have become privatized and remain an important driver of growth for Russia, comprising  $\frac{1}{4}$  of its overall GDP and employing 1% of its population.

However, the management of these companies has been inefficient, oscillating between government and private control. I make the case that, although privatization is necessary for the oil industry, it needs to occur in conjunction with the establishment of clear property rights. Currently, as the Russian government encroaches upon more and more of the oil industry's economic and political rights, companies are neglecting their future profits for short-term satisfaction. The organization of solid property rights will lead to less unnecessary oil depletion in the present and will help to create a long-term strategy for Russia's enormous oil reserves and a long-term growth in aggregate economic productivity, as measured by GDP.

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## **I. Introduction**

This paper explores the degree of Russian state involvement in the national oil industry and the economic impact of such involvement on efficient oil production. Because state control has proved to be an inefficient method of ownership in a range of countries across the world, it is important to examine what the balance between state and government ownership should be. This is especially true in the case of a emerging market like Russia, where undefined property rights continually result in clashes between public and private interests.

The privatization of oil companies in the Russian energy sector remains a challenging and uncertain process. The large energy sector, particularly the oil industry, has been one of the key drivers in the country's development from an agricultural state to an industrial power. However, as Kosenko notes, "[The Russian] economy has a unique quality, which no other economy in the world possesses-our wealth is the cause of our poverty" (1995: 35). Russia's oil fields are some of the most abundant in the world, with projected oil reserves of 60-72 billion barrels [see Appendix 1] making Russia the second-largest oil producer and largest gas producer in the world. The sector also employs 1% of Russia's population and contributes to 25% of Russia's GDP (Ruhl, 2003: 2).

Without the oil revenue, Russia would not have been able to achieve the 5% level of growth that it did after the 1998 oil crisis. GDP growth is an imperative in the post-Communist world, where false prices no longer hide the true size of the economy, and where interdependence with external economies plays a larger role.

The Russian government has recognized this. Russian President Vladimir Putin made special note in his 2003 State of the Nation address when he said, “I have to state that our economic achievement so far have been very, very modest” (2003:1), and went on to set two goals for the next decade to improve the situation: 1) reducing the number of people living in poverty<sup>1</sup> by doubling the GDP and 2) maintaining economic stability through state investment in the oil industry. In 2007, he again proposed raising the national GDP, this time to 7% a year. To obtain this growth rate, the economy will need strong basic industries that fuel growth. This is essential as the economy struggles to escape the productivity lag that became apparent after 1991 [see Appendix 2]

There is a general consensus that Russian growth will depend on hydrocarbon exports (Ruhl, 2003: 12). Currently, 70% of Russia’s exports consist of oil and gas (Ibid). Combined with its large impact on GDP and the Russian workforce, it is imperative that the oil industry becomes one of the stabilizing forces in Russia’s move to capitalism. However, there are many problems with the oil industry that date back to Soviet control that have been revealed in the last decade. Remaining problems include unclear distribution of rents, transportation conflicts, and varying degrees of government ownership that leave firm managers uncertain about the continuity of operations (Curtis, 1998: 299). All of these issues challenge the common conceptions that government enterprises reverse market failures and maximize social welfare (Atkinson and Stiglitz) and lead to evidence that private ownership is the best possible scenario for the industry, going against current Russian government plans to obtain a firmer grip over what they see as a strategic political and economic commodity.

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<sup>1</sup> Currently 1/4 of the total Russian population.

Private ownership alone is not enough, as studies have shown (Guriev and Megginson). Although complete separation of state and government firms and sale of assets to insiders have been effective in countries such as China and Hungary, in Russia it has produced a decline in (2007:297)<sup>2</sup>. The experience of newly-formed private firms and industries in Russia has also shown that very specific conditions are needed for success in Russia, including concentrated ownership, well-defined property rights that allow foreign investor entry, and the correct capital market institutions (such as hard budget constraints, private property rights protection, and rule of law). It is therefore important not only to completely privatize Russian oil companies, but to privatize them under these conditions that will cause optimal expansion and profits. The dilemma is that property rights remain unclear and government and industry are constantly locked in economic and political battles to define them, sacrificing efficiency for the industry.

In the first section, I outline the history of the Russian oil industry. In the second, I examine Russian economic growth on the macroeconomic scale and ask whether the privatization models of other Russian enterprises have produced efficient firms that contribute to economic growth in Russia and why this is applicable to the oil industry. In the third section, I make the case that the oil industry needs specific changes in order to become an effective sector to power Russian economic growth. These changes include less government control and property rights that more clearly define the roles of both government and industry in oil production. If these changes are implemented, the Russian GDP will grow at the healthier rate desired by the Kremlin.

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<sup>2</sup> It is important to note that while the trend has been attributed partly to privatization, it is a multifactor trend and cannot be based solely on inefficient private enterprise development.

## **II. Background <sup>3</sup>**

### **A. Soviet Oil Industry**

Russia's advantage lies in its wealth of natural resources (Gregory, 1995:396). Its top three commodities are natural gas, crude petroleum, and petroleum products. The role of the energy sector in both the Soviet Union and Russian economies has been significant. It was, in fact, natural resources such as iron ore and nickel that contributed to both the Soviet Union's quick industrialization and its subsequent collapse due to lack of funds from energy rents.

Aside from exporting nickel and gold, the Russian Federation is currently the largest exporter of energy products in the world. But, the oil industry has always been plagued by inefficient planning, political squabbles, and transportation problems. The oil business in Russia began in the 19th century in Baku, then a territory under the czar's control, now the capital of Azerbaijan and still a major oil town. The Nobel brothers developed a competitive oil industry from the ground up through the establishment of efficient refineries and the invention of shipping oil in tankers that were a welcome contrast to inefficient Russian transportation (Yergin, 1993:58-59). The oil transportation problem is one that has persisted to this day, mostly because of the deplorable conditions of Russian roads.

In the second half of the 19th century, the Russian government discovered other sources of oil, in Russia itself, as opposed to outlying territories conquered by the czar. These deposits included areas of the Krasnodarsky Krai and Komi in the far north. Refineries were built in European Russia, in cities such as Yaroslavl and Nizhny

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<sup>3</sup> All information not specifically cited comes from Dr. Barry Ickes's Economics of Transition and Dr. Timothy J. Considine's History of Oil classes held during the Spring of 2007.



Novgorod in 1897 and the industry remained one of the czar's key business interests.

After the Bolshevik revolution in 1917, the oil fields were nationalized, and production continued primarily in the Baku regions.

It was only in the 1950s that the Soviet government realized how much oil it possessed (Gustafson, 1989:22) and began to incorporate energy resources as essential building blocks of the Soviet economy. Production and exploration slowly began to shift to the Volga-Ural region and large oil fields were discovered in Siberia [See Appendix 3]. These reserves were so tremendous that the Soviet Union overcame Venezuela as the second-largest exporter of petroleum products by the 1970s.

“The Soviet government's policy towards these reserves became one of both dependency and neglect. Because of the large amounts of oil, it was seen as a necessary commodity to support the industry-oriented and militaristic Soviet economy, and investment in energy supply as a share of total investment in industry grew from 30 to 40% from 1970-1985” (Gustafson, 1989:25). However, since the number of elephant fields<sup>4</sup> discovered was increasing, these were also seen as a commodity that Russia would never lose and could therefore afford to treat carelessly with the same neglect shown to all Soviet industry. Production tactics included striving for production quantity rather than quality, providing disincentives to employees by underpaying them for dangerous or skilled work, and not maintaining the quality of equipment.<sup>5</sup> These problems resulted in two serious oil crises (1977 and 1982) that led the Soviets to rely on imported oil and scrambling to produce lost output. These crises were the results of all the Soviet processes mentioned above, but specifically of three government decisions:

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<sup>4</sup> Fields with production of greater than 500,000 barrels per day

<sup>5</sup> This was not necessary due to lack of competition, which meant processes were not updated for decades.

the failure to develop a conservation policy, the overdevelopment of the Tiumen oil fields, and the disconnect in communication between policy planning in Moscow and policy execution in Siberia (Gustafson, 1989:58). Shadow prices also played a prominent role. As Russia became the Soviet Union's chief producer of energy products, it provided them at a discounted rate to Eastern European countries that had few natural resources of their own, such as Estonia. Although an artificial accounting system was used, the deficit brought on by this behavior was real and grew exponentially every year.

The occurrence of these problems is not surprising, given that they are frequently-occurring symptoms of planned economies based vertical command systems that relay information from ministries to enterprises. While there was communication between the Ministries of Oil Industry and Geology and the site managers in Siberian fields such as Samotlor, Yuganskoye, and Romashkino, there was no horizontal communication between bases established at these fields. This made it impossible to accurately estimate the material and labor needs of enterprises, meaning the planners would alternatively under and overestimate needs. These actions seriously destabilized constant flow of production in an industry where continuity is because economies of scale make it nearly impossible to start and stop oil refining operations. This is especially true in sub-Arctic Siberian temperatures, which are often low enough to cross the first critical threshold for standard equipment ( $-15^{\circ}\text{C}$ ), which causes hydrocarbon steels to break and destructs some standard metal components (Ickes "Legacy of Central Planning").

Several other important characteristics of the Soviet economy contributed to problems, including use of the Soviet Growth Model (SGM) and transfer pricing. SGM emphasizes the use of future over present value, meaning sacrifices in consumption were

expected, while industrialization took place at a break-neck speed in order to achieve that future growth. This meant that any industry that was already productive, such as those in the energy sector, was considered a “low-hanging fruit” and plucked first, resulting in asset stripping (Ibid.) The model also valued extensive growth, the process of using more and more inputs such as crude oil and gas to produce growth instead of attempting intensive growth, or obtaining more output from the same amount of inputs. This resulted in a waste of natural resources, an emphasis and dependence on these resources, and the use of transfer pricing.

Transfer pricing, the valuation of segments of the economy based on artificial prices established by the government, was also one of the main causes of the energy crises. As with all sectors of the economy, oil (as an input) was overpriced because of the lack of free market relative pricing mechanisms. In fact, distortions in energy prices were one of the most important sectoral distortions in the Soviet Union (Gros and Steinherr, 2004:63). Although production levels remained constant over time, low shadow prices were assigned to energy products, underestimating their true value and thus making them easily available to consumers. As a result, Soviet consumers used more energy than in the West, leading to a constant shortage. This existed to such an extent that at one point, the Soviet Union became an oil importer (Gustafson, 1989:60). The assignment of shadow pricing also neglected the economic fact that the supply curve for petroleum is in an industry of increasing costs and that the oil production increases as production methods improve (Adleman, 1964:27). As the demand increased, it strained all other output plans (since all other outputs were dependent on oil to meet their own

targets), and produced extreme inefficiencies in those enterprises, creating a ripple effect throughout the entire economy.

The first Soviet oil crisis, in 1977, was a direct result of the synthesis of such policies. Exploration began to lag in 1970. However, due to the lack of symmetrical, horizontal information, it was only seven years later that leaders in the Kremlin realized it was headed for a tight spot (Gustafson, 1989:77). The lag in exploration was due in part to the move of the energy supply moving across the Urals. While supply was in the East, demand was in the West. This created increased transportation costs for each segment of the oil industry supply chain, as well as higher exploration costs for oil that now had to be extracted from the tundra. The problem was exacerbated by slow political responses from Brezhnev, the leader at the time. The impact of the first oil crisis was a dramatic increase in discovery in Western Siberia and a heavy reliance on several large fields (99). However, the oilmen brought in from European Russia were poorly trained and grossly under-compensated for the kind of work they were doing, meaning their productivity was low.

The second oil crisis began in 1982 and was also a result of poor management techniques, but more so of failure to allocate during planning in Moscow and the government's inability to pay attention to the global oil market. The cost of producing oil and keeping up with the heightened demand caused by shadow pricing was increasing in the early 1980s, a time that was heavily influenced by events such as the shift of power from oil consuming countries to oil producing countries like as Iran and Saudi Arabia, the Soviet invasion of Afghanistan in 1980, and the Iranian Revolution of 1979. Although oil prices were high, the cost of production increased and demand was higher than ever as

the free rider problem persisted in the Soviet energy markets. In order to keep the share of oil production at the 1980 level, a target of 717 million more tons and a tripling of oil investment were needed (Adleman, 1964:100).

Per these calculations, the planners ratcheted up demands in the next five year plan, and Siberian oilmen found it a struggle to keep up, especially as some older fields that were primary producers in the system began to decline in production. The lack of updated equipment exacerbated the problem. All equipment sent over the Urals in the 1960s began to age. Oil wells used to extract crude located further down in the ground were neglected and their pumping mechanization process began to lag, meaning that pressure was not enough to bring the lower underground oil to the surface. As in the previous crisis, more labor was rushed to Siberia to meet the surge in demand as less-produced oil was available. However, as with all other spheres of Soviet policy, planning theory was mismatched with actions and proper housing and amenities were not provided to the oil workers, which resulted in an extremely high turnover rate and inefficient use of remaining laborers (116).

These problems existed in addition to complications of external non-Soviet trade. In the Stalinist economy of the 1950s, the Soviet Union was sheltered against outside trade of any kind. When trade of goods was conducted, a special currency that had no relation to the real ruble was used to shield the internal economy from the effects of trade<sup>6</sup>. However, in the 1970s and 1980s, trade with the West began to flow more freely, pushing world oil prices upward as trade imbalances, in addition to already tight oil markets changed the economic scene. Since the only oil typically sold was the residual

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<sup>6</sup> There were two types of currency in the Soviet Union. The transferable ruble (*valuta*) was used as an accounting tool and had little relation to internal ruble pricing. Internally, cash (*nalichniye*) was given to Soviet citizens while *valuta* was used for accounting measures.

of what was produced for Soviet industrial purposes after energy needs in Russia were satisfied, the USSR could not capitalize on the rising demand, forgoing the profits that could have prevented its collapse.

Organization was necessary to solve these problems. Through more efficient management, the shoddy equipment quality could be reported and intensive growth could have been used to get more out of existing fields. However, since managers did not have monetary incentives to solve these problems, the Siberian oilmen resorted to using water pressure to extract some heavy oil, a process that ruined reserves and that set back the USSR by thousands of barrels of production. This problem is still one that Russian geologists are trying to alleviate.

In summary, Soviet energy policy has been one of the development of Siberian fields in regions where it is often difficult to operate under adverse weather conditions that can freeze essential materials. When the Russian Federation was created, the legacy of the Soviet Union was that of oil production determined by bureaucratic maneuvering in Moscow, a lack of communication between oilmen operating in parallel fields, and a plundering of the fields through use of unscientific extraction techniques. The trade mechanism was also weak as Soviet leaders alternately over and under-exported fuels and responded incorrectly to global oil demand, resulting in a loss of much-needed revenue. Perhaps the biggest implication was that the Soviet energy sector, comprised mostly of oil, grew to absorb 2/3 of all growth in the Soviet industrial development until industrial policy essentially became energy policy (Gustafson 53). The size of the economic efficiencies in energy directly contributed to the collapse of the Soviet economy as a result of lack of funding available to satellite states.

## **B. Russian Oil Industry**

After the fall of the USSR, the oil industry faced the same questions as most other sectors of the newly-minted Russian economy: how exactly to make the transition from a network of state-owned plants to individual firms in a capitalist economy. After the collapse, economic output dropped, with oil output reaching a low of 6 million barrels per day in 1990 (a decrease of 50% from the previous year) (Dienes, 2004:320). The turnaround began in 1999, an occurrence that has been attributed by some to the privatization of the oil industry. Other factors include the adaptation of new Western technology to replace Soviet-era machinery, coaxing more oil out of older fields, and positive restructuring after the financial crisis of 1998.

Russian oil industry privatization occurred in two forms: insider privatization and the loans-for-shares program. There was also a third group, which is not nearly as important at the beginning: companies controlled by government groups (323). In 1992, privatization of all small enterprises began through insider buyouts and public auctions. The Russian voucher program, headed by then-first deputy prime minister Anatoly Chubais, gave Russian citizens the option to purchase a share in medium and large enterprises (Curtis, 1998:316). However, since the vouchers were available to all citizens, each person received 1/145 million of the total shares, too small of a number to instill investor confidence.

Russians opted to sell their shares to holding companies, which would in turn buy larger amounts of the newly-privatized corporations. The problem with voucher privatization was that only 49% of shares went to the outside public, and the rest were distributed to insiders who stayed in office and caused inefficient insider domination

through the “wartime commander” problem, in which command economy managers were designated for different tasks than free market managers, making them inefficient in a crisis situation such as transition) (Ickes, “Privatization”).

In 1996 the Russian government began the second stage of privatization wherein large, state-owned enterprises were privatized through state banks. This was part of the privatization process for several oil industry franchises, including Yukos and Sibneft’. Under this process, financial holding companies such as Mikhail Khodorkovsky’s Menatep loaned money to the government in return for shares of government enterprises that the banks would theoretically sell later to earn money (Curtis, 1998:317). The government defaulted on the loans it had been given, and the banks themselves arranged an auction of these enterprises, under pretenses of divesting from the assets. However, the auctions were organized in such a manner that the banks themselves gained direct and independent ownership of enterprises such as oil, gas, nickel, and coal.

The results of these two privatization techniques is an industry with concentrated, inside ownership by oligarchs like Vagit Alkperov (Lukoil), Vladimir Bogdanov (Surgutneftegaz), and Shafagat Tahavdinov (Tatneft), all of whom, in aggregate, own over \$2 billion USD in wealth (Guriev and Radchinsky, 2005:133). The list of oil oligarchs in the past has included Roman Abramovich<sup>7</sup> and Mikhail Khodorkovsky, but they have been ousted out of the industry as government has shown a greater interest in breaking up the power of individual owners. Oligarch structures have blocked the developments of democratic political institutions and have stripped assets and sent money abroad (Stiglitz:2002). There is an argument, though, that oligarchy is the only viable

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<sup>7</sup> Abramovich voluntarily left the industry, in opposition to others such as Khodorkovsky that have been pushed out.



political system in Russia. Oligarchs are the only political group willing and able to create government change and to develop market institutions that have been absent as government agents attempt to consolidate power (Guriev and Rachinsky:2005).

The largest players in the energy market currently are Lukoil and Rosneft, with independents making up 10% (“Russia Energy Data, Statistics”) [See Appendix 5 and 6]. The largest energy producer is Lukoil, with 3,344 million metric tons of explored reserves, followed by TNK and Yukos (Dienes, 2004:322)<sup>8</sup>. Yukos was previously on top, but Mikhail Khodorkovsky was arrested in 2003 and the company was acquired by a government-owned firm. The super-productive asset of Yuganskneftgaz (producing 1% of the world’s total oil supply) was a part of the acquisition (13-14). This dismantling has led to a lack of secure property rights, a lack of long-term international investor confidence, and weakening of trust between enterprises and the state (Ahrend and Tompson, 2006:35).

Despite the antipathy towards foreign participation in Russian financial transactions, there are also several foreign companies have attempted to enter the Russian market via mergers. In 2003, BP created a joint venture with Tiumen Oil Company, creating TNK-BP, Russia’s second-largest oil company. In 2004, Conoco-Philips also created a joint venture with OAO Lukoil, buying a 7.6% share in Lukoil and contributing to joint projects.

Despite an increase in foreign ownership and privatization to industry insiders in the first stage of the process, the Russian government has continuously looked to keep control of oil, a strategic sector. In 2002, 78% of Russian exports were from the natural resource sector, and 57% of those exports were derived from oil and gas products

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<sup>8</sup> These numbers are all as of 2000.

(Ruhl,2003:19). The budget is also precariously linked to the oil industry. For every one dollar per barrel increase in the price of Urals oil, the federal budget revenue increases by .35% of GDP. Approximately 1% of the country's total employment is in the oil and gas industry (Ibid.)

Due to this importance, the current trend has been to begin reconsolidation of control, sometimes “as a result of quite heavy-handed action” (Ahrend and Tompson, 2006:6). Some estimate that the State owns as much as 40% of all oil industry production assets (41). In addition to federal control, state-level organizations, have also become involved. This type of control comes from governments in areas with a great deal of hydrocarbon deposits in the ground, and these governments are aiming for more autonomy from Moscow by leveraging greater taxes on oil companies operating in their jurisdiction (Locatelli, 2007:11).

The federal government has several levels of direct control over the oil holding companies: taxes, oil rents<sup>9</sup>, and ownership of subsoil resources. Companies are taxed at several level, including through excise duties (a specific tax payable on each ton produced,) the geology fund (used to finance the State Geological Committee, fixed at 10% of gross income,) royalties on hydrocarbons produced and exported (based on approximately 10% of the gross price to excise), profits tax, and an export duty (15). On top of these, the government also takes a share of oil rents and controls the volume of exports.

Ownership of subsoil resources is the most important aspect of government control. The Law of Underground Resources under the Russian constitution states that

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<sup>9</sup> Oil rents can be defined as “a development profit more than sufficient to maintain production” (Adelman 79).

federal and local governments have “concurrent jurisdiction” to manage resources, meaning that they leverage double the government power over oil companies. A recent proposal was made to grant the federal government complete control over mineral extraction (Dienes 330). This means that reserves “could be explored and developed only under license,” which could be revoked at will and restored only if the case is proven in court, an arduous process in the Russian legal system.

Another challenge to the industry’s independence and production capacity is the lack of transportation choices. Muddy roads are seldom used for any sort of heavy-duty transportation in Russia (Curtis 2). Most export routes go through the Black and Baltic Seas, and on land, through Transneft, the state pipeline monopoly (39). Transneft, owned by the Ministry of Industry and Energy in Moscow, helps to block oil companies’ efforts to run their own pipelines, including projects that have begun to materialize in Murmansk and the Far East because they would undermine government authority. However, economic considerations have also played a part in the slow development: investment requirements are high, and long lead times for pipe development establish uncertainty (Dienes 333). Of particular importance to both Transneft and individual oil companies has been exporting to East Asia through Far East pipelines. In the meanwhile, as demand increases and export methods across the vast regions of Siberia remain few, companies are forced to resort to railroad transportation, creating more inefficiency.

Russia’s oil industry today is in a curious position. Though the most profitable and largest sector of the economy, it is hampered by government controls, including a large tax burden, rent uncertainty, and transportation problems, as well as internal inefficiencies of Soviet-era managers in companies that faced insider buyouts and aging

Soviet equipment. In short, as in Soviet times, the Russian oil sector is powerful, but not capable of utilizing assets to their full potential in contributing to the Russian economy.

### **III. Aggregate Privatization Analysis**

In analyzing whether the Russian oil industry should revert to the privatization process begun in the early 1990s, it is important to examine the Russian economy as a whole and to understand whether privatization of other large, industry-intensive firms has been economically efficient and increased total output. It is also important to understand that aggregate privatization results can be applied to analyze oil industry privatization. There are two measures of progress to take into consideration: aggregate GDP as a general metric and the present value of oil.

The privatization process is not unique to Russia. All former Soviet republics had to restructure their economies. Despite different methods of dealing with privatization, all post-Soviet economies faced the same basic challenges: macroeconomic stabilization, price and reforms, and enterprise reform (Fischer and Gelb, 1991:94-98). Subdivisions of these reforms include price liberalization, particularly in energy and housing, and the establishment of property rights and financial markets. The sequencing of reforms also needs to be taken into account. At the beginning of the reform process that began during Gorbachev's tenure as the premier, a number of hurdles to economic growth materialized as a direct result of previous Soviet policies. In Russia, it has become clear that the only type of privatization reforms that truly work is non-concentrated, outsider ownership with a great deal of opportunity for foreign investment.

The process of privatization in Russia, as summarized in Section II, has been conducted through both internal and external methods, primarily through the voucher

program, which, though successful initially, left insiders in control. This is what is defined as a top-down giveaway to insiders [See Appendix 7]. To measure whether this was successful, it is important to examine economic growth, a generally accepted indicator of aggregate economic health.

### **A. GDP Metric**

Economic growth is defined as GDP/GNP growth, which can result from privatization processes. These processes increase productivity and reduce bureaucracy, increasing overall efficiency. The process, if accomplished with an increasing level technological improvements, also holds the ability to affect the not only growth itself, but the rate of growth<sup>10</sup>. The Cobb-Douglas production function,

$$Y=AK^{\alpha}L^{\beta}$$

, where Y=output, A=the rate of technology growth, K is the rate of capital growth, and L is the rate of labor growth, is the mathematical expression of GDP growth<sup>11</sup>.  $\alpha$  and  $\beta$  represent output elasticity with respect to labor (L) and capital (K). In order for GDP growth to increase over time, either  $\alpha$ ,  $\beta$ , or A must increase exponentially. In the case of privatization, A may increase, given more incentives to invent new, more productive technology, and L may also increase, given higher, capitalistic wages.

These processes do need to be conducted in accordance with guidelines that ensure their success. For example, legal frameworks and institutions must be in place at the same time that reforms are being implemented. Otherwise, they are not effective. Soft-budget constraints must also be eliminated to add efficiency.

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<sup>10</sup> Increasing the long-run growth rate is an important economic imperative that is as important as raising the GDP short term.

<sup>11</sup> Where Y represents GDP as made up of private consumption, public consumption, net exports, and investment (savings).

In 1998, it was estimated that almost 130,000 of the country's enterprises had been privatized (Easle and Estrin, 2001:174) with a majority of enterprises coming from the light machinery and consumer good sectors, and most new enterprises containing less than 200 people (178). Small enterprises began to privatize first, in line with reforms proposed by Chubais (Curtis, 1998:315). This wave of reforms was managed through the State Committee for the Management of State Property, which oversaw privatization programs and acted as the main catalyst for privatization. It resulted in 85% of Russian enterprises in service sectors and 33% of state-owned industry-related enterprises being privatized and was considered to be a success.

The larger industry firms, such as those found in the oil industry, have been extremely slow to privatize because of the more complicated processes involved. Whereas smaller firms could simply be sold or auctioned to the highest bidder, larger enterprises needed to set up legal frameworks, find buyers for state-owned assets, monitor the sequencing of the process, and complete other tasks that would ensure that key sectors of the economy were properly positioned during privatization (Lavigne, 1999:165). In Russia, at least 18 months were needed for this set of processes.

The method of privatization involved both auctions and buy-ins. After the first set of privatization auctions for smaller enterprises ended in June 1994, the second stage, using vouchers, began. The auction framework, outlined in section II, resulted mostly in insider ownership through management buyouts, a process that resulted in a specially-skewed private oil sector through the loans-for-shares program. Although there are many disparities of private ownership in the oil sector, Russia's privatization program has been

successful in creating private enterprises and formulating a private economy. Whether that economy is balanced to provide optimal economic growth is another question.

From a precursory examination, it appears that GDP has increased over the 15-year period. However, it is important to account for the short-term productivity fall witnessed from 1991-1994 [See Appendix 2]. This phenomenon can be explained in several ways: the revelation of negative value added, the fall of real income, and a slow transition from state-owned to private enterprises, as well as the collapse of the planning system that held all of these factors in place.

Negative value added was the first factor. Russian-made products during the Soviet-era were typically shoddily made. Due to artificial pricing, however, the prices of inputs were deflated (hence the asset stripping and initial overestimation of oil available to Soviet leaders), and the prices of outputs were inflated, meaning that in some cases, after prices were normalized to market pricing, the outputs were of less value than inputs, creating an instantaneous drop in output value once full prices were revealed.

Another explanation was the removal of inefficiencies that wasted peoples' time, such as queues. As people acquire more leisure time, they can theoretically choose to go to work less of the time, lowering real output and increasing welfare. Third, the transition from public to private sector was slow. Because the efficiency was low in the public sector when privatization began, output fell. However, as ownership, labor, and physical capital moved to public companies, efficiency increased over time. Taking these explanations into account, Russia's GDP growth pattern is in line with other post-Soviet economies, initially shrinking and then gradually increasing. The GDP has risen to about 65% of its 1991 level in 2002 and has increased by \$939 billion over the past 5 years

(Leppanen:2004). This is a good sign of overall macroeconomic growth within the country.

However, growth in Russia compared with FSU nations such as Belarus, Ukraine, and Uzbekistan have been disappointing. Several factors contributed to sub-par economic growth: the macroeconomic crisis of 1998, (caused by deficiencies of structural and institutional establishments of an economy transitioning to a market structure), the lack of foreign investment, and unsuccessful economic stabilization due to poor economic judgment on the part of the government. As Pinto et al argue, the macroeconomic meltdown and slow recovery, as well as general government inefficiencies, were caused by increases in non-payments (2000:298). These include “arrears or overdue accounts payable, barter, and offsets (occurring between enterprises and the budget or energy monopolies).<sup>12</sup>”

One of the biggest offsets occurs through government subsidies to manufacturing enterprises, usually to help factories struggling with Soviet era inefficiencies. Since those transfers have been financed by a combination of accumulation of public debt, the receiving industries gain. All other sectors of society, including any that must be paid with public sector money (such as wages and pensions) lose out as subsidies cycle back through public debt that must be shouldered by Russian laborers. This type of subsidy is an example of soft budget constraints that occurred frequently in socialist economies. To ensure that managers fulfilled their plan, money was thrown at them, resulting in enterprises completely dependent on the government for resources. This created huge strains on the Soviet budget. This practice also created the Russian mentality that success was simply based on connections rather than hard work (44), an attitude that is still

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<sup>12</sup> This is known as Russia's virtual economy.



prevalent today in Russian business transactions. All of these inefficiencies carry through to this day, and the deficits created by this type of behavior have been a contributing factor in initial output fall, and had increased inflation by 84% in 1998 (305).

The Russian system has also remained alarmingly opaque, resulting in the type of asymmetrical information available in Soviet times. Essentially, the problem with Russian output has been hysteresis<sup>13</sup>. Russia is based to a large extent on the economic mechanisms of the Soviet Union because, although Russia had a clear capitalist system during the czarist era, it did not have a chance to take root.

One type of path dependence evident throughout all of Russia's history, beginning with the czarist period, is the prevalence of government ownership. This method has generally been successful both politically and economically as rulers consolidated power over key industries to create leverage in international trade and keep the government running. However, several surveys have revealed that privatization is more effective for the country, its citizens, and the key players in government-controlled industries.

## **B. Studies of Russian Privatization**

Brown et al, in studying 14,620 privatized Russian firms employing over 10 million people in aggregate, conclude that privatization has had a negative effect on economic growth (2006:61-99). These results are due to the effects of Russian insider privatization, which is less effective than the privatization that took place in other former Soviet nations such as Hungary, Romania, and even Ukraine. It is noted that data is available for only one to two years of pre-and post-privatization and there may also be

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<sup>13</sup> Hysteresis usually refers to path dependence. In this case, Russia's current economic path depends to a large extent on its previous Soviet economic policies.

selection bias of firms to be privatized. However, the data used was robust enough that it could be used to test hypotheses about the relative advantages of foreign and domestic ownership. Defining a privately-owned firm as one where the strict majority of capital was in private hands (67), the authors found that, during the privatization programs of 1992-1999, multifactor productivity increased as the number of larger, foreign-owned firms increased in the economy (78). The difference was even more noticeable in Russia than in the other countries, where output and efficiency increased, despite lack of foreign investment.

This can be explained by expectations: whereas managers in Hungary have incentives to demonstrate skills upon being acquired by foreign partners, Russian managers expect to be fired and, as a result, engage in asset stripping. The findings support the view that privatization is a significant process in helping to increase the national growth rate. The study finds that different qualities of privatization existed between the EE and FSU countries, indicating that the concentrated ownership found in Russia is not effective.

Carlin et al found similar benefits of privatization in their 2001 study of 3,305 firms in 25 transition countries including 500 firms in Russia and 200 firms in Poland and Ukraine. Study results indicated that private firms were more likely to engage in new product development, and that competition (1-3 competitors) increased sales growth, as well as labor productivity. The researchers found that competition was a more powerful influence on performance than ownership.

Earle<sup>14</sup> finds in his 1998 study that private share ownership has more of a positive impact on labor productivity, over state ownership, but as in Brown's research, discovers that only outside ownership is effective, leading to productivity improvement, and that leaving insiders to control firms produces negative results. This study focuses solely on Russian industrial firms, using a sample of 430 firms, 199 of which are partially privatized and 86 of which are state-owned. Andreyeva similarly found that efficiency increases to a significant amount with firm privatization, and that regional location and industry of the firm being examined greatly influence firm performance.

Studies of privatization in emerging countries similar to Russia have mirrored the results of Russian studies. Okten and Arin, conducting a study of Turkish cement firms that were recently privatized, found similar results. The main goal of the privatization was to rid the state of inefficient industries, which were increasingly becoming a burden (2006:1). This privatization lowered prices for the product and increased efficiency. Firm technology also became more capital-intensive, with the completion of privatization of 22 of the country's cement firms between 1989-1998. Although, as predicted, employment significantly decreased, and the capital-labor ratio of the Cobb-Douglas production function also increased, showing a significant transition to intensive versus extensive growth. Studies by the World Bank across companies located in New Zealand, the UK, Mexico, and Chile (with the latter two companies being parallel to Russia's economic structure), have also shown that "ownership is a significant determinant of performance ("Privatization: eight lessons of experience", 1992:3).

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<sup>14</sup> While Earle and Brown have co-authored studies, Earle's 1998 study differs from Brown et al's 2006 paper.

Four years after privatization, Chilean Phone company Chile Telecom doubled production capacity and Telemex, a privatize telephone company in Mexico reduced per-unit labor costs incrementally. However, the study notes that “the poorer the country, the longer the odds against privatization producing its anticipated benefits, and the more difficult the process of preparing the terrain or sale” (2).

So, although there are hundreds of cases where privatization has been extremely successful, there are also caveats to take into consideration. Privatization does not work if there is no proper institutional environment, containing private property rights protection (not subject to the complicated multiple levels of Russian taxes) in place, rule of law, hard budget constraints (nearly impossible given Russia’s path reliance on Soviet-era subsidies,) and competition and regulation (Guriev and Megginson, 2007:279). Other constraints include the absence of private investors and the presence of oligarchs (Guriev and Radchinsky, 2005:131) that weaken democratic institutions and compromise competition to serve their own interests. They also have made property rights more ambiguous, a problem because Russian firms need precisely-defined property rights in order to achieve effective ownership, per the Coase theorem.

There are several key lessons to be drawn from the privatization of Russian enterprises: **Privatization works best within a framework of other reform programs** (Kikeri et al, 1992:3). Russia’s transition to effective rule of law has been shaky at best. This makes it easy for companies to engage in practices such as asset stripping, share dilution through minority shareholders, arbitrary seizure of mobile telephone frequencies, and other illegal activity (Goldman, 2003:211). Not only do government officials turn a blind eye to such actions, but they often partake in it themselves, using their government

posts to extract bribes and extortion payments. Although this applies more to small businesses, government corruption, as well as a significant Mafia presence, is still very much a part of doing business in Russia. A report by the Russian Auditing Chamber of the Duma found that as many as 90% of privatized Russian businesses were in violation of the law, and 81% of business managers surveyed agreed that it was impossible to operate a business without violating the laws (213).

Another guideline is that **transparency is critical for economic and political success**. This remains a problem as Russia attempts to establish Western-style accounting standards, as well as clear accounts of both business and government activity. Components of transparency include competitive and objective bidding procedures for businesses, minimal bureaucratic monitoring, and political support of the process. Russia, again, has failed this far on all three counts. The loans for shares fiasco was a major indicator that this program was a failure. Clearly, private business cannot exist on such foundations.

The most important point to remember for former socialist economies is that they need to “privatize in ways that encourage competition, and they should experiment with all available methods that go beyond a case-by-case approach to privatization” (Kikeri et al, 1992:3). It is imperative that Russia use the experiences of its FSU and EE neighbors to incorporate into its own privatization policy. Examples of privatization success stories include Romania and Hungary, which have seen their privatization substantially improve productivity by 20-30% (Brown et al, 1998), the Czech Republic, and the Baltic states with Latvia at the forefront.

There could be specific underlying reasons for these successes, including the geography of these successful states, which are closer to Europe than Russia, and are therefore already linked more closely economically with the West than Russia is. Although Russia had a capitalist boom period prior to World War I, the introduction of communism suppressed any growth that might have occurred organically, without the aid of planning. Other countries, such as Latvia already had the foundations of capitalism when it came into the Soviet Union and therefore leaned much more strongly towards the West. The accession of the Central European and Baltic countries to the European Union has also been of importance. Other differences contributing to the productivity gap include the lack of exports in Russia throughout the Soviet period and a structure where all international trade was channeled through Moscow, meaning that internal producers never had to compete with Western production techniques and thus lost their competitive edge and knowledge of the international market (Djankov, 2002:76).

Summarily, privatization is strongly associated with enterprise restructuring (Djankov and Murell, 2002:4). However, ownership by traditional state firms is less effective than private internal ownership and firms privatized to outsiders result in 50% more restructuring. Privatization studies across countries suggest that, although there are mixed effects across countries, privatization is primarily economically significant. They include changes in country revenue growth and restructuring of new products. Increased competition among newly-privatized enterprises also stimulated productivity improvements. Although there are negative effects with increased privatization, these can be mitigated with a carefully-planned program.

### C. Oil Industry Metric

Although GDP is a generally-accepted measure of aggregate productivity, the metric cannot be used alone when assessing oil industry privatization successes. The key value that can be used to measure this is the present value of the resource. This metric arises from the specific nature of the oil industry. Oil is a non-renewable inventory, and therefore has a specific time horizon when it can be used. This usage depends on all future prices of oil, as well as any exploration and extraction that occurs, also in the future. However, in order to gauge what these activities are truly worth, they must be discounted to the present, using a net present value equation<sup>15</sup>.

However, with an industry that changes as quickly as oil does, it becomes difficult to assess future values of success of exploration that may occur. This is particularly true because oil is a nonrenewable resource and development costs are constantly shifting, making it impossible to understand whether future investment will produce returns that are large enough. In Russia, the changing nature of the politics of oil adds to the confusion. If the state reconsolidates its control over the oil industry, it will not be feasible to measure whether the present value of the resource will be maximized, given the tendency of the Russian government to make industries inefficient. Given the importance of the success of the oil sector, the expected value of the resource must be

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<sup>15</sup> The net present value equation,  $NPV = \sum_{t=1}^n \frac{C_t}{(1+r)^t} - C_0$ , tells what kind of cash flows to expect in the future once all obligations have been met. In this case, it signifies the current return on future investment in oil exploration and production.

determined and maximized through oil industry privatization and secure property rights<sup>16</sup>.

#### **IV. Oil Industry Privatization**

Given the problems that aggregate privatization has created in Russia, it is important that the oil industry, a sector strongly linked to the macroeconomy and already crippled by inefficiencies, be managed carefully. Despite the general problems of Russian privatization, including sale of firms to insiders and the explosion of the second economy, restructuring is the best solution to the problems of the oil industry. The process needs to begin in the political sector. All the major industry problems: subsidies, reallocation of assets, the opaque system, lack of foreign investment, and declining production, can be solved through the deregulation of government control and the definition of clear property rights.

Kremlin participation in the Russian oil industry is particularly strong. Since oil companies became privatized in the 1990s, ownership has been a compromise between the state, the banks, the regions, and the joint stock companies (Locatelli, 1999:1). As a result, each major oil company has a percentage of its shares owned by a bank [See Appendix 8], and a significant percentages of shares under government influence. The taxation system outlined in Section II also puts producers at the mercy of the government, and Transneft ensures that only the government will be able to transport oil in the near future, providing a third method of control.

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<sup>16</sup> Although oil companies always face this risk, it is much easier for them to digest it. Countries, on the other hand, face the risk of having investments that are not diversified (oil), “putting their eggs in one basket,” so to speak.



The Yukos situation in 2004 showed the skewed balance of power that favors federal over regional and oil company governance. During that period, the Russian government arrested Khodorkovsky, then the country's principal owner of its largest oil producer on charges of fraud and tax evasion. This occurred as a result of Yukos auctioning 77% of Yuganskneftgaz, a subsidiary, in 2004. Because the unit was later bought out at a price far less than fair value, the government immediately stepped in ("Russia Energy Data, Statistics and Analysis-Oil, Gas, Electricity, Coal", 2007).

The government has been consolidating power over the last ten years for three specific reasons. First, the lack of new exploration (coincidentally brought on by the previous government) needs to be remediated through new strategies. Second, the government relies on the oil sector to support economic growth and third, the State wants to use oil as a political weapon to counter Asian, European, and American power (Boussena and Locatelli 1). Path dependence has also played an important role.

Because the large oil companies contributed so much to the Russian economy as state enterprises earlier and partly because the Soviet Union had been an industry-intensive producer, Russia would continue to work on the same products, with only a slight growth in the services sector. Although the oil sector projects relatively healthy growth (oil prices have recovered to Soviet levels, foreign investment has greatly increased by 39% in 1995) ("Russian Energy Data Statistics, 2007:4), the main problems that have been associated with shrinkage in output during the transition to the market economy persist.

One of the main problems facing the oil industry today is increasing government ownership. This paper has outlined the numerous inherent problems with government

ownership. They include soft budget constraints that lower incentives for profit maximization, subpar products that are a result of the subsidization of non-profitable institutions, over-employment (from a bribe paid to the firm by the government), production of goods desired by the government rather than the people, and environmental pollution.

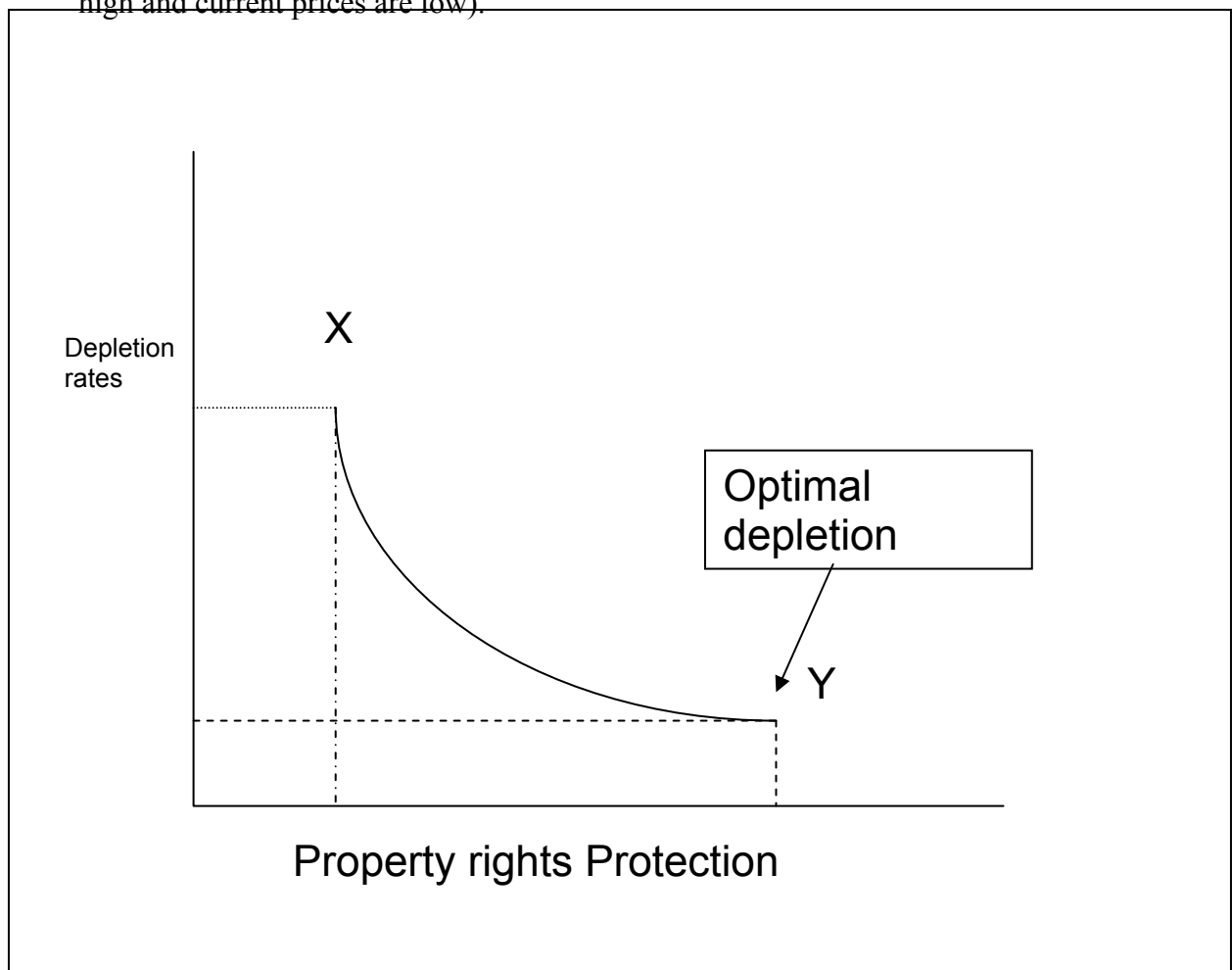
This is a bad position for Russia because property rights are ill-defined, meaning that the government can encroach on industry earnings and control when it feels necessary. A recent study by Reynolds and Kolodziej suggests that the price of Russian oil is correlated to the type of ownership structure present in the country. As oil prices increased from \$30 per barrel to \$70 per barrel from 2005-2005, the government took significant steps to consolidate power, including drafting a new subsoil law<sup>17</sup>. It also took over the Yukos oil company and redistributed its assets to Rosneft, which is 100% state-owned. These problems are the direct result of lack of clearly-defined roles for both the industry and the government. This creates economic instability and uncertainty about the future of business and the power of rule of law in Russia, characteristics that are especially important for foreign investors.

The essential property rights problem lies in the lack of consideration of the net present value of the resources. Following Adelman's classifications of the oil product, it is assumed that product depletion rates depend on cost of production, prices (both current and future), and the interest rate. In their paper on the topic, Gaddy and Ickes add security and property rights to the mix. The model below, developed by Gaddy and Ickes,

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<sup>17</sup> The original law, passed in 1992, was replaced with the more recent one, which states that all subsoil disputes will go to the courts, which tend to be controlled by the government. Other biases include the discouragement of private investment and the "temporary operator" clause, which allows the government to operate an oil or gas field for up to one year if the company license is suspended (944-945).

assumes that if there is complete uncertainty in the market, no production will take place (a situation proved likely in the product shortages of the early 1990s). However, above a given critical level (X), production will take place and oil depletion will also take place, but at a very high rate because the discount rate will be high (since cost of production is high and current prices are low).



As property rights increase, the current depletion level decreases to an optimal level that maximizes the present value of profits (Y). At this point, depletion will take place at a much slower rate as the future (the present value of the profits) is taken into consideration. This picture represents a single company's curve, meaning that not all firms will find themselves at Y at the same exact time. However, it is possible that the

general property rights climate is either so far to the right or the left that all firms shift either towards current or future depletion. Therefore, it is important not to view the whole economy as uniform, but that big shocks in the aggregate economy have great power to move individual company curves.

The implications of this are important. Russian oil companies today are closer to point X than to point Y.. This means that Russia will have more oil revenue today, but will sacrifice future oil revenues, a situation similar to one it experienced in Soviet times, when “low-hanging fruit” were picked and made productive today, sacrificing greater returns tomorrow. Not only does revenue suffer, but production methods do as well. As Putin recognizes this problem, however, he is nationalizing Russian oil companies, bringing back the problems of nationalized industries that existed during the Soviet Union.

Companies again resort to pressure-drilling with water to deplete all remaining reserves instead of taking the oil out carefully, and do not explore potential future reserves. Similarly, companies have also resorted to shipping oil by rail once it was out of the ground, a process more expensive than shipping by pipeline, but one made necessary by time considerations. At all ends of the process, government encroachment upon industry growth and successes has led to enormous economic inefficiencies that create a no-go situation: it seems neither private ownership nor government intervention can solve the problem. However, private industry is the optimal solution, if it includes a secure definition of property rights and the separation of government and private enterprises.

## **V. Conclusion**

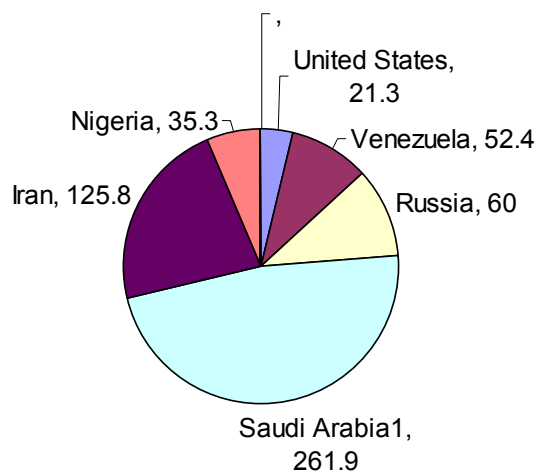
Post-Soviet Russia has relied on the oil industry to propel its economic growth. The industry comprises  $\frac{1}{4}$  of total exports and influences a significant part of the budget every year. It brings in the most revenue, particularly as the global political situation causes oil prices to rise over the long term. It also employs an estimated 1% of the population, spanning refineries in Western Russia and many oil fields in Eastern and Western Siberia. This gives the Kremlin a great deal of leverage in dealing with other countries and planning for economic growth at home.

However, the Russian government has traditionally done a poor job managing its material wealth. From the time of the czars to the post-Soviet regime, soft budget constraints, transportation problems, and most important, government interference in the industry, have caused growth to be less than optimal. Studies conducted on other industries in Russia, as well as industries in countries with similar economic structures have found that private ownership of heavy industry enterprises has been the best for their productivity growth, as well as for the overall productivity growth of that particular country. There are several caveats: privatization must be to outsiders and foreign firms. Ownership must also not be concentrated, and it cannot take place in a vacuum devoid of other institutional reforms such as rule of law and established

The discount rate model shows that, if property rights are clearly defined, companies will profit in the long-run and not be constantly in fear of the government, resulting in a healthier oil industry and a rapidly-growing Russian economy.

## Appendix 1

**Selected Estimated Oil Reserves by country in bbl,  
lowest estimate, 2007**



Data from: <http://www.eia.doe.gov/emeu/international/reserves.html>

## Appendix 2

### Russian GDP Growth Since 1991



Source: Center for Markets in Transition, <http://www.balticdata.info>



### Appendix 3

Pre-and Post-Peak Russian Oil Fields			
Oil Field	Owner	Basin	Cum. Depletion (% in 2000)
Pre-Peak Russian Fields			
Priobskoye	Rosneft	W. Siberia	1
Tevlin-Russinkoye	Lukoil	W. Siberia	26
Tyanskoye	Surgutneftgaz	W. Siberia	5
Sugmuts koye	Gazprom	W. Siberia	12
Sopryshevskoye	Gazprom	Yamalo-Nenetsk	n/a
W. Salym	SPD: Sibir, Evikhon, Shell	W. Siberia	n/a
Post-Peak Russian Fields			
Samotlor	TNK-BP	W. Siberia	68
Romashinko	Tatneft	Volga/Ural	n/a
Momontovskoye	Rosneft	W. Siberia	78
Federovskoye	Surgutneftgaz	W. Siberia	62
Lyantorskoye	Surgutneftgaz	W. Siberia	38
Pravdinsko-Salymskoye	Khantymnasiyskneftegaz	W. Siberia	24
Vatyeganskoye	Lukoil	W. Siberia	26
Povkhovskoye	Lukoil	W. Siberia	54
S. Yagunskoye	Lukoil	W. Siberia	38
Arlan	Bashneft	Volga/Ural	n/a
Estimated decline of post-peak fields: 1-5% yearly			
Source: Grace, John. Russian Oil Supply. Oxford Institute of Energy Studies: 2005, pp.38.			

## Appendix 4

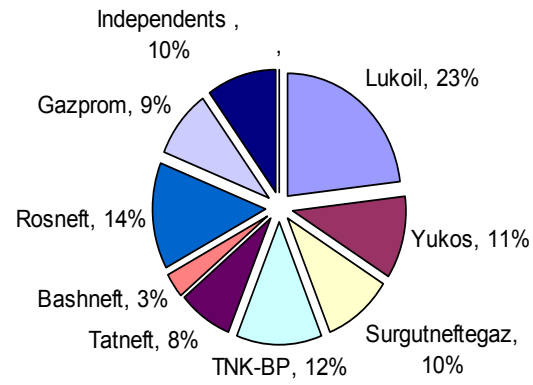
Russian Oil Regions Map: Circa 1996 (oil regions in black)



(Taken from Curtis, 334-Energy Facilities, 1996)

## Appendix 5

**Russia's Proven Oil Reserves (2003 Percentages)**



Source: (" Russia Energy Data, Statistics ").

## Appendix 6

**Table 1: The Russian oil production from 1994 to 1996 according the various «types» of producer, in millions of tonnes**

	1994	1995	1996
-Rosneft	73,2	12,7	13,0
- Lukoil	45,1	53,4	51,0
- Yukos	28,6	35,8	35,0
- SIBNEFT (Siberian Oil Company)	-	20,4	18,5
- Surgutneftegaz (SNG)	34,3	33,3	33,3
- Sidanko ((Siberian & Far East Oil)	32,6	22,9	21,0
- Slavneft	13,2	13,2	13,0
- ONAKO (Orenburg Oil Company)	7,4	7,7	8,0
- Eastern Oil Company (VNK)	11,2	11,2	11,5
- Tyumen Oil Company (TNK)	-	22,7	22,0
- Bachneftekhim	18,0	17,7	16,5
- Tatneft	23,6	25,0	25,0
- KomiTEK	5,1	4,4	3,5
* Enterprises of gas industry	8,0	n a (1)	8,8
* Joint ventures	10,1	14,9	15,5
* Others producers	6,8	11,5 (2)	7,0
* Total	317,8	306,8	302,6

Source: Locatelli

## Appendix 7

Typology of Privatization		
	Top Down	Bottom Up
<b>Giveaway</b>		
Insiders	Russia	
Outsiders	Czech Republic	
<b>Sales</b>		
Insiders		Poland, Hungary
Outsiders	Former GDR	Estonia
Source: Ickes, "Privatization"		

## Appendix 8

Box 1 : Capital structure of the main Russian oil joint stock companies (january 1998) %	
<b>* Lukoil :</b>	
• Shares hold by the State	: 11,57
• Shares hold by the State Property fund	: 16,5
• Shares hold by Lukoil	: 32,1
- shares hold by mperial Bank (1) in guarantee of loans to the State and give to investment reserve of Lukoil	: 5,0
- shares hold by the pension fund of Lukoil	: 10,9
- shares hold by Nikoil, investment fund of Lukoil	: 16,2
• Shares hold by linternational investors	: 20,38
- Arco	: 7,99
• Russian investors	: 15,38
<b>* Sibneft :</b>	
• Shares hold by the State	: 1
• Shares hold (2) by the Petroleum Finance Cy, and bought in 1997 by Finantsovaya Neftyanaya Kompanya (3)	: 51
• Shares hold by SINS (llinked to Stolichny Bank Sberezhenii/Agro)	: 19
• Shares hold by REFINEOIL	: 15
<b>* Sidanko :</b>	
• Shares of the State hold by INTERROS, subsidiary of UNEXIMBANK	: 85
- in guarantee of loans to the State and bought in 1997	: 51
- bought in 1996	: 34
• Shares hold by MENATEP	: 4
• Others investors	: 11
<b>* Slavneft :</b>	
• Shares hold by the Russian State (4)	: 65
• Shares hold by the Belarus State	: 11
• Actions détenues par un fonds de réserve des employés	: 10,2
• Shares hold by the Mozyr refinery	: 6
• Others investors(5)	: 7,8
<b>* Surgutneftegaz :</b>	
• Shares of the State hold by the pension fund of Surgutneftegaz in guarantee of loans to the State (6)	: 40
• Shares hold by the State	: 1
• Shares hold by employees	: 1
• Shares hold by institutionnal investors	: 3
• Shares hold by Neft-Invest (7)	: 40
• Others	: 15

Source: Locatelli

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**Education:**

Bachelor of Science in Economics with Honors in Economics

Minor: Hebrew

Certificate: Module in International, Development, and Transition Economics

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**Thesis Title:**

The Impact of the Fall of the Soviet Union on the Russian Oil Industry

**Thesis Supervisor:**

Dr. Barry W. Ickes

**Work Experience:**

6/2007-8/2007

Human Resource Consulting Analyst Intern

Mercer Human Resource Consulting, Philadelphia

Assisted in analysis of executive and broad-based compensation reward programs for Fortune 500 companies

Supervisor: Senior Analyst Molly Zangrilli

6/2006-8/2006

E-Banking Intern

Bank Hapoalim, Tel Aviv, Israel

Researched best banking practices and influenced key stakeholders in implementing website design decisions

Supervisor: E-Banking Head Dafna HaCohen

02/2005-06/2007

Research Assistant, Supply Chain Department, Penn State University

Worked directly with economists to manage the student-researcher interaction for economic probability experiments

Supervisor: Dr. Gary Bolton

**Honors:**

Schreyer Honors College Scholarship, 2004-2007

Mitte Foundation Scholarship, 2004-2005

The Kenneth and Sybil Jason Enrichment Award Scholarship, 2007

Dean's List: Fall 2005, Spring 2006, Fall 2006, Spring 2007

Fisher School of Business Biz Quiz National Challenge-Third Place, 2006

Sapphire Accelerated Entrance to Major Program, 2004-2007

**Community Service Involvement/Leadership:**

Active in Hillel, the Foundation for Jewish Campus Life (2004-2007)

Vice President, Economics Association (2006-2007)

**Language Proficiency:**

Native Fluency in English and Russian,

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