

Does Russian Legal Reform Matter?
Evidence from Crude Oil-Export Allocations

April 2000

Fourth draft

Daniel Berkowitz*

Department of Economics

University of Pittsburgh

4D11 Posvar Hall

Pittsburgh, PA 15260

Email: dmberk+@pitt.edu

*This paper has been written in cooperation with Alexander Zaderaka (Expert Group, Russian Ministry of Finance, Moscow). I thank Richard Day, David DeJong, Roger Gordon, Paul Gregory, Gene Gruver, Raj Kali, Peter Murrell and Daniel Treisman for their comments. I have benefited from the comments of seminar participants at the University of Pittsburgh and the IRIS conference on the Value of Law in Transition Economies at the Brookings Institution. I am indebted to the National Council for East European and Eurasian Research for generous and patient support of this research under contract #811-12, and the University Center for International Studies at the University and the Center for Russian and East European Studies at the University of Pittsburgh for time off from teaching, and support for travel and data collection. The usual caveat applies.

Does Russian Legal Reform Matter?

Evidence from Crude Oil-Export Allocations

Fourth Draft: April 2000

Daniel Berkowitz*

Department of Economics

University of Pittsburgh

Pittsburgh, PA 15260

Email: dmberk+@pitt.edu

*Written in cooperation with Alexander Zaderaka

Abstract

The evolution of the Russian crude oil sector during the ongoing transition to a market economy is a fascinating case study in the determinants of state allocation of scarce transport capacity. Under socialism, the crude oil sector was a completely integrated monopoly and the all-Union government had exclusive control over investment, pricing, production, transport and export decisions. During the transition, product market competition has increased in the crude oil sector. Nevertheless, the federal government has retained almost near monopoly control over crude oil transport and export allocation by retaining a controlling stake in the pipeline-transport joint stock company Transneft. This paper analyzes the determinants of export capacity allocation to the major Russian oil companies. It is found that, by 1996, one relatively clear law was that a domestic firm's access to world markets should be proportional to its lagged production volume. It is found that this law was operational in 1996. However, capacity was allocated to reward firms that incurred debts from sales due to non-payments from buyers in the domestic market and CIS (Commonwealth of Independent States) market. While export allocation was driven by these legal and political criteria, some attention was paid to efficiency considerations such as distance to port and production

1. Introduction

The evolution of the Russian crude oil sector during ongoing transition to a market economy is a fascinating case study in state allocation of scarce transport capacity. Under socialism, the crude oil sector was a completely integrated monopoly and the all-Union government had exclusive control over investment, pricing, production, transport and export decisions. The substantial spreads between fluctuating world prices and fixed domestic prices provided a major source of state hard currency earnings. During the transition, product market competition has increased in the crude oil sector. There has been the rapid formation and entry of large vertically integrated enterprises and the entry of foreign joint ventures and prices have been liberalized. Nevertheless, the federal government has retained a controlling stake in the Russian crude oil pipeline company, the Transneft joint stock company. Since Transneft ships 90-95 percent of all the crude oil flowing through Russia, the federal government has retained a near monopoly position over crude oil transport in Russia.

In this paper, I analyze determinants of state-export-capacity allocation. State control over critical assets in transition economies has been criticized because it allows politicians to use these assets to advance their own political agendas (see Shleifer and Vishny, 1994). In the case of Russia, even though crude oil prices were liberalized in 1995, substantial spreads between world and domestic price persisted. Thus, crude oil could become a source of rent for corrupt bureaucrats and cash-strapped local and regional governments (see Shleifer and Vishny, 1993). Because crude oil is one of Russia's highest value-added sectors, politicians might be tempted to use their control over export allocation and force oil firms to subsidize loss-making sectors (see Gaddy and Ickes, 1998; Treisman, 1998). Furthermore, politicians representing federal interests could use their control over pipeline access to punish firms owned by regions that are disloyal to federation (see Berkowitz, 1997). Nevertheless, transport monopolies, whether state-owned or private, have operated effectively in other countries. In 1995 Russia implemented a reform of the export-allocation system that attempted to limit political interference and ensure roughly equal

access to crude oil producers. Here, I analyze the extent to which this reform effort was successful.

I find that, by 1996, regulations guiding crude oil throughput allocation for exports were somewhat ill-defined. Nevertheless, one relatively clear regulation was that a domestic firm's access to world markets should be proportional to lagged production volume. I find that this regulation was operational in 1996.¹ Controlling for this law, there is evidence that scarce capacity was allocated to compensate firms that incurred debts from sales due to non-payments from buyers in the domestic market and CIS (Commonwealth of Independent States). However, there is also evidence that efficiency considerations also were also an important factor in export allocations.

There are several other reasons for studying state-export-allocation in post-Soviet Russia.

First, the Russian oil sector has rapidly deteriorated during the 1990s: there have been enormous losses from pipeline bursts and the idling of productive wells. There has been a massive decline in production. Even though there are large and easily exploited reserves and an existing transport infrastructure, the oil sector has failed to attract substantial foreign investment. Understanding just how export capacity is allocated may provide some understanding of the decline of the crude oil sector. Second, the operation of the Russian pipeline provides some insight into why the oil-rich countries of Azerbaijan and Kazakhstan are raising international capital to finance alternative oil transportation systems that bypass the Russian system on which

¹ The basic procedure for the utilization of pipeline and seaport terminals for the export of crude oil and petroleum products on world markets is described in Government Ordinance No. 1446 (approved by the Russian Federation), dated December 31, 1994, entitled, "On the Export of Oil and Petroleum Products outside the Customs Territory of the Russian Federation (see Collected Legislation of the Russian Federation, 1995, No. 2, St. 162; No. 17, St. 1534). However several government ordinances followed which altered this basic ordinance to grant throughput capacity resale rights and special privileges to trading houses and oil companies that would help coordinate exporting.

they have traditionally depended. The construction of alternative routes through Georgia, Turkey and Iran is much more expensive than refurbishing existing Russian capacity.

2. Producers and Exporters

The Russian federal government implemented an economic reform in the early 1990s that included rapid price liberalization of most consumer and producer prices, and a rapid privatization of small shops and businesses. The reform of the crude oil sector, however, was relatively gradual. Until 1995, domestic prices were fixed or subject to administrative controls such as profit ceilings per unit output. While there was the formation of large vertically integrated oil companies, the Ministry of the Economy (the old state planning commission) still issued export quotas based on forecasts of aggregate consumption and production requirements. The Fuel and Energy Ministry dis-aggregated these quotas into quarterly export schedules. A typical export schedule for a company or special trader included export volumes and, the specification of transport either via seaport or pipeline route out of Russia.

A group of ten to twenty special exporters (trading companies) would lobby for these quotas. Some of these special traders had operated as traders coordinating foreign trade during the Soviet era. During the transition, special traders included trading and holding companies that are granted the right by the Russian government to directly export crude oil from Russia. Companies and regional and local governments also lobbied for quotas. A typical bid for a quota could be justified if it satisfied certain state needs, such as shipments to finance state projects. Transneft, the state-controlled transport company had near monopoly control since it shipped roughly 95 percent of the crude through its pipelines. In January of 1995, the system of export quotas was abolished and a regulatory system that was supposed to provide equal access to the domestic companies was adopted.

Tables 1 and 2 provide a brief overview of the Russian crude oil sector between 1992 and 1996. Table 1 shows the world market spot prices are substantially higher than domestic prices.

These substantial world-domestic spread in 1992-1994 can be explained by state price controls over the domestic price. However, by 1995 the domestic was liberalized for most of Russia. The world-domestic price differential is evident in 1995-96 because Russian oil producers were operating with capacity and scheduling constraints on world markets. Nevertheless, these price differentials with and without domestic price liberalization account for the fierce lobbying for export quotas and export access.

Table 2 summarizes the utilization of export routes. The only routes that do not involve transiting oil through a foreign country are Novorossiysk and Tuapse, both of which are located on the Black Sea. All of these seaport routes provide access to western markets. The pipeline routes (Druzhba) provide access to the Czech Republic, Slovakia, Germany, Hungary, Poland and Yugoslavia. The Druzhba has operated with substantial excess capacity. Part of the reason for this is that its oil is shipped to depressed markets in Eastern Europe, that do not have the capacity to transit this oil to more profitable markets. However, prior to the 1995 reform, the seaports, which provide access to western markets, were also operated with substantial excess capacity. Since oil shipped from Ventspils and Odessa had to transit through the independent countries of the Ukraine and Latvia, excess capacity could be due to the problems associated with coordinating shipments with these newly independent countries. However, the Russian seaports of Novorossiysk and Tuapse also operated with excess capacity. By 1996, the seaports were operating at close to full capacity, suggesting that export allocation had improved after the 1995 reforms.

The reform of the export allocation system in January 1995 was directed towards the major domestic companies. However, it is also important to note that these major domestic firms competed with joint ventures and special traders for export allocations. Special traders, as a group, accounted for 33.9 percent and 35.9 percent of export market share. The 1995 export allocation reform was initially set up to limit the role of special traders: their export market share

fell 9.3 percent in 1995. However, in 1996 the special traders regained power and their export market share increased to 24.1 percent.

3. Export Allocation

In this section, I summarize just how a major domestic oil company acquires the right export oil on world markets according to the key reform legislation (government ordinance No. 1446: approved by the Russian Federation, December 31, 1994). The actors in this procedure include the domestic companies, Transneft, the Ministry of Fuel and Energy, and the Interdepartmental Commission. It is important to note that this basic reform legislation has been altered since its inception to include exclusions for traders, joint ventures and favored domestic companies. In the variants of this law that follow, many other federal, regional and local government regulatory agencies become involved. The extent to which this formal law (i.e., law on the books) is relevant to actual export allocation is debatable. For example, when I interviewed high level Transneft managers in the Fall of 1995 in Houston, Texas, I was told on several occasions that it was much more important for a company seeking export access to send a high-level representative to Moscow to “negotiate” with high level officials in Transneft and the Ministry of Fuel and Energy than it was to follow the legal procedures. More explicitly, the key trade journal, the Russian Petroleum Investor (September, 1995) reported that bribes are “often a key factor in determining who gets what access to which pipe and in which volume” (p.28). In this section, I will describe the official procedure and, in the following section, I check if this procedure operates as described on the books.

The export schedule is quarterly. In the current quarter, a domestic oil company is required to submit documents summarizing its export plan for the upcoming quarter to Transneft. A domestic company must also attach a certificate showing the overall production volume achieved during the previous quarter. For example, a company operating in the second quarter would report its overall production volume during the first quarter, and this would impact on its

export allocation for the third quarter. According to this law, the export allocation should be proportional to production volume lagged two quarters. The domestic company must submit these documents to Transneft no later than 30 days prior to the beginning of the next quarter.

Once Transneft has received all of its export requests, it submits a schedule of the transportation-system-throughput capacity for the upcoming quarter, exporters' applications and exporters' certificates of past production volume to the Ministry of Fuel and Energy no later than 30 days prior to the upcoming period. The Ministry of Fuel and Energy reviews these requests, and submits a transportation schedule to the Interdepartmental Commission (comprised of bureaucrats from Transneft, the Ministry of Fuel and Energy, the Federal Energy Commission, the Ministry of Foreign Affairs, the Ministry of the Economy, and, often, other government organizations) no later than 25 days prior to the beginning of the quarter. The Interdepartmental Commission reviews the schedule no later than 20 days prior to the beginning of the quarter. It approves and communicates the final schedule to Transneft and the exporters no later than 15 days prior to the beginning of the next quarter.

Four points about this procedure need to be emphasized. First, according to the law, a company that increases its current crude oil production can export more crude oil two quarters into the future. Second, the timing for setting the schedule is rushed. Transneft and the other regulatory agencies have a limited time at the end of the quarter to organize the schedule, and companies have little time to prepare exports for the next quarter. Third, while many different federal agencies oversee the preparation of the formal schedule, Transneft controls the actual shipping. Finally, throughout 1996, there were major differences between planned and actual export route schedules.

There were several regulations that emerged in 1995 and 1996 that make interpreting just how this law works in practice somewhat confusing. First, in its original design, the reform effectively reduced the export quotas allocated to special traders (they accounted for 9.3% of exports in 1995). However, by the second half of 1996, special traders' export share grew to

28.3%. Special traders had the right to purchase crude oil at domestic prices and resell it at world market prices. Their profits were supposed to fund the many government projects that supported needy regions, needy enterprises, construction projects and government debts to foreign countries).² Second, joint ventures were supposed to be able to ship all of their output to world markets. However, there were rules both at the federal and regional level requiring joint ventures to ship a share of their output to the domestic or CIS market. Thus, *de jure*, one could describe the process as one where the special traders and the joint ventures are first given their allocations; then the domestic producers receive their allocations according to the law. However, *de facto*, it may be the case the laws on the book were largely irrelevant because bargaining for export allocation between the special traders, joint ventures and domestic producers occurred even after export schedules had been drawn up.³

The formal rules stipulated that the right to use the export pipeline and ports were supposed to be based on the “equal access principle,” where access is determined by production volume lagged by two quarters. The seaport routes in 1996, as previously noted, were running at close to full capacity. When export requests exceed capacity, equal access implies that the total amount that a company can export in the upcoming period should be reduced in proportion to its

² For a description of some of these projects in 1996, see the *Russian Petroleum Investor*, December 1996/January 1997, pp. 24-29.

³ I thank Peter Murrell for raising this point. The export and legal sections of the *Russian Petroleum Investor* and the *Interfax* reports are filled with anecdotal information about the bargaining that occurs to gain access to the “tube” (i.e., the pipeline). Furthermore, I have collected fragmentary data showing that there is a difference between the planned and actual shipping schedule. I found this data for 11 of the 13 domestic oil companies for the first half of 1995, but could not obtain the breakdown for the subsidiaries exports (see Market Intelligence Group, 1996b, p.36). The average company obtained 93 percent of its scheduled allocation and the median company obtained 98.7 percent. Bashneft received 36.7 percent of its planned allocation, which was the lowest in the group.

total production volume in the current quarter. Thus, in principle, we would expect that in each quarter a firm would be allowed to export a proportion, α^* , of its lagged production volume. I could not find a figure for α^* in my collection of oil journals and legal documents. However, in the absence of capacity constraints, a reasonable proxy would be the total volume that domestic oil companies export divided by the total volume produced by domestic oil companies lagged by two quarters.⁴ This proportion could be computed for every quarter. However, when I pool the four quarters in 1996, I find that $\alpha^* \approx .225$.⁵

Anecdotal evidence, however, suggests that companies often needed to justify its export allocation on the basis of the importance of exports or production plan to special state programs. Thus, the laws on export access were somewhat unclear. While, in principle, greater current production ensured more export access in the future, the unclearness of the law may have provided opportunities for politicians and regulators to influence the allocation of scarce export capacity. While politicians may have used this access to enhance political goals, they may have also used their discretion to allocate capacity efficiently. Specifically, laws that grant the most access to the largest producers do not necessarily provide access to the most efficient producers. In the next sections, I analyze the extent to which state allocation of the pipeline was guided by legal, political and efficiency considerations.

4. The Tests and Data

In this section I develop a baseline model that can measure the impact of law, political factors and efficiency considerations in state allocation of scarce export capacity during 1996 to

⁴ As previously noted, the issue of capacity constraints is unclear since there is tremendous excess capacity in the overall system while the seaports are operating at full capacity.

⁵ By pooling, I assume for simplicity that there are no major differences between the four quarters of 1996. Such differences might in fact emerge because of political considerations, weather problems, etc.

the 31 subsidiaries of Russia's thirteen major domestic oil companies. By law, each domestic company's export volume in the current quarter should be proportional to its production volume lagged by two quarters. However, there are several political factors that could influence how the state allocates export capacity. In the analysis, I focus on politicians who represent the interests of the federal government. Politicians would be tempted to use export access to reward loyal domestic companies that make unprofitable deliveries to the domestic market or to countries in the Former Soviet Union (now called, the CIS). Second, politicians would favor special traders over the domestic oil companies. Funds from special traders were earmarked throughout 1996 to fund special political projects such as repairing the Moscow Kremlin, financing the modernization of harvester factories and retooling the dairy industry (see RPI, December 1996/January 1997, pp.24-29).⁶ Special traders typically make payments to off-budget funds that can be easily diverted into special projects and, perhaps, into concealed accounts. Tax payments from domestic-company exports typically do not directly finance these special government projects. Furthermore, politicians might favor domestic oil companies over joint ventures, because a larger share of the profits from domestics flows into the state coffers. Finally, if politicians were concerned with using scarce transport and production capacity most effectively, they would allocate more capacity to the more efficient producers.

I have collected export data for all four quarters of 1996, and production volume data for the last two quarters of 1995 and the first two quarters of 1996. I have also constructed political variables and firm-level-production efficiency variables: some of these variables vary on a

⁶ By the start of 1996, 17.7 millions tons of export capacity were allocated to the special traders representing intergovernmental agreements and state needs. By the end of 1996, the special decrees that allocated export capacity to special traders accounted for roughly 70 percent of capacity (roughly 71 million tons). However, special traders shipped only 24 millions during 1996, and the actual shipment was negotiated.

quarterly basis and the others are reported for all of 1996. In order to take full advantage of the richness of this data set, I analyze the following pooled regression:

$$(1) \quad \text{EXP}_{cj} = \alpha_0 + \alpha_1 \text{VOL}(-2)_{cj} + \alpha_2 \text{CREDIT}_{cj} + \alpha_3 \text{JV-Traders} \\ + \alpha_4 \text{PROD}_{cj} + u_{cj}$$

where $c = 1, \dots, 13$ denotes the domestic company, $cj = 1, \dots$ denotes the j th subsidiary of the c th company. Definitions of the variables are as follows:

EXP_{cj} export volume for company cj in the i th quarter of 1996 (thousands of tons);

LEGAL VARIABLE

$\text{VOL}(-2)_{cj}$ volume of production for company cj in two quarters preceding the i th quarter of 1996 (thousands of tons);

POLITICAL VARIABLES

CREDIT_{cj} money that domestic oil refineries and oil refineries in countries from the Former Soviet Union owe company cj as of January 1, 1996 (billions of rubles);

JV-Traders Export capacity allocated to special traders and joint ventures in the i th quarter of 1996 (thousands of tons);

EFFICIENCY VARIABLE

PROD_{cj} Productivity of company cj in 1996 (thousands of tons of output per operating well);

The $\text{VOL}(-2)_{cj}$ variable in equation (1) captures the impact of the law on export allocation.⁷ Clearly, this is an impure measure since production volume is also related to political

⁷ Basing current exports on past production volume is a vestige of socialist planning, where current production would determine a company's future output and export plans. In post-socialist Russia, tying

considerations such as size and political muscle of a firm. The variables $CREDIT_{cj}$ and $JV-Traders$ capture the impact of observable political factors. Firms that ship to refineries in Russia and countries in the Former Soviet Union often pay an implicit tax by foregoing higher world market prices and higher world market profit margins. When these refineries withhold payments, the implicit tax is higher. Since oil refineries are largely subsidized by the Russian federal government and since oil trade with other former Soviet republics is largely administered, we expect, *a priori*, $CREDIT_{cj}$, to be positively associated with exports since politicians would reward loyal firms that make relatively unprofitable shipments. The relationship between exports from domestic companies and $JV-Traders$ should be unambiguously negative if the formal regulatory system is operational. That is, if the joint ventures and special traders get their allocation first and the residual capacity is allocated by the formal regulations, then the sign of this coefficient would be negative. Finally, if politicians take efficiency considerations into account, they would allocate more export capacity to the more productive domestic companies, and $PROD_{cj}$ would be positively associated with a domestic company's exports.⁸

The specification in equation (1) suffers from a potential endogeneity problem because it assumes that productivity ($PROD_{cj}$) determines a company's exports. However, one could also argue that the allocation of export capacity would impact a company's production efficiency. For

current exports to lagged production was a regulation that was intended to eliminate the bargaining for export access. There are richer indicators of legality in the oil sector including the enforcement of shareholder protection rules, the enforcement of investor protection rules and the ways in which contracts between buyers and sellers are enforced. However, I have used lagged volumes as an indicator of legality, because I could collect this information while I could only gather journalistic accounts of the other indicators. I thank Katharina Pistor for raising these caveats.

⁸ If export capacity was efficiently allocated, then the marginal productivity of each company would be equal. Since data necessary to measure marginal productivity of wells is not available, I use average productivity as an efficiency indicator.

example, a company that was allowed to increase its exports might use high-cost wells and, as a result, suffer a loss in productivity. However, a company that obtained export rights might be able to raise more capital on international markets to finance upgrading and, therefore, become more productive. In order to correct for this potential problem, I use the following two variables as instruments for productivity in 1996:

INSTRUMENTAL VARIABLES

XCAP95_{cj} company cj's excess capacity in 1995 (idle wells as a share of the overall stock of wells);

LOSS95_{cj} company cj's crude oil losses in 1995 due to pipeline bursts, and late/missed deliveries from state utility suppliers (tons per thousand tons of 1995 production).

There are several arguments for employing these instruments. First, under the traditional Soviet system, companies were encouraged to produce as much volume as possible and to ignore their production costs. Thus, oil well capacity would be expanded even when a particular operation was inefficient. Under the new system, one might expect that more productive companies have shut down their high cost wells. This would imply that more productive firms have more excess capacity. Second, more productive firms have fewer and less severe pipeline ruptures. Furthermore, the most productive domestic oil majors are able to absorb the problems associated with missed/late deliveries from state utility suppliers. This implies that crude oil losses (LOSS95_{cj}) should be lower for the more productive firms.

Table 4 provides evidence about the quality of these instruments. As expected, excess capacity in 1995 is positively correlated with productivity and the oil loss variable is negatively correlated. Furthermore, the correlation between excess capacity and productivity is stronger than the correlation between excess capacity and exports; and, the correlation between oil losses and productivity is also stronger than the correlation between oil losses and exports. In order to

instrument for productivity in the regression in equation (1), the following equation is estimated in the first stage:

$$(2) \quad \text{PROD}^*_{cj} = \beta_0 + \beta_1 \text{XCAP95}_{cj} + \beta_2 \text{LOSS95}_{cj} + \beta_3 \text{VOL}(-2)_{cj} + \beta_4 \text{CREDIT}_{cj} + \beta_5 \text{JV-Traders} + u_{cj}$$

The empirical analysis uses standard regression analysis with a heteroscedacity correction for standard errors (White, 1980). In the first stage, I obtain an R^2 of 0.377 for the productivity estimate and the coefficients for the excess capacity and crude oil losses are both significant at the 1 percent level and have the expected signs.

Table 4 reports results for the (second stage) export equation. I obtain an impressive R^2 of 0.875. The coefficients for the legal variable, $\text{VOL}(-2)_{cj}$, the political variable, CREDIT_{cj} , and the production efficiency variable PROD^*_{cj} are statistically significant at the 1-percent, 10-percent and 1-percent levels respectively, and have the correct sign. The coefficient on JV-traders is negative, but not statistically significant.

The extent to which this relationship between lagged production volume and exports is indicative of legality is, as previously noted, somewhat unclear. The estimated coefficient for lagged production volume is .179. Thus, controlling for political and efficiency effects, for every additional ton of oil produced, a company could expect to increase its exports by roughly .179 tons in the future. However, as previously noted, if a linear relationship between lagged production volume and exports was operational, then we would expect this proportion to equal $\alpha^* \approx .225$. Conducting an F-test, I find the probability that the estimated coefficient of .179 could be equal to .225 is less than 1 percent. Thus, I reject the hypothesis that the estimated coefficient for the impact of lagged production volume on exports is consistent with the posited benchmark if the laws on the books were operational.

However, controlling for the political and efficiency variables, there is clearly the kind of linear relationship between lagged production volume and exports that is consistent with intent of

the law. First, the coefficient for the constant term in the regression is statistically insignificant from zero. Second, when I reran the two-stage procedure for a specification including lagged production volume and squared lagged production volume, I found that the linear term for lagged production volume remained significantly positive while the coefficient for the squared term was only mildly positive, but, was statistically insignificant from zero. Thus, while an increase in overall production volume does not result in the increased magnitude in export rights per company that we would expect if the law operated as advertised, export rights are, nevertheless, increasing and proportional in lagged production volume.

The regression results suggest that political and efficiency considerations reduce, but not eliminate, a company's legal right to convert extra production into future exports. Controlling for lagged production, companies that had incurred debt from shipments to domestic refineries and refineries in the CIS received additional access of 533 tons per quarter per billion rubles of debt at the beginning of 1996. Using a conversion factor of 4640 rubles per dollar in early January from the Moscow Inter-bank Currency Exchange and roughly .14 tons per barrel, then for each dollar of debt as of January 1996, an average company was compensated roughly 36 cents per dollar of debt with additional exports per quarter.⁹

A striking result is the coefficient for $PROD^*_{cjt}$ is positive and statistically significant at the 1-percent level! Thus, controlling for the law and political effect that, on average, a company that increases its productivity by a thousand tons of oil per operating would be allocated an additional 22,650 tons of crude oil exports per quarter. This provides evidence that efficiency considerations are taken into account when export capacity is allocated.

⁹ The calculation is as follows: the compensation in 1996 is 533 tons per quarter. The average world market price in 1996 is \$145.21 per ton. Since the Moscow Inter-currency Bank exchange rate (MICEX) was roughly 4640 rubles per dollar in early January 1996, the compensation is $(533 \text{ tons per quarters}) * (145.21 \text{ per ton}) / (1 \text{ billion rubles} / 4660 \text{ rubles per dollar}) = \text{roughly } 36 \text{ cents per dollar of debt per quarter.}$

5. The Impact of Efficiency on Export Access

The result that efficiency considerations could play a role in export allocation contradicts the recent literature arguing that state interference in production activities breeds corruption and inefficiency (Shleifer and Vishny 1993, 1994). Thus, as an alternative test for the impact of efficiency on export access, I use the 1996 data for exports from the two Russian seaports: Novorossiysk and Tuapse. These are considered to be the most desirable routes since there is no need to transit through the Ukraine or Latvia, as in the case of the Odessa and Ventspils seaports. Data provided by Khartukov (1995, 1996) shows that the transit cost of shipping from Novorossiysk and Tuapse is substantially lower than from the ports of Odessa and Ventspils. Furthermore, these routes provide access to developed western markets and are typically more profitable than shipping via the Druzhba system to the Czech Republic, Slovakia, Poland, the eastern half of Germany, and the countries comprising the former Yugoslavia. I have the actual yearly route schedule, and not the quarterly schedules. Furthermore, only 29 of my 31 firms have pipeline routes to Novorossiysk and Tuapse. Thus, to preserve degrees of freedom, I conduct the following two-stage least-squares regression to test for the impact of efficiency while controlling for distance to port:

$$(3) \quad \text{EXPshare}_{cj} = \alpha_0 + \alpha_1 \ln \text{DIST}_{cj} + \alpha_2 \text{PROD}^*_{cj} + \varepsilon_{cj}$$

$$(4) \quad \text{PROD}^*_{cj} = \beta_0 + \beta_1 \text{XCAP95}_{cj} + \beta_2 \text{LOSS95}_{cj} + \beta_3 \ln \text{DIST}_{cj}$$

In the first stage, I estimate the company production productivity as a function of excess capacity and losses in 1995 as well as distance. I use this instrumented version of productivity in the second stage estimate of export allocation. Definitions of the variables are as follows:

EXPshare_{cj} export volumes to Novorossiysk and Tuapse as a share of overall production in 1996 for company cj ;

$\ln\text{DIST}_{cj}$ the log of distance from company cj to port (thousands of kilometers: see below for further explanation);

PROD^*_{cj} the instrumented version of PROD_{cj} .

I report all variables as shares or log transformations. If efficiency is an important determinant of export access, then I would expect the signs of the coefficient for $\ln\text{PROD}_{cj}$ to be positive and the coefficient for $\ln\text{DIST}_{cj}$ to be negative in the export regression. I approximate distance to port, DIST_{cj} , with two related measures. First, I use the number of Transneft regional subsidiaries that company cj must pump their oil through to get to Novorossiysk and Tuapse as a proxy for transport nodes (because Novorossiysk and Tuapse are close to each other, the number of transport nodes between a company and either port is the same.) For example, the subsidiary of Rosneft, Termneft, has 1 node since it ships its oil via the Black Sea Trunk Pipeline Joint Stock Company, which then ships it directly to port. The Lukoil subsidiary, Langepasneftegaz has 4 transport nodes: Transneft first pumps Langepasneftegaz's oil through the Sibneftprovod Joint Stock Company, then through the Urals Siberian Trunk Pipeline Joint Stock Company, then through the Privolzhskiy Trunk Pipeline Joint Stock Company, and, finally, through the Black Sea Trunk Pipeline Joint Stock, which takes the throughput to port. The average number of transport nodes in the sample is 3.12, the maximum is 5, the minimum is 1, and the mode is 4.¹⁰

A second distance measure is the sum of throughput pipeline distance on each transport node between the company and the port. This measure is an approximation, since we I do not know precisely at which point on the transport node the company enters the Transneft system. The average distance for a shipment of oil to port is 9.58 thousand kilometers; the longest route is

¹⁰ A problem with the measure is that a negative relation between export access at Novorossiysk and Tuapse and the number of transport nodes may be driven by hold-ups rather than efficiency considerations. Specifically, if the Transneft regional subsidiaries are not coordinated by Transneft, then theory predicts that the number of hold-ups is increasing in the number of transport nodes (see Shleifer and Vishny, 1993).

15 thousand kilometers, the shortest is 800 hundred kilometers and the modal distance is 14 thousand kilometers.

The correlation coefficient between the log of transport nodes and log of distance is very high (.973). Thus, I report results using route distance as a proxy for distance. However, all of the results are robust to using transport nodes as a distance measure.

In the first stage estimate of production productivity, I obtain an R^2 of 0.541, and the coefficients for excess capacity and oil losses in 1995 have the expected signs. However, only excess capacity is statistically significant (at the 1-percent level). The second stage results are reported in Table 5. I obtain an impressive R^2 of 0.658. The results, provide strong evidence that efficiency considerations are an important determinant of export allocation. The distance coefficient is negative and significant at the 1-percent level. *Ceteris paribus*, if a company's distance from port increased by 10%, its exports on average would fall by 3.8%. This suggests that efficiency matters, since firms with lower transport costs get more access. Second, controlling for distance, the coefficient for productivity (output per operating well) is increasing and has a p-value of .019. Thus, more efficient firms get more access.

6. Conclusions

It is well understood that good laws that clearly regulate and protect private business activity are critical for economic development (North 1981). However, it is also the case that simply legislating new good quality laws does not necessarily imply that these laws will be enforced in a manner that promotes economic development (see Berkowitz, Pistor and Richard 2000 for market economies; Pistor, Raiser and Gelfer, 2000, Hendley, Murrell and Rytterman 2000 and Polischuk 2000 in this volume for transition economies). By 1994, the Russian crude oil sector needed good laws, as many efficient domestic companies were denied access to lucrative world markets for lack of political connections. The export allocation law adopted in 1995 attempted to limit the

role of political influence and provide access to the export pipeline on the basis of past production.

I have shown that this new law guided, to a large extent, export allocations as of 1996. Nevertheless, this law did not effectively limit political interference in the export allocation process. Controlling for the law, the state pipeline monopoly Transneft allocated more capacity to companies that had incurred debts from shipments to domestic and refineries. Finally, there is evidence that Transneft offset the existing regulations to favor more efficient companies. Specifically, companies operating with higher output per operating well ratios and located more closely to port tended to receive more export rights. An important set of questions, then, is just what factors would tend to limit political interference with private business activity? Would it be better to replace the existing law with an auction mechanism for allocating throughput capacity? Should Transneft simply be privatized following an American model in which oil companies control their segment of the pipeline? Or, will the current development of alternative oil routes that bypass Russia provide competitive conditions that would limit inefficient political interference in the Russian crude oil sector? These are important areas for future research.

REFERENCES

- Berkowitz, Daniel (1997), "Regional Income and Secession: Center-Periphery Relations in Emerging Market Economies," *Regional Science and Urban Economics* 27: 17-45.
- Berkowitz, Daniel, Katharina Pistor, and Jean-Francois Richard (2000), "Economic Development, Legality and the Transplant Effect," *mimeo*.
- Bliss, Christopher and Rafael Di Tella (1997), "Does Competition Kill Corruption," *Journal of Political Economy* 105 (5): 1001-123.

Gaddy, Clifford G and Barry W. Ickes (1998), "Russia's virtual economy," *Foreign Policy* 77, 53-67.

Interfax reports, various issues during 1993-1996.

Khartukov, Eugene M. (1995), "Russia's Oil Prices: Passage to the Market," East-West Center Working Paper No.20, Hawaii.

Khartukov, Eugene M. (1996), "Changing Tax System Challenges Producers and Refiners in Russia," *Oil and Gas Journal*, 94 (13).

Lazarev, Valery and Paul Gregory (1998), "Screening, Credentials and Information: A Case Study of Soviet Allocation of Vehicles in the Early 1930s," mimeo, Department of Economics, University of Houston, Houston, Texas.

Market Intelligence Group (1995), *Transneft: Russian Oil Transporting Joint Stock Company*. Market Intelligence Group, Moscow.

Market Intelligence Group (1996a), *Transneft: Transneft's performance in 1994 and first quarter of 1995*. Market Intelligence Group, Moscow.

Market Intelligence Group (1996b), *Transneft: Russian Oil Transporting Joint Stock Company: Update - January - June 1995*. Market Intelligence Group, Moscow.

Market Intelligence Group (1997), *Oil Industry in Russia*. Market Intelligence Group, Moscow.

Pistor, Katharina, Martin Raiser, and Stanislaw Gelfer (2000), "Law and Finance in Transition Economies," mimeo.

Russian Petroleum Investor, various issues: 1993-1999.

Shleifer, Andrei and Robert Vishny (!993), "Corruption," *Quarterly Journal of Economics* 108: 599-618.

Shleifer, Andrei and Robert Vishny (!994), "Politicians and Firms," *Quarterly Journal of Economics* 109: 995-1025.

Treisman, Daniel (1998), "Fighting Inflation in a Transition Regime: Russia's Anomalous Stabilization," *World Politics* 50 (2): 235-265.

White, Halbert (1980), "A Heteroskedasticity-consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity," *Econometrica* 48: 817-838.

Tables

Table 1 – Russian Crude Oil Prices

Period	Domestic price as a Percentage of world price
1992:IV	25%
1993:IV	45%
1994:I	46%
1994:II	36%
1994:III	30%
1994:IV	26%
1995:I	36%
1995:II	45%
1995:III	54%
1995:IV	54%
1996:I	52%
1996:II	52%
1996:III	60%
1996:IV	57%

Source: PLANECON, INC. Investment Advisory Service, Market Research and Economic Assessment of Eastern Europe and Former Soviet Republic, various reports.

Table 2 - Export Routes and Capacity Utilization

Route	Capacity*	Capacity Utilization (in percentages)					
		1990	1992	1993	1994	1995	1996
<u>Seaports:</u>							
Novorossiysk	32	96.3	73	85	83.3	84.9	93.7
Tuapse	5.5	100	37.7	59.6	67.5	85.8	84.4
Odessa	8	47.5	12.8	51	74.3	101	102.1
Ventspils	15.6	83.3	41.5	57.9	68.2	71.1	91.4
<u>Pipeline Routes:</u>							
Druzhba (total)	119.3	38.4	27.9	29.9	24.5	31.7	34.7

*Capacity is measured in millions of tons per year.

Sources: Capacity data and 1990 utilization data are from Ernst and Young (1992); Figures for 1992, 1993, 1994, 1995 and 1996 are from Market Intelligence Group (1995, 1996a, 1996b, 1997).

	EXP _{cj}	PROD _{cj}	XCAP95 _{cj}	LOSS95 _{cj}
EXP _{cj}	1			
PROD _{cj}	0.079	1		
XCAP95 _{cj}	-0.175	0.534	1	
LOSS95 _{cj}	0.082	-0.257	-0.2555	1

	Coefficient	t statistic	P value
CONSTANT	28.08	0.253	0.801
VOL(-2) _{cj}	0.179	14.52	0.000
CREDIT _{cj}	0.533	1.677	0.096
JV-Traders	-0.00566	-0.457	0.648
PROD* _{cj}	22.65	2.586	0.011

	Coefficient	t statistic	P value
CONSTANT	0.64	5.24	0.000
lnDIST _{cj}	-0.38	-9.73	0.000
PROD* _{cj}	0.11	2.50	0.019