Does Nationalization Work?
Evidence from Russian State Takeovers

Carsten Sprenger[1]

This version: January 5, 2012

Abstract

Nationalization and its consequences have attracted new interest in the recent financial crisis. We study the effects of nationalization on company performance using a sample of Russian firms. The Russian government has increased its role as an owner in several sectors of the economy in the 2000's. We have assembled a comprehensive data set of nationalization transactions in Russia for the period from 2004 to 2008. Operating performance is measured relative to a close match of a non-nationalized firm that is found using propensity score matching. Overall, the empirical results show no significant effect of the fact of nationalization on performance. There is however, an increase in leverage over the first two years after nationalization. Subsequent research will shed more light on the changes in corporate governance going along with nationalization that can have intermediating effects on performance.

1. Introduction

There has been the recent trend toward more state influence in the aftermath of the global financial crisis. Governments have opted to take over distressed companies such as General Motors, Citibank, Commerzbank, Royal Bank of Scotland and Fortis, at least temporarily. In other countries such as Russia, Venezuela and Bolivia, nationalization has been the result of a long-term policy to increase the influence of the government in certain sectors of the economy. This provides a new testing field for the performance of the government as an owner of industrial and banking assets relative to private owners. Our data for Russia allows conducting such an analysis since the policy of nationalization of companies in so-called strategic enterprises has been pursued for almost a decade.

A specific feature of the Russian economy is the recent trend toward more state influence in certain sectors in the economy and the related incidence of nationalizations, in most cases the

purchase of previously privatized companies by SOEs. This is reflected in the significant increase in the weight of state-owned enterprises in the market capitalization of the largest Russian firms that are publicly traded. According to Sprenger (2010), the fraction of total market capitalization of the 200 largest Russian firms that the ten largest SOEs account for has increased from 31.4 to 47.5 per cent between 2004 and 2008. This is both due to increased share offerings of state-owned companies (IPOs of Rosneft, VTB and secondary offering of Sberbank), but also due to acquisitions by state-owned companies (e.g. Gazprom, Rosneft).

Neshadin et al. (2007) single out five sectors that are dominated by SOEs: infrastructure (railway transport, pipelines, communication, nuclear energy), extraction of natural resources (oil and gas, diamonds), the military-industrial complex, financial services, and mass media. The Russian government has never declared a program of nationalization. However, several objectives of taking ownership positions in various sectors of the economy have been mentioned: the modernization of infrastructure, the diversification of the economy by attracting investments in high-technology sectors, innovation, and the creation of large vertically integrated structures that can survive the international competition.

While there are several studies on the privatization process in Russia, there is almost no systematic research about the performance of remaining and newly established SOEs in Russia. The issue of performance of SOEs is however of great importance since it is a precondition to achieve any of the above mentioned industrial policy goals.

In this paper, we concentrate on nationalization transactions in the period from 2004 to 2008. We define nationalization simply as the transfer of control over a company from private owners to the state. In particular, we use 25% and 50% state ownership as two alternative thresholds that define a nationalization transaction if they are exceeded as a result of an acquisition. A nationalization transaction of the first type provides the government with a stake large enough to block major corporate decisions according to Russian corporate law. A nationalization of the second type means that the government gets a majority and thus full control over the company as the result of the acquisition. We account both for direct and indirect government ownership through other SOEs. In fact, in most cases of nationalization firms have not been acquired directly by federal, regional or municipal government agencies, but by existing state-owned enterprises such as Gazprom, Rosneft, Russian Railways, the State Corporation Russian Technologies or their subsidiaries.

This approach enables us to compare the performance of the same company before and after nationalization. In a first step we follow the methodology by Megginson et al. (1994), which was developed for the performance effects of privatization. It consists in a simple comparison of average performance before and after privatization, or, in our case,

nationalization. In a second step, we analyze the change in performance relative to otherwise similar non-nationalized firms that are identified using propensity score matching.

Since most of the target firms are not traded companies, we measure their performance based on accounting data. We consider firm size in absolute terms (number of employees, total assets), revenue from sales, operating efficiency (sales per employee), return on assets (operating profit over total assets) and leverage. We do not find significant changes in financial performance after the event nationalization on average. There is, however, some evidence of increased leverage if we compare to the year before nationalization.

The paper contributes to the literature on the performance effects of ownership changes in several ways. First, to our knowledge, this is the first paper that studies performance effects of nationalization at the firm level. To this end, we have assembled a comprehensive data set of nationalization transactions in Russia for the period from 2004 to 2008. In addition, we apply of propensity score matching, a technique that has been frequently used in various corporate finance applications but only rarely in the privatization literature. It is, in our view, an effective tool to control for the selection bias in the choice of nationalization targets by the government.

We proceed with short descriptions of three government acquisitions in different industries that shed light on the various methods of nationalization. Next, we provide a short literature review in section 3. In section 4, we provide details on how the database was constructed. Section 5 presents descriptive statistics of the nationalization transactions. Section 6 describes the methodology of the performance comparison. Section 7 presents our results on company performance before and after nationalization. Section 8 concludes and outlines directions of future research.

2. Examples of nationalizations

An important milestone in the process of the fortification of the Russian government's position in the economy was the forced sale of Yuganskneftgaz, the main productive unit of the then-largest Russian oil company Yukos, to the state-owned oil company Rosneft in 2004. Subsequently, the other parts of Yukos were divested, and the company was liquidated in 2007. Since Yuganskneftegaz and most other units of Yukos were merged with the existing Rosneft and thus their financial performance cannot be tracked after the nationalization, we excluded it from our sample. In 2005, 72% of the shares in Sibneft, then owned by oligarch Roman Abramovich, was acquired by the state-owned gas monopolist Gazprom for about $13 million, whose stake increased as a result to more than 75%. The company was subsequently renamed into Gazpromneft and is part of our sample.

In 2007 and 2008, two metallurgical plants, Volgograd Metallurgic Plant "Red October" and Stupinsk Metallurgic Company in the Moscow region have been acquired by RusSpetsStal, a holding company owned to 25.1% by the state-owned enterprise Rosoboronexport, which in turn is part of the state corporation Rostekhnologii. The remaining 74.9% of the ownership was held by several Cyprus and Guernsey-based offshore companies with unknown beneficial owners. According to the Vedomosti newspaper (Dec 6, 2010) the acquisition was mostly financed by loans from state-owned banks Sberbank, VTB and Gazprombank. Both companies went into serious financial difficulties in 2008 and 2009, which led to the bankruptcy of "Red October" and the holding company RusSpetsStal. "Red October" has been eventually been bailed out by Rostekhnologii.

The third example is the Russian car producer AvtoVAZ[2]. Until 2005 it had highly intransparent distribution channels and management structure. It was owned by two holding companies that were linked to AvtoVAZ by cross-ownership. The holdings and the company's management transferred their voting rights to the CEO who voted with a majority at shareholder meetings. The Russian government authorized the state-owned company Rosoboronexport in 2005 to reform this company. The change in control was achieved by giving orders to managers to give their votes not to the CEO but to representatives of Rosoboronexport. They elected a new board and only later dismantled the cross-ownership arrangements and established formal ownership of Rosoboronexport, brought in the investment bank Troika Dialog and Renault as co-owner and foreign partner.

3. Literature Review

In this section, we review the relevant empirical literature on nationalization and the comparison of state-owned and privately owned enterprises.

Chernykh (2011) in the only empirical study that we are aware of that studies nationalizations in Russia. She focuses in her work on the incentives of the government to acquire particular firms using a sample of 153 firms that were privately owned in 2003 among the 200 largest Russian companies in that year. Out of these firms, 26 had been targeted for nationalizion at the end of 2008, and 19 nationalizations actually occurred by that time. The author finds that nationalization in Russia has been driven by political factors and not by economic factors. Belonging to one of the strategic sector increases considerably the likelihood of privatization, while profitability, market share, employment and other economic factors are

---

[2] This description follows an article of the Russian economist Yakov Pappe in the journal Kommersant Den'gi from Oct 15, 2007.

not systematically related to the likelihood of nationalization. Our study is complementary to the one of Chernykh in that we concentrate on the performance effects of nationalization and estimate a model of the determinants of nationalization mainly to find good matches for nationalized companies. We also pursue a different sampling strategy by focusing not only on the largest Russian enterprises. Rather, we assemble a comprehensive dataset of nationalization transactions.

There is also a literature that is concerned with the political economy of nationalizations. One recent contribution is Guriev at al. (2011) who analyze nationalization episodes in the oil industry around the world from 1960 to 2002. The authors provide two main results. First, nationalization is more likely in periods of high oil prices. The recent nationalization episodes in Russia illustrate this finding; our sample contains a large share of transactions in this industry and falls into a period of high and increasing oil prices. Second, nationalizations are more likely in countries with weak political institutions measured by constraints on the executive and the level of democracy.

Our study also relates to the literature that studies the comparative performance of private and state-owned companies. There are two main strands in this literature. The first one focuses on the performance effects of privatization. The literature on the effects of privatization in Central and Eastern Europe and the former Soviet Union has been summarized in two excellent surveys by Djankov and Murrell (2002) and Estrin et al. (2009).[3] While in Central and Eastern Europe privatization typically brought improvements in technical efficiency (labor productivity, total factor productivity) and financial performance, the effects for the countries of the former Soviet Union are less clear. For example, Brown and Earle (2006) find positive effects of privatization on total factor productivity in Romania, Hungary, Ukraine. The effect for Russia is positive or negative depending on specifications, but in any case smaller than in the other three countries. In addition, any positive performance effects of privatization need more time to materialize than in the other countries.

In a recent study on a large sample of privatization deals in China, Bai et al. (2009) find that privatization of China's SOEs had almost no effect on employment in the medium run, but it increased labor productivity and firm profitability. These changes were more pronounced when state ownership was reduced to a minority position.

The second strand in the literature comparing performance of SOEs and private companies performs cross-sectional comparisons of these two types of firms while controlling for other performance drivers. The comparative analysis for developed countries has lead in most cases to the conclusion of superior performance of private firms (e.g. Boardman and Vining,

---

[3] For evidence on privatization around the world see the survey of Megginson and Netter (2001).

1989), but in some cases no significant difference has been found (e.g. Kole and Mulherin, 1997). Recent studies for China, namely Tian and Estrin (2008) and Chen et al. (2009), conclude that state ownership can have a positive effect on corporate performance. Tian and Estrin (2008) find a positive effect of state ownership if it exceeds a certain threshold level (approx. 25% if performance is measured by Tobin's Q). Chen et al. (2009) show that SOEs affiliated to the central government outperform private companies and companies with other forms of state ownership. The authors conclude that the government may be an effective owner in countries with a weak institutional environment.

There is virtually no econometric study of the effect of nationalization on firms' financial or operating performance at the firm level. This paper tries to fill this gap.

4. Data

We have collected data on nationalization transactions in Russia for the period 2004-2008. This time period has been chosen due to the overall activity of the government in taking over privately owned enterprises and such that we have at two and in most cases three years of financial information available before and after the transaction.

For the creation of our database of nationalization deals we use the data bases Zephyr (Bureau van Dijk) as primary source and ThomsonOne Deals (before Platinum SDC) as secondary source. Both are databases of mergers and acquisitions, IPOs and joint ventures around the globe. We extracted a list of domestic acquisitions by Russian companies from Zephyr, both minority and majority stakes. We filter out those acquisitions where the ultimate shareholder of the acquirer is the Russian government, i.e. government agencies and SOEs. Since the ownership classification in Zephyr is far from perfect, we also searched the database by hand for government agencies among the acquirers and a list of large SOEs. Zephyr provides information on the type of ultimate owner, but not for all companies and only at the time when the data is retrieved. Even though few larger SOEs were privatized during our sample period, we cannot assume that the ownership structure of acquirers did not change between the time of the transaction and the time of data retrieval.

Therefore, we need to confirm that the acquirer firm has been state-owned not at the date of the transaction. Except for those state agencies and large SOEs for which we know that their ownership status has not changed, we need to use ownership information from other sources. We use quarterly reports submitted to the Federal Commission for the Financial Markets downloaded from Interfax Spark and the Interfax Spark database that is based on these reports and ownership information provided by Rosstat, the Statistical Office of the Russian Federation.

The same sources of additional information are used to establish whether target firms have been state-owned already before the transaction or not. Actually, the majority of transactions recorded as acquisitions by Russian SOEs in Zephyr are transfers of ownership between different government agencies and SOEs, for example during the reorganization of RAO UES, the former monopolist in the power sector. We excluded all such transactions that represent a pure consolidation and reorganization of state property.

A source of additional information that we used are articles in the business press and in Russian academic journals on the issue of the growing extent of the public sector in the Russian economy. For example a series of articles in Kommersant Den'gi on reports the nationalization efforts of the Russian government in several sectors (Pappe and Drankina, 2007). Also, the articles of Neshadin et al. (2007), Radygin (2009), Chernykh (2009) and Thomson (2006) as well as the annual reports of the Institute of the Economy in Transition provide numerous examples.

As a result, we have a database of 107 nationalization deals, which is sufficiently diversified across sectors. Among others, it includes target companies in the oil and gas sector, mechanical engineering, media and the financial sector. Descriptive statistics presented in the following section is based on this sample.

Finally, we use Bureau van Dijk's Ruslana database and Interfax Spark to obtain financial data on the target firms before and after the nationalization in order to construct our performance indicators and to estimate which are the determinants of the likelihood to be nationalized. We excluded the eight banks from the sample due to the different structure of their balance sheets. For other companies, we were not able to find financial information for at least one year before and after the nationalization year. As a result, we are left with 82 observations.

As noted in the introduction, to obtain a meaningful comparison of company performance to the case of no nationalization, we construct a control group from which we choose matches to the target firms. We obtained this control group from the universe of Russian enterprises in the Ruslana database by imposing the following selection criteria: Firms should have the same two-digit industry code in the US SIC classification as one of the target firms, should be joint-stock companies and have accounting information available in the years 2007 and 2008.[4] As a result, we obtain a sample of 49,780 companies in the control group that is not overlapping with the sample of 82 target firms.

5. Descriptive statistics of nationalization transactions in Russia, 2004-2008

---

[4] The requirement of being a joint-stock company seems justified since the vast majority of target firms has this legal form (open or closed joint-stock company, Russian acronym OAO or ZAO). This excludes limited-liability companies (Russian acronym OOO) with frequently unavailable and less reliable accounting information. The criterion of availability of financial reports could be varied to include other years or a total of available years of at least two.

We start the description of our sample with simple statistics on the number of nationalization transactions in the years 2004-2008. Table 1 presents the numbers for our two different definitions of nationalization. Different cases can occur:

- The government stake may exceeds 25% as the result of the transaction, in which case our variable Nat25 equals one. The second column counts those transactions where the 25% threshold is exceeded but not the 50% threshold.

- The government stake may exceeds 50% as the result of the transaction, in which case our variable Nat50 equals one. The third column counts those transactions where the 50% threshold is exceeded but not the 25% threshold (e.g. an increase in state ownership from 30 to 60%).

- Both thresholds may be surpassed in the same transaction (e.g. an acquisition of a 100% stake). Such cases are counted in the fourth column.

- Finally, the last column counts if any of the two thresholds has been exceeded in a transaction.

Table 1 Number of government takeovers (nationalizations)

Year	Nat25=1, Nat50=0	Nat25=0 Nat50=1	Nat25=1 Nat50=1	Any of Nat25, Nat50 equals 1
2004	2	3	5	10
2005	2	5	7	14
2006	5	0	15	20
2007	6	5	16	27
2008	4	11	21	36
Total	19	24	64	107

In all columns of the table, we see an increasing trend. One should, however, not automatically extrapolate this trend to later years. The financial crisis did not lead to a major increase in state ownership through the bailout of financially distressed companies. It should be noted also that in 94 per cent of the government takeovers the immediate acquirer was a state-owned enterprise, and in 6 per cent it was a regional government.

It is difficult to assess the value of the takeovers since the information on the deal value is often not disclosed. We therefore have to rely on a simple count of transactions.

Table 2 presents the breakdown of state acquisitions according to the ownership stake acquired and the final ownership stake. Even though we did not consider acquisitions of stakes smaller than 25% in our sample it becomes clear from this table that the government mostly strived to acquire controlling stakes in acquired companies.

Table 2 Distribution of acquired and final government ownership stakes

Stake (%)	Acquired Stake: # firms	Final Stake: # firms
[25,50)	19	20
[50,75)	29	24
[75,100)	17	20
100	23	25
n.a.	19	18
Total	107	107

In Table 3, we present a breakdown of nationalization transactions by industrial sector of target companies. There is a clear concentration of nationalizations in the banking, manufacturing and mining (including oil and gas extraction) sectors.

Table 3 Distribution of government takeovers (nationalizations) by industrial sectors

Year / SIC division	2004	2005	2006	2007	2008	Total
Agriculture, Forestry, And Fishing				1		1
Construction	2				4	6
Finance, Insurance, And Real Estate	1	1	2	5	9	18
Manufacturing	3	6	4	9	13	35
Mining	2	5	1	5	1	14
Retail Trade			2			2
Services	1	1	5	4	4	15
Transportation, Communications, Electric, Gas, And Sanitary Services	1		6	1	4	12
Wholesale Trade		1		2	1	4
Grand Total	10	14	20	27	36	107

6. Performance comparison: Methodology

We use a number of performance indicators that can be computed from financial statements. We consider the natural logarithm of number of employees and of total assets as proxies of the size of the firm and the natural logarithm of sales revenues from the main activity of the firm. The main performance indicators are operating efficiency (revenues per employee) and return on assets (operating profit divided by total assets). Finally, we compare also the leverage ratio (all debt divided by total assets) before and after nationalization. For all ratios, i.e. the latter three indicators, we winsorize all observations at the first percentile in each tail. This removes unreasonably small and large values of these indicators and sets them to the value of the observation at the first percentile.

As a first approach to the performance comparison, we report simple averages of the difference between the pre- and post-nationalization values of these indicators similar to Megginson et al. (1994) and Dewenter and Malatesta (2001). We report simple t-tests of the null hypothesis of a zero change of each indicator. To smooth out fluctuations between years and to incorporate information for several years we consider averages of these indicators during the three years before and after nationalization, respectively. We still use an observation if we find the performance indicator at least one year before and one year after the transaction.

We now turn to the description of the matching methodology applied in this papers. Matching methodologies have been becoming popular in corporate finance in the last decade, probably due to their relative simplicity. Recent applications include Asker et al. (2011) for a comparison of investment behavior of publicly traded and privately held firms, Chari et al. (2011) on post-acquisitions performance of U.S. firms that have been acquired by firms from emerging market countries, Li and Zhao (2006) on buy-and hold returns after seasoned equity offerings, and Gong et al. (2007) who evaluate the employment effects of privatization in China.

Matching serves the purpose to construct the non-observed counterfactual of the performance of a nationalized ("treated") company had it not been nationalized. In a randomly chosen treatment sample one could infer the treatment effect from a simple comparison of treated and untreated companies. Targets of nationalization are, however, unlikely to be chosen by the government on a random basis. The proclaimed industrial policy objectives, in contrast, suggest a selection on the basis of the industrial sector where companies operate. It is also possible that companies are chosen based on their past financial performance.

The matching estimator assumes that all drivers of selection into treatment (nationalization) are observable variables. In a first step, a match, i.e. a non-nationalized firm is found that as similar as possible to a nationalized firm in all relevant respects a such that the difference in outcomes for the two firms can be attributed to the fact of nationalization. The propensity score matching applied in this paper reduces the multiple dimensions on which companies could be matched to a single dimension, the propensity score. Let $A_{it} \in \{0,1\}$ the binary indicator of nationalization of firm i at time t. The propensity score is the predicted probability of nationalization obtained from a simple probit regression of A_{it} on a number of covariates that are likely to explain the occurrence of nationalization.

For a nationalized firm i, denote the outcome variable (performance indicator) s periods after nationalization by $y_{i,t+s}^1$. The outcome for a matched non-nationalized firm is denoted by $y_{i,t+s}^0$. The average treatment effect on the treated (ATT), i.e. the average effect of nationalization on a performance indicator is defined as $E\left[y_{i,t+s}^1 - y_{i,t+s}^0 | A_{it} = 1\right]$. The term

$E[y^0_{i,t+s}|A_{it} = 1]$ is the unobservable counterfactual of a nationalized firm had it not been nationalized. Instead of ATT, we observe the difference

$$E[y^1_{i,t+s}|A_{it} = 1] - E[y^0_{i,t+s}|A_{it} = 0]$$

ATT can be expressed as

$$E[y^1_{i,t+s} - y^0_{i,t+s}|A_{it} = 1]$$
$$= E[y^1_{i,t+s}|A_{it} = 1] - E[y^0_{i,t+s}|A_{it} = 0] - \{E[y^0_{i,t+s}|A_{it} = 1] - E[y^0_{i,t+s}|A_{it} = 0]\}$$

where the first two terms on the right-hand side are the observable difference and the last two terms in braces represent the selection bias.

The propensity matching estimator requires two important assumptions. The conditional independence assumption says that if we condition not only on the event of nationalization but in addition on a vector of covariates *X* that contains all variables that affect both nationalization and outcomes then the selection bias term becomes zero. In other words, all firms, conditional on *X*, have the same expected outcome if they continued to be privately owned:

$$E[y^0_{i,t+s}|X, A_{it} = 1] = E[y^0_{i,t+s}|X, A_{it} = 0] = E[y^0_{i,t+s}|X]$$

The second assumption is the common support assumption. It requires that for each value of *X* there is a positive probability both of being treated or untreated: $0 < Pr(A_{it} = 1) < 1$. If we predict extreme probabilities close to zero or one, such observations could simply not been matched properly. In practice this is requires that there is sufficient overlap between the propensity scores of treated and untreated observations, which is imposed by using only those observations whose propensity scores lie in the intersection of the supports of the propensity scores of treated and untreated observations.

Under these assumptions, the effect of nationalization is measured as the average difference in outcome between target and the matched non-target firms. We use the Stata program pscore.ado (Becker and Ichino, 2002) to compute propensity scores and average treatment effects. We choose the nearest-neighbor estimator where every target firm is matched with its closest neighbor in terms of the propensity score. We report standard errors that are computed analytically using the formula provided by Becker and Ichino (2002).

Since we are using differences in performance indicators before and after nationalization we can eliminate time-invariant unobservable differences between target and control firms.

In most studies of program evaluation that apply matching estimators, treatment occurs at the same point of time. In our sample, nationalization may occur at each of the five years from 2004 to 2008. This has the advantage that we are less likely to confound treatment with a common shock (e.g. a macroeconomic event) at the same time. On the other hand, we need to deal with the issue of counterfactual nationalization dates for non-nationalized firms. We follow the approach of Chari et al. (2011) to assign counterfactual nationalization dates randomly while

preserving the proportions of nationalized firms that have been nationalized in each of the five years also among the non-nationalized ones.

We organize the timing of variables setting the year of nationalization to t=0, the year after at t=1, the year before at t=-1 etc. We include the following covariates (right-hand side variables) in the probit model for the propensity score: log of total assets, log of revenues, return on assets, leverage and three-digit SIC industry codes of all (minus one) target firms. Year dummies turned out to be insignificant and are excluded. We do not include the number of employees since it is not available for all firms and would reduce the number of observations considerably. This choice of variables is driven mainly by the desire to match acquired and non-acquired companies as close as possible, and not in the first place by the desire to explain the nationalization decision.

7. Performance comparison: Results

7.1 Simple performance comparisons

Tables 4 presents the results of the simple performance comparison. It turns out that nationalized firms are overall declining, in terms of revenue and total assets. Operational efficiency and leverage are also decreasing in the three years after nationalization as compared to the three years before.

Table 4
Means of performance indicators and t-test for significance

Change in	# observ	Mean	Std. Err.	t-stat
log employment	56	-0.12799	0.113739	-1.1253
log revenue	73	-0.40863	0.138841	-2.9431
log total assets	78	-0.61363	0.112094	-5.4742
operating efficiency	63	-2134	627.7855	-3.3992
return on assets	80	0.003394	0.032638	-0.104
leverage	80	-0.09461	0.044416	-2.1302

Next, we apply the matching methodology to find out whether the target companies operate on declining markets or whether they perform significantly worse than their peers that are found among a large number of firms by propensity score matching.

7.2 Determinants of nationalization

We provide the analysis of the determinants of nationalization and the corresponding performance effects for the following two combinations of our two definitions of nationalization. First, we consider cases where either the 25% or 50% threshold is surpassed in a transaction, i.e.

all transactions where a significant change in control in favor of the government took place. Second, we consider the cases where both the 25% and the 50% thresholds are surpassed in the same transaction, i.e. cases in which the government acquired a majority stake where it owned no or a minor stake before.

Table 5 presents the results. It turns out that firm size measured by total assets affects the likelihood of nationalization positively. Revenue has also a positive effect, while the return on assets has a negative effect. Both coefficients are, however, only significant in one of the two specifications. The rather high pseudo R^2s favor our assumption that the selection for nationalization is based on observable variables.

Table 5
Results of probit models of the likelihood of nationalization

	Either Nat25 or Nat50		Nat25 and Nat50	
Log total assets	0.22	*5.38*	0.11	*1.67*
Log operating revenue	0.04	*0.99*	0.19	*2.61*
ROA	-0.78	*-3.13*	-0.44	*-1.37*
Leverage	-0.15	*-1.02*	-0.33	*-1.52*
constant	-6.80	*-14.65*	-7.33	*-12.53*
No. of observ.	31254		25159	
Pseudo R^2 (%)	35.2		40.4	

Coefficients of industry dummies are not reported. All explanatory variables are one year before nationalization. Industry Italic numbers are z-stats.

7.3 Performance relative to propensity score matches

The results of the estimation of average treatment effects are presented in the appendix. We define treatment again in two alternative ways of the previous section, namely by any significant increase in the control of the government (surpassing either 25% or 50% ownership) or by acquiring full control when the state previously held no or a minor stake (i.e. surpassing both thresholds). We measure the effects on each performance variable by the change from the year previous to nationalization to the year of nationalization, as well as one, two and three years after nationalization. To smooth out idiosyncratic fluctuations in performance, we also compare three-year averages before and after nationalization.

The results show no significant effects of nationalization on size, revenue, operating efficiency and return on assets. There is some evidence that financial leverage goes up in the two years following nationalization as compared to the year before. If government ownership provides an implicit state guarantee this increase in the leverage ratio seems to be a rational reaction of the management of target companies.

8. Conclusion

We have assembled a comprehensive database of nationalization transactions in Russia and investigated the effects of nationalization on financial performance of target companies. We did not find such effects. This might be explained by the fact that state ownership might have opposing effects on performance. On the one hand, it might be less efficient deficiencies in corporate governance, inefficient hiring decisions etc. On the other hand, SOEs may benefit from better access to credit, in particular from state-owned banks, implicit state guarantees and direct subsidies. These factors should be analyzed, as far as the data permits, in further research.

In addition, it will be of great interest to highlight some of the mechanisms through which state ownership may affect the performance of companies, for example changes in the top management and the board of directors.

Many of the changes in ownership that we observe in our sample are accompanied by another important change: target companies are incorporated into business groups with vertical and horizontal links. So we measure the joint effect of changes in ownership and group association. This might be better controlled if we restrict our control firms to be targets of acquisitions by private firms, or, alternatively, to those SOEs that have changed their owners as a result of the consolidation of state property. It remains to see how the reduced quantity of matches and the better quality (in the sense that we compare to other targets firms of acquisitions) trade off against each other.

Appendix

Results for all nationalizations

Change in Performance indicator	Time	No of treated	No control	ATT	Std.error	t-stat
Log no. of	Average	64	42	0.036	0.151	0.240
employees	0	64	42	0.019	0.084	0.225
	1	64	41	-0.111	0.183	-0.606
	2	64	39	-0.02	0.121	-0.167
	3	64	27	-0.058	0.157	-0.373
Log operating	Average	64	57	-0.121	0.216	-0.561
revenue	0	64	58	-0.223	0.157	-1.421
	1	64	56	0.014	0.199	0.069
	2	64	52	0.061	0.283	0.215
	3	64	31	0.215	0.332	0.647
Log total	Average	64	57	-0.137	0.141	-0.968
assets	0	64	58	0.071	0.083	0.852
	1	64	56	0.046	0.12	0.382
	2	64	52	0.148	0.157	0.938

Change in Performance indicator	Time	No of treated	No control	ATT	Std.error	t-stat
	3	64	31	0.13	0.213	0.613
Operating	Average	64	47	-711.832	869.686	-0.818
efficiency	0	64	42	54.582	327.293	0.167
	1	64	41	-76.422	460.751	-0.166
	2	64	39	883.164	614.39	1.437
	3	64	27	1475.609	867.27	1.701
Return on	Average	64	57	-0.022	0.051	-0.429
Assets (ROA)	0	64	58	-0.01	0.041	-0.246
	1	64	56	0.029	0.049	0.594
	2	64	52	0.017	0.057	0.301
	3	64	31	0.063	0.08	0.780
Leverage	Average	64	57	-0.101	0.067	-1.509
	0	64	58	0.035	0.031	1.158
	1	64	56	0.058	0.038	1.522
	2	64	52	0.127	0.059	2.132
	3	64	31	0.01	0.066	0.145

Average refers to the difference between the average performance indicator in the three years after and before nationalization. At times 0,1,2 and 3, the difference in the performance indicator in the year of nationalization, the year after, etc. with respect to the year before nationalization are reported.

Results for transactions where the state share exceeds both the 25% and 50% thresholds

Change in Performance indicator	Time	No of treated	No control	ATT	Std.error	t-stat
Log no. of	Average	44	26	0.091	0.121	0.749
employees	0	44	38	-0.09	0.184	-0.49
	1	44	38	-0.067	0.143	-0.47
	2	44	27	-1328.234	1156.1	-1.149
	3	44	38	0.011	0.064	0.167
Log operating	Average	44	38	-0.149	0.095	-1.569
revenue	0	44	27	-0.005	0.067	-0.08
	1	44	26	-0.052	0.092	-0.566
	2	44	24	-0.105	0.155	-0.679
	3	44	20	-0.092	0.174	-0.531
Log total	Average	44	38	0.025	0.081	0.313
assets	0	44	37	0.07	0.149	0.47
	1	44	36	-0.009	0.221	-0.041
	2	44	25	0.295	0.217	1.361
	3	44	38	0.098	0.098	0.994
Operating	Average	44	37	0.053	0.125	0.424
efficiency	0	44	36	0.022	0.158	0.137
	1	44	25	0.12	0.213	0.564
	2	44	27	14.42	474.192	0.03
	3	44	26	43.19	696.683	0.062
Return on	Average	44	24	127.282	996.888	0.128
Assets (ROA)	0	44	20	1182.988	1058.94	1.117
	1	44	38	0.01	0.06	0.17

	2	44	37	-0.01	0.064	-0.163
	3	44	36	-0.018	0.074	-0.251
Leverage	Average	44	25	-0.005	0.08	-0.063
	0	44	38	0.035	0.039	0.895
	1	44	37	0.089	0.052	1.718
	2	44	36	0.139	0.082	1.696
	3	44	25	0.048	0.089	0.539

References

Asker, John, Joan Farre-Mensa, and Alexander Ljungqvist (2011), Comparing the Investment Behavior of Public and Private Firms, NBER Working Paper No. 17394.

Bai , Chong-En, Jiangyong Lu, and Zhigang Tao (2009), How Does Privatization Work in China?, *Journal of Comparative Economics*, 37(3), 453–470.

Boardman, Anthony E., and Aidan R. Vining (1989) Ownership and Performance in Competitive Environments: A Comparison of the Performance of Private, Mixed, and State-owned Enterprises, *Journal of Law and Economics*, 32(1), 1–33.

Brown and Earle (2006), The Productivity Effects of Privatization: Longitudinal Estimates from Hungary, Romania, Russia, and Ukraine, *Journal of Political Economy*, 114(1), 61–99.

Chari, Anusha, Wenjie Chen, and Kathryn M.E. Dominguez (2011), Foreign Ownership and Firm Performance: Emerging-Market Acquisitions in the United States, NBER Working Paper No. 14786, March 2009, Revised version October 2011.

Chen, Gongmen, Michael Firth, and Liping Xu (2009), Does the type of ownership control matter? Evidence from China's listed companies, *Journal of Banking & Finance*, 33(1), 171–181.

Chernykh, Lucy (2011), Profit or Politics? Understanding Renationalizations in Russia, Journal of Corporate Finance, 17(5), 1237-1253.

Dewenter, Kathryn L., and Paul H. Malatesta (2001), State-Owned and Privately Owned Firms: An Empirical Analysis of Profitability, Leverage, and Labor Intensity, *The American Economic Review*, 91(1), 320–334.

Djankov, Simeon and Peter Murrell (2002), Enterprise Restructuring in Transition: A Quantitative Survey, *Journal of Economic Literature*, 40(3), 739–92.

Estrin, Saul, Jan Hanousek, Evžen Kočenda, and Jan Svejnar (2009), The Effects of Privatization and Ownership in Transition Economies, *Journal of Economic Literature*, 47(3), 699–728.

Gong, Yundan, Holger Görg, and Sara Maioli (2007), Employment Effects of Privatisation and Foreign Acquisition of Chinese State-Owned Enterprises, *International Journal of the Economics of Business*, 14(2), 197-214.

Guriev, Sergei, Anton Kolotilin, and Konstantin Sonin (2011), Determinants of Expropriation in the Oil Sector: A Theory and Evidence from Panel Data, *Journal of Law, Economics, and Organization*, 27(2), 301-323.

IET Annual reports on the Russian economy

Kole, Stacey R., and J. Harold Mulherin (1997), The Government as a Shareholder: A Case from the United States, *Journal of Law and Economics*, 40(1), 1–22.

Li, Kai, and Nagpurnanand R. Prabhala (2007), Self-selection Models in Corporate Finance, Chapter 2 in: *Handbook of Corporate Finance*, Volume 1, edited by B. Espen Eckbo, 37-86.

Li, X. and X. Zhao (2006), Is there an SEO puzzle? *Journal of Empirical Finance* 13, 351–370.

Megginson, William L , Robert C. Nash, and Matthias Van Randenborgh (1994), The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis, *The Journal of Finance*, 49(2), 403-452.

Megginson, William L. and Jeffry M. Netter (2001), From State to Market: A Survey of Empirical Studies on Privatization, *Journal of Economic Literature*, 39(2), 321–389.

Neshchadin, A., O. Kuznetsov, and V. Kashin (2007), Rossiiskaya ekonomika: Tendentsii ogosudarstvleniya [The Russian Economy: Tendency towards Nationalization], *Obshchestvo i ekonomika*, no. 8, 3–27, in Russian.

Pappe, Yakov, and Ekaterina Drankina (2007), Kak natsionaliziruyut Rossiyu [How Russia Is Nationalized], Series of articles in *Kommersant Den'gi*, No. 35, 36, 37,38, 39, and 40.

Radygin, A. (2009), Rossiski rynok sliyanii i poglashenii: etapy, osobennosti, perspektivy [The Russian M&A Market: Stages, Peculiarities, Perspectives], *Voprosy Ekonomiki*, no. 10, 23–45, in Russian.

Sprenger, Carsten (2010), State Ownership in the Russian Economy: Its Magnitude, Structure and Governance Problems, *Journal of the Institute of the Institute of Public Enterprise*, 33(1-2), 63-110.

Tian and Estrin (2008), Retained state shareholding in Chinese PLSs: Does government ownership always reduce corporate value?, *Journal of Comparative Economics*, 36(1), 74–89.

Tompson, William (2007), Back to the future? Thoughts on the political economy of expanding state ownership in Russia, Working paper, downloaded from: http://eprints.bbk.ac.uk/509/