The Effect of State-Private Co-partnership System on Russian Industry

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Abstract

In Russia at the turn of the new millennium, the Putin regime introduced a system of state-private co-partnership with corporate private investors. We argue that this policy had the effect of reducing the likelihood that firm managers-investors would adopt suboptimal investment time horizons. The strategy also served to protect state subsidies to corporations and outside investment funds from expropriation. Using firm-level data that are published by the Russian Trading System stock exchange and the SKRIN database that spans 1998-2006, we test the success of this strategy during this formative era for the modern Russian corporation. We find that co-ownership played an important role in generating improved long-term performance, particularly in industries with high asset-specificity. We also show that the policy was most effective in industries in which firms tended to undertake large lump-sum investments.

Keywords: hold-up costs, Russian industry, state-private co-ownership

JEL codes: D23, G32, P36

1. Introduction

Early during its first tenure, the Putin regime in Russia rejected its predecessor's laissez-faire reforms, but also eschewed a return to the policies of Soviet-era style widespread re-nationalization of basic industry. Instead, the regime opted to implement a state-private-investor corporate co-ownership system.

We argue that the state co-partnership of corporations with private investors -- combined with subsidized state loans to firms in targeted industries -- was an important component of the regime's objective to develop selected industrial sectors beyond Russia's natural resource

base, from which the state subsidies were derived. The motivation for the change in economic direction may have been prompted by the catastrophic economic collapse that occurred during the 1990s under Yeltsin's laissez faire policies.

Firms that received injections of government funds invariably agreed to place state representatives on their executive boards (Anderson, 2008). We argue that such state representation on corporate executive boards worked primarily to assure appropriate applications of state funds to longer-term investments, particularly those requiring larger and lumpier outlays. In extreme cases, state monitoring may have also prevented inside investors from outright stripping of the assets of their firms.

In this paper, section 2 shows that Russian firms with large investment projects and high asset-specificities face potential predation from investor-managers due to a lack of legal protection. Under-investment traps occur when an investor is forced to forgo an otherwise profitable investment due to the existence of externalities, which prevent that investor from capturing the whole social gain from his or her investment. Such externalities arise due to a system of incomplete property rights stemming from the technological and institutional environment within which the investments are to take place. Also Russia, similar to other developing economies, may face another source of externality. Thompson and Hickson (2001) argue that an under-investment trap can arise when it is necessary to undertake a series of large complementary specific investments. Thus, part of the return on each individual investment depends on similar large specific investments. However, such a situation can also give rise to excessive bargaining over quasi-rents. Thus the rational investor may choose to forgo such an investment in the first place.

By definition, a firm-specific asset is one that is substantially less valuable when employed in its next best alternative. Consequently, rational investors, realizing that such an investment is vulnerable to a degree of expropriation proportional to the difference between

its *ex ante* and *ex post* value, is less likely to undertake any asset-specific investment in the first place (Williamson, 1979; Alchian and Woodward, 1988).

Section 3 provides data description and summary statistics for companies that traded on the RTS during between 1998 and 2006. Section 4 discusses empirical results, and Section 5 concludes.

2. Russian investment strategy: a response to the absence of well-defined property rights

2.1. Literature review

We limit this study to measuring any potential effects on Russia's long-term corporate performance, which can be attributed to state intervention through the co-partnership system (we address an important issue of potential endogeneity in Section 4). The above is consistent with the view of Nikonov (2005:80) that Russia's long-term goal is to encourage 'a climate of confidence between state and businesses'. Our hypothesis is also consistent with the work of Ehrlich and Lui (1999), who argue that autocratic regimes can achieve high economic growth, so long as long-term investors are assured against politically-inspired expropriation by elements of the state, including lower-level and regional bureaucrats.

Similarly, Doh et al. (2004) and Vaaler and Schrage (2009) find that for economies with weak legal and financial infrastructures, government intervention in corporate governance can enhance firm profitability. While there is always a real possibility that the central state can itself become predatory, such a strategy can only be profitable once and must be perverse over the longer term.

With regard to the performance of the Russian economy during the 1990s, many authors blame the dramatic disinvestment of the period on the absence of an effective property-protection legal system. This environment encouraged *in situ* managers (who later became better known as oligarchs), to strip the assets of the former Soviet state enterprises

(e.g., Feige, 1994; Mason and Sidorenko-Stephenson, 1997; Aslund 1999, Stiglitz, 2002). Similarly, a large literature that studies this period blames the egregious moral turpitude of corporate oligarchs for the ultimate failure of Yeltsin's laissez faire policy, and for the subsequent severe economic depression (e.g., Braguinsky and Yavlinsky, 2000; Shleifer and Treisman, 2005).

Nellis (1999) and Hoff and Stiglitz (2004) also point out that the regime failed to monitor effectively the newly established private banking system, through which former state enterprise assets were easily converted into liquid foreign assets. Furthermore, Rock and Solodkov (2001) find that a large proportion of state loans, which had been allocated to many state enterprises, ended up in the foreign accounts of numerous oligarchs.

It is beyond the scope of this paper to address satisfactorily the industrial goals of the Russian government. Nevertheless, it is of interest to recall that the co-partnership and subsidized state loan system has similar aspects to the industrializing drive that was launched under the Witte and Stolypin reforms of the late 19th and early 20th centuries. Such reforms were also in part designed to reduce the rent-seeking behaviour of a lower-level bureaucracy (Holzer and Illiash, 2009). The then tsarist state, under these reforms, also instituted partnerships with private investors. Significantly, over a short period and motivated in part by the desire to technologically catch-up with its western neighbours, Russia succeeded in establishing large iron, steel, textile, and coal-mining industries (Gerschenkron, 1962; Geyer, 1987).

2.2. The Putin regime's corporate strategy

Over our sample period, the Russian economy undertook many large fixed investment projects and developed an industrial mix that is typical for an emerging economy. If measured by industry sales, the dominant corporate sectors in our RTS-listed firms base are

natural resources, manufacturing, and utility (in this case, electricity) companies. Cooper (2009) finds that fixed capital investment in the major industrial sectors increased by more than 12 percent on average per year between 1999 and 2008, and projects characteristically had longer-term maturity and high degrees of asset specificity -- both of which suggest large sunk costs.

A western-style legal system is thought to be a necessary prerequisite in order to assure investors against potential hold-ups. Though the early Putin regime nominally adopted a western-style legal code (Lavelle, 2004), the Russian court system remains highly susceptible to frequent state interference, and as a consequence the judicial system has never evolved a professional ethic, which would allow it impartially to enforce legal statutes (Solomon, 2002; Frye, 2004).

Demsetz (1967) and Rogerson (1992) argue that private investors, when undertaking large and lumpy investments, are particularly prone to potential hold-up problems. Nevertheless, there is a high cost to Russia in terms of delayed higher economic growth due to the insubstantial capital formation. Consequently, we argue that the Russian state evolved a substitute mechanism for a property-right-protecting legal system: one that is capable of protecting both state and private investors from potential predatory behavior of firm managers and local and regional bureaucrats. It is within this context that we can begin to understand the rationale behind the regime's strategy for its state-corporate investor initiative.

Because ownership of Russian firms is heavily dominated by individuals who are closely associated with the state and the state itself owns a considerable stake in many of the country's leading corporations, the above system has been characterized by many authors as 'state corporatism' (e.g., Lane, 2000). However, in this paper, we concentrate on the issue of whether the state-private co-partnership mechanism generated long-run corporate growth. Specifically, we argue that co-partnership allows the state more effectively to monitor firms'

insiders, so as not only to safeguard state investment funds, but also to increase the assurance for outside investors against the large-scale asset-stripping that was so widespread during the 1990s.

But more subtly, the co-partnership system also serves to assure that investment funds are more optimally allocated to longer-term investment projects. Indeed, in the absence of effective state monitoring, the propensity of manager-investors to adopt suboptimal investment horizons may be aggravated with state investment subsidies.

Finally, in this section, we briefly consider the alternative hypothesis that the state's co-partnership policy may be simply designed to prevent firm bankruptcies. There are several reasons for discounting this possibility: First, during our study period there was strong corporate growth, which can only have acted to reduce an otherwise high incidence of firm bankruptcy. Furthermore, between 2000 and 2004 Russian corporate debt averaged only 1 percent of the country's GDP. This compares unfavourably with an average of 8.1 percent for Asian corporations and an average of 23.2 for US corporations over the same period.[1] Indeed, Yakovlev (2004) argues that in many cases Russian firms only issue bonds in order to improve their company image and generally did not experience liquidity problems. Even today Russia's domestic corporate bond market remains undeveloped, and companies are forced to borrow in international markets.

3. Data and methodology

3.1. Description of variables and methodology

Our main hypothesis is that the state-private co-partnership initiative had a positive effect on firms' long-term performances over our sample period and that this effect is more pronounced across industries with large investment outlays and highly specific assets.

[1] See Rubtsov (2012) and the IMF Global Financial Stability Report, 2005.

Consequently, we test the relationship between firm long-term performances by comparing a proxy for Tobin's Q with the co-partnership mechanism across a particular industry group.

In our equation, we also include a number of control variables: firm size, debt level, ownership concentration and age (longevity), as well dummy variables for different time periods and oil price effects in the energy sector. In equation (1) below, X1 is our key variable of interest and denotes co-partnership in a particular industry group, while X2 –X7 are control variables.

$$Y_{it}=\beta_0+\beta_1 X_{1it}+\beta_2 X_{2it}+\beta_3 X_{3it}+\beta_4 X_{4it}+\beta_5 X_{5it}+\beta_6 X_{6it}+\beta_7 X_{7it}+v_{it} \quad (1)$$

Our sample is a compilation of financial and ownership data on listed firms that traded on the Russian Trading System (RTS) stock exchange between 1998 and 2006. Ideally, it would have been preferable to record data from the start of the restructuring in 1992. Unfortunately, until 1998 financial records were often not kept.[2] Also, prior to 1998, ownership information was typically opaque. Fortunately, after the RTS stock exchange was established in 1995, the necessary information for our study became available.

At the end of 2006, 329 companies were listed on the RTS stock exchange, with fewer firms trading on the RTS during the earlier years. However, the number of firms included in our dataset is reduced to 253 due to missing observations.[3] Still, our final sample includes most of the listed firms in the energy, metallurgy and mining, manufacturing, communications, banking and other financial services, food and retail, transport, and utility sectors.

The dataset is based on hand-collected information that was compiled from the SKRIN and RTS records. The SKRIN database provides information on Russian public

[2] Financial information, even if existed, was not readily available to an outsider.

[3] Most of the 'missing' firms are banking subsidiaries of listed companies.

companies. It offers annual and quarterly reports, which provide key balance sheet data, ownership characteristics, and other firm-specific information, such as company age. The RTS records provide market capitalization figures.

We apply a widely accepted measure for Tobin's Q to proxy for firm long-term performance: the market value of outstanding stock and debt, divided by the replacement value of production capacity. Tobin's Q is generally thought of as a better measure of a firm's long-term performance than are short-term profitability measures. As it is difficult to compute Tobin's Q in its pure form, a commonly used approximation is the sum of the book value of debt and the market value of equity, divided by the book value of total assets (Fama and French, 2005; Aggarwal and Samwick, 2006).[4] We compute these observations from year-end market and accounting values.

We define a company as a state-private co-partnership when both the state and private investors have significant ownership stakes, in which case the co-partnership dummy variable takes on a value of 1, and 0 otherwise. We also take note of each firm's annual ownership status to account for the fact that many firms in the sample changed ownership category within the 1998-2006 time period.

Company reports disclose information on shareholders with ownership above 5 percent of firm capital; but Russian corporate ownership is highly concentrated, and the average stake held by major shareholders is approximately 50 percent. It is also the case that under co-partnership, neither the state nor any private shareholder typically owns less than 20 percent, and both usually own approximately 40 percent of capital. In general, RTS-listed

[4] We tested the relationship between the variables using an alternative proxy for Tobin's Q, which took the form of the market value of equity plus book value of long-term debt and the difference between current assets and current liabilities, divided by the book value of total assets (Chung and Pruitt, 1994). The results were broadly consistent with our previous findings, and we opted not to include them in our tables.

firms are defined as being wholly privatized or partially privatized corporations. Our sample does not contain wholly state-owned corporations, but if the only major shareholder for a firm is listed as the government, we treat the firm as being 'state-owned' rather than a co-partnership.

A firm has more susceptibility of facing the prospect of an underinvestment trap when the magnitude of its lump-sum investment outlays is greater and the degree of its asset-specificity is higher. With this in mind, we split our sample into three industry groups according to the asset-specificity of firms. Following Berger et al. (1996) and Stromberg (2001), we rank firm-specific assets in accordance with the ratio of the book value of fixed assets divided by the book value of total assets.

We favour using tangible 'physical' assets over intangible assets because in the Russian case 'hard' assets, such as plant and machinery, may provide better security for investors than do 'soft' assets, such as goodwill and R&D (Braun, 2003). Under incomplete contracting, the existence of physical assets can be critical to a stable contractual relationship as investors may be able to lay claim to such assets if the relationship breaks down (Hart, 1995; Hall and Jorgensen, 2008).

Based on the above perspective, we construct an industry specificity mean: a mean of 'physical' specific assets of all firms in a particular industry over the entire period. Unsurprisingly, energy and utility firms have the highest asset specificity, with industry means of 73 and 77 percent, respectively; manufacturing, metallurgy and mining, and transport industries follow with asset specificity means of 59, 60, and 63 percent, respectively. Telecommunications enterprises come next with an industry mean of 41 percent, followed by food and retail companies, which have a mean of 33 percent. Banking and services firms score the lowest asset specificity with a mean of just 19 percent.

To gauge the effect of the co-partnership system on each industry, according to the above criteria, we split our sample into three separate industry groups, and include an interaction term to measure the effect of co-partnership in each group. Correspondingly, we classify all firms in the energy and utility sectors as members of industry group 1. Similarly, firms in manufacturing, metallurgy and mining, and transport are classified as members of industry group 2. Finally, firms in banking and services, communications, and food and retail are classified as members of industry group 3.

In the regression, we include a number of control variables to capture other firm characteristics that may affect firm long-term performance. For example, we employ a widely used proxy for firm size in the form of the natural log of total assets. Following the work of Miwa and Ramseyer (2002) on Japanese industry, we also include the ratio of book long-term debt to total assets in order to pick up any effect on firm long-term performance that might be generated by subsidized long-term loans.

Following Evans (1987), we include a longevity dummy variable, which takes on the value of 1 if the firm existed for at least ten years prior to the privatization initiative, and 0 otherwise. We also incorporate an ownership concentration variable that takes the form of the percentage of capital that is owned by the largest shareholder (Joh, 2003). Finally, we include the natural log of oil prices in the energy sector, and we include time period variables.

To be able to distinguish changes that may have occurred at different stages, we split the time period into three sub-periods: Time period 1, which spans 1998-1999, includes the outgoing Yeltsin regime; time period 2, which spans 2000-2002, covers the early years of the Putin regime; and time period 3, which spans 2003-2006, coincides with the more mature Putin regime. Table 1 offers a description of the variables that are used in the regression analysis.

[Insert Table 1 here]

3.2. Descriptive statistics

Table 2 organizes RTS-listed firms into industrial sectors. The table indicates that the sample is skewed towards firms in natural resources and in the utility and manufacturing sectors. Table 3 lists the number and the percentage of co-partnerships in each sector, and we can see that the number of co-partnerships increased notably between 1998 and 2006 across industry groups 1 and 2.

[Insert Tables 2 and 3 here]

The low Tobin's Q results reported for the first two periods across industry group 1 in Table 4 are driven by the low Tobin's Q of utility firms (mean values are 0.208 and 0.167 for periods 1 and 2, respectively; while energy firms exhibit a much higher Tobin's Q of 0.747 and 0.851). Tobin's Q for industry group 2 is only slightly higher during the same period.

However, the mean value rose dramatically in period 3 for all industry groups, which can be partially attributed to Russia's improved economic conditions and political stability in the latter period. Moreover, industry group 1 and group 2 firms made significant investments during the earlier period, which were likely not matched by improved market capitalization figures due to weak investor confidence at that time (especially across industries such as utilities, which characteristically exhibit low growth prospects).

In this table, company size (measured by total assets) supports the above findings: We can see that industry group 1 firms undertake the largest investment projects, followed by industry group 2 companies (which had particularly significant investment outlays in the first period). Industry group 3 firms tend to have much less assets, which at first may seem surprising, as bank assets usually make up a large percentage of a country's GDP. However, this can be explained by the fact that Russia, like many other developing economies, has a

history of a relatively small percentage of total bank assets relative to its GDP (only 23 percent of GDP in the mid-1990s and 54 percent by the end of 2007).[5]

From Table 4 we see that firms in industry group 3, which is composed of many banking and finance firms, have the highest long-term debt ratios due to the large amount of long-term loans in their capital structure. However, companies in industry group 2 tend to be more leveraged than industry group 1 firms. This is unsurprising, since industry group 2 firms receive state loans due to the fact that they tend to undertake large investment projects. Also firms in industry group 1 tend to be net donors of funds.

Finally, ownership concentration, while generally initially high across all firms, increases over time and tends to be greater for firms with large investments projects. These facts agree with the findings of studies of other developing economies. Some authors argue that high ownership concentration offers better protection for outside investors when firms operate under weak investor-protecting legal systems (e.g., Claessens and Djankov, 1999; Xu and Wang, 1999; Joh, 2003).[6]

[Insert Table 4 here]

4. Empirical findings

Our panel data set is unbalanced, and the Hausman test indicates that we should use a random effects model. As the random effects model does not eliminate possible autocorrelation, we tested (Wooldridge, 2002) for first-order autocorrelation. The model was then adjusted to

[5] See Warner (1998) and the IMF Country Report, 2010.

The slight drop in magnitude of the size variable mean across industry group 3 firms can be attributed to new, smaller firms entering the market during the latter period.

[6] As a weak legal environment does not give smaller investors an opportunity to exercise their ownership control rights, investors tend to misappropriate resources even if their ownership concentration is small. Large shareholders, in the meantime, tend to be more invested in a firm's long-term growth.

allow the estimation of a linear model with AR(1) disturbance (Sanders and Hambrick, 2007; Cantarero and Lago-Penas, 2010).[7]

We use two separate approaches to gauge the effect of co-partnership on the three industrial groups: First, we run a pooled regression with a single co-partnership variable to evaluate whether it has an overall positive effect on corporate long-term performance (Tables 5 and 6). Second, we include separate industry group co-partnership variables to determine which industry group receives the most benefit from co-partnership (Table 7). (And, again, we later address the potential endogeneity of the co-partnership variable.)

Table 5 (column 1) reports the first set of our regression results. It indicates that our co-partnership variable has a positive effect on Tobin's Q for the entire corporate sector, with a coefficient value of 0.475 that is statistically significant at a 1 percent significance level. For robustness checks, we re-run our regressions using the log of Tobin's Q as our dependent variable (column 2). Next, as some firms in our sample may be close to bankruptcy, we re-run our regressions but exclude observations where the Tobin's Q value is lower than 0.1, and we exclude all financial intermediaries. The latter are excluded because such firms tend to display fundamentally different characteristics as compared with other companies (columns 3 and 4).

In column 2, we can see that a unit increase in the co-partnership variable causes a 34.4 percent increase (= $e^{0.296} - 1$) in the dependent variable (while the co-partnership variable remains positive and statistically significant). Similarly, a unit increase in the co-partnership variable leads to increases of 0.476 and 0.586 in Tobin's Q in columns 3 and 4,

[7] Although we primarily rely on a random effects model, we also re-ran our regression using a fixed effects model to provide an additional control check that favorable firm-specific characteristics were not a factor in state partial re-acquisition. As these latter results are consistent with those produced by the random effects model, we do not report them in our tables.

respectively. These results are consistent with our hypothesis that the co-partnership system has an overall positive effect on firm long-term performance.

From the table, we find that our long-term debt variable has a relatively large coefficient, implying that a unit increase in long-term debt leads to 0.135-1.443 increase in Tobin's Q, with a variable being insignificant in only one regression. This is consistent with the policy of using financial institutions to funnel subsidized loans in the form of direct funds, credit interest rates subsidies, or credit guarantees (Vedev, 2008). As expected, these state-subsidized long-term loan programs result in a positive effect on long-term performance.

The first set of regression results is inconclusive with regard to finding any overall effect of firm size on Tobin's Q. The coefficient appears to be only slightly positive and significant in half of our regressions. One rationalization for these findings is that, while larger fixed assets generate higher future cash flows, they also impose higher hold-up costs.

Across all the regression results, firm longevity has a large negative value. This strong finding may at first seem unsurprising as 'old' firms tend to exhaust growth opportunities (Evans, 1987; Variyam and Kraybill, 1992). On the other hand, many 'old' Russian enterprises were favoured through extensive state-subsidized investment funding over the sample period. So the negative parameter for the age-effect dummy variable may be because longer-lived firms were adversely affected by the earlier disastrous privatization experiment that cumulated in the crisis of August 1998.

We find that the ownership concentration variable is only slightly positive, but is significant overall. The results suggest that high ownership concentration may also somewhat discourage wealth tunnelling in Russia. This finding is consistent with various studies on firms in other developing economies with weak property rights (Xu and Wang, 1999; Joh, 2003).

We also consider company long-term performance within each of our three time periods: The first period generally shows a negative impact on Tobin's Q. The only exception is that the coefficient is recorded as positive when we use the log of Tobin's Q as our dependent variable. But overall this result is unsurprising as the first time period includes the final years of the outgoing Yeltsin regime and the August 1998 financial crisis.

Surprisingly, we also find a negative coefficient for the second period despite rising oil prices at the time. Perhaps this negative result is due to the overhang from the August 1998 crisis, combined with an uncertain political environment due to regime change. Nevertheless, we find a strong positive effect for the third time period, when we substitute time period 3 for time period 1 in our regression analysis. This period corresponds to a much improved economic growth during the more mature Putin regime.

Finally, we find that the oil price effect in the energy sector is insignificant. Although at first this result may appear to be a surprise, it is consistent with the fact that energy-sector funds under the new regime were siphoned to other industries, such as manufacturing (Rutland, 2006; Vdovichenko and Voronina, 2006).

Table 6 splits our sample period into three sub-periods in order to gain a better insight into the relationship between Tobin's Q and the variables of interest. We note that state co-partnership variable remains positive and statistically significant at 1-5 percent level across time period 2 and 3. The variable is insignificant in time period 1, which is unsurprising, given that the new co-partnership scheme was not then fully implemented.

Finally, we check if there is a prevailing co-partnership effect in a particular industry. We thus include an interaction term of a co-partnership dummy variable and an individual industry dummy variable in the regression (column 4). However, our findings show that our regression cannot actually pick up the co-partnership effect across individuals industries. This

leads us to infer that grouping industries according to the degree of asset specificity yields more perceptive results.

Table 7 incorporates two (out of three) industry group co-partnership variables, and shows that for industry group 1, the co-partnership variable's coefficient increases (as compared with the results in Table 5) to 1.137, 1.076, and 1.578 in columns 1, 3, and 4, respectively. We also note that now a unit increase in industry group 1 co-partnership variable leads to a 57.9 percent increase (= $e^{0.457} - 1$) in long-term performance (column 2).

In contrast, for industry group 2, the magnitude of the co-partnership variable falls (as compared with the results in Table 5) to 0.313, 0.311, and 0.374, respectively; and the variable is reported to be significant at 5 percent level. Similarly, a unit increase in industry group 2 co-partnership variable leads to a 31.7 percent increase (= $e^{0.275} - 1$) in Tobin's Q. This suggests that while industry group 2 firms may also possess relatively high 'physical' asset specificity and lumpy investments, asset substitution and hold-up costs for this industry are less severe, when compared to industry group 1 (the industry group 3 co-partnership variable is insignificant across all regression outputs, which indicates that our co-partnership variable has no effect on long-term performance, which is to be expected as firms in this group have the lowest industry specificity mean).[8]

[Insert Tables 5-7 here]

As mentioned before, the strength of our inference on the role of co-partnership on firm long-term performance is susceptible to challenge on causality grounds. For example,

[8] We also ran regressions where we tested the effect of co-partnership and other control variables on Tobin's Q separately for firms that are in each of our three industry groups. Our findings are consistent with those produced by the pooled industry sample, however; our Wald chi-squared values were significantly lower (industry group 1 and industry group 2 regressions barely passed the Wald-chi squared test, while industry 3 did not). Therefore, we concluded that pooled regressions may better explain the relationship between Tobin's Q and the variables of interest.

what if the state simply 'cherry-picked' better performing companies, perhaps to enrich venal central government officials? Though Chernykh (2011) finds little evidence to support this hypothesis, for an additional robustness check, we first employ a Two-Stage Least Squares (2SLS-IV) instrumental variable approach (Table 8), and then the Arellano-Bond model (Table 9).

Consistent with our theory, we employ the asset-specificity variable (book value of fixed assets divided by book value of total assets, as outlined in Section 3.1) as our instrument. While, due to the absence of well-defined property rights, the state is likely partially to acquire firms with highly specific 'physical' assets, it is unlikely that the co-partnership system will result in higher asset-specificity. We run a 2SLS procedure, which initially involves regressing the endogenous state co-partnership variable against our instrumental variable, and then substituting the obtained fitted values into the original regression.

From Table 8, we see that the overall state co-partnership variable's coefficient has increased dramatically (its values range between 1.393 and 2.175 in columns 1, 3, and 4, and 1.813 in column 2) and is statistically significant at the 1-5 percent level. The coefficient has also increased for industry group 1, although the most notable increase is captured for industry group 2 (coefficient values range from 1.089 and 1.437 in columns 5, 7, and 8, and 1.253 in column 6). Interestingly, we also note that the oil price effect variable's coefficient is now also significant, although relatively small in magnitude, while the industry group 2 variable displays a significant negative coefficient, together with a positive period 1 coefficient in over half of the regressions. Overall, the findings that are generated by our 2SLS-IV approach appear to strengthen our earlier results.

As a final robustness check, we run our regressions again using the Arellano-Bond model: This is an approach that includes a dynamic effect, which incorporates the addition of

a lagged dependent variable to the variables with explanatory power in the equation. This GMM model specifically addresses the issue of endogeneity of the regressors, and is therefore widely used in estimating the relationship between the variables (e.g., Rajan and Subramanian, 2008).

The regression results in Table 9 show that the overall co-partnership mechanism still has a positive and statistically significant effect on Tobin's Q. As before, co-partnership plays a dominant role in industry group 1, and its impact is generally diminished in industry group 2.

[Insert Tables 8 and 9 here]

5. Summary and conclusion

This paper argues that the significantly improved long-term performance in the Russian corporate sector, following the turn of the millennium, is in part attributable to the new regime's strategy of implementing a state-private co-partnership system. We argue that the co-partnership strategy substitutes for an investor-protecting legal system. Co-partnership works by monitoring against potential asset substitution by investor-insiders, including the propensity of such investors to opt for sub-optimal shorter-term private profit-maximization projects.

In addition, co-partnership also acts to reduce the high hold-up costs that are associated with the propensity of elements of the local bureaucracy towards rent-seeking. We argue that the new co-partnership system predominantly prevails in enterprises that are located in industries that are most vulnerable to both types of predatory behavior: in industries in which firms are more likely to undertake large-sum investment outlays and whose assets have a high degree of 'physical' asset specificity.

Our results show that co-partnership exerts a strong influence on Tobin's Q for firms in the energy and utility sectors, where corporations undertake large investments. We find that state co-partnership also has a significant effect on long-term performance in the manufacturing, metallurgy and mining, and transport sectors, while it has no significant effect in the banking, food and retail, and communications industries. By our measure, firms in these sectors are less prone to expropriation because they typically have less asset specificity and undertake smaller investments.

Our paper raises a number of issues for future study: First, with an extended data set to include more recent periods beyond the initial privatization period, there is the issue as to why the state prefers some industries and firms over others, or indeed why it chooses not to specialize simply in its comparative advantage in natural resources. Second, there is the question whether the co-partnership system is sustainable in the longer term. Finally, there is the important issue of identifying the industrial preferences of modern Russia and whether the present system generates allocational inefficiencies.

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Table 1. Definition of variables*

Variable	Description
Tobin's Q	$(V_t + LTD_t + STDt) / A_t$. Market value of equity plus book value of debt, divided by book value of total assets.
State co-partnership	Equals 1 if the firm adopted the new state-private co-partnership system; 0 otherwise.
State co-partnership industry group 1[9]	Industry group 1 (dummy variable with a value of 1 if firm belongs to industry group 1, 0 otherwise) x State-private co-partnership.
State co-partnership industry group2[10]	Industry group 2 (dummy variable with a value of 1 if firm belongs to industry group 2, 0 otherwise) x State-private co-partnership.
State co-partnership industry group 3[11]	Industry group 3 (dummy variable with a value of 1 if firm belongs to industry group 3, 0 otherwise) x State-private co-partnership.
Long-term debt	LTD_t / A_t. The ratio of book value of long-term debt to total assets.
Size	A_t. The value of total assets.
Longevity	Equals 1 if the firm had existed during the Soviet era; 0 otherwise.
Ownership concentration	Fraction of capital owned by the largest shareholder, expressed in %.
Oil price effect	The natural log of oil price x energy sector.
Time period 1	Year 1998-1999.
Time period 2	Year 2000-2002.
Time period 3	Year 2003-2006.

*All financial variables are measured in thousands of Russian roubles and are adjusted for inflation using year 1998 as a base year.

[9] Industry group 1 represents utility and energy sector firms (highest hold-up costs)
[10] Industry group 2 represents metallurgy and mining, transport, and manufacturing firms (lower hold-up costs)
[11] Industry group 3 represents communications, banking and services, and food and retail firms (lowest hold-up costs)

Table 2. Number of firms that belonged to eight industrial sectors registered on RTS during 1998-2006

Industry	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*
Manufacturing	34	40	41	41	42	43	43	46	45
Utility	54	58	58	58	58	58	63	101	106
Metallurgy and Mining	15	20	19	19	19	22	23	24	24
Energy	18	19	19	19	19	19	19	19	19
Transport	7	7	7	7	7	7	7	7	7
Communications	12	14	15	15	15	15	15	15	15
Banking and Services	5	8	9	14	16	17	21	23	23
Food and Retail	5	6	7	9	10	13	13	14	14
Total	150	172	175	182	186	194	204	249	253

Table 3. Presence of state-private co-partnership systems across three major industrial groups during 1998-2006

Industry group co-partnerships	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*
Industry group 1	1 (2%)	2 (3%)	4 (5%)	2 (3%)	5 (6%)	10 (13%)	12 (15%)	11 (14%)	11 (10%)
Industry group 2	2 (5%)	6 (8%)	5 (7%)	9 (13%)	9 (13%)	11 (14%)	10 (14%)	11 (14%)	17 (22%)
Industry group 3	2 (11%)	2 (8%)	3 (10%)	3 (9%)	3 (8%)	4 (11%)	4 (10%)	4 (8%)	5 (10%)

Table 4. Summary statistics for industry groups 1, 2, and 3 between 1998 and 2006

Variable	Obs IG1	Mean IG1	Std. dev. IG1	Min IG1	Max IG1	Obs IG2	Mean IG2	Std. dev. IG2	Min IG2	Max IG2	Obs IG3	Mean IG3	Std. dev. IG3	Min IG3	Max IG3
								Time period 1							
TQ	86	0.350	0.577	0.003	3.644	57	0.219	0.170	0.008	0.783	22	0.807	0.457	0.196	1.834
Size	133	3.28e+07	1.37e+08	5.64e+04	1.30e+09	99	8.62e+06	1.73e+07	6.82e+04	1.01e+08	39	1.18e+07	4.46e+07	1.23e+05	2.76e+08
Long-term debt	132	0.027	0.083	0.000	0.514	99	0.029	0.064	0.000	0.397	39	0.065	0.123	0.000	0.598
Ownership concentration (%)	135	48.433	11.409	19.000	86.390	95	30.290	17.063	7.000	99.000	40	42.512	21.884	10.100	99.000
								Time period 2							
TQ	191	0.336	0.541	0.001	4.273	134	0.441	0.528	0.030	4.303	56	0.823	0.579	0.094	2.472
Size	232	6.25e+07	2.38e+08	6.10e+05	2.16e+09	194	1.27e+07	3.28e+07	9.90e+04	3.06e+08	97	2.57e+07	8.12e+07	1.69e+05	6.67e+08
Long-term debt	232	0.031	0.063	0.000	0.414	194	0.062	0.146	0.000	0.812	97	0.087	0.115	0.000	0.564
Ownership concentration (%)	229	49.623	11.729	8.100	92.590	194	36.682	18.469	6.000	99.000	92	42.563	18.502	8.000	99.000
								Time period 3							
TQ	343	1.016	1.115	0.035	7.593	251	1.117	0.910	0.018	5.604	127	1.709	1.910	0.078	17.931
Size	408	8.77e+07	3.82e+08	2.86e+03	4.44e+09	295	2.54e+07	6.46e+07	1.51e+04	5.15e+08	186	2.22e+07	3.48e+07	1.65e+04	2.28e+08
Long-term debt	408	0.036	0.075	0.000	0.588	295	0.108	0.146	0.000	0.675	186	0.139	0.164	0.000	0.984
Ownership concentration (%)	387	52.947	14.209	15.720	99.000	280	55.834	23.008	11.280	99.000	175	46.536	21.539	8.750	99.000

Note: During our sample period we identified one industry group 1 firm, and two industry group 2 firms, and two industry group 3 firms, which each had a single shareholder that owned 99 percent of capital. These shareholders mostly represented closed joint- stock investment companies. We also noted that such high ownership concentration levels generally prevailed for no more than two years, which perhaps suggests that these firms were in the intermediate stage of their ownership structure transformation.

Table 5. The effect of the state-private co-partnership system on firm Tobin's Q

Variable	TQ (1)	TQ log (2)	TQ >0.1 (3)	TQ excl. fin. instit. (4)
State co-partnership	0.475***	0.296***	0.476***	0.586***
	(0.114)	(0.104)	(0.123)	(0.132)
Long-term debt	1.443***	0.166	0.135***	1.297***
	(0.261)	(0.234)	(0.277)	(0.353)
Lnsize	0.040	0.112***	0.030	0.063**
	(0.029)	(0.028)	(0.030)	(0.031)
Firm longevity	-1.027***	-1.057***	-1.014***	-1.128***
	(0.134)	(0.140)	(0.134)	(0.133)
Ownership concentration	0.007***	0.008***	0.007***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
Time period 1	-0.301***	0.569***	-0.250***	-0.239***
	(0.073)	(0.066)	(0.096)	(0.081)
Time period 2	-0.356***	-0.149**	-0.388***	-0.365***
	(0.071)	(0.065)	(0.081)	(0.079)
Oil price effect	0.005	0.005	0.005	0.008
	(0.004)	(0.004)	(0.004)	(0.004)
Constant	0.733	-0.486	0.939**	0.376
	(0.459)	(0.432)	(0.479)	(0.492)
No. of obs	1235	1154	1095	1015
R-squared	0.196	0.159	0.171	0.212
Wald-chi squared	229.39***	167.46***	179.72***	197.47***

*, ** and *** denote significance at the 10, 5, and 1 percent level, respectively

Table 6. The effect of the state-private co-partnership system on firm Tobin's Q during three separate time periods and individual industry effect

Variable	TQ Period 1 (1)	TQ Period 2 (2)	TQ Period 3 (3)	TQ Industry (4)
State co-partnership	0.283 (0.404)	0.234**	0.456***	
		(0.099)	(0.152)	
Long-term debt	2.045***	1.799***	1.381***	1.098***
	(0.220)	(0.214)	(0.352)	(0.259)
Lnsize	-0.043*	0.005	0.073**	-0.003
	(0.022)	(0.022)	(0.036)	(0.030)
Firm longevity	-0.362**	-0.489***	-0.991***	-0.845***
	(0.161)	(0.136)	(0.159)	(0.145)
Ownership concentration	0.003	0.003**	0.007***	0.004**
	(0.002)	(0.001)	(0.002)	(0.002)
Time period 1				-0.591***
				(0.078)
Time period 2				-0.528***
				(0.054)
Oil price effect	-0.037	0.439	0.164	-0.019
	(0.044)	(0.399)	(0.204)	(0.068)
Co-partnership energy				0.395
				(0.354)
Co-partnership utility				0.309
				(0.330)
Co-partnership metal and mining				0.445
				(0.334)
Co-partnership manufacturing				0.066
				(0.166)
Co-partnership transport				0.198
				(0.369)
Co-partnership food and retail				-0.313
				(0.631)
Co-partnership banking and services				-0.013
				(0.236)
Industry dummy	Yes	Yes	Yes	Yes
Constant	1.330***	0.789**	0.057	1.602***
	(0.357)	(0.382)	(0.636)	(0.526)
No. of obs	160	375	700	1235
R-squared	0.429	0.300	0.171	0.263
Wald-chi squared	168.72***	181.34***	114.15***	327.23***

*, ** and *** denote significance at the 10, 5, and 1 percent level, respectively

Note: Industry dummy variables collectively pass the Wald-chi squared test (regression results report a value of 35.89, significant at 1 percent level).

Table 7. The effect of the state-private co-partnership system on firm Tobin's Q across industry groups

Variable	TQ (1)	TQ log (2)	TQ >0.1 (3)	TQ excl. fin. instit. (4)
State co-partnership industry group 1	1.137***	0.457**	1.076***	1.578***
	(0.212)	(0.204)	(0.225)	(0.263)
State co-partnership industry group 2	0.313**	0.275**	0.311**	0.374**
	(0.146)	(0.108)	(0.158)	(0.160)
Industry group 1	-0.410**	-0.249	-0.359**	-0.417**
	(0.165)	(0.169)	(0.164)	(0.170)
Industry group 2	-0.135	-0.014	-0.112	-0.185
	(0.175)	(0.180)	(0.175)	(0.187)
Long-term debt	1.463***	0.004	1.319***	1.210***
	(0.266)	(0.237)	(0.283)	(0.362)
Lnsize	0.056*	0.100***	0.041	0.076**
	(0.029)	(0.028)	(0.030)	(0.031)
Firm longevity	-1.064***	-0.994***	-1.039***	-1.132***
	(0.143)	(0.151)	(0.143)	(0.143)
Ownership concentration	0.010***	0.007***	0.009***	0.010***
	(0.002)	(0.002)	(0.002)	(0.002)
Time period 1	-0.530***	0.448***	-0.467***	-0.486***
	(0.077)	(0.070)	(0.099)	(0.085)
Time period 2	-0.496***	-0.249**	-0.497***	-0.518***
	(0.054)	(0.051)	(0.062)	(0.061)
Oil price effect	0.068	0.006	0.004	0.042
	(0.050)	(0.048)	(0.004)	(0.055)
Constant	0.550	-0.013	0.820*	0.269
	(0.470)	(0.465)	(0.487)	(0.508)
No. of obs	1235	1154	1095	1015
R-squared	0.194	0.184	0.204	0.264
Wald-chi squared	208.35***	188.04***	239.20***	278.05***

*, ** and *** denote significance at the 10, 5, and 1 percent level, respectively

Table 8. The effect of the state-private co-partnership system on firm Tobin's Q (IV-2SLS)

Variable	**TQ1 (1)**	**TQ log (2)**	**TQ>0.1 (3)**	**TQ excl. fin. instit. (4)**	**TQ1 (5)**	**TQ log (6)**	**TQ >0.1 (7)**	**TQ excl. fin. instit. (8)**
State co-partnership	2.143**	1.813***	2.175**	1.393***				
	(0.867)	(0.656)	(1.002)	(0.522)				
State co-partnership industry group 1					2.164***	1.814***	2.114**	1.361***
					(0.805)	(0.626)	(0.937)	(0.502)
State co-partnership industry group 2					1.437***	1.253***	1.321**	1.089***
					(0.504)	(0.418)	(0.548)	(0.401)
Industry group 1	-0.290*	-0.393**	-0.219	-0.277	-0.432***	-0.302***	-0.394***	-0.502***
	(0.153)	(0.171)	(0.171)	(0.195)	(0.093)	(0.086)	(0.103)	(0.099)
Industry group 2	-0.228***	-0.019	-0.206*	-0.387***	-0.190**	-0.047	-0.166*	-0.284***
	(0.098)	(0.110)	(0.107)	(0.135)	(0.089)	(0.085)	(0.095)	(0.097)
Long-term debt	1.129***	0.540**	1.045***	0.818**	1.081***	0.564**	0.981***	0.450
	(0.270)	(0.221)	(0.292)	(0.394)	(0.270)	(0.237)	(0.285)	(0.323)
Lnsize	0.062***	0.059***	0.054**	0.126***	0.070***	0.075***	0.060***	0.087***
	(0.022)	(0.019)	(0.023)	(0.031)	(0.021)	(0.020)	(0.022)	(0.023)
Firm longevity	-0.981***	-0.904***	-1.023***	-1.330***	-0.855***	-0.949***	-0.875***	-0.810***
	(0.134)	(0.114)	(0.147)	(0.150)	(0.136)	(0.122)	(0.149)	(0.119)
Ownership concentration	0.001	0.003*	0.001	0.001	-0.0003	0.001	0.0003	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Period 1	0.257	0.672***	0.393*	0.410*	0.310*	0.720***	0.278**	0.192
	(0.198)	(0.191)	(0.208)	(0.233)	(0.144)	(0.153)	(0.138)	(0.128)
Period 2	-0.002	-0.149	0.058	0.044	-0.052	-0.062	-0.013	-0.095
	(0.141)	(0.142)	(0.142)	(0.158)	(0.087)	(0.092)	(0.093)	(0.092)
Oil price effect	0.023***	0.017***	0.022***	0.024*	0.024***	0.012***	0.022***	0.025***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	-0.420	-0.439	-0.297	-0.986**	-0.387	-0.476	-0.509	-1.157***
	(0.380)	(0.311)	(0.394)	(0.562)	(0.338)	(0.335)	(0.387)	(0.396)
No. of obs	1235	1154	1095	1015	1235	1154	1095	1015
R-squared	0.204	0.149	0.084	0.118	0.265	0.091	0.090	0.246
Wald-chi squared	431.19***	243.37***	214.21***	349.67***	467.45***	377.48***	231.89***	407.32***

*, ** and *** denote significance at the 10, 5, and 1 percent level, respectively

Note: We determine that the F-statistic produced by first stage regressions always exceeds the critical value of 10 when there is one endogenous regressor, which suggests that our instrument is not weak (Stock et al., 2002)

Table 9. The effect of the state-private co-partnership system on firm Tobin's Q (Arellano-Bond)

Variable	**TQ1 (1)**	**TQ log (2)**	**TQ>0.1 (3)**	**TQ excl. fin. instit. (4)**	**TQ1 (5)**	**TQ log (6)**	**TQ >0.1 (7)**	**TQ excl. fin. instit. (8)**
TQ L1	0.572***	0.031	0.621***	1.334***	0.565***	0.040	0.625***	1.320***
	(0.092)	(0.042)	(0.108)	(0.124)	(0.092)	(0.042)	(0.108)	(0.122)
State co-partnership	0.486***	0.146	0.497***	0.686***				
	(0.142)	(0.108)	(0.161)	(0.237)				
State co-partnership industry group 1					0.995***	0.217	0.978***	1.915***
					(0.288)	(0.212)	(0.320)	(0.451)
State co-partnership industry group 2					0.298*	0.195	0.336*	0.345**
					(0.181)	(0.136)	(0.200)	(0.158)
Long-term debt	2.343***	-0.796***	2.063***	0.589	2.369***	-0.817***	2.057***	0.661
	(0.295)	(0.230)	(0.431)	(0.602)	(0.295)	(0.232)	(0.431)	(0.599)
Lnsize	-0.254***	0.335***	-0.332***	-0.238***	-0.256***	0.314***	-0.316***	-0.220***
	(0.062)	(0.047)	(0.080)	(0.086)	(0.063)	(0.048)	(0.080)	(0.085)
Ownership concentration	0.005*	0.004*	0.004	0.001	0.006**	0.004**	0.005	0.002
	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)	(0.002)	(0.007)	(0.004)
Period 1	-0.344***	-0.035	-0.507***	-0.411***	-0.329***	0.001	-0.509***	-0.401***
	(0.101)	(0.097)	(0.169)	(0.139)	(0.104)	(0.098)	(0.169)	(0.138)
Period 2	-0.061	-0.083*	-0.103	-0.113	-0.046	-0.068	-0.099	-0.104
	(0.060)	(0.049)	(0.077)	(0.083)	(0.069)	(0.054)	(0.077)	(0.082)
Oil price effect	0.011	0.007	0.008	-0.005	0.009	0.007	0.005	-0.008
	(0.007)	(0.005)	(0.007)	(0.011)	(0.007)	(0.005)	(0.007)	(0.011)
Constant	4.068***	-4.851***	5.391***	3.670***	4.058***	-4.553***	5.112***	3.356**
	(0.943)	(0.729)	(1.234)	(1.324)	(0.967)	(0.754)	(1.231)	(1.313)
No. of obs	767	675	606	550	767	675	606	550
Wald-chi squared	141.00***	92.36***	87.85***	148.66***	141.80***	92.83***	89.66***	160.95***

*, ** and *** denote significance at the 10, 5, and 1 percent level, respectively

Note: The firm longevity variable and Industry group 1 and Industry group 2 variables are dropped from the regression output as fixed effects are omitted from Arellano-Bond estimation.