STATE-BUSINESS RELATIONS AND PARTICIPATION OF FIRMS IN PUBLIC PROCUREMENT IN RUSSIA: AN EMPIRICAL STUDY

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ABSTRACT. In this paper, we regard public procurement as an instrument used by the government for indirect support of enterprises. In this context, we have investigated the place that public procurement occupy in state-business interrelations. Using data from a large survey of Russian manufacturing enterprises conducted in 2009 we show that in Russia public procurement cannot be regarded as a component in the system of exchanges, and the extent of combination between direct and indirect support depends on the level of government. At the federal level direct and indirect instruments of government support complement each other. At the regional and local levels the effect of mutual complementation can be observed only in relations with firms, which conceal information about their ownership structure and are supposedly affiliated with regional and local bureaucrats. In relations with other firms at regional and local levels direct and indirect support substitutes each other.

INTRODUCTION

The global economic crisis of 2008-2009 gave rise to a great expansion of state interference in the economy. This tendency was observed not only in Russia (Simachev et al, 2009) but also in most countries throughout the world (Bertelsmann Stiftung, 2010; World

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Bank, 2010). Experts from international organisations note that state interference in the economy is highly likely to continue in the near future (World Bank, 2011). In a sense, it is possible to speak about "return of the state" to the economy after about 30 years of liberalisation and deregulation of global markets. In this context, empirical analysis of relations between state and business assumes great importance both to economic theory and economic policies.

This line of research has a long history. Its foundation was formed by a well-known study of "state capture" effects (Stigler, 1971) and the papers on patterns of behaviour and the relative inefficiency of "politically influential" firms (Faccio, 2006; Bertrand, Kramarz, Schoar, & Thesmar, 2006). However, in recent years, a prominent economist from Harvard University, Dani Rodrik, in his papers on a "new industrial policy" has upheld a thesis that in emerging economies, the state and business should interact to guarantee steady economic development (Rodrik, 2004, 2008).

With regard to Russia, many researchers following the 1971 model of George J. Stigler and using empirical data from the mid-1990s have found confirmation of the "state capture" hypothesis by firms, especially those at the regional level (Hellman, Jones & Kaufman, 2000; Slinko, Zhuravskaya & Yakovlev, 2004). These authors have asserted that government support was given mainly to large, old, privatised enterprises that were inefficient but had "special relations with authorities". However, other more recent papers (Frye, 2002; Frye, Yakovlev & Yasin, 2009) have used newer empirical data to suggest and prove another hypothesis – one about the existence of "a system of exchanges" between enterprises and government. In particular, these papers have demonstrated that the firms that received government support faced additional costs and liabilities at the same time. The results that were obtained by Yakovlev (2011) indicated that, on the eve of the crisis of 2008-2009, priorities of provision of support by federal, regional and municipal authorities showed quite visible disparities. In particular, the established "system of exchanges" between the state and business at the federal level was much more conservative: It was focused on old enterprises, companies with government stakes and firms that preserved jobs. On the contrary, government support given in 2007-2008 at the regional and municipal levels was more oriented towards modernisation, and

investment activity of enterprises and presence of foreign investors were used as criteria for its provision.

These shifts can be examined in the conceptual framework of "second best institutions" elaborated in Rodrik (2008). They can also be interpreted in Russian conditions as the manifestation of a model of "fiscal federalism and political centralisation," which was used for explanation of successful economic reforms in China (Montinola, Qian, & Weingast, 1995; Qian, 1999; Blanchard & Shleifer, 2001).

In the above-listed papers, interaction between the state and business, is discussed in terms of direct government support in the form of a variety of subsidies or tax benefits. However, analysis of programmes for crisis management, which were implemented by a number of governments during the crisis of 2008-2009 (Bertelsmann Stiftung, 2010), shows that public procurements were an important tool for influencing enterprise behaviour. In particular, in China, the government funded large-scale infrastructure projects that were enacted to stimulate demand, and in Russia, an attempt was made to use public procurements for support of small and midsized enterprises (introducing quotas for small and midsized enterprises – the SMEs in the total volume of government orders). It should be emphasised that use of public procurement as an instrument of crisis management in developed countries is a continuation of a tendency from previous years. For instance, consideration of ecological orientation of suppliers was quite typical of many European countries This was reflected in the "green procurement" policy (for example, see publications of a series of international public procurement conferences at http://www.ippa.ws/).

Problems related to government activities in provision for public needs using the market for public procurement were discussed in a special policy paper of Higher School of Economics (2010). However, the authors discuss mostly the normative legal regulation of public procurements on the basis of either macroeconomic indicators or certain cases from the practice of government customers.

The number of empirical studies of public procurement and their influence on enterprise behaviour in Russia that rely on micro-level data is limited. Yakovlev and Demidova (2010) showed by using the data from large enterprise surveys of 2005 and 2009 that government orders were more often given to large and old enterprises and also to firms with government stakes. In this period,

factors indicating the presence of modernisation (large-scale investment, exports, International Standards Organization (ISO) certification), which could give evidence of the high efficiency of the firms in question, never affected the choice of suppliers for government needs.

However, this study did not examine public procurements in interaction with other tools of government support. Taking into account the fact that public procurements are widely used in many countries as an instrument of crisis management, and regarding these procurements as tools for indirect support of enterprises, we try to answer the following questions:

- What position do public procurements hold in the system of relations between business and the state?

- Can public procurements be considered to be a component in the system of exchanges between enterprises and authorities?

- To what extent are public procurements, as tools for stimulation of demand, combined with mechanisms of direct financial or organisational support of enterprises?

The remainder of our paper is arranged as follows. "Empirical data" describes the main parameters of the sample. The next section presents descriptive statistics, which give an observation of the scale and types of interaction between enterprises and government branches, as well as of differences between the firms that took part in supplying government needs in 2008 and those that did not take part. Along with previous studies, these descriptive statistics serve as the basis for hypotheses development in the section "Hypothesis and Empirical Strategy." In this section we also substantiate research strategy. "Logic and Results of the Empirical Analysis" describes the main results of our regression analysis. The last section concludes.

EMPIRICAL DATA

We based our analysis on the results of a survey of 957 top managers of manufacturing enterprises that was conducted in 2009 by the Institute for Industrial and Market Studies at the HSE and the Levada Centre. Among our respondents, 67.5% were CEOs; CFOs or deputy CEOs in charge of the economy made up 31%. The surveyed

enterprises were located in 48 regions and represented eight sub-industries.[1] The surveyed enterprises employed about 8% of the total payroll in manufacturing, producing about 6% of manufacturing output in 2007.

The average number of employees in the surveyed firms was 587 (the minimum number was 4, and the maximum, 11536). Enterprises with fewer than 250 employees made up 45% of the sample; when 251-500 employees, 24% of the sample; with 501-1000 employees, 17% of the sample; and the share of firms with more than 1000 reached 14% of our sample. Among the surveyed enterprises, 75% were founded before 1992 (which means that decisions about their location, scale and specialisation were made according to criteria of the planned economy). Only 25% of all enterprises could be considered new, including the 15% of all that were founded during the unstable period of 1992-1998.

Six % of the survey enterprises were located in Moscow; regional capitals held 45%; provincial cities had 41%; and 8% were located in townships. In addition to the data on administrative status of the settlements where the respondent firms were located, we also used regional ratings of investment potential according to the Expert-RA Rating Agency in 2008. Of all enterprises, 41 % were located in regions with lower than average investment potential, and 30% were located in regions with above average potential. Firms listing the state as one of their owners constituted 9%; those having foreign shareholders amounted to 8%, and 17% gave no answer about their ownership structure. Affiliated with business groups were 28% of the enterprises, and 40% were members of business associations.

The questionnaire included questions about participation of enterprises in supplying government needs and a number of questions concerned the nature of relations of the respondent firms with government agencies. In particular, top managers of the enterprises had to answer whether they had provided assistance to local and regional authorities for social development of their regions and whether their enterprises had received financial or organisational support from federal, regional and local authorities. Forty-one per cent of the enterprises participated in the system of public procurements, assistance to authorities was given by 71%, but the assistance of 21% of them was substantial (over 0.1% of their sales revenue). Thirteen per cent received some kind of support from

federal agencies; 26%, from regional agencies and 20%, from local authorities.

DESCRIPTIVE STATISTICS OF ENTERPRISES BEHAVIOUR AND THEIR PARTICIPATION IN PUBLIC PROCUREMENT

Data from Table 1 shows the differences between the firms that took part and those that did not take part in supplying government needs in 2008. Columns 3 and 4 in this table describe the general distribution of firms in the sample according to the relevant indicator. Column 5 shows the share of these firms in the total number of firms included in the relevant category. A comparison of this indicator with the average share of the firms that took part in supplying government needs in the sample (41%) allows us to point out that such differences do exist, and the data from Column 7 show that these differences are statistically significant (according to a chi-square test for independence).

TABLE 1
Basic Characteristic of Enterprises and Their Participation in Public Procurements

Characteristic of enterprises	Attributes	Quan-tity	Percen-tage – 1 [a]	Participation in public procurements		p-v [c]
				Quan-tity	Percen-tage – 2 [b]	
Two-digit code of All-Russian Industry Classification Standard	Food	235	24.6%	94	40.0%	
	Textiles and sewing	89	9.3%	35	39.3%	
	Timber and woodworking products	81	8.5%	13	16.1%	0.000***
	Chemical production	88	9.2%	34	38.6%	
	Metallurgy and metal working	98	10.2%	36	36.7%	
	Electrical, electronic and optical equipment	117	12.2%	73	62.4%	
	Transport vehicles and equipment	86	9.0%	49	57.0%	
	General industrial machinery and equipment	163	17.0%	57	35.0%	
	Total	957	100%	391	40.9%	

TABLE 1 (Continued)

Characteristic of enterprises	Attributes	Quan-tity	Percen-tage – 1 a)	Participation in public procurements		p-v c)
				Quan-tity	Percen-tage – 2 b)	
Average number of workers on payroll	Average value	587		692		0.0001*** d)
	Standard deviation	945		1028		
	Min	3		12		
	Max	11536		8400		
Time of foundation	Before 1992	720	75.2%	316	43.9%	0.003***
	1992-1998	145	15.2%	48	33.1%	
	After 1998	92	9.6%	27	29.4%	
	Total	957	100%	391	40.9%	
Government stake in ownership	Present	708	74.0%	276	39.0%	0.000***
	Absent	88	9.2%	56	63.6%	
	No answer	161	16.8%	59	36.7%	
	Total	957	100%	391	40.9%	
Foreign stake in ownership	Present	718	75.0%	302	42.1%	0.407
	Absent	78	8.2%	30	38.5%	
	No answer	161	16.8%	59	36.7%	
	Total	957	100%	391	40.9%	
Investment potential of the region	Low	396	41.4%	140	35.4%	0.000***
	High	274	28.6%	99	36.1%	
	Average	287	30.0%	152	53.0%	
	Total	957	100%	391	40.9%	
Independent enterprise or part of a holding company group	Independent	687	71.9%	295	42.9%	0.102
	Subsidiary of a holding company group	237	24.8%	83	35.0%	
	Head holding company	32	3.4%	13	40.6%	
	Total	956	100%	391	40.9%	
Membership in business associations	No	573	59.9%	216	37.7%	0.015**
	Yes	384	40.1%	175	45.6%	
	Total	957	100%	391	40.9%	
Administrative status of a settlement	Moscow	60	6.3%	31	51.7%	0.193
	Capital of republic / territory, region	433	45.3%	182	42.0%	
	Provincial town	390	40.8%	152	39.0%	
	Township	74	7.7%	26	35.1%	
	Total	957	100%	391	40.9%	

TABLE 1 (Continued)

Characteristic of enterprises	Attributes	Quan-tity	Percen-tage – 1 [a]	Participation in public procurements		p-v [c]
				Quan-tity	Percen-tage – 2 [b]	
Assistance to regional and/or local authorities	No assistance	219	22.9%	87	39.7%	
	Assistance amounting to 0.1% of sales revenue, or non-estimable cost	541	56.5%	224	41.4%	0.910
	Assistance above 0.1% of sales revenue	197	20.6%	80	40.6%	
	Total	957	100%	391	40.9%	
Enterprise received aid from the state	No	603	63.1%	227	37.7%	
	Yes	353	36.9%	163	46.2%	
	Total	956	100%	390	40.8%	0.010**
Received aid from federal authorities	No	828	86.6%	317	38.3%	
	Yes	128	13.4%	73	57.0%	
	Total	956	100%	390	40.8%	0.001***
Received aid from regional authorities	No	709	74.2%	278	39.2%	
	Yes	247	25.8%	112	45.3%	
	Total	956	100%	390	40.8%	0.091*
Received aid from local authorities	No	767	80.3%	302	39.4%	
	Yes	188	19.7%	88	46.8%	0.063*
	Total	955	100%	390	40.8%	

Notes: * differences are significant at the 10%-level; ** at the 5%-level; *** at the 1%-level.
a) Percentage-1 in column 4 was calculated as ratio of absolute values in column 3 to their sum in the same column.
b) Percentage-3 in column 6 was calculated as ratio of absolute values in column 5 to their sum in the same column
c) At the test of the hypothesis about independence of the corresponding attribute of an enterprise and its participation in public procurements.
d) Kruskal-Wallis rank test.

As seen from the above data, participation of the firms in the system of public procurements depends on their lines of business. For instance, in lumber and wood products, only 16% of all firms take part in public procurement, while the suppliers to producers of electrical and electronic equipment and optical instruments is 62%. Participants in public procurement are larger firms (the average

number of workers on their payroll is 692 versus 587 in the total sample). Among the firms founded before 1992, the share of participants in the system of public orders was 44%, and among those founded after 1998, it was only 29%.

The firms with government stakes in capital were apparently more active participants in public procurements. Among them, 63% had government orders, compared to 37% in the group of private firms. Judging by the data of Table 1, membership in business associations had a positive influence on access to government orders; among members of business associations, the share of participants in public procurement was 46%, yet among non-members, it was only 38%. Members of business groups and firms with foreign stakes were less active in the market for public procurement, but these differences remained insignificant.

A significant difference was observed between enterprises located in regions with different investment potentials. In particular, in the regions where investment potential was above average, in 2008, 53% took part in public procurements, while in the regions where investment potential was below average the share of such firms was only 35%. Moreover, we made a preliminary analysis of correlations between participation of enterprises in the system of public procurements, their assistance to the state for social development of the region and whether or not they received support from the state agencies.

We could expect, given the assumption of the "elite exchanges" model (Frye, 2002), that the firms that assisted the authorities would have wider access to public procurements. However, in this case the differences were minimal and statistically insignificant. Having received support from all levels of government (federal, regional and local) was positively related to participation in public procurement. This correlation was most noticeable in enterprises that received support from federal authorities.

At the same time, we must take into consideration that the pattern of the above-mentioned correlations can be influenced by some other factors. For instance, positive correlation between participation in public procurements and membership in business associations may be predetermined by the fact that associations traditionally have a wider representation of large firms, which also are more frequent suppliers of government needs. The factor of

enterprise size can also affect the correlation between receiving support from government and taking part in public procurements because large firms have more often received support from all levels of government.

Nevertheless, the above–presented descriptive statistics, combined with results of previous studies, enabled us to formulate a main hypothesis, which will be tested below by econometric methods.

HYPOTHESES AND EMPIRICAL STRATEGY

Yakovlev's (2011) analysis confirmed the thesis about the predominance of the "exchange model" in the relations between enterprises and the state proposed by Frye (2002). This exchange was displayed through assistance in social development of regions or maintenance of jobs by the enterprises that had been recipients of government support. At the same time, the "system of exchanges", which was established at the federal level, was more focused on old enterprises, companies with government stakes and the firms that had maintained jobs. At the regional and local levels, investment activity of the firms and presence of foreign investors among shareholders were favourable factors for the provision of governmental support.

However, one of limitations of the paper (Yakovlev, 2011) was the problem of endogeneity. In particular, in the support of the more active firms, the causality remained unclear. Although the study contained an implicit suggestion that regional and local authorities supported the investing firms, an alternative interpretation could also be no less true: that large-scale investment was made by the firms that had earlier received government support or were recipients of the rent from government limitation of new entry to their markets.

We have focused our attention in this study on the role of public procurement within the established "system of exchanges" between enterprises and authorities and on the analysis of the relationship between direct and indirect instruments of government support. This approach enabled us to formulate the following four hypotheses:

1. *Public procurement as a component of the system of exchanges.* In the logic of "the model of exchanges", the firm that provides assistance to authorities should have preferential access to government orders.

2. *Complementarity of different tools of public support.* Since the mid-2000s, a tendency toward a much more active industrial policy, with a focus on government attention on certain sectors of the economy or on activities of certain enterprises (as a rule, the large ones) has appeared in Russia. If this type of policy is consistent, direct forms of government support (financial and organizational) can be expected to be combined with indirect support of the same enterprises by means of procurement of their goods and services for government needs.

3. *Mutual substitution of different instruments of government support.* Under the limitation of resources at the disposal of public authorities, logic opposite to Hypothesis 2 is possible: public authorities, in their efforts to provide support to the widest possible range of enterprises, can diversify their instruments of support – for instance, they can render financial or organizational support to those firms that have no access to government orders. This hypothesis, in particular, may be true for regional and local authorities due to the reform of inter-budgetary relations and delineation of powers between different levels of government in the early 2000s. Significant toughening of budgetary constraints for regions, and especially for municipalities, was one of the results of this reform.

4. *Change in the ratios of direct and indirect tools of government support, as indicators of regional social and economic development improve.* Yakovlev (2011) noted that, in the more developed regions, a smaller number of enterprises gave assistance to authorities for social development in the regions, and also a much smaller number of firms received financial or organizational support from the state. However, the data of Table 1 show that the share of firms performing government orders is much higher in more developed regions. This difference was also highly significant in all models that were evaluated by Yakovlev and Demidova (2010). In this connection, we can suppose that a rising level of economic development of a region is related to changes in the structure of cooperation between enterprises and government bodies, notably, that direct support is replaced by indirect assistance.

The above-formulated hypotheses can be empirically tested through the evaluation of logit and probit models with a dependent

variable, State_Procure – an indicator of enterprise participants in public procurement in 2008 – and with independent variables describing the size of the enterprise, date of their foundation, forms of ownership, administrative status of cities, investment potential of regions and indicators of membership in business groups and business associations.

In keeping with the initial purpose of our study, we must also include the variables describing relations of enterprises with government branches in the right part of regression equations. However, our preliminary analysis has shown that these variables are endogenous – they not only affect participation of enterprises in public procurement but, in turn, can depend on it. Therefore, if we evaluate the model with endogenous variables in the right part, we are able to get biased estimates of coefficients at all factors. One of the ways to solve this problem (under the condition that the endogenous variable is continuous) is to use the method of instrumental variables, which in the case of one endogenous variable adds up to the replacement of this variable with its projection in the space of instrumental variables (Green, 2008). However, we have a binary endogenous variable, and its projection can take on any value, so this method will not suffice.

Another method, which allows for coping with the problem of endogeneity, is the evaluation of a system of variables. However, not even a system of linear equations with continuous independent variables can be evaluated unless the conditions of order and rank are fulfilled (Maddala, 2001). In our case, the situation is complicated because dependent variables are binary, so that the system of linear equations cannot be used (just as in the case of evaluation of a model with a binary dependent variable, logit and probit models must be used rather than a model of linear probability).

One of ways out of this difficult situation is offered by Arendt and Holm (2006). If we want to evaluate a model with a binary dependent variable Y_1 and a binary endogenous variable Y_2, then in order to obtain non-biased evaluations, we have to turn to the system of bivariate probit models of the following type:

$$\begin{cases} Y_1^* = X_1\beta_1 + \alpha Y_2 + \varepsilon_1 \\ \\ Y_2^* = X_2\beta_2 + \varepsilon_2 \end{cases} \quad\quad (1)$$

Y_1=1, if Y_1^* > 0 and 0 otherwise,

Y_2=1, if Y_2^* > 0 and 0 otherwise,

(Y_1^*, Y_2^* - latent variables),

Where α, β_1 ,β_2 , ρ are a set of evaluable parameters β_1 ,β_2 are vectors of coefficients, ε_1, ε_2 ~ N(0,0,1,1, ρ) (ρ – coefficient of correlation of errors in the first and second equation), and X_1, X_2 are sets of independent variables corresponding to the first and second equations.

The first set of variables does not contain some variables of the second one. The last requirement, together with non-occurrence of the variable Y_1 in the second equation, is the condition for identification of parameters of the model (just as conditions of order and rank in the case of the linear system with continuous independent variables).

In all our models, Y_1 is the variable State_Procure – the indicator of participation of an enterprise in public procurements in 2008, and Y_2 is one of the variables, which describes relations of the enterprise with the state. This variable will be concretely defined in each of the models given below. The complete description of such dependent variables is given in Table A1 in the Appendix.

The description of all independent variables included in the matrix X_2 is given in the Table A.2 in the Appendix. The matrix X_1 does not include the variables Foreign_Stock and Moscow, Centre, and PGT because hypotheses about independence of the relevant indicators of enterprises and their participation in public procurement were not rejected (see Table 1). Initially, the matrix X_1 contained the variable *Association*, but because coefficients at this variable in the first equation turned out to be insignificant in all models, we decided to exclude it for the sake of higher efficiency of evaluations of coefficients at all variables.

LOGIC AND RESULTS OF THE EMPIRICAL ANALYSIS

The logic of the regression analysis came to the following. At first, we tested the hypothesis about preferences for access to government procurements of the firms that assist authorities in social development of their regions. For this purpose, we estimated models 1.1 and 2.1, which explored the relationship between the variable State_Procure and the variables FirmHelp (the indicator of providing help to the state) and FirmHelpSuf0.1 (the indicator of provision of significant help to the state – more than 0.1% of proceedings from sales), which were dependent variables in the second equations of these models. The results are given in Table 2.

Coefficients at the variables FirmHelp and FirmHelpsuf0.1 in the first equation were insignificant, which means that the fact of providing assistance to authorities does not give the firms any preferential access to public procurements. Consequently, our first hypothesis was not accepted, and we have no reason to assert that public procurements in Russia are a component in the "system of exchanges" between the state and business.

At the second stage, we tested the second and third hypotheses about reciprocal supplement and substitution of direct and indirect instruments of government support. For this purpose, we estimated models 3.1 – 6.1 using variables FRLHelp, FedHelp, RegHelp and LocHelp (respectively, indicators of receiving support from all levels of government, and also separately from federal, regional and local authorities) as explanatory variables in the first equation and dependent variables in the second equation.

According to the results of our estimation (see Table 2), the coefficient at the variable FRLHelp in the model 3.1 was insignificant, which means that we cannot say how much participation of the firms in public procurement depends on receiving direct government support unless we give a concrete designation of the level of this support. Concretisation of levels of support in models 4.1-6.1 has enabled us to explain this influence.

In particular, coefficients of the variables FedHelp and LocHelp in the models 4.1 and 6.1 became significant ($p<0.01$ and $p<0.05$, respectively). In the first case (the model 4.1 with estimation of the

influence of receiving federal support by a firm on its access to public procurements) the coefficient was positive, while in the second case (the model 6.1 with estimation of influence of receiving support from local authorities), it was negative. This means that direct and indirect instruments of government support complement each other at the federal level, but substitute each other at the local level – in other

TABLE 2
Evaluation of the Influence of Relations of enterprises with the State on Access to the System of Public Procurements

	Model 1.1	Model 2.1	Model 3.1	Model 4.1	Model 5.1	Model 6.1
Equation 1						
Dependent variable	State_Procure					
Sector	***					
lnSize	0.138***	0.119**	0.114**	0.097**	0.110**	0.142***
Foundation92-98	-0.048	-0.048	0.022	0.055	0.001	-0.068
Foundation 98+	-0.115	-0.090	-0.056	-0.081	-0.065	-0.134
State_Owner	0.448***	0.487***	0.396**	0.300*	0.423***	0.491***
Reg_Potential_Mid	-0.095	-0.099	-0.080	-0.044	-0.056	-0.072
Reg_Potential_High	0.419***	0.458***	0.527***	0.540***	0.539***	0.391***
Holding	-0.285**	-0.260**	-0.286**	-0.283**	-0.273**	-0.247**
Holdinghead	0.070	0.026	0.027	-0.126	-0.001	0.111
FirmHelp	-0.134					
FirmHelpSuf01		0.340				
FRLHelp			0.383			
FedHelp				1.005***		
RegHelp					0.421	
LocHelp						-0.561**
Equation 2						
Dependent variable	FirmHelp	FirmHelpSuf01	FRLHelp	FedHelp	RegHelp	LocHelp
Sector	***					
lnSize	0.193***	0.091*	0.143***	0.178***	0.195***	0.043
Foundation92-98	-0.205	0.051	-0.437***	-0.746***	-0.241	-0.212
Foundation 98+	-0.065	-0.206	-0.360**	-0.082	-0.307	-0.278
State_Owner	-0.289*	-0.364**	0.497***	0.572***	0.305*	0.312*
Foreign_Stock	0.278	-0.015	0.232	0.064	0.198	0.480***
Reg_Potential_Mid	0.021	0.067	-0.063	-0.222	-0.211*	0.144
Reg_Potential_High	-0.795***	-0.186	-0.686***	-0.635***	-0.973***	-0.465***
Holding	-0.171	-0.199	0.063	0.034	-0.035	0.105
Holdinghead	-0.045	0.415	0.266	0.756**	0.435	0.097
Association	0.368***	0.347***	0.290***	0.178	0.316***	0.173
Moscow	0.154	0.292	0.315	0.101	0.679***	0.355
Centre	-0.592***	-0.010	-0.138	-0.131	-0.101	-0.031
PGT	-0.114	-0.036	0.088	-0.237	0.379*	0.012
P	0.108	-0.198	-0.120	-0.407**	-0.159	0.428**
N	795	795	794	794	794	793

words, the firms that receive support from municipal authorities have fewer chances to get access to the system of public procurements.

The models, which we used to test hypotheses 2 and 3, also offered us the possibility to confirm or reject hypothesis 4, which examined the changing structure of instruments of government support as the level of economic development in the region where the respondent enterprise was located increased. As follows from the data of Table 2, coefficients at the variable Reg_Potential_High (enterprises located in regions with high ratings of investment potential according to Expert-RA Rating Agency) were highly significant. These coefficients had a positive sign in the first equations and a negative sign in the second equations. In other words, in more developed regions firms received direct government support less frequently but had more chances to get indirect support by public procurement systems.

We have to emphasise that the results confirming the validity of hypotheses 2, 3 and 4 were obtained by controlling a large number of other factors, including enterprise size, industrial affiliation, governmental stakes in the capital of respondent firms, time of their establishment, and location.

In addition to this analysis, we must note that while we had 957 observations in our initial sample, we included the data from a narrower range in the above-examined models (from 795 in the models 1.1 and 2.1 to 793 in the model 6.1). This decrease in the size of sample was made because we used many variables with missing values. A more detailed analysis showed that these omissions were largely related to the variables State_Owner and Foreign_Stock, which described ownership structure of the respondent firms. In particular, 161 top managers (or about 17% of all respondents) refused to answer this question.

To eliminate this effect and to check the robustness of the results obtained earlier on a narrow sample, we converted the refusal to answer about ownership structure into an independent category.[2] In Table A.3 in the Appendix, we gave a comparison of basic features of the enterprises that gave and refused to give an answer to the structure of their ownership. As seen from the data of this table, the firms whose top managers refused to disclose information about ownership structure had given assistance to authorities less often than other firms and got support from regional and local authorities a

little more often. They also were slightly more often found in regions with low and average investment potential and were located in townships. However, none of these differences were statistically significant. Only the answers to the question about membership in business associations were significantly different (at the level <0.05). Among the firms that answered the question about ownership structure, 42% were members of business associations, while among those who avoided answering, the ratio of membership was only 31%.We added the variable Ownership_No to both equations in our initial models, then estimated them once more. The results are given in Table 3.

As seen from the above data, model 2.2 shows that substantial assistance to authorities for social development of a region has begun to positively influence access to public procurements – though at a low level of significance (p<0.10). Nevertheless, taking into consideration that the relevant coefficient was insignificant in model 2.1, we cannot believe that this result is robust, and consequently, we cannot affirm that public procurements are a component in the "system of exchange" between enterprises and authorities.

Expansion of the sample and inclusion of the enterprises that refused to answer the question about ownership structure in our analysis gave us a mixed result for the models 3.2-6.2. The coefficient at the relevant variable remained positive and statistically significant only in model 4.2, which describes the correlation between receiving support from federal agencies and access to public procurements. Consequently, we can affirm that reciprocal complement of tools of direct and indirect government support is observed only at the federal level. The results proved to be non-robust in other cases.

However, they give grounds for a new and interesting assumption. In particular, inclusion of the firms that refused to answer about ownership structure in model 5.2 made the coefficient of the variable RegHelp turn from an insignificant into a statistically significant one (p<0.05), and in model 6.2, the coefficient at the variable LocHelp changed its sign from "minus" to "plus".

In other words, after inclusion into our analysis of the firms that refused to answer about ownership structure, receiving support from regional authorities began to significantly affect access to public procurements, and such expansion of the sample at the municipal

level changes the pattern of relations altogether. Let us emphasise that the firms from this group enjoy advantages in receiving direct support from regional and local authorities (see the results for second equations in the models 5.2 and 6.2).

TABLE 3
Evaluation of Influence of Relations of enterprises with the State on Access to the System of Public Procurements (with consideration of firms having refused to give information about their owners)

	Model 1.2	Model 2.2	Model 3.2	Model 4.2	Model 5.2	Model 6.2
Equation 1						
Dependent variable	State_Procure					
Sector	***					
lnSize	0.141***	0.130***	0.118***	0.130***	0.118***	0.147***
Foundation92-98	-0.155	-0.170	-0.109	-0.108	-0.129	-0.154
Foundation 98+	-0.149	-0.130	-0.091	-0.145	-0.101	-0.131
State_Owner1	0.475***	0.498***	0.346**	0.350**	0.394**	0.428***
Ownership_No_answer	-0.034	-0.022	-0.060	-0.023	-0.066	-0.065
Reg_Potential_Mid	-0.005	-0.006	-0.0007	0.019	0.023	-0.026
Reg_Potential_High	0.520***	0.498***	0.598***	0.559***	0.598***	0.520***
Holding	-0.231**	-0.191*	-0.234**	-0.241**	-0.223**	-0.230**
Holdinghead	0.143	0.069	0.069	-0.004	0.037	0.101
FirmHelp	0.164					
FirmHelpSuf01		0.536*				
FRLHelp			0.590***			
FedHelp				0.701**		
RegHelp					0.577**	
LocHelp						0.390
Equation 2						
Dependent variable	FirmHelp	FirmHelpSuf01	FRLHelp	FedHelp	RegHelp	LocHelp
Sector	***					
lnSize	0.204***	0.080*	0.141***	0.182	0.183***	0.027
Foundation92-98	-0.146	0.059	-0.238*	-0.599***	-0.142	-0.088
Foundation 98+	0.001	-0.077	-0.287*	-0.001	-0.299*	-0.215
State_Owner1	-0.268	-0.386**	0.537***	0.590***	0.346**	0.325**
Foreign_Stock1	0.242	-0.037	0.190	0.131	0.165	0.410**
Ownership _No_answer	-0.186	-0.140	0.157	-0.095	0.165*	0.312**
Reg_Potential_Mid	0.005	0.024	0.020	-0.110	-0.085	0.207*
Reg_Potential_High	-0.732***	-0.207	-0.626***	-0.632***	-0.856***	-0.388***
Holding	-0.135	-0.245**	0.037	0.077	-0.039	0.022
Holdinghead	-0.131	0.353	0.321	0.741***	0.510**	0.196
Association	0.330	0.326***	0.310***	0.130	0.339***	0.282***
Moscow	0.120	0.367*	0.119	0.067	0.437*	0.158
Centre	-0.445***	-0.024	-0.099	-0.093	-0.097	-0.029
PGT	-0.024	-0.078	0.028	-0.379	0.280	-0.013*
P	-0.017	-0.310*	-0.252**	-0.204	-0.253*	-0.112
N	955	955	954	954	954	953

In other words, our results show that *the patterns of interaction* of regional and local authorities with the firms that gave information about their owners and the firms that refused to answer this question *are different*. While in the first case, we can observe *substitution* of instruments of direct and indirect government support (see, in particular, the model 6.1 in the Table 2). In the second case, although resources at the disposal of regional and local authorities are limited, we can speak of the *reciprocal complement* of the instruments of government support (model 5.2 in the Table 3). This difference in the nature of interaction is evidence that the second group of firms has advantages in relations with regional and local authorities and gives us grounds for the assumption that the refusal to answer the question about ownership structure may be an indirect sign of *informal affiliation of the relevant firms with regional and local bureaucrats.* However, this assumption certainly needs an additional check.

Concluding this section, we notice that models 3.2-6.2 have confirmed the steadiness of differences between the more and the less developed regions in their use of instruments of direct and indirect support of enterprises. Moreover, we can also mention, among other significant results of our regression analysis, that in all the models, large enterprises and companies with government stakes had more chances to get public procurement. On the contrary, the subsidiaries of holding companies less frequently provided supplies for public needs. These conclusions were in line with the results of the analysis that we earlier carried out (Yakovlev& Demidova, 2010).

MAIN CONCLUSIONS

In this paper we have evaluated the influence of the established interaction of enterprises and governments of different levels on access of these enterprises to the system of public procurement. In our study we relied on a representative sample of Russian manufacturing enterprises, and the obtained results are valid only for this category of firms.

We have suggested the hypotheses that (1) under Russian conditions, public procurement may serve as a component of the "system of exchanges" between enterprises and the state; (2) public procurement as an instrument of indirect support of enterprises may be a complement or a substitute for instruments of direct government

support; and (3) a rising level of economic development of a region leads to a decrease in the volume of direct support and to an expansion of the use of indirect government support.

Our analysis gave the following results:

1. Assistance to authorities in the social development of a region in Russia gives the firm no additional chances for receiving government orders. Accordingly, we cannot maintain that public procurements are integrated into the "system of exchanges" between the state and business.

2. The enterprises that receive direct support from Russian federal authorities enjoy privileges in access to public procurement. This result was robust in different specifications of the initial model with large number of additional factors. Therefore, we can assert that, at the federal level, mutual complement is observed between direct and indirect government support.

3. At the regional and local levels, the revealed relationships are not robust. Nevertheless, our results give us grounds to suggest that in Russia interaction with regional and local authorities is different for the firms that provided information about their ownership structures and those that refused to answer this question. In the first case, we can rather observe *substitution* of instruments of direct and indirect support, but in the second, despite limited resource at the disposal of regional and local authorities, we rather note a reciprocal complement of direct and indirect instruments of government support. The explanation of this difference can be related to the fact that the firms that conceal information about their owners are, in reality, informally affiliated with regional and local bureaucrats. However, this assumption needs further verification and can be a topic for further research.

4. The firms that are located in the more developed regions of Russia received government support less frequently but, at the same time, had more opportunities to get access to public procurements. This result can imply that as the level of economic development of a region increase (which, among other factors, means that revenues of regional and local budgets grow), the role of public procurements as an instrument of government

support and influence on behaviour of firms through stimulation of demand for their goods and services becomes stronger.

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NOTES

1. Food Products; Textile Products and Apparel; Lumber and Wood Products; Chemicals; Primary Metals and Metal Products; General Industrial Machinery and Equipment; Electrical and Electronic Equipment and Optical Instruments; Transportation Machinery and Equipment.

2. In the course of our survey, we didn't ask to name concrete owners. We asked them to answer only what categories – the state, foreign investors, management, employees etc. – were included in the structure of owners. This approach, which gave interesting results, was first offered by Andrei Govorun in his study of the factors that influenced membership of firms in business associations.

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APPENDIX

TABLE A1
List of Variables

Panel A. Dependent Variables	
Name of the variables	**Description of the variable [a]**
State_Procure	The enterprise provided supplies on government orders in 2008
FirmHelp	The enterprise provided assistance to the authorities
FirmHelpSuf	The enterprise provided substantial assistance to the authorities (more than 0.1% of proceedings from sales)
FRLHelp	The enterprise received support from federal, regional or local authorities
FedHelp	The enterprise received support from federal authorities
RegHelp	The enterprise received support from regional authorities
LocHelp	The enterprise received support from local authorities
Panel B. Independent Variables	
Sector	Code of the Industry in of All-Russian Industry Classification Standard (two-digit)
lnSize	Natural logarithms of average number of workers on payroll
Foundation92-98	The enterprise was founded in 1992-1998 [a]
Foundation 98+	The enterprise was founded after 1998 [a]
State_Owner	Government stake in ownership [a]
Foreign_Stock	Foreign stake in ownership [a]
Ownership_no_answer	Refusal to answer the question about ownership structure [a]
Reg_Potential_Mid	Investment potential of the region is average [a]
Reg_Potential_High	Investment potential of the region is above average [a]
Holding	The enterprise is a member of a business group [a]
Holdinhead	The enterprise is a holding company of a business group [a]
Association	The enterprise is a member of a business association [a]
Moscow	Moscow [a]
Centre	Capital of a republic / krai / oblastt [a]
PGT	Township [a]

Notes: All variables assumed values 1 = Yes; and 0 = No.

TABLE A2
Basic Characteristic of Enterprises, which gave and refused to give the answer about structure of their ownership

Characteristic of enterprises	Attributes	Gave the answer about structure of their ownership		Refused to give the answer about structure of their ownership		p-v [a)]
		Quantity	Percentage	Quantity	Percentage	
Two-digit code of All-Russian Industry Classification Standard	Food	199	25%	36	22.4%	0.915
	Textiles and sewing	72	9.1%	17	10.6%	
	Timber and woodworking products	67	8.4%	14	8.7%	
	Chemical production	76	9.6%	12	7.5%	
	Metallurgy and metal working	80	10.1%	18	11.2%	
	Electrical, electronic and optical equipment	98	12.3%	19	11.8%	
	Transport vehicles and equipment	73	9.2%	13	8.1%	
	General industrial machinery and equipment	131	16.5%	32	19.9%	
	Total	796	100%	161	100%	
Average number of workers on payroll	Average value Standard deviation Min Max	580 918 3 11536		617 1070 10 8955		0.86 [b)]
Time of foundation	Before 1992	600	75.4%	120	74.5%	0.772
	1992-1998	118	14.8%	27	16.8%	
	After 1998	78	9.8%	14	8.7%	
	Total	796	100%	161	100%	
Investment potential of the region	Low	324	40.7%	72	44.7%	0.294
	High	225	28.3%	49	30.4%	
	Average	247	31%	40	24.8%	
	Total	796	100%	161	100%	
Independent enterprise or part of a holding company group	Independent	575	72.2%	112	70%	0.33
	Subsidiary of a holding company group	192	24.1%	45	28.1%	
	Head holding company	29	3.7%	3	1.9%	
	Total	796	100%	160	100%	
Membership in business associations	No	462	58%	111	69%	0.01**
	Yes	334	42%	50	31%	
	Total	796	100%	161	100%	

TABLE A2 (Continued)

Characteristic of enterprises	Attributes	Gave the answer about structure of their ownership		Refused to give the answer about structure of their ownership		p-v [a)]
		Quantity	Percentage	Quantity	Percentage	
Administrative status of a settlement	Moscow	48	6%	12	7.5%	0.145
	Capital of republic / territory, region	367	46%	66	41%	
	Provincial town	326	41%	64	39.7%	
	Township	55	7%	19	11.8%	
	Total	796	100%	161	100%	
Assistance to regional and/or local authorities	No assistance	178	22.4%	41	25.5%	0.464
	Assistance amounting to 0.1% of sales revenue, or non-estimable cost	449	56.4%	92	57.1%	
	Assistance above 0.1% of sales revenue	169	21.2%	28	17.4%	
	Total	796	100%	161	100%	
Enterprise received aid from the state	No	505	63.5%	98	60.9%	0.525
	Yes	290	36.5%	63	39.1%	
	Total	795	100%	161	100%	
Received aid from federal authorities	No	683	86%	145	90%	0.158
	Yes	112	14%	16	10%	
	Total	795	100%	161	100%	
Received aid from regional authorities	No	596	75%	113	70%	0.206
	Yes	199	25%	48	30%	
	Total	795	100%	161	100%	
Received aid from local authorities	No	645	81%	122	75%	0.112
	Yes	149	19%	39	25%	
	Total	794	100%	161	100%	

Notes: ** differences are significant at the 5%-level of significance.
     a) Main hypothesis: the two classifications are statistically independent.
     b) Kruskal-Wallis rank test.