

# **Stochastic Frontier in Non-profit Performance Assessment: An Application to Homeowners Associations in Russia\***

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Performance of Russian homeowners associations – non-profits established to manage common property in residential housing – is assessed using the stochastic frontier technique, which is a powerful tool of productivity analysis. Performance variations are explained by physical and social factors, prominent among them is the availability of social capital among tenants, required to resolve collective action problems and ensure accountability of managing bodies and outside contractors. Lack of civic capacity could be an obstacle to implementing community-governance solutions in residential housing, making homeowners associations dysfunctional or prone to capture by vested interests.

## **1. Introduction**

Third sector stakeholders – non-profits' clients and beneficiaries, donors, managers and policy-makers – all need reliable performance indexes of non-profit organizations. Such indexes shed light on the quality of internal organization and management, efficiency of resource utilization, and on the institutional environment in which non-profits operate. And yet the very nature of the third sector makes non-profit performance measurement a difficult problem. In the case of private sector organizations profit and profit-based indexes, such as capitalization, provide a natural basis for measuring performance. For obvious reasons such approach cannot be extended onto non-profits, leaving the sector without a natural, clearly identifiable and practical methodology of productivity analysis and performance assessment. Furthermore, non-profits' goals and objectives could be vague and un-measurable, not in the least due to the absence of market valuations. Finally, various stakeholders of the same organization could have different views of its objectives. All of these features complicate the search for practical and natural performance measures reflecting the nature and operational realities on non-profit organizations.

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\* We are indebted to Anatoly Peresetsky for valuable assistance and useful comments on this paper. Financial support from the Center for Fundamental Research at the State University – Higher School of Economics is gratefully acknowledged.

In the present paper we propose a performance measurement technique for non-profit associations where users jointly operate a common resource. The proposed technique employs the production possibility frontier – a productivity analysis tool which is widely used in assessing performance of public and private sector organizations, but, with the possible exception of educational institutions and health care providers, has not been applied so far in the third sector.

Non-profit associations formed around a common-pool resource have clear-cut comparative advantages over institutional alternatives, such as government ownership and management: users have stronger incentives than governments to better manage smaller-scale common-pool resources, and possess necessary information that could be off-limits for government officials (Araral, 2009). However inability to resolve the inherent collective action problem could seriously impede self-management of the commons, adversely affecting the performance of non-profit associations. Assessing performance of such non-profits is thus an important and non-trivial task.

The ability to resolve the collective action problem is the essence of social capital. Institutions and social capital are key factors of economic welfare, but interplay between the two remains a subject of debates. Some views (Keefer, Knack, 1997) maintain that formal institutions and social capital are substitutes, and therefore institutional reform can make up for insufficient social capital. Alternative opinions (Tabellini 2008a) stress complementarity between institutions and social capital, in which case a lack of social capital could pose an obstacle to an otherwise efficiency-enhancing institutional reform. A closely related issue is the identification of transmission mechanisms between social capital and development – apart from working at the grassroots by cutting transaction costs, social capital improves governance and institutional performance, and its deficit could render an institution dysfunctional.

Such problems are not unique to conventional commons in rural life and natural environment; they also occur in urban setting, and in particular have transpired in the recent residential housing reform in Russia. The reform started in the early 1990s with transfers to tenants of the property titles over *individual* units, and proceeded smoothly until the present stage of ‘collective privatization’, when control over common facilities and infrastructure of apartment buildings (hallways, elevators, building exteriors, parking, security, piping and wiring, etc.) is being devolved from local governments to tenants organized in condominium-like *homeowners associations* (HOA). Such associations are used in this paper to illustrate application of production possibility frontier to measuring performance of non-profit associations.

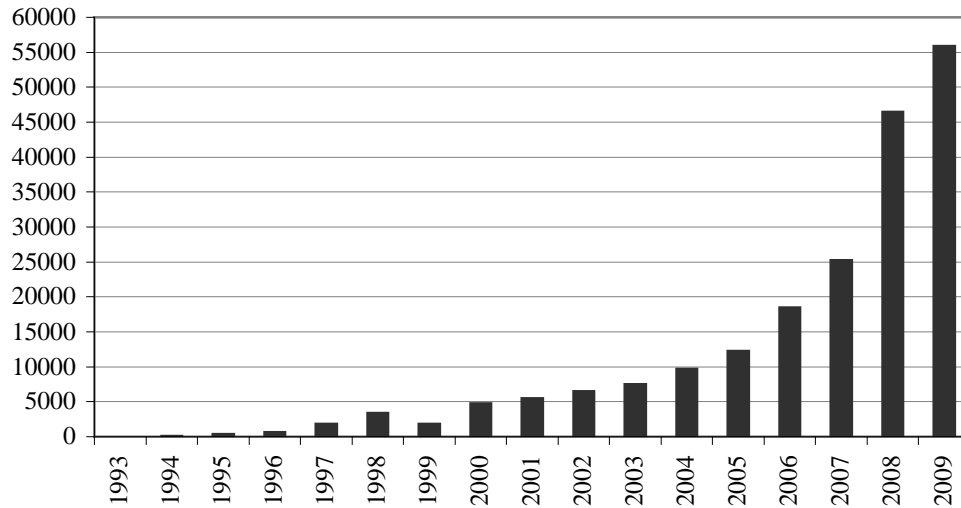
Russian law defines HOA as a non-profit legal entity in which tenants are members and which has a governing board headed by a chairperson. HOA budget is funded by tenants’ maintenance fees and other revenues, including rentals of common property. HOA decisions that require tenants’ approval are passed by simple majority vote. HOA can enter into contracts with local utilities and other service providers; it can retain services of a management company to which operations of common facilities can be outsourced.

The process of HOA formation had a slow start, and accelerated of late (see Fig. 1), in large part due to sticks and carrots used by the government which is interested in de-politicizing the

residential housing sector, cutting subsidies and waste and offloading the cost of housing maintenance on owners. Financial incentives to form HOA, such as cost-sharing of capital repairs, are combined with pressure to expedite HOA formation, lest local governments step in and do it for procrastinating tenants. Presently various forms of self-management of housing infrastructure have been introduced in about ¾ of all apartment buildings in Russia.

Figure 1: HOA dynamics in Russia

Number of HOA



Collective privatization of residential housing proved to be much more difficult and controversial than privatization of individual apartments –despite the strong promise and appeal of the HOA institution, its success was highly uneven (Vihavainen, 2009). Surveys, media reports and other sources reveal multiple problems facing HOA – from revenue shortfalls due to payment delinquency to the ‘capture’ of the new institutions by local bureaucrats, utility operators and other parties (see e.g. Sivaev, 2009; Ermishina, 2009). There is widespread distrust in the society in HOA – the oft cited reasons include lack of understanding of how this institution operates, concerns of unpredictable liabilities that would escalate the cost of housing to households, reluctance to assume responsibilities for repairs of dilapidated buildings, unsettled land disputes, and poor conditions of the local utilities and housing maintenance sector where dominant providers often enjoy unfettered market power. One of the core issues is mistrust among tenants, lack of leadership and capacity for self-organization, and insufficient experience and culture of self-management of common property.

As a result, tenants are often reluctant to form HOA, despite government’s prodding, and many of the existing HOAs function poorly, making their members nostalgic of the status quo ante, even if notorious for mismanagement, waste, and corruption. At the same time, there are quite a few success stories of well-functioning HOAs that were able to improve services, lower costs, cut wastes and otherwise take advantage of common property self-management.

The short history of Russian HOAs provides rich evidence on how the society's ability to operate a new institution affects the outcome of institutional reform. It also illustrates how commons work or don't work in urban setting, depending on material factors, social capital and the external institutional environment.

In the present paper the disparate performance of Russian HOAs is analyzed and explained by using data of a survey conducted in the late 2008. The survey registered satisfaction of tenants with HOA performance, as well as material and non-material factors, including various indexes and proxies of social capital, that could affect the achieved outcomes. We estimate a stochastic frontier of Russian HOAs and thus obtain performance (productivity) indexes which indeed exhibit significant variations reflecting success and failures of individual HOAs.

Comparisons of leaders and laggards among sampled HOAs, and regression analysis reveal tangible and intangible assets of HOAs that underpin success of self-management of urban commons, and shed light on the interplay between institutions, social capital and organizational governance. It is shown that generic social capital has at best mild impact on HOA performance; however we identify a specific type of social capital, called technical civic competence, which underpins the ability of tenant communities to effectively operate the institution of HOA. An important function of technical civic competence is to ensure efficient and accountable governance of urban commons – it is shown that HOA governance serves as a transmission mechanism between social capital and HOA outcomes. However, if official governance mechanisms in HOA malfunction (e.g. as a result of capture), more primordial collective action mechanisms rise in their significance, and so does generic social capital. Our analysis also shows that better-performing HOAs do not engage services of management companies and prefer in-house provision; this is due to a lack of competition among service providers in the residential housing sector. Twin deficit of social capital as a means to operate a multiple agency, and of competition in the service industry that could have alleviated the collective action problem, explains poor state of many Russian HOAs.

The rest of the paper is organized as follows. In the next section main issues of HOA are interpreted through the prism of the New Institutional Economics. Section 3 presents data, and in Section 4 HOA stochastic frontier is estimated. In Section 5 regression analysis is conducted to study impact on HOA performance of various factors, including social capital. Section 6 deals with agency relations in HOA, to explore transmission mechanisms for social capital working through HOA governance, and third-party outsourcing. Section 7 concludes.

## **2. HOA and NIE**

Homeowner associations demonstrate a nexus of key issues and dilemmas of the New Institutional Economics, such as property rights, collective action and common agency, public choice, social capital and boundaries of the organization. The institutional perspective structures HOA analysis and generates hypotheses for empirical testing.

Setting up an HOA is consistent with the *property rights theory*: when transaction costs are high, control rights over an asset should be held by direct beneficiaries (Grossman, Hart, 1986), which

ensures efficiency of unobservable and non-contractible investments in the asset. In the case of common facilities of residential housing tenants are exclusive beneficiaries of such assets and therefore natural holders of property rights. Non-divisibility of housing infrastructure makes such ownership collective. Since the same individuals are owners of infrastructure and consumers of its services, and given non-market nature of such services, HOA assumes the legal status of a non-profit.

Benefits of collective ownership could be outweighed by the *collective action problem* inherent to private provision of *public goods* and self-management of the *commons*. Housing infrastructure combines features of both, and when coordination is eroded by free riding, or tenants fail to reach and implement necessary agreements, collective ownership might no longer be the (second)best regime, yielding this position to other arrangements, such as local government management (Bengtsson, 1998; Saegert, Winkel, 1998; Chen, Webster, 2005).

Complexity of the collective action problem grows with the number of participants (Olson, 1965), and this, *ceteris paribus*, makes HOA operations more complicated in large buildings. Lack of socialization among tenants in such buildings further exacerbates the problem. On the other hand, there is an economy of scale in running common facilities in residential housing, which favors bigger apartment buildings – the latter can get bulk discounts from service providers, afford high quality technical, legal and accounting services, etc. Therefore the overall impact of the building size on performance of HOA is a priori ambiguous.

Capacity for self-organization and collective action is known as *social capital*; its key ingredients are mutual trust, pro-social norms, and social networks (see e.g. Halpern, 2005). Social capital reduces transaction costs of reaching and implementing an agreement over a joint course of action necessary for efficient operation of housing infrastructure. Stocks of social capital in apartment buildings could exhibit broad variations, depending on socio-economic composition and heterogeneity of tenants, prevailing cultural norms and other factors (Saegert, Winkel, 1998). Home ownership is believed to foster civic attitudes and involvement – it raises importance of longer-term public matters and makes tenants concerned over market value of their property which capitalizes the state of common facilities and quality of local governance (DiPasquale, Glaeser, 1999). On the other hand, social capital shows strong inertia (Tabellini, 2008b), and societies where it is historically in short supply and/or where recent dramatic events depleted the earlier endowments of social capital (Aghion et al., 2009), could be ill-prepared for self-management of urban commons.

Still, chances for self-organization in residential housing are perhaps among the strongest in comparison with other collective action problems. Indeed, participants have immediate and powerful material incentives to handle well their collective property, they form a relatively small, stable and compact group with clear boundary rules, have opportunities for frequent face-to-face communication, can set internal rules of the organization and elect governance bodies, and enjoy government recognition and support. These are the key design principles for successful self-organization (Ostrom, 2000), and their confluence bodes well for HOA success even in societies with low stock of social capital and general lack of civic culture and tradition. Moreover, given the combination of these favorable conditions, the success (or lack thereof) of HOA could be viewed as a litmus test of the general ability of a society for self-organization.

HOAs can outsource some of its functions to an outside contractor – a management company; costs and benefits of such option are discussed in the *boundaries of organization* theory. The management company serves as an intermediary between the HOA and its various suppliers, including local utilities. Benefits of such outsourcing are due to professional expertise of management companies and the economy of scale that they have when dealing with multiple client associations. However if management companies have significant market power (this is often the case in Russia where such companies are commonly affiliated with local governments and have other ‘specific assets’ preventing competitive entry), they become parts of vertically integrated monopoly chains occupying the middle position between public utilities and tenants, with detrimental consequences for the latter.

HOAs face with *collective choice* and *common agency problems*. The first of these problems arises over HOA revenue (maintenance fees) and expenditure decisions, which require reconciliation of at times deeply polarized taxation and spending preferences, especially when there is profound economic inequality between tenants. In the West such inequality is less pronounced due to sorting by real estate prices, but in Russia it is still found in older buildings where neighbours could significantly differ from each other in income and status, and even in new condominiums where some apartment units are sold at market prices, while others are transferred by developers over to local governments to be distributed free or at heavy discounts as “social housing”.

The common agency problem occurs in relations between tenants and external contractors (management companies) and/or governing bodies of HOA. Multiplicity of ‘principals’ in a principal-agent setting makes monitoring performance of contractors and association’s officers more complicated: free riding could undermine such monitoring and adversely affect accountability. The Russian law leaves the option of direct management of common facilities by tenants without setting up a formal association; this eliminates the agency problem inside the HOA, but obviously elevates transaction costs in dealing with third parties.

When HOAs and their governing bodies are not sufficiently controlled by tenants due to low participation and weak monitoring at the grassroots, there is a danger that this institution will be *captured* by various interest groups that seek private gains at the expense of tenants. This danger is real when significant resources and vital services are transferred from local governments to the private (for-profit and non-profit) domain with weaker governance and control mechanisms. HOA are appealing targets for capture, given low elasticity of their demand for essential services, non-competitive nature of local utilities, and the prospects of obtaining property titles to land under an apartment building. Potential captors could be local bureaucrats, operators of public utilities and management companies, and insiders – HOA members that put under their control resources of the organization. Anticipation of HOA vulnerability to capture makes tenants apprehensive of the new institution and reluctant to set up an HOA in the first instance.

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<sup>1</sup> In transactions over *private* goods and assets intermediation on behalf of a community could be detrimental to community members, since intermediaries might not have information and incentives necessary for efficient representation (Katz, Neuman, 1990). In the case of public (club) goods such collective representation could be desirable as a means to prevent the hold-up problem and otherwise reduce transaction costs.

### 3. Hypotheses and data

HOA, viewed as a production unit that generates a stream of services to its members, employs various inputs which affect the output; furthermore its performance depends on market conditions and institutional environment. The inputs include HOA revenues and members' contributions in kind, as well as tangible and intangible assets of the association, which are set exogenously. The tangible assets are apartment buildings where HOA operate, characterized by their size and conditions. The main intangible asset is the capacity for collective action and self-organization, or social capital.

It should be expected that both of these types of assets positively affect HOA performance. However, in regard to the intangible assets this assumption needs a refinement. The earlier views of social capital as a generic homogeneous commodity that invariably improves performance of every organization, economy, or society, were refuted in the recent literature, and available evidence leads to the conclusion that performance-enhancing forms and kinds of social capital could be highly context-specific (see e.g. Halpern, 2005). An empirical strategy should thus allow testing various measures and proxies of social capital to find out which, if any, of them improve performance of Russian HOAs. Once HOA-relevant forms of social capital are identified, relative impacts of tangible and intangible HOA assets could be estimated to find out which of those are more essential for HOA operation. An answer to this question will also shed light on an otherwise ambiguous relation between HOA efficiency and building size.

The working of social capital is another matter that requires attention. Social capital could improve performance 'horizontally', at the grassroots, by cutting various transaction costs, or 'vertically', by strengthening accountability in agency relations with governance bodies and third parties. To identify a 'transmission mechanism' between social capital and institutional performance in the case of Russian HOA, an empirical analysis should include measures of the quality of organization governance to explore its influence on outcomes and relations to social capital.

To capture the impact of external environment on HOA, one needs data covering a sufficiently large number of cities. Collecting such data was beyond our means, and hence main attention in this paper will be paid to the working of internal factors of organizational effectiveness, with only occasional references to the role of external conditions.

Data for the study was obtained by a survey of 82 HOA conducted in the fall of 2008; of those HOA, 40 were based in Russia's capital city of Moscow, and the rest in a major industrial city of Perm. Sample selection was controlled over three dimensions: apartment price; time elapsed since building construction/capital repair; and the year HOA was created. In each HOA, the chairperson and nine other randomly selected tenants were interviewed.

Questions of the survey were organized in the following categories<sup>2</sup>:

- (i) performance assessment:

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<sup>2</sup> Some of the questions were similar to those used in (Saegert, Winkel, 1998) in a study of US residential housing.

- overall satisfaction with HOA performance and satisfaction with main services of HOA, such as common facilities maintenance; plumbing; electrical work; upkeep of the backyard; and garbage removal
  - satisfaction with HOA board performance, transparency and accountability of board work
- (ii) socio-economic and demographic characteristics of tenants (age, gender, education, income bracket), and duration of tenancy
  - (iii) social cohesion of tenants (various indicators of trust, mutual assistance and support, acquaintance, interaction, and socializing in everyday life)
  - (iv) contributions to HOA in cash and in kind (accuracy of payments of maintenance fees and utility bills<sup>3</sup>; participation in tenant meetings; volunteering)
  - (v) ability to reach an agreement over HOA operations

In addition, the survey collected information about HOA (and the apartment building where it is based) in general, including age and material conditions of the building, the year HOA was formed, the origin of HOA (created by tenants on their own initiative, or thrust by third parties – local governments, management companies, developers etc.); percentage of privately owned units (the rest are owned by local governments), and whether HOA operates on its own or retains services of a management company.

Generic social capital in tenant communities can be measured by using answers to questions whether one can count on neighbors' support; how often a respondent assisted his/her neighbors and how often received support from them; and how many neighbors and how well a respondent knows. Other proxies of generic social capital are voluntary work in HOA and duration of tenancy in the building (the longer people live next to each other, the better chances they have to develop social ties, cohesion and empathy).

A specific form of social capital is the collective ability to operate an HOA; it can be inferred from tenants' self-reported degree of participation in HOA decision-making; from the ability to have one's voice heard in the process; and from the ease of reaching an agreement among tenants on HOA matters. Answers to these questions are significantly correlated with each other, and their first principal component, explaining 58% of the total variation, is used to measure what we call *technical civic competence* of tenants.

The above components of generic social capital are as a rule positively and statistically significantly correlated with each other, which is an indication that these are indeed various dimensions of the same 'commodity' (Table 1). At the same time generic social capital and technical civic competence are disparate characteristics of tenant communities, largely uncorrelated with each other: technical civic competence has statistically significant correlation with only one dimension of generic social capital, and this correlation has the negative sign.

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<sup>3</sup> Russian HOAs collect from tenants utility payments and remit those to utility providers.



Table 1: Cross-correlations of social capital measures

	GSC1	GSC2	GSC3	YT	SI	VW	TCC
GSC1							
GSC2	.340*						
GSC3	.352*	.724*					
YT		.289*	.189				
SI		.480*	.435*	.266			
VW		.466*	.297	.377*	.571*		
TCC		-.234					

Social capital measures are aggregated by HOA. GSC1-perception of availability of neighbors' support; GSC2-frequency of assisting neighbors; GSC3- frequency of being assisted by neighbors; YT- years of tenancy; SI – social inclusion (indicates how many neighbors and how well a respondent knows); VW – voluntary work (captures frequency of voluntary work); TCC – technical civic competence. Only correlations significant at 10% level are shown; significance at 1% level is marked by \*.

The data reveal considerable differences between the two cities covered by the sample. In Moscow overall tenant satisfaction with HOA work is higher than in Perm – the distributions of responses in a 1 to 5 scale stochastically dominate each other (Fig. 2a). Satisfactions with particular services in the two cities follow the same pattern. But maintenance fees in Moscow are also higher (Fig. 2b), and therefore the question of HOAs' relative *efficiency*, which puts outcomes in relation to inputs, remain open until the next section.

Figure 2a: Tenants satisfaction with HOA performance

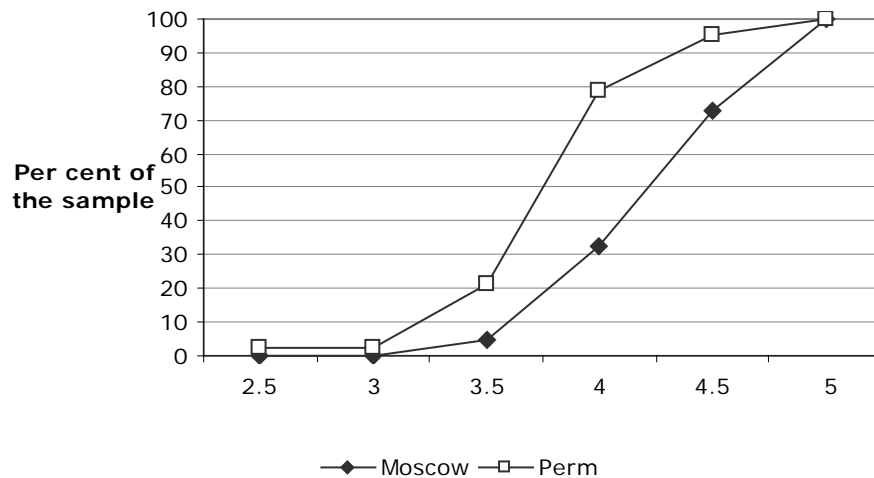
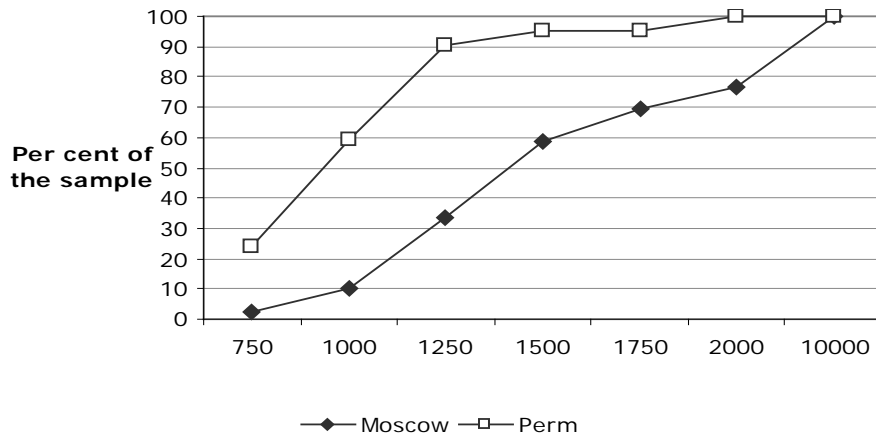


Figure 2b: Costs to tenants of HOA services (rubles per household)



Two cities also differ in their physical capital stocks in the residential housing sector (apartment buildings in Moscow are on the average 50% bigger and four years older), and, more significantly, in their endowments of social capital in tenant communities. Stocks of generic social capital characterized by the above indicators of social cohesion are somewhat higher in Perm – social ties are expected to be stronger in a smaller and more traditional city (Fig. 3a). However the collective ability to operate an HOA, which is a specific form of social capital, is significantly higher in Moscow: distribution of the technical civic competence in Moscow (stochastically) dominates such distribution in Perm (Fig. 3b).

Figure 3a: Generic social capital (perception of availability of neighbors' support)

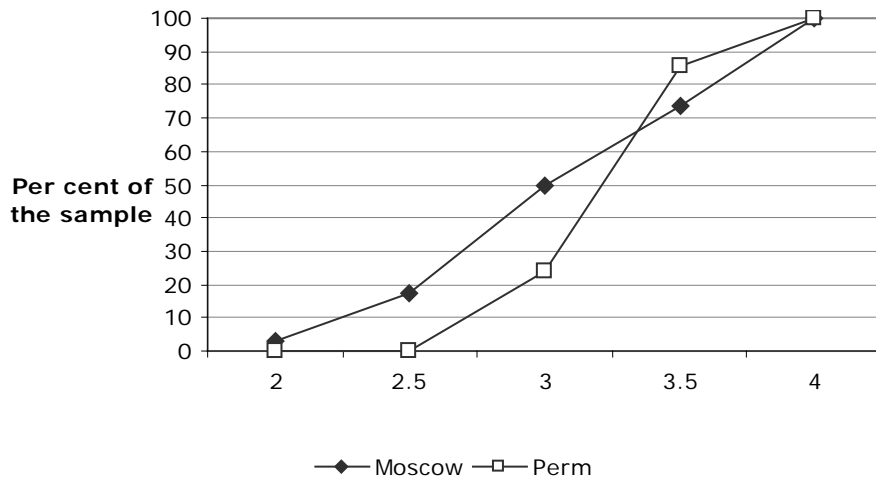
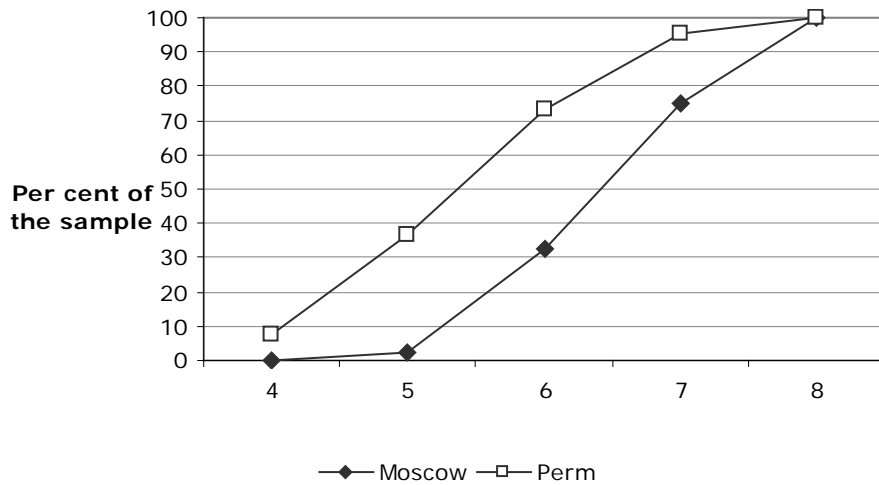
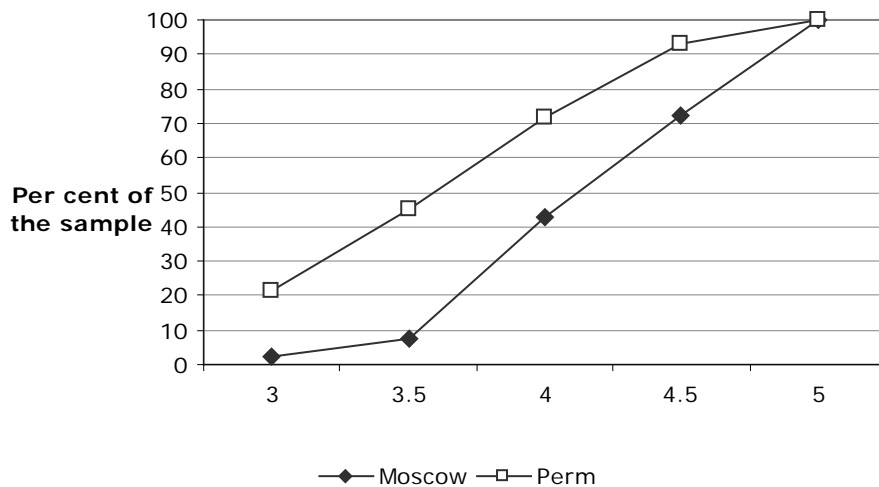


Figure 3b: Technical civic competence



Quality of governance in HOA can be measured using tenants’ assessments of timeliness and quality of HOA board work; of timeliness, accuracy and completeness of information disseminated by boards to tenants; and of boards’ accountability and quality of representation of tenants. Such indexes are strongly correlated with each other (as is often the case with alternative quality of governance indicators, not just in organizations, but also on regional and national levels – see e.g. Putnam, 1993, Tabellini, 2008a), and their first principal component which accounts for 88% of the total variation, is used hereafter as a quality of HOA governance index. This index shows that HOA in Moscow are governed better than in Perm (Fig. 4), which is consistent with the earlier observed lead of the Russian capital city in technical civic competence of tenants (more on this is Section 6).

Figure 4: HOA board performance



#### 4. Performance assessment

Performance of HOAs and the institution of collective ownership of common housing facilities that such organizations implement can be measured by standard productivity analysis tools which approximate the ‘production frontier’. Such techniques are broadly used in productivity studies of various public and private sector organizations (hospitals, universities, government agencies, utilities, farms, banks etc.), but to the best of our knowledge they have not been applied so far to performance assessment of non-profit associations, including HOAs. And yet, as we argue elsewhere (Borisova, Polishchuk, 2008), these techniques have strong advantages over other approaches to efficiency measurement in the non-profit sector, e.g. they produce indexes that are relative to highest achievable outcomes revealed by a large number of observation, which compensates for otherwise unavailable market information.

To apply production frontier estimation techniques<sup>4</sup>, we treat HOA as a production unit that produces  $N$  outputs  $y = (y_1, \dots, y_n)$  and utilizes single (non-exogenous) input  $x$ ; here outputs are services to tenants, and input – the budget of the association. It is assumed that to every  $x$  there corresponds a production possibility set  $P(x) \subset R^N$ , and the organization with input-output bundle  $(x, y)$  is fully efficient if  $y$  belongs to the boundary of  $P(x)$ .<sup>5</sup> Efficiency (productivity)

is measured by the distance function  $D(x, y) = \min \left\{ \theta > 0 \mid \frac{y}{\theta} \in P(x) \right\}$ ; this function attains its maximal value of unity in the case of full efficiency. Otherwise the greater is the deviation from the boundary inwards the production possibility set, the less efficient is the organization.

To estimate the distance function by using the stochastic frontier technique<sup>6</sup>, the following translog specification (Lovell, 1994) was assumed:

$$\ln D(x, y) = \alpha_0 + \sum_{n=1}^N \alpha_n \ln y_n + \sum_{n,m=1}^N \beta_{nm} \ln y_n \ln y_m + \gamma \ln x + \sum_{n=1}^N \delta_n \ln y_n \ln x,$$

which after standard transformations that make use of first-degree homogeneity of  $D(x, y)$  in  $y$ , can be estimated from the following equation:

$$\ln y_{Nit} = \tilde{\alpha}_0 + \sum_{n=1}^{N-1} \tilde{\alpha}_n \ln \frac{y_{nit}}{y_{Nit}} + \sum_{n,m=1}^{N-1} \tilde{\beta}_{nm} \ln \frac{y_{nit}}{y_{Nit}} \ln \frac{y_{mit}}{y_{Nit}} + \gamma \ln x_{it} + \sum_{n=1}^{N-1} \tilde{\delta}_n \ln \frac{y_{nit}}{y_{Nit}} \ln x + u_{it} + v_{it}$$

where  $i$  stands for the number of HOA and  $t$  corresponds to tenants.  $u_{it} \leq 0$  measures inefficiency and is distributed half-normal (normal distribution truncated at zero), and  $v_{it}$  is a

<sup>4</sup> We present here an abridged version of stochastic frontier analysis of homeowners’ associations; for more details and alternative estimation techniques see Borisova, Peresetsky, Polishchuk, 2010.

<sup>5</sup> Notice that this efficiency concept does not specify proportions between partial performance measures, i.e. satisfaction with particular services of HOA; this flexibility allows for various public choice outcomes within individual HOAs.

<sup>6</sup> Stochastic frontier approach is preferable to the alternative non-parametric data envelopment analysis due to unavoidable measurement errors in survey-generated data.

normally distributed error term. Once this latter equation is estimated, the distance function (efficiency index) for observation  $i$  obtains as  $\exp\left\{E(u_{it}|\varepsilon_{it}=u_{it}+v_{it})|\varepsilon_{it}=\hat{\varepsilon}_{it}\right\}$ .

In our calculations output measures were respondents' satisfaction with HOA services listed in the previous section, and estimation was carried out by the maximum likelihood method, with individual characteristics of respondents and city dummies serving as control variables.

Estimated stochastic frontier indeed reveals significant performance variations (Fig. 5); moreover, Moscow-based HOAs on the average perform better than those in Perm, but their performance displays wider fluctuations (Fig. 6).

Prior to a more regular analysis of the causes of observed variations, which is presented in the next section, it is worthwhile to look into common patterns of organizations-leaders and see what distinguishes them from the rest of the sample and especially from the laggards at the bottom of the distribution. Leaders have substantially larger endowments of technical civic competence, but are barely distinguishable from the rest of the sample, including the laggards, in stocks of generic social capital. Socio-economic inequality among tenants in HOAs-leaders is less pronounced, and payment delinquency is much rarer. Leaders are 2.5 times bigger (in the number of tenants) than laggards; tenants in such HOA are more satisfied with services but also pay higher maintenance fees. In leading HOAs virtually all units are privately owned, whereas among laggards on the average 1/3 of the units belong to municipal governments (which have proportional voting and control rights in such HOAs). More than 80% of leading HOAs were established by tenants, whereas among laggards this share is less than 50%. Significantly, none of the leaders outsource HOA operations to a management company, whereas almost 2/3 of the laggards retain services of such companies.

Figure 6: HOA efficiency indexes (sample total)

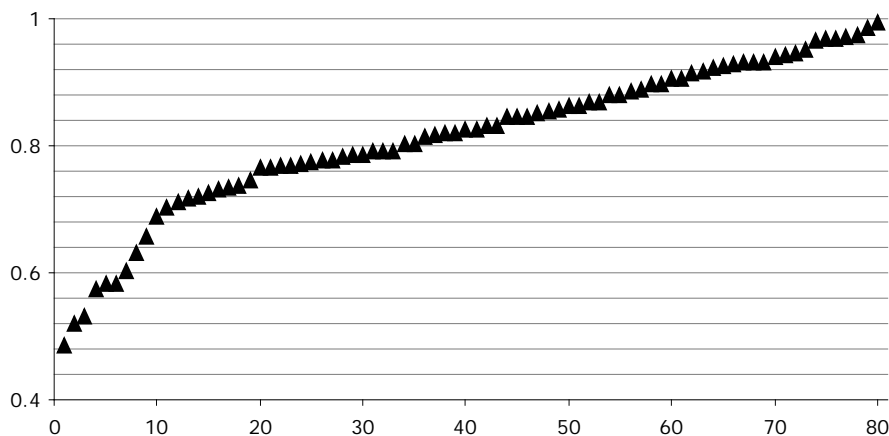
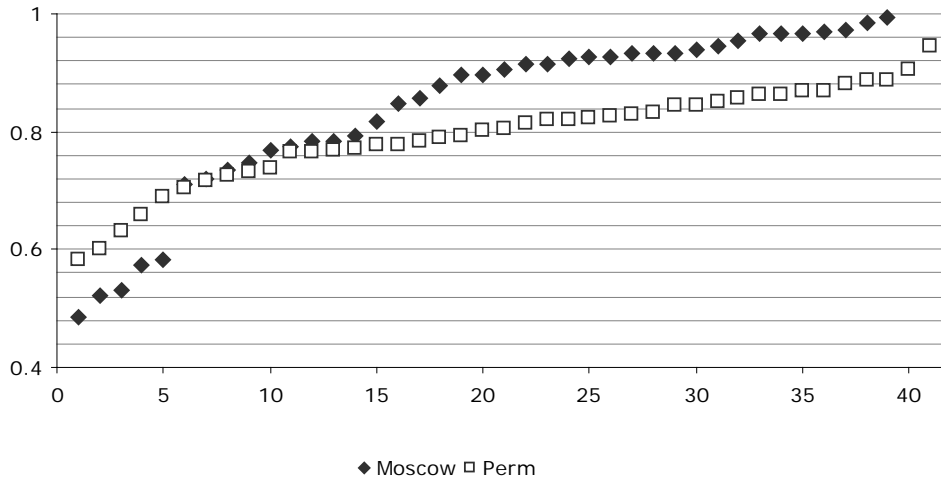


Figure 7: HOA efficiency in Moscow and Perm



## 5. Explaining performance

Assets, constraints, and operational conditions of an organization which are beyond its control, are exogenous variables, which, unlike controllable inputs, are not included in productivity measurement through production possibility frontier. Rather, the impact of such exogenous factors could be studied *after* the production frontier is estimated, by directly regressing on these factors the obtained performance indexes. We are primarily interested in the role played by main tangible and intangible assets of HOAs, i.e. physical and social capital.

To apply the proposed methodology, an aggregation problem must be addressed, which is due to the fact that primary observations in the sample are surveyed tenants, whereas performance (efficiency) indexes are derived for HOAs comprising multiple tenants. Several strategies can be used to resolve this problem – one is to aggregate individual responses *prior* to estimation of the production frontier, and treat HOAs as observations, another – to handle the sample as panel data, and hold the inefficiency term  $u_i$  the same for all respondents from a given HOA, and finally a yet another to calculate “individual inefficiencies” for every respondent and aggregate them *a posteriori*. All three strategies were tested and produced similar results; the third one proved to be the most practical and was used in estimations reported below.<sup>7</sup>

We begin with the following core set of exogenous variables in a regression model: age of the building (a proxy for the physical condition); technical civic competence; generic social capital (measured by availability of neighborly support); origin of HOA (dummy of whether the HOA was created by tenants, instead of a third party); size of HOA (number of households);

<sup>7</sup> For more on aggregation of individual responses into building-wide indexes see Saegert, Winkel, 1998. Further details of explaining HOA performance by econometric models can be found in Borisova, Peresetsky, Polishchuk, 2010.

percentage of apartments which are privately owned. Regression results are reported in Column (1) of Table 2.

Physical and specific social capital stocks are the exogenous variables that are most significantly related to HOA efficiency – one standard deviation of building’s age translates in 2/3 standard deviation of HOA performance, whereas increase of technical civic competence of tenants by one standard deviation improves performance of HOA by 39 per cent of standard deviation. Significance and explanatory power of generic social capital are significantly weaker.

While it is hardly surprising that newer buildings are *ceteris paribus* easier to run, the relative (in)significance of different kinds of social capital is a priori much less obvious. It appears that conventional measures of social capital per se are not good predictors of tenant’s ability to resolve the collective action problem in jointly operating common facilities of their building – what is required for success are specialized traits which underpin the ability to reach and implement an agreement over a joint course of action.

Table 2: Impact of exogenous variables on HOA efficiency

	HOA performance				
	(1) Core factors	(2)	(3)	(4)	(5) Full list of factors
Building age	-0.00407*** (0.000720)	-0.00412*** (0.000775)	-0.00419*** (0.000793)	-0.00418*** (0.000779)	-0.00544*** (0.000808)
Technical competence	0.0497*** (0.0110)	0.0499*** (0.0112)	0.0540*** (0.0125)	0.0488*** (0.0126)	0.0488*** (0.0112)
Generic social capital	0.0483* (0.0259)	0.0489* (0.0263)	0.0473* (0.0272)	0.0472* (0.0267)	0.0171 (0.0294)
Origin	0.0475* (0.0244)	0.0478* (0.0247)	0.0514* (0.0260)	0.0547** (0.0256)	0.0467** (0.0230)
Size	0.0000319 (0.0000323)	0.0000324 (0.0000328)	0.0000177 (0.0000372)	0.0000194 (0.0000365)	0.0000180 (0.0000309)
% private ownership	0.000608** (0.000287)	0.000607** (0.000289)	0.000612** (0.000297)	0.000285 (0.000344)	0.000344 (0.000289)
Inequality		0.00288 (0.0177)	0.000890 (0.0182)	0.000440 (0.0179)	0.0133 (0.0153)
Participation in meetings			-0.00322 (0.00927)	0.00176 (0.00952)	-0.00142 (0.00851)
Social inclusion				-0.0234* (0.0131)	-0.00398 (0.0116)
Payment discipline					-0.0256 (0.0242)
Constant	0.353*** (0.102)	0.343*** (0.118)	0.339*** (0.123)	0.519*** (0.157)	0.540*** (0.142)
R-squared	0.502	0.502	0.509	0.535	0.706
Adj. R-squared	0.452	0.443	0.440	0.461	0.629
Observations	67	67	66	66	49

Building age is in years from capital repairs or construction. Technical competence is the first principal component of various measures of tenants’ ability to operate an HOA. Generic social capital stands for perception of availability of neighbors’ support. Origin is equal to 1 if HOA was established by homeowners and 0 otherwise. Size is measured by total number of households. % private ownership refers to percentage of apartments which are privately owned. Inequality stands for socio-economic inequality among tenants. Participation in meetings is the

first principal component of the total number of tenant meetings and the number that they participated in. Social inclusion indicates how many neighbors and how well a respondent knows. Payment discipline refers to the accuracy of payments of maintenance fees and utility bills. Standard errors are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Two other statistically significant predictors of HOA efficiency are the origin of the organization and per cent of privately owned units. The first of these factors has the expected sign: if an HOA is established by tenants' own joint decision, this is credible evidence – indeed, a signal – of their confidence in the ability to jointly operate common property.

The sign of the second factor shows that HOA performance improves when more decision-making authority is vested with tenants rather than with local governments that has voting rights on behalf of municipally owned units. This finding is plausible, but not a foregone conclusion: although, as it was stated earlier, tenants have strong informational and motivational advantages in running common property, those can be outweighed by difficulties of the collective action problem, in which case a consolidated position of the local government in HOA's decision-making could be a way out of a gridlock. It turns out that the first of the above arguments ends up being stronger, than the second. This conclusion can be reinforced by dividing the sample in two equal halves with the percentage of privately owned units above and below the median – technical civic competence of tenants is significant only in the upper half, whereas in the lower one the only significant factor is the age of the building.

Size of HOA has no significant impact on performance – this is consistent with the presence of two opposite effects mentioned above – the economy of scale, which favors bigger HOAs, and the collective action problem which is easier to solve in smaller groups. The regression shows that these factors more or less cancel off each other.<sup>8</sup> However if the sample is again divided into halves, this time by HOA size, then social capital is significant only in the lower half of smaller HOAs, whereas for bigger ones the only significant factor is the technical conditions of the building proxied by its age. This is consistent with Olson's (1965) views of the role of group size in the collective action problem: smaller size improves odds of resolving such problem, and social capital allows tenants to take advantage of such opportunity, whereas in large groups exceeding 'the radius of trust' (Fukuyama, 1995) size dominates over social capital and the latter loses its significance.

To check robustness of the above conclusions and see if any other exogenous factors, including alternative characteristics of generic social capital, could be affecting performance of HOAs, the core set of regressors was gradually expended by adding one-by-one measures of inequality among tenants; participation in HOA meetings; social inclusion; and accuracy of maintenance fee payments. Regression results are reported in columns (2) to (5) of Table 2: most of the time these newly added factors are insignificant and have only mild influence on the impact and significance of the core factors.

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<sup>8</sup> In some specifications of the regression model the impact of size was mildly significant and positive, but such results were not robust.

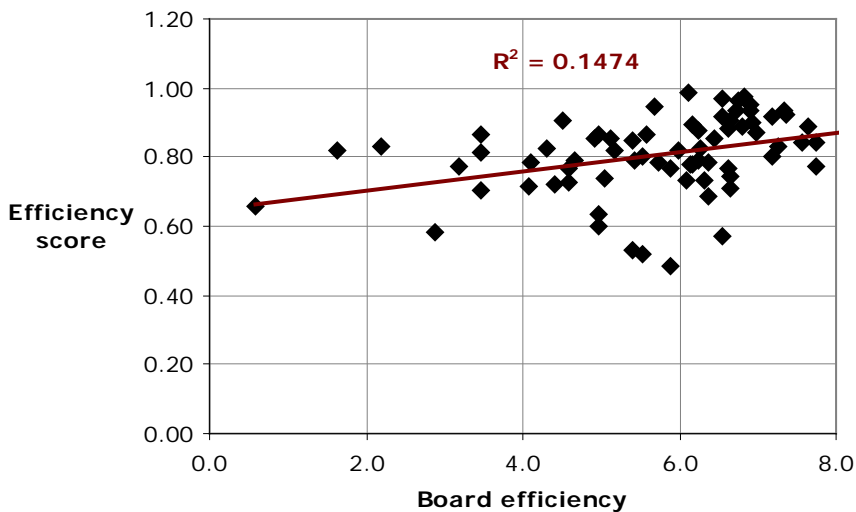


## 6. Making use of institution: governance and contracting

Day-to-day responsibilities of running an HOA are delegated to its board, headed by chairperson, which has the executive authority over spending, operations etc. HOA can also outsource its operations to a specialized management company. Performances of the board and management company (if any) are critically important for the overall success of HOA. In both cases there is an agency problem, and due to multiplicity of principals (the tenants), it could become a hard-to-resolve problem of collective action. Lack of accountability and weak monitoring by tenants due to free-riding could condone sloppy performance of the board and/or management company, or even allow HOA capture with detrimental consequences for the intended beneficiaries of this institution – the tenants. There are multiple reports of such failures of the agency relations in the Russian residential housing sector (see e.g. Yasin, 2005; Sivaev, 2009), and therefore efficiency analysis of HOAs in Russia will not be complete without looking into these key issues.

Correlation between HOA governance index and overall HOA performance in our sample equals .38; strong and statistically significant relation between these measures (Fig. 8) underscores importance of governance for common ownership of housing infrastructure.

Figure 8: HOA governance and efficiency



In its turn, quality of HOA governance, as one would expect, is predicated on the specific social capital among tenants – their technical civic competence. It is noteworthy that generic social capital plays no significant role in explaining board performance.

Table 3: HOA board performance

	HOA governance index
Technical competence	1.121*** (0.126)
Generic social capital	0.465 (0.299)
Controls	Yes
Constant	-4.695* (2.430)
R-squared	0.564
Adj. R-squared	0.532
Observations	75

Technical competence is the first principal component of various measures of tenants' ability to operate an HOA. Generic social capital stands for perception of availability of neighbors' support. Standard errors are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*. Control variables include age, gender and education.

The above results show that the board channels specific social capital into HOA outcomes, thus serving as a 'transmission device' between the two. To find out if the board makes an independent contribution into HOA performance, unrelated to tenants' technical civic competence, we ran a regression of HOA efficiency on board work *and* generic and specific social capital and found that 'in the shadow' of specific social capital the board loses significance (and generic social capital remains insignificant as well). This leads to the conclusion that it would be unrealistic to expect that a lack of tenants' capacity to operate HOA could be made up by good governance *dues ex machina* – without social capital at the grassroots there would be no forces for such substitution.

Table 4: Regression of HOA performance on social capital and performance of the board

	HOA performance
Board performance	0.00712 (0.0127)
Technical competence	0.0323* (0.0189)
Generic social capital	0.0488 (0.0320)
Constant	0.424*** (0.122)
R-squared	0.167
Adj. R-squared	0.130
Observations	73

Board performance is the first principal component of the various measures of board performance. Technical competence is the first principal component of various measures of tenants' ability to operate an HOA. Generic social capital stands for perception of availability of neighbors' support. Standard errors are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

To get further insight into the interplay between governance, social capital, and the organizational performance, and identify possible non-linear effects involved, we again divide the sample into two parts, with board performance resp. above and below the sample average. It turns out that with underperforming board generic social capital becomes significant for the overall performance of the organization – inability to use official governance mechanisms of the

institution makes tenants resorting to more ‘primordial’ direct alternatives, raising importance of generic social capital. Properly functioning board ‘idles’ generic social capital which loses significance – specific social capital is what matters in such case.

Table 5: HOA performance factors with efficient and inefficient governance

	HOA performance	
	(1) Above-average board efficiency	(2) Below-average board efficiency
Building age	-0.00316*** (0.000882)	-0.00652*** (0.00115)
Technical competence	0.0533*** (0.0186)	0.0280 (0.0192)
Generic social capital	0.0125 (0.0337)	0.0764** (0.0356)
Origin	0.0628* (0.0311)	0.0280 (0.0365)
Size	0.0000278 (0.0000376)	0.0000748 (0.0000602)
% private ownership	0.000235 (0.000391)	0.000808* (0.000408)
Constant	0.471*** (0.144)	0.390** (0.177)
R-squared	0.436	0.656
Adj. R-squared	0.323	0.566
Observations	37	30

Building age is in years from capital repairs or construction. Technical competence is the first principal component of various measures of tenants’ ability to operate an HOA. Generic social capital stands for perception of availability of neighbors’ support. Origin is equal to 1 if HOA was established by homeowners and 0 otherwise. Size is measured by total number of households. % private ownership refers to percentage of apartments which are privately owned. Standard errors are in parentheses. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Turning to the second type of agency relations – with a management company – recall that such companies are supposed to bring in advantages of specialization and economy of scale. Since the Russian law allows the backup option of direct management of an HOA without outsourcing these functions to a third party, revealed preferences-type reasoning suggests that all else being equal, HOAs working with management companies should be expected to do better than those working without outside professional help.

The data shows that the opposite is true: on the average those HOAs in the sample that work *without* management companies achieve 10% higher efficiency score (.83) than those working with such companies (.75). Recall that none of the most successful HOAs described in Section 4 engage services of management companies, whereas such companies are involved with two of every three of worst-performing organizations.

The puzzle is explained by the fact that more often than not involvement of a management company is *not* a free choice of tenants: out of 52 HOAs in the sample that were established by tenants themselves, only 6, or 12%, work with management companies, whereas among 29 HOAs that were created by third parties – local authorities, developers, and sometimes

management companies themselves, 11, or 38%, engage services of management companies. This is consistent with numerous complaints about Russian management companies which often fail to deliver value for money and used as instruments of HOA capture. One of the main reasons for this frustration is a lack of competition – in many instances management companies are privatized municipal services that enjoy near-monopoly power in their localities (Yasin, 2005). Competitive entry in this industry is obstructed by a lack of required production assets, and administrative barriers raised by local governments which could have informal affiliations with dominant providers of management services. Under such circumstances HOAs often prefer to make do on their own, without outsourcing to management companies. This appears to be the second-best choice, which however denies Russian homeowners the benefits of professional management of their common facilities.

Such losses could be not too dramatic for successful HOA where apartment buildings are in good conditions and tenants have enough social capital to elect honest and competent individuals to run the association, and to properly monitor performance of HOA officers afterwards. In the case of less fortunate tenant communities a competitive management services industry could have made a big difference by alleviating the lack of inner capacity to resolve the collective action problem.<sup>9</sup> Competition delivers performance through market discipline even if the ability to ensure such performance within a multiple agency setting vis-à-vis an individual management company is weak. It is therefore unfortunate that Russian homeowners are faced with a twin deficit of social capital *inside* their communities and *outside* competition of management companies.

## 7. Concluding remarks

The short history of Russian HOAs confirms the general dictum that ‘slow-moving institutions’, first and foremost social norms and culture, could impede faster-unfolding institutional reform (Roland, 2004). Material factors certainly play an important role in uneven outcomes of HOA reform – growing rift between the escalating costs of maintenance and utilities, on the one hand, and household incomes, on the other, especially in poorer neighborhoods, where buildings urgently need repair, and wages are low, makes tenants reluctant to assume responsibility for common facilities of their houses. Social factors however also play a major role – a lack of ability to operate the new institution could turn it into a dysfunctional ‘empty shelf’ prone to capture and other kinds of misuse.

Complementary input that is required to properly self-manage urban commons is the social capital. Due to historical reasons, mainly a long history of authoritarian rule and further recent depletion during economic hardship and dislocation of the post-communist transition, the stock of social capital in Russia is low, and exists largely in obsolete forms (Rose, 2000) which are

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<sup>9</sup> Substitution between social capital among tenants and management companies competition is illustrated by the experience of HOAs in Taiwan, where tenants were often unable to ensure efficient management of common facilities on their own, and thus reluctant to form HOAs, not unlike in Russia. The growth of Taiwanese HOA was driven by “...highly competitive and innovative property companies – rather than through HOA governance structures per se. The latter are characterised by many of the same problems that weigh down conventional municipal government.” (Chen, Webster, 2004).

poorly suited for running modern institutions. Accountable governance seems to be the crux of the matter, and this is a collective action problem which is among the hardest to resolve. Our analysis shows that HOA governance is as good as tenants' social capital, and therefore hopes that good governance could still be possible against the backdrop of passive society appear to be groundless, at least in the case of HOAs. A lack of competition in the housing services industry denies Russian HOAs an external remedy for unresolved collective action problem, creating an institutional stalemate.

Commonly observed frustration in the institution of HOA and reluctance to form HOAs is a natural reaction to the above problems. Despite of poor track record of local governments' maintenance of residential housing, it is viewed by many as a preferred option to self-management (such sentiments are consistent with the general pattern of longing for more government regulation, even of low quality, in societies with a lack of social capital – see Aghion et al., 2009).

The general conclusion of the presented analysis is that design of efficient institutions for urban commons, as for the commons in general (Ostrom, 1990), requires greater flexibility (Saegert, Winkel, 1998), and in particular attention to social conditions on the ground, which could render 'best-practice institutions' non-performing.

The paper also demonstrates the potential of the stochastic frontier-based methods of performance assessment in the third sector. Obtained relative efficiency measures seem to capture performance variations of HOA, further regression analysis allows to explain them. Finally, we could recommend this method for other types of non-profit associations.

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