Pertti Haaparanta and Tuuli Juurikkala

Bribes and local fiscal autonomy in Russia

SUOMEN PANKKI
FINLANDS BANK

EUROJÄRJESTELMÄ
EUROSYSTEMET

BOFIT Personnel 2007

Economists

Mr Pekka Sutela, head
Russian economy and economic policy
Russia's international economic relations
China in the world economy
Pekka.Sutela@bof.fi

Ms Tuuli Juurikkala, economist
Russian economy and economic policy
Private sector development
Tuuli.Juurikkala@bof.fi

Mr Juuso Kaaresvirta, economist
Chinese economy and economic policy
Juuso.Kaaresvirta@bof.fi

Ms Tuuli Koivu, economist
Chinese economy and economic policy
Tuuli.Koivu@bof.fi

Mr Iikka Korhonen, research supervisor
Exchange rate policies in transition economies
Monetary policy in transition economies
Editor-in-Chief of *BOFIT Discussion Papers*
Iikka.Korhonen@bof.fi

Ms Seija Lainela, economist
Russian economy and economic policy
Editor-in-Chief of *BOFIT Weekly*
Seija.Lainela@bof.fi

Mr Aaron Mehrotra, economist
Chinese economy and economic policy
Monetary policy in transition economies
Aaron.Mehrotra@bof.fi

Mr Simon Ollus, economist
Russian economy and economic policy
Russian industrial policy
Simon.Ollus@bof.fi

Mr Jouko Rautava, economist
Russian and Chinese economies and economic policies
Editor-in-Chief of *BOFIT Online*
Jouko.Rautava@bof.fi

Ms Heli Simola, economist
Economic relations between Russia and Finland
Russia's impact on the Finnish economy
Heli.Simola@bof.fi

Ms Laura Solanko, economist
Russian regional issues
Public economics
Laura.Solanko@bof.fi

Ms Merja Tekoniemi, economist
Russian regional issues
Merja.Tekoniemi@bof.fi

On leave of absence

Mr **Vesa Korhonen**, email: Vesa.Korhonen@formin.fi
Mr **Jian-Guang Shen**, email: JGShen@imf.org

Information Services

Ms Liisa Mannila, department secretary
Department coordinator
Publications traffic
Liisa.Mannila@bof.fi

Ms Päivi Määttä, information specialist
Information services
Paivi.Maatta@bof.fi

Ms Tiina Saajasto, information specialist
Information services
Tiina.Saajasto@bof.fi

Contact us

Bank of Finland
BOFIT – Institute for Economies in Transition
PO Box 160, 00101 Helsinki, Finland

Phone: +358 10 831 2268
Fax: +358 10 831 2294
E-mail: bofit@bof.fi

Pertti Haaparanta and Tuuli Juurikkala: Bribes and local fiscal
autonomy in Russia

Contents

Pertti Haaparanta and Tuuli Juurikkala

Bribes and local fiscal autonomy in Russia

Abstract[1]

Russian industrial enterprises inherited from the Soviet era a tradition of producing welfare and infrastructure services within the firm, also for outside users. Despite the massive restructuring of the economy that took place since, many firms are still active in service provision. At the same time, opaque fiscal federalism is a problem for municipalities whereas rent extraction by public sector officials is a problem for firms. In this paper we examine whether there is a link between these phenomena. We propose a model on local fiscal incentives, service provision by firms and the municipality-firm relationship in the form of bribes. Using survey data from 404 medium and large industrial enterprises in 40 regions of Russia, we find that the higher the share of own revenues in the local budget, the more likely the firms are to report bribes. In the case of infrastructure services, the data also support the hypothesis that the channel is through service provision: the less fiscal autonomy, the more service provision and the less likely the firms are to report bribes.

Pertti Haaparanta and Tuuli Juurikkala

Bribes and local fiscal autonomy in Russia

Tiivistelmä

Venäläiset teollisuusyritykset perivät neuvostoajoilta keskeisen roolin paikallisten sosiaali- ja infrastruktuuripalveluiden tuottajina. Huolimatta 1990-luvun alussa alkaneesta yhteiskunnan ja talouden rakennemuutoksesta monet yritykset tuottavat yhä itse palveluita tai tukevat paikallisia palveluita muulla keinoin. Samaan aikaan federaatio-, alue- ja kuntatasojen välinen vallan-, vastuun- ja rahanjako on ollut epäselvä ja toisaalta yrityksiltä on vaadittu epävirallisia maksuja julkisen sektorin palveluiden saamiseksi. Tässä tutkimuksessa kehitetään yksinkertainen teoreettinen malli yllä mainittujen ilmiöiden mahdollisista yhteyksistä ja testataan mallin tulokset 404 keskisuuresta ja suuresta yrityksestä 40:llä Venäjän alueella kerätyllä aineistolla. Mallin mukaan yritykset ja kunta voivat liittoutua ylempiä hallintotasoja vastaan. Yritys saa anteeksi veroja, jos se osallistuu palveluiden tuotantoon, ja toisaalta sen pitäisi joutua silloin maksamaan vähemmän lahjuksia. Tulokset osoittavat, että mitä itsenäisempi kunta on taloudellisesti, sitä vähemmän yritykset osallistuvat paikallisen infrastruktuurin ylläpitoon ja toisaalta sitä todennäköisemmin ne raportoivat joutuneensa maksamaan lahjuksia. Asumispalveluiden tuotannossa vastaavaa yhteyttä ei löydy.

Asiasanat: paikallishallinto, taloudelliset kannustimet, korruptio, palvelutuotanto, yritykset, Venäjä

1   Introduction

Russia inherited from the Soviet Union a production structure in which industrial enterprises played a major role in providing goods and services such as housing and medical care. The result was a system that Ericson (1999) calls Industrial Feudalism, where federal authority is quite weak relative to regional and municipal authorities and where people are tied to the local economy through the provision of public services.

These same firms are still extensively participating in the provision of local services, typically provided by the public sector or specialised private enterprises in a market economy. This is clearly shown in the data collected in a unique survey of 404 medium-sized and large Russian industrial firms, as the firms continue to own social assets and finance the public social sphere and infrastructure.[2]

The services produced by firms are not limited to social ones but include parts of infrastructure like electricity and heating as well. In some extreme cases, for example, heat production might be the only profitable activity within an enterprise that originally concentrated in a completely different line of business. Furthermore, firms may directly contribute to the local community by financing municipal social assets, local road or rail building, the renovation of water supply and sewage systems and so on, anticipating tax or other favours from the municipal government, which is in turn often willing to engage in these barter transactions in order to avoid losing tax revenue to upper levels of government.[3] It may be argued that engaging in these activities diverts firms' resources from more productive uses, thus impeding growth.

In this paper we present a simple model for local service provision to derive hypotheses on whether increased local fiscal autonomy is good or bad for the Russian firms, and test our hypotheses using these newly available survey data. In previous literature it has been pointed out that in order for decentralization to be really effective, structures of local accountability have to be in place first (see e.g. Bardhan 2005). Otherwise, ambiguous resource allocation between different layers of government may result in perverse fiscal incentives at the local level. We show that local government officials are not necessarily helpless in the face of predation by upper levels of government, as has been suggested

---

[2] The survey and basic data description is available in Haaparanta-Juurikkala-Lazareva-Pirttilä-Solanko-Zhuravskaya (2003).
[3] The Russian Federation government is three-tiered, with federal, regional and municipal layers.

in previous literature, but rather collude with local firms to get around the challenge. Firms participate by offering local services. This practice may then also have the positive effect that fewer bribes are demanded from the private sector locally.

Service provision by firms may also be seen as a mere legacy from the Soviet era, or as a regular economic decision to compensate workers with a package of wages and fringe benefits, just as in any country.[4] In addition to these approaches, the general discussion on corporate social responsibility in Russia and elsewhere attempts to shed light on the issues of local participation by firms. In this paper we, however, concentrate particularly on the firm- local public sector interaction and hypotheses related to fiscal incentives of the municipality.

The system of regional autonomy with formal, local non-autonomy can in general be seen as a major source of problems in the Russian economy. Shleifer and Treisman (2000) argue that this system has supplied all the sub-national authorities with incentives to engage in rent extraction. Given that shared taxes are a major source of revenue, the problem of the commons arises where resources are devoted to fight for the revenue and to divert revenue for own use and away from everybody else. At the local and regional levels, it is understood that if they locally get only a share of the tax revenue collected, then it is beneficial to divert the revenue from higher-level authorities. With large powers devoted to the regional authorities, this has certainly been feasible.

This system also has implications for the relationships between firms and authorities. As noted above, one way to divert tax revenue is to extort payments from the firms indirectly by means of charging various extra fees and directly by blackmailing. This practice naturally shrinks the tax base, but may be viewed as the optimal solution by subnational authorities. However, this system does not offer an efficient means of collecting revenue and certainly has implications for the regional and local provision of public services. In this system, authorities are biased towards subsidizing firms that are seen as a source of rents, while they are biased against protecting firms from corruption (Gehlbach 2003)[5].

These problems are aggravated by the lack of local autonomy, which increases incentives for local authorities to use firms as a source of revenue, especially when expendi-

---

[4] See Friebel and Guriev (2005), and Grosfeld et al (2001). In two companion papers to this one, using the same data, Juurikkala and Lazareva (2006a and 2006b) find that giving up company housing has in many cases involved a lengthy negotiation process with the local public sector, and that current social service provision by the firms indeed reduces their labour turnover.

tures dictated by federal authorities cannot be met. This situation also reduces incentives to efficiently provide public services (Litwack 2003). An additional source of inefficiency arises when local revenues are independent of local policies. This happens if municipalities' income comes from sources such as tax sharing and as transfers from higher-level governments[6]. In this case, local authorities do not have any incentive to efficiently produce public services. Zhuravskaya (2000) provides evidence for this mechanism. Her results have been partly challenged by Alexeev and Kurlyandskaya (2003), who argue that the marginal tax rates for own revenue are below 100% and that the source of inefficiency is the inability of regional authorities to commit to efficient incentive contracts. But the main point of under-provision of local public goods remains.

The mechanisms described above do not, however, allow for the possibility of diverting taxes at the local level. Empirically, this is a significant phenomenon (Kurlyandskaya 2002, Lavrov, Litwack, and Sutherland 2001, and Sonin 2003). One possible route for diversion is to make local enterprises provide public services in exchange for reduced taxes or increased tax arrears[7].

We analyse the reasons behind these persisting phenomena by focusing on the connection of the ambiguous distribution of tax revenues between various layers of government, and possible excessive local regulation and bribery. We model why, in the current situation, it may be optimal at the local level to provide services through industrial firms. We take the regional and federal level action as given and concentrate on the relations between the municipal and upper levels of government from the local point of view, as well as on those between the municipality and firms.

Our model is based on Zhuravskaya (2000). It implies that if the main motive for providing (in principle) publicly provided services through firms is to increase the municipality's share in overall tax revenues, then one should observe that the firms are more likely to bribe, if the level of local fiscal autonomy is high. This result is in contrast to the result in Zhuravskaya. The intuition is that with less budgetary independence, municipalities have an interest in colluding with the firms in such a way that they produce services and in exchange are forgiven part of their taxes. Thus, municipalities have less incentive to extort bribes. We did indeed find evidence in the survey data that the higher the share of own

---

[5] Timofeev (2002) argues also that local authorities are more sensitive to local "pressures", increasing the problem in regions with a higher degree of sub-regional decentralization.
[6] Transfers to a municipality decline when its revenues increase.
[7] See also Tonis (2003).

revenues in the local budget, the more likely the firms are to report bribes, and that firms engaged in heating or housing provision do receive special treatment from the public sector.

Next, in sections 2 and 3 we present the model and evidence from the survey data. Section 4 concludes and sets an agenda for future work.

2   The model

Our model attempts to highlight the crucial role of service provision by firms in shaping the relationship between firms and local authorities. Our point is that service provision can be a means for the local authorities to fight for a higher share of tax revenue under conditions where the distribution of tax revenue is not clearly defined.

Assume there are several layers of government with municipalities at the lowest level. Assume further that the total taxes being collected are T, of which the (representative) municipality receives share $0 < \theta < 1$. The tax revenue is thus a common pool that the various authorities try to capture (Shleifer and Treisman 2000, Zhuravskaya 2000). Assume there are n public goods. Thus the ordinary public sector optimisation problem is

$$\max_{\{g_i\}} u(g_1,...,g_n)$$
$$s.t. \qquad\qquad (1)$$
$$\sum c_i g_i \leq \theta T$$

Here P_i = the amount of the public good i produced and c_i = the unit cost of producing it in the public sector.

Assume now that the municipality has the option of affecting the tax collection. To make our point clear we assume that the municipality can decide how much a firm has to pay in taxes to give it incentives to supply a public good. Let that be good 1. In this case the optimisation problem becomes

$$\max_{\{g_i,s\}} u(P_1,...,P_n)$$
$$s.t.$$
$$\sum_{i=2}^{n} c_i P_i \leq \theta(T-s) \qquad (2)$$
$$c_{p1} P_1 \leq s$$

Here c_{p1} = the unit cost of producing public good 1 by the private firm and s = the taxes the firm can avoid paying. Thus, the firm has an interest in the tax revenue-hiding scheme itself. Implicit in the formulation (2) is the assumption that the municipality can perfectly control the production of the public good. Finally, it is also assumed that the firm cannot hide any of its revenue from the local officials. Given that the municipality benefits from the scheme when these assumptions are made, it certainly would benefit even if the firm were able to shirk on a small part of the public good production requirement.

Comparing (1) and (2), it is clear that a) the tax rebate to the firm increases the total tax revenue that the municipality can obtain, assuming the firm supplies the good; b) the public good provision can be biased towards the production of good 1; and c) the tax rebate can be optimal for the municipality even if the firm's unit cost of producing the public good is higher than the municipality's unit cost.

To get a more concrete impression of how these ideas may be applied and to understand what role the service provision by firms can play, we take a special case of the model outlined above. This extends Zhuravskaya's (2000) model to a situation in which the firm might also produce a public good, or in our case, to be exact, a private good or service, which would, however, typically be provided by the public sector or by specialised as opposed to industrial firms. The feature outlined above, the sharing of tax revenues, already incorporates Zhuravskaya. The point we make is that the provision of local services by the firms may reverse Zhuravskaya's conclusion that tax revenue sharing results in excessive regulation or harassment of firms at the expense of public good provision.

As in Zhuravskaya (2000), public revenues T consist of the sum of shared and own revenues. In our case, we next restrict ourselves to a situation where the municipality produces only good 2. By assumption, own revenues consist of a fixed part $\overline{W}$ and a variable part $W(P_1, P_2, B)$, where B is a private benefit to the mayor from excessive business regulation or bribes. Own revenue is an increasing function of the local tax base. Public goods provision reduces the general costs of doing business, thus increasing local economic activity and having a positive effect on the tax base. Over-regulation, or demanding bribes, has the opposite effect. In addition, we assume that public goods provision cannot increase revenue net of the costs of providing them: $0 < W_{P1} < 1$, $0 < W_{P2} < 1$ and $W_B < 0$.

We also assume that the shared revenues depend on the municipality's own revenues, consisting of a fixed part $\overline{T}$ and a variable part $\alpha[W(P_1, P_2, B) - s]$ where the exoge-

nous parameter α, $-1 \leq \alpha \leq 0$, represents the mayor's ability to raise revenues at the margin. α measures the degree by which the city can affect its revenues through its own measures. Zhuravskaya (2000) estimates α to be close to –1 while Alexeev and Kurlyandskaya (2002) estimate a smaller (in absolute value) figure. The idea here is that higher-level authorities can affect the transfers to the region. In general, they reduce transfers if revenues at the local level increase. This provides perverse incentives at the local level. We thus define $\theta \equiv 1 + \alpha$. We also set, for simplicity only, both the public and private sector unit costs of production to unity. With the more natural assumption that private sector production costs are lower, there would be an additional motive for shifting production to the private sector. We want to focus only on the tax revenue-shifting motive. The optimisation problem of the municipality becomes

$$\max_{\{P_1, P_2, B, s\}} u(P_1, P_2, B)$$
$$s.t.$$
$$P_2 \leq \overline{W} + \overline{T} + \theta[W(P_1, P_2, B) - s] \quad (3)$$
$$P_1 \leq s$$

Setting $s = P_1$, we can express the budget constraints as $\theta P_1 + P_2 \leq \overline{W} + \overline{T} + \theta[W(P_1, P_2, B)]$ Constructing the Lagrangian for solving the optimisation problem above gives us $L = u(P_1, P_2, B) + \lambda[\overline{W} + \overline{T} + \theta W(P_1, P_2, B) - \theta P_1 - P_2]$ from where it may already be seen that when the mayor's ability to raise revenues worsens, or θ decreases, the relative price of producing P_1 becomes lower. Now P_1, P_2, B (and s since P_1 is set equal to s at the optimum) are defined by equations (i) – (iv):

(i) $u_{p1} - \lambda\theta + \lambda\theta W_{p1} = 0$
(ii) $u_{p2} - \lambda + \lambda\theta W_{p2} = 0$
(iii) $u_B + \lambda\theta W_B = 0$
(iv) $\theta P_1 + P_2 = \overline{W} + \overline{T} + \theta[W(P_1, P_2, B)]$

These conditions clearly show that public good provision is biased towards the provision of good 1. In the extreme case where θ = 0, i.e. local revenues are not at all affected by local policies, local authorities clearly have an incentive to harass local firms for the authorities' own benefit (by (3iii)). But contrary to the case analysed in Zhuravskaya, the incentives to provide P_1 are also strengthened, since now it can be used to increase local

revenues[8]. Hence, it is not at all clear how the shared tax problem affects the extent of harassment relative to public good provision.

To get a clearer picture we consider a special case where P_1 and P_2 are perfect substitutes or in practice they are the same good, which either the public or the private sector, or both, can produce. This describes a situation in which really the issue is how much of the (public) good is to be provided within the public sector and how much by firms. The optimisation problem is now

$$\max_{\{P_1, P_2, B, s\}} u(P_1 + P_2, B)$$
$$s.t. \quad\quad\quad\quad\quad\quad\quad\quad (4)$$
$$\theta P_1 + P_2 = \overline{W} + \overline{T} + \theta[W(P_1 + P_2, B)]$$

from which one can conclude that the public sector will not produce the good at all, given the possibility to make the private sector produce it through the tax rebate incentive, and the fact that the mayor is not able to keep all locally raised tax revenue within the municipality budget.

Proposition 1: $P_2 = 0$ when P_1 and P_2 are perfect substitutes and $\theta < 1$

Proof of proposition 1:

Straightforward $\therefore$

Clearly, with the assumptions made, it is cheaper for the authorities to make firms produce all of a (public) good: one unit of the good 1 produced by the firm costs only $\theta < 1 = $ cost of providing one unit by the local government. Thus, it is optimal to make firms provide all of it.

The municipality's optimisation problem now reduces to

$$\max_{\{P_1, B\}} u(P_1, B)$$
$$s.t. \quad\quad\quad\quad\quad\quad (5)$$
$$\theta P_1 = \overline{W} + \overline{T} + \theta[W(P_1, B)]$$

---

[8] Note that in Zhuravskaya's case (where s = 0) the relative supplies of both public goods are at their first best levels but their provision is suboptimal. The first best case for the given transfer policies adopted by higher-level authorities can be obtained by maximizing the utility with B = 0 and subject to the budget constraint $P_1 + P_2 \leq \overline{W} + \overline{T} + \theta[W(P_1, P_2, B)]$.

We also assume that $W(P_1, B)$ is concave, $0 < W_{P_1} < 1$ and $W_B < 0$ as above, and that $W_{P_1 P_1} < 0$, $W_{BB} < 0$ and $W_{P_1 B} < 0$. Furthermore, we assume, according to Zhuravskaya (2000), that the utility function is of form $u = P_1 + bB$. The parameter b measures the degree to which the mayor is corrupt. From (5) it then follows that the less able the mayor is to keep the local tax revenues within the local budget, the more the private sector produces good P_1 and the less incentive there is for the mayor to extract private benefits through bribes or other means.

$$\text{Proposition 2: } \frac{dB}{dP_1} < 0$$

$$\text{Proposition 3: } \frac{dP_1}{d\theta} < 0$$

The proofs of these propositions are in Appendix.

By combining these two propositions, we reach a striking conclusion: The less local authorities can control the revenues they have access to, the less they will harass local firms for their own private benefit if they have an opportunity to use local firms to provide the (public) good. This is exactly the opposite of the main conclusion in Zhuravskaya (2000). The intuition is that the opportunity to switch tax revenue to local authorities through firms' provision of public services increases the cost of harassment relative to the case when the option is not available.

In the empirical work, we do not have data directly on θ. Proposition 2 implies that if the main motive for providing (public) services through firms is to increase the share of the local community in shared tax revenues, then one should observe a negative correlation between the bribes paid to local authorities and the extent of service provision by local firms. Proposition 3 implies that if θ varies across municipalities one should also expect the relative provision of public services by firms to vary across them if the ease with which firms can provide various services varies across municipalities. If e.g. a firm did not divest its housing stock or stop providing heat to users outside the firm early on in the transition, one may expect the municipality to not be willing to allow it to do it later. Hence, one would see differences in the divestment of the housing stock or heat production as reflecting variation in θ across municipalities.

Next we discuss evidence from firm survey data. We concentrate on housing and heating as they have been by far the major social and infrastructure assets or services the firms provide. Also, our theory does not require that all services be used to divert tax revenues to the local authorities. Hence, we are trying to find if there is any evidence for the diversion mechanism outlined above. Also, we are concerned with whether the mechanism is significant enough. By focusing on the most important services provided by the firms, we can achieve both goals. We provide first an overview of which firms provided housing and/or heating in 2003 [9], and, separately, which firms were likely to report positive bribes. Second, we combine these results to see whether and how service provision and, simultaneously, the probability that the firms report positive bribes, are determined by the level of local fiscal autonomy in their respective municipality.

3   Evidence

3.1   The data [10]

The results are based on a survey of 404 middle-sized and large manufacturing firms in 40 Russian regions conducted in 2003. In the survey we examined the extent of social service and infrastructure provision by the firms and the firms' assessment of the quality of public infrastructure and the regulatory environment. Background information including ownership, investment, performance, competition, and finance decisions of the firms was also gathered.

The source of information for the population of firms is the enterprise registry maintained by Rosstat (Federal State Statistics Service). In the construction of our sample we concentrated on the industrial sector, and within it manufacturing firms for which energy production is not a regular line of business. We set a minimum size limit of 400 employees, as pilot interview rounds indicated that smaller firms are unlikely to provide infrastructure or social services. Constructed in such a way, our sample frame contained 3523 firms. Our sampling technique includes a combination of clustering by region and systematic sampling by size. In the 404 firms in our final sample, the general manager and the managers responsible for social and infrastructure affairs were interviewed face-to-face. Accounting information was left to be filled in by the chief accountant.

---

[9] These issues are discussed in more depth in two companion papers, Juurikkala (2006) and Solanko (2006).
[10] For more details, see Haaparanta et al (2003).

In our sample, compared to the population of Russian firms, the majority of industries are adequately represented in terms of the share of the firms, as are the federal districts. The fact that we surveyed medium and large enterprises explains the bias towards metallurgical firms regarding the distribution of industrial employment. The size distribution of our final sample is close to the population, with the median establishment having 784 and the average over 1600 employees.

Only 5% of the firms in the sample are relatively new, created during the 1990s. The majority of the firms in the sample are open joint stock companies, which is not surprising as most of the formerly state-owned firms were turned into open joint stock companies during the mass privatization of the early 1990s and some 80% of the sampled firms were privatized during 1991-1994. Lastly, similar to many previous surveys, the sample contains some degree of selection bias towards the better-performing firms.

In addition to the survey data, we use municipal data from Rosstat. The exact variables used are defined below in the results section.

3.2 Results: which firms do what?

Housing

In the data (Haaparanta et. al. 2003), firms provided welfare services extensively. Over 90% reported providing or supporting at least one service in 2003. In this paper, we concentrate on housing provision as it has been by far the most important of the services included in the survey (the others varying from medical services and day care to sports utilities and holiday resorts).[11]

In the spring of 2003, over half of the surveyed social managers reported that their respective firms still owned housing or provided housing support in some other form, mostly through direct subsidies. It is also striking that in over half of the firms that offer this benefit, users are not just employees and their families.

In our analysis of the connection between fiscal autonomy, bribes and service provision, we use the following simple question posed to the general managers of the surveyed firms as the measure of whether a firm was engaged in social service provision or not:

---

[11] In three companion papers, Juurikkala (2006), and Juurikkala and Lazareva (2006a) and (2006b), we analyze in more detail the provision of welfare services by the surveyed firms, the determinants of housing di-

Does your firm have housing? Yes or no

From the probit estimations in Table 1 it may be concluded that housing within the firm in 2003 was first and foremost determined by legacy, i.e. whether the firm had inherited housing from the Soviet era (from the year 1990) or not. Our main variable of interest, the share of own revenues in the local budget, seems to have a positive effect on whether the firm has housing. This effect is, however, significant only at the 10% level, or not at all, once we control not only for the size of the firm, measured by employment, but also for the size of the municipality, measured by the logarithm of the number of inhabitants. Thus, from the perspective of our model, housing services do not seem to be a channel through which tax revenues are diverted to municipalities. Our model abstracts from many elements of local decision-making. It may be, e.g., the case that the local electorate demands that prevailing practices be continued. Also, our model does not predict exactly what happens with every social or infrastructure service under different levels of fiscal independence.

As to our measure of fiscal independence, the share of own revenues in the local budget in 1999, we use this variable as a proxy for fiscal incentives, even if it is possible that it does not capture the phenomenon completely. However, we feel that if a municipality has a high share of own revenues in its budget, it is highly likely that a large proportion of any extra income collected in the municipality would also flow to the local budget. This may be because the municipality has a good bargaining position towards regional and federal authorities, for example. In this case, the previously demonstrated ability to retain revenues more effectively would also be a signal of future actions.

Based on more detailed analysis in a companion paper (Juurikkala 2006), we also include in our estimations as an explanatory variable for housing provision the question whether the firm received budget assistance from the public sector during the years 2000-2002. This effect is positive and robust to different specifications. Further, having a boiler goes hand in hand with having housing, which is not a surprise as the local infrastructure was in many cases built around a large plant so that it provided heating also to the nearby residential buildings. What is of course interesting is that this relation has persisted until this decade. Lastly, supporting municipal housing is also connected with having housing

vestment timing and the compensation aspects of firm-provided benefits. Solanko (2006) analyses the determinants of district heating provision by the same firms.

within the firm, confirming the finding from our data that service provision is done mostly by firms with close connections with the public sector in general.

Heating

Of the 404 firms surveyed, 306 reported having a boiler on site and 167 of them responded positively when asked the following question, used as our dependent variable and proxy for infrastructure service provision:

Does your firm sell or exchange heat to outside users? Yes or no

Similarly to findings in Solanko (2006), in Table 2 it can be seen that the size of the firm matters, as does again the inheritance factor. Having housing in 1990 mostly means that the firm produced also heat. Most interestingly, in contrast to housing, our measure of fiscal independence has now the negative effect predicted by our model, and this result is both significant and robust to different specifications.

One potential explanation for this difference compared to housing services is that selling heat may be even profitable, irrespective of whether the firms disclose this information or not (in our survey, only 69 of the 167 firms selling or exchanging heat outside reported it as profitable), whereas keeping up housing is more likely to be a mere burden (as again analyzed in companion papers). Thus, firms themselves may have an incentive to go along with diversion if it altogether implies a lower tax burden (including bribes paid to authorities).

The better the firm considered the surrounding infrastructure to be, the more likely it was to sell heat outside. Non-monetary help for improving local infrastructure had no significant relationship to heat provision. The larger the population in the municipality, the less likely the firm was to provide heating to users outside the firm, though this effect is not significant. For housing the result was again vice versa but not significant either.

All the results presented so far are of course subject to discussion, as the specifications are simplified versions from analysis in companion papers. Our intent was to keep the estimations simple enough, while not losing too much information needed for the main purpose of this paper, which is to see whether fiscal autonomy and the propensity to bribe could really be connected through the channel of local service provision.

Bribes

In the past few years more and more studies have tried to measure corruption. In this survey, we intended to utilize a benchmark way of asking these questions, namely not asking directly whether the firm pays something, while still asking it clearly enough for the respondent to understand what we were actually after. This goal of reaching some kind of psychological balance between gaining knowledge of bribes and not being too offensive led us to the following formulation, inspired mostly by Reinikka and Svensson (2003):

How much does a firm like yours typically have to pay to officials to make things work more smoothly?

The question was asked as a percentage of the annual sales of the firm. Surprisingly many firms, 173 out of 404, did answer, and 69 of them gave answers above 0%, ranging from less than 1% to 20% of sales. For the purpose of this paper, we formulated a dummy equal to 1 if the firm answered something positive and 0 if the firm agreed to answer but reported 0% "speed money".

In line with our model's predictions, the measure of fiscal autonomy, i.e. the share of own revenues in the local budget, has a positive and significant effect on the probability that a firm reports positive bribes. This result is both significant and robust, as is seen in Tables 3 and 4. Having a boiler on site is positively associated with bribes. The larger the firm and the municipality, the less bribes seem to change hands, though these results are not significant. The connections of bribes with non-monetary help for local infrastructure building, and with the possible budgetary assistance received from the state, are as expected: positive and negative, respectively. These variables may be interpreted as forms of corruption themselves: officials may squeeze or accept non-monetary help from the firm in the same way as they demand money, and vice versa, budget assistance may be interpreted as a negative bribe: money moves the other way around, i.e. from the public pockets to private ones.

In Table 3 we present results without, and in Table 4 results with, a Heckman correction of a response bias found in the data, namely that the more state ownership a firm had, the less likely it was to answer our question on bribes. The correction actually makes our case even stronger. We want to, however, report also some of the results without it, due to data limitations. Without the correction, we see that just having a boiler on site is very much connected with reporting positive bribes, as opposed to selling or exchanging heat

outside the firm, which is our main variable of interest here. With the correction, however, we have to date not been able to run the estimations with the boiler among the explanatory variables.

Altogether the results thus far provide quite strong evidence for the role of heating provision in tax diversion. Both the bribe determinants and provision of heating are affected by the variables of interest according to the theory presented above.

3.3   Results: simultaneous estimations

As bribes and service provision are determined simultaneously in our model, we utilize bivariate probit to answer our final question, i.e. to test whether it is service provision through which local fiscal incentives and bribes are connected.

To account for the selection problem caused by survey nonresponse, we consider the bivariate probit as two seemingly unrelated univariate probits. The estimates of the two probits, the Heckman-corrected bribe equation and the heating or housing equation, should stay the same, but the seemingly unrelated estimation procedure corrects the standard errors to account for correlation across the two equations.

As is seen in Table 5, the simultaneous estimation results strengthen our conclusions from the univariate probit estimations above. The bribe estimation results hold and the service results become even stronger. For heating provision, the size of the municipality is now a significant explanatory variable. The larger the population, the less likely firms are to provide heating to users outside the firm. The level of fiscal autonomy and the assessment of the state of local infrastructure by firms also become even more significant in explaining whether firms provide heating in the locality.

As to housing, the evidence from the bivariate estimation tells that it is not used for tax revenue diversion, and the result is stronger than from the univariate estimation. Now fiscal incentives have a significant, albeit weak, positive connection with housing provision.

In addition to the results shown here in detail, we have carried out several robustness checks. As our data allows us to use different proxies for service provision, we have tested several specifications of all of the equations. Conclusions from these estimations are somewhat mixed. First, all available proxies for the same services do not produce the same results as the survey questions chosen: for example, if one measures housing by asking a question on whether a firm allows outside users to benefit from company housing, the re-

sults differ from those presented here. Second, if one chooses a completely different service to proxy especially infrastructure, the results again change. Third, we would anticipate similar results if we used money spent by firms on services produced outside the firm as a service provision proxy, instead of the firm engaging in service production directly, but in practice the results are different.

Further, both the results presented here and the outcomes of our robustness checks are all subject to data limitations caused by using survey data. The low number of observations for the bribe question is obviously one of our main concerns in this sense. Our results also hinge upon the measure of fiscal incentives we have chosen to use.

Finally, despite these shortcomings, one result is very clear from our data: the connection of fiscal incentives and bribes is positive, significant and robust. The channel through service provision is not quite as clear and further work is needed to better understand how and why different services produce even opposite results. Our main candidate for an explanation is so far the possible difference in the profitability of providing the services: for instance, heating may be a business worth staying in but social service provision less so.

4   Conclusions

In this paper we propose a model on local service provision under poorly defined property rights. Our model indicates that allowing for firms to produce part of the welfare or infrastructure services required within the locality may lead to situations where reducing the decision-making powers of the municipality over tax revenues does not necessarily result in excessive regulation or other harassment of firms at the local level, which is a claim made in previous literature.

The data from our survey clearly shows that firms in Russia are still active in local social service and infrastructure provision. We also find strong evidence for our main proposition that the greater the fiscal autonomy, the more likely the firms are to bribe. We find also that the channel through which tax revenues are diverted to local authorities is the provision of heating services.

There exist naturally alternative potential explanations. First, there are strong municipalities in Russia, which can successfully squeeze money both from the firms and the

upper levels of government, and second, industrial firms are largely tied to service provision due to the Soviet legacy of more or less forced social responsibility. Or, firms provide services as long as the local markets for them are not developed to any modern standards.

Still, being connected to local fiscal incentives or not, the data supports the proposition that the firms engaged in service provision are harassed less than the other firms, or in our case rather benefit from positive discrimination, receiving assistance from the public sector. In general and along many dimensions, service-providing firms have closer ties with the public sector than others.

To conclude, in the analysis of a phenomenon such as corruption, poor property rights, ambiguous revenue and expenditure mandates, as well as local-specific institutional arrangements and historical legacies, may play a significant role. This should be taken into account, not only in a transition environment, but more generally in any empirical analysis of public-private interrelationships and their implications for firm performance and economic growth.

References

Alexeev, M. and G. Kurlyandskaya (2003): Fiscal federalism and incentives in a Russian region, *Journal of Comparative Economics*, vol. 31, 20-33

Andrienko, Y. and S. Guriev (2004): Determinants of interregional mobility in Russia. *The Economics of Transition*, vol. 12, 1-27.

Bardhan, P. (2005): *Scarcity, Conflicts, and Cooperation. Essays in the Political and Institutional Economics of Development*. MIT Press, Cambridge, MA and London, England.

Ericson R. (1999): The Post-Soviet Russian Economic System: An Industrial Feudalism?, mimeo, Columbia University.

Friebel, G. and S. Guriev (2005): Attaching Workers through In-Kind Payments: Theory and Evidence from Russia. The World Bank Economic Review, October 5, 2005.

Gehlbach, S. (2003): Taxability and Government Support of Business Activity: Testing Theories of Social Contract Failure, Working Paper, Center for Economic and Financial Research (CEFIR)

Grosfeld, I., C. Senik-Leygonie, T. Verdier, S. Kolenikov and E. Paltseva (2001): Workers' Heterogeneity and Risk Aversion: A Segmentation Model of the Russian Labor Market. *Journal of Comparative Economics* 29, pp. 230-256.

Haaparanta, P., T. Juurikkala, O. Lazareva, J. Pirttilä, L. Solanko and E. Zhuravskaya (2003): Firms and public service provision in Russia. BOFIT Discussion Paper No 16/2003.

Juurikkala, T. (2006): Determinants of social service provision by industrial firms in Russia. Unpublished draft.

Juurikkala, T. and O. Lazareva (2006a): Lobbying at the local level: social assets in Russian firms. BOFIT Discussion Paper 1/2006, Bank of Finland.

Juurikkala, T. and O. Lazareva (2006b): Non-wage benefits, costs of turnover and labor attachment: evidence from Russian firms. BOFIT Discussion Paper 4/2006, Bank of Finland.

Kurlyandskaya, G. (2002): Budgetary Pluralism of Russian Authorities, Discussion Papers, No. 17, Local Government and Public Service Reform Initiative, Open Society Institute.

Lavrov, A, J. Litwack, and D. Sutherland (2001): Fiscal Federalist Relations in Russia: A Case for Subnational Autonomy, OECD Centre for Co-Operation with Non-Members, OECD.

Litwack (2002): Central Control of Regional Budgets: Theory with Applications to Russia, *Journal of Comparative Economics*, vol. 30, 51-75.

Reinikka, R. and J. Svensson (2003): Survey Techniques to Measure and Explain Corruption. World Bank Policy Research Working Paper No. 3071.

Shleifer, A. and D. Treisman (2000): *Without a Map: Political Tactics and Economic Reform in Russia*. MIT Press, Cambridge, MA and London, England.

Solanko, L. (2006): Coping with missing public infrastructure: An analysis of Russian industrial enterprises. BOFIT Discussion Paper 2/2006, Bank of Finland.

Sonin, K (2003): Provincial Protectionism, William Davidson Working Paper No. 557, April, University of Michigan Business School.

Starodubrovskaya, I. (2002): Trends in divestiture: Issues, Instruments and Outlook for Russia. Presentation at IFC Workshop on Local Management of Mineral Wealth, June 10 – 11, 2002.

Timofeev, A. (2002): Fiscal decentralization and government subsidies. EERC Working Paper, revised version August 2002.

Tonis (2002): Privileges for Enterprises, Efficient Discrimination or Room for Abuse? Working Paper No. 02/01, EERC

Zhuravskaya, E. V. (2000): Incentives to provide local public goods: fiscal federalism, Russian style. *Journal of Public Economics*, Vol. 76, pp. 337-368.

Tables

Table 1 Probit: Which firms were likely to have housing?

Explanatory variables	Question: *Does your firm have housing?*					
	Spec 1 n=401	Spec 2 N=216	Spec 3 n=216	Spec 4 n=215	Spec 5 n=215	Spec 6 n=215
Log employment 2002	0.209**	0.031	0.021	0.020	-0.003	-0.009
Log municipal population	-	-	0.131	0.122	0.116	0.125
Housing 1990	1.495***	1.663***	1.698***	1.653***	1.636***	1.625***
The share of own revenues in mun budget	-	0.017***	0.012	0.010	0.013*	0.014*
Budget assistance	-	-	-	0.609***	0.585***	0.517**
Boiler	-	-	-	-	0.506*	0.487*
Help to mun housing	-	-	-	-	-	1.320***
Pseudo R2	0.1662	0.2025	0.2083	0.2321	0.2454	0.2926
Industry dummies	yes	yes	yes	yes	yes	yes

*** significant at 1% level, ** significant at 5% level, * significant at 10% level

Table 2 Probit: Which firms were likely to sell or exchange heat outside the firm?

Explanatory variables	Question: *Does your firm sell/ exchange heat outside the firm*?					
	Spec 1 n=402	Spec 2 n=217	Spec 3 n=217	Spec 4 n=217	Spec 5 n=217	…
Log employment 2002	0.380***	0.356***	0.372***	0.369***	0.377***	…
Log municipal population	-	-	-0.159	-0.154	-0.162	…
Housing 1990	0.945***	1.494***	1.475***	1.564***	1.566***	…
The share of own revenues in mun budget	-	-0.024***	-0.018**	-0.016**	-0.016**	…
Assessment of local infra	-	-	-	0.480*	0.483*	…
Non-m help to local infra	-	-	-	-	-0.104	
Pseudo R2	0.1467	0.2529	0.2613	0.2734	0.2741	…
Industry dummies	yes	yes	yes	yes	yes	…

*** significant at 1% level, ** significant at 5% level, * significant at 10% level

Table 3 Probit: Which firms were likely to report positive bribes?

Explanatory variables	Question: *How much does a firm like yours typically have to pay to officials to make things work more smoothly*? Answer >0% => dummy=1					
	Spec 1 n=96	Spec 2 n=96	Spec 3 n=95	Spec 4 n=96	Spec 5 n=96	Spec 6 n=95
Log employment 2002	-0.190	-0.168	-0.184	-0.258	-0.219	-0.274
Log municipal population	-	-0.149	-0.163	-0.174	-0.111	-0.099
The share of own revenues in mun budget	0.019*	0.025**	0.024**	0.030**	0.026**	0.036***
Housing 2003	-	-	0.166	-	-	-
Boiler	-	-	-	0.759**	-	0.942**
Sell heat	-	-	-	-	0.394	-
Non-m help to local infra	-	-	-	-	-	0.740**
Budget assistance	-	-	-	-	-	-0.590*
Pseudo R2	0.0757	0.0835	0.0893	0.1188	0.0952	0.1931
Industry dummies	yes	yes	yes	yes	yes	yes

*** significant at 1% level, ** significant at 5% level, * significant at 10% level

Table 4 Probit: Which firms were likely to report positive bribes? Ownership selection bias corrected

Explanatory variables	Question: *How much does a firm like yours typically have to pay to officials to make things work more smoothly*? Answer >0% => dummy=1					
	Spec 1 n=85	Spec 2 n=85	Spec 3 n=84	Spec 4 n=85	…	…
Log employment 2002	-0.097	-0.074	-0.078	-0.068		
Log municipal population	-	-0.070	-0.069	-0.076		
The share of own revenues in mun budget	.013**	0.017***	0.018***	0.017***		
Housing 2003	-	-	-0.010	-		
Boiler	-	-	-	-		
Sell heat	-	-	-	-0.047		
Non-m help to local infra	-	-	-	-		
Budget assistance	-	-	-	-		
Industry dummies	yes	yes	yes	yes		

*** significant at 1% level, ** significant at 5% level, * significant at 10% level

Table 5 Biprobit: Simultaneous estimation of bribes and service provision, ownership bias corrected in the bribe equation

Bribe dummy	Spec 1	Spec 2	Bribe dummy	Spec 3	Spec 4
Log employment 2002	-0.074	-0.074		-0.074	-0.074
Log municipal population	-0.070	-0.070		-0.070	-0.070
The share of own revenues in mun budget	0.017***	0.017***		0.017***	0.017***
Industry dummies	yes	yes		yes	yes
Selling heat			**Housing 2003**		
Log employment 2002	0.372***	0.369***		0.021	0.020
Log municipal population	-0.159*	-0.154*		0.131	0.122
The share of own revenues in mun budget	-0.018***	-0.016***		0.012*	0.010
Housing 1990	1.475***	1.564***		1.698***	1.653***
Assessment of local infra	-	0.480**		-	-
Budget assistance	-	-		-	0.609***
Industry dummies	yes	yes		yes	yes

*** significant at 1% level, ** significant at 5% level, * significant at 10% level

Appendix

Proof of proposition 2:

FOC's for (5) are (vii) and (viii):

(vii) $\qquad\qquad u_{p1} = \lambda\theta(1 - W_{p1})$

(viii) $\qquad\qquad u_B = \lambda\theta W_B$

$\Rightarrow \dfrac{u_{p1}}{u_B} = \dfrac{1 - W_{p1}}{W_B} = \dfrac{1}{c}$ does not depend on θ, and defines implicitly $B = B(P_1)$

$\Rightarrow W_B(P_1, B) = c(1 - W_{p1})$

$\Rightarrow (W_{BB} + cW_{p1B})dB = (-W_{p1B} - cW_{p1p1})dP_1$

$\qquad\qquad \Rightarrow \dfrac{dB}{dP_1} < 0 \quad \therefore$

Proof of proposition 3:

From the budget constraint $\theta P_1 = \overline{W} + \overline{T} + \theta W[P_1, B(P_1)]$ we derive

$$\theta\left[\underbrace{1 - W_{p1} - W_B \dfrac{dB}{dP_1}}_{<0}\right]dP_1 = \underbrace{[\overline{W} - P_1]}_{<0}d\theta$$

$\Rightarrow > 0$

$\Rightarrow \dfrac{dP_1}{d\theta} < 0$ if $1 - W_{p1} - W_B \dfrac{dB}{dP_1} > 0$, which has to hold if we do not want to assume a

perpetuum mobile $\therefore$

BOFIT Discussion Papers

http://www.bof.fi/bofit