Economics of Spacemen: Estimation of Tax Evasion in Russia

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Abstract

Using Russian banking transactions data, I identify "spacemen", short-life firms specially created for tax evasion. I estimate "spacemen" tax evasion to be 6.2% of GDP in 2003 and 7.5% in 2004. I find that around 60% of Russian firms use "spacemen" schemes; tax evasion of an average firm exceeds 40% of taxes paid; small and medium firms evade about 40% more than large firms. The leaders in this type of tax evasion are government controlled companies and the largest tax evader is Gazprom. In 2003-2004 Gazprom affiliated entities transferred $1.9B to "spacemen". Alternative explanation is that private companies use more advanced methods of stealing taxes which are not identifiable using my dataset. Government treasuries transferred $0.5B to "spacemen" in 2003 and $0.8B in 2004 which might be treated as direct stealing of budget funds. I find that tax evasion has strong positive correlation with regional corruption.

1 Introduction

Measuring tax evasion is a challenge for economists due to a natural lack of data. The majority of studies on this topic rely on surveys or other indirect methods. I directly estimate tax evasion in Russia by identifying "spacemen", short-life firms specially created for tax evasion purposes that are

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typically registered in the names of persons who lost their IDs. These firms pay around zero taxes and disappear in 0.5 - 2 years. Empirically, I identify a "spaceman" as a firm which pays either zero taxes or has a ratio of tax paid to gross margin less than 0.1%. According to my estimates, an average "spaceman" lives 1.5 years and has monthly revenue $481,800 that is 3 times higher than the average revenue of regular firms. Net revenues of "spacemen" were $55B in 2003 and $86B in 2004, which corresponds to 14% and 17% of GDP respectively. Assuming that tax evasion is 44% of "spacemen's" net revenues[1], the evasion using "spacemen" might be estimated as 6.2% and 7.5% of GDP respectively or almost half of all tax collection. Small and medium firms evade about 40% more taxes than large firms. One possible explanation of this empirical fact is that large firms are better monitored by tax authorities therefore they use fewer "spacemen" schemes. Another explanation is that large firms might use more advanced methods of tax evasion (e.g. through off-shore companies) or shelter these activities better.

An interesting finding is that the top tax evaders in Russia are the government controlled companies: in 2003-2004 Gazprom affiliated firms transferred $1.9B to "spacemen", Slavneft and Rosneft sent $469M and $177M respectively[2]. Yukos, which was accused of tax evasion and destroyed by authorities, transferred $9.4M to "spacemen" in 2003, about 100 times less than Gazprom did in the same period. I also document direct evidence of stealing budget money: in 2003-2004 federal treasuries sent $1.3B to "spacemen".

I find that tax evasion is highly related to regional corruption: the correlation between tax evasion measure and corruption is .44 (significant at 1%). I also document the negative correlation between tax evasion and FDI, however understanding the causality of this relation requires additional tests.

To the best of my knowledge, there is only one study which directly measures tax evasion. Fisman and Wei (2004) estimate tax evasion based on Hong Kong's reported exports to China and China's reported imports from Hong Kong at the product level. They find positive relation between the tax rate and evasion. The remainder is structured as follows. Section II gives the conceptual framework of tax evasion using "spacemen". Section III describes the data used in this analysis and "spacemen" identification. Section IV presents the geography and dynamics of tax evasion. Section V describes the tax evaders and section VI concludes.

[1] Using "spacemen" firms typically evade VAT (18%), profit tax (24%) and personal income tax (13%)

[2] Top 500 firms which evade taxes using "spacemen" might be found at http://home.uchicago.edu/~mmirono1/

2 Tax Evasion in Russia

There are three main types of tax evasion in Russia. They might be classified as "legal", "illegal" and "semi-legal".

The legal schemes typically involve using external or internal off-shore companies with low tax regimes for profit accumulation. For example, in 2001 Sibneft decreased profit tax by 10 billion rubles ($330M) by selling oil through several traders registered in the low-tax zones in Chukotka and Kalmykia (Vedomosti (2002)). Another way of legal tax optimization is a so-called "insurance scheme". Companies evade social security and personal income taxes by making salary payments in the form of insurance payments. According to Expert (2004), the share of the "insurance schemes" was 44% of the entire insurance market. Even though the Russian government recently initiated several attempts to reduce relative benefits of these "legal schemes", they are still widespread.

The illegal schemes are usually associated with underreporting of revenues and "black cash" transactions (see Yakovlev (2001)). Black cash tax evasion is widespread among small and medium-sized enterprises, and rarely used by large firms.

Finally, one of the most popular ways of tax evasion involves using semi-legal schemes, when firms are balancing on the edge of legal and illegal. Companies decrease the taxable income by inflating expenses through fake contracts. For example, firm A wants to decrease taxable income by $1000. It makes a deal with firm B for rendering consulting services. Firm A makes a $1000 payment to firm B, but on the same day the owner of firm A gets $1000 back minus a small commission (typically 2-3%). Firm B, a so-called "spaceman"[3], comes out of nowhere, does not perform any real activities, pays almost zero taxes, and disappears in 0.5-2 years (flies into space). "Spacemen" are specially created for tax evasion purposes and their formal owners do not even suspect that they own a firm. Some portion of the money received by a "spaceman" might be resent to a real supplier[4], or transferred to another "spaceman", the rest of money is typically returned to the initial sender in the form of "black cash" or a sight draft. Tax evasion using "spacemen" typically involves long chains of transactions, where each transaction, if analyzed separately, appears legitimate; however the entire scheme is illegal.

The costs associated with opening a new "spaceman" usually do not exceed $400, and law firms specializing in registering new businesses often offer already registered "spacemen" for sale (in their

[3]This type of firms is also called "dump", "flash-light", "bruise", "hedgehog". See Vedomosti (2005b) for detailed description of these firms.

[4]E.g. if firm A wants to buy a computer for $1000, but to reflect expenses for $3000, it sends $3000 to a "spaceman", gets a receipt for $3000, the "spaceman" pays $1000 to a real vendor of the computer, and the owner of firm A gets $2000 cash back, minus 2% commission from the firm which operates the "spaceman".

ads they call "spacemen" as "ready for use firms"). Marginal cost of operating "spacemen" is bank commission (around 1% of cashing funds). Small and medium firms usually do not have their own "spacemen"; they pay a 2-3% commission to organizations specializing in providing "spacemen" services. Radaev (2001) gives detailed description of this type of semi-legal schemes.

It is common belief that the majority of Russian businessmen use one method of tax evasion or another, however due to natural reasons, measuring these activities is a challenging task for economic researchers. To the best of my knowledge, all existing estimations of tax evasion in Russia are based on indirect methods. Using banking transaction data, I identify firms that are "spacemen", and based on that, I estimate direct tax evasion at the micro level.

3 Data Sources and Identification of "Spacemen"

The sources and definitions of the data used in this research are discussed in detail in the Data Appendix. The main dataset for my empirical work is the banking transaction data for 2003 and 2004 that leaked from the Russian central bank to the public in 2005[5] and were obtained through ViveData that legally sells these data. This dataset includes transactions that took place within Russia only and does not have operations in foreign currencies. The data permit me to measure the funds inflow and outflow at the firm level and include a verbal description of each transaction. The source of data for GRP, tax collection and foreign investment in fixed capital is Goskomstat (Russian bureau of statistics). The source of information about affiliation of companies to Gazprom is its official web-site www.gazprom.ru.

I exclude banks, financial institutions and insurance companies from the analysis. I also drop individual entrepreneurs and tiny companies (monthly revenue less than 100,000 rubles ($3,300)), since they heavily rely on the "black cash" tax evasion. Since the VAT and the profit tax in Russia are paid on a quarterly basis[6] I only include firms which have at least one transaction before 10/01/2004 in the analysis. Exclusion of firms which were born in the last quarter of the sample period leads to underestimation of tax evasion for the 4th quarter since I cannot identify "spacemen" which were created during this period. To reduce a measurement error, specifically misprinted INNs, I exclude all firms which had less than 10 transactions over the entire sample period. This leaves me with a sample of about 207,000 companies.

The quality of the data does not allow me to precisely identify tax payments; therefore I treat any transfer to the federal treasuries (UFK, OFK and FKU), tax inspection (GNI), or social security

[5] Vedomosti (2005) discusses this incident

[6] Large enterprises are required to pay the VAT and the profit tax on monthly basis

funds (FSS) as a tax payment. This potentially leads to overestimation of a firm tax burden. Since "spacemen" do not submit income statement to tax authorities, as a proxy for profitability I use the difference between funds received and funds paid over the entire sample period. I define firm profitability margin as

$$Margin = \max\left(\frac{F\_R - F\_P}{F\_R}, -1\right)$$

where F_R is the total amount of fund received and F_P is the total amount of funds transferred including tax payments for the entire sample period. As a proxy for a firm average tax rate, I define

$$\begin{aligned} Net\_tax\_rate &= \frac{Tax\_paid}{F\_R - (F\_P - Tax\_paid)},\ if\ F\_R \geq F\_P \\ &= undefined,\ if\ F\_R < F\_P \end{aligned}$$

where Tax_paid is the total transfer to the tax collection organizations. To check robustness of the results I also define gross tax rate as

$$Gross\_tax\_rate = \min\left(\frac{Tax\_paid}{F\_R}, 1\right)$$

I report summary statistics of my sample in Table 1. Column (2) describes the base sample of my analysis. An average firm performs about 40 transactions per month, receives revenue[7] of $300.000 and pays $7,900 in taxes including $220 in social security tax, which corresponds to approximately a $670[8] average wage bill per firm[9]. Column (3) includes only the firms which received more money than they paid. Comparing to the firms from column (2), these firms live 12 days shorter, get about 10% more money and pay 33% less taxes (24% less in absolute terms). I can explain it by an increased concentration of "spacemen": share of firms that pay 0 taxes increases by 16% relative to column (2). Column (4) shows the summary statistics for "spacemen", firms which satisfy the following criteria: a) net tax rate less than 0.1%; b) social security tax paid less than 210 rubles ($7) per month that approximately corresponds to a wage bill equal to one minimum wage[10]; and c) that are not open joint stock corporation. These selection criteria leave me with a sample of approximately 45,000 spacemen.

[7] By "revenue" I mean all funds received by a firm during a period. This approach has several drawbacks: it excludes all revenue received in form of non-bank transaction, e.g. cash receipts, and includes non-revenue proceeds such as bank loans. However, since it is quite a challenging task to disentangle the different types of proceeds, I treat all proceeds as revenue, based on the assumption that my proxy for revenue is highly correlated with the real firm revenue

[8] In 2003-2004 Russia had diminishing marginal social tax scale starting from 35.6% for small wages and decreasing to 2% for wages greater than $20.000 per year. According to the Russian ministry of finance, the effective social tax rate in 2004 was 30.4% http://www1.minfin.ru/off_inf/769.htm

[9] This is much lower than a real wage bill since the majority of Russian firms, especially small and medium ones, pays wages in a form of "black cash" or use "insurance schemes

[10] Minimum wage in Russia was 450 rubles ($15) per month in 2003 and 600 rubles ($20) starting 10.01.2003.

As a control sample, I select firms with net tax rate greater than 1% (see column (5)) and call them "normal" firms. In comparison to a "normal" firm, a "spaceman" lives 170 days less, receives almost 3 times more revenue, performs 40% less transactions and has a 2.5 times higher margin, all differences are significant at 1% level. These simple statistics allow us to rule out several alternative explanations of the "spacemen" nature. One possible explanation is that these firms have better skills to avoid taxes than regular firms, therefore they are much more profitable, therefore the firms which I call "spacemen" are actually winners and "normal" firms are losers. However, in that case winners should live on average longer than losers, and my estimations show that "spacemen" have a much shorter life than "normal" firms. Another possible explanation is that the majority of "spacemen" are newly born firms which go bankrupt within a short time period and therefore pay 0 taxes. To rule out this hypothesis, in column (5) I show firms, which appear in the sample for the first time from February, 2003 to November 2003 and die within one year (age<365). We can see that comparing to "normal" firms these "newly born bankrupts" have almost 3.5 times higher average revenue (1.5 times higher median revenue), and 2 times higher margin. However, an average wage bill of these firms is 36 times less than one of "normal" firms. This allows us to conclude that the majority of firms which are dieing within one year are phantoms which I call "spacemen".

Figure 1 supports the "spacemen" theory. The probability that a “spaceman” dies within one year is 3-6 times higher than one for a “normal” firm. If we compare new firms with existing ones (presented in the sample before 01.20.03), we can see that the probability that a just born "normal" firm dies within one year is about 2 times higher than one for existing firm. This coincides with the survival story: firms which were presented at the beginning of the sample period have a much higher average quality than startups; therefore they have a longer expected life. However, an existing "spaceman" has about a 20% more chance to die within one year than a newly born spacemen does. It means that longevity of "spacemen" does not depend on their performance and therefore an existing "spaceman" should die faster just because it is older than a newly born one. Figure 2 shows the density of age distribution for "normal" firms and "spacemen". We can see that the age of spacemen is almost uniformly distributed from about 3 months to 2 years. Since my sample period is only 2 years, this graph underestimates the age of firms; however we can see a key difference in longevity of "normal" firms and "spacemen".

Table 2 shows sensitivity of spacemen's characteristics depending on selection criteria. Column (1) and (2) describe the difference between spacemen which do not pay taxes at all and those who pay nominal taxes. We can see that "spacemen-taxpayers" live about one month longer and have 4 times higher monthly revenues than "spacemen-non-taxpayers". I can explain it by the fact that paying

some nominal tax significantly decreases the probability of tax inspection and therefore "spacemen-taxpayers" can afford to live longer and operate at higher capacity than their "non-taxpayer" peers. Firms from Column (3), with net tax rate from 0.1% to 1%, have characteristics somewhere in the middle between "spacemen" and "normal" firms (columns (4) and (5) of Table 1). Therefore they most likely represent a mix of these types, and this is why I exclude them from analysis. In column (4)–(6) I select "spacemen" based on the gross tax rate and. We can see that main results are robust to selection criteria.

4 Geography and Dynamics of Tax Evasion

Table 3 shows distribution of tax evasion by regions. Moscow accounts for 84% of all tax evasion in Russia. It is not surprising since almost all large Russian companies are registered in Moscow. Net revenues of "spacemen" in Moscow exceed 60% of GRP and exceed tax collection by more than 5 times. Assuming that evasion is 44% of "spacemen" net revenues[11], tax evasion using "spacemen" exceeds 26% of Moscow GRP. This approach significantly underestimates the total tax evasion since it does not include the "black cash" firm revenues and tax optimization using off-shores. The Altai republic has the highest tax evasion to GRP ratio[12]. Net revenue of "spacemen" in this region exceeds GRP by 3% and is almost 6 times higher than tax collection. This fact is also not surprising since the Altai republic as well as Kalmykia have been serving as internal off-shores for a long time. Due to the already mentioned fact that almost all largest firms, including the oil and gas companies, are registered in Moscow, tax evasion in main oil and gas provinces looks extremely low: Tyumen, Khanty-Mansi and Yamalo-Nenets autonomous okrugs have tax evasion less than 1% of GRP.

Tax evasion is highly correlated with regional corruption. Figure 3 shows relation of tax evasion measure and regional corruption measure constructed in 2002 by Transparency International. Correlation is highly significant and is not caused by Moscow outlier. This strong relationship might have several possible explanations. Since bribes account for a significant share of firm real expenses, and obviously firms cannot legally subtract them from taxable income, they shelter part of their gross income, transferring it to "spacemen" in order to be able to pay higher bribes. Another possible explanation is that tax evasion is observable by officials and they claim a share of evaded taxes from businesses. The difference between these two explanations is that in the first case corruption is ex-

[11] If evaded funds are used for paying "dividends", then tax evasion is 18% VAT, 24% profit tax and 13% personal income tax, which adds up to 44% evasion $1 - \frac{1}{1.18}(1 - .24)(1 - .13) = .44$.In case of using evaded funds for paying salary, tax evasion is about the same (35.6% social tax and 13% personal income tax)

[12] I exclude Kalmykia, Aginsk Buryat and Evenki autonomous okrugs from analysis. See note (*) for Table 3.

ogenous and tax evasion is endogenous, and in the second case the situation is opposite. I think the truth is somewhere in between. Additional empirical tests are required to establish the causality of this relationship. I find that tax evasion is negatively correlated with the FDI growth (see Figure 4), however revealing the nature of this relationship also requires additional empirical tests.

Despite the official anti tax evasion campaign, tax evasion in 2004 increased by 37% in real terms, which is significantly higher than the GDP growth. Net revenues of "spacemen" were 14% and 17% of GDP in 2003 and 2004 respectively, which corresponds to tax evasion 6.2% and 7.5% of GDP. Figure 5 shows the quarterly dynamics of net transfers to "spacemen". This trend might be explained by the increased power of government officials in Russia. After Khodorkovskiy's show trial, authorities received much more instruments to blackmail private businesses and extract additional rents. According to the estimates provided by INDEM (www.indem.ru), the average size of bribe related to business corruption increased 11-13 times from 2001 to 2005. Therefore a significant growth of "spacemen" revenue might be caused by an increased demand for bribes. Based on these numbers, it might be the case that the Russian anti-corruption campaign has the same effect as an anti-drug war: the more severe punishment for drug distribution the government imposes the more bribes the drug dealers must pay to the police for "protection". Therefore they should increase their business revenue in order to finance increased expenses.

5 Who are the Spacemen's clients?

Since "spacemen" are phantom companies, an analysis of their names cannot help us identify the real tax evaders. In order to reveal them, I analyze the transfers of "normal" companies to "spacemen". I define "spacemen transfer ratio" as

$$sp\_trans\_ratio = \min\left(\frac{F\_to\_Sp}{F\_R}, 1\right)$$

where F_to_Sp is the total amount of funds transferred to spacemen. Table 4 describes the relation between size of firm and tax evasion. We can see that 71% of firms sent funds to "spacemen" at least once, however only 58% might be considered "spacemen" schemes users ($sp\_trans\_ratio > .01$). An average firm transfers about 13% of its revenue to "spacemen". I define a tax evasion measure as

$$tax\_evasion_S = \frac{.44\left[\sum_{i\in S} F\_to\_Sp_i\right]}{\sum_{i\in S} Tax\_paid_i}$$

where $F\_to\_Sp_i$ is a total transfer to "spacemen" by firm i, Tax_paid_i is a total tax payment of firm i and S is the set of firms (small, medium or large). We can see from column (4) that an average

firm evades 41% of taxes paid. An interesting result is that the small and medium firms evade about 40% more taxes than the large firms. One possible explanation of this empirical fact is that the large firms are better monitored by tax authorities therefore they use fewer "spacemen" schemes. Another explanation is that the large firms might use more advanced methods of tax evasion, e.g. through off-shore companies or shelter these activities better. Tiny firms with monthly revenue less than 100,000 rubles ($3,300) also evade taxes through "spacemen" schemes much less than the medium firms. The most likely explanation is that the tiny firms use the "black cash" tax evasion instead. An indirect support of this hypothesis is the highly negative margin for these firms. Since my proxy for revenue does not include cash receipts, it means that a significant portion of tiny firms' revenues is cash, and it is likely that they prefer simple underreporting of revenue rather than using the complicated "spacemen" schemes.

The top tax evaders in Russia are government controlled companies, and the largest one is Gazprom. In 2003-2004 Gazprom affiliated firms sent $1.9B to spacemen[13]. Slavneft and Rosneft sent $469M and $177M respectively. This finding contradicts the official anti-tax evasion campaign and the motivation of property nationalization. Federal, republican and municipal enterprises (GUP, MUP, etc.) are also active senders of funds to "spacemen". Altogether, in 2003-2004 they transferred more than $1B to "spacemen" (however, almost 2 times less than Gazprom alone). I find evidence of direct stealing of budget funds: federal treasuries and ministries sent $1.3B to spacemen in 2003-2004. The largest government senders are the Moscow and Chechnya branches of the federal treasury. Figure 6 shows the dynamic of net transfers of government affiliated agencies to "spacemen".

6 Conclusion

I show that the "spacemen" tax evasion in Russia exceeds 40% of tax collection. About 60% of the Russian firms use the "spacemen" schemes and one third of them are heavy users (evade more than 30% of gross revenues). Despite the anti tax evasion campaign which started in 2003, the net revenues of "spacemen" increased from 14% of GDP in 2003 to 17% of GDP in 2004. This growth might be explained by a strengthened power of authorities to extract rents, and therefore business is forced to increase evasion in order to meet the increased demand for bribes.

I find that the government controlled companies are the top tax evaders. These findings contradict the official propaganda of the Russian authorities that they nationalize property in order to redistribute rents from the oligarchs to the ordinary people. In fact, by stealing more taxes (besides the less efficient

[13] Top 500 "spacemen"'s clients, full list of Gazprom affiliated companies which sent funds to "spacemen" as well as the list of its "spacemen" might be found at http://home.uchicago.edu/~mmirono1/

governance), they actually decrease the budget revenues and therefore the welfare of people which rely on government support. I also document evidence that direct stealing of budget funds increased in 2004 by 27%.

I show that the tiny firms most likely prefer to use "black cash" evasion rather than the "spacemen" schemes. Small and medium firms evade around 40% more taxes than large firms. I also find that tax evasion is highly related to regional corruption.

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A Data Appendix

Banking transaction data were obtained through www.ViveData.com. After deleting duplicate transactions the sample includes 102,238,090 transactions for 2003 and 134,479,418 for 2004. Each entry has information about payer and receiver (name, INN (individual number of taxpayer, 9 or 10 digit code), bank account), verbal description of transaction, sum in Russian rubles. Key id of agent is INN. Since data has a lot of typos, similar INNs within one bank account were united under the most often used INN. Government agencies within one bank account were treated as one organization. After uniting similar INNs, the sample contains transactions of 1,682,197 unique entities. Organizations

and individuals which share one bank account were excluded from analysis since I do not have information for private accounts, only bank accounts (in Russia it is common that individuals have private accounts within one bank account). Incorrect INNs (not 9 or 10 digits) were also excluded from the sample. After performing these iterations, my sample consists of 885,489 entities with separate bank accounts and correct INN. The following dummies were defined for each agent:

gov - 1 for federal and regional treasuries, tax collected agencies, customs, government social security or pension funds;

oao - 1 for open joint-stock companies

ooozao - 1 for limited partnerships and closed joint-stock companies

pboul - 1 for individual entrepreneurs

mgup - 1 for any 100% state affiliated entity

zavod - 1 if name contains "plant" (zavod)

bank - 1 if name contains "bank" or abbreviation "KB" (commercial bank)

broker - 1 if name contains "broker" or "exchange" (birzha)

fond - 1 for not for profit, charities, and educational organizations

inostr - 1 for foreign companies (includes foreign abbreviation such as Ltd., Inc.,GmbH, etc.)

Any transfer to agencies which might collect taxes (gov=1) were treated as tax payment. Any transaction to these agencies with description containing "ESN" (abbreviation of social tax) were treated as social tax payment. Obviously, such simple algorithm significantly overestimates tax payments. All program code for transformation procedures and variable creation might be found at http://home.uchicago.edu/~mmirono1/data_spacemen/sql_prog/.

B Appendix

Table 1. Summary Statistics for 2003 -2004

Variable	Non-finance Ltds & Incs (1)	(1) exclude tiny firms (2)	(2) & $ rec. > $ paid (3)	Space-men (4)	(3) & net tax rate > 1% (5)	(3) & lived < year (6)
N	333,712	207,487	133,020	44,620	70,700	7,211
% presented before 1.20.03	45.0	45.5	41.7	19.6	57.0	0.0
% presented after 12.15.04	70.1	71.4	69.4	52.9	81.1	0.0
% b. 1.20.03 & af. 12.15.04	31.9	32.6	28.9	6.1	45.9	0.0
Mean age, calendar days	524	510	498	397	567	243
Med age, calendar days	589	566	543	385	694	257
Mean N of trans per month	26.9	39.0	35.5	24.4	40.0	22.5
Med N of trans per month	9.9	17.4	14.8	5.5	20.0	6.1
Mean funds rec. p. month,$	187,118	300,352	329,655	481,799	169,919	564,990
Med funds rec. p. month, $	7,792	29,281	32,252	40,500	23,709	36,020
Mean tax paid p. month, $	5,117	7,894	5,996	28	11,092	3,162
Med tax paid p. month, $	119.1	290.4	187.1	0.0	1,023.2	0.0
Mean ESN paid p. month, $	146.4	221.0	176.9	0.2	326.0	9.0
Med ESN paid per month, $	0.0	0.0	0.0	0.0	10.3	0.0
Mean net tax rate, %	17.0	15.2	15.2	0.0	28.6	4.9
Med net tax rate %	2.7	1.7	1.7	0.0	22.1	0.0
Meangross tax rate, %	15.1	7.3	4.9	0.0	9.1	1.5
Med gross tax rate %	1.6	0.8	0.4	0.0	4.2	0.0
% of firms with tax paid=0	25.3	19.9	23.1	66.4	0.0	53.6
Mean margin, %	-3.6	11.9	46.1	69.7	28.0	61.1
Med margin, %	3.6	9.9	39.8	83.1	18.7	72.1

Age is defined as a difference in days between last and first observed transaction. Margin is defined as maximum of (funds received - funds paid, including tax)/funds received and -1. Net tax rate is defined as tax paid / (funds received - funds paid, net of tax), defined only for firms with a positive margin. Gross tax rate is defined as taxes paid/total funds received. Column (1) includes companies which have Ltd. or Inc. in their names (ooozao or oao) with at least 10 observed transactions and appeared in the sample before 10.01.2004, excludes government agencies, banks, brokerage firms, insurance firms, state affiliated enterprises and non-profit organizations; (2) includes firms from (1) and for those average received funds exceed 100,000 rubles ($,3300) per month; (3) includes firms from (2) which received more money than they paid; (4) includes "spacemen", firms from (3) which satisfy following criteria a) tax rate < 0.001, b) ESN paid $<$ $6.5 per month, c) not oao; (5) includes firms from (3) which have tax rate >0.01;

(6) includes firms from (3) which appear first time in the sample between 02/01/03 and 12/01/03, and have age <= 365 days.

Table 2. Sensitivity of "spacemen"'s characteristics to selection criteria

	Selection by net tax rate			Selection by gross tax rate		
	t=0	0<t<0.1%	0.1%<t<1%	t=0	0<t<0.1%	0.1%<t<1%
Variable	(1)	(2)	(3)	(4)	(5)	(6)
N	29,649	14,971	10,693	39,940	28,713	20,800
% presented before 1.20.03	14.3	30.2	35.8	17.7	30.4	39.2
% presented after 12.15.04	51.6	55.4	59.9	52.6	56.1	63.0
% b. 1.20.03 & aft. 12.15.04	4.6	9.1	15.4	6.4	9.7	19.7
Avg. age, calendar days	388	415	461	389	416	475
Med age, calendar days	377	398	464	371	399	487
Avg. N of trans per month	11.8	49.3	49.7	13.3	49.1	49.4
Med N of trans per month	3.7	17.4	14.7	4.6	18.8	15.9
Avg. funds rec. per month, $	230,210	980,052	420,597	212,193	780,513	342,366
Med funds rec. per month, $	19,434	205,879	71,534	18,049	162,674	45,172
Avg. funds paid per month, $	90,811	332,332	221,188	151,730	537,795	335,055
Med. funds paid per month, $	2,132	40,563	27,751	6,367	87,742	35,704
Avg. tax paid per month, $	0.0	84.8	729.4	0.0	109.2	1,246.4
Med. tax paid per month, $	0.0	12.5	74.5	0.0	15.2	155.8
Avg. net tax rate, %	0.0	0.0	0.4	0.0	1.2	6.3
Avg. gross tax rate, %	0.0	0.0	0.2	0.0	0.0	0.4
Avg. margin, %	71.4	66.4	52.5	36.2	25.5	13.0
Med margin, %	87.8	74.0	52.1	63.5	24.3	7.9

"Spacemen" are the firms from column (2) of Table 1, which satisfy following criteria a) ESN paid < $6.5 per month, b) not oao, c) net/gross tax rate within indicated margins. All other definitions are the same as in Table 1.

Table 3. Revenues of "spacemen" by regions

Region	Code (1)	2003, mln. nominal R (2)	2004 mln. nominal R (3)	2004, mln. real R (4)	% to GRP, 2003 (5)	% to tax collection, 2003 (6)
Adygeya republic	1	88	234	211	0.9	4.7
Bashkortostan republic	2	578	3,969	3,576	0.2	1.5
Buryat republic	3	30	73	65	0.1	0.6
Altai republic	4	7,429	7,837	7,061	102.6	581.6
Dagestan republic	5	7,575	12,391	11,163	15.7	225.0
Ingush republic	6	1,525	61	55	34.8	388.1
Kabardino-Balkar republic	7	125	206	186	0.5	8.6
Kalmyk republic*	8	36,459	52,691	47,470	237.3	1,639.4
Karachaevo-Cherkess rep	9	95	282	254	0.8	10.5
Karelia republic	10	142	293	264	0.3	3.1
Komi republic	11	618	1,418	1,277	0.6	4.3
Mari-El republic	12	266	232	209	1.2	10.5
Mordovia republic	13	209	613	552	0.8	2.6
Sakha (Yakutia) republic	14	414	593	534	0.3	2.6
North Osetiya republic	15	219	146	132	1.1	12.5
Tatarstan republic	16	6,244	10,647	9,592	2.1	17.9
Tuva republic	17	13	52	47	0.2	1.6
Udmurtia Republic	18	868	1,724	1,553	0.9	7.4
Khakasia republic	19	486	246	222	1.7	13.4
Chechnya republic	20	91	150	135	NaN	8.1
Chuvash republic	21	244	429	387	0.5	4.4
Altai krai	22	934	1,157	1,042	1.1	11.7
Krasnodar krai	23	2,873	4,200	3,784	1.1	9.6
Krasnoyarsk krai	24	1,241	2,692	2,425	0.5	3.2
Primorskii krai	25	2,525	5,810	5,234	2.2	18.1
Stavropol krai	26	1,791	2,623	2,363	1.8	15.1
Khabarovsk krai	27	1,272	1,829	1,648	1.1	8.2
Amur oblast	28	1,361	265	239	2.6	20.9
Arkhangelsk oblast	29	140	348	313	0.1	1.2

Region	(1)	(2)	(3)	(4)	(5)	(6)
Astrakhan oblast	30	324	687	619	0.6	5.4
Belgorod oblast	31	1,511	5,510	4,964	2.0	18.1
Bryansk oblast	32	4,733	1,353	1,219	10.0	100.3
Vladimir oblast	33	575	1,574	1,418	0.9	7.6
Volgograd oblast	34	2,065	3,725	3,356	1.6	14.0
Vologda oblast	35	835	2,829	2,548	0.9	5.9
Voronezh oblast	36	2,709	5,641	5,082	2.7	27.0
Ivanovo oblast	37	6,861	9,995	9,004	20.4	175.2
Irkutsk oblast	38	2,038	3,178	2,863	1.2	10.0
Kaliningrad oblast	39	2,780	4,149	3,738	5.9	45.9
Kaluga oblast	40	8,991	6,448	5,809	19.6	155.4
Kamchatka oblast	41	190	347	313	0.7	4.7
Kemerovo oblast	42	1,375	5,489	4,945	0.8	6.4
Kirov oblast	43	712	1,050	946	1.2	10.7
Kostroma oblast	44	192	1,301	1,172	0.6	5.3
Kurgan oblast	45	155	362	326	0.4	4.2
Kursk oblast	46	1,200	2,509	2,260	2.3	21.3
Leningrad oblast	47	1,287	1,750	1,577	1.1	9.1
Lipetsk oblast	48	211	478	431	0.3	1.6
Magadan oblast	49	174	379	342	0.7	5.5
Moskow oblast	50	29,776	30,444	27,427	7.0	49.7
Murmansk oblast	51	280	881	794	0.4	3.0
Nizhny Novgorod oblast	52	4,024	9,298	8,377	1.8	19.5
Novgorod oblast	53	153	213	192	0.4	4.0
Novosibirsk oblast	54	9,297	8,360	7,531	6.3	56.8
Omsk oblast	55	1,711	2,990	2,694	1.7	12.7
Orenburg oblast	56	557	1,002	903	0.5	3.7
Oryol oblast	57	400	939	846	0.9	8.1
Penza oblast	58	387	1,491	1,343	0.8	8.9
Perm oblast	59	1,166	2,564	2,310	0.5	4.7
Pskov oblast	60	905	618	557	3.2	26.7
Rostov oblast	61	3,698	11,714	10,553	2.2	19.3

Region	(1)	(2)	(3)	(4)	(5)	(6)
Ryazan oblast	62	4,289	9,607	8,655	6.9	56.4
Samara oblast	63	5,875	9,669	8,711	2.2	20.6
Saratov oblast	64	2,650	6,350	5,721	2.2	17.7
Sakhalin oblast	65	1,945	3,829	3,450	3.0	27.1
Sverdlovsk oblast	66	7,647	16,397	14,772	2.7	24.5
Smolensk oblast	67	3,050	3,382	3,047	5.7	56.4
Tambov oblast	68	340	563	508	0.8	8.3
Tver oblast	69	11,632	8,825	7,951	17.4	151.8
Tomsk oblast	70	256	708	638	0.3	2.5
Tula oblast	71	4,986	3,950	3,559	6.4	58.0
Tyumen oblast	72	1,587	2,689	2,423	0.1	1.0
Ulyanovsk oblast	73	328	812	732	0.6	5.9
Chelyabinsk oblast	74	3,617	8,960	8,072	1.7	14.3
Chita oblast	75	57	237	214	0.1	0.6
Yaroslavl oblast	76	3,330	5,050	4,550	3.4	25.8
Moscow city	77	1,374,741	2,028,597	1,827,564	60.3	521.0
St. Petersburg city	78	35,369	76,667	69,069	8.4	60.3
Evrei autonomous oblast	79	10	9	8	0.1	1.2
o/w Aginsk Buryat *	80	5,529	17,636	15,888	296.7	323.9
o/w Komi-Permyak	81	0	0	0	0.0	0.0
o/w Koryak	82	22	87	79	0.5	4.2
o/w Nenets	83	4	16	14	0.0	0.2
o/w Taimyr	84	12	28	25	0.4	0.5
o/w Ust-Ordyn Buryat	85	1	6	5	0.0	0.5
o/w Khanty-Mansi	86	2,761	5,865	5,283	0.4	3.3
Chukotka	87	37	83	75	0.3	0.8
o/w Evenki	88	3,978	4,370	3,937	401.1	433.8
o/w Yamalo-Nenets	89	2,704	11,019	9,927	0.8	6.3
Total		1,643,881	2,467,894	2,223,328	13.9	112.5

*Numbers for Kalmyk republic and Aginsk-Buryat autonomus okrug are significantly overestimated since for unknown reasons Belarus enterprises have INNs starting with 8.

Table 4. Tax evasion by size

Variable	Small (1)	Medium (2)	Large (3)	Total (1) - (3) (4)	Tiny (5)
N	83,634	14,916	1,898	100,448	77,835
Mean sp_trans_ratio, %	13.5	12.1	11.4	13.3	12.6
Std dev sp_trans_ratio, %	23.5	20.1	20.9	23.0	28.7
Med sp_trans_ratio, %	2.2	3.6	2.6	2.5	0.0
Mean gross tax rate, %	15.5	11.7	10.8	14.9	45.4
Std dev gross tax rate, %	21.3	17.3	16.0	20.7	39.1
Med gross tax rate, %	7.2	4.8	4.6	6.8	29.4
Tax evasion, % of tax paid	45.8	48.4	33.4	41.2	35.4
Mean margin, %	-4.7	1.9	2.9	-3.5	-34.3
Std dev margin %	52.2	48.9	49.8	51.7	66.3
Med margin %	3.5	5.1	5.9	3.8	-41.1
% of sp_trans_ratio>0	68.0	88.1	93.4	71.5	29.7
% of sp_trans_ratio>1%	56.4	66.4	64.2	58.0	28.0
% of 1%<sp_trans_ratio<5%	15.0	22.0	25.0	16.2	4.2
% of 5%<sp_trans_ratio<10%	9.6	13.0	12.1	10.1	3.1
% of 10%<sp_trans_ratio<30%	16.8	19.0	16.1	17.1	6.6
% of sp_trans_ratio>30%	15.0	12.4	11.0	14.5	14.1

The table includes firms with gross tax ratio greater than 1% ("normal" firms). Sp_trans_ratio is defined as ratio of gross payments to "spacemen" to the revenue; "tiny" are firms with monthly revenue less than .1mln rubles ($3,300) per month; "small" - from 0.1 mln. ($3,300) to 3 mln. ($.1 mln.); "medium" - from 3 mln. ($.1 mln) to 30 mln. ($1 mln.) and "large" from 30 mln. ($1 mln.). Tax evasion is calculated as ratio of total funds transferred to spacemen to total tax payments multiplied by .44 (18% VAT, 24% profit tax and 13% personal income tax).

C Appendix

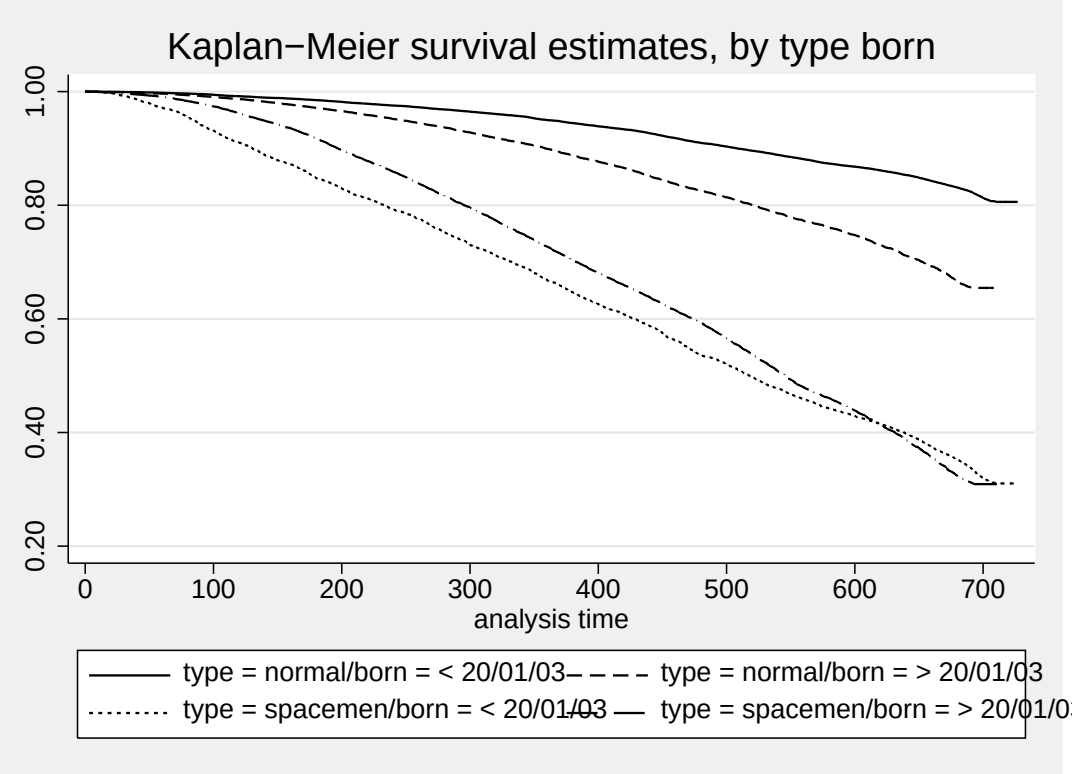

Figure 1

"Spacemen" - firms from column (4) of Table 1, "normal" - from column (5) of Table 1. "Born before 20/01/03" means presented in the sample before 20/01/03.

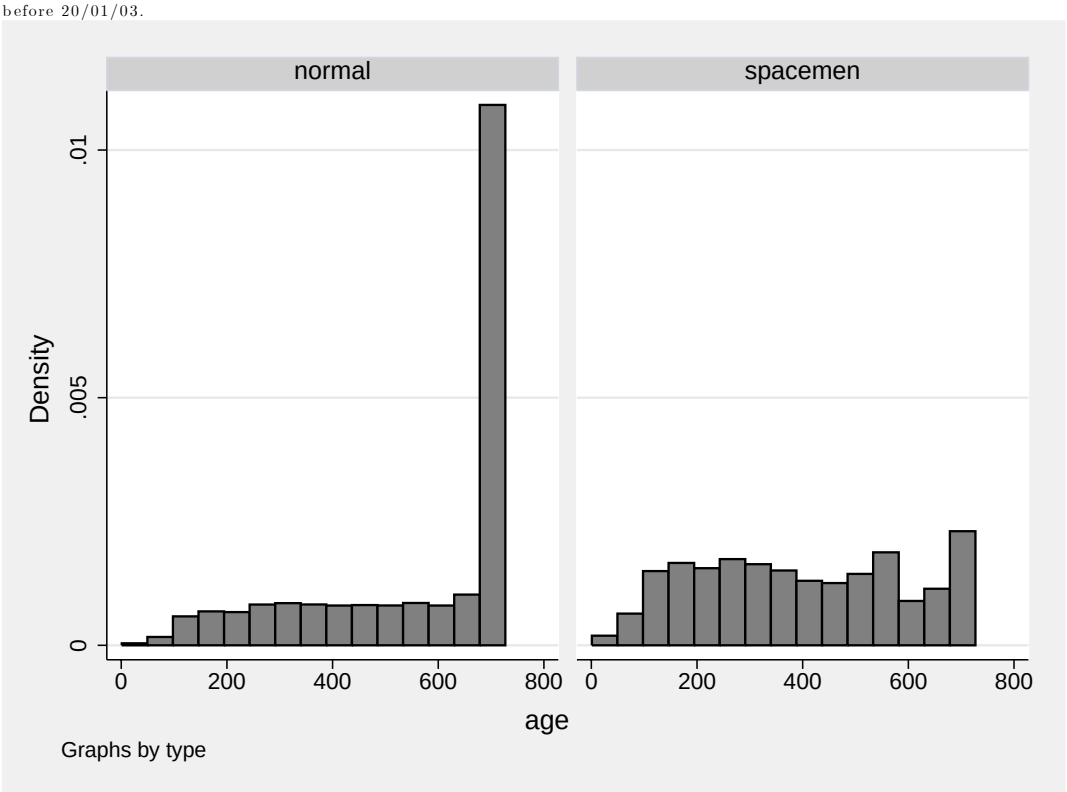

Figure 2

Distribution density for "age" variable. "Spacemen" - firms from column (4) of Table 1, "normal" - from column (5) of Table 1.

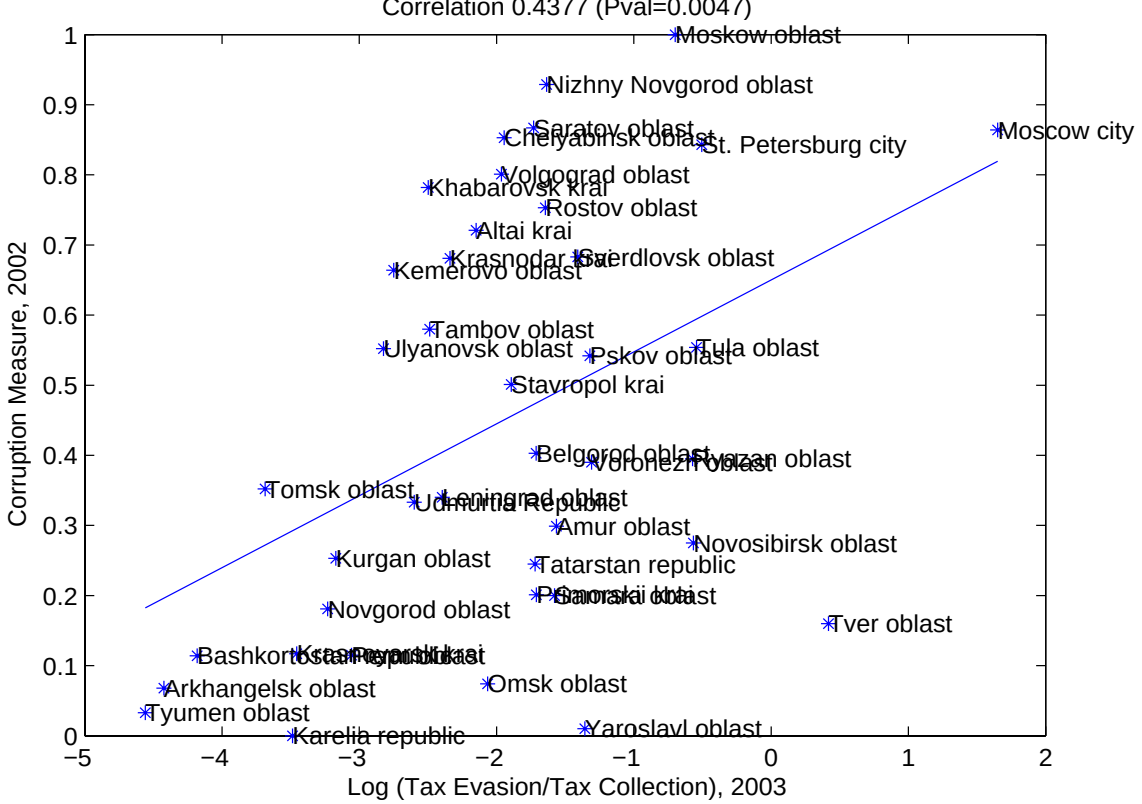

Figure 3

Source for regional corruption measure is Transparency International Russia, http://www.transparency.org.ru ; tax evasion = net revenues of " "

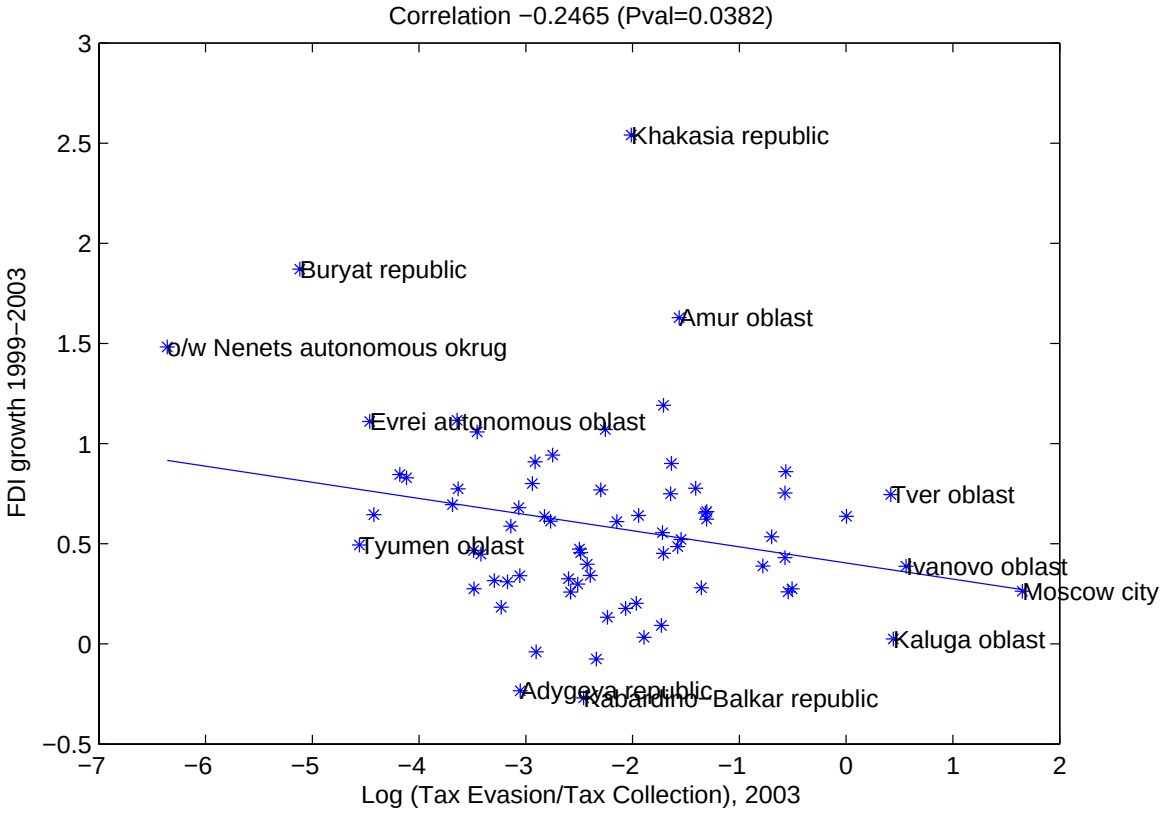

Figure 4

FDI (foreign investment in fixed capital) and tax collection taken from Goskomstat data; tax evasion = net revenues of "spacemen"

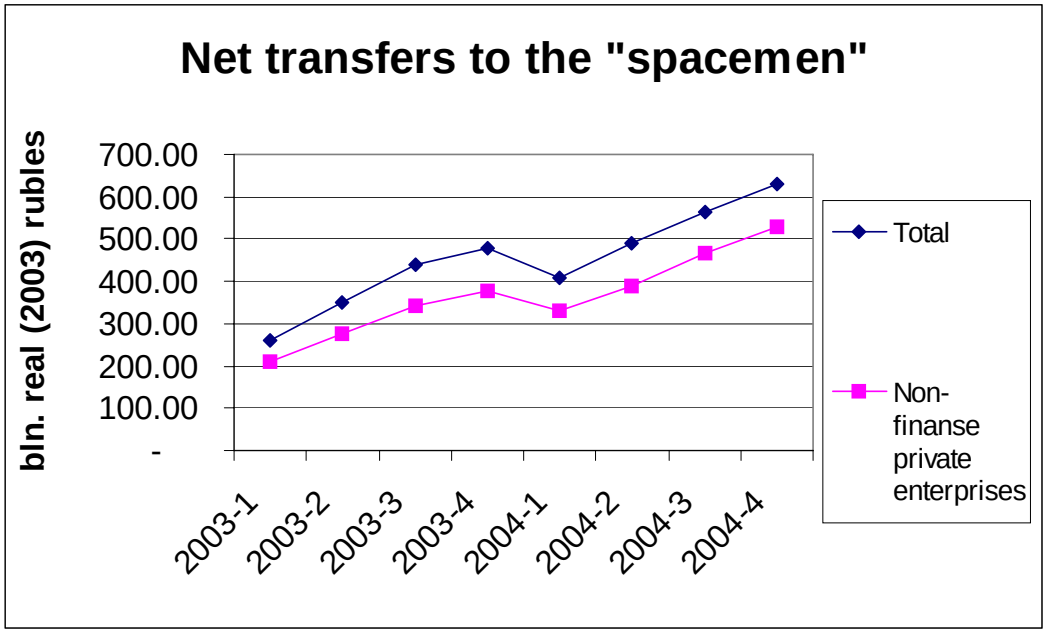

Figure 5

Net real transfers to "spacemen" by quarters (12% inflation assumed). "Non-finance private enterprises" exclude individual entrepreneurs, banks, brokerage firms, insurance companies, federal and municipal enterprises

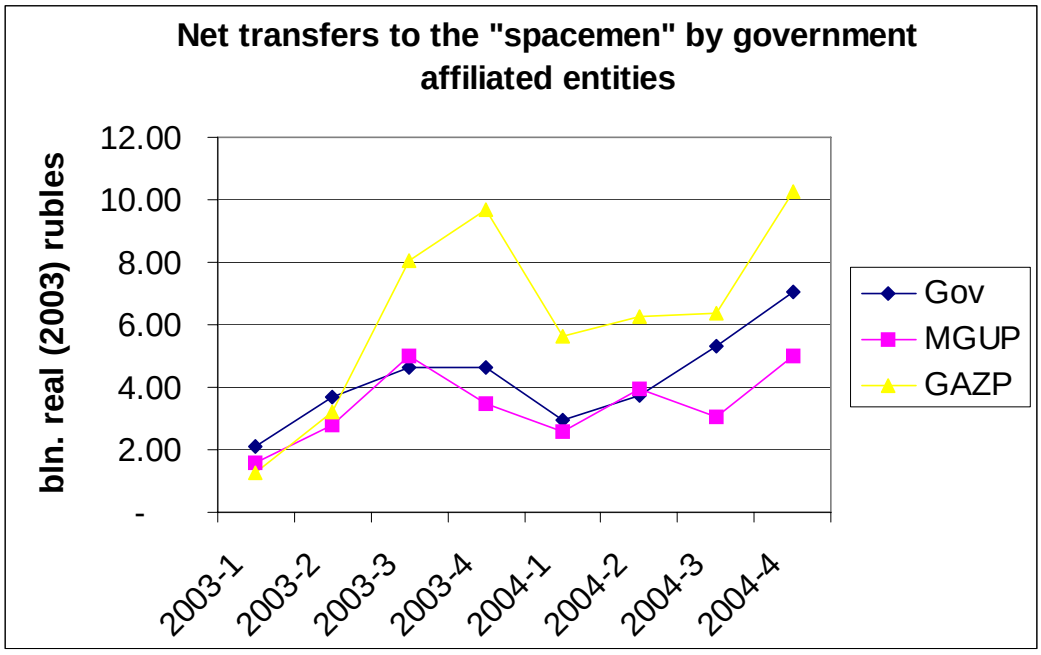

Figure 6

Net real transfers to "spacemen" by government affiliated entities (12% inflation assumed). Gov stands for federal treasuries, ministries and tax-collection entities. MGUP is dummy for state and municipal owned enterprises (names contain "state", "republican" or "municipal"). GAZP includes all Gazprom affiliated companies which sent funds to the "spacemen". Full list of Gazprom affiliated companies that transfer funds to "spacemen" might be found at http://home.uchicago.edu/~mmirono1/data_spacemen