

Economics of Spacemen: Tax Evasion and Firm Performance. Evidence from Russian banking transaction data.

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September 28, 2006

Abstract

Using Russian banking transactions data, I identify "spacemen", short-life firms specially created for tax evasion. I estimate "spacemen" tax evasion to be 5.5% of GDP in 2003 and 6.4% 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. Though I do not find significant effect of tax evasion on revenue, asset growth and profitability, I document a negative relation between tax evasion and share of fixed assets.

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

*I am grateful to Gary Becker, Marianne Bertrand, Sergey Guriev and Atif Mian for helpful comments and suggestions. I would like to thank Vera Kashirtseva for help with editing this manuscript. I am also grateful to ViveData for providing data for this research

Russia by identifying "spacemen", short-life firms specially created for tax evasion purposes that are 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 12.4% and 14.5% of GDP respectively. Assuming that tax evasion is 44% of "spacemen's" net revenues¹, the evasion using "spacemen" might be estimated as 5.5% and 6.4% of GDP respectively or almost a 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 respectively². 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. Alternative explanation is that private companies use more advanced methods of stealing taxes which are not identifiable using my dataset. 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.

Using Rosstat accounting data for about 1000 companies, I find neither negative nor positive effect of tax evasion on firm performance. A 1% increase in tax evasion measure corresponds to a 1% decrease in reported profit, that might be treated as a zero total effect on firm's real profit (reported and unreported). I document a negative relation between tax evasion measure and share of fixed assets, however this relation disappears when I control for the industry. The possible explanation for this empirical fact is that tax evasion is more common in industries with relatively low share of fixed assets, for example evasion in trade is twice as much as in other industries.

To the best of my knowledge, there is only one study which directly measures tax evasion. Fisman

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

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

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 gives a portrait of an average tax evader and presents dynamics of tax evasion. Section V analyzes effect of tax evasion on performance and section VI concludes.

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

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

portion of the money received by a "spaceman" might be resent to a real supplier⁴, 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 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 2005⁵ 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, foreign investment in fixed capital and companies accounting data is Rosstat (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

⁴E.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".

⁵Vedomosti (2005) discusses this incident

paid on a quarterly basis⁶ 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 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

$$\begin{aligned} Net_tax_rate &= \frac{Tax_paid}{F_R - (F_P - Tax_paid)}, \text{ if } F_R \geq F_P \\ &= \text{undefined}, \text{ if } F_R < F_P \end{aligned}$$

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 revenue⁷ of \$300.000 and pays \$7,900 in taxes including \$220 in social security tax, which corresponds to approximately a \$670⁸ average wage bill per firm⁹. Column (3) includes only the firms which received more money

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

⁷By "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

⁸In 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

⁹This 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

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 wage¹⁰; and c) that are not open joint stock corporation. These selection criteria leave me with a sample of approximately 45,000 spacemen. 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

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

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.

The source for firms’ accounting data is Rosstat. The database provided by AK&M contains 19,423 entrees for 2003 and 10,028 entrees for 2004¹¹. Rosstat database has basic accounting items: current and non-current assets, short-term and long-term debt, inventory, cash, revenue, profit, profit tax and some others. I match this database with my banking data by exact name and region correspondence. The largest Russian corporations were naturally excluded from analysis because they typically operate through affiliated firms, which are presented in my banking data, however are absent in Rosstat data. Therefore using these data it is impossible to determine tax evasion for the largest Russian corporations. This leaves me with 736 matched records for 2003 and 583 for 2004¹².

I construct 2 measures of tax evasion at the company level:

$$Shadow = \frac{F_to_Sp}{F_P}$$

¹¹The sales person at AK&M could not explain me the selection criteria of Rosstat, as well why 2004 database contains as twice as less records than 2003 database. Data Appendix contains the short summary of Vedomosti investigation about this issue.

¹²Such a low percentage of matched firm might be explained by the fact that for majority of firms spelling of names in banking database differs from spelling in Rosstat database, and INN, unique ID of a firm, is absent in Rosstat database therefore I could not match Rosstat and banking data by INN.

$$ShadowR = \max\left(\frac{F_to_Sp}{revenue}, 1\right)$$

where F_to_Sp - funds transferred to "spacemen", F_P is total amount of funds transferred, $revenue$ is firm's reported revenue from Rosstat data. I use both measures in my analysis because $Shadow$ has lower measurement error than $ShadowR$, but $ShadowR$ has better economic interpretation.

I report summary statistics for Rosstat data in Table 3. Columns (1) and (2) have information about all matched companies, columns (3) and (4) contain only firms, data for which were presented in both years. Mean assets for my sample are twice as less as for an original Rosstat sample of 10,000 companies, that might be explained by exclusion the largest corporations. Nominal growth of assets and revenues is about 40% from 2003 to 2004. The possible explanation for this outstanding growth is that real inflation in 2003-2004 were much higher than reported one¹³. We can see that tax evasion does not change significantly from 2003 to 2004. $ShadowR$ is estimated around 4% for this sample, which means that Russian mid-size companies send around 4% of their revenues to "spacemen". However, since F_to_Sp includes only revealed transfers to "spacemen", $ShadowR$ underestimates tax evasion at the company level. $Shadow$ provides unbiased estimation because if I do not reveal affiliation of some bank accounts with a particular firm, it leads to the same underestimation error of F_P and F_to_Sp . This is why $Shadow$ gives 1.5 times higher estimation of tax evasion than $ShadowR$ does.

4 Spacemen's Clients and Dynamics of Tax Evasion

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".

Table 4 describes relation between tax evasion and size. We can see that 71% of firms sent funds to "spacemen" at least once, however only 58% might be considered "spacemen" schemes users ($shadow > .01$). An average firm in my sample shelters 11.1% of total payments. We can see that estimation of $Shadow$ for the large firms (10.8%) is more than 50% higher than this estimation for Rosstat firms (see Table 3). There might be two possible explanation of this empirical fact. The first explanation is that companies for which Rosstat collect data are more transparent ones. The largest tax evaders try to hide their activities both from tax authorities and statistical organizations. Another possible explanation is that large and mid-size companies prefer to shelter profits through affiliated

¹³According to Rosstat, inflation for 2003 and 2004 was below 12% and GDP growth for 2004 was 7.1% . However, Rosstat reports nominal GDP for 2003 as 13.2 trillion rubles and 17.0 trillion for 2004. If we assume 7.1% economic growth, it gives us inflation around 20%.

entities, therefore looking at the bank accounts of firm-principal does not allow me to capture main source of tax stealing.

I define a tax evasion measure for a group of firms as

$$tax_evasions_S = \frac{.44 \left[\sum_{i \in S} F_to_Sp_i \right]}{\sum_{i \in S} Tax_paid_i}$$

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 spacemen¹⁴. 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".

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

¹⁴Top 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/>

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 exogenous 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 almost by 30% in real terms, which is significantly higher than the GDP growth. Net revenues of "spacemen" were 12.4% and 14.5% of GDP in 2003 and 2004 respectively, which corresponds to tax evasion 5.5% and 6.4% 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 Tax Evasion and Performance

The most interesting question is whether tax evasion affects firm's performance. On the one hand, tax evasion gives a firm more resources for development and increase profitability of investment. On the other hand, evasion decreases transparency of business, makes it more difficult to attract financing and increases power of corrupt officials to extract rents. In the equilibrium, firms should evade taxes until marginal benefits offset marginal costs of evasion, this is why on the margin, tax evasion should have zero effect on firm's real performance. Therefore I am going to test null hypothesis that tax evasion has no effect on firm's real profitability, revenue and growth.

Under null hypothesis I can formulate several testable predictions. One prediction is that elasticity

of tax paid to tax evasion measure should be equal to -1; or 1% increase of *Shadow* should decrease tax paid by 1%. As was described before, tax evasion in Russia among large and mid-size companies goes mostly through overreporting the costs, and not underreporting the revenues, therefore *Shadow* should have zero effect on firm's reported revenues. Another prediction that follows from null hypothesis that *Shadow* has zero effect on asset and revenue growth.

Table 6 describes relation of tax payments and tax evasion. Dependent variable for columns (1) - (3) is a profit tax according to Rosstat data. I control for revenue, assets and industry (all from Rosstat). Point estimates of coefficient before *Shadow* are very close to -1 in economical and statistical sense for all 3 specifications: -.94, -.77, -.80. To provide additional tests of this hypothesis, I use total tax payment obtained through banking data. "Total tax" includes all payments to government agencies: profit tax, social security tax, VAT, all other taxes and duties. Since *F_R* is a proxy for revenue obtained through banking data and has the same measurement error as "total tax", I use it as a control in column (4) and (5) instead of *revenue*. We can see that null hypothesis still cannot be rejected. However, point estimates are around 2 times higher than those for profit tax, but this difference is statistically insignificant.

To check robustness of results I report relation of tax margins and tax evasion in Table 6a. Columns (1)-(3) show negative relation between profit tax to revenue (or assets) ratio and *Shadow*. Columns (4)-(5) show similar relations for "total tax". However, point estimations for "total tax" specifications are 7-12 times higher than those for "profit tax". I can explain it by the fact that Russian firms use "spacemen" scheme mostly to evade VAT and social security tax, not profit tax. Therefore, relation between total tax payments and *Shadow* is much stronger.

Table 7 shows effect of tax evasion on different proxies of firm's performance. As it was expected, elasticity of reported profit to *Shadow* is close to -1. However, we can see zero effect of tax evasion measure on other proxies of firm's performance: revenues, assets and growth.

Summarizing evidence from Table 6 and Table 7, I can conclude that 1% increase in tax evasion measure decreases reported profit by 1%, therefore tax evasion has zero effect on total firm's profitability (reported and unreported). Analyzing other proxies of firms' performance, I find that tax evasion has no effect on revenue, assets, and growth of firms. These findings are not surprising, because if two thirds of firms evade taxes (another third of firms might evade taxes as well, they just were not caught using my methodology) then it becomes a common knowledge that everybody is a tax evader. Investors know that random firm is hiding a significant part of the revenues¹⁵, tax-collecting officials

¹⁵For example, Russian banks while considering personal loan requests or mortgage application almost do not rely on official information about salary. Instead, they require to provide indirect proofs of real income: unofficial reference

know that they can claim bribes from everybody because everybody is evading, and new entrants do not have other options rather than evade taxes as well. In this equilibrium not-to-evade is a strongly dominated strategy because if everybody thinks that everybody evades, then a non-evader is worse-off because it pays more taxes, but corrupt officials claim the same level of rents, and investors require the same return on capital as for evaders.

Another question which might be answered using my data is whether tax evasion affects asset and capital structure. Column (1) of Table 8 shows that tax evasion is negatively related to a share of fixed assets. The possible explanation of this fact is that the less fixed assets a firm has, the less share of assets might be seized by government in case of revealing evasion. Therefore, the marginal expected costs of evasion is less for the firms with relatively low level of fixed assets, and they should evade more in equilibrium. However, this negative relation becomes statistically insignificant when I control for industry (see column (2)). Since the asset structure is largely determined by industry where a firm is operating, and the negative relation between tax evasion and share of fixed assets is mostly caused by cross-industry variation, we can conclude that tax evasion is more common in industries with relatively low level of fixed assets. Another support of this hypothesis is Table 5, where I report cross-section estimations of tax evasion for different industries. We can see that tax evasion in trade is almost 2 times higher than in other industries, and trade has relatively low level of fixed assets.

Surprisingly, I did not find any significant effect of tax evasion on capital structure or debt structure (see columns (3) and (4) of Table 8). This might be due to incapability of firm credibly signals to investors about their transparency without revealing this information to tax authorities.

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 12.4% of GDP in 2003 to 14.5% 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

about salary from employer, copy of passport to verify if applicant has enough money to travel abroad, and where he/she can travel, property registered by the names of close relatives, etc., because everybody knows that in private sector, official wage has nothing to do with a real wage in majority of cases.

rents from the oligarchs to the ordinary people. In fact, by stealing more taxes (besides the less efficient 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.

The interesting finding is that tax evasion has no effect on firms' performance: real profit, revenue, asset and growth. I can explain this empirical finding by the theory, that Russian business is in "everybody evades" equilibrium.

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A Data Appendix

A.1 Banking Transaction Data

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

oozao - 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/.

A.2 Rosstat Data

Rosstat accounting data were provided by AK&M (www.akm.ru). Database for 2002 contains 22,528 entrees, for 2003 - 19,423 entrees and for 2004 - 10,028 entrees. The sales person at AK&M could not explain the selection criteria for Rosstat database and the reason why 2004 database has twice as less entrees. Alexandra Petrachkova, the journalist of Vedomosti (the most respectful Russian business newspaper), was going to publish an article about my research and asked AK&M to provide official explanation of the source of these data. A top manager from AK&M responded to Alexandra that "they do not have Maxim Mironov among their clients and data which they provide are taken from open sources". Further investigation of Alexandra revealed that only 2 companies Skrin and Spark have legal rights to sell Rosstat data. CEO of Spark commented to Alexandra that before summer 2006, one company (he did not want to mention its name) was regularly buying Rosstat database which contains data for largest companies through corrupt employees of Rosstat. After that this company was selling these data to all other companies, including AK&M. This summer Rosstat found the source of data leaking, and the employees who were stealing the data, were fired.

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 (ooooao 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 \leq 365 days.

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

Variable	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%
	(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. Summary statistics, Rosstat and banking data

Variable	All		Complete	
	2003	2004	2003	2004
	(1)	(2)	(3)	(4)
Mean assets, mln. \$	13.17	22.51	16.00	22.31
Median assets, mln. \$	4.10	7.83	6.52	8.51
Mean revenue, mln. \$	23.93	36.71	27.07	36.56
Median revenue, mln. \$	8.41	15.36	12.54	16.64
Mean profit, mln. \$	-0.33	1.86	1.24	1.90
Median profit, mln. \$	0.1	0.4	0.3	0.5
Mean shadowR, %	4.2	4.2	3.4	4.0
Median shadowR, %	0.5	0.5	0.4	0.5
Mean shadow, %	6.2	5.9	6.5	6.4
Median shadow, %	1.2	1.5	1.4	1.5
Mean total_tax/revenue, %	11.0	9.8	10.1	10.0
Median total_tax/revenue, %	6.7	4.9	6.4	5.0
Mean profit tax/revenue, %	1.8	1.8	1.7	1.7
Median profit tax/revenue, %	0.6	0.7	0.7	0.8
N obs	736	583	414	414

The source for firm's accounting data is Rosstat; ShadowR is a ratio of transfer to "spacemen" to firm's reported revenue; Shadow is a ratio of transfer to "spacemen" to total firm's outflow, profit tax is taken from Rosstat data, "total_tax" is calculated using banking data as sum of all transfers to tax collecting agencies. Columns (1) and (2) provide information about all matched firm (Rosstat and banking database), columns (3) and (4) have information about firms which were matched for both years.

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 shadow, %	11.1	11.1	10.8	11.1	6.0
Std dev shadow, %	18.6	16.8	17.1	18.3	16.1
Med shadow, %	2.1	4.0	3.1	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
Mean funds rec. p/month, th.\$	22.8	281.4	3,393.3	125.0	1.0
Med funds rec. p/month, th. \$	22.1	200.0	5,570.0	898.1	0.9
Std funds rec. p/month, th. \$	13.9	203.6	1,738.8	18.8	0.6
% of shadow>0	68.0	88.1	93.4	71.5	29.7
% of shadow>1%	56.1	68.5	67.8	58.2	25.3
% of 1%<shadow<5%	15.5	22.4	26.0	16.8	6.6
% of 5%<shadow<10%	10.0	14.3	12.1	10.7	4.0
% of 10%<shadow<30%	17.9	20.4	18.0	18.2	7.4
% of shadow>30%	12.7	11.4	11.7	12.5	7.2

The table includes firms with gross tax ratio greater than 1% ("normal" firms). Shadow is defined as ratio of gross payments to "spacemen" to the total amount of funds transferred; "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).

Table 5. Tax evasion by industries

Variable	shadowR (1)	shadow (2)	shadowR (3)	shadow (4)
construction	0.003 (0.015)	0.024 (0.014) *		
trade	0.029 (0.011) **	0.028 (0.012) **	0.029 (0.008) ***	0.025 (0.008) ***
coal	-0.021 (0.031)	-0.001 (0.028)		
oil	-0.011 (0.042)	-0.023 (0.048)		
food	0.005 (0.019)	0.011 (0.018)		
electricity	-0.035 (0.051)	-0.049 (0.056)		
metal	-0.009 (0.03)	-0.005 (0.031)		
chemical	-0.004 (0.018)	-0.006 (0.021)		
machine	-0.016 (0.017)	-0.008 (0.02)		
transport	-0.011 (0.019)	-0.025 (0.022)		
textile	-0.011 (0.023)	0 (0)		
services	0.035 (0.018) *	0.005 (0.021)		
telecom	0.006 (0.03)	-0.001 (0.026)		
alc_tab	-0.017 (0.042)	-0.021 (0.048)		
jewelry	-0.026 (0.036)	-0.04 (0.04)		
constant	0.035 (0.009) ***	0.05 (0.01) ***	0.034 (0.004) ***	0.053 (0.005) ***
R-sq between	0.025	0.021	0.015	0.009

The source for firm's accounting data is Rosstat; ShadowR is a ratio of transfer to "spacemen" to firm's reported revenue; Shadow is a ratio of transfer to "spacemen" to total firm's outflow, profit tax is taken from Rosstat data. Information about the industry is taken from Rosstat

Table 6. Tax evasion and tax payments

Variable	Log(profit tax)			Log(total tax)	
	(1)	(2)	(3)	(4)	(5)
shadow	-0.938	-0.771	-0.801	-1.715	-1.719
	(0.422) **	(0.419) *	(0.413) *	(0.53) ***	(0.531) ***
Controls					
Log(revenue)	Y	Y	Y	N	N
Log (F_R)	N	N	N	Y	Y
Log(assets)	N	N	Y	N	Y
Industry	N	Y	Y	Y	Y
$P(H_0, b = -1)$	0.884	0.584	0.629	0.178	0.176
R-sq					
within	0.177	0.181	0.173	0.061	0.061
between	0.231	0.282	0.314	0.366	0.367
overall	0.22	0.272	0.306	0.365	0.366
Number of obs	1168	1168	1168	1184	1184
Number of groups	843	843	843	855	855

The source for firm's accounting data is Rosstat; Shadow is a ratio of transfer to "spacemen" to total firm's outflow, profit tax is taken from Rosstat data, "total_tax" is calculated using banking data as sum of all transfers to tax collecting agencies. F_R is total firm's inflow, calculated using banking data

Table 6a. Tax margins and tax evasion

	profit tax/revenue		profit tax/assets	total tax/revenue	total tax/assets
Variable	(1)	(2)	(3)	(4)	(5)
shadow	-0.02	-0.019	-0.023	-0.145	-0.25
	(0.012) *	(0.012)	(0.013) *	(0.035) ***	(0.054) ***
Controls					
Log(assets)	N	Y	Y	Y	Y
Industry	Y	Y	Y	Y	Y
R-sq					
within	0.000	0.001	0.022	0.002	0.049
between	0.059	0.073	0.043	0.079	0.077
overall	0.06	0.076	0.048	0.072	0.068
Number of obs	1307	1307	1307	1180	1264
Number of groups	933	933	933	851	904

Reported standard errors are from between regressions. The source for firm's accounting data is Rosstat; Shadow is a ratio of transfer to "spacemen" to total firm's outflow, profit tax is taken from Rosstat data, "total_tax" is calculated using banking data as sum of all transfers to tax collecting agencies.

Table 7. Performance and tax evasion

	Log(profit)	Log(revenue)	Log(assets)	Drevenue	Dassets
	(1)	(2)	(3)	(4)	(5)
Shadow	-0.959	-0.046	0.004	-0.158	-0.048
	(0.522) *	(0.228)	(0.306)	(0.227)	(0.228)
Controls					
Log(revenue)	Y	N	N	N	N
Log(assets(-1))	Y	Y	N	Y	Y
Industry	Y	Y	Y	Y	Y
R-sq					
within	0.266	0.001	0.001	0.148	0.306
between	0.216	0.35	0.064	0.026	0.048
overall	0.229	0.353	0.057	0.027	0.05
Number of obs	638	780	1308	780	780
Number of groups	428	496	934	496	496

The source for firm's accounting data is Rosstat; Shadow is a ratio of transfer to "spacemen" to total firm's outflow, profit tax is taken from

Table 8. Tax evasion, asset and capital structure

	Share of fixed assets		Leverage	LTD/Debt
	(1)	(2)	(3)	(4)
Shadow	-0.147	-0.089	0.094	-0.096
	(0.068) **	(0.064)	(0.093)	(0.121)
Controls				
Log(assets)	Y	Y	Y	Y
Industry	N	Y	N	N
R-sq				
between	0.024	0.163	0.002	0.014
Number of obs	1303	1303	1303	835
Number of groups	934	934	931	628

The source for firm's accounting data is Rosstat; Shadow is a ratio of transfer to "spacemen" to total firm's outflow, Share of fixed assets calculated as a ratio of Non-current assets to total assets. Leverage is ratio of interest bearing debt to shareholders equity. I do not report within regression because of low within variation of dependent variable.

C Appendix

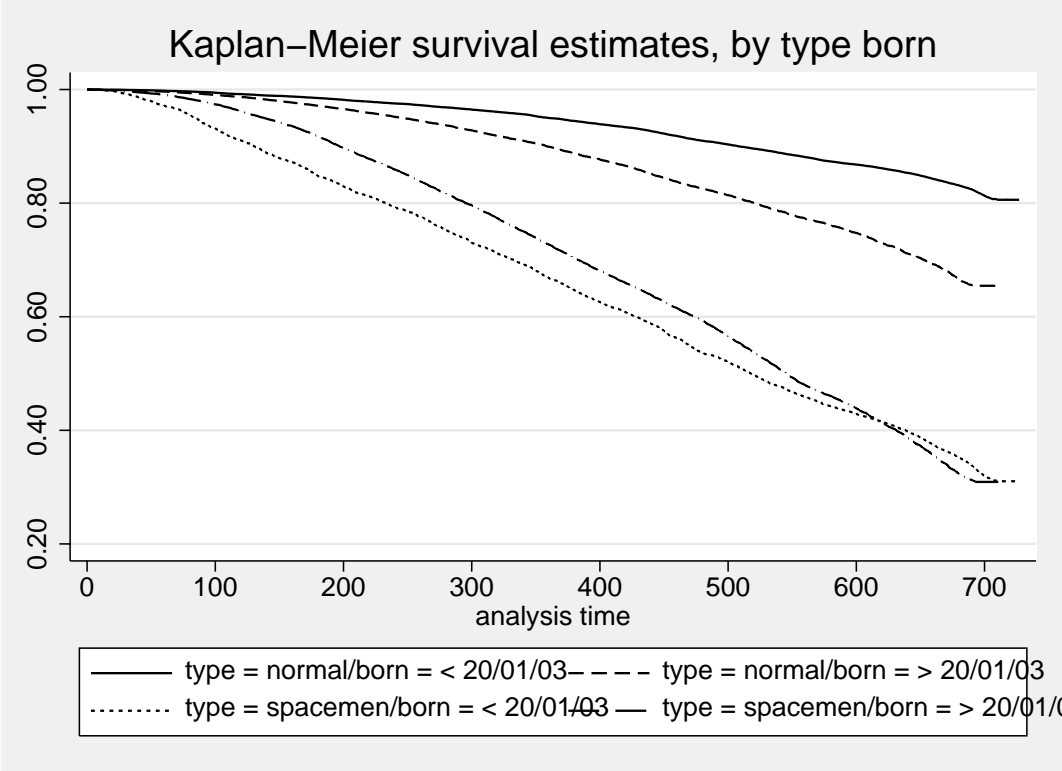


Figure 1

"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.

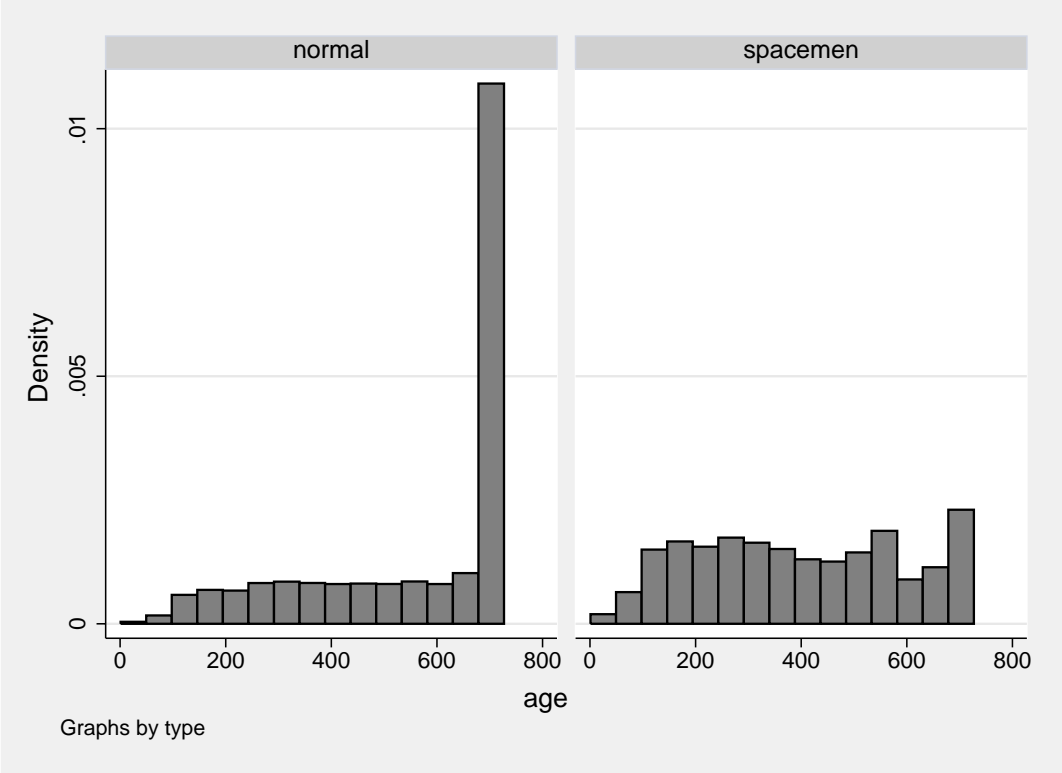


Figure 2

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

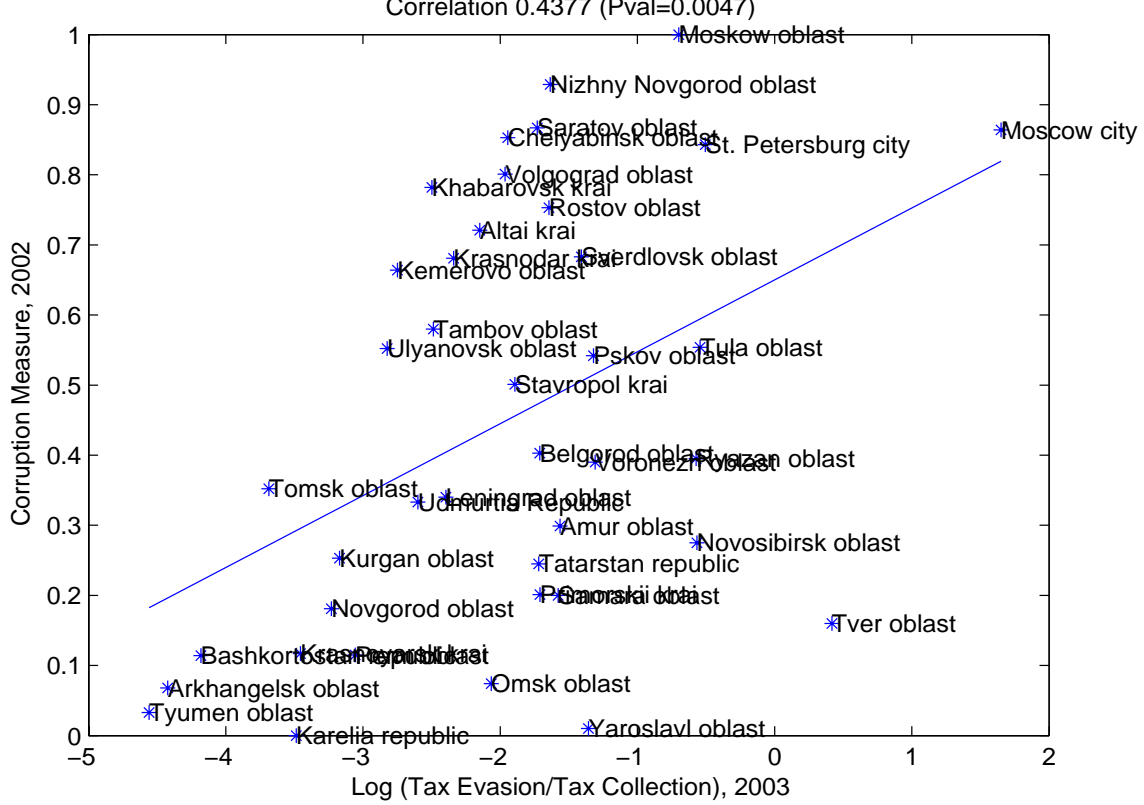


Figure 3

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

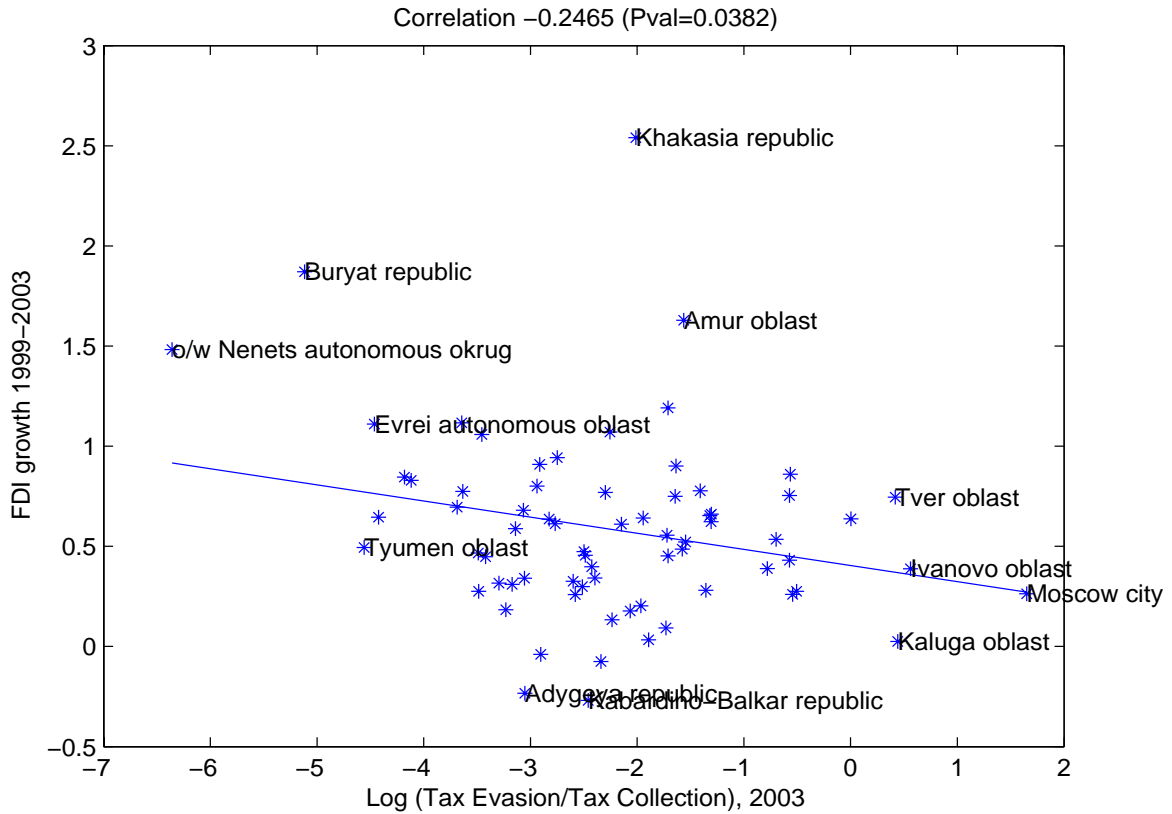


Figure 4

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

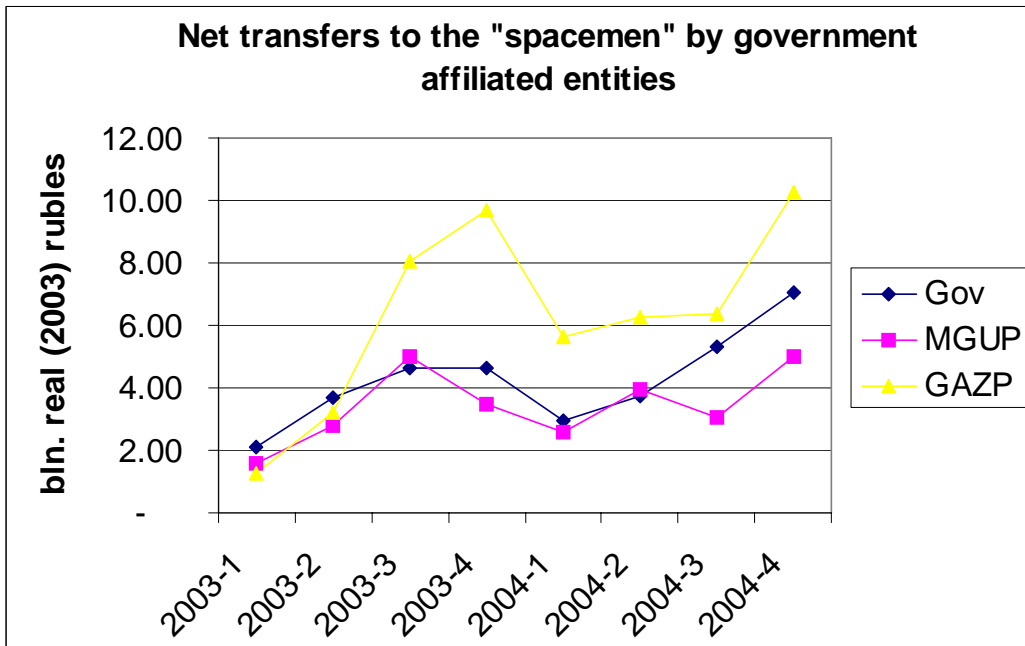


Figure 6

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