Cash Flow Diversion and Corporate Governance: Evidence from Russia

Maxim Mironov*
IE Business School
Castellon de la Plana 8
28006 Madrid, Spain
maxim.mironov@ie.edu
http://www.mironov.FM

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Abstract

Using a unique set of data that contains 236 million banking transactions of 1.7 million Russian firms over the 2003 to 2004 period, I examine the use of "spacemen", short-lived special purpose entities created for cash flow diversion purposes. I first estimate diversion in Russia to be 11.3% of GDP in 2003 and 13.1% of GDP in 2004, which corresponds to tax evasion of 4.6%-5.0% and 5.4%-5.8% of GDP, accordingly. Next, based on transfers to spacemen, I construct a direct measure of cash flow diversion for 180 public companies. I find that on average, firms divert 18% (2.6%) of their real profits (revenue) to spacemen per year, although large corporations evade 50%-70% less than small ones. Finally, I document that neither government ownership nor commonly advocated good corporate governance practices such as audit by a reputable accounting firm or the presence of a foreign director on the board help to curb diversion activities.

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1 Introduction

As outlined by Shleifer and Vishny (1997), analysis of frictions caused by diversion of corporate resources in private interests has been the focus of many recent studies in corporate finance. However, empirical valuations of diversion activities are limited mostly to indirect estimates due to the fact that income diversion is difficult to observe and even more difficult to quantify. Using a unique set of Russian banking transaction data, I develop an approach to directly measure diversion.

The diversion of a firm's resources is part of the private benefits enjoyed by management and/or a controlling shareholder. Under the assumption that non-pecuniary benefits (e.g., benefits of influence) do not vary significantly across similar companies, measuring the private benefits of control can allow one to capture variation in cash flow diversion activities by controlling parties. The literature offers three ways to measure private benefits of control. The first method, pioneered by Lease, McConnell, and Mikkelson (1983), relies on the difference in prices between voting and non-voting shares with the same or similar dividend rights. This method is widely used in many empirical studies, e.g., DeAngelo and DeAngelo (1985), Bergstrom and Rydqvist (1990, 1992), Zingales (1994, 1995), and Nenova (2003). Using this approach, Zingales (1994) estimates that the private benefits of control in Italy range from 59% to 103% of the value of non-voting equities. Using a sample of 18 countries, Nenova (2003) estimates that the value of controlling block votes ranges from half of firm market value in Korea to almost zero in Finland. The second method, first applied by Barclay and Holderness (1989), is based on the difference between the negotiated price of a controlling block of publicly traded companies and the market price of the shares. Using this methodology, Dyck and Zingales (2004) estimate that the value of control in 39 countries varies from -5% of firm value in Switzerland to 65% in Brazil. The third method, developed by Bertrand, Mehta, and Mullainathan (2002), focuses on the tunnelling of resources from firms where controlling parties have low cash flow rights to firms where controlling parties have high cash flow rights. They estimate the benefits of control to be 25% of marginal profits in firms with low cash flow rights.

In this paper I develop a new method of *directly* measuring cash flow diversion that is based on identification of special purpose entities called "spacemen" – short-lived firms created for diversion purposes that are typically registered in the names of persons who have lost their IDs. In the case of private firms, spacemen schemes are used purely for tax evasion. In case of public corporations, these schemes are used both for tax evasion and for expropriating minority shareholders. My approach to measuring diversion is closely related to that of Desai, Dyck, and Zinglales (2004), who report cases of enormous income diversion by leading Russian oil corporations via affiliated traders. My approach is

distinct, however, in that I focus on activities related to the artificial inflation of firms' costs whereas Desai, Dyck, and Zinglales (2004) analyze the underreporting of companies' revenues.

To identify spacemen, I use a unique set of Russian banking transaction data for the period 2003-2004. This dataset, which leaked to the public from the Russian Central Bank in 2005, contains 234 million transactions of 1.7 million firms, and covers 75%-80% of *all* banking transactions made in Russia in 2003-2004. Each transaction has a detailed description. For example, the data indicate that on 01.26.2004, Gaztaged (100% subsidiary of Gazprom[1]), paid 538 million rubles ($18 million) to Trubniy Torgoviy Dom for pipes for YamalGazInvest, and on 07.09.2003, Rosneft[2] paid rent of 637 rubles ($21) to Selivanovskaya Voda for a water cooler.

Empirically, I define a "spaceman" as a firm that pays either zero taxes or infinitesimal taxes relative to its turnover. According to the Russian tax system, even a loss-generating firm must pay VAT, social security tax and property tax. Hence, my identification criteria guarantee that such a firm cannot survive even a simple examination by tax authorities. Because a chief executive is subject to significant fines or even imprisonment, if found guilty of tax evasion, spacemen are typically registered in the names of persons who have lost their IDs or homeless people. Using my methodology, I identify 42,483 spacemen. An average spaceman lives 1.5 years and has about $470K of cash receipts. This is four times higher than the average cash receipts of a regular firm. I estimate cash flow diversion using spacemen schemes as $49B in 2003 and $77B in 2004, which corresponds to 11.3% and 13.1% of GDP, respectively. By transferring funds to spacemen, a firm typically evades VAT (18%), profit tax (24%), dividend tax (9%), social security tax (2%-35.6%), and personal income tax (13%). Depending on the funds use, tax evasion using spacemen schemes can be estimated as approximately 4.6%-5.0% of GDP in 2003 and 5.0%-5.8% of GDP in 2004.

In most cases, large Russian corporations do not send funds directly to spacemen, rather they use affiliated entities that deal with the spacemen. Consider an example associated with Gazprom, the largest natural gas producer in Russia. This company used its affiliates "Gaztaged", "Laingaz", and "Provaidgaz" (100% subsidiaries of Gazprom), in addition to other entities for these purposes. For instance, in 2003-2004 "Gaztaged" sent $992M to the spaceman "Trubniy Torgoviy Dom" and "Laingaz" transferred $267M to the spaceman "Energosintez-M". Hence, in calculating diversion for large Russian corporations, I aggregate net transfers to spacemen of a main firm and all its affiliates[3]. Using this methodology I estimate cash flow diversion for 180 large Russian corporations. I construct

[1] Gazprom is the largest Russian company (natural gas producer).
[2] Rosneft is one of the largest oil producer in Russia.
[3] Affiliate firms are the firms such that the main company has at least 20% ownership stake in the firm.

three measures of diversion: net transfer to spacemen as a percentage of real profit, which I define as reported profit plus net transfers to spacemen ($ShadowP$); net transfers to spacemen as a percentage of revenue ($ShadowR$); and net transfer to spacemen as a percentage of assets ($ShadowA$). I find that an average company diverts 18% of its real profit, 2.6% of its revenue, or 1.6% of its assets per year.

I perform two tests to verify my measures. First, I analyze the relation between transfers to spacemen and a firm's reported profitability. If companies divert cash flow by transferring funds to spacemen then I should observe a negative relation between my measures of diversion and reported profitability. As a proxy for profitability I use the reported sales margin, which is the ratio of operating profit to revenue. I find that all my diversion measures are negatively related to the reported sales margin, with the coefficient on $ShadowP$ statistically significant at the 1% level and the coefficients on $ShadowA$ and $ShadowR$ significant at the 5% level. The economic significance of this effect is also large: a one standard deviation increase in $ShadowP$, $ShadowA$, or $ShadowR$ corresponds to a 4.5%, 1.7%, and 1.7% decrease in the sales margin (an average company in my sample has 12.7% sales margin). The results of this test support my measures of cash flow diversion.

Another natural check of my measures is to relate them to well known measures of private benefits of control. Unfortunately, I cannot use the method of controlling block transactions because, to the best of my knowledge, in Russia there were only four such transactions of publicly traded companies from 2000 to 2007. The dual class share approach also cannot be applied directly because in Russia there are no dual class shares with the same or similar dividend rights and different voting rights. However, I apply a variation of the dual class share approach to my sample using the price difference between ordinary and preferred shares. Fifty companies in my sample have both ordinary and preferred shares traded on RTS (Russian Trading System), of which 35 have superior dividend rights of preferred stock relative to ordinary stock. Following the methodology of Nenova (2003), I estimate the voting premium for these 35 stocks. I observe a positive relation between the voting premium and my diversion measures (statistically significant at the 9%-14% level). My measures of cash flow diversion are therefore consistent with a widely used measure of private benefits of control.

Next, I explore what factors may restrict the diversion of company resources. Several studies document that a better legal environment (La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV henceforth) (1998, 2000), Nenova (2003), Dyck, and Zingales (2004)), a higher level of investor protection (Nenova (2003), Dyck, and Zingales (2004)), greater product market competition, and increased public opinion pressure (Dyck and Zingales (2004)) may decrease diversion. I extend this analysis and empirically study the relations between cash flow diversion and several proxies for corporate governance.

My first governance proxy is government ownership. From a theoretical point of view, it is not clear how government control should affect cash flow diversion. On the one hand, by restricting diversion, the government benefits from higher tax collections and from higher returns on its equity, which would suggest that the government has high incentives to curb diversion. On the other hand, the government acts through its officials, and their interests might be significantly biased towards extraction of private benefits. I show that the government ownership does not help to decrease cash flow diversion. According to my estimates, Gazprom (controlled by the government) has the highest cash flow diversion in absolute terms, with net transfers to spacemen by its affiliates of $1.4B in 2003-2004. I find that other government-controlled corporations are also among the leaders in diversion. For instance, I estimate cash flow diversion of United Energy System[4] as $381M, the diversion of Rosneft[5] as $194M, and the diversion of Russian Railways[6] as $148M. It is well known that government ownership leads to lower efficiency. My findings suggest that it also does not decrease tax evasion, that is, by acquiring a privately owned company, the government actually decreases tax collections.

Turning to the other governance proxies, surprisingly, I find no relation between cash flow diversion and an audit by a Big 4 accounting firm (Deloitte, Ernst & Young, KPMG, or PriceWaterhouse Coopers (PWC henceforth)). For example, PWC, the auditor of Gazprom, did not mention the fact that in 2003-2004 Gazprom bought pipes for almost $1B from an unknown company "Trubniy Torgoviy Dom", which does not have an office and the director of which is impossible to find. I also find no relation between cash flow diversion and the presence of a foreign director on the board or a cross-listing on an international stock exchange. These results suggest that independent directors may not have enough power or information to protect shareholders from management fraud. Finally, I explore differences in diversion between large and small firms. I find that large corporations (with assets greater than $100M) evade about two to three times less than small ones. This findings suggest that large corporations may be better monitored by tax authorities, shareholders, and the media.

The rest of the paper is structured as follows. Section II gives background on income diversion using spacemen. Section III describes the data and sample used in the analysis. Section IV discusses the spacemen identification strategy, my cash flow diversion measures, and results of tests to verify the measures, Section V presents the empirical results related to corporate governance. In Section VI I conclude.

[4] Energy generation and transfer monopoly.
[5] Large oil production company.
[6] Railways monopoly.

2 Income Diversion Using Spacemen

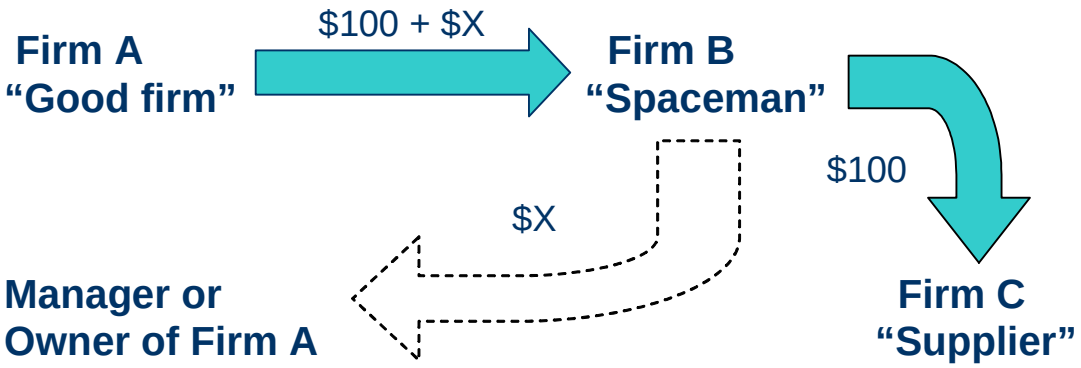
There are three main types of income diversion and tax evasion in Russia. They might be classified as "legal", "illegal", and "semi-legal".

The legal schemes typically involve external or internal off-shore affiliated companies with low tax regimes. For example, in 2001 Sibneft decreased its income tax by 10 billion rubles ($330M) by selling oil through several traders registered in low-tax zones in Chukotka and Kalmykia (Vedomosti (2002)). Desai, Dyck, and Zinglales (2004, Table 3) further report cases of enormous income diversion in Russia using these "legal" schemes. For instance, whereas the average domestic price of oil (net of taxes) in 1999 was $7.20 per barrel and the average export price of oil (net of export costs and excise taxes) was $13.50, Yukos production subsidiaries sold oil for $1.1-$1.8 and Sibneft subsidiaries sold oil for $2.2. Desai, Dyck, and Zinglales (2004) provide evidence that virtually all major Russian oil companies were involved in tax optimization using transfer pricing.

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, but is rarely used by large firms.

Finally, one of the most popular ways of income diversion involves using semi-legal schemes. In this case, companies divert cash flow by inflating expenses through fake contracts. For example, firm A wants to evade $X. It makes a deal with firm B for rendering goods or services that have a true value of $100, but firm A pays to firm B amount of $100+$X. Firm B pays $100 to a real supplier (firm C) that delivers goods or services and returns $X to the manager or the owner of firm A. Firm B, often called a "spaceman"[7], comes out of nowhere, does not perform any real activities, pays almost zero taxes, and disappears in 0.5 to 2 years ("flies into space"). Spacemen are specifically created for income diversion and tax evasion purposes, and are typically registered in the names of homeless people or persons who lost their IDs - these formal owners usually do not know that they own a firm. Some portion of the money received by a spaceman might be re-sent to a real supplier or transferred to another spaceman, but majority of the money is typically returned to the initial sender in the form of "black cash" or a sight draft. Cash flow diversion using spacemen typically involves long chains of transactions, where each transaction, if analyzed separately, appears legitimate; however, the entire scheme is illegal.

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



There are two types of spacemen. The first does not submit accounting statements to authorities and does not pay taxes at all . This type of spacemen lives up to one year, because if a firm does not fill out a tax report, it significantly increases the probability of tax inspection. The second type of spaceman imitates the activity of a small firm. It regularly submits financial reports to authorities and pays nominal taxes. According to an unwritten rule, newly born small firms have a first tax inspection only after two to three years of operations. After expiration of this "safe time", tax authorities will reveal that a spaceman's banking transactions do not match the submitted reports, however. by this time the spaceman ceases its operations, the owner or the chief executive is impossible to find, and the bank account is empty. This type of spaceman lives up to two years or slightly more, much longer than the first type.

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 "firms ready for use"). The marginal cost of operating spacemen is the bank commission (around 0.5%-1% of cashing out funds). Small and medium firms usually do not have their own spacemen; they pay a 1%-3% commission to organizations specializing in providing spacemen services. Radaev (2001) gives a detailed description of this type of semi-legal scheme.

What restricts companies from stealing infinitely? If managers can evade taxes using spacemen, why do they pay taxes at all? In private talks, Russian entrepreneurs note that there is some "minimum level of tax payments" that they should pay. This level is usually negotiated between an entrepreneur and authorities, and depends on political connections, the importance of each tax payer for the regional budget, etc. Many entrepreneurs employ relatives of tax inspectors to have good relations with tax authorities and to obtain lower level of minimum tax payments. In exchange for "tax breaks", entrepreneurs should behave "friendly" to authorities, e.g., they should finance elections. For instance, while it is well known that almost all Russian oil companies in 1998-2003 evaded taxes using off-shore

traders, only Mikhail Khodorkovskiy (head of Yukos[8]), who started to finance opposition parties, was put in jail for tax evasion. Therefore, even though there is no formal criteria that can define the maximum level of allowed evasion for each entrepreneur, two main factors affect this level: political connections and friendliness to authorities.

In the case of private firms, spacemen schemes are typically used purely for tax evasion. In case of public corporations, the schemes are used not only to evade taxes, but also to expropriate minority shareholders. Using banking transaction data I identify spacemen and cash flow diversion at the firm level.

3 Data

3.1 Banking Transaction Data

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[9]. These data can be bought from several web sites[10]. I obtained these data from ViveData[11] for $500. This dataset includes transactions that took place within Russia only. It does not include operations in foreign currencies, nor does it include transactions made within the same bank, i.e., if a firm pays a supplier that has an account in the same bank, this transaction is not present in the dataset. It also does not include cash deposits and cash withdrawals, i.e., if a firm deposits a daily cash receipt into its bank account, I cannot observe this transaction in the data.

The dataset contains 236 million transactions of 1.7 million firms. Each entry has information on the payer, recipient, date, and sum, and also contains detailed description of each transaction. The transactions range from very large to tiny. For example, the data show that on 01.26.2004, Gaztaged, 100% subsidiary of Gazprom, paid 538 million rubles ($18 million) to Trubniy Torgoviy Dom for pipes for YamalGazInvest, whereas on 07.09.2003, Rosneft paid rent of 637 rubles ($21) to Selivanovskaya Voda for a water cooler. This dataset allows one to track cash movements for almost every firm in Russia over the 2003-2004 period. Using this dataset, Vedomosti (2005c) track the most notorious M&A deal of 2004. YuganskNefteGaz, the main Yukos production subsidiary, was bought by an unknown firm "BaikalFinanceGroup" (BFG), that was later acquired by Rosneft. Vedomosti

[8] In 2003 Yukos was the largest Russian company according to market capitalization. It was accused of tax evasion and forced into bankruptcy. Yukos assets were sold in 2004-2005 via auctions

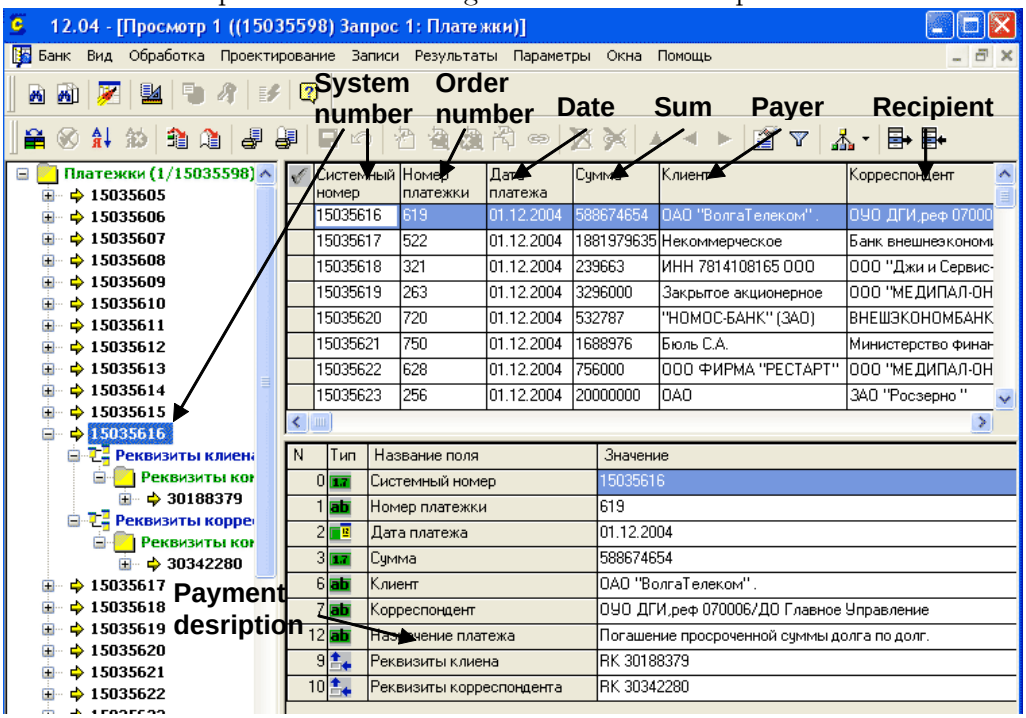
[9] Vedomosti (2005a) discusses this incident.

[10] For example, www.mos-inform.com, www.specsoft.info, and www.wmbase.com.

[11] www.vivedata.com.

(2005c) reveals that on 12.15.2004, Gazpromneft and BFG transferred 49.35B rubles ($1.75B) each as an advance payment for YuganskNefteGaz and on 12.30.2004, BFG, the winner of the auction, finalized the transaction by transferring 211.4B rubles ($7.5B) to the Department of Justice.

A detailed description of the banking transaction data is provided in the Data Appendix.



There is no exact evidence how these data were leaked. An internal investigation of the Russian Central Bank did not yield any results. However, after this scandal, the central bank stopped the leakage and therefore I could not obtain banking data for 2005-2008. Babkin (2005), an economist from the Russian Central Bank, observes that this dataset is widely used by many commercial banks for credit rating evaluation. Using these data banks can verify the accuracy of financial statements, analyze firms' key customers and suppliers, and investigate the financial activities of a firm with its affiliates.

Note that some articles in Russian media state that this dataset contains only those transactions made through a Moscow branch of the Russian Central Bank. I test this hypothesis below.

3.2 Can We Trust the Data?

Since the authenticity of the data was never confirmed by the Russian Central Bank, I examine whether the banking database contains transactions of real companies and how complete it is. For this purpose I use the Rosstat[12] database of Russian companies provided by Spark[13]. This database contains a

[12] Rosstat is an official Russian statistical agency.
[13] spark.interfax.ru

firm's INN (taxpayer number), name, region, date of registration, industry, directors, owners, and some other identifying information about the firm. In addition, it contains basic accounting data, such as revenue, profit, net income, assets, debt, and other items. According to the Russian law, all firms (even small ones) must report their balance sheets and income statements to Rosstat on a quarterly basis. Even though this law does not set any explicit penalty on the firms that do not report, the majority of Russian firms prefer to report their data to Rosstat to maintain good relations with the tax authorities. Rosstat contains accounting data for about 1.5 million Russian firms. If my banking data are real, I should find a large degree of similarity between the Rosstat data and the banking data.

Test 1. Matching of Rosstat to Banking Data

Using the Rosstat database, I select 100 random companies from the 20 largest Russian regions that show non-zero profit or revenue for 2003 or 2004 and match them to my banking database by INN. Table 1 shows the results. I find a match between Rosstat and the banking data for about 70% of the companies. We can see from the table that the sample is biased towards Moscow city and Moscow region, with a 90%-92% matching rate compared to the average 67% for the other regions. This test is consistent with the hypothesis that the database leaked from the Moscow branch of the Russian Central Bank, since the probability that a Moscow firm uses a Moscow bank is much higher than that of a regional firm using a Moscow bank. However, we should take into account the fact that the majority of large Russian corporations that operate in different regions have headquarters in Moscow (e.g., Gazprom, United Energy System, Lukoil[14], Rosneft, Russian Railways, Aeroflot[15]). According to expert estimates, about 80%-90% of Russian financial and banking activities are concentrated in Moscow. I therefore conclude that this dataset covers 75%-80% of the banking transactions of *all* Russian firms.

Test 2. Matching of Banking Data to Rosstat

Using the banking dataset, I choose 1,000 random firms. To avoid inclusion of spacemen, I select only those firms that have a ratio of tax paid to total turnover greater than 1%[16]. As I discuss in Section II, spacemen are less likely to provide their financial statements to authorities and therefore are less likely to be present in the Rosstat database. I match these 1,000 firms to the Rosstat database by INN and I find a match for 676 out of the 1,000 firms. Why can I not find 32% of the firms in the Rosstat database? One possible explanation is the presence of typos in INNs in the banking database

[14] The largest private oil production company.
[15] The largest Russian airline company.
[16] I provide the reasoning for this selection criteria in the next section.

(the data appendix describes this problem in detail). While I performed several exercises to clean my dataset, I cannot be sure that I cleaned everything. Another possible explanation is that due to the absence of punishment for non-reporting, some firms choose not to send their reports to Rosstat.

Test 3. Analysis of the Matched Firms

I randomly select 500 firms that are present in both Rosstat and the banking dataset. Using similar logic as in Test 2, I choose only the firms that have a ratio of tax paid to total turnover greater than 1%. I select all banking transactions for these 500 firms from my banking sample and obtain a sample of about 300,000 transactions. For each firm I manually classify transactions that correspond to revenue receipts and profit tax payments according to the description of each transaction. I aggregate these transactions at the firm level for 2003 and 2004. For revenue ($Revenue\_B$) I use cash basis accounting principles (i.e., if a transaction took place in 2003, I account for it in 2003), because it is often impossible to determine from the transaction description the time of service rendering. For profit tax payments ($Profit\_tax\_B$) I rely on the transaction description in determining the period, since all tax payments must include the corresponding tax period in the transaction description. I denote $Profit\_B = Profit\_tax\_B/Tax\_rate$. Since a portion of profit tax for 2004 should be paid in the beginning of 2005, and my banking dataset does not have 2005 transactions, $Profit\_B$ for 2004 is underestimated. From the Rosstat database I obtain reported revenue ($Revenue$) and profit before tax ($Profit$) for each firm. I define $Margin\_B = Profit\_B/Revenue\_B$ and $Margin = Profit/Revenue$. In addition, I calculate a firm's age as the number of years for which a firm reports non-zero activities (profit or revenue) during 1994 - 2005. According to this methodology a firm's age lies within 0 to 12 years. The average firm age for my sample is 4.04 years.

I report summary statistics and correlations in Table 2. We can see from this table that sample characteristics for the Rosstat data are quite similar to those for the banking data. The correlation between $Log(Revenue)$ and $Log(Revenue\_B)$ is 0.76 for 2003 and 0.56 for 2004, the correlation between $Log(Profit)$ and $Log(Profit\_B)$ is 0.87 for 2003 and 2004, and the correlation between $Margin$ and $Margin\_B$ is 0.66 for 2003 and 0.49 for 2004. Further, 26%-28% of the firms have "banking revenues" within [-10%, +11%][17] of the reported revenues and 64%-71% firms have their "banking" and reported revenue within the [-39%, +65%] range[18]. These facts suggest that the banking dataset contains *real* transactions of *real* firms. However, it is likely that some transactions might be missing or mistyped, otherwise correlations between analogous characteristics should be higher. Figure 1, which plots $Log(Revenue)$ against $Log(Revenue\_B)$ and $Log(Profit)$ against

[17] ± 0.1 in exponential terms.
[18] ± 0.5 in exponential terms.

$Log(Profit\_B)$ provides additional evidence of similarity between Rosstat and banking transaction data.

To summarize the results of these tests, I draw three main conclusions about my data. The first is that *the banking data are real though incomplete*. The sample contains data for about 75%-80% of all Russian firms, and accurate data for about two-thirds of them. Therefore, the sample contains accurate data for about 50%-55% of all Russian firms (by accurate I mean data that are reported to Rosstat). My second conclusion is that *the sample is biased towards Moscow region*, which comes from the fact that the data were leaked from the Moscow branch of the Russian Central Bank. My third conclusion is that *the data contain some errors* due to misprints or other unknown reasons.

3.3 Sample of Companies

To construct a sample of companies I start with a list of 347 corporations that were traded on RTS (Russian Trading System) in the beginning of 2006. I choose these companies because Federal Financial Market Service (FFMS) requires that traded companies regularly submit quarterly reports that contain information about board composition, auditor, principal shareholders, and other information. Since large Russian companies typically divert cash flow using affiliate entities, I restrict my sample to those companies that have a list of affiliates available for 2003 or 2004. This yields a sample of 180 companies.

Using information from quarterly reports, I manually code the following characteristics related to corporate governance: share of the government, share of the largest individual shareholder, whether the company is traded on RTS or MICEX (Russian stock exchanges), whether the company has ADRs (American Depositary Receipts) or GDRs (Global Depositary Receipts), whether it has a credit rating assigned by Moody's, S&P, or Fitch, whether it is audited by one of the Big 4 accounting firms (Deloitte, Ernst & Young, KPMG, or PWC), and whether a foreigner serves on the board. I set a dummy for government control equal to 1 if the government owns more than 25% of company shares and 0 otherwise.

All these companies have accounting information available according to Russian accounting standards (RAS), and 49 have reporting by U.S. Generally Accepted Accounting Principles (GAAP) or International Financial Reporting Standards (IFRS). I collect information about the firm's total assets, revenue, profit, debt, and sales margin (ratio of operating profit to revenue) from Rosstat or the companies' reports.

I report summary statistics in Table 3. Column (1) describes the entire sample, column (2) describes the companies that have only RAS reporting, and columns (3) - (4) contain only those

companies that have GAAP or IFRS reporting. In columns (1) - (3) I report variables according to RAS (where applicable) and in column (4) according to GAAP or IFRS. All statistics are averaged for 2003-2004. An average company has assets of $1.7B, revenue of $0.9B, and profit of $190M. As we can see from the table, the companies that report according to international standards are about eight to nine times larger than those that do not. The government controls 37% of the companies and the average share of the largest individual owner is 4%. However, the real ownership concentration in Russia is much higher, as many companies do not report their true ownership structure. For example, it is well known that 50% of Norilsk Nickel[19] was owned by Vladimir Potanin and Mikhail Prokhorov (25% each), but on 09.30.2004, FFMS had the following ownership structure of Norilsk Nickel: 52% - ING bank (nominal holder), 29.08% - Brunswick UBS (nominal holder), 6.22% - Rosbank (nominal holder), Mikhail Prokhorov - 0.37% (owner). Even though almost all Russian corporations are controlled either by the government or an individual owner, only 30 companies in my sample report the share of the largest individual owner as greater than 1%. 19% of the companies have a foreigner serving on the board. Not surprisingly, the companies with GAAP/IFRS reporting have almost four times higher probability of having a foreigner on the board (41% for the GAAP/IFRS sample vs. 11% for the RAS sample). 66% of the companies are traded on RTS or MICEX in 2003-2004, and 11% are traded on foreign stock exchanges. We can see that 22% of the companies are audited by Big 4 accounting firms, with the probability that a GAAP/IFRS company has a Big 4 auditor about 3.5 times higher than that for a RAS firm (48% for the GAAP/IFRS sample vs. 13% for the RAS sample).

4 Measuring Cash Flow Diversion

4.1 Identification of Spacemen

My measures of cash flow diversion are based on transfers of companies to spacemen. Empirically, I identify spacemen as firms that do not pay taxes or that pay negligible taxes relative to their turnover. To reduce measurement error, specifically, misprinted taxpayer numbers (INNs), I exclude all firms that have fewer than 10 transactions over the entire sample period[20]. Out of 1,677,693 firms that are present in my sample, 310,040 appear only once, 139,553 appear twice, and 353,973 have 3 to 10 transactions during the 2003-2004 period. In spite of the large number (803,566) of firms with fewer

[19] The world largest producer of nickel.

[20] It might be the case that the same typo in INN presents more than once. For example, if an internal database of firm A contains a typo in INN of firm B, then each time firm A transfers money to firm B we are going to observe the same typo in the banking transaction database.

than 10 transactions, they account for only 0.3% of the total turnover. I also exclude banks, financial service firms and insurance companies from the analysis because these institutions often have high fund inflows and outflows, and therefore the ratio of taxes paid to total turnover is not meaningful. I also drop individual entrepreneurs and very small companies (monthly revenue less than 100,000 rubles ($3,300)), because they cannot be spacemen according to my definition[21]. Since the VAT and the income tax are paid on a quarterly basis[22] in Russia, I only include firms that have at least one transaction before 10/01/2004 in the analysis. Exclusion of firms that were born in the last quarter of the sample period leads to underestimation of income diversion for the 4th quarter of 2004 because I cannot identify spacemen that were created during this period. This leaves me with a sample of about 207,000 companies.

The quality of the data does not allow me to specifically identify tax payments, therefore I treat any transfer to the federal treasury, a tax inspection authority, or a social security fund[23] as a tax payment. This potentially leads to overestimation of a firm's tax burden[24]. I identify a firm as a spaceman if it satisfies all of the following criteria: a) the ratio of taxes paid to the difference in fund inflows and outflows (*net tax rate*) is less than 0.1%; b) social security tax paid is less than 216 rubles ($7.2) per month, which approximately corresponds to a wage bill equal to one minimum wage[25]; c) the firm is not an open joint stock corporation; and d) the firm's fund inflows are greater than outflows. According to the Russian tax system, even a loss generating firm must pay VAT, social security, and property taxes, hence these criteria guarantee that such a firm cannot survive even a simple examination by tax authorities. I define a firm's gross tax rate as

$$gross\ tax\ rate = \frac{tax\ paid}{(funds\ inflow\ +\ funds\ outflow)/2}$$

Since the price for spaceman services in 2003-2004 started as low as 1%, such firms cannot pay taxes higher than 1% of average turnover by the nature of their business. Therefore, I classify a firm as "regular" if it has a gross tax rate greater than 1%, where firms with tax rates between 0.1% and 1% represent a mix of spacemen and regular firms and therefore I do not attribute them to either class.

[21] As I describe in Section II, the fixed costs to set up a spaceman start from $400 and the marginal costs start at 0.5% of turnover. Taking into account the fact that a spaceman lives only 1-2 years, it is not profitable to operate spacemen with an average turnover of less than $3,300 per month.

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

[23] Upravleniye Federalnogo Kaznacheystva (UFK), Otdeleniye Federalnogo Kaznacheystva (OFK), Finansovo-Kaznacheyskoe Upravlenie (FKU), Gosudarstvennaya Nalogovaya Inspekciya (GNI), and Fond Socialnogo Strahovaniya (FSS).

[24] For example, if a local tax inspector sublets a part of its building to a cafe then each rental payment made by the cafe is going to be treated as a tax payment.

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

I report summary statistics in Table 4. Column (1) describes the base sample of my analysis. An average firm performs 38 transactions per month, receives $283,371, pays $245,640 and has an average tax payment of $7,913, including $288 in social security taxes (ESN), which corresponds to approximately a $950[26] average wage bill per firm[27]. Column (2) contains only the firms that received less funds than they paid out and column (3) comprises the firms with greater fund inflows than outflows. The share of spacemen in column (3) is much higher than in column (2) because regular firms can have banking fund outflows higher than inflows whereas spacemen cannot. For example, according to my data, in 2003-2004 "The Seventh Continent" (INN 770500562), a large Moscow retailer, has inflows of 10B rubles ($330M) and outflows of 30B rubles ($1B). This situation is common for the firms in this industry because in the retail sector a significant portion of firms' revenue comes in form of cash receipts from private individuals and these transactions are not present in my banking dataset. In contrast, spacemen will always have banking inflows higher than outflows because, by the nature of their business, spacemen cash out a major part of their inflows and cash out transactions are not present in my banking data. However, spacemen might be present in column (2) because my banking dataset is incomplete; for example, if a spaceman gets revenues from a client from the same bank then I cannot see fund inflows for this spaceman in my data and therefore I cannot identify it. A higher concentration of spacemen in column (3) in comparison to column (2) explains why the firms in column (3) pay lower taxes both in relative and in absolute terms compared to the firms in column (2): the average gross tax rate for the firms in column (3) is 27% lower (5.9% vs. 8.1%) than that for the firms in column (2), and in absolute terms, column (3) firms pay almost two times lower taxes ($5,916 vs. $11,217) than column (2) firms.

Column (4) of Table 4 contains only regular firms, column (5) comprises regular firms that have fund inflows greater than outflows, and column (6) includes only spacemen. We can see from these subsample statistics that a spaceman has more than 2.5 times higher monthly turnover than a regular firm ($641,535 vs. $251,247), but performs 40% fewer transactions (25 vs. 42), so an average spaceman transaction is 4.3 times larger than an average regular firm transaction. Further, a spaceman lives almost 200 fewer days than a regular firm (391 days vs. 588 days), where firm age is defined as the date of the last transaction minus the date of the first transaction in my sample. These simple statistics allow us to rule out several alternative explanations of spacemen. One such alternative explanation is

[26] In 2003-2004 Russia had a diminishing marginal social tax scale starting at 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.

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

that these firms have better ability to avoid taxes than regular firms, and thus the firms which I call spacemen are actually winners and regular firms are losers. However, in that case winners should live longer than losers on average, and my estimations show that spacemen have a much shorter life than regular firms. Another possible explanation is that the majority of spacemen are newly born firms that go bankrupt within a short period of time and therefore pay zero taxes. However, by construction spacemen have fund inflows higher than outflows. Moreover, as we can see from the data, spacemen on average have almost four times higher receipts than regular firms ($472,813 vs. $121,735), so they are much bigger than regular firms. Therefore we can rule out the hypothesis of "newly born bankrupts".

Figure 2 supports the spacemen theory. The probability that a spaceman dies within one year is three to six times higher than that for a regular firm. If we compare recently created firms with existing ones (presented in the sample before 01.20.03), we see that the probability that a newly born regular firm dies within one year is about two times higher than that for an existing firm. This is consistent with the survival story: firms that were present 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 a 20% higher chance of dying within one year than a newly born spaceman does. This 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 3 shows the density of the age distribution for regular 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, nevertheless we can see that there is a key difference in the longevity of regular firms and spacemen.

Table 5 shows the sensitivity of spacemen characteristics to various selection criteria. Columns (1) and (2) describe the difference between spacemen that do not pay taxes and those that pay some nominal level of taxes. The table shows that "spacemen-taxpayers" live about one month longer (408 days vs. 392 days) and have more than four times higher monthly receipts than "spacemen-non-taxpayers" ($946,461 vs. $231,724). As I describe in Section II, paying nominal taxes 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 in column (3) with a net tax rate of 0.1% to 1% have characteristics somewhere in the middle between spacemen and regular firms (columns (5) and (6) of Table 4). Figure 4 depicts the density of the age distribution of firms with net tax rate less than 0.1% (column (1) and (2) of Table 5) and firms with net tax rate from 0.1% to 1% (column (3) of Table 5). We can see that the age density of firms in column (3) has a spike around 2 years, similar to the age density of regular firms, although this spike is much smaller. I therefore

conclude that these firms represent a mix of spacemen and regular firms, and hence I exclude them from analysis. In columns (4) and (5) of Table 5 I select spacemen based on the gross tax rate. We can see that the main results are robust to the above selection criteria.

Using the identification approach discussed above I find 42,483 spacemen[28]. In 2003 spacemen received 2,324B RUR and sent 824B RUR, and thus net transfers to spacemen in 2003 can be estimated as 1,500B RUR or $49B. In 2004 I estimate net transfers to spacemen as 2,223B RUR or $77B. In GDP terms, net transfers to spacemen were 11.3% of GDP in 2003 and 13.1% of GDP in 2004.

By transferring funds to spacemen, a firm avoids several taxes. If the funds are used to pay dividends, then a firm evades 18% VAT, 24% profit tax, and 9% dividend tax that sum up to 41%[29]. If the funds transferred to spacemen are used to pay salaries "under the table" then a firm evades 18% VAT tax, 2%-35.6% social security tax, and 13% personal income tax. According to the Russian ministry of finance, the effective social tax rate in 2004 was 30.4%, and hence total tax evasion in this case is estimated to be 44%[30]. Based on these assumptions, I estimate tax evasion using spaceman schemes as 4.6%-5.0% of GDP in 2003 and 5.4%-5.8% of GDP in 2004.

4.2 Construction of Cash Flow Diversion Measures

I calculate cash flow diversion at the company level as the sum of net transfers to spacemen by all the company's affiliates. I define an affiliate as a firm such that the main companies owns at least 20% of the firm[31]. My approach to measuring diversion does not capture all private benefits of control. For example, it does not capture diversion related to transfer pricing, which Desai, Dyck, and Zinglales (2004) document to be enormous in Russia. Therefore, my measures of cash flow diversion may significantly underestimate the total private benefits enjoyed by controlling parties.

For my sample of companies I find approximately 7,700 affiliates. For example, I identify 794 affiliates for Gazprom, 300 affiliates for Lukoil, and 97 affiliates for Norilsk Nickel. Matching this list of affiliates to my banking database I find around 1,400 affiliates that sent funds to more than 11,000 spacemen. As I mention in Section III, my banking transaction dataset is incomplete and contains some errors. For example, it might be the case that a firm pays taxes using a bank account that is not present in my data, in which case this firm would be incorrectly classified as a spaceman. In order to mitigate this problem, I manually check the 1,000 largest spacemen of the 11,000, which account for 88% of all transfers to spacemen. I exclude a firm from my spaceman sample if it reports a relatively

[28] A list of all spacemen can be found at http://www.mironov.FM/data_spacemen/all_spacemen.xls.
[29] $1 - 1/1.18 \cdot 0.76 \cdot 0.91 = 0.41$.
[30] $1 - 1/1.18/1.306 \cdot 0.87 = 0.44$.
[31] If I use a 50% threshold, my main results do not change.

high profit (more than 1% of its revenue), as such a firm should pay relatively high taxes and therefore cannot be a spaceman by definition, and hence must be misclassified due to errors in the dataset. I find that 495 of the 1,000 largest spacemen have accounting data available in the Rosstat database. After analyzing the accounting data of these spacemen, I exclude 126 of them based on the "relatively high profit" criteria[32].

Note that not all the monies transferred to spacemen constitute cash flow diversion. If a firm pays a spaceman for non-existent consulting services then the diversion is 100% of the payment. However, if a firm orders some goods from a spaceman then the diversion is a fraction of the transfer. To illustrate, consider a manager who wants to divert some cash by buying a computer above the fair price. He buys a computer from a spaceman for $3000, the spaceman transfers $1000 to a real firm that sells computers, the real firm delivers the computer and the manager gets $2000 "cash back". In this case the diversion is $2000, not $3000. Empirically, I estimate the net transfer to a spaceman as the difference between the money transferred to the spaceman and the money that the spaceman transferred to regular firms.

I construct three measures of cash flow diversion at the company level:

$$ShadowP = \frac{net\ transfers\ to\ spacemen}{profit\ before\ taxes + transfers\ to\ spacemen}$$

$$ShadowR = \frac{net\ transfers\ to\ spacemen}{revenue}$$

$$ShadowA = \frac{net\ transfers\ to\ spacemen}{assets},$$

where *net transfers to spacemen* are the net funds transferred to spacemen by all of a company's affiliates. Revenue, profit before taxes, and book assets are taken from Rosstat or GAAP/IFRS reports. I calculate *ShadowP* only for the firms with a positive profit. To reduce the influence of outliers and measurement error, I winzorize my measures of cash flow diversion at the 95th percentile[33]. Figure 5 shows pairwise correspondence between my measures.

I report summary statistics in Table 6 . Column (1) describes the entire sample, column (2) includes only the companies that have RAS reporting, and columns (3) - (4) contain only those companies that have GAAP or IFRS reporting. In columns (1) - (3) I use accounting variables

[32] A full list of excluded spacemen with accounting data can be found at http://www.mironov.FM/data_spacemen/126_excluded_spacemen.xls.

[33] For example, revenue reporting according to Russian accounting standards includes only revenue of the main company and does not include revenue of affiliates. Therefore, revenue according to RAS might be significantly underestimated and *ShadowR* overestimated. A similar problem exists with measurement of profit and assets.

according to RAS and in column (4) according to GAAP or IFRS. Annually, an average firm transfers about 18% of its real profit, 1.6% of its total assets, and 2.6% of its revenue to spacemen. The standard deviations of *ShadowP*, *ShadowA*, and *ShadowR* are 24%, 2.6%, and 4.6%, respectively. Not surprisingly, companies from the GAAP/IFRS sample divert about 25% less than companies from the RAS sample.

Figure 6 compares measures constructed using the Russian accounting standards data and the GAAP/IFRS data (columns (3) and (4) of Table 6). The figure shows that a few observations have much higher *ShadowR* and *ShadowP* diversion according to Russian accounting standards. This is due to the fact that the largest Russian corporations are structured as holding companies, therefore GAAP/IFRS-based metrics have consolidated revenue/profit, whereas under RAS reporting, the metrics reflect revenue and profit only for the main company.

In Table 7, I record results for the 20 (out of 180) corporations that transferred the largest amount of funds to spacemen in 2003-2004. As we can see from this table, government controlled corporations (Gazprom, RAO UES, Russian Railways, and Rosneft) are among the top tax evaders in absolute terms. In Tables 7a and 7b I report cash flow diversion measures for these companies normalized according to RAS and GAAP/IFRS (where available). We can see from Table 7b that Gazprom transfers 7%-8% of its real profit to spacemen, Rosneft 8%-14%, Norilsk Nickel about 2%, and Russian Railways 2%-4%. Comparing the cash flow diversion measures for private and government controlled corporations, we can see that all these companies actively use spacemen for income diversion.

4.3 Verification of the Diversion Measures

Well-known papers on measuring private benefits of control (PBC), e.g., Barclay and Holderness (1989), Zingales (1994, 1995), Nenova (2003), and Dyck and Zingales (2004), attribute to PBC mainly diversion of company resources by controlling shareholders. In my research I widen the definition of diversion, as management also might divert resources from both minority and *majority* shareholders. For example, in the case of government controlled corporations, monetary benefits of control are enjoyed almost entirely by management, not the controlling shareholder.

In estimating cash flow diversion, I make the assumption that net transfers to spacemen represent diversion in one form or another. The diversion might be tax evasion, if conducted by an owner of a private firm. The diversion might be tax evasion and expropriation from minority shareholders ,if conducted by a majority shareholder. Or the diversion might be tax evasion and expropriation from all shareholders, if conducted by the management of a firm.

However, there is an alternative explanation for transfers to spacemen: firms do not know that

they work with spacemen and transfer money to them along with legitimate suppliers[34]. I test this hypothesis by analyzing the relation between transfers to spacemen and a firm's sales margin, i.e., the ratio of reported operating profit to revenue. If transfers to spacemen are related to income diversion then I should find a negative relation between my cash flow diversion measures and sales margin, because *ceteris paribus* the higher is the level of faked expenses, the lower should be reported profitability. In contrast, if transfers to spacemen are the same as payments to legitimate suppliers, I should find no relation between transfers to spacemen and the reported sales margin. To test this hypothesis, I use an additional sample of the 5,000 largest Russian companies provided by AK&M. This dataset contains basic accounting items: current and non-current assets, short-term and long-term debt, inventory, cash, revenue, profit, profit tax, etc. I match this database to my banking data by matching OKPO to INN[35]. I estimate cash flow diversion at the company level as the sum of transfers to spacemen by the company. This potentially leads to underestimation of diversion because transfers of affiliates are excluded. Table 8 contains summary statistics of the AK&M sample.

I run panel regressions of reported sales margin on my diversion measures for the main and AK&M samples. I report the results in Table 9. As we can see from columns (1)-(3) of the table, these measures have a strong negative relationship with sales margin. While a high level of statistical significance for $ShadowP$ is caused in part by a mechanical correlation between $ShadowP$ and sales margin (*ceteris paribus* if a firm's profit is low then $ShadowP$ is high and the sales margin is low), the other measures of diversion ($ShadowA$ and $ShadowR$) also have a negative relation with sales margin significant at the 5% level. That means that transfers to spacemen and reported profitability are negatively related. Economic significance of this effect is also large: a one standard deviation increase in $ShadowP$, $ShadowA$, or $ShadowR$ corresponds to a 4.5%, 1.7%, and 1.7% decrease in sales margin, whereas an average company in my sample has a 12.7% sales margin. Similar regressions for the AK&M sample (columns (4)-(6)) deliver the same results: all cash flow diversion measures are negatively related to sales margin and all coefficients are significant at the 1% level. These findings support the hypothesis that transfers to spacemen are related to cash flow diversion activities.

Another possible check on my diversion measures is to relate them to other measures of private benefits of control. There are two well-known approaches to measuring PBC. The first is based on controlling block transactions (Barclay and Holderness (1989), Dyck and Zingales (2004)) and the second is related to estimation of the voting premium based on dual class shares (Zingales (1994,

[34] Firms usually use such arguments when they explain activities with spacemen to tax inspectors.

[35] INN gives a firm's ID in the banking transaction data, and OKPO gives a firm's ID in the AK&M dataset. Table of matching is taken from the Russian registry agency, provided by ViveData.

1995), Nenova (2003)). Unfortunately, I cannot use the controlling block methodology because, to the best of my knowledge, in Russia there were only four control block transactions of publicly traded companies from 2000 to 2007. The second method also cannot be applied directly because in Russia there is no dual class shares with the same or similar dividend rights and different voting rights. However, I apply a variation of the dual class approach to my sample of companies using the price difference between ordinary and preferred shares.

According to Russian law, companies can issue ordinary and preferred stocks. A share of preferred stocks cannot be higher than 25% of the total charter capital. Preferred shares are entitled to a certain level of dividends (determined by companies' bylaws) and carry no voting rights. In the case of failure to pay required dividends, preferred stocks receive voting rights along with ordinary stocks. Preferred shares can vote in two cases: reorganization or liquidation of a company, and modification of company bylaws if the proposed change limits the rights of the preferred stock owners. In my sample of 180 companies, 50 companies have both ordinary and preferred stocks that are traded on RTS[36]. I manually check the bylaws of all these companies to identify preferred stock's dividend rights. The majority of the companies employ the following dividend mechanism: preferred stocks totalling 25% of charter capital are entitled to 10% of net income ("10% to 25%" henceforth), e.g., if preferred stocks are 5% of charter capital then these stocks get 2% of net income. However, other firms use a fixed dividend (e.g., Ritek (RITK)[37] sets a minimum dividend for preferred stocks as 50% of the stock's face value) or some other mechanism (e.g., owners of Baltika's (PKBA)[38] preferred stocks are entitled to deposit interest in Sberbank[39] plus 10% of the stock's face value). To estimate the voting premium, I select the companies that have superior dividend rights of preferred stocks compared to ordinary stocks. 35 out of 50 companies satisfy this criterion, i.e., have an explicit clause in the bylaws saying that a dividend for preferred stocks cannot be less than that for ordinary stocks. Absent this requirement it is a challenging task to determine whether cash flow rights of preferred stocks are higher or lower than those of ordinary stocks. For example, consider two companies with no debt and the "10% to 25%" rule. The first company reinvests 30% of net income and the second reinvests 80% of net income (the rest is distributed in the form of dividends). Then the preferred stocks of the first company will have inferior cash flow rights in comparison with ordinary stocks (two times lower), whereas the preferred stocks of the second company are going to have higher cash flow rights (three times higher). My selection criterion still leaves a high degree of heterogeneity in preferred

[36] Russian Trading System.
[37] A large oil company.
[38] The largest Russian brewery.
[39] The largest commercial bank.

stock dividend rights, however at least I can be sure that all preferred stocks in my subsample have superior formal cash flow rights relative to ordinary stocks.

I estimate the voting premium for 2003 and 2004 following the methodology of Nenova (2003):

$$Voting\ Premium\,(t) = \frac{[P_o\,(t) - P_p\,(t)]\,N_o}{P_o\,(t)\,N_o + P_p\,(t)\,N_p}$$

where $P_o\,(t)$ and $P_p\,(t)$ are the average yearly prices of the ordinary and preferred shares, N_o and N_p are the number of ordinary and preferred shares, and t denotes the year. To calculate prices, first I estimate the monthly price by averaging the closing prices of all days when the stock was traded. Next I get the yearly price by averaging the monthly prices of the given stock. I calculate the historical dividend premium of preferred stocks as

$$Dividend\ Ratio = \frac{\sum_{t=1999}^{2004} D_p\,(t)}{\sum_{t=1999}^{2004} D_o\,(t)}$$

where $D_o\,(t)$ and $D_p\,(t)$ are the dividends of the ordinary and preferred shares. I use historic dividend information for six years since 1999[40], and average total dividends across the years instead of averaging the ratios $D_p\,(t)\,/D_o\,(t)$ because it is quite common in my sample that in some years a company paid dividends only to preferred stocks or did not pay dividends at all. I am able to estimate the dividend premium for 32 companies out of 35, because three firms (IGST, KRKN, UDMN[41]) paid no dividends for ordinary shares. I estimate the relative liquidity of preferred shares as

$$Liquidity\,(t) = \frac{Trades_p\,(t)}{Trades_o\,(t)}$$

where $Trades_p\,(t)$ and $Trades_o\,(t)$ are the total number of trades per year of preferred and ordinary shares[42].

I report summary statistics in Table 10. We can see from the table that companies with preferred stocks are about 10%-15% lesser than an average company from my sample (see Table 3) and divert about 20%-40% less cash flow (see Table 6 for comparison). The average voting premium is 30.6% of

[40] In 1998 Russia faced a severe economic and financial crisis that significantly changed the structure of the Russian economy. Therefore, dividend information before 1998 might be not relevant for predicting future dividend payments.

[41] Izhstal (IGST) is a steel producer, Saratov NPZ (KRKN) is an oil refinary, and Udmurtneft (UDMN) is an oil production company.

[42] The majority of stocks from my sample are traded only a few times per month. Therefore a number of trades might be a better indicator of liquidity rather than bid ask spread.

total company value in 2003 and 27.7% in 2004. Preferred stocks tend to be very illiquid. We can see that an average preferred stock has only 85-100 trades per year and half of preferred stocks are traded less than two to three times per month (25-39 trades per year). Only seven out of 35 preferred stocks have at least one trade during every month from 2003-2004[43]. Ordinary stocks are more liquid, on average, traded 1.4 times more frequently than preferred stocks, but also tend to have low liquidity, as half of ordinary stocks are traded less than four to five times per month (44-62 trades per year). On average, preferred stocks receive three times the dividends of ordinary stocks.

To analyze the relation between my cash flow diversion measures and the voting premium, I run panel regressions of *Voting Premium* on *ShadowP*, *ShadowA*, and *ShadowR*. In a multivariate specification I include other factors that might explain price differences between ordinary and preferred shares. First, I add the dividend premium of preferred stocks. Even though I select the companies with identical or similar bylaw provisions regarding the dividend rights of preferred stocks, the true dividend rights might be significantly different. Some companies treat the "preferred should get not less than ordinary" rule literally, and pay exactly the same dividends for both ordinary and preferred stocks, whereas other companies pay much higher dividends for preferred shares (up to 20 times higher), and thus *Dividend Ratio* might be a key factor that explains the cross-sectional variation of *Voting Premium*. Second, I include the relative liquidity of preferred shares. The price difference between two classes of stocks might be explained in part by the lower liquidity of preferred shares. Finally, I control for government ownership and industry. I include a dummy for the electricity industry only, because electric companies represent almost half of my subsample, and I drop dummies for other industries so as to avoid having too many variables in a regression with only 32 observations.

Columns (1)-(3) of Table 11 show the results of the univariate regressions and columns (4)-(6) report the results of the multivariate specifications. In the univariate setting, all coefficients on the diversion measures are positive; however, only the coefficient on *ShadowA* is statistically significant at the 10% level. In the multivariate specifications, the coefficient on *ShadowA* is positive and statistically significant at the 10% level, and the coefficients on *ShadowP* and *ShadowR* are positive and significant at the 15% level. Low statistical significance might be caused by the low number of observations. From an economic point of view, a one-standard deviation increase in *ShadowP*, *ShadowA*, and *ShadowR* corresponds to a 2.8%, 3.8%, and 3.2% increase in *Voting Premium*. Taking into account that on average *Voting Premium* is about 30% of total company value, the economic significance of the diversion measures is substantial. As expected, the higher is the dividend payout of preferred

[43] This number is not reported in Table 10.

shares, the lower is the price difference between ordinary and preferred shares; the coefficient on *Dividend Ratio* is negative and significant at the 1% level. The government controlled corporations have about 18%-19% lower *Voting Premium*. To check that my results are not driven primarily by the electricity industry, in columns (7)-(9) I present results of the regressions for all companies except electric companies. We can see that exclusion of the electricity industry does not significantly affect coefficient estimations for the cash flow diversion measures. Even though I have half as many observations, the coefficients on *ShadowP*, *ShadowA*, and *ShadowR* remain positive and generally maintain about the same level of statistical significance (significant at the 21%, 1%, 13% level). Analysis of the relation between the voting premium and the cash flow diversion measures reveals that they are positively related. I therefore conclude that my diversion measures are consistent with alternative measures of private benefits of control.

Finally, another interpretation of transfers to spacemen is that these funds are used to maintain good relations with the government, and thus spacemen activities are beneficial for all shareholders. In 2007 Transparency International[44] ranked Russia 143rd out of 180 countries in their Corruption Perception Index, just above Angola, Nigeria, and Guinea-Bissau, and often companies are forced to pay bribes in order to survive. Obviously, to the extent this is the case, a company cannot record in its income statements "other SG&A expenses: bribes - $1,000", and so spacemen money is the main mechanism for all illegal expenses. However, there are several reasons to conclude that not all transfers to spacemen are used to pay bribes, but rather a major portion of the spacemen money is used for cash flow diversion. First, spacemen activities are not reported to and not controlled by minority shareholders. For example, if a CEO or a major shareholder needs to pay a $100 bribe, there is no control mechanism that prevents him from transferring more than $100 to spacemen. It is likely that the manager will transfer to spacemen as much as he can as long as the marginal benefits of diversion are greater than the marginal costs. Second, if all spacemen monies were used for the benefit of the company, then all shareholders should benefit equally. However, I find a positive relation between transfers to spacemen and the price difference between ordinary and preferred shares. These empirical findings suggest that not all shareholders benefit equally, and thus the transfers to spacemen are related to cash flow diversion. Last, but not least, not all companies face the need to bribe officials. If we look at government controlled corporations, for example, do they need to pay bribes to maintain good relations with the government, its main shareholder? Consider the case of Gazprom, a natural gas producer and the largest Russian corporation. In 2003-2004 the government owned 38%

[44] www.transparency.org.

of Gazprom and in 2005 it increased its ownership share to 51%. The top managers of Gazprom are among the most influential people in Russia. For example, Dmitry Medvedev was a chairman of the Gazprom board from 2000 until 2008, when he was elected President of Russia. Alexey Miller has been a CEO of Gazprom since 2001. Both of these individuals are members of prime minister Putin's team, the most influential person in Russia. It is difficult to imagine a government official that would raise a serious impediment to the business activities of Gazprom. However, according to my data, the net transfers of Gazprom to spacemen in 2003-2004 were 1,378 million dollars. Since it is likely that this money was not used for bribe payments, this result suggest that transfers to spacemen were to achieve diversion goals.

5 Cash Flow Diversion and Corporate Governance

A central question of modern corporate finance is: what institutions help reduce the diversion of corporate resources by management and/or controlling shareholders? Several empirical studies use a cross-country analysis to determine the factors that curb private benefits of control. Among these factors are a better legal environment (LLSV (1998, 2000), Nenova (2003), Dyck and Zingales (2004)), a higher level of investor protection (Nenova (2003), Dyck and Zingales (2004)), greater product market competition, and increased public opinion pressure (Dyck and Zingales (2004)). I extend this analysis and empirically study the relation between cash flow diversion and different characteristics related to corporate governance.

Government ownership. By way of its taxing authority, the government is *de facto* a large minority shareholder of every corporation. Desai, Dyck, and Zingales (2007) show that an increase in tax enforcement can significantly decrease income diversion and benefit outside shareholders. Direct ownership of a large stake in the company should further increase the incentives for the government to decrease cash flow diversion, because a reduction in income diversion leads not only to higher tax collections but also to higher returns to the equities owned by the government. However, the government experiences the same principle-agent conflict (e.g., Jensen and Meckling (1976), Shleifer and Wolfenzon (2002)) as other corporations. Moreover, in case of government ownership this conflict is even more severe because the incentives of officials who act on the behalf of the government are often not in line with the true interests of the government. Therefore, in case of government ownership, there are two forces that act into opposite directions. It is thus an empirical question as to how government ownership affects cash flow diversion.

Audit. An important role of auditors is to certify and analyze companies' financial statements. It

is a common view that auditors should protect shareholders from management fraud. By transferring funds to spacemen, management hurts the interests of shareholders in two ways. First, it diverts current cash flow available to shareholders. Second, it decreases future expected cash flow by making the company liable for tax evasion associated with spacemen activities – if the government discovers and proves the existence of spacemen schemes then the company could have to pay all evaded taxes plus penalties. Since auditors have full access to a firm's detailed financial information including contracts, invoices, payments, and business correspondence, an audit might be a powerful tool that restricts cash flow diversion and protects the interests of minority shareholders.

Board of directors. The institution of independent directors is an important instrument of corporate governance. Many Russian corporations invite reputable foreigners to serve on their board. However, in making their decisions, independent directors rely on the information provided by management and certified by auditors. Therefore, it is not clear whether independent directors have enough power to restrict income diversion activities.

Cross-listing. Companies that are cross-listed in New-York or London are required to follow stricter standards of corporate governance. Lel and Miller (2008) find that companies from weak investor protection regimes cross-listed on a major U.S. stock exchange are more likely to terminate poorly performing CEOs than non-cross listed ones. Therefore, we can expect that cross-listing may work to restrict the ability of management to divert cash flow.

Size. In general, large corporations are better monitored by the government and minority shareholders. Large corporations are also more visible to the media, with the media playing a significant role in curbing private benefits of control (see Dyck and Zingales (2004)) and improving corporate governance (see Dyck, Volchkova, and Zingales (2008)). Therefore, large corporations can be expected to divert less income than small ones.

To analyze the relation between cash flow diversion and corporate governance, I run panel regressions of my diversion measures on the corporate governance characteristics above. I report the results in Table 12. Columns (1)-(2) show the regressions for $ShadowP$, columns (3)-(4) for $ShadowA$, and columns (5)-(6) for $ShadowR$. I perform the analysis for the entire sample of companies (columns (1), (3), and (5)), as well as for the companies that report according to GAAP/IFRS (columns (2), (4), and (6)).

We can see that the coefficient on government control (government owns more than 25%) is statistically insignificant for all specifications. This finding suggests that the proclaimed intent of the Russian government to reduce tax evasion by increasing government participation in the economy is not supported by empirical evidence: corporations owned by the government evade as much as

privately owned companies. Moreover, it is common knowledge that government corporations are less efficient than private ones, and thus we can conclude that the government in fact decreased tax collections by nationalizing leading companies.

Surprisingly, if we look at the entire sample of companies (columns (1), (3), and (5)), the dummy for whether a foreigner serves on the board is positive and close to statistically significant for all diversion measures (p-values are 10%, 18%, and 18% for $ShadowP$, $ShadowA$, and $ShadowR$, respectively). Economical significance is large: the presence of a foreigner on the board is related to a 30%-40% increase in cash flow diversion. A possible explanation for this finding is that management of companies with a high level of diversion invite the foreigners on their board in order to show a "high" level of corporate governance and protect themselves from the claims of the government and minority shareholders. For the GAAP/IFRS sample, a coefficient on having a foreigner on the board is statistically not different from zero. These results suggest that reputable directors cannot protect minority shareholders from cash flow diversion activities conducted by management.

As expected, the companies that are traded on a stock exchange divert less cash flow compared to their not-traded peers. The coefficient on the related dummy is negative and significant at the 4%-12% level in four out of six specifications. However, these estimations are biased downward due to a sample selection problem. Since all companies from my sample eventually were traded[45], it is likely that the companies that were not traded in 2003-2004, started to decrease cash flow diversion activities two to three years before listing on RTS. Therefore, we can expect that the true difference in cash flow diversion between traded and not-traded companies is much larger than my estimates.

Another interesting result is that an audit by a Big 4 accounting firm (Deloitte, Ernst & Young, KPMG, or PWC) does not help to reduce cash flow diversion. For the entire sample of companies (columns (1), (3), and (5)), all coefficients on the related dummy are insignificant; for the GAAP/IFRS sample (columns (2), (4), and (6)), the coefficients are insignificant in two out of three specifications. These findings indicate that *Enron was not an exception,* that is, an audit by a reputable firm does not protect shareholders from management fraud. For example, in 2003-2004, Gaztaged (100% subsidiary of Gazprom) transferred one billion dollars to an unknown company "Trubniy Torgoviy Dom". According to Spark[46], this company was registered on 03.12.2003 with charter capital of 10,000 RUR ($330). According to my banking data, it received from Gazprom $343,000,000 in 2003 and $657,000,000 in 2004 as payment for pipes. If we look at Rosstat data we can find that revenues of "Trubniy Torgoviy Dom" were $148,000 in 2003 and $206,000 in 2004, or about 3,000 times less than actual revenues. In

[45] As I explain in Section III, in constructing my sample I select the companies that were traded on RTS in 2006.
[46] spark.interfax.ru.

addition, this firm does not have a web site or office. Based on this evidence, we can conclude that this company is a classical spaceman and a billion dollars transferred to it as a pure cash flow diversion. However, PWC in their audit opinion for Gazprom did not mention any facts related to this strange supplier of Gazprom.

Cross-listing in the U.S. or U.K. does not curb cash flow diversion either. The coefficient on the related dummy is statistically close to zero in all specifications. However, this result is not surprising given my previous findings. If a company wants to issue ADRs or GDRs (American Depositary Receipts or Global Depositary Receipts), it is required to follow stricter corporate governance standards, i.e., have a reputable auditor, include independent directors, and improve information disclosure. However, according to the empirical evidence above, these instruments of corporate governance do not restrict cash flow diversion, and thus cross-listing of company stocks is likely to have a similar effect.

Finally, as expected, large corporations divert less cash flow. The coefficient on a size dummy (assets greater than \$100M) is negative and statistically significant at the 1%-10% level in all specifications. Economic significance is also high: large corporations divert about 50%-70% less than small ones. In order to check the robustness of this result, I use the AK&M sample. Table 13 shows the relation between my cash flow diversion measures and firm size. We can see that the coefficient on the logarithm of a firm's assets is negative and statistically significant at the 1% level in all specifications. Therefore, we can conclude that large companies divert less cash flow through spacemen schemes than small ones.

6 Conclusion

In this paper I develop a new approach to measuring cash flow diversion. Using a unique dataset of Russian banking transactions, I identify special purpose entities referred to as spacemen that are specifically created for diversion purposes. I measure cash flow diversion at the firm level as the sum of transfers to spacemen. My diversion measures are consistent with a well-known measure of private benefits of control that is based on the price difference between voting and non-voting shares. I estimate cash flow diversion in Russia as 11.3%-13.1% of GDP, which corresponds to tax evasion of 4.6%-5.8% of GDP.

Based on the sample of 180 companies, I analyze the interactions between cash flow diversion and several characteristics of corporate governance. I find that government ownership does not help to decrease cash flow diversion. This finding, in addition to the well-known fact, that government ownership is related to lower economic efficiency, suggests that an increase in government participation

in the economy leads to a decrease in tax collections in absolute terms. Surprisingly, I find no relation between cash flow diversion and important instruments of corporate governance such as an audit of a reputable accounting firm (Deloitte, Ernst & Young, KPMG, or PWC), the presence of a foreign director on the board, or an international cross-listing of company shares. These findings suggest that reputable auditors and independent directors cannot protect minority shareholders from management fraud. However, I document that large corporations (with assets greater than $100M) divert to spacemen 50%-70% less than small ones. The possible explanation of this finding is better monitoring by the government, minority shareholders, and the media.

The findings above suggest several directions for future research. A direct measure of cash flow diversion can allow one to analyze how diversion affects firm performance and capital structure, or to understand the welfare implications of diversion activities. Using my approach to measure diversion, it is also possible to study the interactions between politicians and firms. Cash flow diversion is often associated with corruption, and corruption is a way for firms to obtain some benefits from politicians. Analysis of spacemen activities on and around elections may reveal what kind of services politicians provide to firms.

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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 a payer and recipient (name, INN (individual number of taxpayer, 9 or 10 digit code), bank account), verbal description of transaction, and an amount in Russian rubles. Key id of agent is INN (individual taxpayer number) . 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 INNs. 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 transactions to these agencies with description containing "ESN" (acronym for social security 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://www.mironov.FM

B Appendix

Table 1. Rosstat and Banking Data Correspondence Across Regions

Region	% found
Arkhangelsk region	83
Irkutsk region	72
Ivanovo region	67
Kaliningrad region	66
Kamchatka region	84
Kemerovo region	66
Khabarovsk region	66
Krasnoyarsk region	58
Kurgan region	45
Leningrad region	61
Moscow city	92
Moscow region	90
Novosibirsk region	58
Omsk region	65
Perm region	82
Rostov region	53
Sakhalin region	78
Sant Petersburg city	72
Sverdlovsk region	58
Tumen region	73
Total	69

"% found" shows a percentage of matched firms from banking database and Rosstat. I choose 100 random firms from each of the 20 largest Russian regions using Rosstat database (www.spark.interfax.ru). After that I matched these 2000 firms to my banking sample. The second column of the table shows the percentage of firms that were present at my banking sample from each region.

Table 2. Summary Statistics of Rosstat/Banking Data Matched Sample

Variable	2003	2004
Revenue_B, th. $	808.2	748
	(2262.9)	(2051.7)
N of obs	411	452
Revenue, th. $	866	950.2
	(1911.6)	(2024.3)
N of obs	317	309
Profit_B, th. $	35.4	36.1
	(93.8)	(111.8)
N of obs	281	133
Profit, th. $	25.8	35
	(81.2)	(97.9)
N of obs	325	315
Margin_B	5.6	4,8
	(9.6)	(8.8)
N of obs	278	132
Margin	6.4	6.6
	(9.4)	(10.1)
N of obs	244	234
% |Log(Revenue)-Log(Revenue_B)|<0.1	26.2	28.1
% |Log(Revenue)-Log(Revenue_B)|<0.5	71	64
Correlations		
Log(Revenue), Log(Revenue_B)	0.759	0.56
N of obs	309	292
Log(Profit), Log(Profit_B)	0.872	0.868
N of obs	206	87
Margin, Margin_B	0.66	0.491
N of obs	199	85

The sample consists of 500 random firms that are present in both Rosstat database and the banking dataset. Profit_B is calculated as profit tax payment for corresponded years divided by .24 (profit tax rate). Profit tax payments are taken from the banking dataset and attributed to a year based on transaction description. Revenue_B is a sum of cash receipts for corresponded years taken from my banking dataset. Profit and

Revenue are reported profit and revenue taken from Rosstat. Log(Revenue) and Log (Revenue_B) are natural logarithms of Revenue and Revenue_B. % |Log(Revenue)-Log(Revenue_B)|<0.1 (0.5) indicates the percentage of observations for which an absolute difference between logarithms of Revenue and Revenue_B is less than 0.1 (0.5). Margin is Profit/Revenue. Margin_B=Profit_B/Revenue_B. Averages for Margin, Margin_B, Revenue, Revenue_B, Profit and Profit_B are calculated only for non-zero observations. Standard deviations are in parentheses.

Table 3. Summary Statistics for the Sample of Companies

	All (RAS)	RAS only (RAS)	GAAP/IFRS (RAS)	GAAP/IFRS only (GAAP/IFRS)
Variable	(1)	(2)	(3)	(4)
Assets, mln. $	1,701	589	4,810	6,850
	(7,400)	(2,241)	(13,497)	(16,477)
Revenue, mln. $	875	323	2,405	3,860
	(2,776)	(822)	(4,920)	(7,117)
Profit, mln. $	192	66	542	824
	(694)	(321)	(1,172)	(1,705)
Debt/assets, %	21.87	21.62	22.53	19.23
	(18.47)	(19.20)	(16.50)	(15.50)
Sales margin , %	12.71	9.62	21.39	16.45
	(16.39)	(14.60)	(18.05)	(15.88)
Share of the largest ind, %	3.86	2.72	7.07	
	(10.41)	(6.85)	(16.43)	
Government control, %	37.31	35.63	42.05	
Foreigner on board, %	18.75	10.89	40.91	
Credit rating, %	13.99	2.42	46.59	
Traded, %	65.77	61.29	78.41	
ADR or GDR, %	11.31	4.03	31.82	
Audit by Big 4, %	22.62	13.71	47.73	
Big (assets > $100 million), %	72.02	65.32	90.91	
N of companies	180	137	49	49
N of obs	336	248	88	88

RAS is Russian Accounting Standards, GAAP is General Accepted Accounting Principles, IFRS is International Financial Reporting Standards. Assets, revenue, profit and debt are taken from firm's accounting statements. Sales margin is a ratio of operating profit to revenue. Share of the largest individual is percentage of largest ownership by individual. Government control is 1 if share of government ownership is greater than 25% and 0 otherwise; foreigner on board is 1 if a non-Russian citizen serves on board and 0 otherwise; credit rating is 1 if a company has Moody's, Fitch or S&P credit rating, 0 otherwise; Traded on RTS or MICEX is 1 if company stocks are traded on RTS or MICEX)Russian stock exchanges), 0 otherwise; ADR or GDR is 1 if company has American Depositary Receipts or Global Depositary Receipts and 0 otherwise; Audit by Big 4 is

1 if a company auditor is Deloitte, Ernst & Young, KPMG or PWC and 0 otherwise. Big is 1 if book assets are greater than $100M and 0 otherwise. Column (2) shows the subsample of the firms that do not have GAAP or IFRS reporting, and columns (3)-(4) show the firms that do have. In columns (1) - (3) I use accounting variables according to RAS and in column (4) according to GAAP or IFRS. Standard deviations are in parentheses. 6 firms in the sample have GAAP/IFRS reporting only for one year, this is why they present in both RAS and GAAP/IFRS subsamples for different years.

Table 4. Summary Statistics Spacemen vs Regular firms

Variable	All, (1)	All, sum_r< <sum_p (2)	All, sum_r> >sum_p (3)	Regular (4)	Regular sum_r> >sum_p (5)	Space-men (6)
N	207,176	78,049	129,127	100,313	57,996	42,483
% presented before 1.20.03	44.56	50.36	41.06	61.94	60.11	18.68
% presented after 12.15.04	70.46	73.15	68.84	83.09	82.40	52.24
% b. 1.20.03 & af. 12.15.04	31.56	36.98	28.29	51.57	49.54	5.41
Mean age, calendar days	506	526	493	588	581	391
Mean N of trans per month	38	43	36	42	38	25
Mean funds rec. per month, $	283,371	208,908	328,379	121,735	133,711	472,813
Mean funds paid per month, $	245,640	384,715	161,579	129,512	84,702	168,722
Mean tax paid per month, $	7,913	11,217	5,916	15,900	12,761	26
Mean ESN paid per month, $	288	375	235	572	503	0
Mean gross tax rate, %	6.70	8.07	5.87	13.68	12.91	0.01

Age is defined as a difference in days between last and first observed transaction. Gross tax rate is defined as a ratio of taxes paid to average turnover, sum_r is total funds received and sum_p is total funds paid. 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, for which average received funds exceed 100,000 rubles ($3,300) per month and which received more money than they paid; column (2) includes firms from column (1) that sent more funds than received; column (3) contains firms from column (1) that received more funds than transferred; column (4) includes regular firms, i.e. firms with gross tax rate>0.01; column (5) contains regular firms that sent more funds than received; (6) includes spacemen, firms from (3) which satisfy following criteria a) net tax rate < 0.001, b) ESN paid $<$ $6.5 per month, c) not oao.

Table 5. Sensitivity of Spacemen's Characteristics to Selection Criteria

		Selection by net tax rate		Selection by gross tax rate	
	Tax=0	0<t<0.1%	0.1%<t<1%	0<t<0.1%	0.1%<t<1%
Variable	(1)	(2)	(3)	(4)	(5)
N	28,153	14,330	9,297	18,004	10,835
% presented before 1.20.03	13	29	33	29	33
% presented after 12.15.04	51	54	57	55	57
% b. 1.20.03 & af. 12.15.04	4	8	12	8	13
Mean age, calendar days	382	408	448	408	450
Mean N of trans per month	12	50	49	51	47
Mean funds rec. per month, $	231,724	946,461	400,240	837,057	354,553
Mean funds paid per month, $	90,467	322,462	210,226	344,744	176,451
Mean tax paid per month, $	0	77	681	84	955
Mean ESN paid per month, $	0	1	1	1	1
Mean gross tax rate, %	0	0	0	0	0

Age is defined as a difference in days between last and first observed transaction. Gross tax rate is defined as a ratio of taxes paid to average turnover, sum_r is total funds received and sum_p is total funds paid. Column (1) includes spacemen which pay 0 taxes. Column (2) contains spacemen with net tax rate greater than 0 and less than 0.001; Column (3) includes spacemen with net tax rate greater than 0.001 and less than 0.01; Column (4) contains spacemen with gross tax rate greater than 0 and less than 0.001; Column (5) includes spacemen with gross tax rate greater than 0.001 and less than 0.01

Table 6. Summary Statistics of the Cash Flow Diversion Measures

	All (RAS)	RAS only (RAS)	GAAP/IFRS only (RAS)	GAAP/IFRS only (GAAP/IFRS)
Variable	(1)	(2)	(3)	(4)
ShadowP, %				
Mean	17.86	19.20	14.54	12.27
Median	6.93	7.11	6.74	6.57
St. dev.	23.76	24.89	20.45	18.01
N of obs	296	211	85	78
ShadowR, %				
Mean	2.60	2.69	2.33	1.25
Median	0.72	0.60	0.94	0.80
St. dev.	4.64	4.86	4.00	1.47
N of obs	318	233	85	86
ShadowA, %				
Mean	1.63	1.73	1.36	1.05
Median	0.57	0.55	0.59	0.48
St. dev.	2.57	2.73	2.02	1.79
N of obs	329	241	88	88

RAS is Russian Accounting Standards, GAAP is General Accepted Accounting Principles, IFRS is International Financial Reporting Standards. ShadowP, ShadowR and ShadowA are cash flow diversion measures defined in Section IV. Column (2) shows the subsample of the firms that do not have GAAP or IFRS reporting, and columns (3)-(4) show the firms that do have. In columns (1) - (3) I use accounting variables according to RAS and in column (4) according to GAAP or IFRS. 6 firms in the sample have GAAP/IFRS reporting only for one year, this is why they present in both RAS and GAAP/IFRS subsamples for different years.

Table 7. Cash Flow Diversion by Top Russian Companies

Name	Ticker	2003, mln.$	2004, mln. $	Total mln. $
Gazprom	GAZP	573.00	805.00	1,378.00
Lukoil	LKOH	318.47	97.70	416.17
RAO UES	EESR	212.30	168.43	380.73
TNK BP	TNKO	226.57	65.03	291.60
Sidandko	SDNK	192.27	19.33	211.59
Rosneft	ROSN	96.37	97.60	193.97
Slavneft	SLAV	56.17	136.20	192.37
Mosenergo	MSNG	132.60	24.36	156.96
Russian Railways	RZHD	34.03	114.27	148.30
Severstal	CHMF	26.14	117.00	143.14
Novolipetsk Steel	NLMK	66.30	59.93	126.23
Tatneft	TATN	98.23	21.14	119.37
Salavatnefteorgsintez	SNOZ	38.97	78.83	117.80
Rostelecom	RTKM	31.92	64.53	96.45
Norilsk Nickel	GMKN	25.40	37.10	62.50
Purneftegaz	PFGS	11.16	31.58	42.74
Yukos	YUKO	25.16	13.48	38.64
Rusal Achinsk	AGKK	12.00	20.78	32.78
Sibneft	SIBN	15.95	12.49	28.44
Magnitogorsk Steel	MAGN	4.42	20.73	25.15

Net transfers to spacemen of leading Russian companies. The table contains 20 companies which transfer the largest amount. Entire table of 180 might be found at my web-page http://www.mironov.FM

Table 7a. Diversion Measures for Top Russian Companies, RAS

		ShadowP, %		ShadowA, %		ShadowR, %	
Name	Ticker	2003	2004	2003	2004	2003	2004
Gazprom	GAZP	7.9	10.3	0.7	1.0	2.2	2.7
Lukoil	LKOH	13.5	2.7	4.2	1.0	3.6	0.8
RAO UES	EESR	16.2	15.5	2.0	1.5	12.2	14.5
TNK BP	TNKO	76.9	71.9	2.4	0.6	4.8	1.1
Sidandko	SDNK	83.0	83.0	10.2	0.2	19.1	0.9
Rosneft	ROSN	10.8	11.1	2.1	0.6	3.8	2.7
Slavneft	SLAV	14.5	21.2	4.1	9.2	4.4	8.4
Mosenergo	MSNG	55.4	12.7	3.1	0.6	5.7	0.8
Russian Railways	RZHD	8.9	11.4	0.1	0.2	0.7	0.5
Severstal	CHMF	3.1	6.2	1.1	2.7	1.0	2.7
Novolipetsk Steel	NLMK	6.2	2.7	2.8	1.6	2.7	1.4
Tatneft	TATN	15.2	1.6	2.5	0.4	2.5	0.4
Salavatnefteorgsintez	SNOZ	34.8	58.4	6.6	8.5	6.3	7.0
Rostelecom	RTKM	6.5	14.5	1.7	3.7	2.5	4.4
Norilsk Nickel	GMKN	1.4	1.6	0.3	0.4	0.6	0.7
Purneftegaz	PFGS	23.3	13.8	2.8	0.7	1.7	3.3
Yukos	YUKO	2.0	0.5	0.1	0.1	10.4	6.3
Rusal Achinsk	AGKK	79.8	40.2	3.4	5.8	4.1	6.5
Sibneft	SIBN	10.3	0.6	0.3	0.2	0.4	0.2
Magnitogorsk Steel	MAGN	0.5	1.4	0.2	0.5	0.1	0.5

Cash flow diversion measures for Top 20 Russian companies according to Russian Accounting Standards. ShadowP, ShadowA and ShadowR are cash flow diversion measures defined in Section IV.

Table 7b. Diversion Measures for Top Russian Companies, GAAP/IFRS

		ShadowP, %		ShadowA, %		ShadowR, %	
Name	Ticker	2003	2004	2003	2004	2003	2004
Gazprom	GAZP	6.8	7.7	0.6	0.8	2.1	2.5
Lukoil	LKOH	6.4	1.7	1.2	0.3	1.4	0.3
RAO UES	EESR	11.5	7.4	0.6	0.4	1.1	0.7
TNK BP	TNKO	6.8	1.3	1.4	0.4	2.1	0.5
Sidandko	SDNK	NaN	NaN	NaN	NaN	NaN	NaN
Rosneft	ROSN	13.8	7.8	1.4	0.4	NaN	1.9
Slavneft	SLAV	NaN	NaN	NaN	NaN	NaN	NaN
Mosenergo	MSNG	83.4	16.3	3.4	0.6	5.7	0.9
Russian Railways	RZHD	1.9	3.5	0.1	0.3	0.2	0.5
Severstal	CHMF	3.2	6.1	0.7	1.9	0.8	1.8
Novolipetsk Steel	NLMK	6.8	2.6	2.1	1.2	2.6	1.4
Tatneft	TATN	16.7	NaN	1.1	0.2	1.9	NaN
Salavatnefteorgsintez	SNOZ	NaN	NaN	NaN	NaN	NaN	NaN
Rostelecom	RTKM	19.7	25.0	1.5	3.0	3.1	5.2
Norilsk Nickel	GMKN	1.8	1.5	0.2	0.3	0.5	0.6
Purneftegaz	PFGS	NaN	NaN	NaN	NaN	NaN	NaN
Yukos	YUKO	NaN	NaN	NaN	NaN	NaN	NaN
Rusal Achinsk	AGKK	NaN	NaN	NaN	NaN	NaN	NaN
Sibneft	SIBN	0.6	0.4	0.2	0.1	0.2	0.1
Magnitogorsk Steel	MAGN	0.6	1.3	0.1	0.4	0.1	0.4

Cash flow diversion measures for Top 20 Russian companies according to GAAP/IFRS. ShadowP, ShadowA and ShadowR are cash flow diversion measures defined in Section IV.

Table 8. Summary Statistics for the AK&M sample

Variable	2003	2004
Assets, mln. $	60.6	78.3
	(408.3)	(499.0)
Revenue, mln. $	57.4	78.7
	(249.7)	(355.3)
Profit, mln. $	7.4	11.5
	(72.5)	(103.0)
Debt/assets, %	16.99	18.13
	(20.55)	(21.00)
Sales margin , %	9.06	9.18
	(10.13)	(10.42)
ShadowP, %	26.05	26.19
	(30.57)	(30.51)
ShadowA, %	3.54	3.74
	(6.07)	(6.23)
ShadowR, %	1.85	2.02
	(3.11)	(3.25)
N of obs	4,910	4,969

Assets, revenue, profit and debt are taken from Rosstat database. Sales margin is a ratio of operating profit to revenue. ShadowP, ShadowA and ShadowR are cash flow diversion measures defined in Section IV. Standard deviations are in parentheses.

Table 9. Relation Between Diversion Measures and Reported Sales Margin

Dependent variable: Sales margin						
	Sample of Companies. All (RAS)			AK&M sample		
	(1)	(2)	(3)	(4)	(5)	(6)
ShadowP	-0.188			-0.08		
	(0.031) ***			(0.003) ***		
ShadowA		-0.673			-0.057	
		(0.297) **			(0.015) ***	
ShadowR			-0.376			-0.083
			(0.156) **			(0.027) ***
Controls						
Log(Assets)	Y	Y	Y	Y	Y	Y
Industry	Y	Y	Y	Y	Y	Y
R-sq	0.276	0.204	0.254	0.279	0.197	0.197
Number of obs	295	326	317	8490	8368	8472
Number of groups	165	175	172	4951	4909	4949

This table contains panel regressions with random effects of sales margin on different measures of cash flow diversion. Columns (1) - (3) show regressions for the sample of companies and columns (4) - (6) include regressions for the AK&M sample. Sales margin is operating profit divided by revenue. ShadowP, ShadowR and ShadowA are cash flow diversion measures defined in Section IV. Industry is a set of dummy variables for different industries. Assets are book assets according to RAS.

Table 10. Summary Statistics for Dual Class Shares

Variable	2003	2004
Assets, mln. $	1,202.3	1,491.0
	(3,066.0)	(3,696.7)
Revenue, mln. $	741.3	946.3
	(1,323.7)	(1,783.0)
ShadowP, %	15.48	12.56
	(22.57)	(15.13)
ShadowA, %	0.94	0.99
	(1.39)	(1.50)
ShadowR, %	1.29	1.25
	(1.99)	(1.70)
Voting Premium, %	30.55	27.67
	(11.72)	(12.41)
Dividend Premium	2.88	3.50
	(2.62)	(4.03)
Liquidity	0.72	0.74
	(0.54)	(0.74)
Total trades (ordinary stocks)	430.7	281.0
	(1,182.5)	(612.2)
Median	44.0	62.5
Total trades (preferred stocks)	100.9	84.9
	(183.1)	(111.8)
Median	25.0	39.0
N of obs	33	34

The table contains summary statistics for the companies which have both ordinary and preferred shares traded on RTS with superior dividends rights of preferred shares. Assets and revenue are taken from Rosstat database, ShadowP, ShadowR and ShadowA are cash flow diversion measures defined in Section IV. Voting Premium is derived based on the price difference between voting (ordinary) and non-voting (preferred) shares. Dividend Premium is the ratio of the cumulative dividends for preferred shares to the cumulative dividends for ordinary shares. Liquidity is a relative liquidity of preferred stocks that is defined as a ratio of total trades of preferred stocks to total trades of ordinary stocks. Total trades is the number of trades per year of the given stock. Please see Section IV for detail description of the variables. Standard deviations are in parentheses.

Table 11. Relation Between Cash Flow Diversion Measures and Voting Premium

Dependent variable: Voting Premium									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ShadowP	0.016			0.15			0.331		
	(0.127)			(0.101)			(0.251)		
ShadowA		2.988			2.432			3.872	
		(1.737) *			(1.425) *			(1.433) ***	
ShadowR			0.704			1.753			2.888
			(1.457)			(1.194)			(1.781)
Dividend Ratio				-0.023	-0.02	-0.022	-0.027	-0.021	-0.023
				(0.005) ***	(0.005) ***	(0.005) ***	(0.005) ***	(0.004) ***	(0.004) ***
Liquidity				0.056	0.061	0.06	0.194	0.196	0.19
				(0.033) *	(0.033) *	(0.034) *	(0.057) ***	(0.046) ***	(0.054) ***
Government control				-0.189	-0.179	-0.195	-0.246	-0.223	-0.248
				(0.05) ***	(0.049) ***	(0.051) ***	(0.048) ***	(0.037) ***	(0.046) ***
Electricity				-0.048	-0.028	-0.03			
				(0.038)	(0.037)	(0.039)			
R-sq	0	0.082	0.007	0.502	0.514	0.501	0.778	0.846	0.793
Number of obs	66	67	67	62	62	62	31	31	31
Number of groups	35	35	35	32	32	32	16	16	16

This table contains "between" panel regressions of Voting Premium on different measures of cash flow diversion. Columns (1) - (6) contain regressions for the entire sample and columns (7)-(9) include only non-electricity companies. ShadowP, ShadowR and ShadowA are cash flow diversion measures derived in Section IV. Voting Premium is derived based on the price difference between voting (ordinary) and non-voting (preferred) shares. Dividend Ratio is the ratio of the cumulative dividends for preferred shares to the cumulative dividends for ordinary shares. Liquidity is a relative liquidity of

preferred stocks that is defined as a ratio of total trades of preferred stocks to total trades of ordinary stocks. Total trades is the number of trades per year of the given stock. Please see Section IV for detail description of these variables. Government control is 1 if government owns more than 25% of the shares and 0 otherwise. Electricity is a dummy for electricity industry.

Table 12. Cash Flow Diversion and Corporate governance

Dependent variable:	ShadowP		ShadowA		ShadowR	
	All (RAS)	GAAP/ IFRS	All (RAS)	GAAP/ IFRS	All (RAS)	GAAP/ IFRS
	(1)	(2)	(3)	(4)	(5)	(6)
Government control	0.031	0.03	-0.003	0.001	-0.011	0.006
	(0.05)	(0.079)	(0.005)	(0.006)	(0.01)	(0.005)
Foreigner on board	0.065	0.015	0.005	-0.001	0.01	0.004
	(0.039) *	(0.051)	(0.004)	(0.006)	(0.008)	(0.003)
Credit rating	0.019	-0.138	-0.003	0	0.02	0.004
	(0.054)	(0.069) **	(0.006)	(0)	(0.011) *	(0.005)
Traded	-0.012	-0.104	-0.008	-0.01	-0.011	0.004
	(0.034)	(0.06) *	(0.004) **	(0.005) **	(0.007)	(0.004)
ADR or GDR	0.062	-0.015	0.004	-0.002	0.011	-0.004
	(0.057)	(0.062)	(0.006)	(0.005)	(0.013)	(0.004)
Audit by Big 4	-0.068	-0.04	0.006	-0.002	0.005	-0.008
	(0.043)	(0.066)	(0.005)	(0.005)	(0.008)	(0.004) *
Big (assets > $100M)	-0.091	-0.172	-0.015	-0.055	-0.019	-0.028
	(0.04) **	(0.092) *	(0.004) ***	(0.007) ***	(0.007) ***	(0.006) ***
Controls						
Industries	Y	Y	Y	Y	Y	Y
R-sq	0.132	0.174	0.164	0.485	0.15	0.369
Number of obs	295	80	328	88	317	88
Number of groups	165	47	176	49	172	48

This table contains panel regressions with random effects of ShadowP, ShadowA and ShadowR defined in Section IV on different characteristics of corporate governance. Government control is 1 if share of government is greater of 25% and 0 otherwise; foreigner on board is 1 if a non-Russian citizen serves on board and 0 otherwise; Big is 1 for the companies with book assets greater than $100M and 0 otherwise; Traded is 1 if company stocks are traded on RTS or MICEX, Russian leading stock exchanges, 0 otherwise; ADR or GDR is 1 if company stocks are cross-listed in the US or UK; Big 4 is 1 if a company auditor is Deloitte, Ernst & Young, KPMG or PWC and 0 otherwise. Columns (1), (3) and (5) include the entire sample of companies; columns (2), (4) and (6) include only the companies that have accounting reporting according to GAAP/IFRS.

Table 13. Cash Flow Diversion and Firm Size. AK&M Sample

Dependent var:	ShadowP		ShadowA		ShadowR	
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Assets)	-0.0162	-0.0088	-0.0089	-0.0076	-0.0014	-0.0009
	(0.0025) ***	(0.0027) ***	(0.0005) ***	(0.0006) ***	(0.0003) ***	(0.0003) ***
Controls						
Sales Margin	Y	Y	Y	Y	Y	Y
Industry	N	Y	N	Y	N	Y
R-sq	0.1534	0.1779	0.0638	0.083	0.0103	0.0262
N of obs	8490	8490	8368	8368	8472	8472
N of groups	4951	4951	4909	4909	4949	4949

Panel regressions of different diversion measures on logarithm of book assets. ShadowP, ShadowR and ShadowA are cash flow diversion measures derived in Section IV. Industry is a set of dummy variables for different industries. .

C Appendix

Figure 1. Rosstat and Banking Data Correspondence

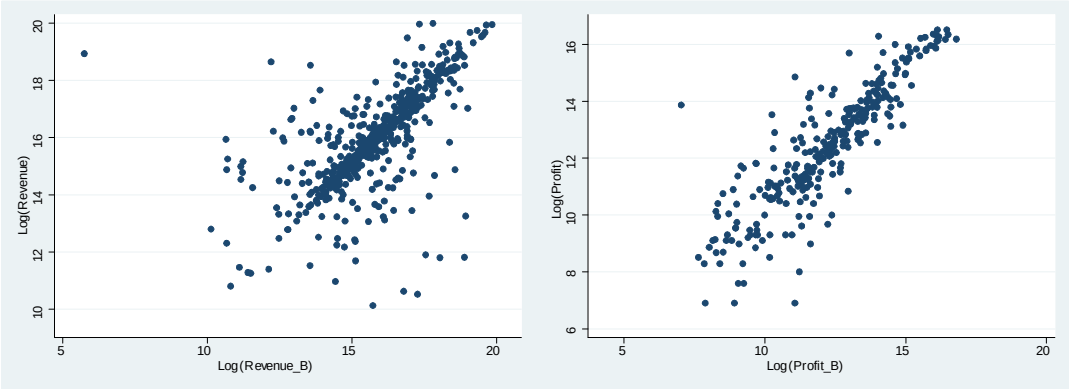

Figure 2. Kaplan-Meier Survival Estimates. Regular Firms vs. Spacemen

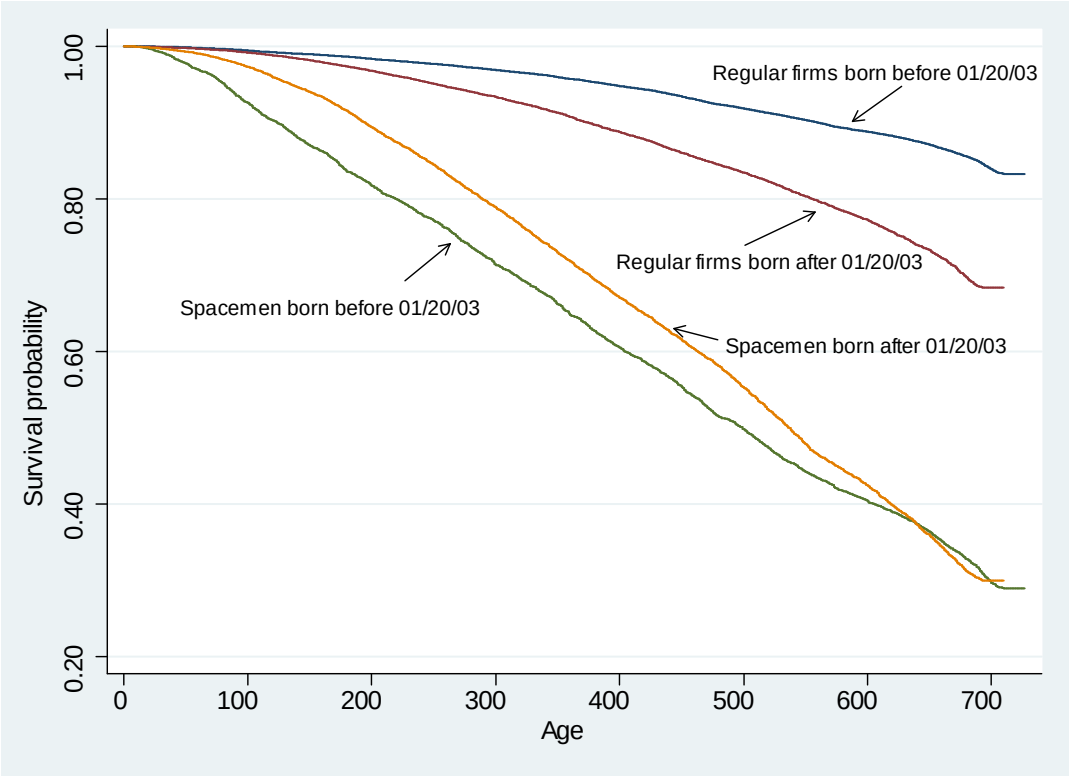

Figure 3. Density of Age Distribution. Regular Firms vs. Spacemen

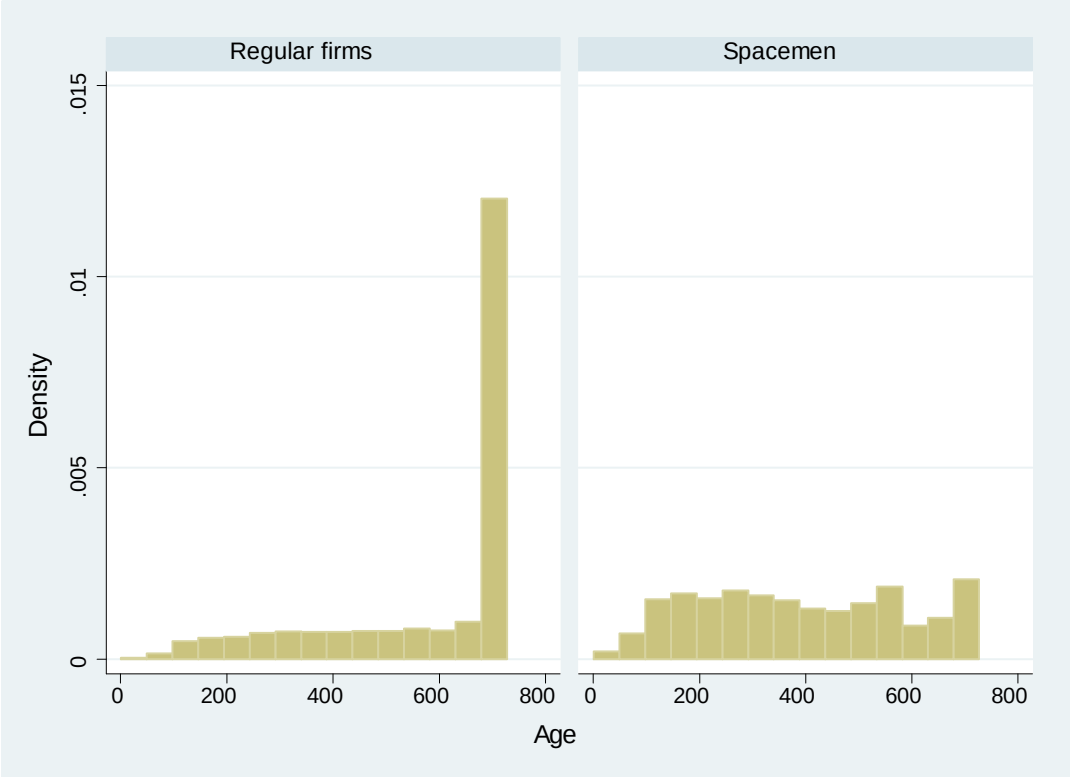

Figure 4. Age Distribution by Spacemen Type

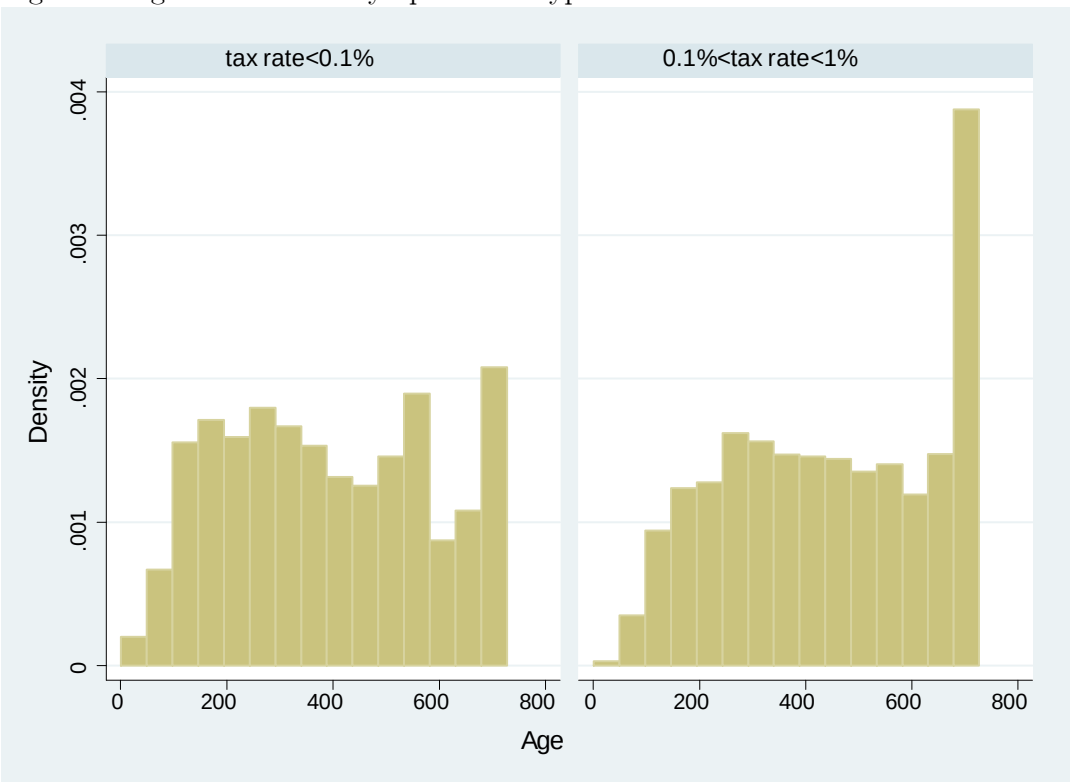

Figure 5. Pairwise Correspondence of Different PBC Measures

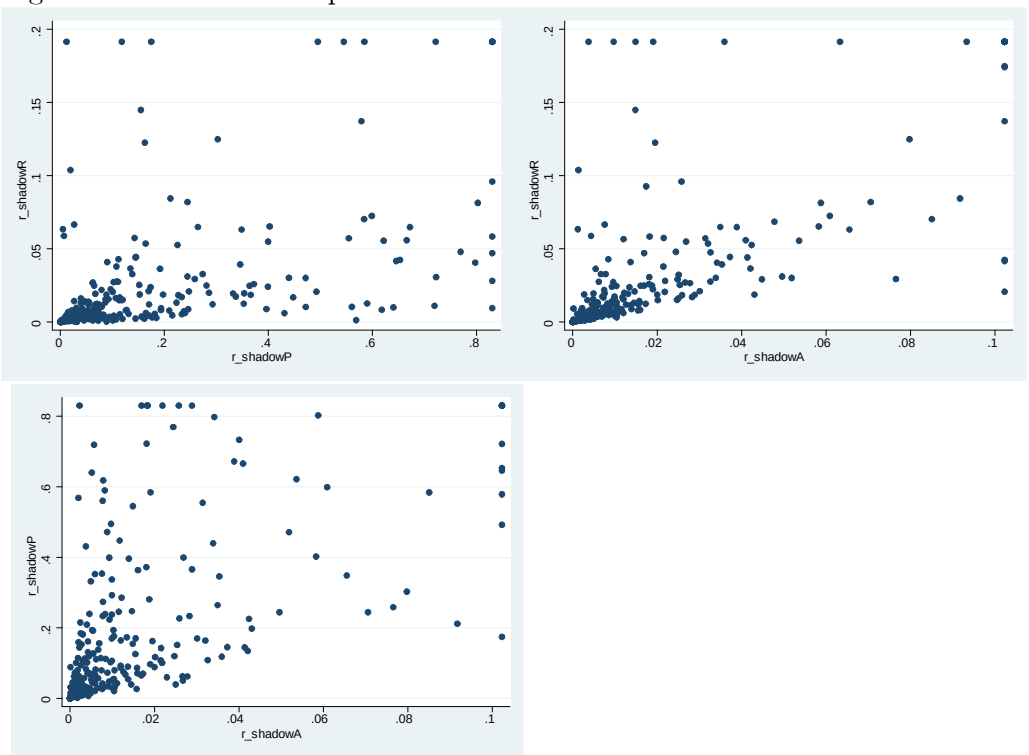

Figure 6. GAAP and RAS PBC Measures Correspondence