Taxes, Theft, and Firm Performance

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ABSTRACT

This paper examines the interaction between income diversion and firm performance. Using unique Russian banking transaction data, I identify 42,483 *spacemen,* fly-by-night firms created specifically for income diversion. Next, I build a direct measure of income diversion for 45,429 companies and show that it is negatively related to firm performance. Then, I identify the main reason for the observed effect as managerial diversion rather than tax evasion *per se.* Finally, I show that stricter tax enforcement can improve firm performance. A one standard deviation increase in tax enforcement corresponds to an increase in the annual revenue growth rate by 2.6%.

Keywords: Tax evasion, tax avoidance, firm value, governance

JEL Codes: D73, G30, G38, H11, H26

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The role of taxation constitutes a core research area in corporate finance (see Graham (2003) for a literature review). However, few studies have analyzed how avoiding taxes affects a firm's performance. The lack of evidence is not surprising because tax evasion is difficult to identify and even more difficult to quantify. The absence of reliable measures of tax evasion is a major impediment to empirical research in this area.

From a theoretical perspective, tax evasion can be described as two sides of the same coin. On one side, tax evasion is a transfer of money from the government to a firm. Thus, it should increase firm value. On the other side, because tax evasion fosters agency problems, it should decrease firm value. Few recent studies provide empirical evidence on this topic. An important paper by Desai, Dyck, and Zingales (2007) analyzes the interaction among corporate taxes, tax avoidance, corporate governance, and corporate market value. They provide evidence that increased tax enforcement can increase (rather than decrease) a company's market value.

Why is Russia an interesting case for research? The data availability in Russia presents a unique opportunity to analyze the entire economy. Most of the existing approaches of measuring shadow activities suffer from various types of selection bias.[1] Therefore, the identified effects can be attributed to the specific samples under study. Because my data cover a substantial number of firms ranging from very small ones to really big ones, I can provide a comprehensive analysis of the entire economy. It is hard to imagine that such data will become available for the U.S. or any Western economy in the near future.

This paper makes three contributions to the literature. First, I develop a novel approach to measuring income diversion which comprises of managerial diversion–concealment from firms' owners and tax evasion–concealment from tax authorities. Second, I show that income diversion activities are negatively related to firm performance and that this relationship is due

to managerial diversion rather than tax evasion *per se*. Finally, I show that stricter tax enforcement is positively related to firm performance. Following Desai, Dyck, and Zingales (2007), I provide comprehensive empirical evidence on why tax evasion may be negatively related to firm value.

In this paper, I develop a new method to directly measure income diversion based on the identification of special-purpose entities called *spacemen,* fly-by-night firms that are created for tax evasion and managerial diversion purposes. I use a unique dataset of Russian banking transactions that was leaked to the public from the Russian Central Bank in 2005. The dataset contains 234 million transactions involving 1.7 million entities and covers 75% to 80% of all banking transactions made in Russia in 2003 to 2004. The dataset provides a detailed description of each transaction. Empirically, I identify spacemen as firms that pay no or negligible taxes relative to their turnover. According to the Russian tax system, even a loss-making firm is required to pay value added tax (VAT), social security tax (SST), and property tax. Therefore, this identification criterion guarantees that spacemen would be unable to survive even a simple examination by tax authorities. Because a chief executive who is found guilty of tax evasion is subject to significant fines and even imprisonment, spacemen are often registered in the names of people who are ready to sell their identification data or people who lost their identification data or had it stolen. I identify 42,483 spacemen in the data. An average spaceman exists for 1.5 years and has $470K of monthly cash receipts, which is four times higher than the average for a regular firm. I estimate income diversion using spacemen as 11.4% to 13.1% of GDP, which corresponds to tax evasion of 4.7% to 5.9% of GDP.

How do companies evade taxes using spacemen? Consider a company that transfers $100 dollars to a spaceman for fake consulting services. Because no real services were

provided, the spaceman returns this cash to a company's owner or manager. However, the company records this expense for tax purposes, and in so doing, hides $100 of income from tax authorities.[2]

Spacemen can be used not only for tax evasion but also for managerial diversion. Hermitage capital, the largest foreign investment fund in Russia in 2004, provides the following example. In 2004, Gazprom[3] bought pipes for $700 million from the unknown company Trubny Torgovy Dom. This company was established in 2003 with only $350 in charter capital and does not have a real address. Its CEO is impossible to locate, and market participants had never heard of the company (Forbes (2006)). Trubny Torgovy Dom is the 6th largest of the 42,483 spacemen identified in the banking data.

Because the data do not allow a distinction between tax evasion and expropriation of minority investors in case of publicly traded companies, I focus my research on privately held companies. Based on transfers to spacemen, I build a measure of income diversion for a sample of 45,429 companies. An average company transfers 5.8% of its revenue and 32.3% of its book assets to spacemen each year. The largest 454 companies in my sample (top one percentile) divert 3.5% of their assets and 3.6% of their revenue per year. These estimates are much lower than those reported by Graham and Tucker (2006). Using a sample of 44 U.S. tax shelter cases, they show that the average tax reduction produced by the tax shelters is 9% of firm asset value. The likely explanation for this difference is selection bias. While Graham and Tucker estimate tax shelter activities only for companies that were accused of tax evasion, my research covers the entire economy.

Second, I analyze the relationship between income diversion and firm performance. It is unclear whether the overall effect should be positive or negative. On the one hand, hiding income from the government reduces firms' costs via lower tax payments, which should

improve firm performance. On the other hand, tax evasion might be associated with managerial diversion or other types of agency costs. Therefore, it can hurt firm performance. Because income diversion is an endogenous decision for every firm, exogenous instruments are required to establish the effect of income diversion on firm performance. As instrumental variables, I use dummies that correspond to a firm's local tax agency. Every firm is assigned a local tax agency based on its registration address. There is a significant variation in the strength of tax enforcement across different tax agencies: some agencies have many more firms assigned to every single tax inspector than others. In addition, tax agencies differ in skills and incentives. Using tax agency dummies as instruments also satisfies the exclusion restriction: tax agencies are responsible only for tax collections and are independent from other government agencies which might obstruct firms' business. Therefore, tax agencies affect firm performance via different level of tax enforcement, not through other channels. Based on IV estimation, I find that on average, a transfer to spacemen of 1% of revenue corresponds to a decrease in the annual revenue growth rate by 2.6% and an annual decline in productivity as measured by revenue per employee by 1.5%.

An important economic question is whether the observed effect is caused by tax evasion or managerial diversion.[4] Unfortunately, the banking data do not identify the final recipients of the cash dispensed from the spacemen accounts. Therefore, I cannot precisely verify whether the spacemen money went to a company's owners or was diverted by its management. To distinguish between these two possible causes, I compare firms managed by their owners to firms not managed by their owners. The assumption underlying this identification is as follows. The managers can use the same mechanisms to steal from the companies' owners that the owners use to steal from the government. If the CEO is also the company's owner, then the only motive for income diversion is tax evasion. However, if the

CEO is not the company's owner, then the transfers to spacemen can include not only tax evasion but also managerial diversion. I find that for the solely owned companies managed by their owners, the effect of income diversion on firm performance is not statistically different from zero. For the remainder of the companies, however, this effect is negative and statistically significant at the 1% level. Based on this evidence, I conclude that the main reason for tax evaders' underperformance is managerial diversion rather than tax evasion. This empirical finding might also be explained by other types of agency costs that are not necessarily related to managerial diversion. The act of stealing money from the government through tax evasion might deteriorate incentives for management to work hard to achieve revenue growth and value creation.

Finally, I provide a robustness test on the results by analyzing the interaction between tax enforcement and firm performance. If income diversion activities worsen firm performance, then we should expect that stricter tax enforcement would improve firm performance. As a proxy for tax enforcement, I use the number of persons employed by a local tax agency scaled by the number of firms that they monitor. The underlying assumption is that the more tax inspectors who monitor a firm, the better the tax enforcement is on that firm. The empirical results suggest that the level of tax enforcement is positively related to firm performance. A one standard deviation decrease in tax enforcement corresponds to a decrease in the annual revenue growth rate by 2.6% and an annual decline in productivity measured as revenue per employee by 1.8%.

My empirical findings suggest an additional explanation for the fact that existing empirical studies do not find a strong positive relationship between tax evasion and firm value. Although tax evasion might increase current disposable income, it is negatively related to firm performance and, consequently, to future free cash flow. This could be one reason

why the possible positive effect of tax evasion on firm value (if any) is much smaller than predicted by the theory that tax evasion is simply a transfer of money from the government to shareholders.

This paper contributes to the larger body of literature on corporate tax avoidance and tax evasion. Mills (1998) shows that firms cannot maximize financial reporting benefits and tax savings independently, or without cost. Desai and Dharmapala (2006) construct a measure of tax avoidance based on the component of the book-tax gap that is not attributable to accounting accruals. They show that increases in incentive compensation tend to reduce the level of tax sheltering. Also, based on the book-tax gap measure, Desai and Dharmapala (2009) show that the effect of tax avoidance on firm value is not significantly different from zero but is positive for well-governed firms. Fisman and Wei (2004) measure tax evasion based on the difference between Hong Kong's reported exports to China at the product level and China's reported imports from Hong Kong. They show that a 1% increase in the tax rate is associated with a 3% increase in evasion.

This paper is also related to the growing literature on tunneling and income diversion. Johnson et al. (2000) describe cases of legal tunneling in developed civil-law countries. Bertrand, Mehta, and Mullainathan (2002) focus on the tunneling 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 income diversion to be 25% of marginal profits in firms with low cash flow rights. Atanasov et al. (2010) analyze how the 2002 legal changes in Bulgaria affected specific forms of tunneling, firm valuation, and firm reported profitability.

This paper also contributes to the literature on economy-wide tax evasion. There are two well-known direct approaches to measure shadow economy. The first method is based on micro surveys, and the second relies on the discrepancy between income reported to tax

authorities and that measured by selective checks. Schneider and Enste (2000) and Alm, Martinez-Vazquez, and Schneider (2004) provide a comprehensive overview of these methods. The main disadvantage of the survey method is that "results from these surveys are sensitive to the way the questionnaire is formulated… [and] most interviewed hesitate to confess fraudulent behavior", Schneider and Enste note. The main disadvantage of the second method is possible selection bias, because selection of taxpayers for audit is not random. The direct approach suggested in this paper neither relies on survey design, nor suffer from sample selection bias. It captures 35% to 70% of the entire shadow economy in Russia.

The remainder of the paper is structured as follows. Section I provides an analytical framework. Section II describes the data. Section III discusses the empirical strategy. Section IV presents the empirical results, and Section V concludes the paper.

I. Analytical Framework

A. Tax Evasion and Managerial Diversion Using Spacemen

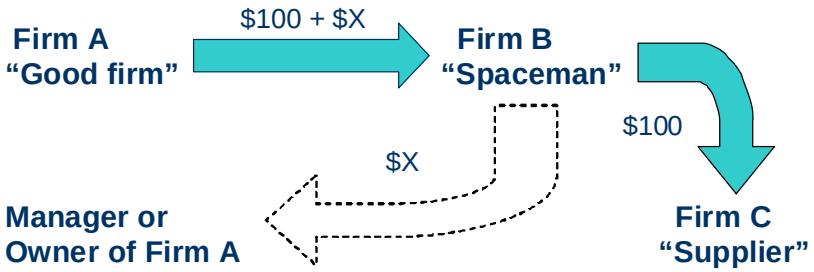
Companies in Russia evade taxes in several different ways. Many companies simply underreport their revenues in so-called black cash transactions (see Yakovlev (2001)). Black cash tax evasion is widespread among small enterprises, but large firms rarely use it. Large and medium companies typically use more advanced schemes for tax evasion that involve the creation of special purpose entities (SPEs). It is important to distinguish between tax evasion and tax avoidance. Franzoni (1998) defines tax avoidance as a way to reduce taxes "by which individuals reduce their own tax in a way that may be unintended by tax legislators but is permissible by law." In contrast, tax evasion is an *illegal* way of reducing tax payments.

The legal schemes (tax avoidance) often involve the use of external or internal off-shore affiliated companies in areas with low tax regimes. Desai, Dyck, and Zinglales (2007) provide an example of Sibneft, the fifth largest Russian oil company: "Sibneft's production

subsidiary was selling oil at just $2.20/ barrel, considerably below the average export price (net of export costs and excise taxes) of $13.50 and also well below the average domestic price (net of taxes) of $7.20/ barrel. Unsurprisingly, company financial reports revealed an effective corporate tax rate of just 2.6%, far below the statutory rate of 30%." In 2001, Sibneft decreased its income tax by 10 billion rubles [RUR] ($330 million) by selling oil through several traders registered in low-tax zones in Chukotka and Kalmykia (Vedomosti (2002)). Desai, Dyck, and Zinglales provide evidence that virtually all major Russian oil companies were involved in tax optimization using these schemes.

The illegal schemes typically involve the artificial inflation of expenses through fake contracts. For example, firm A wants to evade $X so it makes a deal with firm B to render goods or services that have a true value of $100, but firm A pays firm B $100 + $X. Firm B pays $100 to a real supplier (firm C) that delivers goods or services, and Firm B returns $X to firm A's manager or owner in the form of cash or a sight draft. Firm B, referred to as a *spaceman* in this paper, comes from seemingly nowhere, does not perform any real activities, pays almost no taxes, and disappears ("flies into space") in 0.5 to 2 years. This type of firm is also called a "dump," "flashlight," "bruise," "hedgehog," "fly-by-night company," or a “one-day-company.” See Vedomosti (2005b) for a detailed description of these firms. According to Sergei Arkelov, the deputy head of the Federal Tax Service, spacemen generally do not submit accounting statements to authorities (Interfax (2011)). However, some spacemen may submit financial reports to authorities, even though these reports do not reflect their true activities (Kommersant Money (2011)). Tax evasion using spacemen often involves long chain of transactions, with each transaction appearing to be legitimate; however, the entire scheme is illegal.

Exhibit 1. Income Diversion Using Spacemen



Because $X can be large and is usually paid in cash, "spaceman" schemes require the collaboration of bank officials. As the Wall Street Journal (2006) reports, "In the West, most business payments are made by bank transfer, and cash withdrawals of even a few thousand dollars can raise eyebrows. In Russia, cash is king. Companies–both criminal and outwardly legitimate–often use it to pay salaries, and so avoid onerous payroll taxes… To get their hands on that money, businesses must navigate strict rules barring banks from dispensing large amounts of cash. Luckily for them there are dozens of small, fly-by-night banks ready to use legal loopholes–and panoply of complex financial scams–to get around the rules. For the banks, which charge fees of as much as 5% for customers to withdraw cash, it is a lucrative business."

To help establish some basic facts about spacemen, I conducted a small survey among several business executives who manage companies with revenues ranging $1M to $100M.[5] According to these executives, spacemen are typically registered in the names of homeless people or persons whose identification has been lost or stolen. Spacemen are also often registered in the names of people who sell their identification data.[6] In 2003 to 2004, the costs of creating a new spaceman were about $350 to $500, and law firms that specialize in registering new businesses often sell spacemen that are already registered. As Kommersant Money (2011) describes, these law firms typically register many spacemen at the same address, and often the same owner and CEO are served for multiple spacemen. The marginal

cost of operating a spaceman comes is due to the bank commission (around 0.5% to 1%) that is taken on cash withdrawals. In general, small and medium firms do not have their own spacemen but pay a 1% to 3% commission to organizations that specialize in providing spacemen services. Radaev (2001) provides a detailed description of this type of tax evasion scheme.

How much do companies save in taxes from spacemen schemes? Consider the case of a company that transfers $100 to a spaceman for fake services, and this money is returned to the company's owner. The spaceman provides an invoice for $84.75 (services) + $15.25 (VAT, 18%), totaling $100. The company can then decrease its total VAT payment by $15.25 (VAT already "paid" by spaceman). Next, the company is allowed to decrease its taxable income by $84.75 (the cost of "services" provided by the spaceman), which yields a profit tax savings equal to $20.34 (=$84.75*24% [the profit tax rate]). If the company had paid all appropriate taxes on the $100, the amount left for the company to return to its owner would be $64.41, not $100. Further, if the company paid $64.41 as a dividend, the owner would have to pay a dividend tax of $5.80 ($64.41*9% [the dividend tax rate]). Thus, if a firm uses a spaceman to hide its $100 profit, then the total tax evasion would be $41.39 ($15.25+20.34+5.80), or 41.39% of the money transferred to the spaceman. Another popular way of using spacemen money is payment of an under-the-table salary, thereby avoiding payroll taxes (Wall Street Journal (2006)). In this case, companies evade social security tax (30.4%),[7] VAT (18%), and personal income tax (13%). Thus, the total tax savings is 49.51% of the money transferred to the spacemen.[8] Finally, a company might use money transferred to spacemen to pay "black cash" expenses because some suppliers, especially small businesses, offer substantial discounts for "black cash" payments, which allow the suppliers

to hide these cash receipts from the tax authorities. By using spacemen money to pay "black cash" expenses, a firm evades VAT on the amount of "VAT paid" by spacemen.

The same schemes can be used not only for tax evasion but also for managerial diversion. William Browder, CEO of Hermitage, believes that "Gazprom [is] destroying shareholder value through …the increased use of secretive intermediaries, whose relationships with the company remained unknown" (Times (2005)). Many investors agree with Mr. Browder that large companies use spacemen primarily for managerial diversion rather than for tax evasion. Indeed, if a manager transfers some of the firm's profits to spacemen, then these profits are hidden not only from the government but also from minority investors.

Spacemen schemes are very popular among Russian firms. "'At present over 2,000 legal entities are being registered per day, while over 50% of the firms are being created for the purpose of participation in tax evasion schemes,' the head of the Federal Tax Service said when he spoke in the State Duma [Russian Parliament]… According to him, the current legislation does not tackle the problem of the one-day-companies which are being set up for the purpose of tax evasion" (BBC (2006)). According to my interviews with Russian businessmen, the spacemen schemes were still functioning as of 2010.

B. Tax Evasion and Firm Performance

Does tax evasion benefit a firm and its shareholders? From a theoretical point of view, the answer is unclear. On the one hand, tax evasion is a de facto money transfer from the government to a firm and therefore should be in shareholders' interests. On the other hand, in addition to the direct costs of tax evasion, tax evasion might also incur additional agency costs, including managerial diversion. For example, tax evasion is always associated with

accounting manipulations, and thus creates an opportunity for employees to use these manipulations for their own private benefits.

Empirical evidence on this topic is very limited. Desai, Dyck and Zingales (2007) document that an increase in tax enforcement in Russia was followed by a positive market reaction. They explain this finding using the theory that the tax system affects the size of private benefits of control extracted by company insiders. Using a large sample of U.S. firms, Desai and Dharmapala (2009) show that the average effect of tax avoidance on firm value is not significantly different from zero but is positive for well-managed firms. Both studies build empirical evidence from samples of publicly traded companies.

However, it is not obvious that the same effect is present for privately held companies. If tax evasion does not have a negative effect on firm value for privately held companies, the overall effect of tax evasion is unclear because almost every publicly traded company was privately held in the early stages of its development. For example, the largest U.S. tech companies, Google, Microsoft, and Apple (now worth more $200 billion each) were owned by only 2 to 3 individuals as of 10 to 30 years ago. Therefore, in this paper I test a following hypothesis.

Hypothesis 1: For privately held companies, tax evasion represents a simple transfer of value from the state to companies' owners.

Another important economic question is *why* tax evasion might be related to firm value. Desai, Dyck, and Zingales (2007) provide a simple explanation for this relationship: "Increased tax enforcement reduces the amount of private benefits [the] controlling shareholders can enjoy. More interestingly, the increase in tax enforcement can increase the amount outside shareholders will receive, even accounting for increased levels of taxation. Accordingly, for a given tax rate, an increase in tax enforcement can increase (rather than

decrease) the market value of a company." It is possible that a similar effect might be in place for privately held companies. Lax tax enforcement allows a firm's owner to evade taxes, but it also provides an opportunity for a manager to steal from the company; as a result, lax tax enforcement can worsen firm performance. Therefore, the second hypothesis that I test in this paper is as follows.

Hypothesis 2: The negative effect of tax evasion on firm performance (if any) is related to managerial diversion rather than tax evasion *per se*.

II. Data and Sample

A. Banking Transaction Data

The main dataset used in this paper is the banking transaction data for 2003 and 2004 that were leaked to public from the Moscow branch of Russian central bank in 2005 (Vedomosti (2005a)). These data can be purchased from several web sites including www.mos-inform.com, www.specsoft.info, www.wmbase.com, and www.rusbd.com. I purchased these data from www.vivedata.com for $500. This dataset includes transactions that took place within Russia only. It does not include operations in foreign currencies nor does it include cash deposits and cash withdrawals.

The raw dataset contains 236 million transactions involving 1.7 million entities. Each entry has information on the payer, recipient, date, and amount as well as a detailed description of each transaction. The transactions range from very large to miniscule. For example, the data show that on January 26, 2004, Gaztaged, a 100% subsidiary of Gazprom, paid 538 million rubles ($18 million) to Trubny Torgovy Dom for pipes. In contrast, Rosneft, the largest oil company in Russia, paid a water cooler rental of 637 rubles ($21) on July 9, 2003, to Selivanovskaya Voda.

To reduce measurement error due to misprinted taxpayer numbers (INN), all firms with fewer than 10 transactions over the entire sample period are excluded. In spite of the large number (803,566) of firms with fewer than 10 transactions, these firms account for only 0.3% of the total turnover. Banks, financial service firms, and insurance companies are excluded from the analysis. Individual entrepreneurs and very small companies (monthly revenue of less than 100,000 rubles [$3,300]) are also dropped because they cannot be considered spacemen according to the description used here.[9] Because firms pay the VAT and the profit tax on a quarterly basis in Russia, I include in the analysis only firms that had at least one transaction before October 1, 2004. The exclusion of firms that were formed in the last quarter of the sample period leads to an underestimation of tax evasion for the fourth quarter of 2004 because spacemen created during this period cannot be identified. This leaves a sample of about 207,000 companies.

There is no exact evidence regarding how these data were leaked. An internal investigation of the Russian Central Bank did not yield any results. However, following the scandal caused by the leak, the central bank stopped the leakage, and therefore, no banking data could be obtained for 2005 and beyond. Vladimir Babkin, an economist with the Russian Central Bank, observes that many commercial banks commonly use this dataset to evaluate credit ratings (Bank Review (2005)). Using these data, banks can verify the accuracy of financial statements, analyze firms' key customers and suppliers, and investigate a firm's financial activities with its affiliates.

Because the Russian Central Bank never confirmed the authenticity of the data, I perform several tests to verify the dataset's completeness and to determine whether it contains transactions of real companies. The detailed description of these procedures is provided in the Internet Appendix. From the results of these tests, I draw three main conclusions. First, the

banking data are real but incomplete. The sample contains data for 75% to 80% of all Russian firms. Second, the sample is biased toward Moscow, because the data were leaked from the Moscow branch of the Russian Central Bank. Third, the data contain some errors due to misprints and other unknown reasons.

B. Additional Data Sources

To verify the spacemen selection procedures, I use several additional data sources. The first dataset includes the personal income of Moscow residents, the second is the city of Moscow's auto registration database, the third is the companies' registry data, and the fourth is a police database of lost and stolen identifications. I provide a detailed description of these datasets in the Internet Appendix.

I obtain the companies' financial data from Rosstat, an official Russian statistical agency. This database contains information about a company's identification, name, address, date of incorporation, industry, directors, owners, and basic accounting data such as revenue, profit, net income, assets, and debt. According to Russian law, all firms (even small ones) must report their balance sheets and income statements to Rosstat on a quarterly basis. Rosstat contains accounting data for about 1.5 million Russian firms.

C. Identification of Spacemen

Empirically, I identify spacemen as firms that pay no or negligible taxes. The quality of the banking data does not allow for the identification of all tax payments because descriptions of some payments are missing; therefore, any transfer to a tax collecting agency is treated as a tax payment.[10] A firm is defined as a spaceman if it satisfies all of the following criteria: (a) the ratio of taxes paid to the difference in cash inflows and outflows (net tax rate) is less than 0.1%; (b) the firm pays less than 216 rubles ($7.2) in SST per month, which approximately corresponds to one minimum wage;[11] and (c) the firm's cash inflows are higher than its

outflows. According to the Russian tax system, even a firm with a loss must pay VAT, SST, 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

$$gross\ tax\ rate = \frac{tax\ paid}{\left(cash\ inflow + cash\ outflow\right)/2} \tag{1}$$

Because the price for spaceman services in 2003 to 2004 started as low as 1%, the nature of their business prevents such firms from paying taxes that are higher than 1% of average turnover. Therefore, a firm is classified as *regular* if it has a gross tax rate of more than 1%, and firms with tax rates between 0.1% and 1% represent a mix of spacemen and regular firms and therefore are not attributed to either class.

I identify 42,483 spacemen and 100,313 regular firms in the data. Panel A in Table I presents the summary statistics. The first two columns describe the base sample of 207,176 firms. An average firm performs 38 transactions per month, has receipts of $283,371, spends $245,640, and has an average tax payment of $7,913, including $288 in SST, which corresponds to an average wage bill of approximately $950 per firm. This figure is much lower than a real wage bill. For example, Braguinsky, Mityakov, and Liscovich (2010) estimate "under the table" payments as much as 75% of actual salaries. The third and fourth columns contain only regular firms, and the fifth and sixth columns include only spacemen. These subsample statistics indicate that a spaceman has a monthly turnover that is over 2.5 times greater than that of a regular firm ($641,535 versus $251,247) but performs 40% fewer transactions (25 versus 42); therefore, an average spaceman transaction is 4.3 times higher than an average regular firm transaction. Furthermore, a spaceman exists almost 200 days

fewer than a regular firm (391 days versus 588 days) when firm age is defined as the date of the last transaction minus the date of the first transaction in the sample.

[Insert Table I here]

Next, I examine whether the assumed qualitative characteristics of spacemen motivated in Section I.A are supported by the data. Specifically, I test the following statements: (a) spacemen either do not submit accounting statements to authorities or submit reports that do not coincide with their real activities, (b) many spacemen are often registered at the same address, and (c) spacemen are typically registered in the names of homeless people, people who sell their identification data, or people whose identification has been lost or stolen.

To test these statements, I match a sample of 3,000 randomly selected spacemen and a sample of 3,000 randomly selected regular firms to companies' registry data to identify companies' CEOs and owners. Next, I match the CEOs' and owners' identifications to auto registry, personal income data, and lost and stolen identification database. To obtain companies' accounting statements, these subsamples are matched to Rosstat.

Panel B in Table I presents summary statistics. As the table shows, 43.4% of spacemen are not found in the Rosstat database (never provided any reports to Rosstat) as compared to 9.5% of regular firms. Out of the 1,697 spacemen present in Rosstat, only 589 (34.7%) reported a positive combined revenue for 2003 to 2004. Concerning these 589 spacemen, the average (median) spaceman reported $2,433K ($9.3K) of revenue, even though its true cash receipts were $13,630K ($2,630K). These statistics contrast to those of regular firms. Out of 2714 regular firms, 1,897 (69.9%) reported positive revenue in 2003 to 2004. An average (median) regular firm reported $3,586K ($390K) of revenue, and it received $2,866K ($450K) of cash inflow in its bank account. Figure 1 plots a logarithm of reported revenue against a logarithm of cash inflow for spacemen and regular firms. The evidence supports the

statement that spacemen either do not submit accounting, or they submit reports that do not coincide with their real activities.

[Insert Figure 1 here]

The data presented in the table indicate that spacemen are often registered at a "mass registration" address, or an address at which many of other companies are also registered; 69.9% of spacemen are registered at addresses where at least 100 other firms are registered, and 28.4% of spacemen are registered at addresses where at least 500 other firms are registered (for regular firms, the respective statistics are 38.6% an 14.3% accordingly). Identification data on 18.9% of spacemen's CEOs are present in the police database of lost and stolen identifications.

The data employed in this research do not allow the identification of whether a person is homeless. Neither it is possible to verify whether a person sold his/her identification for spaceman registration. However, some proxies for individual wealth can be obtained using car ownership and personal income data. According to the Moscow auto registry data, 17.8% of spacemen's CEOs own (or ever owned) a car, and 13.9% of them earned more than $1 per day ($365 per year). I define a person as "poor" if he or she never owned a car and has income below $1 per day. According to this definition, 73.7% of spacemen's CEOs can be classified as poor people. In comparison, the average CEO of a regular firm has a reported income that is 4 times higher than that of the average CEO of a spaceman[12] and is 3 times more likely to own a car. The data for the owners of spacemen exhibit a similar pattern. Compared to the owners of regular firms, an average spacemen owner earns an income that is 6 times lower and is one-third as likely to own a car. Even though the CEOs and owners of spacemen are much poorer than those of regular firms, the average cash receipts of spacemen are about 5 times greater than those of regular firms ($13,631K vs. $2,866K). This evidence

suggests that the nominal CEOs and owners of spacemen are not the real ones. Surprisingly, the identifications of 9.7% of regular firms' CEOs are present in the database of lost and stolen identifications, and 36.1% can be classified as poor. A possible explanation of this empirical finding is that under tax evasion, even legitimate businesses might prefer to hide their true owners.

I provide additional verification tests of spacemen selection procedures in the Internet Appendix.

D. Sample of Companies

I match the sample of 100,313 regular firms identified in the previous subsection to Rosstat database. The number of companies present in the Rosstat database is 89,722; of these, 62,643 have nonzero reported revenues for either 2003 or 2004. As discussed earlier, the banking data are incomplete, which is why I choose only firms whose reported revenues for 2003 and 2004 are relatively close to their banking cash receipts.[13] Due to data limitations, the ultimate beneficiaries of money transfers through spacemen cannot be precisely identified. The banking data make it possible to trace the money from companies to spacemen, but they do not allow the verification of who eventually received the cash dispensed from the spacemen accounts. Therefore, in the case of publicly traded companies, tax evasion cannot be empirically separated from the expropriation of minority shareholders. Hence, I exclude open joint stock companies from the sample. This yields a sample of 45,429 companies.

Table II presents the sample summary statistics. An average (median) company has assets of $864K ($71K), revenue of $1.4M ($255K), and a net income of $48K ($2K). Employment data for 31,594 companies are present in Rosstat. An average (median) company has 78 (47) employees. As indicated in the table, the reported profitability for

sample companies is quite low. The average (median) earnings before taxes (EBT) margin is 2.1% (1.2%), and the net income margin is 1.1% (0.9%). Low reported profitability is reflected in relatively low tax payments. An average (median) firm pays 1.4% (0.6%) of its revenue as a profit tax, 2.7% (1.4%) as VAT, and 1.5% (0.6%) as SST. I estimate *profit tax* as the difference between EBT and net income. Rosstat data do not include VAT and SST, which is why those taxes were estimated using a description of tax payments from the banking dataset. I obtain ownership and CEO data for 40,319 members of the sample using companies' registry data. An average (median) company has 2.1 (1) owners. I define *CEO not owner* as *1* if the CEO is not one of the company's owners and *0* otherwise. I find that 42.9% of the companies are not managed by their owners.

[Insert Table II here]

It is difficult to measure firm performance under tax evasion. Popular measures of firm performance such as ROA and ROE cannot be used because reported earnings would be mechanically correlated with tax evasion measures.[14] I also cannot rely on the market-to-book ratio because the sample companies are not publicly traded. This is why firm growth and changes in productivity are employed as measures of firm performance. Because the banking data are limited to 2003 and 2004 and the Rosstat data were available until 2007, I estimate an average of 3-year growth starting in 2003 and 2004. As we can see from Table II, an average firm experienced 19.1% of revenue growth per year and 26.6% of asset growth per year. Ratios of revenue to assets and revenue per employee are used as productivity measures. Over a 3-year period, an average change of revenue per employee was 18.9% per year, and the average change of the revenue to assets ratio was –10.3% per year.

It is important to note that survival bias may be a serious issue in the sample because 42% of the firms that had non-zero revenue in 2004 are missing in 2007. Not all of these

firms necessarily went bankrupt. Some may have failed to submit statistical forms in 2007, or Rosstat may not have included their information in the 2007 data. However, bankruptcy is a key reason for these firms' absence. To account for survival bias, the values of the growth and productivity variable were set at the bottom percentile for the firms that disappeared from that sample and had negative total net income for the last 3 years before their disappearance. A firm that had a positive total net income for the last 3 years before it disappeared from the sample is considered as not present for some random reason(s), and therefore, I do not estimate growth and productivity measures for such a firm. The performance measures that are corrected for survival bias are reported at the bottom of Table II.

III. Empirical Strategy

First, I build a measure of income diversion based on companies' transfers to spacemen. Note that not all of the money transferred to spacemen constitutes income diversion. A firm that pays a spaceman for nonexistent consulting services decreases its taxable income by 100% of the payment. However, if a firm orders some goods from a spaceman, the hidden income is only a fraction of the transfer. To illustrate this difference, consider a manager who wants to decrease taxable income by purchasing a computer for more than its fair price. The manager 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 receives $2000 cash back. In this case, the income diversion is $2000 instead of $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 the regular firms. I construct three measures of income diversion at the firm level:

$$ShadowP = \frac{Net\ transfers\ to\ spacemen}{Total\ payments} \tag{2a}$$

$$ShadowR = \frac{Net\ transfers\ to\ spacemen}{Revenue} \quad (2b)$$

$$ShadowA = \frac{Net\ transfers\ to\ spacemen}{Assets} \quad (2c)$$

where *Net transfers to spacemen* are the net cash transferred to spacemen by a firm, *Total payments* represent the total amount of money paid from the firm's bank account, and *Revenue* and *Assets* are book revenue and assets taken from Rosstat.

Second, I test Hypothesis 1 by estimating the following regression:

$$Performance^{i}_{t,t+3} = \alpha + \beta Shadow^{i}_{t} + \gamma Controls^{i}_{t} + \theta_{t} + \varepsilon^{i}_{t} \quad (3)$$

where i and t are firm and time indexes, $Performance^{i}_{t,t+3}$ is one of performance measures defined in Section II.D, $Shadow^{i}_{t}$ is one of the three income diversion measures defined above, $Controls^{i}_{t}$ is a set of firm-level controls, θ_{t} are year fixed effects, and ε^{i}_{t} is the error term. Hypothesis 1 implies that $\beta \geq 0$ because if Hypothesis 1 holds, then tax evasion is the same as the reduction of a firm's overall costs. Firms with lower costs *ceteris paribus* should outperform firms with higher costs or at least show the same performance.

There are two potential problems with the OLS estimation of equation (3). The first is that measurement errors of the income diversion measures and performance measures might be correlated. For example, if a company underreported revenue in 2003 or 2004, its revenue growth will mechanically increase, as will the change in productivity measured as revenue per employee and the income diversion measure *ShadowR*. Therefore, the OLS estimates of coefficients for income diversion measures may be upwardly biased. The second possible issue is the endogenous relationship between income diversion and firm performance. Firms with low growth opportunities might focus their energy on tax evasion rather than revenue creation. It is also possible that there is separation of talents; in other words, some managers

know how to increase a firm's productivity and gain market share while others are good at manipulating accounting reporting and evading taxes.

To address these concerns, I need to find an exogenous source of variation that affect the ability of firms to divert income but do not directly influence performance indicators. As such a source, I use variation in strength of tax enforcement across different tax agencies. Typically, there are several tax agencies in each region. For example, the city of Moscow has 36 local tax agencies, the region of Moscow has 59, and Saint Petersburg has 27. Tax agencies are responsible for collecting and checking tax filings. They can also initiate tax investigation if necessary. Tax agencies differ one from another by several dimensions. First, tax agencies are staffed differently: some agencies have many more firms assigned to every single tax inspector than others. Second, tax inspectors differ in skills, level of education, and incentives. As a result, there is a significant variation in the level of tax enforcement across tax agencies. This is why I use tax agency dummies as a source of exogenous variation to instrument for income diversion. It is important to note that tax agencies are responsible only for tax collections. Other government agencies are responsible for granting licenses and permissions, firm registrations, safety checks, etc. These government agencies operate independently from tax agencies. Therefore, tax agencies affect firm performance only via different level of tax enforcement, not through other activities that might hinder business development. The assignment of every firm to tax agencies depends purely on its registration address. However, the choice of a tax agency is not exogenous for many Russian firms. According to the Russian businessmen I interviewed, entrepreneurs often prefer to register their businesses with tax agencies where they have good connections, i.e., where a friend or a relative works. Russian law has no established punishment for a firm that has different legal and physical addresses. Not surprisingly, almost 50% of firms in the sample have different

legal and physical addresses; all of these firms are excluded from the IV estimation to avoid the problem of an endogenous choice of tax office. This exclusion does not fully insure that a choice of tax office was exogenous for every firm in the remaining subsample, but the probability of endogenous choice is significantly smaller.[15]

Third, I distinguish the effect of managerial diversion from the effect of tax evasion by itself. As discussed earlier, the banking data do not identify the final recipients of spacemen money. Hence, I cannot directly separate tax evasion from managerial diversion using the banking data. To solve this problem, I apply the following identification criteria. If a company's CEO is also its owner, then income diversion constitutes only tax evasion:

$$Shadow_t^i = Tax\ Evasion_t^i,\ if\ CEO_t^i = Owner_t^i \tag{4}$$

Indeed, if the same person is the company's owner and manager, then the only motive for income diversion is tax evasion. In contrast, if a company's CEO is not its owner, then income diversion includes not only tax evasion but also managerial diversion:

$$Shadow_t^i = Tax\ Evasion_t^i + Managerial\ Diversion_t^i,\ if\ CEO_t^i \neq Owner_t^i \tag{5}$$

To test Hypothesis 2, I estimate the following regression:

$$\begin{aligned} Performance_{t,t+3}^i = \alpha + \beta_1 Shadow_t^i + \beta_2 Shadow_t^i \cdot CEO\ not\ owner_t^i + \\ + \beta_3 CEO\ not\ owner_t^i + \gamma Controls_t^i + \theta_t + \varepsilon_t^i \end{aligned} \tag{6}$$

where i, t, $Performance_{t,t+3}^i$, $Shadow_t^i$, $Controls_t^i$, θ_t, and ε_t^i are the same as in equation (3), and $CEO\ not\ owner_t^i$ is a dummy that is equal to 1 if a company's CEO is not one of that company's owners. Hypothesis 2 implies that $\beta_1 \geq 0$ and $\beta_2 < 0$.

Finally, to check the robustness of the results, I analyze the relationship between firm performance and the level of tax enforcement. If income diversion is positively related to firm performance, then stricter tax enforcement should be negatively related to firm

performance and vice versa. As a proxy for tax enforcement, I use the number of employees that work at the local tax agency. Even though the government does not disclose such information, it can be obtained from the database of Moscow residents' personal income. Because this dataset contains identification data for both employer and employee, the exact number of people employed by every local Moscow tax agency can be obtained. I use 2002 as a base year to ensure that the number of tax employees would be exogenous to a firm's decisions to evade taxes in each subsequent year. The number of employees varies from 145 persons at tax agency № 33 to 370 persons at tax agency № 15. An average Moscow tax agency has 258 employees. As discussed earlier, tax agencies are only responsible for tax enforcement and are not involved in other activities that might worsen a firm's business environment. Therefore, except for this distinction in the level of tax enforcement, I consider that all Moscow firms operate under homogeneous corruption and in a homogenous business environment. From the banking transaction data, I obtain the number of active firms registered within every tax agency. A firm is considered "active" if it performed at least 10 banking transactions within the 2003 to 2004 period.

I denote a proxy for the inverse tax enforcement as follows.

$$Inverse\,Tax\,Enforcement_j = \frac{Number\ of\ Firms_j}{Number\ of\ Tax\ Employees_j} \tag{7}$$

where j is the index of a local tax agency, $Number\ of\ Tax\ Employees_j$ is the number of persons employed at a local tax agency j in 2002, and $Number\ of\ Firms_j$ is the number of firms registered a local tax agency j, which performed at least 10 banking transactions in 2003 to 2004. This proxy varies from 17.7 (tax agency № 20) to 70.5 (tax agency № 5), with an average of 41.4 and a standard deviation of 14.7. The economic intuition behind this proxy is as follows. If a tax inspector has fewer firms to monitor, he can devote more time and

effort to monitor each particular firm and therefore provide better tax enforcement. Next, I estimate the following regression:

$$Performance^{i}_{t,t+3} = \alpha + \beta Inverse\ Tax\ Enforcement^{i} + \gamma Controls^{i}_{t} + \theta_{t} + \varepsilon^{i}_{t} \qquad (8)$$

where $Inverse\ Tax\ Enforcement^{i}$ is defined above, and i, t, $Performance^{i}_{t,t+3}$, $Controls^{i}_{t}$, θ_{t}, and ε^{i}_{t} are the same as for equation (3). If income diversion improves firm performance, β should be positive. If income diversion worsens firm performance, β should be negative.

IV. Empirical Results

A. Tax Evasion at the Economy Level

I estimate net transfers to spacemen as 1,500B rubles ($49B) in 2003 and 2,223B rubles ($77B) in 2004. Net transfers to spacemen account for 11.4% of GDP in 2003 and 13.1% of GDP in 2004. I estimate a lower bound of tax evasion using spacemen as 620B rubles ($20B) in 2003 and 920B rubles ($32B) in 2004. The identified tax evasion equates to 4.7% to 5.4% of GDP or 17.1% to 18.6% of all tax collection. My estimates for tax evasion using spacemen are close to those of the Russian central bank.[16] As mentioned earlier, the banking dataset covers about 80% of all transactions made in Russia. If we assume that the concentration of spacemen in the rest of economy is the same as in the banking data, the true size of the "spaceman economy" can be estimated as 14.2% to 16.3% of GDP.

What fraction of the shadow economy do I identify? Official estimates (Rosstat) of the shadow economy in Russia are 20% to 25% of GDP in 2000 to 2003. Using electricity and currency demand approaches,[17] Schneider and Enste (2000) estimate the size of the Russian shadow economy as 20% to 27% of GDP in 1990 to 1993. Schneider (2005) uses the latent estimation approach, in which the hidden economy is considered as "unobserved variable," and the currency demand approach to measure the shadow economy in 145 countries. He estimates that in 1999 to 2003, the size of the shadow economy in Russia was 46.1 to 48.7%

of GDP. Based on these estimations, I conclude that the identified spaceman activities comprise 35% to 70% of the entire shadow economy in Russia.

B. Income Diversion at the Firm Level

I estimate income diversion at the company level as the sum of net transfers to spacemen. This approach to measuring diversion captures only one channel and does not cover other ways to avoid taxes. For example, it does not include income diversion related to transfer pricing, which Desai, Dyck, and Zinglales (2004) document to be enormous in Russia. However, the channel that I measure is substantial. As discussed in the previous subsection, the net transfers to spacemen account for 11.4% to 13.1% of GDP.

Table III presents the summary statistics of the income diversion measures. To reduce the influence of outliers and measurement error, the measures of income diversion are winsorized at the top 95th percentile. Annually, an average firm transfers to spacemen 7.1% of its total payments, 32.3% of its book assets, and 5.8% of its revenue. Large firms transfer less to spacemen than small firms. Consider a firm from the bottom quartile in terms of its assets. On average, it diverts 8.5% of its total payments, 53.6% of its book assets, and 6.8% of its revenue. In contrast, an average firm from the top quartile transfers to spacemen 5.9% of its total payments, 14.3% of its book assets, and 5.0% of its revenue. A possible explanation for this finding is that large firms are more visible in the media and are better monitored by the government.

[Insert Table III here]

In the Internet Appendix, I provide a detailed analysis of the constructed income diversion measures. Summarizing the results of the empirical tests, I draw the following conclusions. First, all obtained measures of income diversion are negatively related to firms' actual tax payments. Second, the theoretical predictions for tax savings coincide with

empirical estimations. Specifically, regardless of spacemen money usage, every $1 transferred to spacemen should lead to 15.3¢ of VAT savings. The estimated 95% confidence interval for the relevant coefficient is [–.160, –.055]. Third, as proposed by the theoretical analysis, profitable and unprofitable firms use spacemen for different purposes and to evade different taxes. Profitable firms use 57% of transfers to spacemen to make dividend payments (profit hiding), 24% for under-the-table salaries, and 19% to pay other "black cash" expenses. Firms with losses use 25% of money transferred to spacemen to pay under-the-table salaries and 75% to pay for "black cash" expenses. Fourth, as the theoretical analysis proposed, there is a positive relationship between reported profitability and the income diversion measures for unprofitable firms, whereas a negative relationship is present among these variables for profitable firms. I estimate that for profitable firms, on average, a dollar transferred to spacemen decreases reported profit by 29.5¢, whereas for firms with losses, $1 transferred to spacemen increases reported profit by 27.8¢.

C. Income Diversion and Firm Performance

I estimate equation (3) using *ShadowR* as a measure of income diversion. Firm-level controls include *profit/revenue, log(assets), debt/assets*, and industry dummies. It is important to note that actual profit consists of reported profit (*EBT*) and hidden profit (included in income diversion measures). Therefore, I construct a measure of actual profit (*Actual EBT*) using estimates reported in the previous subsection (see the Internet Appendix for detailed calculations). Table IV, Panel A presents the OLS estimation of equation (3). The coefficient estimates for the income diversion measure are negative and statistically significant at the 1% to 5% levels for all performance indicators. On average, 1% of the revenue transferred to spacemen corresponds to a .14% decrease in the annual revenue growth rate, a .06% decrease

in the assets growth rate, and a .07% annual decrease in productivity as measured by revenue per employee.

[Insert Table IV here]

To address potential problems with the OLS estimates, I apply the exogenous instruments discussed in Section III. Table IV, Panel B reports the IV estimations of equation (3) for the subsample of firms with the same legal and physical address (the OLS estimations for the same subsample are reported in the Internet Appendix). Column (1) reports the first stage results of the IV estimation, and columns (2) to (5) report the second stage results. The table data indicate that the IV estimates trend in the same direction as the OLS; income diversion is negatively related to firms' growth and change in productivity, and all estimated coefficients are significant at the 1% level. However, the IV estimates are substantially larger than the OLS estimates. On average, a 1% revenue transfer to spacemen corresponds to a 2.6% decrease in the annual revenue growth rate, a 1.6% decrease in the assets growth rate, and a 1.5% annual decline in productivity as measured by revenue per employee.

I perform several robustness checks on the findings. First, I test the results using other measures of income diversion as described in Section III (*ShadowA* and *ShadowP*). Second, I estimate equation (3) using 1- and 2-year firm growth and change in productivity as performance measures. Third, I estimate equation (3) with reported EBT rather than actual EBT as a control. The results obtained in these robustness checks do not change significantly from the results described earlier in this subsection. A detailed description of these robustness checks is provided in the Internet Appendix.

D. Theft or Taxes?

In this subsection, I test whether the observed negative effect of income diversion on firm performance is related to managerial diversion or tax evasion *per se*. I estimate equation (6) using *ShadowR* as a measure of income diversion. The set of control variables includes *profit/revenue, log(assets), debt/assets,* and industry dummies. Because OLS estimates have several potential issues, which were discussed above, the same instruments are applied for the estimation of equation (6) as for the estimation of equation (3). Table V, Panel A presents the IV estimations of equation (6) for the subsample of firms that have the same legal and physical address (the OLS estimation for the same subsample is reported in the Internet Appendix). As we can see from columns two through five, the coefficient estimates for *ShadowR*(β_1) and *ShadowR*CEO not owner*(β_2) are negative in all regression specifications. These estimates are statistically significant at the 1% to 5% level in columns two through four, though when change in revenue per employee is used as a performance measure (column 5), the estimates become statistically insignificant. Note that for firms that are not managed by their owners, the overall effect of *ShadowR* on firm performance ($\beta_1 + \beta_2$) is negative and statistically significant at the 1% level for all measures of performance (see the last row of Table V, Panel A). The findings support the hypothesis that *both* tax evasion and managerial diversion are negatively related to firm performance.

[Insert Table V here]

However, the possibility remains that transfers to spacemen include managerial diversion even if a firm is managed by one if its owners. A CEO who is also a firm owner might divert income from other shareholders; therefore β_1 can capture the effect of diversion in addition to tax evasion. To check whether this is indeed the case, I estimate equation (6) for the subsample of solely owned companies. If a company's CEO is also the company's single owner, then there are no other shareholders to steal from; thus, *ShadowR* captures *only* tax

evasion. Table V, Panel B reports the IV estimations of equation (6) for the subsample of single owner firms with the same legal and physical address (the OLS estimation for the same subsample is reported in the Internet Appendix). As we can see from the table, the negative effect of managerial diversion is more pronounced. Compared to Panel A, the point estimates for β_2 are 1.4 to 2.0 times larger, and the statistical significance of these estimates also increases (columns 2 to 5). However, the estimates for β_1 move in the opposite direction and become statistically insignificant in 3 out of 4 specifications.

I perform several robustness checks and estimate equation (6) for different specifications. First, I test the results using other measures of income diversion (*ShadowA and ShadowP).* Second, I estimate equation (6) using different time horizons for firms' performance measures. Third, I estimate equation (6) using reported EBT instead of actual EBT as a control. The results of these robustness checks are as follows. The estimates for β_2 are negative in all specifications and statistically significant at the 5% level in the majority of specifications. The estimates for β_1 are negative and statistically significant in the majority of the "Panel A" specifications when all firms are included. However, the estimates for β_1 are statistically insignificant in the majority of the "Panel B" specifications when only single owner firms are included. The detailed results of these robustness checks are provided in the Internet Appendix.

Based on the evidence, I conclude that the main cause of firms' underperformance is managerial diversion rather than tax evasion by itself. The empirical results might be also explained by other types of agency costs that are not necessarily related to managerial diversion. Stealing money from the government (tax evasion) might deteriorate the

incentives for management to work hard and invest their efforts in revenue growth and value creation.

E. Robustness Test: Tax Enforcement and Firm Performance

The test applied here is similar to the one used by Desai, Dyck, and Zingales (2007) to test their model. If tax evasion is negatively related to firm performance (due to managerial diversion or other reasons), then stricter tax enforcement should be associated with better firm performance. This implies that the coefficient for $Inverse\,Tax\,Enforcement^{i}$ (β) in equation (8) should be negative.

I estimate equation (8) using *profit/revenue, log (assets), debt/assets*, and industry dummies as control variables. Table VI presents the results for the subsample of firms with the same legal and physical address. The data presented in the table indicate that the coefficient estimates for $Inverse\,Tax\,Enforcement^{i}$ (β) are negative and statistically significant at the 1% level for all performance measures (columns 1 to 4). The economic significance is also notable. A one standard deviation decrease in tax enforcement corresponds to a 2.6% decrease in the annual revenue growth rate and a 1.8% annual decline in productivity as measured by revenue per employee. These empirical finding suggest that better tax enforcement is positively related to firm performance.

[Insert Table VI here]

The main assumption underlying the measure of tax enforcement is that employees are homogeneous across different tax agencies. Unfortunately, the database of personal income does not contain information about job titles and other employee characteristics such as education, experience, etc. However, the total wage bill can be used as an alternative proxy for the quality of tax enforcement. If we assume that a higher salary is associated with higher skills, then this proxy might be a better measure of tax enforcement than the number of

employees. The Internet Appendix reports the estimation of equation (8) using the total wage bill of the local tax agency as a proxy for tax enforcement. In addition, I perform the same robustness checks as before, i.e., I estimate equation (8) using different time horizons for firms' performance measures and I use reported EBT rather than actual EBT as a control. The outcome remains the same: an increase in tax enforcement is related to improved firm performance.

F. Discussion

The empirical results suggest that the spacemen evasion schemes not only decrease the taxes collected by the government, but they also worsen firms' performance. A natural question arises: why can't the government end the use of these schemes? There are at least two possible answers to this question.

First, fighting with spacemen can be dangerous. The Wall Street Journal (2006) tells the story of Andrei Kozlov, the first deputy chairman of the Russian Central Bank, who led a crackdown on spaceman schemes and other money laundering activities. Mr. Kozlov monitored Russian banks and withdrew licenses from banks that were involved in suspicious activities, including spaceman schemes. On September 13, 2006, Mr. Kozlov was assassinated. According to the police investigation, his murder was related to his professional activity.[18]

The second possible answer is that many government officials use spacemen to divert income from government-controlled companies, as in the case of Gazprom. In 2005, Hermitage Capital published several descriptions of the spacemen activities of Gazprom in the media (see Dyck, Volchkova, and Zingales (2008) for a description of similar media campaigns initiated by Hermitage).[19] The Gazprom management is affiliated with the very top government officials: Alexei Miller, CEO of Gazprom, and Dmitry Medvedev, a former

chairman of Gazprom board, are both close friends of Vladimir Putin (Financial Times (2006)).[20] Mironov(2006) shows that in addition to Gazprom, other government-controlled companies used spacemen to divert hundreds of millions of dollars.

Despite these obstacles, the government continues to fight against spacemen. In January 2011, President Medvedev introduced a draft of the new anti-spacemen bill. "Those persons who provided their identification for registration of one-day-companies should be responsible for that, regardless of who these persons are, ordinary people, homeless, or somebody else," Mr. Medvedev said (Vedomosti (2011)). He proposed that these persons should be fined up to $17,000. He also proposed to punish individuals who acquire other people's identifications for spaceman registration with a fine of up to $17,000 or up to 3 years imprisonment.

Another important question is: why do firm owners allow their managers to steal? The identity and behavior of a company's CEO are certainly not exogenous variables. Unlike in publicly traded companies, the shareholders of privately held companies have a strong influence over their companies' management. In that case, why did the shareholders fail to restrict managerial diversion in their own companies? Unfortunately, due to data limitations, I cannot provide the precise answer to this question, and further research should explore this topic. However, one possible explanation might be the inability (or partial ability) of firms' owners to enforce contracts with management. Even if the companies' owners discover managerial diversion, they often cannot take the CEO to court because the firms' owners use the same schemes for tax evasion.

Finally, an interesting economic question is: why do the data not reveal any positive effect of tax evasion on firm performance for companies that are managed by their owners? If manager-shareholder agency costs are the *only* negative side of tax evasion, then we should observe a positive effect of tax evasion for the firms that do not experience this agency

conflict (See Jensen and Meckling (1976) for a detailed discussion of this conflict) However, it might be the case that tax evasion involves some costs other than agency costs between management and shareholders. One possibility is that tax evaders might face difficulty in accessing capital markets. If companies can hide income from the government, then they can do the same in relation to debt holders. Therefore, banks are unwilling to provide capital to these companies. Another possibility is that tax evasion distorts investment decisions. Further empirical research should be done to test these possible explanations.

V. Conclusion

This paper develops a novel approach to measuring income diversion. Using a unique dataset of Russian banking transactions, I identify special-purpose entities, referred to as spacemen, that are specifically created for the purpose of income diversion. Spaceman activities in Russia totaled 11.4% to 13.1% of GDP in the period of 2003 to 2004, which corresponds to tax evasion of 4.7% to 5.9% of GDP.

Based on the transfers to spacemen, I build a firm-level measure of income diversion for a sample of 45,429 privately held firms. An average firm transfers 5.8% of its revenue to spacemen. Then, I provide empirical evidence that income diversion is negatively related to firm performance. On average, a 1% revenue transfer to spacemen corresponds to a 2.6% decrease in the annual revenue growth rate and a 1.5% annual decline in productivity as measured by revenue per employee.

Next, I find empirical support for the hypothesis that the observed effect comes from managerial diversion rather than from tax evasion *per se*. For solely owned firms managed by their owners the effect of income diversion on firm performance is not significantly different from zero, whereas for the firms that are not managed by their owners, the effect of income diversion on firm performance is negative and statistically significant at the 1% level.

Finally, following Desai, Dyck, and Zingales (2007), I show that the level of tax enforcement can be positively related to firm performance. A one standard deviation decrease in tax enforcement corresponds to a 2.6% decrease in annual revenue growth rate and a 1.8% annual decline in productivity measured as revenue per employee.

I suggest several areas for future research. First, it is important to analyze whether good corporate governance can curb tax evasion and diversion activities. If spaceman activities hurt performance, why do companies not voluntarily restrict these activities? Is it the case that in countries with poor legal systems, tax enforcement is the only channel to restrict managerial diversion? Second, future research could investigate the different factors (e.g., government attention, media attention, and shareholders' political connections) that affect firms' ability to evade taxes. Third, it is interesting to explore the firms which have chosen legal address opportunistically. Specifically, what kind of firms would prefer to be registered in the tax districts with *higher level of* tax enforcement? Finally, income diversion is often associated with corruption, and corruption enables firms to obtain benefits from politicians. Thus, an analysis of spaceman activities on and around elections may reveal the types of services that politicians provide to firms.

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[1] See Schneider and Enste (2000) and Alm, Martinez-Vazquez, and Schneider (2004) for a detailed discussion of these issues.

[2] This mechanism of hiding income may remind of a method used by the infamous Long-Term Capital Management (LTCM) in 1996 to 1997. LTCM reduced its taxable income by $106 million using artificially created losses. These losses were generated through nine cross-border lease-stripping transactions involving several special-purpose entities. See e.g., New York Times August 28, 2004 for the story.

[3] This company is the largest extractor of natural gas in the world and the largest Russian company.

[4] I am grateful to an anonymous referee for raising this question.

[5] I provide their detailed responses in the Internet Appendix.

[6] For example, in July 2008, Moscow tax authorities revealed that the identities of more than 100 students (including those from top Russian universities) were used for spacemen registration (RBC Daily (2008)).

[7] In 2003 to 2004, Russia had a diminishing marginal social tax scale that began at 35.6% for small wages and decreased to 2% for wages of more 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

[8] I provide the detailed calculations of total tax savings for every case in the Internet Appendix.

[9]As described in Section I, the fixed costs to set up a spaceman begin at $350, and the marginal costs begin at 0.5% of turnover. Because a spaceman only exists for 1 to 2 years, it is not profitable to operate spacemen with an average turnover of less than $3,300 per month.

[10] This potentially leads to an overestimation of a firm's tax burden. For example, if a local tax office sublets a part of its building to a cafe, then each rental payment made by the cafe will be treated as a tax payment.

[11] In 2003 to 2004, the official minimum wage in Russia was 600 rubles ($20).

[12] Note that an average income is calculated only for persons with positive income. Because twice as many "regular" CEOs have positive income in 2002 than spaceman CEOs, the true difference in income between regular CEOs and spaceman CEOs is about 8 times.

[13]Specifically, I include the firms for which $|log(\textit{total revenue})-log(\textit{total cash inflow})|<1$, where *total revenue* is the company's total revenue for 2003 and 2004 taken from Rosstat, and *total cash inflow* is the

company's cash receipts for 2003 and 2004, which were obtained from the banking data. The empirical results are robust to different cut-off points (0.25, 0.5, and 0.75)

[14] Under tax evasion, reported earnings equate to actual earnings minus hidden earnings (evaded from tax). Therefore, reported earnings would be mechanically negatively related with tax evasion measures.

[15] For example, the city and region of Moscow have a total of 95 local tax agencies. If we assume that relatives and friends of business owners (if any) are uniformly distributed among tax agencies independent of business location, there is only a 1/95 probability that a business owner with connections at a local tax agency will register its business at the address of its physical location.

[16] "The chief of Russia's Central Bank, Sergei Ignatiev, estimates the value of annual phoney banking transactions at 1.5 to 2 trillion rubles. As for the budget's losses, they range 500 to 800 billion rubles a year, Ignatiev told the State Duma [Russian parliament] on Tuesday," Itar-Tass (2007) reports.

[17] See Alm, Martinez-Vazquez, and Schneider (2004) for a detailed description of these methods. They also provide a comprehensive analysis of other approaches to measure the shadow economy.

[18] In October 2008, the banker Aleksei Frenkel was found guilty of organizing Kozlov's murder (Kommersant (2008)). According to the prosecution, Frenkel organized the murder after his bank, VIP-Bank, had its license withdrawn by Kozlov on June 16, 2006.

[19] Following this action, the Washington Post (2006) reports that in November 2005, William Browder, CEO of Hermitage, "was turned away at the Moscow airport… Since then, he's been unable to get a visa to return to Russia, even though his Hermitage Capital Management Ltd. has $4 billion invested in the country, making it the largest foreign institutional investor there." As Mr. Browder himself stated, he was declared a "threat to national security" (Financial Times (2009)).

[20] In 2008, Mr. Medvedev was elected President of Russia, and Mr. Putin assumed the role of prime minister.

Table I. Summary Statistics. Spacemen vs. Regular Firms

The table compares summary statistics of spacemen and regular firms. The firms' classification procedures are described in Section II.C. Panel A describes statistics from the banking transaction data. *Age* is defined as a difference in days between last and first observed transaction. *Tax paid* is total payments to the federal treasury, tax agencies, and social security funds. *SST* is the total payments to social security funds. *Gross tax rate* is defined as a ratio of taxes paid to the average turnover. Panel B presents statistics for randomly selected samples of 3,000 spacemen and 3,000 regular firms from Moscow. *Found in Rosstat* is a dummy equal 1 if a firm presents in Rosstat database. *Revenue* is firm's total reported revenue for 2003-2004 taken from Rosstat. *Revenue>0 [$10K]* is a dummy equal to 1 if firm's total revenue for 2003-2004 is greater than 0 [$10K]. *>100[500] firms registered at the same addr* is a dummy equal to 1 if more than 100[500] firms are registered at the same address according to Rosstat. *Found detailed data for firm's CEO[owners]* is a dummy equal to 1 if firm's CEO[owners] detailed identification data is present in the companies' registry data. *CEO [owner] has (had) a car* is a dummy equal to 1 if firm's CEO[owner] ever owned a car according to the car registry data. *CEO's [owner's] income* is taken from the personal income database. *Identification of CEO[owner] was lost or stolen* is a dummy equal to 1 if CEO's [owner's] identification data is present in the database of lost and stolen identifications. *CEO (owner) is poor* is defined in Section II.C.

Panel A: Banking transaction data

	All		Regular		Spacemen	
	Mean	Median	Mean	Median	Mean	Median
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Age, calendar days	506	557	588	709	391	376
Number of transactions per month	38	17	42	22	25	6
Cash inflow per month, $	283,371	28,604	121,735	18,588	472,813	40,455
Cash outflow per month, $	245,640	23,637	129,512	18,975	168,722	4,988
Tax paid per month, $	7,913.1	290.3	15,899.6	1,527.2	26.1	.0
SST paid per month, $	288.0	5.3	572.5	75.2	.3	.0
Gross tax rate	.0670	.0085	.1368	.0656	.0001	.0000
Number of firms	207,176		100,313		42,483	

Panel B: Rosstat, companies' registry, personal income, auto registry, lost and stolen IDs data

	Regular			Spacemen		
	Mean	Median	N of obs	Mean	Median	N of obs
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Found in Rosstat	.905		3,000	.566		3,000
Revenue for 2003-2004>0	.699		2,714	.347		1,697
Revenue for 2003-2004>$10K	.681		2,714	.170		1,697
Revenue for 2003-2004, $000's	3,596	391	1,897	2,433	9	589
Cash inflow in 2003-2004, $000's	2,866	451	1,897	13,631	2,630	589
Corr[log(Revenue), log(Cash inflow)]	.680		1,897	.168		589
>100 firms registered at the same addr	.386		2,714	.699		1,697
>500 firms registered at the same addr	.143		2,714	.284		1,697
Found detailed data for firm's CEO	.396		3,000	.334		3,000
Identification of CEO was lost or stolen	.098		1,188	.189		1,002
CEO has (had) a car	.481		1,188	.178		1,002
CEO's income in 2002 >0	.562		1,188	.323		1,002
CEO's income in 2002 >$1 per day	.394		1,188	.122		1,002
CEO's income in 2002, $000's	3.89	.86	668	1.01	.22	324
CEO is poor	.369		1,188	.738		1,002
Found detailed data for firms' owners	.387		3,000	.395		3,000
Identification of owner was lost or stolen	.087		1,160	.131		1,184
Owner has (had) a car	.486		1,160	.165		1,184
Owner's income in 2002 >0	.487		1,160	.268		1,184
Owner's income in 2002 >$1 per day	.361		1,160	.110		1,184
Owner's income in 2002, $000's	5.90	1.01	565	.97	.24	317
Owner is poor	.417		1,160	.770		1,184

Table II. Summary Statistics for Sample of Companies

The table presents summary statistics for the sample of 45,429 privately held companies. All statistics are averaged for 2003-2004. *Assets, Revenue, Employment, EBT* (earnings before taxes), *Net Income*, and *Debt* are taken from Rosstat. *Profit tax* is calculated as *EBT* minus *Net Income* for the firms with positive *EBT*. Value added tax (*VAT*) and social security tax (*SST*) are calculated as the total of relative payments using the banking data. *Moscow City* and *Moscow Region* are dummy variables equal to 1 for firms from Moscow city and Moscow region respectively. *N of transactions* is the total number of banking transactions presented in the banking data. CEO and ownership data are taken from companies' registry data. *N of shareholders* is the number of companie's owners. *CEO not owner* is a dummy variable equal 1 if CEO is not one of the company's owners. Δ*Revenue*, Δ*Assets*, Δ*Revenue/Assets*, and Δ*Revenue/Employee* are defined as $\Delta Varriable_t = [\log(Variable_{t+3}) - \log(Variable_t)]/3$ for respective variables. Corrections for survival bias are described in Section II.D

Variable	Mean (1)	Median (2)	St. dev. (3)	N of obs (4)	N of firms (5)
Assets, $000's	864	71	7,636	78,744	45,429
Revenue, $000's	1,425	255	10,648	78,744	45,429
Net Income, $000's	47.9	2.1	1,556.4	78,031	45,230
Employment	78	47	419	44,373	31,594
Revenue/Assets	10.9	4.0	21.8	78,744	45,429
Debt / Assets	.132	.000	.263	78,744	45,429
EBT / Revenue	.021	.012	.117	77,178	45,046
Net Income / Revenue	.011	.009	.105	77,010	45,020
Profit Tax / Revenue	.014	.006	.022	54,639	35,915
VAT / Revenue	.027	.014	.035	62,580	38,664
SST / Revenue	.015	.006	.023	73,813	43,324
SST per employee, $000's	.128	.057	.199	41,950	30,088
N of transactions	1,075	590	1,711	78,655	45,417
N of shareholders	2.1	1.0	2.2	70,040	40,319
CEO not owner	.429			70,040	40,319
Moscow city	.823			78,744	45,429
Moscow region	.137			78,744	45,429
ΔRevenue	.191	.195	.462	46,833	27,710
ΔAssets	.266	.229	.464	49,567	29,075
ΔRevenue/Assets	-.103	-.072	.413	46,730	27,647
ΔRevenue/Employee	.189	.196	.330	24,531	17,837
ΔRevenue (corrected for survival)	-.112	.108	.748	57,960	34,592
ΔAssets (corrected for survival)	.048	.140	.647	59,424	35,197
ΔRevenue/Assets (corrected for survival)	-.370	-.162	.660	57,857	34,549
ΔRevenue/Employee (corrected for survival)	-.031	.133	.541	30,353	22,347

Table III. Summary Statistics of Income Diversion Measures

The table presents income diversion measures. ShadowP, ShadowA, and ShadowR are defined in section III. Firms are sorted by quartiles according to book assets.

Variable	Mean (1)	Median (2)	St. dev. (3)	N of obs (4)	N of firms (5)
All companies (mean assets=$864K)					
ShadowP	.071	.007	.137	78,535	45,406
ShadowA	.323	.014	.668	76,928	44,809
ShadowR	.058	.006	.101	78,103	45,316
Bottom quartile (mean assets=$47K)					
ShadowP	.085	.002	.163	18,316	11,367
ShadowA	.536	.000	.898	16,962	10,863
ShadowR	.068	.001	.115	18,209	11,330
Second quartile (mean assets=$59K)					
ShadowP	.072	.005	.137	19,699	11,349
ShadowA	.384	.021	.715	19,505	11,301
ShadowR	.060	.004	.103	19,629	11,327
Third quartile (mean assets=$170K)					
ShadowP	.069	.009	.131	20,027	11,356
ShadowA	.267	.021	.564	19,970	11,339
ShadowR	.057	.007	.097	19,921	11,326
Top quartile (mean assets=$3,048K)					
ShadowP	.059	.011	.116	20,493	11,357
ShadowA	.143	.013	.370	20,491	11,355
ShadowR	.050	.008	.089	20,344	11,335
Top percentile (mean assets=$40,078K)					
ShadowP, %	.037	.006	.092	845	454
ShadowA, %	.035	.003	.142	846	454
ShadowR, %	.036	.005	.075	840	454

Table IV. Income Diversion and Firm Performance

The table presents the relation of income diversion to firm performance. $\Delta Revenue$, $\Delta Assets$, $\Delta Revenue/Assets$, and $\Delta Revenue/Employee$ are defined as $\Delta Variable_t = [\log(Variable_{t+3}) - \log(Variable_t)]/3$ for respective variables and corrected for survival bias (see section II.D for details). *ShadowR* is the measure of income diversion defined in section III *Assets, Revenue*, and *Debt* are taken from Rosstat. *Actual EBT* is firm's earnings before tax taken from Rosstat and corrected for income diversion (see Data Appendix for description of the correction procedure). *Industry* and *Year* are industry and year dummies. Panel A presents OLS estimations. Panel B presents IV estimations. Instrumental variables are dummies that correspond to a firm's local tax agency. *Tax agency* is a dummy for a firm's assigned local tax agency. Column (1) reports the first-stage results of IV estimation and columns (2)-(5) report second-stage results.The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels

Panel A: OLS estimation

Dependent var:	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)
ShadowR	-.139***	-.063**	-.187***	-.069**
	(.033)	(.030)	(.028)	(.033)
Actual EBT/Revenue	1.24***	1.03***	1.04***	.92***
	(.03)	(.02)	(.03)	(.03)
Log(Assets)	.007***	-.035***	.059***	.022***
	(.002)	(.002)	(.001)	(.002)
Debt/Assets	-.132***	-.111***	-.132***	-.081***
	(.015)	(.013)	(.013)	(.015)
Industry, Year	Y	Y	Y	Y
R-sq	.075	.075	.114	.097
Number of obs	56,300	57,727	56,205	29,677
Number of firms	34,118	34,734	34,077	21,949

Panel B: IV estimation

	First stage	Second stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-2.624***	-1.617***	-2.228***	-1.470***
		(.577)	(.470)	(.493)	(.491)
Actual EBT/Revenue	.075***	1.509***	1.175***	1.287***	1.024***
	(.006)	(.060)	(.048)	(.052)	(.049)
Log(Assets)	-.003***	-.001	-.037***	.049***	.019***
	(.000)	(.003)	(.003)	(.003)	(.003)
Debt/Assets	.001	-.134***	-.102***	-.147***	-.090***
	(.002)	(.022)	(.018)	(.020)	(.022)
Industry, Year	Y	Y	Y	Y	Y
Tax agency	Y				
R-sq	.042				
Number of obs	28,711	28,711	29,481	28,663	15,318
Number of firms	17,065	17,065	17,376	17,044	11,224

Table V. Firm Performance, Income Diversion, and CEO Ownership. IV estimations

The table describes the effect of income diversion and CEO ownership on firm performance. Instrumental variables are dummies that correspond to a firm's local tax agency. *Tax agency* is a dummy for a firm's assigned local tax agency. *CEO_not_owner* is a dummy which equates to 1 if a company's CEO is not one of company's owners. All other variables are defined in Table IV. Panel A presents estimations for the subsample of firms which have the same legal and physical address. Panel B presents estimations for the subsample of solely-owned firms which have the same legal and physical address. Column (1) reports the first-stage results of IV estimation and columns (2)-(5) report second-stage results. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Panel A: All firms

	First stage	Second stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-2.393***	-1.188**	-2.647***	-.912
		(.685)	(.597)	(.591)	(.585)
ShadowR*CEO_not_owner		-2.036***	-1.689***	-1.275**	-.760
		(.584)	(.475)	(.514)	(.573)
CEO_not_owner	-.005***	.062*	.076***	.001	.009
	(.001)	(.035)	(.028)	(.032)	(.034)
Actual EBT/Rev, log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.038				
Number of obs	25,054	25,054	25,743	25,011	13,476
Number of firms	14,856	14,856	15,128	14,837	9,872
P-value (β_1+β_2)=0		.000	.000	.000	.009

Panel B: Solely owned firms

	First stage	Second stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-.986	-.409	-1.610**	-.658
		(.830)	(.734)	(.705)	(.706)
ShadowR*CEO_not_owner		-2.890***	-2.468***	-2.101***	-1.363*
		(.808)	(.675)	(.703)	(.749)
CEO_not_owner	-.008***	.134***	.142***	.070	.055
	(.002)	(.051)	(.042)	(.045)	(.047)
Actual EBT/Rev, log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.043				
Number of obs	11,744	11,744	12,068	11,726	6,186
Number of firms	7,128	7,128	7,264	7,116	4,587
P-value (β_1+β_2)=0		.000	.000	.000	.003

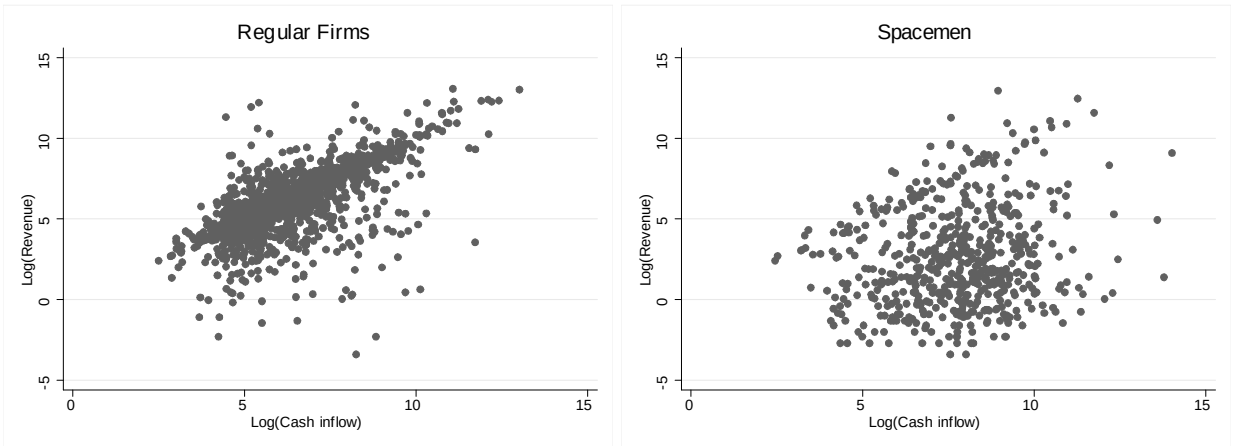
Table VI. Tax Enforcement and Firm Performance

The table describes the relation of tax enforcement to firm performance for the firms which have the same legal and physical address. *Inverse tax enforcement* is defined in Section III. All other variables are defined in Table IV. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Dependent var:	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)
Inverse tax enforcement	-.0018***	-.0012***	-.0020***	-.0013***
	(.0004)	(.0003)	(.0003)	(.0004)
Actual EBT/Revenue	1.262***	.982***	1.086***	.909***
	(.043)	(.033)	(.039)	(.042)
Log(Assets)	.009***	-.032***	.057***	.025***
	(.003)	(.003)	(.002)	(.003)
Debt/Assets	-.173***	-.135***	-.178***	-.110***
	(.025)	(.021)	(.022)	(.024)
Industry, Year	Y	Y	Y	Y
R-sq	.094	.081	.127	.114
Number of obs	21,218	21,807	21,183	11,621
Number of firms	12,543	12,777	12,529	8,479

Figure I. Reported Revenue and Cash Inflow. Spacemen vs. Regular Firms

The figure plots selected statistics for randomly selected samples of 3,000 spacemen and 3,000 regular firms from Moscow. *Revenue* is firm's total reported revenue for 2003-2004 taken from Rosstat. *Cash Inflow* is firm's total cash inflow for 2003-2004 taken from the banking transaction data. The statistics are plotted only for the firms with positive *Revenue* (1897 regular firms and 589 spacemen).



Internet Appendix to "Taxes, Theft, and Firm Performance"*

I. Evidence on Spacemen from the Business Executives

Using my personal network, I distributed the following questionnaire among 10 business executives. 6 people agreed to answer the questions on the anonymous basis. I report the questionnaire and the answers below.

This is an anonymous questionnaire, which contains series of personal questions or ones pertaining to the nature of your business. Its primary purpose is to establish a knowledge base on usage of short-lived firms ("spacemen") from representatives of the business sector such as yourself.

A. Questions regarding the 1999 to 2004 period

1. Based on your knowledge and prior experience, which of the following offer "spaceman" firm services in most instances:

(A) Banks

(B) Specialized law firms

(C) Companies that register "spaceman" firms for their own needs

(D) Other (please clarify)

Responses:

Person 1: (A)

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Person 2: (B)

Person 3: (C)

Person 4: As far as I know, companies register them for their own needs and get the necessary documents on the side. For cashing, banks register everything themselves.

Person 5: (B)

Person 6: (B)

2. Based on your knowledge and prior experience, "spaceman" firms are usually registered for:

(A) Individuals who have lost their passports

(B) Individuals who are willing to provide their identifications and become the nominal founders of such firms in return for an adequate compensation (For example there are certain stipulations that many "spaceman" firms are registered under homeless people).

(C) Other (please clarify)

Responses:

Person 1: (A)

Person 2: (B)

Person 3: (A), (B)

Person 4: (A), (B)

Person 5: (A), (B) These are problems that the "Specialized Law Firms" deal with. The actual companies lack both the ability and the assets to run this kind of "service" - at least small and middle-sized companies.

Person 6: (A), (B)

3. What is the approximate price of the "spaceman" firm services?

Responses:

Person 1: N/A

Person 2: 20 to 30 thousand RUB.

Person 3: 2 to 3% of the turnover

Person 4: Free for friends or partners. For others, 1 to 2%. As much as 5% for cashing.

Person 5: It's roughly equal to the price of registering any legal firm. Everything is "legal" and it's profitable for law firms to attract a bigger clientele. The registered firm becomes a "spaceman" firm only when it gets used for "shady" purposes.

Person 6: 1 to 2% If the firm is being registered for personal needs, it costs about as much as registering any other legal firm.

4. If using "spaceman" firms can indeed significantly cut down a company's taxable income, how then the company calculates the amount of taxes that need to be paid? In theory, one can always report a null or a negative profit, avoid paying both the VAT (Value Added Tax) and the Corporate Tax and simply pay SST and the Income Tax from minimal salaries. However, even when using "spaceman" firms, the companies still paid some taxes. How was the tax then calculated?

(A) By coming to an informal consensus with the local tax agency.

(B) By coming to an informal consensus with some other branch of government (Please clarify as to which one).

(C) By assessing the total profitability of the business (clarify what level of profitability would have been considered prudent).

(D) In such a way as to always show a non-negative profit of any magnitude.

(E) Other (please clarify)

Responses:

Person 1: (D)

Person 2: Between 2000 and 2004 the taxes weren't really paid. However, in 2006 to 2007 it was a shift towards market criteria - for example in programming, it was customary to pay 50% of the salary legally. Once that criterion was fulfilled, you happily paid taxes to have net profit margin of around 20 to 25%.

Person 3: (C). You usually pay legally the minimum level of salaries, which is recommended by authorities in your part of the country and report the smallest, non-negative profit.

Person 4: (D)

Person 5: The tax agency uses a number of methodologies to assess the total profit of a company. It is impossible to conceal the true number of workers (since most of them need to receive both social and health benefits from the government). Usually the tax agencies start to piece together the actual magnitude of tax evasion from these figures.

Person 6: (C)

5. When businessmen choose the address for their companies, they usually:

(A) Register the company at its actual address.

(B) Choose an address that best suits their personal connections at the tax agency.

(C) Other (please clarify)

Responses:

Person 1: (B)

Person 2: (B)

Person 3: (A), (B) It all depends on whether you have connections in the tax agency. If you do, then sure. If not, you can always find connections at a different tax agency.

Person 4: It depends on the size and the primary goal of the business. For serious business the answer is (A).

Person 5: From 1999 to 2004 there was no law stating that the physical address of a firm should match the one on official papers. It could always be argued that the lease agreement on company space was interrupted and the address had to be changed. That is why (A) was almost never the case. (B) was almost always though. There was also a trend of "not putting your eggs in the same basket"…

Person 6: If you have connections, (B). If not, (A).

6. What punishment (formal or informal) can the authorities impose on a company if its physical address is found to be different from the officially registered one?

Responses:

Person 1: N/A

Person 2: As far as I know, informal.

Person 3: A written request to change the address. However that rarely happens in reality.

Person 4: Haven't heard of such problems.

Person 5: No punishment was imposed.

Person 6: Practically none.

B. Questions regarding the current period (2007 to 2010)

7. Do businessmen still use "spaceman" firms today?

Responses:

Person 1: Yes

Person 2: Yes

Person 3: A lot more seldom in Moscow. Other parts of the country are still a mess.

Person 4: A lot less nowadays, however everything depends on the size of the company (risk at hand) and part of the country.

Person 5: N/A

Person 6: Yes, but less often.

8. What is the cost of their services?

Responses:

Person 1: Approximately 4 to 10%

Person 2: 30 to 50 thousand RUB.

Person 3: Around 5%

Person 4: 5 to 7%

Person 5: N/A

Person 6: 6 to 8%

9. Have the working conditions changed much since the beginning of 2000s?

Responses:

Person 1: Yes

Person 2: More taxes are paid in full.

Person 3: It became harder to use these schemes, but at the same time corruption increased and something has to feed it. So every time someone does pull a scheme, the taxing branch milks it for bribes instead of enforcing the law on it.

Person 4: Most definitely, if you pull something like this in Moscow, you'll lose more than you'll gain.

Person 5: N/A

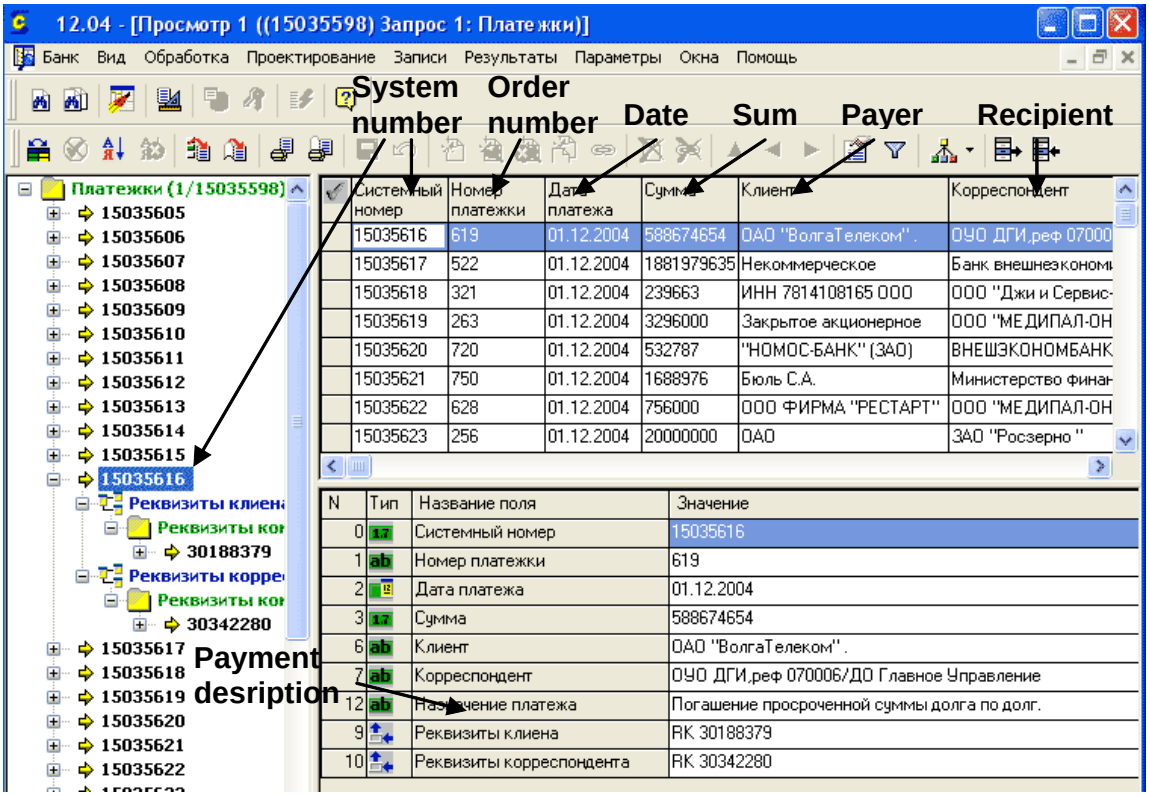
Person 6: Yes, the taxing authority became more attentive

II. Banking Transaction Data (Extended Version)

The main dataset used in this paper is the banking transaction data for 2003 and 2004. It was leaked to public from the Moscow branch of Russian central bank in 2005 (Vedomosti (2005)). These data can be purchased from several Web sites, including www.mos-inform.com, www.specsoft.info, www.wmbase.com, and www.rusbd.com. I bought these data from www.vivedata.com for $500. This dataset includes transactions that took place within Russia only. It does not include operations in foreign currencies, nor does it include cash deposits and cash withdrawals.

The transactions range from very large to tiny. For example, the data show that on January 26, 2004, Gaztaged, a 100% subsidiary of Gazprom, paid 538 million rubles ($18 million) to Trubny Torgovy Dom for pipes. In contrast, Rosneft, the largest oil company in Russia, paid its rental fee for a water cooler of 637 rubles ($21) on July 9, 2003, to Selivanovskaya Voda.

Exhibit A1. Screenshot of the Banking Transaction Data



After deletion of duplicate transactions, the banking dataset includes 102,238,090 transactions for 2003 and 134,479,418 for 2004. Key identification of an agent is INN (unique taxpayer number). Because data had many typos, I combined similar INNs within one bank account under the most often used INN. Government agencies within one bank account were treated as one organization. The dataset contains transactions of 1,682,197 unique entities. Organizations and individuals that share one bank account are excluded from analysis because of the lack information for private accounts; only bank accounts are available (in Russia, individuals commonly have private accounts within one bank account). Incorrect INNs (not 9 or 10 digits) are also excluded from the dataset. After performing these iterations, the dataset contains transactions of 885,489 entities with separate bank accounts and correct INNs. I define the following dummies for each entity:

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

- oao: 1 for open joint-stock companies (acronym “OAO” in Russian)
- ooozao: 1 for limited partnerships and closed joint-stock companies (acronyms “OOO” and “ZAO” in Russian)
- pboul: 1 for individual entrepreneurs (acronym “PBOUL” in Russian)
- mgup: 1 for any 100% state-affiliated entity (acronym “GUP” and “MUP” in Russian)
- 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 profits, charities, and educational organizations

Any transfers to agencies that might collect taxes (gov=1) were treated as tax payments. Any transactions to these agencies with description containing SST (social security tax) were treated as social tax payments. All program code for transformation procedures and variable creation can be found at http://www.mironov.FM.

Because the Russian Central Bank never confirmed the authenticity of the data, I examine whether the banking database contains transactions of real companies and how complete it is. For this purpose, I use the Rosstat[1] database of Russian companies provided by Spark[2]. This database contains a firm's INN, name, region, date of registration, industry, directors, owners, and other identifying information about the firm. In addition, it contains basic accounting data, such as revenue, profit, net income, assets, and debt. According to the Russian law, all firms (even small ones) must report their balance sheets and income statements to Rosstat on a quarterly basis. Although this law does not set any explicit penalty for 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 the banking data used here are accurate, there should be a large degree of similarity between the Rosstat data and the banking data.

A. Test 1. Matching Rosstat to Banking Data

Using the Rosstat database, I select up to 3,000 companies with highest revenues from the 20 largest Russian regions[3]. Columns (1) and (2) of Table AI contain average revenue for 2003 for every region. An average company from Moscow has about 15 times higher revenue ($98.4M) than that of an average one from outside of Moscow ($6.3M). This is not surprising because the majority of large Russian corporations that operate in different regions have their headquarters in Moscow (e.g., Gazprom, United Energy System, Lukoil[4], Rosneft, Russian Railways, Aeroflot[5]). According to expert estimates supported by Rosstat data, about 80 to 90% of all Russian business activities are concentrated in Moscow.

I match this sample of companies to the banking database by INN. Columns (3) to (5) of Table AI show the results: 71% of the firms from Rostat are also present in the banking database. The match rate for Moscow city and Moscow region (94 to 97%) is much higher than the match rate for other regions (49 to 84%, average 69%)[6]. The results of this test are consistent with the hypothesis that the database leaked from the Moscow branch of the Russian Central Bank because the probability that a Moscow firm uses a Moscow bank is much higher than that of a regional firm using a Moscow bank. Also, an average firm from column (4) has 30% greater revenue than an average one from column (2). The regional firms caused this difference in size. This result is also consistent with the hypothesis of leakage from Moscow because the probability that a large regional firm has an account in a Moscow bank is much higher than that of a small regional firm having one. See column (6) of Table AI for the results of the match weighted by revenue. Even for firms from outside Moscow, the match rate is 79% to 97% with an average of 90%. Columns (7) to (10) show firms that

have at least 100 banking transactions present in the banking data set. As expected, these companies are much larger; the average revenue of a firm from column (8) is $23.2M whereas the average revenue of a firm from column (4) is $13.9M. Even though only 39% of the firms from the original sample have at least 100 transactions in the banking database, they account for about 85% of the total revenues.

[Insert Table AI here]

Summarizing the results of this test leads to the conclusion that the banking dataset is significantly biased toward Moscow. Of the 3000 largest firms from Moscow city and Moscow region, 94% to 97% are present in the banking database (90% to 95% have at least 100 transactions). The match rate for firms outside of Moscow is much lower; on average, 69% of regional firms are present in this study's banking data set (account for 90% of the total revenues) and only 34% of them have more than 100 transactions (account for 76% of the total revenue). Because about 80% to 90% of financial and business activities are concentrated in Moscow, this data set covers 75% to 80% of the banking transactions of all Russian firms.

B. Test 2. Matching Banking Data to Rosstat

I select a random sample of 1,000 firms from the banking dataset. To avoid inclusion of spacemen, I select only those firms that have a ratio of tax paid to total turnover of more than 1%[7]. As discussed in Section I of the paper, spacemen are less likely to provide their financial statements to authorities and therefore are less likely to be present in the Rosstat database. A comparison of these 1,000 firms with the Rosstat database by INN matched 676 of the 1,000 firms. Why are 32% of the firms not found in the Rosstat database? One possible explanation is the presence of typos in the INNs in the banking database. Although I performed several attempts to clean this dataset, it is possible that not everything was cleaned. Another possible

explanation is that due to the lack of punishment for nonreporting, some firms chose not to send their reports to Rosstat

C. Test 3. Analysis of the Matched Firms

I choose a random sample of 500 firms that are present in both Rosstat and the banking dataset. Using similar logic as in Test 2, I select only the firms that have a ratio of tax paid to total turnover of more than 1%. Then I choose all banking transactions for these 500 firms the banking dataset. In total, I get a sample of about 300,000 transactions. I manually classify each firm's transactions that correspond to revenue receipts and profit tax payments according to the description of each transaction. Next, 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, it is accounted for in 2003) because it is often impossible to determine the time of performing the service from the transaction description. For profit tax payments (*Profit_tax_B*), I use the transaction description to identify the period because all tax payments must include the corresponding tax period in the transaction description. I define *Profit_B* as *Profit_tax_B/Tax_rate*. Because a portion of profit tax for 2004 should be paid at the beginning of 2005 and the banking dataset does not have 2005 transactions, *Profit_B* for 2004 is underestimated. I obtain Reported revenue (*Revenue*) and profit before taxes (*Profit*) for each firm from the Rosstat database. I define *Margin_B* as *Profit_B/Revenue_B* and *Margin* as *Profit/Revenue*. See Table AII for summary statistics and correlations.

[Insert Table AII here]

The table data indicate 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. Furthermore, 26% to 28% of the firms have banking revenues within [-10%, +11%][8] of the reported revenues, and 64% to 71% have their banking and reported revenue within the [-39%, +65%][9] range. These facts suggest that the banking data set 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 A1, which plots *Log(Revenue)* against *Log(Revenue_B)* and *Log(Profit)* against *Log(Profit_B)* provides additional evidence of similarity between Rosstat and banking transaction data.

[Insert Figure A1 here]

Summarizing the results of these tests, I draw three main conclusions. First, the banking data are real but incomplete. The sample contains data for about 75% to 80% of all Russian firms. Second, the sample is biased toward the Moscow city and Moscow region, which comes from the fact that the data were leaked from the Moscow branch of the Russian Central Bank. Third, the data contain some errors due to misprints or other unknown reasons.

III. Additional Data Sources

In addition to the banking dataset, I use several other data sources for verification of spacemen selection procedures.

The first dataset includes personal income of Moscow residents. It contains more than 7 million records for 2002, and more than 9 million records for 2003 and 2004. Each entry contains unique identification data (name, address, identification number) for both employer and employee. There can be multiple records per person if a person receives income from several sources. Guriev and Rachinsky (2006) use these data to measure income inequality in the presence of super-rich individuals.

The second dataset is the Moscow city auto registration database for 2005 (contains also retrospective data). Each entry contains information about the vehicle (make, model, and year), its owner (person name or company name, address, identification number), and record date. It contains more than 11 million records. There can be multiple records per person (company) if a person (company) owns (owned) several cars. Braguinsky, Mityakov, and Liscovich (2010) use these data combined with personal income data to estimate hidden earnings.

The third dataset is companies' registry data for 2005 (contains also retrospective data). Each entry contains information about company's shareholders (person name or company name), CEO (person name), and record date. The dataset contains registry information for 538,188 companies. There is unique identification data (name, address, identification number) of CEO and shareholders for 262,809 companies.

The fourth datasets is a police database of lost and stolen identifications for 2007 (includes also retrospective data). Each entry contains person name, reporting date, and identification number that was lost or stolen. The data contains 5.1 million stolen identifications and 672 thousand lost identifications.

These four datasets leaked to public domain from different government agencies and were obtained through www.rusbd.com.

IV. Identification of Spacemen (Extended Version)

In this paper, I measure income diversion based on companies' transfers to spacemen. Empirically, I identify spacemen as firms that pay no or only negligible taxes relative to their turnover. The quality of the banking data does not allow identification of all tax payments because description of some payments are missing; therefore any transfer to the federal treasury, a tax agency, or a social security fund is treated as a tax payment. This potentially

leads to overestimation of a firm's tax burden[10]. A firm is defined as a spaceman if it satisfies all of the following criteria: (a) the ratio of taxes paid to the difference in cash inflows and outflows (net tax rate) is less than 0.1%; (b) SST paid is less than 216 rubles ($7.2) per month, which approximately corresponds to one minimum wage[11]; and (c) the firm's cash inflows are higher than outflows. According to the Russian tax system, even a firm with a loss must pay VAT, SST, 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

$$gross\ tax\ rate = \frac{tax\ paid}{(cash\ inflow + cash\ outflow)/2} \tag{A1}$$

Because the price for spaceman services in 2003 to 2004 started as low as 1%, the nature of their business prevents such firms from paying taxes higher than 1% of average turnover. Therefore, a firm is classified as regular if it has a gross tax rate of more than 1%, and firms with tax rates between 0.1% and 1% represent a mix of spacemen and regular firms and therefore are not attributed to either class.

See Table AIII for summary statistics. Column (1) describes the base sample of the analysis. An average firm performs 38 transactions per month, has receipts of $283,371, spends $245,640, and has an average tax payment of $7,913 including $288 in SST, which corresponds to approximately a $950[12] average wage bill per firm[13]. Column (2) includes only the firms that received fewer funds than they paid out, and column (3) comprises the firms with more fund inflows than outflows. The percent of spacemen in column (3) is much higher than in column (2) because regular firms can have banking fund outflows higher than inflows, but spacemen cannot. For example, according to the banking data, in 2003 to 2004, The Seventh Continent (INN 770500562), a large Moscow retailer, had 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 the form of cash receipts from private individuals, transactions that are not present in the banking data set. 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 outflow transactions are not present in the banking data. However, spacemen might be present in column (2) because the banking dataset is incomplete; for example, if a spaceman receives revenues from a client from the same bank, transactions for this spaceman are not in the data and therefore cannot be identified. 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% versus 8.1%) than that for the firms in column (2), and in absolute terms, column (3) firms pay taxes almost half ($5,916 versus $11,217) that of column (2) firms.

[Insert Table AIII here]

Column (4) of Table AIII contains only regular firms, column (5) comprises regular firms that have fund inflows more than outflows, and column (6) includes only spacemen. These subsample statistics indicate that a spaceman has more than 2.5 times higher monthly turnover than a regular firm ($641,535 versus $251,247) but performs 40% fewer transactions (25 versus 42), so an average spaceman transaction is 4.3 times higher than an average regular firm transaction. Furthermore, a spaceman exists almost 200 fewer days than a regular firm (391 days versus 588 days) when firm age is defined as the date of the last transaction minus the date of the first transaction in the sample. These simple statistics exclude several alternative explanations of spacemen, one of which is that these firms have

better ability to avoid taxes than do regular firms, and, thus, the firms considered spacemen in this study are actually winners, and regular firms are losers. However, in that case, winners should operate longer than losers on average, but the estimates here show that spacemen have a much shorter life than regular firms. Another possible explanation is that the most spacemen are recently started firms that go bankrupt within a short period of time and therefore pay zero taxes. However, by design, spacemen have fund inflows higher than outflows. Moreover, as the data indicate, spacemen on average have almost four times higher receipts than regular firms ($472,813 versus $121,735), so they are much larger than regular firms. Therefore, we can exclude the hypothesis of recently started bankrupts.

Figure A2 provides further evidence on spacemen nature. The probability that a spaceman goes out of business within 1 year is three to six times higher than that for a regular firm. A comparison of recently created firms with existing ones (presented in the sample before January 20, 2003) indicates that the probability that a recently started regular firm goes out of business within 1 year is about twice as high 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 start-ups; therefore, they have a longer expected life. However, an existing spaceman has a 20% higher chance of closing within 1 year than a start-up spaceman does. This means that a spaceman's longevity does not depend on its performance; therefore, an existing one should cease to exist more quickly just because it is older than a new one.

[Insert Figure A2 here]

See Figure A3 for the density of the age distribution for regular firms and spacemen. The age of spacemen clearly is almost uniformly distributed from about 3 months to 2 years. Because this sample period is only 2 years, this graph underestimates the age of firms;

nevertheless, it illustrates that there is a key difference in the longevity of regular firms and spacemen.

[Insert Figure A3 here]

Table AIV 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 (column [2]) exist about 1 month longer (408 days versus 392 days) and have more than four times higher monthly receipts than spacemen-nontaxpayers ($946,461 versus $231,724). Firms in column (3) with a net tax rate of 0.1% to 1% have characteristics somewhere between spacemen and regular firms; see columns (5) and (6) of Table AIII.

[Insert Table AIV here]

Figure A4 depicts the density of the age distribution of firms with net tax rate less than 0.1% (columns [1] and [2] of Table AIV) and firms with net tax rate from 0.1% to 1% (column [3] of Table AIV). The age density of firms in column (3) spikes around 2 years, similar to the age density of regular firms, although this spike is much smaller. This leads to the conclusion that these firms represent a mix of spacemen and regular firms and hence were excluded from the analysis. Columns (4) and (5) of Table AIV are composed of spacemen based on the gross tax rate. The main results are robust to the preceding selection criteria.

[Insert figure A4 here]

V. Verification of the Income Diversion Measures

When explaining spacemen activities to tax inspectors, firms usually argue that they did not know that some of their suppliers happened to be spacemen. They work with spacemen and transfer money to them along with legitimate suppliers, and it is not the firm's fault that some of its suppliers do not pay taxes. Therefore, the most intuitive way to test whether I

indeed measure income diversion is to relate a firm's tax payments to the income diversion measures developed in this paper. For this purpose, I estimate the following regressions:

$$Tax\ ratio=\alpha+\beta Shadow+\gamma controls+\varepsilon \quad \text{(A2)}$$

where *Tax ratio* is either $\frac{Profit\ tax}{Revenue}$, or $\frac{VAT}{Revenue}$, or $\frac{SST}{Revenue}$, or $\frac{SST}{Employee}$. *Shadow* is either *ShadowP*, or *ShadowA*, or *ShadowR*. See Table AV for the estimation results. According to the table data, all of the income diversion measures are negatively related to tax payments, and this relation is highly statistically significant (*t*-stats vary from -9.9 to -40.3). Economic significance is also substantial. According to columns (1) to (9), 1 standard deviation of *ShadowP (ShadowA, ShadowR)* corresponds to a 12% (15%, 12%) decrease in profit tax, a 14% (16%, 13%) decrease in VAT, and a 15% (19%, 13%) decrease in SST. Firms that use more spacemen pay less SST per employee. Columns (10) to (12) show that 1 standard deviation of *ShadowP (ShadowA, ShadowR)* corresponds to 10% (6%, 10%) decrease in SST paid per employee.

[Insert Table AV here]

Next I compare the theoretical prediction for β with the empirical findings. As I discuss in Section I.A, there are three main usages of spacemen money.

A. First usage: Profit hiding

Consider the case a company transfers $100 to a spaceman for fake services and this money are returned to company's owner. The spaceman provides invoice for $84.75 (Services) + $15.25 (VAT, 18%), totaling $100. The company then can decrease its total VAT payment by $15.25 (VAT already "paid" by spaceman). Next, the company is allowed to decrease its taxable income by $84.75 (cost of "services" provided by spaceman) which yields to profit tax savings equal to $20.34 (=$84.75*24%[profit tax rate]). Therefore, in case of paying all taxes, the company could return to its owner only $64.41, not $100. Finally, if

the company had paid $64.41 as dividends then the owner would have to pay dividend tax $5.80 (=$64.41*9%[dividend tax rate]). Thus, if a firm uses spacemen to hide actual profits, then the total tax evasion would be $41.39 (=$15.25+20.34+5.80), or 41.39% of the money transferred to spacemen.

B. Second usage: Paying under-the-table salary

Consider the case a company transfers $100 to a spacemen and pays this money as under-the-table salary. The spaceman provides the same invoice as one in the previous case. The net salary payment of $100 would correspond to a gross payment of $114.94 if paid in a legitimate way (the personal income tax rate in Russia is 13%, so $100/[1-0.13]= $114.94). Therefore, the evasion of individual income tax is $14.94. Next, the company evades social security tax which is 30.4%[14] of the gross salary payment, or $34.94 (=$114.94*.304). In addition, the company can decrease its total VAT payment by $15.25 (VAT already "paid" by spaceman). However, if all payroll taxes were paid, the taxable profit of the firm would be lower. The gross payroll costs which corresponds to $100 net payment would be $149.88 (=$114.94+$34.94). Whereas, the spaceman provides invoice only for $84.75 (costs of "services" provided by spacemen). Therefore, the company would decrease its profit tax payment by $15.63 (=[$149.88-$84.75]*0.24). Thus, if a firm uses spacemen to pay under-the-table salary, then the total tax evasion in this case would be $49.51 (=$14.94+$34.94+$15.25-$15.63) or 49.51% of the money transferred to spacemen

C. Third usage: Paying other "black cash" expense

Consider the case a company transfers $100 to a spacemen and uses this money to pay some "black cash" expense[15]. The spaceman provides the same invoice as one in the first case. The company can decrease its total VAT payment by $15.25 (VAT already "paid" by spaceman). However, the company got an invoice from spacemen only for $84.75, not for

$100. Therefore, if the company would pay $100 costs in a legitimate way, it can decrease its profit tax payment by $3.66 (=[$100-$84.75]*0.24). Thus, the total tax evasion in this case is $11.59 (=$15.25-$3.66).

As I discuss in Section I.A, the money transferred to spacemen can also represent managerial diversion. From the tax prospective, the managerial diversion causes the evasion of the same taxes as profit hiding causes.

Exhibit A2 summarizes the effect of a $1 payment to spacemen on VAT, EBT, profit tax (applicable only for firms with positive reported profit), dividend tax, SST, and personal income tax depending on the money usage:

Exhibit A2. The Effect of $1 Payment to Spacemen on EBT and Different Taxes

Money usage	VAT	EBT	Profit Tax	Dividend Tax	Income Tax	SST
Profit hiding	-0.1525	-0.8475	-0.2034	-0.0580		
Under-the-table salary	-0.1525	0.6514	0.1563		-0.1494	-0.3494
Black cash expenses	-0.1525	0.1525	0.0366			

Making exact predictions regarding coefficients for the income diversion measures (β) for profit tax and SST is a challenging task because the distribution of spacemen money among these three items is unknown. However, VAT is evaded in all three cases. Therefore, $1 transferred to spacemen should correspond to 15.3¢ VAT savings. The data in column (6) of Table AV reveal that on average, $1 transferred to spacemen corresponds to 3.6¢ in VAT savings, which is 4.2 times less than the theoretical prediction. One of the possible explanations of such underestimation is the endogeneity problem. More efficient firms *ceteris paribas* would be expected to evade more taxes than their less efficient peers. There are several possible reasons for that. First, the higher the firm's actual earnings are, the higher are the potential benefits of tax evasion. Second, more profitable firms can divert more income

without risk of being detected than their less profitable peers can. Probability of tax agency typically depends on a firm's reported earnings: The higher are the reported earnings, the lower is probability of scrutiny by tax authorities. Therefore, firms with high actual earnings have more room for tax evasion without risk of being detected. Last, firms might pursue a strategy of smoothing their reported earnings: Evade more taxes in good times and less in bad times.

I test the described endogeneity hypothesis by analyzing how changes in firms' productivity are related to income diversion behavior. However, measuring firms' productivity in the presence of tax evasion is not a trivial task. Reported earnings cannot be used for this purpose because they are the difference between actual earnings and underreported earnings. If a firm for some reason increases the amount of underreporting, this decreases reported earnings by the same amount. Therefore, reported earnings and the income diversion measures are mechanically negatively correlated. Because reported earnings cannot be relied on, I use revenue growth as a direct measure of firms' performance. I also use assets growth and employment growth as indirect measures of performance. A firm experiencing a positive productivity shock can then be expected to hire more staff and acquire more assets in order to meet future growth opportunities. In contrast, a firm cutting its workforce and decreasing its assets indicates a negative productivity shock. To analyze the relation between change in firm's performance and tax evasion, I estimate the following regressions:

$$Shadow_t = \alpha + \beta\left[log(Measure_t) - log(Measure_{t-1})\right] + \gamma Shadow_{t-1} + \delta controls + \varepsilon_t \qquad \text{(A3)}$$

where *Measure* is either revenue, assets, or employment, *Shadow* is either *ShadowP*, or *ShadowA*, or *ShadowR*. Regressions of *ShadowA* on assets growth and *ShadowR* on revenue growth were not estimated because these pairs of variables are mechanically correlated by construction. See Table AVI for the results. As the table shows, coefficients in all

specifications except one –column (6)– are positive and statistically significant at the 1% to 5% level. These results lead to the conclusion that if a firm experiences a positive productivity shock, it increases its transfers to spacemen as a percentage of its total payments, revenue, or assets. In other words, the data supports the endogeneity hypothesis that more efficient firms evade more taxes than their less efficient peers.

[Insert Table AVI here]

Another possible check of income diversion measures is to compare profitable and unprofitable firms[16]. The key difference between them is that unprofitable firms do not need to use spacemen for profit hiding because they do not pay profit tax. Because of that, unprofitable firms might use spacemen only to pay under-the-table salary and black cash expenses. The impact on reported profit (EBT) is positive in both cases. Therefore, we should observe a positive relation between unprofitable firms' income diversion measures and reported profitability. Contrary to unprofitable firms, profitable ones do generate taxable profit and therefore have incentives to use spacemen to minimize reported profits. The net effect on reported profitability depends on the mix of spacemen money usage. For example, if a company uses 1/3 of spacemen money for hiding profit, 1/3 for salary payments, and 1/3 for black cash expenses, $1 transferred to spacemen should correspond to a 1.4¢ decrease in reported profitability. Generally speaking, if the use of spacemen for profit hiding is large enough, we should observe a negative relation between reported profitability and the income diversion measures. To test this prediction, I estimate regressions of reported profitability on the income diversion measures separately for profitable and unprofitable firms (see Table AVII, Panel A for the results). The data in columns (4) to (6) indicate that all of the income diversion measures are positively related to the reported profitability for unprofitable firms. All coefficients are significant at the 1% level. Economic significance is also large. As

column 6 indicates, $1 transferred to spacemen on average corresponds to a 7¢ increase in reported profitability. For profitable firms, the situation is the opposite. All tax evasion measures are negatively related to reported profitability with *t*-statistics ranging from -18.6 to -33.5; see columns (1) to (3). Economically, $1 transferred to spacemen corresponds on average to a 7¢ decrease in reported profitability; see column (3). All differences between coefficients for profitable and unprofitable firms are significant at the 1% level; see column (7).

[Insert Table AVII here]

The result for VAT is different. According to the theoretical prediction, $1 transferred to spacemen should generate a 15.3¢ VAT savings for all firm types. Therefore, we should observe a negative relation between VAT and the income diversion measures for both profitable and unprofitable firms. Moreover, this relation should be the same. Table AVII, Panel B reports the results of regressions of VAT on the income diversion measures. Coefficients for all of the income diversion measures are negative for both profitable and unprofitable firms. The differences in coefficients for *ShadowP*, *ShadowA*, and *ShadowR* between profitable and unprofitable firms are statistically insignificant from zero; see column (7). These empirical findings support the theoretical prediction that $1 transferred to spacemen generates the same VAT savings for both profitable and unprofitable firms.

In the case of SST, there is no exact theoretical prediction regarding whether coefficients for the income diversion measures should be higher, lower, or the same for profitable and unprofitable firms. This depends on the distribution of spacemen money among different usages; therefore, the result can be in either direction. However, the theory provides a clear prediction: If any profitable firms and any unprofitable firms use some of the spacemen money to pay under-the-table salary, a negative relation should be observed between SST and

the income diversion measures for both profitable and unprofitable firms. I examine this prediction by estimating the regressions of SST payments on the tax evasion measures separately for profitable and unprofitable firms (see Table AVII, Panel 7 for the results). According to the data in columns (1) to (6), all coefficients for the tax evasion measures are negative and statistically significant at the 1% level (*t*-statistics vary from -6.3 to -26.1), which is in line with the theoretical predictions.

Having obtained the above results, I can estimate what portion of spacemen money is used for different purposes. Let a firm spend *x* part of the spacemen money to pay under-the-table dividends (profit hiding) and *y* part for under-the-table salary. Then an average dollar transferred to spacemen should generate

$$0.153x+0.153y+0.153(1–x–y)=0.153 \quad \text{(A4a)}$$

of VAT savings,

$$0.349y \quad \text{(A4b)}$$

of SST savings, and

$$0.847x–0.654y–0.153(1–x–y) \quad \text{(A4c)}$$

of EBT underreporting. An average dollar transferred to spacemen is associated with a 3.6¢ VAT savings (column [6] of Table AV), which is 4.2 times lower than the theoretical prediction. As I discussed above, the possible reason for such underestimation is the endogeneity problem. Because the underestimation effect for EBT and SST cannot be directly estimated, I further assume that the underestimation effect is the same across VAT, EBT, and SST. Using the empirical estimations from columns (3) of Panel A and Panel C of Table AVII, the following system of equations can be derived for profitable firms

$$y_p \cdot 0.349 = 0.0201 \cdot 4.2$$
$$x_p \cdot 0.847 - y_p \cdot 0.654 - (1 - x_p - y_p) \cdot 0.153 = 0.0702 \cdot 4.2 \quad \text{(A5)}$$

that provides estimates of x_p =0.567 and y_p =.241. Because the firms with losses do not pay profit tax, they are assumed not to use spacemen money for profit hiding or, in other words, x_l =0. Using of the coefficient estimation from column (6) of Table AVII, Panel C, I derive y_l as $y_l = 0.0209 \cdot 4.2 / 0.349 = 0.250$.

Next, I test whether the assumption x_l =0 finds support in the data. Given y_l =0.250, an average dollar transferred to spacemen should generate $-y_l \cdot 0.654 - (1 - y_l) \cdot 0.153 = -0.278$ of EBT underreporting (or 0.278 overreporting) for the unprofitable firms. Considering the extent of overestimation, the prediction for coefficient in the relevant regression should be 0.278/4.2=0.066. Column (6) of Table AVII, Panel A shows that the point estimate of the coefficient for *ShadowR* is 0.0705 with 95% confidence interval of [0.0386, 0.1024]. Therefore, we cannot reject the hypothesis that x_l =0 at 5% level.

Based on these results, I conclude that profitable firms use 57% of transfers to spacemen 57% for dividend payments (profit hiding), 24% for under-the-table salaries, and 19% for paying other "black cash" expenses. Unprofitable firms use 25% of spacemen money to pay under-the-table salaries and 75% to pay for "black cash" expenses. Using the derived corrections, I measure actual firms' earnings as

$$Actual\ EBT = \begin{cases} EBT + 0.295 \cdot Net\ transfers\ to\ spacemen, & if\ EBT > 0 \\ EBT - 0.278 \cdot Net\ transfers\ to\ spacemen, & if\ EBT < 0 \end{cases} \quad \text{(A6)}$$

After deriving *Actual EBT*, I perform a simple check to determine whether it is a better proxy for firms' profitability than *EBT.* For this purpose, I estimate the univariate regressions of the firm performance measures[17] on *EBT/Revenue* and *Actual EBT/Revenue* (see Table

AVIII for the results). As the data in this table indicate, *Actual EBT* better explains cross-section variation of firm performance than *EBT*. For prediction of revenue growth (columns [1] and [2]), R-squared yields 14%; for assets growth (columns [3] and [4]), R-squared is higher by 21%, and R-squared gains 13% for change in productivity measured by revenue per employee (columns [7] and [8]).

[Insert Table AVIII here]

Finally, I estimate the following equation using the same instruments as for estimation of equation (3) (see section III for description of these instruments):

$$\frac{VAT}{Revenue} = \alpha + \beta ShadowR + \gamma Controls + \varepsilon \qquad \text{(A7)}$$

where *ShadowR* is a measure of income diversion defined in section III, *Controls* is a set of firm controls that includes *Actual EBT/Revenue*, *Log(Assets)*, *Debt/Assets*, and industry dummies, and ε is the error term. Applying the instrumental variables allows to address several possible issues of OLS estimates (see section III for the detailed discussion). The point estimate for β is -0.107, and the 95% confidence interval is [-0.160, -0.055]. According to the theoretical prediction, $1 transferred to spacemen should generate a 15.3¢ VAT savings. As we can see, this prediction lies within the 95% confidence interval.

Summarizing the results of this section, I draw the following conclusions. First, all obtained measures of income diversion are negatively related to firms' actual tax payments. Second, I find that theoretical predictions for tax savings coincide with empirical estimations. Specifically, regardless of spacemen money usage, $1 transferred to spacemen should lead to 15.3¢ of VAT savings. The estimated 95% confidence interval for the relevant coefficient is [-.160, -.055]. Third, as proposed by theoretical analysis, profitable and unprofitable firms use spacemen for different purposes and evade different taxes. Profitable firms use 57% of

transfers to spacemen to make dividend payments (profit hiding), 24% for under-the-table salaries, and 19% for paying other "black cash" expenses. Unprofitable firms use 25% of spacemen money to pay under-the-table salaries and 75% to pay for "black cash" expenses. Fourth, as the theoretical analysis proposed, there is a positive relation between reported profitability and the income diversion measures for unprofitable firms and a negative relation between the same variables for profitable firms. I estimate that for profitable firms, an average dollar transferred to spacemen decreases reported profit by 29.5¢ whereas for firms with losses, $1 transferred to spacemen increases reported profit by 27.8¢.

VI. Income Diversion Measures and Private Benefits of Control

William Browder believes that "Gazprom [is] destroying shareholder value through …the increased use of secretive intermediaries, whose relationships with the company remained unknown" (Times (2005)). Many investors agree with Mr. Browder that large companies use spacemen primarily for managerial diversion, not for tax evasion. Indeed, if a manager transfers some of firm's profits to spacemen, then these profits are hidden not only from the government, but also from minority investors.

To test this hypothesis, I relate my measures of income diversion to the measures of private benefits of control (PBC henceforth). If spacemen are used for expropriating minority investors, then we should observe a positive relation between the income diversion measures and the measures of PBC. 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, 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 2008. 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 the sample of publicly traded 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 2003 to 2004, 50 companies have both ordinary and preferred stocks that are traded on RTS (Russian Stock Exchange). 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 totaling 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)[18] 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)[19] preferred stocks are entitled to deposit interest in Sberbank[20] 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 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):

$$Voting\ Premium(t) = \frac{\left[P_o(t) - P_p(t)\right]N_o}{P_o(t)N_o + P_p(t)N_p} \tag{A8}$$

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

$$Dividend\ Premium = \frac{\sum_{t=1999}^{2004} Div_p(t)}{\sum_{t=1999}^{2004} Div_o(t)} \tag{A9}$$

where $Div_o(t)$ and $Div_p(t)$ are the dividends of the ordinary and preferred shares. I use historic dividend information for six years since 1999[21], and average total dividends across

the years instead of averaging the ratios $Div_o(t)/Div_p(t)$ 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[22]) paid no dividends for ordinary shares. I estimate the relative liquidity of preferred shares as

$$Liquidity(t) = \frac{Trades_p(t)}{Trades_o(t)} \tag{A10}$$

where $Trades_p(t)$ and $Trades_o(t)$ are the total number of trades per year of preferred and ordinary shares[23].

I report summary statistics in Table AIX. We can see from the table that these companies divert 1% of their assets per year and 1.3% of their revenue per year, which is much less than an average for my sample of privately held companies. These findings are not surprising, because public companies are much bigger (mean revenue is $845M) and potentially more visible to the government and media. The average voting premium is 29.1%. Preferred stocks tend to be very illiquid. We can see that an average preferred stock has only 92 trades per year and a median stock exhibits only 35 trades. Ordinary stocks are more liquid, on average, traded 1.37 times more frequently than preferred stocks, but also tend to have low liquidity, as an average (median) ordinary stock has 355 (49) trades per year. Preferred stocks receive 3.2 times the dividends of ordinary stocks.

[Insert Table AIX here]

To analyze the relation between my income diversion measures and the voting premium, I run panel regressions of *Voting Premium* on *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.

[Insert Table AX here]

Columns (1) and (2) of Table AX show the results of the univariate regressions and columns (3) and (4) report the results of the multivariate specifications. In the univariate setting, all coefficients on the diversion measures are positive; however, only the coefficient for *ShadowA* is statistically significant at the 10% level. In the multivariate specifications, both coefficients for *ShadowA* is positive and statistically significant at the 10% level, and the coefficient for *ShadowR* is positive and significant at the 14% 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 *ShadowA* (*ShadowR)* corresponds to a 3.5% (1.7%) increase in *Voting Premium*. Taking into account that on average *Voting Premium* is about 29.1% of total company value, the economic significance of the diversion measures is substantial. As expected, the higher is the dividend payout of preferred 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 corporations controlled by the government have 18% to 20% lower Voting Premium. To check that my results are not driven primarily by the electricity industry, in columns (5) and (6) of Table AX 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 income diversion measures. Even though I have half as many observations, the coefficients for *ShadowA* and *ShadowR* remain positive and generally maintain about the same level of statistical significance (significant at the 1% and 11% level). I therefore conclude that my income diversion measures are positively related to measures of PBC.

VII. Robustness Tests

I validate an explanation of Russian businessmen (see Section AI) why entrepreneurs prefer to choose a legal address different from physical address. According to their responses, many business owners register their companies with tax agencies where they have good connections. I estimate the following regression

$$ShadowR_t^i = \alpha + \beta Different\_address^i + \gamma Controls_t^i + \theta_t + \varepsilon_t^i \quad \text{(A11)}$$

where $ShadowR_t^i$ is a measure of income diversion defined in Section III, $Different\_address^i$ is a dummy which equates to 1 if firm's registration (legal) address and physical address are not the same, $Controls_t^i$ means different sets of firm controls, θ_t are year fixed effects, and ε_t^i is the error term. If a firm chooses a registration address different from the physical address to have better ability to evade taxes, then β should be positive. I report estimations of this regression in Table AXI. In univariate (column 1) and multivariate (columns 2 to 4) specifications the coefficient estimates for $Different\_address^i$ are positive

and statistically significant at 1% to 5% level. Firms which have different legal and physical address divert .18% to .32% more revenue than firms which have the same legal and physical address (as I described in Section II.C, an average firm diverts 5.8% of its revenue). When I include all controls (column 5), the coefficient estimate drops by 25% compared to the one from column (4), and statistical significance declines to 12% level. The presented evidence supports the explanation of Russian businessmen: one of the reasons why firms might choose to have different registration address is to be able to evade more taxes.

[Insert Table AXI here]

In Table AXII, I provide results of the robustness tests for section IV.C of the paper. Panel A reports the OLS estimations of equation (3) for the subsample of firms which have the same legal and physical address. Panel B (Panel C) reports IV estimation of equation (3) using *ShadowA(ShadowP)* as a measure of income diversion in place of *ShadowR*. Panel D (Panel E) reports IV estimation of equation (3) using 1-year (2-year) firm growth and change in productivity as performance measures. Panel F reports IV estimation of equation (3) using *EBT* instead of *Actual EBT* as a control.

[Insert Table AXII here]

In Table AXIII, I provide the estimations of equation (6) for the subsample of firms which have the same legal and physical address (see Table V, Panel A for the reference). Panel A reports the OLS estimations of equation (6). Panel B (Panel C) reports IV estimation of equation (6) using *ShadowA(ShadowP)* as a measure of income diversion in place of *ShadowR*. Panel D (Panel E) reports IV estimation of equation (6) using 1-year (2-year) firm growth and change in productivity as performance measures. Panel F reports IV estimation of equation (6) using *EBT* instead of *Actual EBT* as a control.

[Insert Table AXIII here]

In Table AXIV, I provide the estimations of equation (6) for the subsample of solely owned firms which have the same legal and physical address (see Table V, Panel B for the reference). Panel A reports the OLS estimations of equation (6). Panel B (Panel C) reports IV estimation of equation (6) using *ShadowA(ShadowP)* as a measure of income diversion in place of *ShadowR*. Panel D (Panel E) reports IV estimation of equation (6) using 1-year (2-year) firm growth and change in productivity as performance measures. Panel F reports IV estimation of equation (6) using *EBT* instead of *Actual EBT* as a control.

[Insert Table AXIV here]

In Table AXV, I provide results of the robustness tests for section IV.E of the paper. Panel A reports the OLS estimation of equation (8) using a total wage bill of the local tax agency as a proxy for tax enforcement. For this regression, I redefine a proxy for the inverse tax enforcement as follows:

$$Inverse\ Tax\ Enforcement_j = \frac{Number\ of\ Firms_j}{Total\ Wage\ Bill_j} \tag{A12}$$

where j is the index of a local tax agency, $Total\ Wage\ Bill_j$ is a total wage bill for a local tax agency j in 2002, $Number\ of\ Firms_j$ is a number firms registered a local tax agency j which performed at least 10 banking transactions in 2003 to 2004. Panel B (Panel C) reports the OLS estimation of equation (8) using 1-year (2-year) firm growth and change in productivity as performance measures. Panel D reports the OLS estimation of equation (8) using *EBT* instead of *Actual EBT* as a control.

[Insert Table AXV here]

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[1] Rosstat is an official Russian statistical agency.

[2] spark.interfax.ru

[3] Spark allows up to 3000 companies to be selected in one selection. Because some companies' records are missing INNs (my primary identification number), I get a sample of 58,527 companies, not 60,000.

[4] The largest private Russian oil production company

[5] The largest Russian airline company

[6] A previous version of this paper used a sample of 100 random companies from the 20 largest regions (2000 firms in total). The results were similar: 90% to 92% match for Moscow city and Moscow region and 67% average match for other regions.

[7] See section III.A of the paper for the reasoning for this selection criteria.

[8] ±0.1 in exponential terms

[9] ±0.5 in exponential terms

[10] For example, if a local tax office sublets a part of its building to a cafe, then each rental payment made by the cafe will be treated as a tax payment.

[11] The official minimum wage in Russia was 450 rubles ($15) per month in 2003 and 600 rubles ($20) starting October 1, 2003.

[12] In 2003 to 2004, Russia had a diminishing marginal social tax scale starting at 35.6% for small wages and decreasing to 2% for wages of more 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

[13] This is much lower than a real wage bill because the majority of Russian firms, especially small and medium-size ones, pay also wages "under the table."

[14] In 2003 to 2004, Russia had a diminishing marginal social tax scale starting at 35.6% for small wages and decreasing to 2% for wages of more 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

[15] In section I, I discuss possible reasons why companies might prefer to pay for some expenses using “black cash” rather than do it in a legitimate way.

[16] A firm is denoted as a profitable if it has a positive NI both for 2003 and 2004. A firm is denoted as unprofitable if it has negative NI both for 2003 and 2004. Firms that have positive NI in 2003 (2004) and negative NI in 2004 (2003) are excluded from this analysis.

[17] See section II.C for the description of the performance measures.

[18] A large oil company

[19] The largest Russian brewery

[20] The largest commercial bank

[21] 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

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

[23] 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.

Table AI. Rosstat and Banking Data Correspondence Across Regions

I choose up to 3000 largest firms from each of the 20 largest Russian regions using Rosstat database (www.spark.interfax.ru). After that I match these firms to the banking data. Column (1) has the initial number of firms from each region. Column (2) reports the mean of revenue. Column (3) reports the number of firms present in the banking sample. Column (4) shows the mean of revenue for matched firms. In column (5), the percentage of matched firms is calculated. In column (6), the percentage of matched firms weighted by revenue is calculated. Columns (7)–(10) report the same characteristics for the firms that have at least 100 banking transactions.

	Rosstat		Banking				N of transactions $\geqslant$ 100			
	N	Rev, $000's	N	Rev, $000's	%N	%Rev	N	Rev, $000's	%N	%Rev
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Bashkortostan	2,962	6,140	1,888	8,751	64	91	848	16,627	29	78
Chelyabinsk	2,956	4,926	2,057	6,507	70	92	876	13,002	30	78
Irkutsk	2,886	2,625	1,836	3,605	64	87	719	7,346	25	70
Kemerovo	2,896	4,077	1,744	6,145	60	91	612	14,504	21	75
Krasnodar	2,936	4,649	2,385	5,213	81	91	1,303	7,874	44	75
Krasnoyarsk	2,975	5,947	1,723	9,489	58	92	764	18,347	26	79
Leningrad	2,942	2,561	1,453	4,524	49	87	448	12,197	15	73
Moscow city	2,837	98,358	2,678	97,716	94	94	2,548	99,865	90	91
Moscow region	2,937	12,716	2,840	12,764	97	97	2,799	12,575	95	94
Nizh. Novgorod	2,925	5,698	2,348	6,478	80	91	1,396	9,525	48	80
Novosibirsk	2,933	4,258	2,085	5,321	71	89	1,095	7,799	37	68
Omsk	2,970	1,559	1,530	2,396	52	79	569	4,987	19	61
Perm	2,938	4,173	1,819	6,095	62	90	724	12,902	25	76
Rostov	2,911	4,158	2,222	4,891	76	90	1,187	7,284	41	71
Samara	2,897	7,770	2,111	9,110	73	85	1,051	15,713	36	73
St. Petersburg	2,883	15,465	2,410	16,089	84	87	1,802	18,566	63	75
Sverdlovsk	2,949	7,918	2,338	9,011	79	90	1,284	14,444	44	79
Tatarstan	2,930	5,881	1,918	8,266	65	92	1,001	13,611	34	79
Tyumen	2,921	16,759	2,377	19,888	81	97	1,186	37,214	41	90
Volgograd	2,943	2,398	1,962	3,322	67	92	824	6,730	28	79
Total	58,527	10,751	41,724	13,929	71	92	23,036	23,161	39	85

Table AII. Summary Statistics of Rosstat and Bank Data Matched Sample

The sample consists of 500 random firms that are present in both the Rosstat database and the banking dataset. $Profit\_B$ is calculated as profit tax payment for the corresponding years divided by .24 (profit tax rate). Profit tax payments are taken from the banking data set and attributed to a year based on the transaction's description. $Revenue\_B$ is the sum of cash receipts for the corresponding years taken from the banking data set. Reported $Profit$ and $Revenue$ are taken from Rosstat. $Log(Rev)$ and $Log(Rev\_B)$ are natural logarithms of $Revenue$, and $Revenue\_B$. % $|Log(Rev) - Log(Rev\_B)|<0.1$ (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 nonzero observations.

	2003			2004		
	Mean	St. dev.	N of obs	Mean	St. dev.	N of obs
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Revenue_B, $000's	808	2,263	411	748	2,052	452
Revenue, $000's	866	1,912	317	950	2,024	309
Profit_B, $000's	35.4	93.8	281	36.1	111.8	133
Profit, $000's	25.8	81.2	325	35.0	97.9	315
Margin_B, %	5.6	9.6	278	4.8	8.8	132
Margin, %	6.4	9.4	244	6.6	10.1	234
% |Log(Rev)-Log(Rev_B)|<0.1	26.2		309	28.1		292
% |Log(Rev)-Log(Rev_B)|<0.5	70.9		309	64.0		292
Correlations						
Log(Rev), Log(Rev_B)	.759		309	.560		292
Log(Profit), Log(Profit_B)	.872		206	.868		87
Margin, Margin_B	.660		199	.491		85

Table AIII. Summary Statistics Spacemen vs Regular Firms

Age is defined as the difference in days between the last and the first observed transaction. *Gross tax rate* is defined as the ratio of taxes paid to average turnover, sum_r is total funds received, and sum_p is total amount of funds paid. Column (1) includes companies that have Ltd. or Inc. in their names (ooozao or oao) with at least 10 observed transactions and appeared in the sample before October 1, 2004; it excludes government agencies, banks, brokerage firms, insurance firms, state-affiliated enterprises, and nonprofit organizations whose average inflow of funds exceed 100,000 rubles ($3,300) per month and that had higher inflow than outflow. Column (2) includes firms from column (1) that had higher outflow than inflow. Column (3) contains firms from column (1) that received more funds than they transferred. Column (4) includes regular firms (i.e., firms with a gross tax rate >0.01. Column (5) contains regular firms that had more outflow than inflow. Column (6) includes spacemen and firms from column (3) that satisfy following criteria: (a) net tax rate < 0.001, (b) SST paid < $6.5 per month, and (c) not oao.

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 SST 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

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

Age is defined as the difference in days between the last and the first observed transaction. *Gross tax rate* is defined as the ratio of taxes paid to average turnover, sum_r is total funds received, and sum_p is total amount of funds paid. Column (1) includes spacemen that pay no taxes. Column (2) includes spacemen with a net tax rate higher than 0 and less than 0.001; Column (3) includes spacemen with a net tax rate higher than 0.001 and less than 0.01; Column (4) contains spacemen with a gross tax rate higher than 0 and less than 0.001; Column (5) includes spacemen with gross tax rate higher than 0.001 and less than 0.01.

		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 SST paid per month, $	0	1	1	1	1
Mean gross tax rate, %	0	0	0	0	0

Table AV. Relation Between Income Diversion Measures and Tax Payments

This table contains OLS regressions of tax payments on the income diversion measures. Profit tax is calculated as EBT minus NI for the firms with positive EBT. Value added tax (VAT) and social security tax (SST) are calculated as the sum of relative payments using the banking data. *ShadowP*, *ShadowA*, and *ShadowR* are income diversion measures defined in Section III.C. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels

Depend. var:	Profit Tax / Revenue			VAT / Revenue			SST / Revenue			SST / Employee		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ShadowP	-.0121***			-.0278***			-.0155***			-.0954***		
	(.0005)			(.0008)			(.0005)			(.0062)		
ShadowA		-.0032***			-.0067***			-.0041***			-.0123***	
		(.0001)			(.0002)			(.0001)			(.0012)	
ShadowR			-.0165***			-.0363***			-.0192***			-.1270***
			(.0008)			(.0012)			(.0008)			(.0089)
Log(Assets)	.0020***	.0017***	.0020***	.0003***	-.0003***	.0003***	-.0010***	-.0014***	-.0010***	.0201***	.0196***	.0202***
	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0001)	(.0000)	(.0000)	(.0000)	(.0007)	(.0007)	(.0007)
Debt/Assets	-.0017***	-.0019***	-.0017***	-.0028***	-.0030***	-.0027***	.0020***	.0018***	.0019***	-.0316***	-.0317***	-.0310***
	(.0006)	(.0006)	(.0006)	(.0007)	(.0007)	(.0007)	(.0004)	(.0004)	(.0004)	(.0047)	(.0048)	(.0047)
Industry	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
R-sq	.100	.100	.099	.091	.097	.093	.077	.085	.077	.056	.052	.056
N of obs	54,528	53,463	54,317	62,580	61,040	62,192	73,813	72,176	73,322	41,950	41,372	41,717
N of firms	35,878	35,333	35,792	38,664	38,050	38,544	43,324	42,711	43,227	30,088	29,713	29,968

Table AVI. Relation Between Income Diversion Measures and Productivity Shocks

This table contains OLS regressions of income diversion measures on changes in performance measures. *ShadowP*, *ShadowA*, and *ShadowR* are defined in Section III. $Variable[-1]$ means $Variable$ lagged by 1 year. $\Delta \log(Variable)$ is defined as $\log(Variable) - \log(Variable[-1])$. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels

Dependent var:	ShadowP			ShadowA		ShadowR	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δlog(Revenue)	.0048***			.0439***			
	(.0006)			(.0032)			
Δlog(Employment)		.0034**			.0267***	.0008	
		(.0015)			(.0071)	(.0012)	
Δlog(Assets)			.0015**				.0014***
			(.0006)				(.0005)
ShadowP[-1]	.4839***	.4938***	.4753***				
	(.0050)	(.0080)	(.0050)				
ShadowA[-1]				.4097***	.4440***		
				(.0054)	(.0085)		
ShadowR[-1]						.4737***	.4459***
						(.0084)	(.0053)
log(Assets)[-1]	-.0030***	-.0040***	-.0034***	-.0367***	-.0409***	-.0031***	-.0025***
	(.0003)	(.0005)	(.0003)	(.0017)	(.0027)	(.0004)	(.0003)
Debt/Assets[-1]	-.0127***	-.0080**	-.0104***	-.0954***	-.0607***	-.0044	-.0089***
	(.0026)	(.0039)	(.0025)	(.0131)	(.0192)	(.0031)	(.0020)
Industry	Y	Y	Y	Y	Y	Y	Y
R-sq	.2030	.2422	.2082	.1974	.2304	.2304	.1975
N of obs	32,119	12,527	33,416	32,787	12,601	12,601	32,787

Table AVII. Reported Profit, VAT, SST, and Income Diversion Measures.

The table contains OLS regressions of EBT and different tax payments on the income diversion measures. A firm is denoted as profitable if it has a positive NI both for 2003 and 2004. A firm is denoted as loss-making if it has a negative NI both for 2003 and 2004. *ShadowP*, *ShadowA*, and *ShadowR* are defined in Section III. Panel A contains regressions of reported EBT on the income diversion measures. Panel B contains regressions of VAT/Revenue on the income diversion measures. Panel C contains regressions of SST/Revenue on the income diversion measures. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Panel A: Reported profit and income diversion measures							
Dependent var: EBT/Revenue							
	Profitable firms (P)			Loss-making firms (L)			P - L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ShadowP	-.0501***			.0737***			-.1238***
	(.0025)			(.0118)			(.0120)
ShadowA		-.0142***			.0249***		-.0391***
		(.0004)			(.0024)		(.0024)
ShadowR			-.0702***			.0705***	-.1407***
			(.0038)			(.0163)	(.0167)
Log(Assets)	.0085***	.0075***	.0085***	-.0068***	-.0045***	-.0066***	
	(.0003)	(.0003)	(.0003)	(.0009)	(.0010)	(.0009)	
Debt/Assets	-.0097***	-.0111***	-.0105***	-.0763***	-.0757***	-.0770***	
	(.0029)	(.0029)	(.0029)	(.0058)	(.0059)	(.0059)	
Industry	Y	Y	Y	Y	Y	Y	
R-sq	.102	.104	.103	.079	.081	.078	
Number of obs	41,706	40,947	41,531	6,991	6,885	6,943	
Number of firms	21,026	20,878	21,000	3,894	3,869	3,882	

Panel B: VAT payments and income diversion measures

Dependent var: VAT/Revenue							
	Profitable firms (P)			Loss-making firms (L)			P - L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ShadowP	-.0292***			-.0335***			.0044
	(.0012)			(.0032)			(.0034)
ShadowA		-.0071***			-.0077***		.0006
		(.0002)			(.0007)		(.0008)
ShadowR			-.0394***			-.0376***	-.0018
			(.0016)			(.0048)	(.0051)
Log(Assets)	.0002	-.0005***	.0002*	.0002	-.0004	.0003	
	(.0001)	(.0001)	(.0001)	(.0003)	(.0003)	(.0003)	
Debt/Assets	-.0066***	-.0070***	-.0066***	-.0014	-.0013	-.0012	
	(.0011)	(.0012)	(.0011)	(.0019)	(.0019)	(.0019)	
Industry	Y	Y	Y	Y	Y	Y	
R-sq	.107	.114	.109	.074	.076	.073	
Number of obs	35,172	34,433	34,989	4,933	4,825	4,883	
Number of firms	19,085	18,910	19,042	3,056	3,019	3,037	

Panel C: SST payments and income diversion measures

Dependent var: SST/Revenue							
	Profitable firms (P)			Loss-making firms (L)			P - L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ShadowP	-.0147***			-.0214***			.0067***
	(.0007)			(.0020)			(.0022)
ShadowA		-.0039***			-.0054***		.0015***
		(.0001)			(.0005)		(.0005)
ShadowR			-.0202***			-.0209***	.0007
			(.0010)			(.0033)	(.0034)
Log(Assets)	-.0012***	-.0016***	-.0012***	-.0001	-.0006***	-.0001	
	(.0001)	(.0001)	(.0001)	(.0002)	(.0002)	(.0002)	
Debt/Assets	-.0015**	-.0016***	-.0015**	.0005	.0003	.0000	
	(.0006)	(.0006)	(.0006)	(.0012)	(.0012)	(.0011)	
Industry	Y	Y	Y	Y	Y	Y	
R-sq	.096	.106	.098	.057	.061	.056	
Number of obs	39,722	38,942	39,510	6,877	6,755	6,794	
Number of firms	20,414	20,240	20,384	3,775	3,742	3,763	

Table AVIII. Different Measures of Profitability and Firm Performance.

This table contains OLS regressions of performance measures on reported profitability (*EBT/Revenue*) and actual profitability (*Actual EBT/Revenue*). $\Delta Variable$ is defined as $[\log(Variable_{t+3}) - \log(Variable_t)]/3$. Correction for survival bias is described in Section II.D. *ShadowP*, *ShadowA*, and *ShadowR* are income diversion measures defined in Section III. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Dependent var:	ΔRevenue		ΔAssets		ΔRev/Assets		ΔRev/Employee	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EBT/Revenue	1.39***		1.05***		1.29***		1.07***	
	(.03)		(.02)		(.03)		(.03)	
Actual EBT/Revenue		1.27***		1.00***		1.15***		.99***
		(.03)		(.02)		(.02)		(.03)
R-sq	.055	.062	.041	.050	.060	.066	.065	.073
Number of obs	56,665	56,665	58,098	58,098	56,569	56,569	29,831	29,831
Number of firms	34,217	34,217	34,831	34,831	34,176	34,176	22,037	22,037

Table AIX. Summary Statistics for Dual Class Shares

The table presents summary statistics for a sample of companies with dual class shares. *ShadowA* and *ShadowR* are income diversion measures defined in Section III. *Assets*, *Revenue* are taken from Rosstat. *Dividend Premium*, *Voting Premium*, and *Liquidity* are defined in section AV.

Variable	Mean (1)	Median (2)	St. dev. (3)	N of obs (4)	N of firms (5)
Assets, mln. $	1,349	627	3,377	67	35
Revenue, mln. $	845	450	1,565	67	35
ShadowA	.010	.004	.014	67	35
ShadowR	.013	.005	.018	67	35
Voting Premium	.291	.283	.121	67	35
Dividend Premium	3.191	1.823	3.388	62	32
Liquidity	.729	.553	.646	67	35
Total trades (ordinary stocks)	355	49	933	67	35
Total trades (preferred stocks)	93	35	150	67	35

Table AX. Income Diversion Measures and Voting Premium

The table presents "between" panel regressions of voting premium on the income diversion measures. *ShadowA* and *ShadowR* are income diversion measures defined in Section III. *Assets*, *Revenue* are taken from Rosstat. *Dividend Premium*, *Voting Premium*, and *Liquidity* are defined in section AV. *Government control* is a dummy variable which equates to 1 if the government ownes at least 25% of company's shares. *Electricity* is a dummy variable which equates to 1 for electricity industry. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Dependent variable: Voting Premium						
	All companies			Non-electric companies		
	(1)	(2)	(3)	(4)	(5)	(6)
ShadowA	2.988*		2.432*		3.872***	
	(1.737)		(1.425)		(1.433)	
ShadowR		.704		1.753		2.888
		(1.457)		(1.193)		(1.781)
Dividend Premium			-.020***	-.022***	-.021***	-.023***
			(.005)	(.005)	(.004)	(.004)
Liquidity			.061*	.060*	.196***	.190***
			(.033)	(.033)	(.046)	(.054)
Government control			-.179***	-.195***	-.223***	-.248***
			(.049)	(.051)	(.036)	(.046)
Electricity			-.028	-.030		
			(.038)	(.038)		
R-sq	.082	.007	.514	.501	.846	.793
Number of obs	67	67	62	62	31	31
Number of firms	35	35	32	32	16	16

Table AXI. Income Diversion and Endogenous Choice of Legal Address

The table describes the relation between income diversion and endogenous choice of legal address. *ShadowR* is defined in Section III. *Different address* is a dummy which equates to 1 if a firm's registration (legal) address and physical address are not the same. *Assets, Revenue, Debt,* and *EBT* are taken from Rosstat. *Industry* and *Year* are industry and year dummies. *Tax agency* is a dummy for a firm's assigned local tax agency. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Dependent var: ShadowR	(1)	(2)	(3)	(4)	(5)
Different address	.0032***	.0026***	.0026***	.0018**	.0014
	(.0008)	(.0008)	(.0008)	(.0009)	(.0009)
EBT/Revenue		-.0274***	-.0253***	-.0264***	-.0257***
		(.0029)	(.0030)	(.0030)	(.0030)
Log(Assets)		-.0024***	-.0022***	-.0018***	-.0020***
		(.0002)	(.0002)	(.0002)	(.0002)
Debt/Assets		-.0185***	-.0122***	-.0122***	-.0117***
		(.0015)	(.0015)	(.0015)	(.0015)
Year		Y	Y		Y
Industry			Y	Y	Y
Tax agency				Y	Y
R-sq	.0003	.0089	.0221	.0243	.0270
Number of obs	78,103	76,618	76,618	76,618	76,618
Number of firms	45,316	44,930	44,930	44,930	44,930

Table AXII. Income Diversion and Firm Performance.

The table describes the relation of income diversion to firm performance for the subsample of firms which have the same legal and physical address. *Tax agency* is a dummy for a firm's assigned local tax agency. All other variables are defined in Table IV. Panel A reports the OLS estimations of equation (1). Panel B (Panel C) reports IV estimation of equation (1) using *ShadowA(ShadowP)* as a measure of income diversion in place of ShadowR. Panel D (Panel E) reports IV estimation of equation (1) using 1-year (2-year) firm growth and change in productivity as performance measures. Panel F reports IV estimation of equation (1) using *EBT* instead of *Actual EBT* as a control. Instrumental variables are dummies that correspond to a firm's local tax agency. Column (1) reports the first-stage results of IV estimation and columns (2)-(5) report second-stage results. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Panel A: OLS for the firms which have the same legal and physical address				
Dependent var:	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)
ShadowR	-.170***	-.083**	-.210***	-.110**
	(.047)	(.041)	(.040)	(.047)
Actual EBT/Revenue	1.324***	1.057***	1.136***	.940***
	(.039)	(.030)	(.035)	(.038)
Log(Assets)	.008***	-.032***	.055***	.024***
	(.003)	(.002)	(.002)	(.003)
Debt/Assets	-.136***	-.104***	-.149***	-.089***
	(.021)	(.018)	(.019)	(.021)
Industry, Year	Y	Y	Y	Y
R-sq	.089	.082	.120	.106
Number of obs	28,711	29,481	28,663	15,318
Number of firms	17,065	17,376	17,044	11,224

Panel B: ShadowA and firm performance. IV estimations.

	First stage	Second stage			
Dependent var:	ShadowA	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowA		-.613***	-.316***	-.528***	-.373***
		(.107)	(.084)	(.092)	(.077)
Actual EBT/Revenue	.452***	1.542***	1.134***	1.328***	1.056***
	(.031)	(.064)	(.049)	(.056)	(.051)
Log(Assets)	-.072***	-.039***	-.055***	.015**	-.005
	(.002)	(.008)	(.006)	(.007)	(.006)
Debt/Assets	-.049***	-.174***	-.126***	-.180***	-.114***
	(.013)	(.024)	(.019)	(.021)	(.022)
Industry, Year	Y	Y	Y	Y	Y
Tax agency	Y				
R-sq	.087				
Number of obs	28,390	28,390	29,151	28,348	15,230
Number of firms	16,921	16,921	17,230	16,902	11,148

Panel C: ShadowP and firm performance. IV estimations.

	First stage	Second stage			
Dependent var:	ShadowP	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowP		-1.655***	-.963**	-1.663***	-1.158***
		(.480)	(.401)	(.419)	(.406)
Actual EBT/Revenue	.108***	1.449***	1.114***	1.263***	1.004***
	(.009)	(.066)	(.053)	(.058)	(.053)
Log(Assets)	-.005***	.001	-.036***	.049***	.019***
	(.000)	(.003)	(.003)	(.003)	(.003)
Debt/Assets	-.004	-.147***	-.110***	-.159***	-.096***
	(.003)	(.022)	(.018)	(.020)	(.022)
Industry, Year	Y	Y	Y	Y	Y
Tax agency	Y				
R-sq	.044				
Number of obs	28,851	28,851	29,625	28,803	15,382
Number of firms	17,102	17,102	17,416	17,082	11,257

Panel D: Income diversion and 1-year firm performance. IV estimations.

	First stage	Second stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-2.947***	-2.658***	-.516	-1.527**
		(.833)	(.698)	(.783)	(.741)
Actual EBT/Revenue	.093***	1.751***	1.441***	1.432***	1.311***
	(.006)	(.106)	(.084)	(.101)	(.102)
Log(Assets)	-.003***	-.014***	-.083***	.085***	.041***
	(.000)	(.005)	(.004)	(.004)	(.006)
Debt/Assets	.001	-.047	-.031	-.134***	-.030
	(.002)	(.033)	(.027)	(.033)	(.041)
Industry, Year	Y	Y	Y	Y	Y
Tax agency	Y				
R-sq	.045				
Number of obs	34,297	34,297	34,649	34,197	15,225
Number of firms	19,768	19,768	19,910	19,695	9,986

Panel E: Income diversion and 2-year firm performance. IV estimations.

	First stage	Second stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-2.719***	-2.257***	-1.614***	-1.651***
		(.677)	(.553)	(.592)	(.616)
Actual EBT/Revenue	.083***	1.663***	1.324***	1.391***	1.188***
	(.006)	(.077)	(.061)	(.068)	(.069)
Log(Assets)	-.003***	-.006*	-.054***	.059***	.033***
	(.000)	(.004)	(.003)	(.003)	(.004)
Debt/Assets	.001	-.128***	-.082***	-.161***	-.082***
	(.002)	(.026)	(.022)	(.024)	(.027)
Industry, Year	Y	Y	Y	Y	Y
Tax agency	Y				
R-sq	.042				
Number of obs	31,276	31,276	31,922	31,204	16,481
Number of firms	18,466	18,466	18,733	18,442	12,016

Panel F: Income diversion and firm performance, controlled for EBT. IV estimations.

	First stage	Second stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-1.914***	-1.121**	-1.649***	-1.044**
		(.568)	(.463)	(.487)	(.482)
EBT/Revenue	-.011**	1.347***	1.061***	1.158***	.949***
	(.005)	(.045)	(.034)	(.040)	(.043)
Log(Assets)	-.002***	.004	-.035***	.052***	.022***
	(.000)	(.003)	(.003)	(.002)	(.003)
Debt/Assets	-.009***	-.167***	-.127***	-.174***	-.111***
	(.002)	(.023)	(.019)	(.020)	(.022)
Industry, Year	Y	Y	Y	Y	Y
Tax agency	Y				
R-sq	.031				
Number of obs	28,711	28,711	29,481	28,663	15,318
Number of firms	17,065	17,065	17,376	17,044	11,224

Table AXIII. Firm Performance, Income Diversion, and CEO Ownership.

The table describes the effect of income diversion and CEO ownership on firm performance. *Tax agency* is a dummy for a firm's assigned local tax agency. *CEO not owner* is a dummy which equates to 1 if a company's CEO is not one of company's owners. All other variables are defined in Table IV. Panel A reports the OLS estimations of equation (2). Panel B (Panel C) reports IV estimation of equation (2) using *ShadowA(ShadowP)* as a measure of income diversion in place of ShadowR. Panel D (Panel E) reports IV estimation of equation (2) using 1-year (2-year) firm growth and change in productivity as performance measures. Panel F reports IV estimation of equation (2) using *EBT* instead of *Actual EBT* as a control. Instrumental variables are dummies that correspond to a firm's local tax agency. Column (1) reports the first-stage results of IV estimation and columns (2)-(5) report second-stage results. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Panel A: OLS estimation of equation (2)

Dependent var:	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)
ShadowR	-.173***	-.075	-.234***	-.053
	(.061)	(.055)	(.052)	(.061)
ShadowR*CEO not owner	-.013	-.045	.053	-.131
	(.100)	(.087)	(.087)	(.099)
CEO not owner	-.036***	-.007	-.059***	-.019*
	(.012)	(.011)	(.011)	(.011)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y
R-sq	.091	.082	.124	.111
Number of obs	25,054	25,743	25,011	13,476
Number of firms	14,856	15,128	14,837	9,872
P-value (β_1+β_2)=0	.022	.079	.011	.021

Panel B: IV estimation of equation (2) using ShadowA as the measure of income diversion

	First Stage	Second Stage			
Dependent var:	ShadowA	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowA		-.584***	-.301***	-.562***	-.269***
		(.112)	(.096)	(.098)	(.082)
ShadowA*CEO not owner		-.226***	-.188***	-.147***	-.138**
		(.062)	(.053)	(.054)	(.057)
CEO not owner	-.020**	.016	.038**	-.025	.004
	(.009)	(.021)	(.017)	(.019)	(.019)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.086				
Number of obs	24,761	24,761	25,440	24,722	13,389
Number of firms	14,725	14,725	14,995	14,707	9,797
P-value (β_1+β_2)=0		.000	.000	.000	.000

Panel C: IV estimation of equation (2) using ShadowP as the measure of income diversion

	First Stage	Second Stage			
Dependent var:	ShadowP	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowP		-1.043**	-.527	-1.372***	-.546
		(.505)	(.436)	(.444)	(.439)
ShadowP*CEO not owner		-1.456***	-1.283***	-.880**	-.643
		(.416)	(.338)	(.369)	(.421)
CEO not owner	-.005***	.052*	.071***	-.006	.010
	(.002)	(.031)	(.025)	(.028)	(.029)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.043				
Number of obs	25,203	25,203	25,897	25,160	13,540
Number of firms	14,891	14,891	15,166	14,873	9,901
P-value (β_1+β_2)=0		.000	.000	.000	.013

Panel D: IV estimation of equation (2) using 1-year firm performance

	First Stage	Second Stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-1.950*	-1.801**	-1.234	-.807
		(1.008)	(.868)	(.982)	(.916)
ShadowR*CEO not owner		-1.165	-1.425**	-.414	-.300
		(.834)	(.656)	(.834)	(.908)
CEO not owner	-.005***	.019	.101**	-.094*	.005
	(.001)	(.052)	(.041)	(.053)	(.058)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.043				
Number of obs	30,033	30,033	30,342	29,943	13,412
Number of firms	17,250	17,250	17,372	17,184	8,778
P-value (β_1+β_2)=0		.005	.000	.127	.260

Panel E: IV estimation of equation (2) using 1-year firm performance

	First Stage	Second Stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-2.143***	-1.185*	-2.110***	-.915
		(.823)	(.692)	(.734)	(.720)
ShadowR*CEO not owner		-2.226***	-2.111***	-1.202*	-.604
		(.680)	(.536)	(.626)	(.652)
CEO not owner	-.005***	.071*	.109***	-.017	.012
	(.001)	(.042)	(.033)	(.039)	(.040)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.040				
Number of obs	27,327	27,327	27,908	27,262	14,526
Number of firms	16,072	16,072	16,305	16,049	10,591
P-value (β_1+β_2)=0		.000	.000	.000	.044

Panel F: IV estimation of equation (2), controlled for EBT

	First Stage	Second Stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-1.876***	-.905	-2.204***	-.548
		(.704)	(.615)	(.606)	(.596)
ShadowR*CEO not owner		-1.259*	-.897	-.831	-.550
		(.664)	(.567)	(.572)	(.607)
CEO not owner	-.006***	.015	.029	-.028	-.005
	(.001)	(.038)	(.032)	(.033)	(.034)
EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.028				
Number of obs	25,054	25,054	25,743	25,011	13,476
Number of firms	14,856	14,856	15,128	14,837	9,872
P-value (β_1+β_2)=0		.000	.008	.000	.093

Table AXIV. Firm Performance, Diversion, and CEO Ownership. Solely Owned Firms

The table describes the effect of income diversion and CEO ownership on firm performance for solely owned firms. *Tax agency* is a dummy for a firm's assigned local tax agency. *CEO not owner* is a dummy which equates to 1 if a company's CEO is not one of company's owners. All other variables are defined in Table IV. Panel A reports the OLS estimations of equation (2). Panel B (Panel C) reports IV estimation of equation (2) using *ShadowA(ShadowP)* as a measure of income diversion in place of ShadowR. Panel D (Panel E) reports IV estimation of equation (2) using 1-year (2-year) firm growth and change in productivity as performance measures. Panel F reports IV estimation of equation (2) using *EBT* instead of *Actual EBT* as a control. Instrumental variables are dummies that correspond to a firm's local tax agency. Column (1) reports the first-stage results of IV estimation and columns (2)-(5) report second-stage results. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Panel A: OLS estimation of equation (2)

Dependent var:	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)
ShadowR	-.165*	-.059	-.257***	.005
	(.100)	(.091)	(.083)	(.105)
ShadowR*CEO not owner	-.046	-.058	.043	-.170
	(.143)	(.128)	(.122)	(.147)
CEO not owner	-.013	.015	-.035**	-.002
	(.019)	(.016)	(.016)	(.017)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y
R-sq	.097	.086	.132	.120
Number of obs	11,744	12,068	11,726	6,186
Number of firms	7,128	7,264	7,116	4,587
P-value (β_1+β_2)=0	.044	.198	.018	.114

Panel B: IV estimation of equation (2) using ShadowA as the measure of income diversion

	First Stage	Second Stage			
Dependent var:	ShadowA	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowA		-.312**	-.158	-.342***	-.136
		(.126)	(.107)	(.109)	(.092)
ShadowA*CEO not owner		-.235***	-.231***	-.118	-.173**
		(.090)	(.079)	(.078)	(.081)
CEO not owner	-.030**	.047	.076***	-.006	.033
	(.014)	(.033)	(.027)	(.030)	(.029)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.092				
Number of obs	11,588	11,588	11,908	11,573	6,143
Number of firms	7,055	7,055	7,191	7,045	4,552
P-value (β_1+β_2)=0		.000	.000	.000	.001

Panel C: IV estimation of equation (2) using ShadowP as the measure of income diversion

	First Stage	Second Stage			
Dependent var:	ShadowP	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowP		-.193	-.079	-.837	-.052
		(.614)	(.532)	(.529)	(.550)
ShadowP*CEO not owner		-1.854***	-1.685***	-1.188**	-1.201**
		(.584)	(.489)	(.512)	(.550)
CEO not owner	-.011***	.104**	.121***	.037	.062
	(.003)	(.046)	(.038)	(.041)	(.042)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.046				
Number of obs	11,833	11,833	12,159	11,815	6,226
Number of firms	7,150	7,150	7,289	7,139	4,606
P-value (β_1+β_2)=0		.001	.000	.000	.017

Panel D: IV estimation of equation (2) using 1-year firm performance

	First Stage	Second Stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-.747	-1.125	-.099	-.682
		(1.248)	(1.052)	(1.218)	(1.106)
ShadowR*CEO not owner		-2.002*	-2.705***	-1.016	-.569
		(1.197)	(.961)	(1.200)	(1.269)
CEO not owner	-.010***	.093	.205***	-.050	.048
	(.002)	(.079)	(.062)	(.079)	(.084)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.046				
Number of obs	14,432	14,432	14,596	14,386	6,274
Number of firms	8,531	8,531	8,601	8,497	4,198
P-value (β_1+β_2)=0		.032	.000	.373	.257

Panel E: IV estimation of equation (2) using 1-year firm performance

	First Stage	Second Stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-.920	-.164	-1.297	-1.869**
		(.995)	(.864)	(.900)	(.873)
ShadowR*CEO not owner		-2.759***	-3.080***	-1.498*	-.021
		(.948)	(.780)	(.870)	(.896)
CEO not owner	-.009***	.133**	.189***	.025	-.009
	(.002)	(.061)	(.050)	(.057)	(.058)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.044				
Number of obs	12,919	12,919	13,220	12,888	6,693
Number of firms	7,800	7,800	7,923	7,788	4,944
P-value (β_1+β_2)=0		.000	.000	.003	.018

Panel F: IV estimation of equation (2), controlled for EBT

	First Stage	Second Stage			
Dependent var:	ShadowR	ΔRevenue	ΔAssets	ΔRev/Assets	ΔRev/Employee
	(1)	(2)	(3)	(4)	(5)
ShadowR		-1.074	-.475	-1.651**	-.502
		(.848)	(.762)	(.717)	(.710)
ShadowR*CEO not owner		-1.549*	-1.348*	-1.139	-.990
		(.865)	(.755)	(.737)	(.757)
CEO not owner	-.009***	.053	.075*	.010	.030
	(.002)	(.052)	(.045)	(.045)	(.046)
Actual EBT/Rev, Log(Assets), Debt/Assets, Industry, Year	Y	Y	Y	Y	Y
Tax offices	Y				
R-sq	.037				
Number of obs	11,744	11,744	12,068	11,726	6,186
Number of firms	7,128	7,128	7,264	7,116	4,587
P-value (β_1+β_2)=0		.003	.015	.000	.031

Table AXV. Tax Enforcement and Firm Performance

The table describes the relation of tax enforcement to firm performance for the firms which have the same legal and physical address. Panel A reports the OLS estimation of equation (3) using a total wage bill of the local tax agency as a proxy for tax enforcement (see section AVII for definition of *Inverse tax enforcement).* Panel B (Panel C) reports the OLS estimation of equation (3) using 1-year (2-year) firm growth and change in productivity as performance measures. Panel D reports the OLS estimation of equation (3) using EBT instead of Actual EBT as a control. *Inverse tax enforcement* is defined in Section III. All other variables are defined in Table IV. The numbers in parentheses are robust standard errors, clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Panel A: Estimation of equation (3) using a tax agency wage bill as a proxy for tax enforcement

Dependent var:	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)
Inverse Tax Enforcement	-.0032***	-.0020***	-.0035***	-.0017**
	(.0008)	(.0007)	(.0007)	(.0007)
Actual EBT/Revenue	1.342***	1.072***	1.136***	.897***
	(.061)	(.048)	(.054)	(.059)
Log(Assets)	.008**	-.036***	.058***	.025***
	(.004)	(.003)	(.003)	(.003)
Debt/Assets	-.131***	-.084***	-.150***	-.088***
	(.034)	(.030)	(.030)	(.033)
Industry, Year	Y	Y	Y	Y
R-sq	.085	.073	.127	.105
Number of obs	13,139	13,489	13,112	7,100
Number of firms	7,559	7,686	7,548	5,108

Panel B: Estimation of equation (3) using 1-year firm performance

Dependent var:	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)
Inverse Tax Enforcement	.0000	-.0001	-.0003	-.0002
	(.0005)	(.0005)	(.0005)	(.0006)
Actual EBT/Revenue	1.489***	1.204***	1.379***	1.266***
	(.078)	(.056)	(.078)	(.097)
Log(Assets)	-.003	-.075***	.089***	.045***
	(.004)	(.004)	(.004)	(.006)
Debt/Assets	-.088**	-.058*	-.170***	-.051
	(.038)	(.031)	(.038)	(.047)
Industry, Year	Y	Y	Y	Y
R-sq	.039	.046	.052	.047
Number of obs	25,728	26,010	25,646	11,634
Number of firms	14,733	14,844	14,672	7,585

Panel C: Estimation of equation (3) using 2-year firm performance

Dependent var:	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)
Inverse Tax Enforcement	-.0012***	-.0009**	-.0016***	-.0013***
	(.0005)	(.0004)	(.0004)	(.0004)
Actual EBT/Revenue	1.390***	1.083***	1.223***	1.045***
	(.054)	(.040)	(.051)	(.057)
Log(Assets)	.004	-.046***	.066***	.041***
	(.003)	(.003)	(.003)	(.004)
Debt/Assets	-.166***	-.116***	-.193***	-.099***
	(.030)	(.025)	(.028)	(.031)
Industry, Year	Y	Y	Y	Y
R-sq	.068	.065	.094	.093
Number of obs	23,274	23,762	23,217	12,585
Number of firms	13,646	13,840	13,626	9,157

Panel D: Estimation of equation (3), controlled for EBT

Dependent var:	ΔRevenue	ΔAssets	ΔRevenue/Assets	ΔRevenue/Employee
	(1)	(2)	(3)	(4)
Inverse Tax Enforcement	-.0017***	-.0012***	-.0019***	-.0012***
	(.0004)	(.0003)	(.0004)	(.0004)
EBT/Revenue	1.365***	1.044***	1.186***	.973***
	(.049)	(.037)	(.045)	(.048)
Log(Assets)	.009***	-.032***	.057***	.025***
	(.003)	(.003)	(.002)	(.003)
Debt/Assets	-.183***	-.144***	-.185***	-.117***
	(.025)	(.021)	(.022)	(.024)
Industry, Year	Y	Y	Y	Y
R-sq	.085	.073	.121	.106
Number of obs	21,227	21,816	21,192	11,627
Number of firms	12,545	12,778	12,531	8,483

Figure A1. Rosstat and Banking Data Correspondence

The figure plots Log(Revenue) vs. Log(Revenue_B) and Log(Profit) vs. Log(Profit_B) for a sample of 500 randomly selected firms. All variables are defined in Table AII.

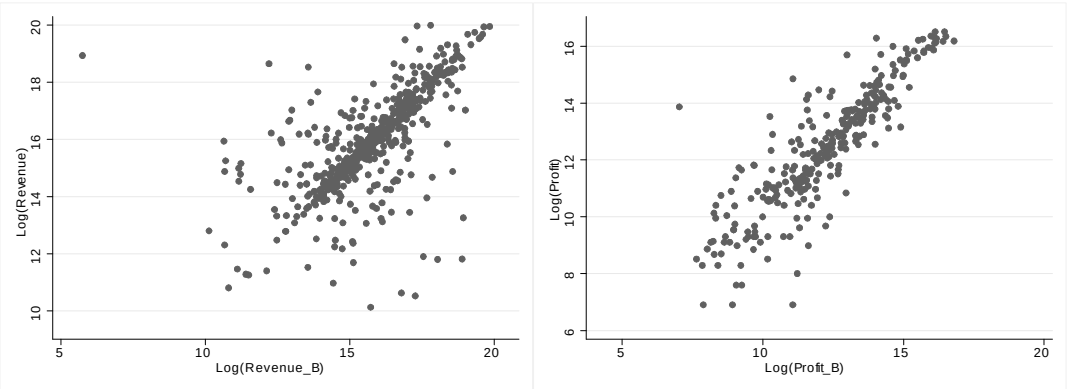

Figure A2. Kaplan-Meier Survival Estimates. Regular Firms vs. Spacemen

The figure plots Kaplan-Meier survival estimates for spacemen and regular firms. The firms' classification procedures are described in Section A3. *Age* is defined as the difference in days between the last and the first observed transaction.

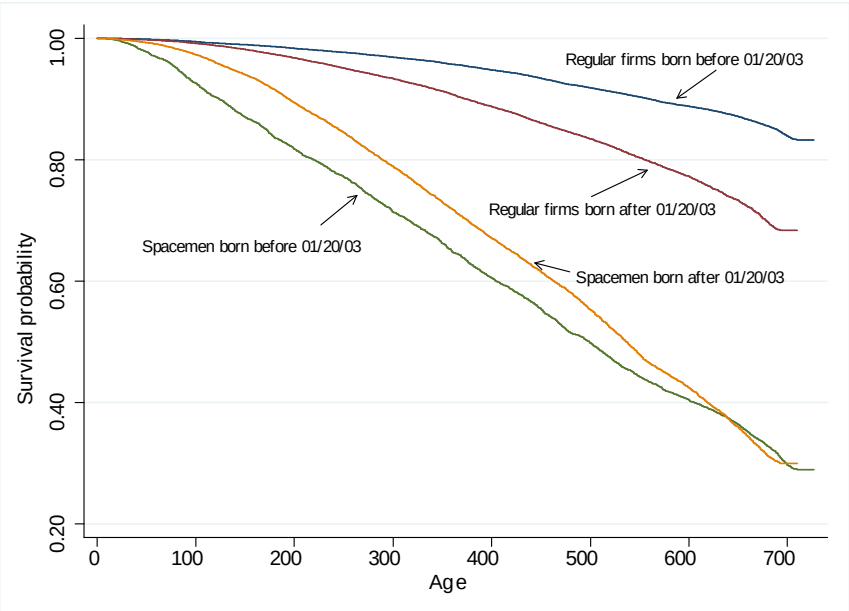

Figure A3. Density of Age Distribution. Regular Firms vs. Spacemen

The figure plots *Age* distribution of spacemen vs. regular firms. The firms' classification procedures are described in Section A3. *Age* is defined as the difference in days between the last and the first observed transaction.

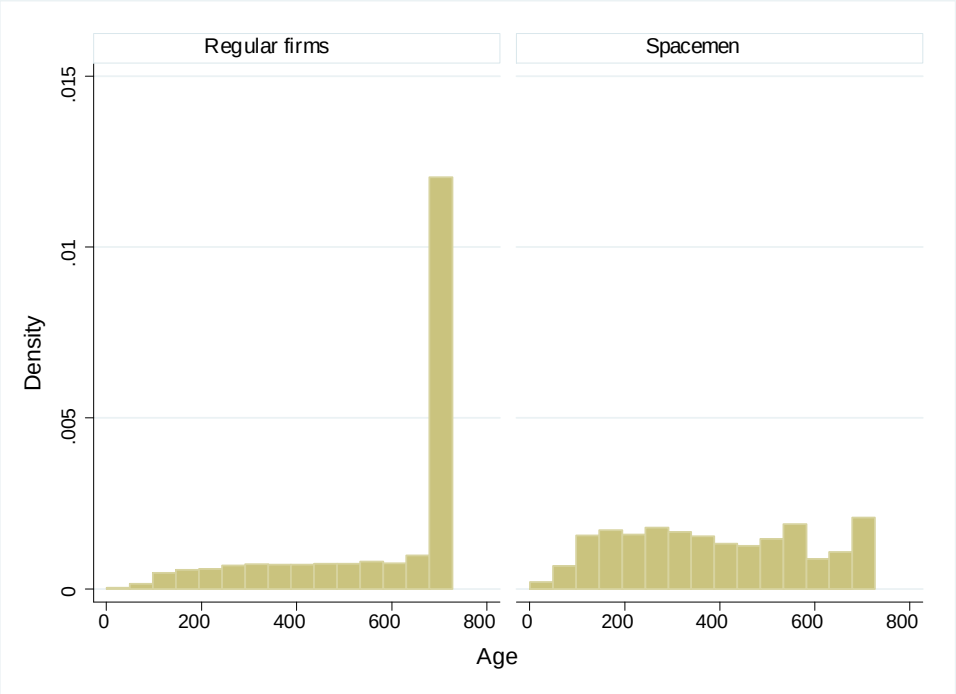

Figure A4. Age Distribution by Spacemen Type

The figure plots *Age* distribution of firms with with net tax rate less than 0.1% (columns [1] and [2] of Table AIV) and firms with net tax rate from 0.1% to 1% (column [3] of Table AIV). Net tax rate is defined in sSction A3. *Age* is defined as the difference in days between the last and the first observed transaction.