Tax Enforcement and Income Diversion:

Evidence after Putin's election in 2000

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October 2016

Abstract

Using a direct estimate of income diversion for 156 firms for the period from 1999 through 2004, we show that an increase in tax enforcement after the election of Vladimir Putin in 2000 is associated with a decrease in the appropriation of private rents by insiders in firms investigated for tax evasion. We also find evidence consistent with a simultaneous spillover effect: the largest nongovernment-controlled companies in Russia decrease income diversion even though they were not explicitly targeted as tax evaders. This effect is significant both economically and statistically after changes in firm-level corporate governance are controlled for, and it cannot be explained by trends regarding the general improvement of corporate governance in Russia during our sample period.

Keywords: tax enforcement, income diversion, corporate governance, spillover

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

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1. Introduction

In this paper, we want to answer two questions. First, we investigate whether tax enforcement may be used as an instrument to curb income diversion by managers and/or controlling shareholders. Second, we analyze whether income diversion simultaneously decreases in other companies that are not explicitly being investigated for tax evasion and, if so, which firm characteristics are associated with this spillover effect.

The first challenge in answering these questions concerns how to estimate income diversion. The literature offers three methods to proxy income diversion indirectly by measuring the private benefits of control: The first method, pioneered by Lease, McConnell, and Mikkelson (1983), relies on differences in prices between voting and nonvoting shares that have the same or similar dividend rights. The second method, first applied by Barclay and Holderness (1989), is based on differences between the negotiated prices of the controlling blocks of publicly traded companies and the market prices of shares. The third method, developed by Bertrand, Mehta, and Mullainathan (2002), focuses on the tunneling of resources from firms where the controlling parties have low cash flow rights to firms where the controlling parties have high cash flow rights. We follow a new approach introduced by Mironov (2013) to *directly* quantify a dollar-value estimate of income diversion. This method is based on the identification of special purpose entities called "spacemen": short-lived firms created for diversion purposes through the artificial inflation of firm costs that are typically registered in the names of persons who have lost their IDs.

The second challenge concerns how to address endogeneity. We use a series of actions that started with a memorandum released by the Russian Ministry of Finance after the election of Vladimir Putin in 2000 as an exogenous shock to tax enforcement.[1] The memo, issued in

[1] See Desai, Dyck, and Zingales (2007) for a detailed description.

July 2000, explicitly mentioned four large oil companies that were suspected of tax avoidance: Sibneft, Slavneft, Yukos and TNK. Subsequently, the pressure on Sibneft and other oil companies increased through the rest of 2000 and until Summer 2001. For instance, in August 2000, the tax police raided the offices of Sibneft, leading to criminal charges against the company. In November of the same year, the tax police announced proposals aimed at closing channels for tax avoidance by oil companies. Then, on January 25, 2001, President Putin met with oligarchs to discuss the passage of new tax laws designed to end tax avoidance schemes. Sibneft remained a target of government action, and additional criminal and civil actions were filed in the Spring and Summer of 2001.

Our sample comprises 156 large Russian firms in 12 different industries during the period from 1999 through 2004. We construct five corporate governance variables at the firm level: cross-listing as an American Depositary Receipt (ADR) in the U.S., being audited by one of the 'Big 5' international accounting firms,[2] and three variables related to the company's board: whether a foreigner serves on the company's board, the size of the board and whether the CEO has a seat on the board. These firm-specific variables allow us to study how different corporate governance mechanisms interact with tax enforcement at the firm level.

We begin by documenting the magnitude of income diversion in our sample. To construct our income diversion metric, we use a unique set of Russian banking transaction data for the 1999-2004 period. Leaked to the public from the Russian Central Bank in 2005, the dataset contains 513 million transactions of 1.7 million firms and covers 75%-80% of all banking transactions that occurred in Russia during the 1999-2004 period. We construct three measures of diversion: net transfers to spacemen as a percentage of total bank payments, net transfers to spacemen as a percentage of revenue, and net transfers to spacemen as a percentage

[2] Because the sample period starts in 1999, Arthur Andersen was still one of the "Big 5" accounting firms.

of assets. We find that income diversion among public firms is sizeable and significant, although smaller in relative terms than the effect documented by Mironov (2013) for private firms. According to our data, on average, a company diverts 2.7% of its total payments, 1.8% of its revenue, or 1.7% of its assets per year.[3]

Next, we investigate whether the release of the memorandum at the end of July 2000 had an impact on income diversion by the four oil firms included therein. Income diversion as an annual percentage of revenue is shown to decrease significantly for these companies starting in 2002 and through 2004, the end of our sample period. We then analyze the quarterly evolution of spacemen and income diversion as a percentage of total bank payments (quarterly data on revenues are unavailable) for these companies. We observe that coinciding with the release of the memorandum, the number of new spacemen created (net of those eliminated) begins to decrease significantly starting from the last quarter of 2000, but becomes negative (that is, the total number of spacemen decreases) only starting from the last quarter of 2001 and through 2002. In parallel, income diversion as a percentage of total bank payments begins to significantly decrease during the last quarter of 2001. This evidence shows a gradual reaction to tax enforcement shock consistent with firms needing time to redesign their operations and, possibly, to avoid further scrutiny from the tax authorities prompted by sudden changes.

We then investigate—controlling for firm corporate governance—whether this shock had any spillover effect on income diversion among other Russian companies. We hypothesize that larger firms should react more promptly to the threat of stricter tax enforcement. This hypothesis is motivated by the limited resources of tax authorities and the high costs involved

[3] Income diversion likely includes bribes, which, one may argue, may have a positive net present value for a firm's minority shareholders. Obviously, such activities are not reported and, therefore, cannot be controlled by minority shareholders. For example, if a CEO or a major shareholder needs to pay a $100 bribe, there is no control mechanism that prevents him from transferring more than $100 to spacemen. The manager will likely transfer to spacemen as much as he or she can as long as the marginal benefits of diversion are greater than the marginal costs.

in the detection of fraud. The hiring policy of tax offices in Moscow after 2000 provides some indirect empirical evidence consistent with this hypothesis. Moreover, larger firms are likely to be the largest diverters in absolute terms.

To test this hypothesis, we analyze which firm characteristics are related to a decrease in income diversion. Using annual cross-sectional regressions, we show that the decrease in income diversion from 2001 to 2002 is larger for larger sized firms. This result is robust after we control for firm corporate governance, industry fixed effects and other firm characteristics such as firms' leverage and income diversion (relative to revenue) in the previous year. Moreover, this effect is not significant in any other year in the sample period. We interpret this result as evidence of a spillover effect on income diversion among larger firms sparked by the memorandum and the subsequent tax enforcement actions. The variation in income diversion is also unrelated to any corporate governance instrument.

In the panel regressions, we show that the largest 10% of Russian firms according to market capitalization that are not controlled by the government reduce their income diversion by approximately 3% of revenue per year, on average, starting in 2002. This result is statistically significant at the 5% level and robust after we control for changes in corporate governance at the firm level and year and firm fixed effects. When we analyze the quarterly evolution of spacemen and income diversion as a percentage of total bank payments for these firms, we uncover a pattern very similar to that documented for the four firms included in the memorandum.

By contrast, average income diversion keeps increasing after 2001 for large firms controlled by the government and for the rest of (smaller) firms in our sample. Hence, our finding cannot be explained by a general improvement in corporate governance in Russia during the sample period. We interpret this finding as evidence in favor of our hypothesis of a spillover effect of tax enforcement among the largest public Russian firms. This finding

remains robust when we consider, alternatively, the 5% and the 25% largest companies and when we perform quantile regressions based on company size.

We contribute to the literature analyzing the frictions caused by the diversion of corporate resources to private interests (e.g., Shleifer and Vishny, (1997)) and the institutions that may help reduce such diversion. The extant literature has focused on factors such as debt discipline (Jensen and Meckling (1976)), the legal environment (La Porta, Lopez de Silanes, Shleifer, and Vishny (1998, 2000), Nenova (2003), Dyck and Zingales (2004)), the level of investor protection (Nenova (2003), Dyck and Zingales (2004)), product market competition (Guadalupe and Pérez-González (2010)), and increased public opinion pressure (Dyck and Zingales (2004)).

In this paper, we focus on two institutions: tax enforcement and corporate governance. Desai, Dyck, and Zingales (2007), the closest reference to our paper, introduced the notion of the state as, *de facto*, the largest minority shareholder in almost all corporations. They show that the tax enforcement actions following Putin's election in 2000 are associated with higher market capitalization of Russian oil firms, and they interpret this result to arise from a decrease in income diversion. Our direct measure of income diversion can be applied to all firms across sectors, whereas using alternative indirect measures based, for instance, on voting premia would restrict the sample to firms with dual share classes. Thus, extending the analysis of Desai et al. (2007), we provide direct evidence that an increase in tax enforcement is associated with lower income diversion among not only oil firms but also large public firms in general.

We also contribute to the literature on income diversion and corporate governance in emerging economies. A close reference to our work is Jiang, Lee, and Yue (2010), who document cash flow tunneling among Chinese companies through intercorporate loans during the period between 1996 and 2006. Whereas their sample is larger and their time span is longer, we use an exogenous shock (Putin's measures after ascending to power in 2000) to explore the

causal relationship. The authors conclude that only continued public enforcement was successful to eradicate tunneling. In addition, Black (2001) finds a positive correlation between firm value and corporate governance for a reduced sample of 21 Russian firms in 1999. Black, Love, and Rachinsky (2006) then extend this evidence to a larger set of Russian firms and different governance indices for the 1999-2004 period. Overall, their results support a positive link between firm-specific corporate governance and value. Black, Jang, and Kim (2006) use an instrumental variable approach to test whether better governance predicts higher market value among over 500 Korean companies in 2001. Moreover, in a recent paper, Bennedsen and Zeume (2015) document rent expropriation through tax heavens among a large set of publicly listed firms from 52 countries and find that increased transparency after the signing of Tax Information Exchange Agreements is associated with increases in shareholder value. Hanlon, Hoopes, and Shroff (2014) use the same event (the memorandum on tax evasion issued in July 2000) to show that the change in tax enforcement led to an improvement in earnings informativeness.

Additionally, we contribute to the literature on spillover effects in law enforcement. In this regard, Alm, Deskins, and McKee (2009) study tax compliance in a lab experiment and find that income reporting is sensitive to information obtained from other subjects. Rincke and Traxler (2011) present field evidence on externalities on compliance with TV license fees. In a paper more closely related to ours, Pomeranz (2015) finds strong evidence of spillover effects in VAT reporting among Chilean firms based on a randomized experiment. We use an exogenous shock, the election of Putin in 2000, to show that the memorandum released by the Russian Ministry of Finance affected income diversion among large nongovernment-controlled firms that were not explicitly mentioned in the memo. Our results thus contribute to the debate on the efficacy of tax enforcement with respect to income diversion and its interaction with firm corporate governance in emerging markets.

The remainder of the paper is structured as follows. Section 2 presents the analytical framework of the paper and introduces our empirical strategy. Section 3 describes the data used in the analysis. Section 4 presents our empirical results. We present conclusions in Section 5.

2. Analytical Framework

We borrow the model in Desai et al. (2007) to illustrate our tests. Let $0 \leq d \leq 1$ denote the proportion of income that insiders (controlling shareholders and/or managers) divert. Insiders own a fraction λ of the company. Diverting is costly, and this cost is represented by the quadratic function

$$C(d) = \frac{\gamma}{2} d^2,$$

where γ denotes the quality of corporate governance. There is also a tax system characterized by two variables: the corporate tax rate t and the level of tax enforcement α. Increasing α makes tax evasion more costly, as it can be interpreted as a higher likelihood of been caught and fined. Thus, the personal cost can be represented by the function

$$C(d) = \frac{\alpha}{2} d^2.$$

The total net payoff to the insider is given by

$$\lambda(1-d)(1-t) + d - \frac{\gamma+\alpha}{2} d^2.$$

Hence, the optimal amount of diversion is

$$d^* = \min\left(\frac{1-\lambda(1-t)}{\gamma+\alpha}, 1\right).$$

Given a tax rate t, this equation has the following implications:

1. Tighter tax enforcement reduces income diversion: $\frac{\partial d}{\partial \alpha} < 0$.

2. This effect is stronger when corporate governance is weaker: $\frac{\partial d}{\partial \alpha \partial \gamma} > 0$.

Our tests concern whether, as predicted by the model, an increase in tax enforcement is associated with lower income diversion. Notice that both "forces," tax enforcement and

governance improvement, are predicted to work in the same direction and to potentially act simultaneously. Thus, we control for firm corporate governance. Although these implications are derived from the model, they are not explicitly tested in Desai et al. (2007). The direct measure of income diversion from Mironov (2013) allows us to test these predictions.

As an exogenous change in tax enforcement, we use the series of actions implemented by the administration of newly elected President Vladimir Putin. His election in March 2000 was followed by a significant and unexpected change in the tax regime from that existing under his predecessor, President Boris Yeltsin. Interestingly, this change in regime did not include any substantial modification of the corporate tax rate. Desai et al. (2007) present a detailed chronology of these events that we summarize in the Introduction. One of the first actions was the dissemination of a memorandum released by the Russian Ministry of Finance on July 28, 2000, that identifies four large oil-extracting companies (Sibneft, Slavneft, Yukos and TNK) that were suspected of using tax evasion schemes. A series of actions against these companies then followed and continued until Summer 2001.

2.1 Empirical strategy

Our empirical strategy is the following. We first test, without any controls, whether income diversion significantly decreases after 2001 for the 4 firms cited in the tax avoidance memorandum. We analyze income diversion and the number of newly created spacemen in each firm during each quarter to identify more precisely when tax enforcement actions started to affect firms' income diversion. We show that these firms significantly decreased spacemen creation immediately after the issuance of the memorandum and started dismantling their spacemen during the last quarter of 2001, exactly the same quarter in which income diversion begins to decrease significantly.

We then investigate whether the new stance of Putin's administration on tax avoidance had any spillover effect on other Russian firms across time. We hypothesize that if a spillover effect exists, larger firms should respond more promptly and significantly to the new policy. This hypothesis is motivated by the limited resources of tax authorities and the high costs involved in the detection of fraud. Moreover, larger firms are likely to be the largest diverters in absolute terms.

To test this conjecture, we first analyze the change in income diversion across all the firms in our sample (outside of the four firms in the memorandum) to identify the characteristics that are the most correlated with annual decrease in income diversion during the sample period. We also control for industry-fixed effects. These tests show that firm size is negative and significantly correlated with income diversion in the transition from year 2001 to year 2002. Second, we analyze the quarterly evolution of income diversion and spacemen growth for the subsample of large private companies. We show that these firms significantly decreased new spacemen creation in the second half of 2000 and started to dismantle their spacemen, thus reducing income diversion, in the last quarter of 2001.

Based on this evidence, we create a new variable, *Tax enforcement*, that takes a value of one for the years 2002, 2003 and 2004 if a firm is not controlled by the government and if it belongs to the top 10% of firms according to 2001 market capitalization. Otherwise, the variable takes a value of zero. We pick 2002 as the first year of our treatment because we observe that the net number of spacemen is still growing in 2001, albeit less rapidly than in 2000. Indeed, quarterly income diversion (as a percentage of total bank receipts) starts decreasing only in the last quarter on 2001.[4] We then regress income diversion on this variable for the years from 1999 through 2004. As controls, we introduce the firm-specific corporate

[4] Quarterly data on revenues are not available.

governance variables, firm size, and firm. We also include firm and year fixed effects. In addition, we perform a number of robustness tests to confirm our results.

Parallel to the increase in tax enforcement, companies in our sample exhibit, on average, an improvement in some corporate governance institutions. To rule out the possibility that a general trend in corporate governance is driving our results, we compare this set of large companies with the four firms included in the memorandum, large government-controlled firms and the rest of the firms in the sample.

Before presenting our tests and results we briefly describe the direct measure of income diversion in Mironov (2013). We then define the firm-level governance variables. Finally, we define a set of control variables.

2.2 Income Diversion Using Spacemen

As an illustration of the method,[5] consider the following example. Firm A wants to divert $X of income. Thus, it makes a deal with firm B whereby firm B renders to firm A goods or services worth $100 but for which 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 then returns $X to firm A's manager or owner in the form of cash. This diversion hurts firm A's minority shareholders in two ways. First, mechanically, the company's EBITDA (earnings before interest, taxes, depreciation and amortization) decreases by $X. Consequently, several of the company's performance and financial ratios, including its Interest Coverage Ratio, are negatively affected. Second, cash is removed from the company, which immediately reduces the market value of equity, jeopardizes the firm's ability to grow in the future, and thus directly affects the firm's market value.

[5] For a full description of the method, we refer the reader to Mironov (2013).

Firm B is a fly-by-night firm called a "spaceman": it appears to come out of nowhere, does not perform any real activities, pays almost no taxes, and disappears ("flies into space") within 0.5 to 2 years. Because $X can be large, spaceman schemes require the collaboration of bank officials. Mironov (2013) identifies 42,483 spacemen and estimates income diversion to be as large as 11.4%-13.1% of Russia's GDP during the 2003-2004 period.

Specifically, a firm is defined as a spaceman if it satisfies 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 $7.2 in Social Security taxes per month, an amount that approximately corresponds to Social Security taxes paid on one minimum wage; and (c) the firm's cash inflows exceed its outflows. According to the Russian tax system, even a firm with a loss must pay VAT, Social Security taxes, and property taxes; hence, these criteria guarantee that such a firm cannot survive even a simple examination by tax authorities. Based on these criteria, we identify 99,925 spacemen for the 1999-2004 period.

Next, income diversion at the company level is calculated as the sum of net transfers to spacemen by all company affiliates. In most cases, large Russian corporations do not send funds directly to spacemen but use affiliated entities that, in turn, interact with spacemen. Consider Gazprom, a company that used its affiliates, Gaztaged, Laingaz, and Provaidgaz (100% subsidiaries of Gazprom), and other entities for these purposes. For instance, in 2003-2004, Gaztaged sent $992 M to the spaceman Trubniy Torgoviy Dom, and Laingaz transferred $267 M to the spaceman Energosintez-M. Hence, in calculating the diversion of large Russian corporations, we aggregate net transfers to spacemen by a main firm and all its affiliates.[6]

This approach to the measurement of diversion does not capture all the private benefits of control. For example, it does not capture diversion related to transfer pricing, which Desai

[6] Affiliate firms are firms in which the main company has at least a 20% ownership stake. Replacing the 20% threshold with a 50% threshold does not affect the results.

et al. (2007) document to be enormous in Russia. Moreover, it does not capture diversion via consumption of perks (e.g., a private jet plane, membership in an exclusive club, a privileged retirement plan or health insurance). Our measures of cash flow diversion, therefore, may significantly underestimate the total private benefits that managers and/or controlling parties enjoy.

3. Data and Sample

The main data source used in this paper is a unique dataset of Russian banking transactions for the period from 1999 to 2004. The data for 2003 and 2004 are used in Mironov (2013) and come from www.vivedata.com, and the data from 1999 to 2002 come from www.rusbd.com. The dataset contains information on 513,169,660 transactions involving 1,721,914 business and legal government entities and self-employed entrepreneurs without legal enterprise status, including the date of each transaction, the payer, the recipient, the amount paid, and the self-reported purpose of the transaction. Mironov (2013) imposes numerous reality checks on these data.

To determine our final data set, we impose three filters. First, because large Russian companies typically divert cash flow through affiliate entities, we restrict the sample to companies that have lists of affiliates.[7] Second, companies must have available governance information. These data are manually collected from company reports.[8] Third, to control for

[7] Most affiliates can be identified from company reports in years 2003 and 2004. Data on affiliates prior to 2003 are, in many cases, unavailable. We assume that affiliate companies in 2003 were also affiliates during the 1999-2002 period. For the total sample of 156 companies, we find more than 7,000 affiliates during the 1999-2004 period. Matching this list of affiliates to the banking database, we identify approximately 1,661 affiliates that sent funds to more than 11,000 spacemen. For example, we identify 212 affiliates of Gazprom, 68 affiliates of Lukoil, and 29 affiliates of Norilsk Nickel. Failing to account for these affiliates would severely bias our results.

[8] The Federal Financial Market Service (FFMS) requires that companies trading on the Russian Trading System (RTS) submit yearly reports containing, *inter alia*, information on board composition and the company's auditor. Moreover, the regulator requires companies to disclose data from previous years when they go public. Nevertheless, historical reports were not always available because there is no legal requirement that firms retain

the accuracy of the banking data, company receipts and payments must be consistent with reported revenue.[9] These filters yield a final sample of 156 companies for the 1999-2004 period.[10] Although this number may seem relatively small, it is significantly larger than those in previous studies on Russian data, such as Black (2001). The sample includes the vast majority of listed Russian firms for each year.

Using information from quarterly reports submitted to the FFMS, we code the following variables related to corporate governance. *ADR* is a variable that takes a value of one if a company has ADRs and zero otherwise.[11] *Audit by Big 5* is a variable that takes a value of one if a company is audited by one of the Big 5 accounting firms (Arthur Andersen, Deloitte, Ernst & Young, KPMG, or PWC) and zero otherwise. *Board size* is the number of directors serving on a company's board. *CEO ownership* indicates a CEO's company stock ownership as a percentage of total market capitalization. *CEO on board* and *Foreigner on board* are variables that take a value of one if the CEO has a seat on the board or a foreigner serves on the board, respectively, and zero otherwise.[12]

We supplement these data with data from Rosstat, the Russian statistical agency, which is accessible at spark.interfax.ru. This database contains each firm's INN (taxpayer number), name, region, date of registration, and industry, as well as additional identifying information

them. We need these data to construct the goveranance variables in our tests. Additionally, the fact that a company reports this information adds a extra layer of credibility to the remainder of the reported data.

[9] Specifically, we include only firms for which |log(Receipts+Payments)-log(Revenue)|<log(10).

[10] In the first year of our sample, 1999, the number of firms that satisfy the three filters is only 57. The number of observations increases year by year. This is because the further we move back in time, the less the information collected in 2003-2004 (i.e., affiliate lists) corresponds to the actual data. In addition, the annual reports for 1999-2000 were more difficult to obtain for earlier years than for later years.

[11] Our data do not distinguish between Level 1 ADRs, which trade Over-The-Counter, and Level 2 and 3 ADRs, which are directly listed on U.S. stock exchanges. Although this distinction may have important implications for the effective monitoring pressure in place, our limited sample size of cross-listed firms does not allow for such tests. During the sample period, no Russian firm traded as an ADR in Hong Kong, and only 3 Russian companies (Lukoil, Gazprom and Tatneft) were listed on the London Stock Exchange. These companies were also listed on the New York Stock Exchange.

[12] The literature has studied other corporate variables, including the threat of dismissal measured by CEO turnover, ownership concentration and shareholder activism (e.g., Dyck et al. (2008)). Unfortunately, data limitations do not allow us to construct these variables.

about the firm. In addition, it contains basic accounting data, such as revenue, profit, net income, assets, debt, and other items. According to Russian law, all firms (even small ones) must report their balance sheets and income statements to Rosstat on a quarterly basis. Although the law does not explicitly penalize 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 approximately 2.5 million Russian firms.

We use these data to construct a set of control variables that have been used in previous studies (see, for instance, Doidge et al. (2009)). Log*(Revenue)* is the natural logarithm of the company's reported revenue. *Owned by government* is a variable that takes a value of one if the government owns more than 20% of the company shares and zero otherwise (a threshold of 50% yields similar results). *Debt/Assets* is the ratio of the company's long-term debt over its total asset value, both at book value. Log *(Board size)*, Log *(Revenue)*, and *Debt/Assets* are winsorized at the top 95th percentile. Since we have only 156 companies, we assign industry dummies according to Fama French 12 industry classification criteria.

Table 1, Panel A, presents summary statistics for all firms in our sample. An average (median) company has a revenue of 683 M (143 M) dollars and assets of 1,287 M (174 M) dollars.[13] Of the companies, 64.2% were traded on RTS or MICEX in 1999-2004, and 7.3% were cross-listed on U.S. exchanges. Additionally, 18.2% were audited by a Big 5 accounting firm. The average board has 8.4 members (the median is 8), and CEO ownership is very low, with an average of 1.6% and a median that is not distinguishable from zero (for comparison, U.S. directors and officers holdings in Yermack's (1996) sample account for, on average, 9.1% of company market capitalization, with a median of 2.8%). Given that CEO ownership is nearly zero for the majority of the firms in our sample, we remove this variable in later tests. In more

[13] The exchange rate is updated annually. The average rate over the sample period was 30 Rubles per Dollar.

than 83% of cases, the CEO serves on the board of directors, and 14.6% of the companies include at least one foreigner on the board. The government controls 27.7% of the companies in the sample. The average leverage (*Debt/Assets*) is 16.5%, with a median of 11.7%.

Panel B of Table 1 reports summary statistics for the subsample of companies with ADRs, which are much larger than most companies in the sample. An average (median) company that is cross-listed on the U.S. stock exchange has a revenue of 4,235 M (1,072 M) dollars and assets of 9,199 M (1,779 M) dollars. A much larger percentage (62.2%) of these companies are audited by Big 5 accounting firms, and they are more likely (35.6%) to have a foreigner sitting on the board and to be controlled by the government (40%). The average cross-listed company has a Tobin's *Q* value[14] equal to 1.168. Their operating performance is also higher. The average *EBITDA Margin (EBITDA/Revenue)* for companies with ADRs is 28.6%, whereas the average *Margin* for all companies in the sample is 16.6%.

Panel C of Table 1 shows the annual average value of each variable from 1999 through 2004. Notice that the average firm becomes steadily larger over time, as measured by both revenue and assets. It is worth mentioning that some governance and control variables experienced a sharp increase starting in the year 2002. In particular, the average number of firms cross-listing as an ADR in the U.S. increased from approximately 6.5% of the companies in the sample in 2001 to almost 9% in 2002-2004. The average number of foreign board members also increases from 12.9% in 2001 to 18% in 2002. Simultaneously, the average number of firms controlled by the government in our sample gradually decreased from more than 30% in 2001 to 22% in 2004.

[Insert Table 1 here]

[14] We calculate Tobin's *Q* for listed companies as follows. For the numerator, we take total assets, subtract the book value of equity, and add the market value of equity. For the denominator, we use total assets.

4. Empirical Results

4.1 Measuring Income Diversion

Note that not all monies transferred to spacemen constitute cash flow diversion. If a firm pays a spaceman for nonexistent consulting services, then the diversion is 100% of the payment. However, if a firm orders goods from a spaceman, the diversion is a fraction of the transfer. As an illustration, consider a manager who wishes to divert cash by buying a computer above fair price. He or she buys the computer from a spaceman for $4,000, the spaceman transfers $1,000 to a real firm that sells computers, the real firm delivers the computer, and the manager receives $3,000 in "cash back." In this case, the diversion is $3,000, not $4,000. Empirically, we estimate a net transfer to a spaceman as the difference between the money transferred to a spaceman and the money the spaceman transfers to regular firms.

We identify 99,925 spacemen during the 1999-2004 period. On average, each spaceman receives 281 transfers from firms during the sample period for a total amount of $4.5 million. The average spaceman performs 100 payments to final suppliers or to other spacemen for a total value of $1.6 million. Moreover, a spaceman lives, on average, less than 2 years and pays $340 in taxes over its life.

Following Mironov (2013), we construct three measures of income diversion at the firm level:

$$ShadowP = \frac{Net\ transfers\ to\ spacemen}{Total\ \ payments},$$

$$ShadowR = \frac{Net\ transfers\ to\ spacemen}{Revenue},$$

$$ShadowA = \frac{Net\ transfers\ to\ spacemen}{Assets}.$$

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

Table 2, Panel A, presents summary statistics for 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 2.7% of its total payments, 1.7% of its book assets, and 1.8% of its revenue. By contrast, cross-listed companies with ADRs (panel B) transfer to spacemen an smaller percentage: 1.8% of their payments, 0.9% of their assets, and 1.3% of their revenue.[15]

[Insert Table 2 here]

Table 3 shows the top 20 largest companies according to income diversion. Comparing the median diversion values in Table 3 with those in Table 2, we observe that income diversion is highly skewed by a subset of large companies engaged in massive diversion, in both absolute and relative terms.

The largest diverter is Lukoil, one of the world's largest oil producers, with $7.5 billion dollars accumulated from 1999 to 2004, followed by Gazprom, the largest Russian company, with $2.2 billion dollars. Lukoil significantly decreased its transfers to spacemen starting in 2002. The sharp decline in income diversion reported in Table 3 translates into an increase in the company's EBITDA Margin (unreported in the table) from 16% in 2001 to 29% in 2002 and a decline in the estimated *ShadowR* measure of income diversion from 8.4% in 2001 to 3.6% in 2002. During the same period, income diversion, net transfers and *ShadowR* more than

[15] Table A1 in the Appendix reproduces Table 2 using gross transfers instead of net transfers to spacemen. The pattern is very similar, although the figures are slightly larger.

doubled for Tatneft, a relatively smaller oil company in Tatarstan that is controlled by the government. Consequently, its EBITDA Margin (unreported in the table) actually decreased from 24% in 2001 to 18% in 2002. Interestingly, state-owned Gazprom significantly increased its transfers to spacemen during the 2003-2004 period. In the next section, we present empirical evidence for our sample showing how Putin's tax enforcement measures curbed income diversion in large nongovernment-controlled firms without affecting smaller firms and government-owned firms.

[Insert Table 3 here]

4.2 Income Diversion and Tax Enforcement

In this section, we analyze the effect of the increase in tax enforcement after the election of Vladimir Putin in 2000 on firms' income diversion. As documented by Desai et al. (2007), the implementation of these measures extended into the middle of 2001, after it formally began with the release of a memorandum in July 2000 by the Russian Ministry of Finance that included a list of the worst corporate tax offenders (four oil companies): Sibneft, Slavneft, Yukos and TNK. After this event, the pressure on Sibneft and other oil companies increased through the rest of 2000 and until Summer 2001.

Panel A in Table 4 shows the evolution in income diversion (as a percentage of revenue) for the 4 oil-extracting firms included in the tax avoidance memorandum issued by the Ministry of Finance in July 2000. The evidence reported in Panel A has two implications. First, until 2001, income diversion was increasing for all these companies virtually every year. Second, the increase in tax enforcement had a sizeable impact on income diversion for those firms explicitly mentioned in the memorandum. From 2001 to 2002, *ShadowR* decreases between

24% in the case of Slavneft and 55% in the case of TNK. Although tax enforcement actions were undertaken in the second half of 2000 and until the middle of 2001, it typically takes some time for companies to change their business processes. To document the gradual effect of tax enforcement on income diversion, Panel B presents the quarterly evolution of net transfers to spacemen as a percentage of the company's total bank payments, *ShadowP*.[16] In the case of Sibneft, income diversion decreased from 1.73% of payments in the last quarter of 2001 to 0.8% in the third quarter of 2002 and remained below this figure for the rest of the sample period. The average quarterly transfer until the second quarter of 2002 is 1.48%. After that quarter, the average transfer decreased to 0.49%, a third of the former figure. In the case of TNK, the most drastic change in income diversion occurred from the last quarter of 2001 (2.08%) to the first quarter of 2002 (0.5%). The average quarterly net transfer to spacemen until the end of 2001 is 2.04%, whereas the average net transfer afterward is less than half that value (0.99%). The time series of available data for Slavneft and Yukos end on the second quarter of 2003. For Salvneft, income diversion decreased three times in the third quarter of 2001: down from 2.26% in the second quarter to 0.71% in the third quarter. The proportion is very similar if we compare the average quarterly *ShadowP* before the third quarter of 2001 (3.84%) with the average value afterward (1.04%). Finally, Yukos began decreasing net transfer significantly in the first quarter of 2002, when *ShadowP* decreased from an average of 2.27% per quarter until the end of 2001 to 1.03% in the first quarter of 2002 (the average afterward is very similar, 1.12% quarterly). Thus, although it varies slightly from company to company, we can talk of a structural (i.e., permanent) decrease in income diversion toward the second half of 2001 and, mostly, the beginning of 2002 for the firms explicitly targeted in the memorandum released in July 2000.

[16] Data on revenue are not available quarterly; hence, *ShadowR* cannot be estimated at such a frequency.

Panel A in Figure 1 presents the quarterly average rate of growth of net spacemen (the number of new spacemen "born" net of those "dead") among the four companies mentioned in the tax avoidance memorandum. In other words, every quarter, we report the average net inflow of spacemen in that quarter as a proportion of the average number of existing spacemen at the end of the previous quarter. We also estimate the moving average of the growth rate of net spacemen each quarter t as the average of the ratio in quarters t-1, t and t+1. A simple inspection of the figure shows that on average, the rate of creation of new spacemen starts to decrease in the fourth quarter of 2000, right after the memorandum was released. However, firms actually begin to eliminate spacemen (i.e., to show a negative growth rate) only in the last quarter of 2001 and through 2002. This coincides with the evidence on income diversion (quarterly *Shadow P*) in Table 4, Panel B. Therefore, although the memo was released in July 2000, there is a transition period in which firms gradually adjust until they actually begin to dismantle the evasion mechanism (spacemen) in place. This gap can be explained by the nature of the transactions and companies' interest in avoiding abrupt variations that could signal the existence of fraudulent activities to the tax authorities.

[Insert Table 4 here]

[Insert Figure 1 here]

4.3 Evidence of a Spillover Effect

In this section, we test whether the decrease in income diversion after 2001 reported in the previous section for the four firms explicitly mentioned in the memorandum extended to other Russian firms. If so, we want to investigate which company features may explain the

spillover effect and whether this effect was mitigated by better corporate governance, as predicted by the model.

For each firm in our sample, we define the change in income diversion in the year 2000 as the difference between *ShadowR* in the year 2000 and *ShadowR* in the year 1999. We then regress these changes against *ShadowR*, *Log(Revenue)*, *Owned by government* and *Debt/Assets*, each as of 1999. The regression also includes the corporate governance variables and industry fixed effects.[17] We repeat this process for the years 2001 through 2004. The OLS cross-sectional estimates are reported in Table 5. The four firms included in the tax avoidance memorandum released in July 2000 have been removed. Notice that during every year, the number of firms increases since there are new firms that satisfy the data requirements.

During each year, *ShadowR* at the beginning of the year is negative and strongly related to the variation in income diversion over the year. This result is consistent with mean reversion in income diversion over time among Russian firms. Among the firm characteristics included in the regressions, firm size is the only variable that is statistically significant at the 5% level, and it is significant only in the year 2002. That is, larger firms decreased their income diversion significantly more in the year 2002, exactly the same year as the four firms included in the memorandum issued by the Russian Ministry of Finance decreased their income diversion, as shown in Table 4. Notice that company size is significant after we control for the level of income diversion, firm corporate governance and industry fixed effects.

[Insert Table 5 here]

These results extend the evidence reported in Table 4 for the four oil companies in the memorandum to a potentially larger set of large Russian companies, even if they were not

[17] Results without the corporate governance variables are very similar.

explicitly mentioned in the memorandum. To find additional evidence in favor of spillover effects, we analyze the largest 10% of companies (in terms of 2001 market capitalization) that are not directly controlled by the government. We exclude companies controlled by the government because, arguably, it is not necessary to take any public tax enforcement action against these companies. In addition, there is evidence that managers of government-controlled companies are indirect subordinates of President Vladimir Putin and that he appoints them. For instance, Alexei Miller, a close friend of Vladimir Putin, was appointed as CEO of Gazprom in the year after Putin was elected President.

Six companies meet these double criteria: Lukoil, Severstal (the largest steel producer in the country), Yukos, MTS (Russia's largest mobile network provider), Norlisk Nickel (the world's largest nickel producer) and Surgutneftegas (one of the largest oil companies in Russia). Together, these companies represent 90% of the total market capitalization of all companies not controlled by the government in 2001. Because Yukos is included in the list of companies mentioned in the memorandum, we remove it.

Panel A in Table 6 presents the annual evolution of our measure of income diversion, *ShadowR*, for these corporations from 1999 (when available) through 2004. For each year, we report the value of *ShadowR* for each firm. Notice that in all cases, income diversion increased until (and through) 2001. The decline in *ShadowR* from 2002 onward is, in most cases, very dramatic. In the case of Lukoil, the decline in 2002 is more than half, and it continues every year afterward. For Severstal, the value of *ShadowR* in 2002 decreases to a value of about one-third of the previous value, although it increases thereafter. In the case of Norilsk Nickel, *ShadowR* declines more than 60% from 2001 to 2002. In Panel B, we repeat the same quarterly analysis performed in Table 4 for the new companies. The pattern is the same. Lukoil and Severstal exhibit a sharp decrease in *ShadowP* (income diversion relative to total bank payments) in the last quarter of 2001; Norlisk Nickel, in the first quarter of 2002. In the case

of MTS and Surgutneftegas, the variation is more nuanced. Income diversion is, consistently, one order of magnitude lower in these two companies than in the other companies in the table. We examine the rate of change in the number of net spacemen in Panel B of Figure 1. Similar to the figure in Panel A, the rate of growth in spacemen decreases significantly in the third quarter on 2000, around the date of the release of the memorandum in July of that year. However, the actual dismantling of these structures (negative growth rates) begins in the last quarter of 2001 and continues through 2002. Therefore, in this larger set of firms, the decrease in the growth of net inflow of spacemen also exhibits a gradual transition from the release of the memorandum to the actual destruction of spacemen starting in the last quarter of 2001.

[Insert Table 6 here]

Next, we test our hypothesis with the panel data. Based on the evidence from Table 6 and Panel B from Figure 1, we pick 2002 as the first year of our treatment because we observe that the net number of spacemen is still growing in 2001, albeit less rapidly than in 2000. Indeed, quarterly income diversion (as a percentage of total bank receipts) starts decreasing only in the last quarter of 2001. Thus, we construct a new variable, *Tax enforcement*, that takes a value of one in the years 2002, 2003, and 2004 if the company is among the largest 10% of companies according to market capitalization in 2001 and if it is not controlled by the government; otherwise, the variable takes a value of zero.

In column (1) of Table 7, we report the results of the regression of income diversion, represented by the variable *ShadowR*, on *Tax enforcement*. We also include the control variables defined in Section 3. The four firms included in the memorandum have been removed (they are also removed in all the robustness tests). The results presented in the table indicate that increased tax enforcement resulted in a significant decrease in income diversion for large

Russian corporations starting in the year 2002. This result is robust to the inclusion of year and firm fixed effects. On average, large nongovernment-controlled firms decreased income diversion by 2.7% of sales from 2002 onward relative to their previous value in 2001. This decrease is economically large in comparison with the average *ShadowR*, 1.8% of revenue, reported in Table 2, and it is statistically significant at the 5% level. This result indicates that the companies presumably targeted by Putin's Administration evaded much more than the average company in the sample before the tax enforcement actions occurred.[18]

We then include in column (2) the dummy variable ADR and in column (3) all the corporate governance variables. The coefficient remains virtually the same in both cases, and they are significant at the 5% level. None of the corporate governance variables has a significant coefficient.

As additional robustness test, we remove the observations from year 2001, which we have identified as the year of the "shock" (as explained, the memorandum was released in July 2000 and the coercive measures by Putin's administration continued through 2001). The results are presented in Table A3 in the Appendix. They remain qualitatively robust, although the size of the coefficient on income diversion decreases slightly from 2.7% to 1.9%, which is significant at the 5% level. In Table A4, also in the Appendix, we perform the same test as in Table 7 but restrict the sample to the 57 firms available in 1999, the first year of the sample. The results are even stronger, with a larger coefficient on tax enforcement significant at the 1% level. This indicates that the filters imposed to the data are not conditioning our results.

[Insert Table 7 here]

[18] Table A2 in the Appendix replicates Table 7 using gross transfers instead of net transfers to spacemen. After defining *Gross ShadowR = Gross transfers to spacemen/Revenue*, we find that on average, large nongovernment-controlled firms decreased income diversion by 3.5% of sales from 2002 on relative to their previous value in 2001. These result is very robust after controlling for corporate governance in different specifications of the test.

4.4 Interpretation

The evidence reported in Tables 5 to 7 and Figure 1 is consistent with a spillover effect induced by the tax enforcement measures adopted by Putin's administration after his election in 2000. Although the memorandum issued by the Ministry of Finance mentioned only four Russian oil companies, income diversion significantly decreased among other large nongovernment-controlled companies in different sectors following a very similar time pattern. We have shown that company size (proxied by revenue) is a key factor that explains the reach and magnitude of the spillover effect.

With hindsight, one possible interpretation is that Putin targeted larger nongovernment-controlled firms to leverage his power among Russian oligarchs and, ultimately, derive private benefits. This interpretation is consistent with the fate of Yukos. In October 2003, Khodorkovsky—CEO of Yukos—was arrested. From 2003-2004 onward, the Russian government claimed unpaid taxes from Yukos for a total amount of U.S. $27 billion. Between 2004 and 2007, most of Yukos's assets were seized by the Russian government and sold for a fraction of their value to the state-owned oil company Rosneft. Nevertheless, some evidence conflicts with this hypothesis. First, several of the CEOs from the companies that exhibited a more drastic decrease in income diversion after 2001 were publicly known to be in good terms with Putin, such as Sibneft and Lukoil. Desai et al. (2007) also show that investors positively evaluated Putin's action: the market price of Sibneft and other oil and gas companies significantly increased after Putin's stronger stance on tax evasion was made public. Moreover, according to the IMF, foreign direct investment in Russia grew by 26%, 130% and 94% in the years 2002, 2003, and 2004, respectively. Although these facts do not prove anything by themselves, they are difficult to reconcile with higher risk of expropriation and suggest that

foreign and local investors positively reacted to Putin's policies, even though some of those investors have recently recognized that they were mistaken.[19]

As an alternative interpretation, we postulate that Russian authorities may have had limited resources and therefore, targeted the largest firms first because in absolute value, those firms were the greatest income diverters. In support of this hypothesis, the number of employees at the central tax office in Moscow in charge of supervising large firms increased fourfold from 1999 to 2004. By contrast, the aggregate increase in the rest of offices in the city was only 20% over the same time period.[20] We hypothesize that large firms felt an imminent threat after the public release of the memorandum and, despite not being explicitly targeted by the Ministry of Finance, reacted simultaneously to the four firms in the memorandum by reducing their number of spacemen and, ultimately, their income diversion. Although we cannot test this hypothesis directly, Table 3 shows some indirect support for this intuition: three of the six largest nongovernment-controlled firms in our sample (*Tax enforcement = 1*) are also the largest absolute diverters, as measured by their aggregate dollar diversion from 1999 to 2001 (*Lukoil*, *Norilsk Nickel*, and *Severstal*). This result is consistent with a gradual spillover effect of tax enforcement measures that are costly to monitor and implement and that began, explicitly, with the four oil firms included in the 2000 memorandum. The evolution of quarterly *ShadowP* and the net flow of spacemen documented in Figure 1 suggest that firms explicitly targeted in the memorandum (Table 4) and the largest nongovernment-owned large firms (Table 6) reacted similarly to Putin's tax enforcement policy.

The reported evidence on the decrease in income diversion after the tax enforcement measures suggests that minority shareholders should profit from this policy. One way to

[19] Bill Browder (CEO and founder of Hermitage Capital Investment): "I naively thought that Putin was acting in the national interest and was genuinely trying to clean up Russia." (Browder (2015), p. 160).

[20] According to the Moscow Personal Income Data (see Mironov (2015) for the data description), the number of employees at the tax office that supervises the largest taxpayers increased from 92 in 1999 to 292 in 2004, whereas the total number of employees in the 33 district tax offices increased from 8004 in 1999 to 9550 in 2004.

analyze this possibility would be to study the evolution in payouts among the set of large nongovernment-controlled firms in comparison with the rest of firms in the sample. Unfortunately, payout data for those years are very incomplete. Incidentally, among the set of large firms in Table 6, we observe very dramatic increases in cash dividends around the implementation of stricter tax enforcement: *Lukoil*, for instance, increased its cash dividends by 483% in 2001 and 285% in 2002; *Norilsk Nickel*, by 591% and 1,508% in 2001 and 2002, respectively. Desai et al. (2007) report that Sibneft paid dividends for the first time in November 2000 ($53 million) and paid close to $1 billion in 2001. Although we cannot discard the possibility that firms used alternative mechanisms to expropriate cash flow, this evidence is consistent with a value redistribution toward minority shareholders after the reduction in income diversion via spacemen.

In Tables 5 and 7, we find no evidence of any relation between income diversion and any of our corporate governance variables regardless of whether we analyze the cross-sectional variation in income diversion year by year (Table 5) or the relation between *ShadowR* and each of the governance variables in the panel data (specification (3) in Table 7).

One could argue that, at least in those years, corporate governance in Russia was not very developed.[21] From an empirical point of view, corporate governance is endogenously determined, and we lack any identification strategy for the companies' choice regarding

[21] As anecdotal evidence on this point, in 2003-2004, Gaztaged (a 100% subsidiary of Gazprom) transferred one billion dollars to an unknown company, Trubniy Torgoviy Dom. According to Spark (Spark.interfax.ru), this company was registered in December 2003 with a charter capital investment of 10,000 RUR ($330). Banking data show that the new company received $343,000,000 from Gazprom in 2003 and $657,000,000 in 2004 in payment for pipes. According to Rosstat data, Trubniy Torgoviy Dom's revenue is $148,000 in 2003 and $206,000 in 2004, or approximately 3,000 times less than its actual revenue. In addition, this firm has no website or office. Based on this evidence, we conclude that this company is a typical spaceman and that the transfer of a billion dollars to it constituted pure cash flow diversion. There is no mention of whatever this transfer or the alleged supplier in PWC's audit opinion for Gazprom. We can only speculate whether this oversight was due to incompetence or bribery.

governance quality and institutions. Moreover, our sample size is rather small, and there is little within-firm variation across time for the governance variables: if a firm cross-lists as an ADR in a given year, then it will most likely be cross-listed in the following year; likewise, if a firm is audited by a Big 5 accounting firm, then it will most likely be audited by a Big 5 firm in the following year. For the smaller subset of large nongovernment-controlled firms this is likely a more serious concern.

4.5 Robustness Tests

As a robustness test, we redefine the *Tax enforcement* variable to take a value of 1 for the largest 5% (Table 8) of nongovernment-controlled firms in the sample. Imposing this threshold shrinks the sample to three firms. The coefficient on *Tax enforcement* increases to 4.4% and is significant at the 5% level. When we define the threshold as the largest 25% of firms (Table 9), the coefficient is negative and significant at the 5% level and decreases by approximately half, from 2.7% to 1.6%. In this case. the number of firms that take a value of 1 for this variable grows to 14 companies. This results indicate that the spillover effect from the memorandum on income diversion is concentrated among the largest firms although its statistical significance is robust to the different thresholds considered.

[Insert Table 8 here]

[Insert Table 9 here]

To further disentangle the effect of firm size on our results, we conduct two sets of quantile regressions. In Table 10, Panel A, we create four tax enforcement dummies that take a value of 1 after 2001 if the firm is private and belongs to the first quartile (largest firms according to 2001 market capitalization) through the fourth quartile (smallest firms); the

dummy variables take a value of zero otherwise. We repeat the same procedure for government-controlled firms. We then run the panel regressions while controlling for *Debt/Assets*, Log*(Revenue)*, and the corporate governance variables. We also include year and firm fixed effects. In the first column, in which we consider only quartiles of private firms, we observe that the top quartile (largest firms) carries a negative and significant coefficient. By contrast, the rest of coefficients on the quartiles with smaller firms are not significantly different from zero. When we perform the same test for government-controlled firms in the second column, we find that, almost symmetrically, only the third quartile (smaller firms) carries a significant (negative) coefficient, although it is much smaller in absolute terms than the coefficient on the first decile of private firms. These results remain virtually the same when we simultaneously include all the firms, public and private, in the third column.

In Table 10, Panel B, we repeat the same type of exercise but divide firms, both private and government-controlled firms, into ten deciles according to their 2001 market capitalization. The results are qualitatively analogous: only the top decile of private firms and the seventh decile of government-owned firms carry a negative and significant coefficient on the corresponding dummy, although the latter is approximately four times smaller in absolute terms than the coefficient on the top decile of private firms. These results confirm that the new, stronger stance on tax enforcement taken by Putin after his arrival to power had a distinctive effect on income diversion among large firms that are not controlled by the government.

[Insert Table 10]

As a final test on the robustness of the spillover effect spurred by the tax enforcement measures implemented by the Putin administration, we create a new variable, *Private company*, that takes a value of 1 if the company is not controlled by the government in years 2002, 2003,

and 2004; otherwise it takes value of 0. We then interact this variable with firm size, proxied by Log*(Revenues)*. We introduce the same controls and governance variables as in Table 7. Our object of interest is the sign of the interaction between size and the private company dummy. The results are presented in Table 11. Confirming the findings in previous tables, the interaction term has a negative coefficient, which is significant at 10%.

[Insert Table 11]

We also explore how the size of the window around the exogenous shock (enhanced tax enforcement by Putin's administration) affects the results. Since the *Tax enforcement* variable takes a value of 1 starting in 2002, we consider two symmetric windows around this year: from 2000 through 2003 and from 2001 to 2002. The results are reported in Tables A5 and A6, respectively, of the Appendix. In the first case (Table A5), the number of observations is reduced from 681 to 491. The coefficient on *Tax enforcement* in specifications (1) through (3) increases marginally in comparison with the full sample estimates in Table 7, and it is statistically significant at the 1% level. The rest of the specifications follow a very similar pattern. The results are even stronger in Table A6, in which the window includes only the years 2001 and 2002 despite the decrease in the number of observations to 249. In general, these tests suggest that the effect of the government's tax enforcement measures on income diversion that began in mid-2000 was a structural change that lasted at least several years. This result should not be entirely surprising since, arguably, Putin was himself the main threat to tax evading companies and as he remained in power during all those years.

Finally, the decrease in income diversion may have been caused by a general trend in corporate governance improvement that is not captured by firm-specific governance variables. In support of this alternative explanation, Panel C in Table 1 shows that some corporate governance and control variables (notably, *ADR*, *Foreigner on board*, and *Owned by government*) experienced, on average, significant changes starting in 2002. Thus, we have more

firms with "good governance" in the second half of our sample period. To address this concern, Figure 2 shows that the pattern of income diversion after 2001 is very different for the subsample of large publicly listed companies than for large companies owned by the government, which include Tatneft (an oil company), Mosenergo (an electricity distribution monopolist in Moscow), and the gas-giant Gazprom. We also compare this subsample to the rest of the companies in our sample. Notice that income diversion across both government-owned companies and the rest of the companies in our sample continues to increase after 2001. We interpret this finding as evidence that the results reported in Tables 5 through 7 do not result from an improvement in the general level of corporate governance in Russia during the sample period. Figure 1 also shows that the pattern in income diversion experienced by the four companies explicitly mentioned in the memorandum is very similar to the pattern displayed by the six largest nongovernment-controlled firms according to market capitalization in our sample. This result lends support to our assumption that the increase in tax enforcement affected large nongovernment-controlled companies, regardless of whether they were included in the memorandum.

[Insert Figure 2 here]

5. Conclusion

Using a unique set of banking transaction data for large public Russian corporations, we have investigated the efficacy of tax enforcement in reducing income diversion. In particular, we have employed a metric developed by Mironov (2013) to directly estimate income diversion among public firms in Russia, and we have used these estimates to study the effect of an exogenous shock to tax enforcement in 2000, after Vladimir Putin became Russia's President, on income diversion.

The estimated magnitude of income diversion is sizeable, amounting, on average, to 1.8% of company revenue or 1.7% of assets per year. The evidence thus supports the role of tax enforcement in curbing income diversion. Companies explicitly mentioned in a memorandum issued by the Ministry of Finance that were suspected of tax avoidance showed a drastic decrease in income diversion after 2001. In addition, a set of large nongovernment-controlled firms experienced a similar decline in income diversion after 2001. Moreover, we have shown that the decrease in income diversion for this set of firms is robust after we control for firm-level corporate governance; firm leverage and size; and year and firm fixed effects. The (decreasing) trend in income diversion shown, on average, by these firms after 2001 is in sharp contrast to the average increasing trend displayed by large government-controlled firms and the rest of the (smaller) firms in our sample. Overall, we interpret this evidence as empirical support for the role of tax enforcement as a powerful mechanism to curb income diversion in emerging markets.

These results cast doubt on the efficacy of corporate governance mechanisms that are typically used in advanced economies to limit income diversion in emerging economies. As a stakeholder in a company, the government may, via tax enforcement, have a larger impact on income diversion than the conventional governance institutions. This impact then has positive externalities in reducing income diversion among other large firms that are not explicitly targeted by tax authorities.

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Table 1

Summary Statistics: Sample of Companies

The table presents summary statistics for the sample of 156 companies. In Panels A and B, all statistics are averaged for 1999 to 2004. Panel C includes average values per year. Panel D presents the correlations across the corporate governance variables. *Revenue, Assets, Total bank payments, EBITDA* (earnings before interest, taxes, depreciation and amortization), and *Debt* are taken from Rosstat. *Total bank payments* represents the total amount of money paid from the firm's bank account. The remaining variables are manually collected from companies' quarterly reports. *ADR* is a variable that takes a value of one if the company has American Depositary Receipts (ADRs) and zero otherwise. *Tobin's Q* is computed as total assets minus the book value of equity plus the market value of equity divided by total assets. *Audit by Big 5* is a variable that takes a value of one if the company is audited by one of the Big 5 accounting firms (Arthur Andersen, Deloitte, Ernst & Young, KPMG, or PWC) and zero otherwise. *Board size* is the number of directors serving on the company's board. *CEO ownership* represents the CEO's company stock ownership as a percentage of total market capitalization. *CEO on board* and *Foreigner on board* are variables that take a value of one if the CEO has a seat on the board or a foreigner serves on the board, respectively. *Owned by government* is a variable that takes a value of one if the government owns more than 20% of the company shares and zero otherwise. The *Tax enforcement* variable is defined as equal to 1 starting in 2002 for the largest 10% of companies according to market capitalization as of 2001 that are not controlled by the government. The variable takes a value of zero for the years 1999 through 2001.

Panel A. Summary statistics for entire sample

	Mean	Median	St. dev.	N of obs.	N of firms
	(1)	(2)	(3)	(4)	(5)
Revenue, $000's	683,707	143,075	2,239,771	687	156
Assets, $000's	1,287,107	174,493	6,499,900	687	156
Total bank payments, $000's	683,841	53,513	3,272,284	687	156
EBITDA, $000's	143,542	8,560	578,406	682	156
EBITDA/Revenue	0.166	0.138	0.131	682	156
Debt/Assets	0.165	0.117	0.155	687	156
Publicly traded	0.642	1.000	0.480	687	156
ADR	0.073	0.000	0.260	687	156
Audit by Big 5	0.182	0.000	0.386	687	156
Board size	8.454	8.000	2.646	687	156
CEO ownership	0.016	0.000	0.063	678	154
CEO on board	0.833	1.000	0.374	687	156
Foreigner on board	0.146	0.000	0.353	687	156
Owned by government	0.277	0.000	0.448	687	156
Tax enforcement	0.023	0.000	0.151	687	156

Panel B. Summary statistics for companies with ADR					
	Mean	Median	St. dev.	N of obs.	N of firms
	(1)	(2)	(3)	(4)	(5)
Revenue, $000's	4,235,368	1,072,100	6,710,728	45	13
Assets, $000's	9,199,321	1,779,458	19,685,980	45	13
Total bank payments, $000's	4,603,213	669,044	10,182,055	45	13
EBITDA, $000's	1,061,749	244,233	1,677,518	45	13
EBITDA/Revenue	0.286	0.287	0.136	45	13
Debt/Assets	0.176	0.175	0.125	45	13
Market cap	7,215,699	1,677,592	12,764,289	45	13
Tobin's *Q*	1.168	1.039	0.625	45	13
Audit by Big 5	0.622	1.000	0.490	45	13
Board size	9.600	10.000	2.209	45	13
CEO ownership	0.004	0.001	0.013	45	13
CEO on board	0.844	1.000	0.367	45	13
Foreigner on board	0.356	0.000	0.484	45	13
Owned by government	0.400	0.000	0.495	45	13
Tax enforcement	0.267	0.000	0.447	45	13

Panel C. Average values per year

	1999	2000	2001	2002	2003	2004
Revenue, $000's	341,133	508,280	499,499	601,783	832,652	1,090,154
Assets, $000's	1,181,515	841,586	1,058,525	1,193,960	1,467,456	1,850,593
Bank receipts, $000's	160,552	422,917	514,966	516,345	837,096	1,305,279
EBITDA, $000's	70,712	117,124	112,789	102,451	163,295	245,042
EBITDA/Revenue	0.193	0.189	0.170	0.170	0.152	0.141
Debt/Assets	0.093	0.121	0.153	0.175	0.198	0.204
Publicly traded	0.421	0.607	0.694	0.523	0.748	0.731
ADR	0.053	0.043	0.065	0.086	0.087	0.090
Audit by Big 5	0.175	0.188	0.177	0.172	0.189	0.187
Board size	9.263	8.761	8.516	8.313	8.236	8.127
CEO ownership	0.017	0.016	0.015	0.014	0.015	0.020
CEO on board	0.912	0.932	0.798	0.844	0.803	0.761
Foreigner on board	0.053	0.162	0.129	0.180	0.142	0.157
Owned by government	0.404	0.256	0.306	0.273	0.268	0.224
Tax enforcement	0.000	0.000	0.000	0.047	0.039	0.037
Number of observations	57	117	124	128	127	134

Table 2

Summary Statistics for Income Diversion

The table presents income diversion measures. *ShadowP = Net transfers to spacemen/Total payments*, *ShadowA = Net transfers to spacemen/Assets*, and *ShadowR = Net transfers to spacemen/Revenue*, where *Net transfers to spacemen* is the net cash transferred to spacemen by a firm, *Total payments* represents the total amount of money paid from the firm's bank account, and *Revenue* and *Assets* are book revenue and assets taken from Rosstat. The three measures of income diversion are winsorized at the top 95th percentile.

	Mean	Median	St. dev.	N of obs.	N of firms
	(1)	(2)	(3)	(4)	(5)
Panel A. Summary statistics for the entire sample					
ShadowR	0.018	0.008	0.024	687	156
ShadowA	0.017	0.006	0.024	687	156
ShadowP	0.027	0.017	0.029	687	156
Panel B. Summary statistics for companies with ADR					
ShadowR	0.013	0.009	0.015	45	13
ShadowA	0.009	0.005	0.013	45	13
ShadowP	0.018	0.009	0.024	45	13

Table 3

Income Diversion by Top Listed Russian Companies

The table shows the top 20 largest listed companies according to accumulated income diversion ($000's) for the period between 1999 and 2004. Income diversion is measured as net transfers to affiliated spacemen. A firm is defined as a spaceman if it satisfies all 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 $7.2 in Social Security taxes per month, an amount that approximately corresponds to Social Security taxes paid on the salary of one minimum wage worker; and (c) the firm's cash inflows exceed its outflows.

Ticker	Name	1999	2000	2001	2002	2003	2004	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LKOH	Lukoil	.	3,134,821	3,647,323	263,772	228,527	174,024	7,448,467
GAZP	Gazprom	54,278	107,446	141,176	141,459	587,887	1,152,517	2,184,763
CHMF	Severstal	73,649	147,183	177,769	53,926	94,647	360,786	907,959
GMKN	Norilsk Nickel	.	.	443,168	80,928	20,724	76,340	621,160
NLMK	NLMK	27,625	43,348	38,356	47,563	121,348	78,177	356,417
TATN	Tatneft	.	72,253	42,344	97,873	100,554	29,105	342,130
TNKO	TNK	.	.	.	.	89,691	191,880	281,572
SDNK	Sidanko	.	73,684	.	171,136	7,193	.	252,013
YUKO	Yukos	.	73,233	74,505	40,260	.	.	187,998
ROSN	Rosneft	.	.	.	.	60,458	127,281	187,740
MSNG	Mosenergo Mikhailovsky	1,511	6,346	16,322	6,587	75,771	18,433	124,970
MGOK	GOK	1,359	6,443	2,039	1,467	33,264	79,345	123,917
UDMN	Udmurneft	.	4,003	9,660	513	38,665	56,004	108,845
AGKK	Rusal	5,482	.	49,889	12,962	14,769	25,124	108,225
PFGS	Rosneft-Purneftegaz	.	23,394	14,735	4,022	13,550	25,376	81,076
CHMK	ChMK	.	40,791	17,077	2,968	4,696	14,140	79,673
RTKM	Rostelekom	.	3,430	7,580	12,649	27,650	27,128	78,437
MTSS	MTS	.	2,274	7,444	12,186	14,135	40,916	76,956
SLAV	Slavneft	.	.	.	75,628	.	.	75,628
MFGS	SN-MNG	2,872	8,700	5,668	11,502	9,920	34,886	73,548

Table 4

Income Diversion by Companies in the Tax Avoidance Memorandum

Panel A shows annual *ShadowR = Net transfers to spacemen/Revenue* for the period between 1999 and 2004 for the four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance. *Net transfers to spacemen* is the net cash transferred to spacemen by a firm. A firm is defined as a spaceman if it satisfies all 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 $7.2 in Social Security taxes per month, an amount that approximately corresponds Social Security taxes paid on the salary of one minimum wage worker; and (c) the firm's cash inflows exceed its outflows. Panel B shows quarterly *ShadowP = Net transfers to spacemen/Total payments*. *Total payments* represents the total amount of money paid from the firm's bank account. Quarterly revenues are not available.

Panel A

ShadowR

Ticker	Name	1999	2000	2001	2002	2003	2004
SIBN	Sibneft	0.0166	0.0206	0.0367	0.0193	0.0113	0.0096
TNKO	TNK	0.0744	0.0534	0.0590	0.0265	0.0267	0.0350
SLAV	Slavneft	0.0461	0.0626	0.0603	0.0460	.	.
YUKO	Yukos	0.0106	0.0569	0.0790	0.0527	.	.

Panel B

Shadow P

Quarter	SIBN	TNKO	SLAV	YUKO
1999-1	0.0441	0.0177	0.0322	0.0081
1999-2	0.0042	0.0109	0.0218	0.0108
1999-3	0.0147	0.0551	0.0423	0.0130
1999-4	0.0104	0.0534	0.0290	0.0176
2000-1	0.0138	0.0086	0.0314	0.0295
2000-2	0.0123	0.0128	0.0647	0.0426
2000-3	0.0132	0.0114	0.0356	0.0281
2000-4	0.0127	0.0158	0.0499	0.0235
2001-1	0.0121	0.0117	0.0541	0.0299
2001-2	0.0128	0.0133	0.0226	0.0237
2001-3	0.0100	0.0135	0.0071	0.0189
2001-4	0.0173	0.0208	0.0082	0.0167
2002-1	0.0133	0.0050	0.0071	0.0103
2002-2	0.0169	0.0072	0.0164	0.0206
2002-3	0.0080	0.0194	0.0104	0.0090
2002-4	0.0009	0.0013	0.0204	0.0041
2003-1	0.0015	0.0006	0.0097	0.0014
2003-2	0.0048	0.0039	0.0041	0.0084

2003-3	0.0078	0.0078	0.0130
2003-4	0.0066	0.0135	0.0200
2004-1	0.0034	0.0133	0.0111
2004-2	0.0071	0.0124	0.0149
2004-3	0.0059	0.0126	0.0008
2004-4	0.0031	0.0106	0.0002

Table 5

Change in Income Diversion

The table shows the cross-sectional regression of the change in *ShadowR = Net transfers to spacemen/Revenue* in year *T+1* relative to year *T*, where *T* ranges from 1999 through 2003, on the variable *ShadowR*, the company's (Log) *Revenue*, and two firm variables: *Owned by government* and *Debt/Assets*, each as of year *T.* The regression includes year and industry dummies based on Fama and French 12 industry classification criteria. We include the corporate governance variables: *ADR*, *Audit by Big 5*, *Board size*, *CEO on board*, *and Foreigner on board.* All the variables are defined in Table 1. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent var:	ShadowR(T+1)-ShadowR(T)				
Year	1999	2000	2001	2002	2003
ShadowR(T)	-0.7564	-0.2317	-0.4669	-0.4249	-0.2795
	(0.2747)***	(0.0765)***	(0.1006)***	(0.1149)***	(0.0985)***
Log(Revenue)	0.0012	-0.0009	-0.0019	-0.0007	0.0001
	(0.0035)	(0.0013)	(0.0009)**	(0.0014)	(0.0009)
Corporate governance variables	Y	Y	Y	Y	Y
Debt/Assets, Government control	Y	Y	Y	Y	Y
Year dummy	Y	Y	Y	Y	Y
Industry dummy	Y	Y	Y	Y	Y
R-sq	0.423	0.316	0.337	0.219	0.164
Number of firms	57	113	123	125	125

Table 6

Income Diversion by Top Listed Russian Companies

Panel A shows annual *ShadowR = Net transfers to spacemen/Revenue* for the period between 1999 and 2004 for the largest 10% of firms according to 2001 market capitalization that are not controlled by the government. *Net transfers to spacemen* is the net cash transferred to spacemen by a firm. A firm is defined as a spaceman if it satisfies all 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 $7.2 in Social Security taxes per month, an amount that approximately corresponds Social Security taxes paid on the salary of one minimum wage worker; and (c) the firm's cash inflows exceed its outflows. Panel B shows quarterly *ShadowP = Net transfers to spacemen/ Total payments*. *Total payments* represents the total amount of money paid from the firm's bank account. Quarterly revenues are not available.

Panel A

ShadowR

Ticker	Name	1999	2000	2001	2002	2003	2004
LKOH	Lukoil	.	0.0848	0.0848	0.0363	0.0257	0.0132
CHMF	Severstal	0.0538	0.0701	0.0848	0.0284	0.0341	0.0770
MTSS	MTS	.	0.0040	0.0085	0.0114	0.0086	0.0184
GMKN	Norilsk Nickel	.	.	0.0848	0.0291	0.0045	0.0130
SNGS	Surgutneftegas	.	0.0009	0.0014	0.0007	0.0003	0.0007

Panel B

ShadowP

Quarter	LKOH	CHMF	MTSS	GMKN	SNGS
1999-1	0.0391	0.0207	0.0005	0.0314	0.0018
1999-2	0.0641	0.0417	0.0141	0.0142	0.0041
1999-3	0.0046	0.0436	0.0469	0.0165	0.0055
1999-4	0.0089	0.0516	0.0375	0.0433	0.0032
2000-1	0.0949	0.0203	0.0410	0.0202	0.0034
2000-2	0.1749	0.0360	0.0068	0.0321	0.0057
2000-3	0.1007	0.0418	0.0048	0.1060	0.0031
2000-4	0.1126	0.0649	0.0048	0.0473	0.0036
2001-1	0.1531	0.0392	0.0051	0.1302	0.0016
2001-2	0.1623	0.0410	0.0059	0.1320	0.0019
2001-3	0.0772	0.0736	0.0111	0.1477	0.0054
2001-4	0.0244	0.0222	0.0117	0.1241	0.0008
2002-1	0.0223	0.0228	0.0215	0.0359	0.0014
2002-2	0.0040	0.0201	0.0129	0.0229	0.0011
2002-3	0.0034	0.0132	0.0064	0.0223	0.0025
2002-4	0.0015	0.0193	0.0094	0.0431	0.0051
2003-1	0.0103	0.0091	0.0061	0.0036	0.0017
2003-2	0.0048	0.0072	0.0071	0.0031	0.0012
2003-3	0.0029	0.0179	0.0094	0.0040	0.0006

2003-4	0.0054	0.0147	0.0105	0.0042	0.0008
2004-1	0.0061	0.0278	0.0316	0.0125	0.0006
2004-2	0.0024	0.0381	0.0120	0.0115	0.0016
2004-3	0.0018	0.0274	0.0101	0.0215	0.0017
2004-4	0.0014	0.0202	0.0132	0.0187	0.0004

Table 7

Income Diversion and Tax Enforcement

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables with controls for the company's (Log) *Revenue* and *Debt/Assets*, as well as *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Tax enforcement* takes a value of 1 for 2002, 2003, and 2004 if the company is not controlled by the government and belongs to the largest 10% of companies according to 2001 market capitalization; it takes a value of 0 otherwise. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed. Standard errors are in parentheses. They are clustered at the firm level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent variable	ShadowR		
	(1)	(2)	(3)
Tax enforcement	-0.0273	-0.0262	-0.0277
	(0.0111)**	(0.0104)**	(0.0108)**
ADR		-0.0044	-0.0049
		(0.0087)	(0.0092)
Audit by big 5			0.0021
			(0.0041)
Foreigner serves on board			0.0044
			(0.0046)
Log (Board size)			0.0018
			(0.005)
Ceo on board			-0.0022
			(0.0025)
Log(Revenue)	-0.0044	-0.0043	-0.0043
	(0.0024)*	(0.0024)*	(0.0025)*
Debt/Assets	0.0084	0.0079	0.0088
	(0.0085)	(0.0086)	(0.0083)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.078	0.079	0.084
Number of obs	681	681	681
Number of firms	153	153	153

Table 8

Income Diversion and Tax Enforcement

Robustness test: Top 5% in 2001 market capitalization

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables with controls for the company's (Log) *Revenue* and *Debt/Assets*, as well as *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Tax enforcement* takes a value of 1 for 2002, 2003, and 2004 if the company is not controlled by the government and belongs to the largest 5% of companies according to 2001 market capitalization; it takes a value of 0 otherwise. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed. Standard errors are in parentheses. They are clustered at the firm level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent variable	ShadowR		
	(1)	(2)	(3)
Tax enforcement	-0.0443	-0.0457	-0.0490
	(0.0187)**	(0.0195)**	(0.0218)**
ADR		0.0025	0.0024
		(0.0057)	(0.0058)
Audit by big 5			0.0002
			(0.004)
Foreigner serves on board			0.0059
			(0.0045)
Log (Board size)			0.0006
			(0.005)
CEO on board			-0.0016
			(0.0024)
Log(Revenue)	-0.0047	-0.0048	-0.0048
	(0.0025)*	(0.0026)*	(0.0026)*
Debt/Assets	0.0055	0.0057	0.0068
	(0.0082)	(0.0083)	(0.008)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.085	0.085	0.092
Number of obs	681	681	681
Number of firms	153	153	153

Table 9

Income Diversion and Tax Enforcement

Robustness test: Top 25% in 2001 market capitalization

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables with controls for the company's (Log) *Revenue* and *Debt/Assets*, as well as *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Tax enforcement* takes a value of 1 for 2002, 2003, and 2004 if the company is not controlled by the government and belongs to the largest 25% of companies according to 2001 market capitalization; it takes a value of 0 otherwise. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed. Standard errors are in parentheses. They are clustered at the firm level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent variable	ShadowR		
	(1)	(2)	(3)
Tax enforcement	-0.0169	-0.0161	-0.0163
	(0.007)**	(0.0065)**	(0.0065)**
ADR		-0.0084	-0.0090
		(0.0107)	(0.0111)
Audit by big 5			0.0006
			(0.0042)
Foreigner serves on board			0.0035
			(0.0049)
Log (Board size)			0.0010
			(0.0051)
CEO on board			-0.0021
			(0.0025)
Log(Revenue)	-0.0044	-0.0042	-0.0042
	(0.0024)*	(0.0024)*	(0.0024)*
Debt/Assets	0.0062	0.0055	0.0061
	(0.0085)	(0.0087)	(0.0084)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.072	0.074	0.078
Number of obs	681	681	681
Number of firms	153	153	153

Table 10

Income Diversion and Tax Enforcement

Robustness test: Quantile regressions

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables from Table 7 with controls for the company's (Log) *Revenue* and *Debt/Assets*, along with *Year* and *Firm dummies.* All the variables are defined in Table 1. In Panel A, we create four tax enforcement dummies that take a value of 1 for 2002, 2003, and 2004 if the firm is private (Private Quartile) and belongs to the first quartile (largest firms according to 2001 market capitalization) through the fourth quartile (smallest firms); the dummy variables take a value of zero otherwise. We repeat the same procedure for government-controlled firms (Gov Quartile). In Panel B, we repeat the same procedure by replacing quartiles with deciles. The top (bottom) decile for private (government-owned) firms includes the top (bottom) 10% largest (smallest) firms according to 2001 market capitalization. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed. Standard errors are in parentheses. They are clustered at the firm level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Panel A

Dependent variable	ShadowR		
	(1)	(2)	(3)
Private Quartile 1 after 2002	-0.0155		-0.0156
	(0.0067)**		(0.007)**
Private Quartile 2 after 2002	0.0078		0.0075
	(0.0062)		(0.0066)
Private Quartile 3 after 2002	-0.0007		-0.0009
	(0.0045)		(0.005)
Private Quartile 4 after 2002	0.0004		0.0002
	(0.0057)		(0.006)
Gov Quartile 1 after 2002		-0.0039	-0.0052
		(0.0051)	(0.0053)
Gov Quartile 2 after 2002		0.0072	0.0048
		(0.0052)	(0.0049)
Gov Quartile 3 after 2002		-0.0049	-0.0060
		(0.0027)*	(0.0033)*
Gov Quartile 4 after 2002		0.0072	0.0062
		(0.0057)	(0.006)
Firm variables	Y	Y	Y
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.083	0.063	0.091
Number of obs	681	681	681
Number of firms	153	153	153

Panel B

Dependent variable	ShadowR		
	(1)	(2)	(3)
Private Decile 1 after 2002	-0.0316		-0.0304
	(0.0128)**		(0.0128)**
Private Decile 2 after 2002	0.0016		0.0012
	(0.0039)		(0.0045)
Private Decile 3 after 2002	0.0063		0.0057
	(0.0128)		(0.013)
Private Decile 4 after 2002	0.0083		0.0079
	(0.0033)**		(0.004)**
Private Decile 5 after 2002	-0.0101		-0.0106
	(0.0097)		(0.01)
Private Decile 6 after 2002	-0.0026		-0.0030
	(0.0046)		(0.0052)
Private Decile 7 after 2002	0.0003		-0.0002
	(0.0099)		(0.0102)
Private Decile 8 after 2002	0.0086		0.0082
	(0.0079)		(0.0081)
Private Decile 9 after 2002	0.0000		-0.0005
	(0.0036)		(0.0042)
Private Decile 10 after 2002	-0.0075		-0.0079
	(0.0083)		(0.0087)
Gov Decile 1 after 2002		0.0011	-0.0009
		(0.0045)	(0.0041)
Gov Decile 2 after 2002		-0.0108	-0.0114
		(0.0124)	(0.0123)
Gov Decile 3 after 2002		0.0010	-0.0003
		(0.0032)	(0.0036)
Gov Decile 4 after 2002		0.0208	0.0109
		(0.0119)*	(0.0082)
Gov Decile 5 after 2002		0.0001	-0.0011
		(0.0073)	(0.0078)
Gov Decile 6 after 2002		-0.0048	-0.0061
		(0.004)	(0.0046)
Gov Decile 7 after 2002		-0.0047	-0.0058
		(0.0021)**	(0.003)*
Gov Decile 8 after 2002		0.0064	0.0054
		(0.0059)	(0.0062)
Gov Decile 9 after 2002		0.0028	0.0018
		(0.0095)	(0.0098)
Gov Decile 10 after 2002		0.0075	0.0063
		(0.0112)	(0.0112)
Firm variables	Y	Y	Y

Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.102	0.067	0.110
Number of obs	681	681	681
Number of firms	153	153	153

Table 11

Income Diversion and Tax Enforcement

Robustness test: Interaction between private company dummy and company size

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variables *Private company* and the product of this variable and company size. We include a set of corporate governance variables with controls for the company's (Log) *Revenue* and *Debt/Assets*, along with *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Private compamy* takes a value of 1 for 2002, 2003, and 2004 if the company is not controlled by the government; it takes a value of 0 otherwise. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed. Standard errors are in parentheses. They are clustered at the firm level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent variable	ShadowR		
	(1)	(2)	(3)
Private company	0.0269	0.0250	0.0255
	(0.0151)*	(0.0139)*	(0.014)*
Private company*Log(Revenue)	-0.0023	-0.0022	-0.0022
	(0.0013)*	(0.0012)*	(0.0012)*
ADR		-0.0108	-0.0113
		(0.0114)	(0.0119)
Audit by big 5			0.0008
			(0.004)
Foreigner serves on board			0.0032
			(0.005)
Log (Board size)			0.0006
			(0.0052)
CEO on board			-0.0021
			(0.0026)
Log(Revenue)	-0.0023	-0.0108	-0.0021
	(0.0013)*	(0.0114)	(0.0026)
Debt/Assets	-0.0028	-0.0026	-0.0026
	(0.0025)	(0.0025)	(0.0025)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.060	0.064	0.068
Number of obs	681	681	681
Number of firms	153	153	153

APPENDIX

Table A1

Summary Statistics for Gross Income Diversion

The table presents income diversion measures. *Gross ShadowP = Gross transfers to spacemen/Total payments*, *Gross ShadowA = Gross transfers to spacemen/Assets*, and *Gross ShadowR = Gross transfers to spacemen/Revenue*, where *Gross transfers to spacemen* is the gross cash transferred to spacemen by a firm, *Total payments* represents the total amount of money paid from the firm's bank account, and *Revenue* and *Assets* are book revenue and assets taken from Rosstat. The three measures of income diversion are winsorized at the top 95th percentile.

	Mean	Median	St. dev.	N of obs.	N of firms
	(1)	(2)	(3)	(4)	(5)
Panel A. Summary statistics for the entire sample					
Gross ShadowR	0.024	0.010	0.030	687	156
Gross ShadowA	0.023	0.010	0.032	687	156
Gross ShadowP	0.038	0.023	0.041	687	156
Panel B. Summary statistics for companies with ADR					
Gross ShadowR	0.017	0.011	0.020	45	13
Gross ShadowA	0.013	0.007	0.018	45	13
Gross ShadowP	0.023	0.012	0.029	45	13

Table A2

Income Diversion and Tax Enforcement

Gross ShadowR

The table shows the regression of *Gross ShadowR = Gross transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables with controls for the company's (Log) *Revenue*, and *Debt/Assets*, along with *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Tax enforcement* takes a value of 1 for 2002, 2003, and 2004 if the company is not controlled by the government and belongs to the top 10% of companies according to 2001 market capitalization; it takes a value of 0 otherwise. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed. Standard errors are in parentheses. They are clustered at the firm level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *Gross ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent variable	ShadowR		
	(1)	(2)	(3)
Tax enforcement	-0.0354	-0.0343	-0.0358
	(0.0132)***	(0.0127)***	(0.0131)***
ADR		-0.0046	-0.0054
		(0.0099)	(0.0104)
Audit by big 5			0.0010
			(0.0049)
Foreigner serves on board			0.0051
			(0.0054)
Log (Board size)			0.0028
			(0.0065)
CEO on board			-0.0024
			(0.0031)
Log(Revenue)	-0.0060	-0.0059	-0.0059
	(0.0032)*	(0.0032)*	(0.0033)*
Debt/Assets	0.0130	0.0125	0.0138
	(0.0113)	(0.0114)	(0.0111)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.078	0.079	0.083
Number of obs	681	681	681
Number of firms	153	153	153

Table A3

Income Diversion and Tax Enforcement

Robustness test: Removing year 2001

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables with controls for the company's (Log) *Revenue* and *Debt/Assets*, as well as *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Tax enforcement* takes a value of 1 for 2002, 2003, and 2004 if the company is not controlled by the government and belongs to the largest 10% of companies according to 2001 market capitalization; it takes a value of 0 otherwise. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance and all the observations from year 2001 have been removed. Standard errors are in parentheses. They are clustered at the firm level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent variable	ShadowR		
	(1)	(2)	(3)
Tax enforcement	-0.0188	-0.0174	-0.0192
	(0.0104)*	(0.0088)**	(0.0097)**
ADR		-0.0038	-0.0040
		(0.0082)	(0.009)
Audit by big 5			0.0004
			(0.0044)
Foreigner serves on board			0.0084
			(0.0052)
Log (Board size)			-0.0009
			(0.0061)
CEO on board			-0.0019
			(0.0028)
Log(Revenue)	-0.0040	-0.0039	-0.0039
	(0.0023)*	(0.0024)	(0.0024)
Debt/Assets	0.0094	0.0088	0.0104
	(0.01)	(0.0102)	(0.0099)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.057	0.057	0.070
Number of obs	558	558	558
Number of firms	153	153	153

Table A4

Income Diversion and Tax Enforcement

Robustness test: Including only companies available in 1999

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables with controls for the company's (Log) *Revenue* and *Debt/Assets*, along with *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Tax enforcement* takes a value of 1 for 2002, 2003, and 2004 if the company is not controlled by the government and belongs to the largest 10% of companies according to 2001 market capitalization; it takes a value of 0 otherwise. The table includes only the 57 companies with available data as of 1999. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance been removed. Standard errors are in parentheses. They are clustered at the firm level. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent variable	ShadowR		
	(1)	(2)	(3)
Tax enforcement	-0.0299	-0.0299	-0.0327
	(0.0018)***	(0.0018)***	(0.0038)***
ADR		-0.0017	-0.0004
		(0.0085)	(0.0079)
Audit by big 5			0.0043
			(0.0048)
Foreigner serves on board			0.0082
			(0.0058)
Log (Board size)			-0.0003
			(0.0102)
CEO on board			0.0006
			(0.0032)
Log(Revenue)	-0.0056	-0.0055	-0.0055
	(0.0037)	(0.0042)	(0.0042)
Debt/Assets	0.0001	-0.0002	0.0017
	(0.0118)	(0.012)	(0.0124)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.103	0.103	0.116
Number of obs	314	314	314
Number of firms	57	57	57

Table A5

Income Diversion and Tax Enforcement

Robustness test: Years 2000 thorough 2003

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables with controls for the company's (Log) *Revenue*, *and Debt/Assets*, along with *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Tax enforcement* takes a value of 1 for 2002 and 2003 if the company is not controlled by the government and belongs to the top 10% of companies according to 2001 market capitalization; it takes a value of 0 otherwise. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed The standard errors are clustered at the firm level. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

Dependent variable	ShadowR		
	(1)	(2)	(3)
Tax enforcement	-0.0300	-0.0288	-0.0283
	(0.0115)***	(0.0114)**	(0.0112)**
ADR		-0.0046	-0.0049
		(0.0089)	(0.0084)
Audit by big 5			0.0031
			(0.005)
Foreigner serves on board			-0.0031
			(0.0052)
Log (Board size)			0.0065
			(0.0054)
CEO on board			-0.0009
			(0.003)
Log(Revenue)	-0.0026	-0.0025	-0.0025
	(0.0019)	(0.0019)	(0.002)
Debt/Assets	0.0101	0.0095	0.0097
	(0.0112)	(0.0114)	(0.0113)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.072	0.073	0.078
Number of obs	491	491	491
Number of firms	151	151	151

Table A6

Income Diversion and Tax Enforcement

Robustness test: Years 2001 and 2002

The table shows the regression of *ShadowR = Net transfers to spacemen/Revenue* on the variable *Tax enforcement* and a set of corporate governance variables with controls for the company's (Log) *Revenue*, and *Debt/Assets*, along with *Year* and *Firm dummies.* All the variables are defined in Table 1. The variable *Tax enforcement* takes a value of 1 for 2002 if the company is not controlled by the government and belongs to the top 10% of companies according to 2001 market capitalization; it takes a value of 0 otherwise. The four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance have been removed. Standard errors are in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% level, respectively. The standard errors are clustered at the firm level. *ShadowR*, Log (*Board size*), Log (*Revenue*), and *Debt/Assets* are winsorized at the top 95th percentile.

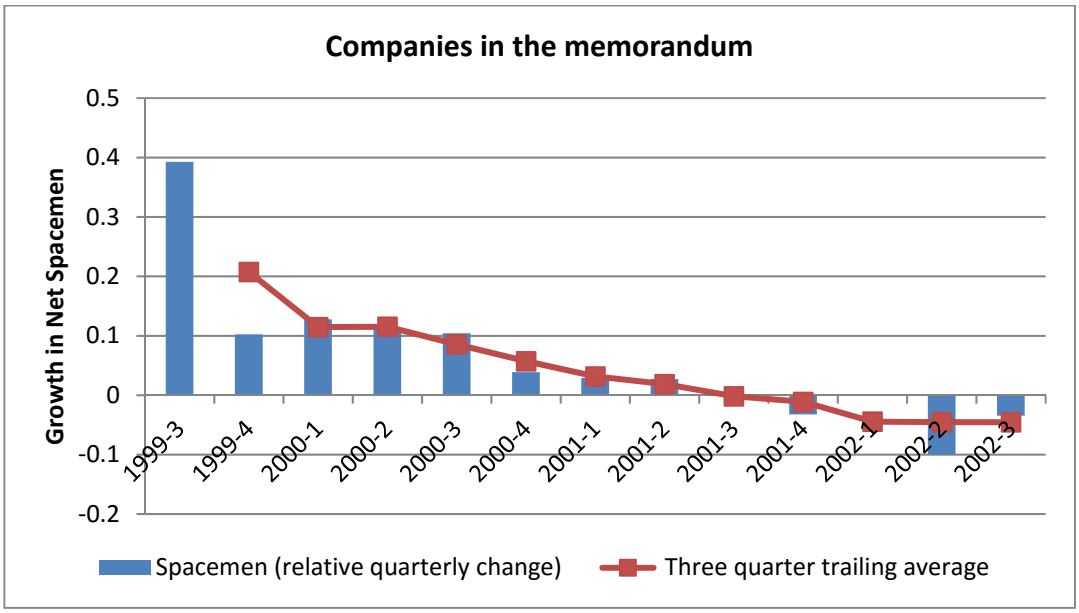
Dependent variable	ShadowR		
	(1)	(2)	(3)
Tax enforcement	-0.0293	-0.0284	-0.0271
	(0.0113)***	(0.012)**	(0.0114)**
ADR		-0.0057	-0.0065
		(0.0148)	(0.0134)
Audit by big 5			0.0090
			(0.0109)
Foreigner serves on board			-0.0060
			(0.0056)
Log (Board size)			0.0101
			(0.01)
CEO on board			0.0010
			(0.0059)
Log(Revenue)	-0.0071	-0.0061	-0.0062
	(0.0064)	(0.0075)	(0.008)
Debt/Assets	-0.0011	-0.0011	0.0047
	(0.0275)	(0.0276)	(0.0328)
Year dummy	Y	Y	Y
Fixed effects	Y	Y	Y
R-sq	0.093	0.094	0.111
Number of obs	249	249	249
Number of firms	138	138	138

Figure 1

Quarterly Evolution of the Change in Net Spacemen

Each bar represents the average net number of spacemen created in a given quarter divided by the average number of spacemen in operation in the previous quarter. The line is a moving average of the growth rate of net spacemen and is constructed, in each quarter t, as the average of the bars in quarters t-1, t and t+1. Panel A includes only the four companies cited in the tax avoidance memorandum released in July 2000 by the Russian Ministry of Finance: *Sibneft, Slavneft, Yukos and TNK.* Panel B includes a sample of large private companies: *Lukoil, Severstal, MTS, Norilsk Nickel,* and *Surgutneftegas*. These companies are the largest 10% of companies according to market capitalization in 2001 that are not controlled by the government.

Panel A



Panel B

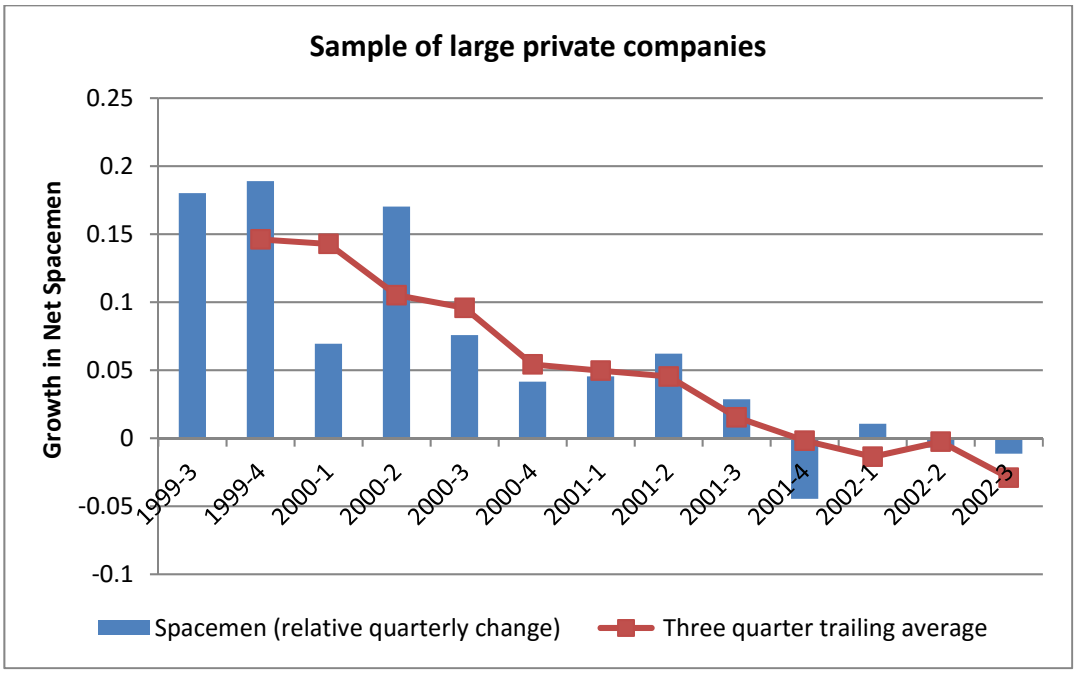

Sample of large private companies
Growth in Net Spacemen
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
1999-3
1999-4
2000-1
2000-2
2000-3
2000-4
2001-1
2001-2
2001-3
2001-4
2002-1
2002-2
2002-3
Spacemen (relative quarterly change)
Three quarter trailing average

Figure 2

Evolution of Income Diversion for Different Sets of Companies

The graph shows the evolution of average *ShadowR = Net transfers to spacemen/Revenue* for four sets of companies from 1999 through 2004. *Net transfers to spacemen* is the net cash transferred to spacemen by a firm. The c*ompanies in the Memorandum* include *Sibneft, Slavneft, Yukos and TNK*. The *Sample of large private companies* includes *Lukoil, Severstal, MTS, Norilsk Nickel,* and *Surgutneftegas*. These companies are the largest 10% of companies according to market capitalization in 2001 that are not controlled by the government. The *Sample of large government-controlled companies* includes *Tatneft, Mosenergo,* and *Gazprom.* The *Control sample* includes the rest of the companies in our sample.