Monitoring the Monitors: Auditors, Corporate Theft, and Corruption.

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Abstract

Using a unique database of banking transactions, I examine the relationship between auditing and income diversion in a sample of 25,824 companies. In contrast to the other studies, my methodology enables me to accurately measure corporate theft and to observe the fees charged by auditors, which are not available to the public. I find that Big 4 auditors receive higher audit and non-audit fees when their clients transfer more money to fraudulent entities. A 1 standard deviation increase in income diversion corresponds to a 9.2% increase in audit fees and a 24.8% increase in other fees. I find that this relationship is partially explained by the auditors' propensity to corrupt. The relationship between audit fees and income diversion is 3 times stronger for Big 4 auditing firms with senior employees who have a high propensity to corrupt than for Big 4 firms with senior employees with a low propensity to corrupt. In addition, I find that Big 4 employees with high propensity to corrupt receive much higher annual salary increases than do their less corrupt colleagues. A 1 standard deviation in PTC corresponds to a 4-8.3% increase in annual salary. Finally, I find that firms that are audited by the Big 4 benefit from a lower cost of capital, which motivates clients to choose reputable auditors, even if such auditors constrain income diversion. This study contributes to our understanding of the relationship between auditing and corporate theft, and it is relevant to large swathes of the (non-OECD) global economy.

Keywords: Audit quality, Big 4 auditors, corporate governance, income diversion, audit fees

JEL Codes: D73, G30, G38, H26, H83, M43

1. Introduction

Can auditors prevent the diversion of corporate resources? Do Big 4 auditors prevent corporate theft to a greater extent than other auditors? Do auditors receive higher fees from clients engaged in fraudulent transactions? I study these and related questions using data from Russia. The Russian economy is characterized by a low level of law enforcement and low litigation risk for auditors, and it is representative of the non-OECD global economy.

A vast body of literature examines the effects of cross-country variation in institutional features such as law enforcement and litigation effectiveness on financial reporting and corporate governance (for example, La Porta et al., 1997; Ball et al., 2000; Defond and Hung, 2004; Srinivasan et al., 2014). One institutional feature driving audit quality is the litigation risk faced by auditors, which varies significantly among countries, as documented in La Porta et al. (2006). Audit quality, especially for clients audited by the Big 4, is observed to be higher in countries with greater litigation risk (Seetharaman et al., 2002; Choi et al., 2009). However, much remains to be learned about countries with different institutional settings, such as highly corrupt countries with low litigation risk. Russia provides such an environment. It is the world's six largest economy, with a per capita GDP of $23,163.[1] This figure is approximately equal to that of many developing countries, such as Poland, Hungary, Latvia, Romania, Croatia, Turkey, Chile, Uruguay, Argentina, Panama, Malaysia and Kazakhstan. It also shares similarities in key institutional features with other developing countries. For example, in 2017, the World Bank Ease of Doing Business index ranked Russia 40 out of 190 nations, close to Slovakia, Kazakhstan, Romania, Bulgaria, Hungary, Croatia, Thailand, and Mexico. The 2016 Corruption Perceptions Index, produced by Transparency International, ranked Russia 131 out of 177

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[1] Source: WorldBank 2016 data

countries, along with Iran, Kazakhstan, Ukraine, and Nepal and just below Mexico, Paraguay, and Azerbaijan.

There is ample empirical evidence to support the notion that in the U.S., audits by Big 4 firms are associated with higher accounting quality (Teoh and Wong 1993, Defond and Jiambalvo 1993, Becker et al. 1998, Lennox and Pittman 2010). Internationally, however, the effectiveness of Big 4 auditors in improving accounting quality has been found to vary with the strength of investor protection in the country (Knechel et al. 2018), with lower effectiveness in those countries with weaker investor protection regimes (Francis and Wang 2008). The Big 4 have also been involved in serious cases of audit weakness across the world, although systematic evidence of the effect of auditors on the likelihood of fraud across countries is limited.[2] The lack of evidence is not surprising because the availability of systematic data, especially for countries with poor institutions, is limited. In addition, one cannot fully rely on the methods developed in the U.S. because in countries with weak institutions, the majority of accounting fraud cases might never be revealed to the public. Moreover, issues with data availability and weaknesses in current estimation methods of fraud/diversion limit the generalizability of studies performed to date.

The availability of data for Russia provides a unique opportunity to analyze in detail the effects of audits on corporate theft for a typical non-OECD economy with low-quality institutions. The dataset available from the Russian Central Bank contains 513 million transactions involving 1.7 million entities over the period from 1999 to 2004. I can systematically measure illegal financial activities for nearly all Russian companies. Because the data allow for the direct measurement of the diversion of corporate resources by managers and as

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[2] See the discussion in Weber et al. (2008) ofon the Comroad AG fraud (in Germany), audited by KPMG, Skinner and Srinivasan (2012) for the Kanebo fraud (in Japan), audited by PwC, Grove and Victoravich (2014) for the Longtop fraud (in China), audited by Deloitte, and Bhasin (2013) for the Satyam Computers fraud (in India)), audited, by PwC.

well as audit and non-audit fees paid to auditors—even those not disclosed to the public—I am able to perform a comprehensive analysis of client-auditor relationships for the entire economy.

This paper makes three contributions to the literature. First, I show that, even in a country with a weak legal environment, audited firms exhibit significantly lower levels of corporate theft than non-audited firms. This reduction is even stronger for firms audited by Big 4 auditors. Second, as a deterrent of corporate theft, financial auditing is less than perfect. Consistent with auditor complicity, I document that Big 4 auditors charge higher fees (particularly non-audit fees) to clients who divert more money to fraudulent entities. Finally, I find that this positive link between audit fees and income diversion is at least partially explained by the auditors' propensity to corrupt. The higher this propensity is among the auditor senior staff, the stronger the positive relationship is between audit fees and the corporate theft of their clients.[3]

I provide evidence on the effectiveness of auditors by focusing on one type of corporate fraud: the diversion of corporate resources by managers. The data for this research come from Russia, an economy characterized by weak shareholder rights and enforcement of securities regulation (La Porta et al. 1997). I use a unique database of corporate theft that I create based on payments made by companies to "fly-by-night" entities with the intention of having the diverted money be returned fraudulently to owners or managers of companies in Russia. These fly-by-night companies referred, to as "*Spacemen*" (following the common term used for such companies in Russia), are shell companies created fraudulently for the purpose of receiving payments for fake services; the payments are then returned to the owners or managers of the companies making the payments.[4] *Spacemen* can be used both to divert income in order to enrich

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[3] The Propensity to Corrupt measure is developed in Mironov (2015). This measure is built based on traffic violations of Muscovites for the 1997 to 2007 period and allows inferring propensity to pay bribes to the traffic police.

[4] Mironov (2013) discusses the following example. In 2004, Gazprom3 bought pipes for $700 million from the unknown company Trubny Torgovy Dom. This company was established in 2003 with only $350 in charter capital, and it does not have a real address. Its CEO is impossible to locate, and market participants had never heard of the

managers or owners and to increase expenses in order to evade taxes. In the first case, the fraud enriches managers at the expense of shareholders (or owner-managers at the expense of other shareholders) and, in both cases, illegally reduces taxes payable by the company and distorts accounting statements. The *Spacemen* identification methodology is described in detail in Mironov (2013). Primarily, I use data from the Russian Central Bank to identify payments to auditors and to various entities that I identify as *Spacemen*. My sample consists of 25,824 companies, both public listed and private, with data from 1999 and 2003.[5]

I estimate that on average, 7.3 percent of revenues are diverted in my sample of Russian companies to fly-by-night entities. Russian firms that choose to be audited exhibit a lower level of income diversion. Of the entire sample, 3,261, or approximately 12 percent, of firms choose to be audited by a total of 264 auditors. Of the audited firm sample, approximately 13 percent are audited by the Big 4 firms. Following convention, I consider PricewaterhouseCoopers (PwC), KPMG, Ernst & Young and Deloitte & Touche as the Big 4 accounting firms.

I find that audited firms divert less than non-audited firms; on average, audited firms divert 4.9% of revenues to fly-by-night entities. Big 4 auditors are associated with even lower diversion: 2.4% of revenue. Since audit and non-audit firms significantly differ in several important characteristics, I use propensity score matching (PSM) on key observables (size, profitability, leverage, industry, etc.). I find that non-audited firms from the matched sample divert 5.7% of their revenue, approximately 16% more than their audited counterparts. I also use PSM techniques to compare firms audited by Big-4 firms and by non-Big4 firms. I find that

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company *(Forbes, 2006)*. Trubny Torgovy Dom is the 6th largest of the 99,925 *Spacemen* identified in the banking data.

[5] As I describe in Data and Descriptive Statistics section, I restrict my sample only to companies with yearly revenue of at least 1 million dollars.

firms audited by non-Big 4 auditors divert approximately 29% more than the firms audited by the Big 4.

The banking database also allows me to measure audit and non-audit related fees paid by clients. As expected, I find that the Big 4 charge higher audit fees than other auditors in my sample after I control for other determinants of audit fees, such as firm size, profitability, and complexity. Most interestingly, both audit and non-audit fees to Big 4 auditors increase with the extent of income diversion to *Spacemen.* This result may suggest that Big 4 auditors receive greater fees as an incentive from clients to ignore income diversion by managers. It can also reflect price protection by Big 4 auditors when they audit risky clients (see, e.g., Bell et al, 2001 and Lyon and Maher, 2005) and know that they cannot detect and stop all income diversion. My empirical evidence allows me to exclude the possible explanation that auditors charge higher fees as a response to the greater efforts required to audit firms with larger numbers of fraudulent transactions.[6]

To further explore the nature of the relationship between fees and income diversion, I use Mironov's (2015) methodology to construct the propensity to corrupt (PTC) measure for auditors and their clients. This measure is based on the idea that drivers can often avoid a formal penalty in exchange for a bribe. Thus, observing a person's recorded traffic violations for a significant period of time allows one to infer the individual's propensity for corruption. Mironov (2015) shows that PTC for firm management is positively correlated with income diversion and the amount of wages paid under the table. I document a similar relationship for my sample of companies. PTC for firm management and PTC for income diversion are positively related in all of the studied subsamples of firms: non-audited, audited and audited by Big 4 firms. Furthermore, I find that the management of audited companies is less corrupt than the

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[6] I provide detailed arguments on this matter in Results.

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management of non-audited companies. I also find that the auditors' management is less corrupt than that of the companies in my sample. Big 4 auditors are less corrupt than non-Big 4 auditors. However, I document evidence that the positive link between the audit fees and corporate theft by clients is three times stronger for high PTC Big 4 auditors, compared to low PTC Big 4 auditors. This empirical evidence provides support for the hypothesis that Big 4 auditors receive greater fees as an incentive from clients to ignore income diversion by managers. I also find that, compared to non-Big 4 auditors, Big 4 firms can better identify other potential risks of accounting fraud related to the corruptness of their clients. Given the client level of income diversion and other observable characteristics, a one standard deviation increase in client PTC corresponds to a 1% decrease in the probability of being audited by a Big 4 firm.

I extend the PTC analysis to the level of individual employees. Using the personal income database, I obtain income data for 1,313 Big 4 employees for the period of 1999-2004. I find that employees with high PTC exhibit significantly higher annual income growth than their colleagues with low PTC. One standard deviation increase in PTC corresponds to an increase in salary from 4% to 8.3% depending on the specification of the econometric model.

Finally, I examine whether clients benefit when they subject themselves to an audit, especially by a Big 4 firm. Given that the sample firms are predominantly private companies, I examine cost of debt. I find that interest costs increase with the extent of transfers to *Spacemen*, i.e., debt holders protect themselves with higher interest payments when they expect higher diversion in firms. Audited firms benefit from lower interest costs, and clients of Big 4 auditors benefit even more in terms of interest costs on their borrowings.

I help to contribute to the extant research in a number of ways. First, I use an alternative to commonly used accrual accounting-based proxies for earnings quality (such as earnings management measures) to assess audit effectiveness. Lang et al. (2003) express concern that "constructs such as earnings management are notoriously difficult to measure" (page 385). My

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measure of corporate theft captures a first-order issue in a number of countries where income diversion is an important concern and one that an auditor is expected to monitor. I thus add to the literature by examining an under-researched dimension of auditor effectiveness. Second, my analysis predominantly examines private firms, whereas the related literature widely focuses on public firms contained in cross-country datasets such as Worldscope. Usage of the private firm data allows me to obtain evidence on the value of audit itself against the value of no-audit. Prior research (with the exception of a few studies, including Blackwell et al. (1998), Kim et al. (2011), and Minnis (2011)) has focused mainly of the value of Big N audit versus non-Big N audit. Third, audit and non-audit fee information is not publicly disclosed in Russia. I am able to gather this information using my banking data. My analysis provides insight into how auditors set their fees in environments in which fees are not disclosed. Fourth, I introduce a measurement of the corruptness of auditors and their clients. I establish a link between auditors' corruptness and the fees that they charge. Finally, I address the issues of the client demand for and the audit effectiveness of big-name auditors in a weak institutional environment. My finding that auditing, especially by Big 4 auditors, limits but does not eliminate income diversion informs on the effectiveness of auditing in a weak institutional setting. Moreover, my finding that Big 4 audited companies are rewarded by capital providers suggests that auditor reputation matters even in a low-litigation environment.

The rest of the paper proceeds as follows. In Section 2, I review the prior literature. In Section 3, I discuss the sample and present descriptive statistics. In Section 4, I discuss the empirical results. In Section 5, I present robustness checks to verify the results, and in Section 6, I conclude.

2. Prior Literature

Big 4 auditors (defined as the set comprising PwC, Arthur Andersen, Deloitte, KPMG and Ernst and Young and their predecessor firms) perform a dominant share of audits for publicly listed companies both in the U.S. and internationally. Francis and Wang (2008) find that Big 4 auditors have over a 75 (50) percent market share in 26 (34) in 42 countries, with a low of 25 percent in the Philippines and a high of 100 percent in Kenya. The review paper by Simnett et al. (2016) shows that the most popular indicators of audit quality in international auditing research are Big N versus non-Big N, along with audit fees.

Companies are observed to appoint big-name auditors when doing so will reduce agency costs. Client demand might arise from the need to provide investors assurance on financial reporting quality. Fan and Wong (2005) find, in a sample of eight Southeast Asian countries, that firms with a greater extent of ownership problems inherent in their ownership structure were more likely to hire Big 5 audit firms. This fact is likely caused by demand from capital providers and other stakeholders for high-quality audits to serve as a substitute for weak public institutions. Thus, it is unsurprising that big audit firms have larger market shares than other auditors in countries with weaker institutions, though their share is lower than it is in countries with stronger institutions. Lennox (2005) suggests that unlisted companies that are not subject to monitoring by capital markets intermediaries (such as equity analysts) and are subject to weaker disclosure requirements may exhibit a greater need for higher-quality auditors. Managers in such companies may appoint brand name auditors, such as the Big 4, to communicate their bonding to a higher-quality reporting regime.

Watts and Zimmerman (1986) conjecture that larger audit firms provide better audits due to their greater monitoring ability. Prior research on U.S. companies finds that Big 4 auditors provide higher audit quality than other firms. Teoh and Wong (1993) find a higher earnings response coefficient to earnings audited by big-name audit firms than for those audited by other auditors. Balvers et al. (1988) and Beatty (1989) find that the use of a big-name auditor is

associated with lower IPO underpricing. Mansi et al. (2004) find that larger auditors are associated with lower debt pricing in client firms. Using data from Taiwan, Chi et al. (2017) show that interest rate spreads are lower when audit quality is higher. Lawrence et al. (2011) suggest that the differences in audit quality are a reflection of client characteristics, such as firm size, implying a selection bias in the samples used in prior papers; however, DeFond et al. (2016) dispute this claim by showing that Lawrence et al.'s results are driven by specific research design choices made in their paper.

The higher audit quality of big audit firms is considered a result of one or both of two factors: larger auditors desire to maintain their high-quality reputation (DeAngelo 1981), and larger auditors have incentives to avoid legal risk and consequent financial liability (Dye 1993). DeAngelo (1981) presents an agency theory-based framework in which large audit firms invest in audit technology to provide superior quality audits. These investments create large portfolios of clients that might leave the firm if audit weaknesses are discovered. The greater potential reputational harm motivates larger firms to continue to provide high-quality audits. Both reputational effects and litigation fears likely contribute to the effectiveness of Big 4 audits in the U.S.

In the international setting, the extent of legal liability for auditors varies significantly across countries (La Porta et al., 2006; Wingate 1997). Consequently, the supply of effective audits by Big 4 auditors is also observed to vary across countries. Demand for high-quality audits may be lower in countries with weak institutions for a few reasons. First, weak institutions foster opaque business environments that limit audit effectiveness. Second, the resulting limited demand for auditing reduces incentives for audit firms to develop audit expertise, which reduces their auditor credibility. Finally, in the absence of strong law enforcement, a negative audit has lesser value because it does not entail significant consequences for the firm or its managers.

Prior papers have considered audit fee premiums as a measure of the audit quality provided by Big 4 auditors. In their review paper, Hay and Knechel (2017) emphasize that "whether the Big N audit firms charge higher fees is one of the most extensively researched areas in the auditing literature". Craswell et al. (1995) and DeFond et al. (2000) document a Big 4 fee premium in Australia and Hong Kong, respectively. Choi et al. (2008), however, survey evidence from the U.K. and the U.S. and conclude that the evidence is mixed and does not conclusively show that Big 4 auditors command a fee premium in these two countries. Whatever the evidence in the four countries examined by this research indicates, all these countries are in the upper end in terms of investor protection and enforcement of securities laws. Evidence from these countries is unlikely to generalize to countries that do not share the effective institutional characteristics of these countries. Research on countries with poor institutions has been limited by data availability. Most studies have employed small samples of companies.[7]

Evidence from cross-country studies can be more helpful. Choi et al. (2008) find that across countries, audit fees increase with the extent of legal liability for auditors. Furthermore, within a given legal liability, Big 4 auditors charge higher audit fees than non-Big 4 auditors. Finally, the Big 4 premium decreases as the legal liability strengthens. In contrast to this last piece of evidence in Choi et al. (2008), Francis and Wang (2008) find that the earnings quality of companies audited by a Big 4 auditor increases in stricter legal regimes but not for clients of non-Big 4 firms. However, given the differences in methodology between these papers, the reasons for the contrasting results are unclear. While these papers both suggest that the higher legal liability for auditors causes Big 4 auditors to provide better audit quality and charge more

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[7] Using data from 118 Bangladeshi firms, 219 Indian firms and 229 Pakistani firms, Ahmed and Goyal (2005) show that Big 4 audit firms charge higher fees than local audit firms. Based on a sample of 434 observations in China, Chen, Su, and Wu (2007) show that the Big 5 charge significantly higher audit fees in the supplementary auditing market; however, their fees are not significantly different from those of local firms in the statutory market. Using a sample of 67 Indonesian companies, Basioudis and Fifi (2004) find that no audit fee premium is charged by Indonesian Big 5 auditors.

for it, the effectiveness of Big 4 auditors in countries with weak institutions is unclear. The focus in this paper is on audit quality and fee difference in a country with weak institutional development and low legal liability for auditors.

Big 4 auditors are global organizations with incentives to maintain their reputations for high quality across countries, including low litigation (see, e.g., the argumentation in Carson, 2009). They have training and knowledge-sharing practices that can potentially provide a consistent level of audit quality worldwide (Simunic and Stein 1987; Francis and Wang 2008). Reputational concerns provide incentives for auditors, even in low-litigation countries, to provide high-quality audits. Weber et al. (2008) and Skinner and Srinivasan (2012) provide evidence from Germany and Japan, respectively, that audit clients defect from big-name auditors upon the revelation of audit quality weaknesses. This evidence is consistent with reputational harm for big-name auditors following the discovery of audit weaknesses. Since Big 4 auditors have an international reputation to protect, they are more likely than domestic audit firms to provide higher-quality audits. Big firms possess international networks, and local offices draw on the expertise of the global network (Carson, 2009). However, even big audit firms are subject to the limitations of the institutional environments in which they perform their audits. A number of countries lack the infrastructure to support the professional development of auditors (Michas 2011). While Japan and Germany have low auditor litigation risk, they are among the most developed countries in the world. This fact leaves open the question of reputational incentives in countries lower on the institutional development scale, which is a question I explore in this paper.

3. Data and Descriptive Statistics

I construct the test and control variables from a few databases from Russia. Corporate financial data are from Rosstat, the official Russian statistical agency. Rosstat contains

information about a company's identification number, name, address, industry, date of incorporation, owners, directors, and basic accounting data such as revenue, assets, net income, and liability. While the number of financial statement items is limited, the universe of companies covered is extensive, as all Russian firms must report their balance sheet and income statements on a quarterly basis. Rosstat thus contains the information for approximately 1.5 million Russian firms. Using Rosstat data, I select all audit firms with revenue greater than $100,000 in 2003, which results in a sample of 264 auditors.

I also use banking data from the Russian Central Bank; these data were used previously by Mironov (2013) and are available from a number of vendors in Russia.[8] The Internet Appendix to Mironov (2013) provides extensive verification checks of the data, including matching with the official firm registry, firm accounting data, and tax returns. The banking data consist of 513,169,660 transactions involving 1,721,914 million business and government entities, and they contain information on the date of the transaction as well as its payer, recipient, amount and purpose. The data cover the period from 1999 to 2004 and include only transactions that took place within Russia; transactions in foreign currencies, cash deposits or cash withdrawals are excluded.[9] I select all transactions where the payment is to one of the sample audit firms and the purpose is indicated as payments to auditors. I classify a transaction as a payment for audit services if its description contains the word "audit". [10] All other fees to auditors (e.g., payments for consulting) are classified as other fees to auditors. Russian company law requires that annual accounting statements (unaudited) be submitted to authorities no later than March 31 of the following year. Auditing procedures typically occur in the year when the

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[8] These data could be purchased from several websites, including www.mos-inform.com, www.specsoft.info, http://www.superdatabase.info/, http://bazabd.com/, and www.rusbd.com. In the present study, the data were purchased from www.rusbd.com.
[9] Mironov (2013) uses banking data for 2003-2004 because initially only the data for this period were available. Mironov (2015) uses banking data for 1999-2004, the same data used in this paper.
[10] This methodology might potentially underestimate audit fees. If a company does not specifically classify its payment as for "audit", I classify it is as a payment for other services.

filing is required and often after the unaudited results are filed. Therefore, I assign audit payments in time with a 1-year lag; e.g., payments made from January 1, 2000 to December 31, 2000 are assigned as audit payments for 1999 accounting statements. Since the banking data cover the 1999 to 2004 period, I can identify audit payments for 1999-2003. Payments for auditing 2004 statements cannot be identified since an audit of 2004 cannot be performed until 2005, and I do not have banking transactions for 2005.

I select from Rosstat all companies that have revenue greater than $1,000,000. I impose this restriction because audit services are typically required only by relatively large companies. Since I cannot be certain that the banking data represent the complete set of transactions for every firm, I choose only firms whose reported revenue is relatively close to their turnover from the banking data. Specifically, I include firms for which |log(revenue)-log((cash inflow+cash outflow)/2)|<1, where revenue is the company's total revenue for a given year (1999-2003) taken from Rosstat; cash inflow and cash outflow are the company's cash receipts and payments for this year, which are obtained from the banking data.[11] This yields a sample of 51,815 company years.

I identify transfers to *Spacemen* using the banking data. Intuitively, *Spacemen* are firms that do not pay taxes despite having transactions that would normally require taxes to be paid. More precisely, Mironov (2013) defines a firm as a Spaceman "if it satisfies all of the following criteria: (a) the ratio of taxes paid to the difference in cash inflows and outflows (net tax rate) is less than 0.1%; (b) the firm pays less than 216 rubles ($7.2) in social security tax per month, which corresponds to the minimum wage; and (c) the firm's cash inflows are higher than its outflows. According to the Russian tax system, even a firm with a loss must pay VAT, SST, and property taxes; hence, these criteria guarantee that such a firm cannot survive even a simple

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[11] The empirical results are robust to different cut-off points (0.5, 0.75, 2)

examination by tax authorities." More details of the identification of *Spacemen* and the numerous reliability checks can be found in Mironov (2013). I identify 99,925 *Spacemen* in the banking transaction data. Note that transactions with *Spacemen* might enrich managers at the expense of shareholders or illegally reduce the taxes payable by the company. In both cases, these transactions distort accounting statements. If a firm hides a significant portion of its profit using *Spacemen* schemes, then the numbers it reports to the stakeholders do not reflect the actual figures.

Next, I construct a measure of income diversion at the firm level:

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

I report sample summary statistics in Table 1. Panel A statistics show that 11.26% of companies are audited, and 1.51% are audited by Big 4 accounting firms. Panel B presents summary statistics for the sample of audited firms. Among audited firms, 13.2% are clients of Big 4 auditors. The average audit (non-audit) fee in the sample is $31,630 ($18,240). Table 2 presents descriptive statistics for the top 20 audit firms in the sample. The Big 4 audit firms derive the highest average fees from their clients. Consistent with the large international presence of these audit networks, they are also among the largest by number of clients, though some of the other audit firms have more clients than Deloitte (which is the smallest of the Big 4 in Russia, as measured by the number of clients).

I obtain employment data from the personal income database of Moscow residents, which contains 55 million records for the 1999–2004 period. The data set includes unique identification (name, address, and identification number) for both an employer and an employee. These data have been used extensively in academic research (e.g., Guriev and Rachinsky, 2006; Braguinsky, Mityakov, and Liscovich, 2010; Braguinsky and Mityakov, 2015; Mironov, 2015).

4. Empirical Results

I present below the results of the relationship between auditing and income diversion. I also examine the relationship between income diversion by clients and audit fees. Finally, I analyze the relationships among cost of debt, income diversion, and auditing to examine the consequences of income diversion and auditing.

4.1 Auditing and Income Diversion

Companies choose to be audited to signal their quality to potential investors and other interested parties. The firm's decision process can be presented using a simplified chart.
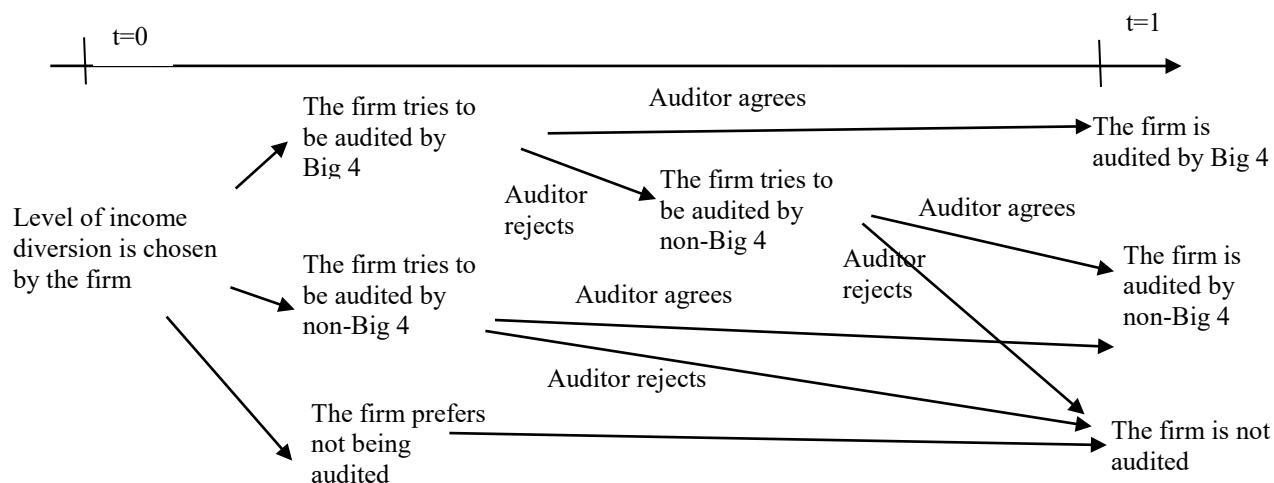
Auditing procedures typically start when the reporting period is closed; thus, no key variables, including income diversion, can be changed. The accounting firms can only accept or reject the client, observing its level of income diversion. Certainly, auditing is not a two-period game. It is a multi-period game; thus, auditors can influence future levels of income diversion. Unfortunately, my data cover only several years. The average auditor tenure in my sample is 1.6 years. Only 17% of the audited firms have the same auditor for more than 2 years. I do not have sufficient data to test whether auditors have long-term effects on diversion. Thus, in this paper, I

use a simplified model: auditors can infer the level of income diversion of their clients and make decisions about auditing based on their observations. I test the following hypotheses.

HYPOTHESIS 1: *The probability of being audited decreases with a firm's income diversion.*

HYPOTHESIS 2: *Given that the firm is audited, the probability of being audited by a Big 4 accounting firm decreases with the firm's income diversion.*

I employ the following logistic regressions to test these hypotheses:

$$\Pr(Audited_t^i) = L(\alpha + \beta ShadowR_t^i + \gamma Controls_t^i + \theta_t + \varepsilon_t^i)$$

$$\Pr(Big4_t^i \mid Audited_t^i) = L(\alpha + \beta ShadowR_t^i + \gamma Controls_t^i + \theta_t + \varepsilon_t^i)$$

where i and t are firm and time indices, $ShadowR_t^i$ is the income diversion measure defined above, $Audited_t^i$ is a dummy for whether a company's financial statements were audited, $Big4_t^i$ is a dummy for whether a company's financial statements were audited by a Big 4 firm, $Controls_t^i$ is a set of firm-level controls, θ_t are year fixed effects, and ε_t^i is the error term. The control variables include firm size, measured by the log of revenues of the firm (*Log(Revenue)*); firm profitability, measured by earnings before taxes scaled by total assets (*EBT/Assets*); leverage, measured as debt scaled by total assets of the firm (*Debt/Assets*); and whether the firm is controlled by the government (*Gov Control*). I include the extent of inventories and receivables in the firm scaled by total assets (*InvRec*) as a measure of complexity facing the audit task, following Choi et al. (2009). *Loss* measures whether the firm makes a loss in that fiscal year. Finally, I include two measures of ownership: *CEO_Owner* measures whether the CEO is the owner of the firm, and *N_Owners* measures the number of shareholders. I consider these two as governance variables that can impact the extent of income diversion in the firm. *L()* is a logistic function. All variables are defined in Appendix A.

Table 3 presents the results of the above estimation. All standard errors are clustered at the firm level, and all specifications include dummy variables to control for industry, the region in which the firm is located, and year. Marginal effects are reported. Column 1 presents the results using the entire sample, and Column 2 presents the results for the sample of audited firms. The Column 1 results show that the probability of being audited decreases with income diversion. The related coefficient is -0.105 and is statistically significant at 1%. One standard deviation of *ShadowR* corresponds to a 0.012 decrease in the probability of being audited (the unconditional probability of being audited in my sample is 0.113). As we can see from Column 2, the probability of being audited by Big 4 firms compared to non-Big 4 firms also decreases with income diversion. The coefficient for *ShadowR* is -0.32 and is significant at the 5% level. One standard deviation of *ShadowR* in a subsample of audited firms corresponds to a 0.027 decrease in being audited by a Big 4 firm (given that the firm is audited, the probability of being audited by a Big 4 firm is 0.132).

The control variables also provide some interesting insights. The probability of being audited increases with firm size (the coefficient is 0.049), and the demand for an audit by a Big 4 firm also increases with firm size (the coefficient is 0.049). Government ownership has a positive effect on the probability of an audit (the coefficient is 0.0345); however government-controlled companies prefer not to choose Big 4 auditors (the coefficient is -0.28). The probability of being audited by a Big 4 firm is positively correlated with firm leverage (coefficient is 0.0575). The most likely explanation is reverse causality. Firms audited by a reputable auditor have better access to capital markets. Firms that have more inventories and receivables have a lower probability of being audited, and they choose Big 4 auditors (likely because they are more complex to audit). Firms in which the CEO is one of firm's owners are less likely to be audited, and they choose Big 4 auditors. A possible explanation is that the principle-agent conflict is less severe in companies in which the CEO is also a firm owner.

The marginal effects obtained using the logistic regressions might not be accurate estimates of the income diversion effect because audited and not-audited firms significantly differ in other characteristics. As we can see from Table 1, Panels A, B, and C, audited and non-audited firms have different sizes, profit margins, debt levels and other key variables. To address this difference in characteristics, I apply the propensity score matching (PSM) technique. The PSM matches each audited firm with a non-audited firm using a propensity score, predicted likelihood of being audited based on a firm's observable characteristics. As the covariates that predict the decision to be audited, I use firm size, profitability, debt financing, ownership, industry, and other characteristics. Table 3, Panel A presents the results. As evident from columns (1) – (4), there are no significant differences in covariates between the audited firms and the matched control sample of non-audited firms. For the sample of firms audited by Big 4 and firms audited by non-Big 4 auditors (columns (5) – (8)), there are also no significant differences in the covariates, except for the variable *Loss*. In general, the estimations using the PSM technique are not conceptually different from the logistic estimations. Audited firms divert 0.79% less revenue than non-audited ones. Firms audited by Big 4 divert 0.71% less revenue than firms audited by non-Big 4 auditors.

I recognize the endogenous relationships among the type of firm, the choice to be audited and the type of auditor (Big 4 or smaller auditor) that the firm chooses to hire. For instance, firms with better internal governance are likely to both choose to be audited and divert fewer corporate resources for private use. Although I conduct an analysis based on a propensity score-matched sample, the endogeneity might still be an issue to consider. In multi-period settings, the auditors might influence firms' choices, and firms' choices might influence the decisions of auditors to audit or not. Thus, it might be a simultaneous relationship between these two variables. Moreover, a firm that is considering being audited in the future might start to decrease income diversion a few years in advance. Therefore, auditing tomorrow might *de facto*

decrease income diversion today. Since my data do not have any exogenous variation in firm decisions to be audited, I cannot claim any causal relationship regarding whether income diversion affects the audit or vice versa. However, it is important to note that external market participants do not observe the level of firm income diversion. They only see whether firm financial statements were audited or not. I document that audited firms have lower levels of income diversion than non-audited firms. Firms audited by Big 4 auditors have lower levels of income diversion than firms audited by non-Big 4 auditors. This evidence provides support for the signaling hypothesis. Good firms are willing to signal their quality to potential investors and partners by hiring reputable auditors.

Since the firms audited by Big 4 and non-Big 4 firms exhibit significant differences in income diversion, it is interesting to analyze the difference in fees between different types of auditors. In Panel B of Table 4, I expand the PSM analysis to estimate the difference in fees across auditors. I use the same covariates as before. Panel B of Table 4 reports the results. The difference in the logarithms of audit fees between firms audited by Big 4 and non-Big 4 firms is 1.42. The difference in the logarithms of other fees is 1.35. Both estimates are significant at the 1% level. These estimations indicate that Big 4 auditors charge approximately 4 times more for the same type of service. The average audit fee of a Big 4 firm is 170.4 thousand dollars (see Table 1, Panel C). Let a firm satisfy the quality criteria to be audited by a Big 4 firm. This firm can save approximately 130 thousand dollars if it chooses a smaller auditor. However, if the firm chooses to do so, the market participants might believe that the firm diverts 0.71% more revenue (see Table 3, Panel A). The average revenue of firms audited by Big 4 firm is 254 million dollars. The firm faces the following trade-off: to pay an additional 130 thousand dollars to signal to the market that it diverts 1.8 million dollars less. We can conclude that, from the theoretical prospective, paying additional fees to Big 4 auditors might be justified by signaling a significant reduction in income diversion activities.

4.2 Audit Fees and Income Diversion

The idea that audit fees vary with clients' characteristics is not new. For example, using a sample of Norwegian private firms, Hope et al. (2012) showed that audit fees vary with firm characteristics related to ownership structures and family relationships. In this section, I analyze the relationship between audit fees and income diversion.

While auditors are expected to prevent the diversion of resources for private benefit, clients that are keen on diverting funds could co-opt auditors by providing them with excess audit fees. Auditors incur greater risk when they agree to audit companies with a greater level of income diversion, and they can compensate themselves for the higher risk and cost of detection with higher audit fees. The link between litigation risks and audit fees has been studied primarily in high-litigation countries (see Simunic and Stein, 1996, Bell et al., 2001, Schelleman and Knechel, 2010). However, even in low-litigation countries, audit firms pay reputational costs in cases of audit failure (see Weber et al., 2008 and Skinner and Srinivasan, 2012). Using my data, I can directly measure clients' income diversion; thus, I test the following hypothesis.

HYPOTHESIS 3: *Income diversion and audit fees are positively related.*

Since, in low-litigation countries, primarily reputation risk should matter, I test the following hypothesis.

HYPOTHESIS 4: *The audit fee premium related to income diversion should be higher for reputable auditors.*

To test Hypotheses 3 and 4, I estimate the following regression:

$$Log\left(Audit\ Fees_t^i\right) = \alpha + \beta_1 Big4_t^i + \beta_2 ShadowR_t^i + \beta_3 ShadowR_t^i \cdot Big4_t^i + \delta Controls_t^i + \theta_t + \varepsilon_t^i$$

where i and t are firm and time indices, $ShadowR_t^i$ is the income diversion measure defined above, $Audit\ Fees_t^i$ are audit fees paid to auditors, $Big4_t^i$ is a dummy for whether a company's

financial statements were audited by a Big 4 firm, $Controls_t^i$ is a set of firm-level controls, θ_t are year fixed effects, and ε_t^i is the error term.

Long-standing concerns about auditor independence have led to requirements to disclose fees for non-audit services in the U.S. and elsewhere (Koh et al., 2012) and the ban on auditor-provided consulting services in the Sarbanes-Oxley Act of 2002. To test for possible conflicts of interests, I also include other fees paid to auditors as a dependent variable, along with audit fees:

$$Log\left(Other\ Fees_t^i\right) = \alpha + \beta_1 Big4_t^i + \beta_2 ShadowR_t^i + \beta_3 ShadowR_t^i \cdot Big4_t^i + \delta Controls_t^i + \theta_t + \varepsilon_t^i$$

where i and t are firm and time indices, $ShadowR_t^i$ is the income diversion measure defined above, $Audit\ Fees_t^i$ are audit fees paid to auditors, $Other\ Fees_t^i$ are other fees paid to auditors, $Big4_t^i$ is a dummy for whether a company's financial statements were audited by a Big 4 firm, $Controls_t^i$ is a set of firm-level controls, θ_t are year fixed effects, and ε_t^i is the error term.

I report the results of the above estimation in Table 5. The sample consists of all audited firms only. Panel A reports the regression results with audit fees as the dependent variable, and Panel B reports results with non-audit fees as the dependent variable. The Panel A, Column (1) results show that Big 4 auditors receive significantly higher audit fees than other audit firms even after I control for auditor tenure, auditor size, client firm size, profitability and other factors that prior research has found to be related to audit fees (Choi et al., 2009, Minnis 2011). This result confirms the Big 4 audit fee premium result documented in prior literature (DeFond et al., 2000).

Estimates on the control variables show that a longer auditor tenure is associated with higher audit fees. Larger audit firms (*Big 4* and *log(Revenue auditor)*) receive greater audit fees, and larger clients pay higher fees, as observed on the positive and significant coefficient on the *Log (Revenue)* term. Loss-making firms pay higher audit fees. In the results in Column (2), I examine whether audit fees are associated with transfers to *Spacemen*. The lack of a significant

coefficient on *ShadowR* suggests that on average, audit fees are not associated with greater funds diversion.

In Column (3), I examine the relationship between Big 4 auditors and income diversion. The variable of interest is the interaction between Big 4 auditors and *ShadowR*. The coefficient on the interaction term *ShadowR**Big4 (β_3) is positive and statistically significant, suggesting that Big 4 auditors are paid more when their clients divert more funds out of the firm. The effect is also economically significant. A one standard deviation increase in income diversion corresponds to an approximately 9.2 percent increase in audit fees.

While the results suggest that the Big 4 receive higher audit fees when income diversion increases, the essence of this relationship is not obvious. One possibility is that the higher fees reflect price protection for greater risk on the part of the Big 4 auditors. Another possibility is that they represent fees to look the other way when executives divert funds out of the firm. Surprisingly, only Big 4 auditors exhibit higher fees relating to income diversion in their fees. I find no statistically significant effect of income diversion on audits for non-Big 4. The Big 4 effect remains similar when I do not include the main effect and include only the interaction in Column (4).

Given the concerns about the provision of non-audit services and the potential for auditors' loss of independence arising from non-audit fees, I examine the relationship between income diversion and non-audit fees. The results are presented in Panel B, where the dependent variable is Log of other (non-audit) fees paid to the auditors. The inferences from these results broadly mirror the inferences from the audit fee regressions. Column (1) results show that Big 4 auditors receive a significantly greater extent of non-audit fees, which likely reflects their ability to provide a greater extent of non-audit services. Column (2) results show that non-audit fees are not related to the extent of income diversion in the client firms. However, Column (3) results show that Big 4 auditors receive greater non-audit fees when their clients divert more income out

of the firm; this economic effect is even more significant than in the case of audit fees. A one standard deviation increase in income diversion corresponds to a 24.8 percent increase in non-audit fees. The same effect remains in Column (4) when I drop the main effect of transfer to *Spacemen*/revenue and include only the interaction effect. As in the case of audit fees, I cannot distinguish between non-audit fees paid for a greater risk of auditing risky clients and those for auditors looking the other way. However, it is interesting that the premium exists only for Big 4 auditors and not for other auditors. The results show that clients that divert income out of the firm pay a cost in terms of excess audit fees when they have Big 4 auditors but do not need to do so for non-Big 4 auditors.

It is worth noting that audit and non-audit fee information is not publicly disclosed in Russia. I am able to gather this information based on the banking data that I described earlier. Therefore, the relationships I observe between audit fees and income diversion cannot normally be observed outside the firm. The salutary effect of public scrutiny related to audit fees on auditor monitoring caused the SEC to demand disclosure of audit and non-audit fees in the U.S. in 2000. The absence of public information about audit fees in Russia likely reduces the disciplinary effect on auditors.

To summarize, I find support for Hypothesis 4, which states that reputable auditors charge higher premiums related to clients' income diversion than other auditors do. However, I do not find complete evidence in support of Hypothesis 3, specifically that *all* auditors charge premiums related to income diversion. My evidence does not support the explanation that auditors charge higher fees because of the greater efforts required to audit risky clients. If this were the case, we should expect that the audit fees would increase with income diversion for all auditors, not only for the Big 4. If some task requires more effort, it should require more effort from all firms that perform this task. However, we observe only that highly reputable auditors charge premiums. In addition, we can see that the auditors charge higher fees, particularly

through non-audit fees. The non-audit fee premium related to income diversion is three times higher than the audit fee premium. If risky clients require more effort to audit, then we should observe a primarily effect on audit fees and not on other fees.

4.3 Auditor Corruption and Income Diversion

In the previous section, I discussed two factors that can lead to higher audit fees in the presence of income diversion: (1) auditors charge higher premium because of the higher risk from potential enforcement or the reputational costs of being associated with diverting firms, or (2) the auditor partners and other senior employees who turn a blind eye to the income diversion are themselves enriched by the higher audit and consulting fees. This latter rationale is more likely in the presence of corrupt auditors. While it is hard to test these two possibilities directly, I employ an indirect method using the propensity to corrupt (PTC) measure developed in Mironov (2015). This measure is built based on traffic violations of Muscovites for the 1997 to 2007 period. Drivers occasionally commit traffic violations. However, not all traffic violations are recorded. A person who is stopped by police may often avoid formal punishment in exchange for a bribe. Thus, observing a driver's recorded traffic violations for a substantial period of time allows an inference to be made regarding the individual's PTC, which is measured as the difference between the number of expected traffic violations and the number of actual traffic violations for this person. The greater this difference is, the higher is the person's PTC. Mironov (2015) shows that the PTC for firm management is positively related to a firm's illegal activities, specifically income diversion and undeclared wages paid to employees. The idea behind this measure of corruption is not new. Fisman and Miguel (2007) show that the number of unpaid parking tickets received by United Nations diplomats is related to country-level corruption norms.

Table 6 Panel A provides descriptive statistics of PTC. The PTC of top management (PTC Top 5) of non-audited firms is 4.29, which is higher than PTC of audited firms (not by Big 4) at 4.21. Firms audited by the Big 4 have even lower PTC, 4.08. All differences are significant at the 1% level, which implies that audited firms have less corrupt management than firms that are not audited and those that are audited by Big 4 have less corrupt management than non-Big 4 audited firms. Note also that the PTC of auditors, 3.94, is lower than the PTC of other firms. Non-Big 4 auditors have a higher PTC than Big 4 auditors (4.03 versus 3.46). These statistics are consistent with the evidence that the management of audit firms is less corrupt than the management of other companies, and the management of Big 4 firms is less corrupt than the management of non-Big 4 auditors.

I divide auditors into four subsamples: non-Big 4 low PTC; non-Big 4 high PTC; Big 4 low PTC; and Big 4 high PTC. As a threshold to separate auditors, I use median PTC. To test whether auditors' PTC and fees are linked, I estimate the following regressions:

$$Log\left(Fees_t^i\right) = \alpha + \beta_1 Big4_t^i + \beta_2 ShadowR_t^i + \beta_3 ShadowR_t^i \cdot Big4_t^i + \beta_4 HighPTCNonBig4_t^i + \beta_5 HighPTCBig4_t^i +$$
$$+ \beta_6 ShadowR_t^i \cdot HighPTCNonBig4_t^i + \beta_7 ShadowR_t^i \cdot HighPTCBig4_t^i + \delta Controls_t^i + \theta_t + \varepsilon_t^i$$

where i and t are firm and time indices, $ShadowR_t^i$ is the income diversion measure defined above, $Fees_t^i$ are either audit or other fees paid to auditors, $Big4_t^i$ is a dummy for whether a company's financial statements were audited by a Big 4 firm, $HighPTCNonBig4_t^i$ is a dummy for high PTC non-Big 4 auditors, $HighPTCBig4_t^i$ is a dummy for high PTC Big 4 auditors $Controls_t^i$ is a set of firm-level controls, θ_t are year fixed effects, and ε_t^i is the error term.

Table 6, Panel B presents the estimation results. As we can see from Column 2, there is a positive link between audit fees and an interaction of *ShadowR* and high PTC Big 4 auditors. The related coefficient is 1.59 and is significant at the 1% level. The coefficient for an interaction f

ShadowR with Big 4 auditors is 0.87 and is significant at the 1% level, indicating that the link between the audit fees and the client's income diversion is approximately 3 times stronger for highly corrupt Big 4 auditors. Regarding the other fees paid to auditors, the situation is slightly different. The coefficient for an interaction of *ShadowR* and high PTC Big 4 auditors is statistically insignificant (see Column 4). However, highly corrupt Big 4 auditors charge 40% premiums over less corrupt Big 4 auditors, and the coefficient for dummy High PTC Big 4 auditors is 0.33 (Column 3). There is no fee premium charged by high PTC non-Big 4 auditors. There might be two explanations for this finding. The first is related to the results reported in the previous section. There is no significant relationship between a client's income diversion and the audit fees for non-Big 4 auditors, likely because the value of their reputation is quite low. If the value of reputation and auditing standards is low, the clients would not bribe auditors to overcome these standards. The second explanation is that non-Big 4 auditors have lower skills than Big 4 auditors have. Thus, they cannot *ex-ante* estimate the level of illegal activities of their clients and include them in prices.

Another possible extension of the auditor corruption hypothesis is to the performance of individual employees. I have collected the data of all Big 4 employees for the period 2000-2004 and available PTC data. The available data include yearly income, employer, and year of birth. As a measure of an individual auditor's performance, I use the year-to-year income growth. Table 7, Panel A provides descriptive statistics. An average employee of Big 4 earns $22,390 per year. The average income growth is 53% per year.[12] As we can see from the table, the average (median) income percentile in the sample is 0.40 (0.38). Since the PTC measure is calculated only for drivers, it biases my sample of employees towards higher-income employees who can afford to drive a car. An average employee in the sample is approximately 31 years old. The

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[12] After the financial crisis of 1998 and 300% rouble devaluation, in 1999, the economy entered the phase of fast growth with high inflation and high rates of salary growth.

average (median) PTC for Big 4 employees is 3.96 (3.20). The average and median PTC of the general population is 5.0; thus, Big 4 employees are much less corrupt than the average person.

Table 7, Panel B presents the relation between income growth and employee PTC. As we can see from columns 1-4, the coefficient for PTC is positive and statistically significant at 1-5% level in all specifications. The economic significance is also substantial. One standard deviation of PTC corresponds to a 4-8.3% increase in income per year. A direct interpretation of this econometric result is as follows. Big 4 employees who bribe traffic police more often than their colleagues receive a much higher annual increase in their total compensation.

It is important to note that in this subsection, I establish causal relationships among audit fees, PTC and income diversion. The PTC measure is constructed using the individual driving record, and income diversion is realized prior the setting of fees by the auditor. Thus, PTC and income diversion can be treated as exogenous variables with respect to individual income growth and fee setting by the Big 4 audit firms.

To summarize, the positive link between audit fees and the accounting manipulation of their clients for Big 4 auditors is at least partially explained by the auditors' PTC. Moreover, corrupt auditors charge higher consulting fees. However, the positive link between income diversion and the fees paid to auditors is also present for less corrupt Big 4 auditors. Additionally, Big 4 auditors value high-PTC employees more than low-PTC employees. The PTC of an employee and his or her annual increase in salary are positively correlated.

4.4 Audit Effort, Income Diversion and Cost of Capital

The results from Sections 4.1 suggest that firms that are audited, especially those that are audited by Big 4 audit firms, divert less income out of the firm. However, the association between audit fees and greater income diversion is consistent with the evidence that Big 4 auditors price protect themselves for the risk of auditing firms that have greater income diversion

and that firms pay more to audit firms to co-opt the auditor into the income diversion scheme. In combination, these two results suggest that while auditing, especially by a reputed auditor, is associated with lesser income diversion, such reputed auditors also receive higher fees when they audit income-diverting firms. This second result is surprising to the extent that some of the increased audit fees are to compensate the audit firm for the risk of associating with an income-diverting firm, which suggests that firms expect to receive some benefit from being audited by a reputed auditor.

I examine whether income-diverting firms receive any benefit in their cost of capital when they are clients of more reputed auditors. Since most firms in the sample are private firms, I am unable to develop measures of cost of equity. I therefore examine their cost of debt by estimating the following regression:

$$Debt\ Interest\ Rate_t^i = \alpha + \beta_1 audited_{t-1}^i + \beta_2 Big4_{t-1}^i + \gamma Controls_t^i + \theta_t + \varepsilon_t^i$$

where i and t are firm and time indices, *Debt Interest Rate* is an average interest rate paid on a company's debt, *Audited* is an indicator variable identifying whether the company's financial statements are audited, and *Big 4* is an indicator variable identifying whether the company's financial statements are audited by a Big 4 audit firm. *Controls* are the same set of firm-level controls as in the previous regressions, θ are year fixed effects, and ϵ is the error term. I lag the auditor indicator variables by one year because in year t, banks can observe only whether a company has an audited statement for year t-1.

I report the results of the above estimation in Table 8. Column (1) results show that firms that are audited pay a lower cost of debt (94 basis points) than firms that are not audited. In Column (2), I add an interaction between *ShadowR* and *Audited* to examine whether the interest cost varies for audited firms when there is greater income diversion. The coefficient on *ShadowR*Audited* is insignificant, showing no such effect. In Column (3), I distinguish auditors

as Big 4 auditors or others. Column (3) results show that the debt cost benefit is enjoyed only by firms that are audited by the Big 4 audit firms; the coefficient for *Big 4* is negative and statistically significant at the 1% level. Companies that are audited by the Big 4 audit firms pay on average 190 basis points less interest on their debt than companies that are not. The coefficient for *Audited* is negative but statistically insignificant. Columns (5) to (6) present the results within the sample of audited firms. The results in Column (5) confirm Column (3) results, which indicate that clients of Big 4 auditors have lower interest costs than clients of other auditors. The magnitude (193 basis points) is similar to that in Column (3) estimates. I also include an interaction between *ShadowR* and *Big 4*. As in Column (4), the coefficient on *ShadowR*Big 4* is insignificant. In Column (6), I replicate the Column (5) results but by substituting the Big 4 measure with a continuous measure of auditor revenues. The inferences remain unchanged: consistent with previous results, I find a negative and significant coefficient on auditor size as the interest cost for clients decreases with auditor size.

The estimates in Columns (1) to (4) also show that interest costs increase with the extent of income diversion (coefficient on *ShadowR* is positive and significant).[13] However, I do not observe the same within the sample of audited firms, which suggests that the greater cost is a function of a lack of auditing and that the Big 4 do not incrementally change the impact on debt cost; this result is consistent with the lack of significance of the interaction term noted above.

Overall, the results in Table 8 suggest that more reputed Big 4 auditors are associated with a lower cost of capital for their clients, which potentially explains why clients, even those that engage in income diversion, hire reputed auditors and pay them a significant price premium.

5. Robustness tests

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[13] The coefficient on *ShadowR* is significant at the 10% level in Columns 1 and 3 and is significant at the 11% level in Columns 2 and 4.

I perform several robustness checks to verify the reported results. First, I use the logarithm of assets instead of the logarithm of revenue as a control for firm size in all key regressions. *ShadowR* and *Revenue* might be mechanically correlated, and thus I use an alternative proxy for size. Specifically, I recalculate the results in Table 3, Table 5, Table 6, and Table 7.[14] The coefficients of interest retain their signs and remain statistically significant.

Next, I include whether a company was publicly traded as an additional control. Since public companies are subject to greater control and scrutiny from regulators, the status of a company this might be an important factor explaining the level of income diversion. The introduction of this control has little effect on the estimation results, most likely because less than 1% of my sample is publicly traded. All of the coefficients in Table 3, Table 5, Table 6, and Table 7 barely change.

Finally, I check whether my definition of being audited is robust to the introduction of some threshold. I define a firm as audited "if a company made any payments to an audit firm for audit services during a particular year". However, one might argue that some threshold for audit fees should be introduced. Accordingly, I construct the variable *Payment to auditors/Revenue*. Then, I define *Audited=1* only if a firm is in the top 90% of the distribution of *Payment to auditors/Revenue.* Basically, I define a firm as audited only if it made some significant payment to auditors. In my particular case, the top 90% threshold corresponds to 0.013% of revenue. The average audited firm in my sample has revenue of $56.7 million, and thus a payment to auditors of at least $7,570 is required for a firm to be considered "audited". I reestimate the results of Table 3, Table 5, Table 6, and Table 8. None of the coefficients of interest change significantly.

6. Conclusions

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[14] The detailed results of the robustness tests are untabulated and are available upon request.

I examine the relationship between auditing and corporate theft from companies in Russia using a novel database of diversion of funds from companies that I created. I find that companies that choose to be audited exhibit a lower extent of income diversion, especially firms that are audited by the Big 4 audit firms. Both the audit and non-audit fees of Big 4 auditors are higher when their clients are observed to divert more, which could reflect one or both of the following possibilities. Big 4 auditors, which have the most to lose with a tainted reputation, price protect themselves when they audit risky clients. The more pernicious possibility is that clients that divert resources out of the firm pay their auditors more to look the other way when they steal from their firms. My empirical findings provide some support in favor of the latter hypothesis. The higher the auditor corruptness, the higher the income diversion of their clients and the stronger the positive link between auditor fees and corporate theft. Finally, I find that the cost of capital is lower for firms that are audited by Big 4 auditors, providing a rationale for why low income-diverting firms would choose to be audited by a Big 4 firm to signal their low diversion status.

Overall, my findings provide evidence on the valuable role of auditing, especially by a Big 4 auditor, even in an economy characterized by weak investor protection and poor law enforcement. It also demonstrates the limits of auditing, even by reputed auditors, in preventing theft from companies in low-quality institutional environments. Even the biggest audit firms do not eliminate or significantly reduce income diversion from companies.

Appendix A – Variable Descriptions

Variable Name	Definition	Data Source
Revenue	Fiscal year revenues	Rosstat
Assets	Total assets	Rosstat
EBT	Earnings before taxes	Rosstat
Actual EBT	Earnings before taxes corrected for hidden earnings	Rosstat
Debt	Sum of short-term debt and long-term debt	Rosstat
Transfers to Spacemen	Transfers to "fly-by-night" entities estimated using the banking transaction database	See Mironov (2013) for details
Debt interest rate	Interest expenses divided by average Debt, i.e., Debt interest rate (t)=Interest expenses (t)/[(Debt (t)+Debt (t-1)/2], where t is year	Rosstat
Gov control	Dummy variable that takes a value of 1 if the government owns more than 25% of the company	Rosstat
Audited	Dummy variable that equals 1 if a company made any payments to an audit firm for audit services during a particular year, lagged by 1 year; e.g., *Audited* is equal to 1 for the year 2000 if a company made payments for audit services during the period Jan 2001 – Dec 2001	Banking transaction data
Audited by Big 4	Dummy variable that equals 1 if a company made payments to a Big 4 accounting firm (PwC, KPMG, E&Y, and Deloitte) for audit services during a particular year, lagged by 1 year	Banking transaction data
Audit fees	Total audit fees paid to auditors for the year	Banking transaction data
Other fees to auditors	Payments paid to auditors other than for audit services for the year	Banking transaction data
Auditor tenure	Number of years of auditor service	Rosstat
Revenue of auditor	Auditor's revenues for 2003	Rosstat
InvRec	(Inventory + Accounts Receivable)/Assets	Rosstat
Loss	Dummy variable equal to 1 if EBT<0	
Revenue growth	Log(Revenue(t))–Log(Revenue(t-1))	
CEO_Owner	Dummy variable equal to 1 if the firm's CEO is also one of the firm's owners in 2004.	Rosstat
N_Owners	Number of firm shareholders in 2004.	Rosstat
Current Ratio	Current Assets/Current Liabilities	Rosstat
PPE	Property, plant, and equipment	Rosstat
NegEquity	Dummy variable equal to 1 if NetAssets < 0 NetAssets is the difference between a firm's assets and liabilities.	Rosstat
PTC	Propensity to Corrupt	Mironov (2015)
Annual income	Annual income of Big 4 employees	Personal income database
Income growth	Log(*Annual income(t)*)-Log(*Annual income(t-1)*)	
Year of birth	Year of birth of Big 4 employees	Personal income database

Rosstat is the acronym for Rossisky (Russian) Statistics, an official Russian statistical agency (http://www.gks.ru/) that collects detailed information about Russian firms. Data are available at Spark (spark.interfax.ru).

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Table 1: Summary Statistics

The table presents summary statistics for the sample of 25,824 companies for the time period 1999-2003. Panel A presents statistics for the entire sample. Panel B describes the sample of firms with audited financial statements. Panel C presents the sample of firms audited by Big 4 firms. All variables are defined in Appendix A.

Panel A: All firms

	Mean	Median	St. dev.	N of obs.	N of firms
	(1)	(2)	(3)	(4)	(5)
Revenue, $000's	$14,572	$2,628	$183,131	51815	25824
Assets, $000's	$18,073	$1,029	$535,567	51815	25824
EBT, $000's	$1,867	$41	$48,955	51815	25824
Actual EBT, $000's	$2,002	$110	$49,796	51815	25824
EBT / Assets, %	12.54	5.38	21.40	51815	25824
Actual EBT / Assets, %	30.51	11.74	76.98	51815	25824
Debt / Assets, %	15.49	0.01	25.46	51815	25824
Log(Revenue)	8.18	7.87	1.15	51815	25824
InvRec	0.60	0.66	0.27	51815	25824
PPE	0.17	0.07	0.22	51815	25824
Current Ratio	1.58	1.07	1.35	51815	25824
Loss, %	14.93	0.00	35.64	51815	25824
NegEquity, %	13.54	0.00	34.21	51815	25824
ShadowR	0.073	0.023	0.111	51815	25824
Debt interest rate	0.146	0.121	0.123	7437	4668
Gov Control, %	5.24	0.00	22.29	51815	25824
CEO_owner, %	44.37	44.83	36.82	51815	25824
N_owners	2.80	2.76	3.64	51815	25824
Audited, %	11.26	0.00	31.61	51815	25824
Audited by Big 4, %	1.49	0.00	12.10	51815	25824

Panel B: Firms with audited financial statements

	Mean	Median	St. dev.	N of obs.	N of firms
	(1)	(2)	(3)	(4)	(5)
Revenue, $000's	$56,741	$5,705	$489,286	5834	3261
Assets, $000's	$87,959	$4,041	$1,404,511	5834	3261
EBT, $000's	$9,957	$187	$124,341	5834	3261
Actual EBT, $000's	$10,354	$289	$126,721	5834	3261
EBT / Assets, %	12.45	6.90	20.41	5834	3261
Actual EBT / Assets, %	18.17	10.36	39.31	5834	3261
Debt / Assets, %	16.86	2.54	25.36	5834	3261
Log(Revenue)	9.01	8.65	1.55	5834	3261
InvRec	0.51	0.52	0.28	5834	3261
PPE	0.24	0.15	0.25	5834	3261
Current Ratio	1.65	1.14	1.39	5834	3261
Loss, %	16.25	0.00	36.89	5834	3261
NegEquity, %	12.08	0.00	32.60	5834	3261
ShadowR	0.049	0.016	0.084	5834	3261
Debt interest rate	0.129	0.101	0.119	1401	905
Gov Control, %	9.92	0.00	29.90	5834	3261
CEO_owner, %	33.42	44.83	35.55	5834	3261
N_owners	3.02	2.76	5.86	5834	3261
Audited by Big 4, %	13.20	0.00	33.85	5834	3261
Audit fees, $000's	$31.63	$5.23	$254.28	5834	3261
Other fees to auditors, $000's	$18.24	$0.00	$219.30	5834	3261
Revenue of auditor in 2003, $000's	$9,822	$781	$25,677	5834	3261
Audit tenure, years	1.63	1.00	0.98	5834	3261

Panel C: Firms with audited accounting statements by Big 4 firm

	Mean (1)	Median (2)	St. dev. (3)	N of obs. (4)	N of firms (5)
Revenue, $000's	$254,007	$35,919	$1,303,152	770	352
Assets, $000's	$455,681	$28,366	$3,820,439	770	352
EBT, $000's	$57,738	$2,469	$333,797	770	352
Actual EBT, $000's	$59,636	$2,646	$340,157	770	352
EBT / Assets, %	15.54	11.98	23.04	770	352
Actual EBT / Assets, %	16.79	13.26	26.44	770	352
Debt / Assets, %	24.80	14.05	28.93	770	352
Log(Revenue)	10.49	10.49	1.78	770	352
InvRec	0.42	0.40	0.26	770	352
PPE	0.28	0.20	0.26	770	352
Current Ratio	1.58	1.13	1.36	770	352
Loss, %	17.40	0.00	37.94	770	352
NegEquity, %	19.87	0.00	39.93	770	352
ShadowR	2.44	0.83	5.16	770	352
Debt interest rate	9.14	6.92	8.66	301	172
Gov Control, %	0.39	0.00	6.23	770	352
CEO_owner, %	23.06	0.00	26.93	770	352
N_owners	2.62	2.76	2.15	770	352
Audit fees, $000's	$170.38	$43.02	$676.81	770	352
Other fees to auditors, $000's	$105.34	$0.00	$588.92	770	352
Revenue of auditor in 2003, $000's	$61,964	$25,425	$42,276	770	352
Audit tenure, years	1.94	1.00	1.17	770	352

Table 2: Top 20 auditors

The table presents summary statistics for the 20 largest auditors by revenue. *N of clients* is the number of companies audited by the specific auditor in 1999-2003. *N of obs.* is the number of company years audited by the auditor. *Revenue of clients* is the average book revenue of the auditor's clients. *Audit fees* is the average audit fees paid to auditors for the corresponding years. *Other fees* is the average of other payments (including consulting fees) paid to auditors for the corresponding years.

Auditor	Audit fees $000's	Other fees $000's	N of obs.	N of clients	Revenue of clients, $000's
(1)	(2)	(3)	(4)	(5)	(6)
PwC	$217.3	$179.5	387	180	$300,791
KPMG	$178.5	$46.1	178	87	$293,770
Ernst & Young	$75.8	$10.3	147	89	$110,086
Deloitte & Touche	$66.5	$35.8	75	41	$150,945
BDO	$46.9	$35.4	125	88	$89,779
FBK	$30.7	$10.3	141	82	$90,241
Baker Tilly Russaudit	$28.3	$18.9	104	58	$24,528
RCM T.A.	$28.2	$6.1	83	45	$77,213
Scott, Riggs, and Fletcher	$26.5	$0.1	5	3	$284,897
Tax Bureau	$25.5	$15.0	18	12	$106,509
Rosexpertiza	$22.5	$7.9	126	77	$54,970
SBT	$18.5	$13.0	63	45	$55,281
Top Audit	$13.9	$7.4	21	15	$32,878
Nexia Pacioli	$12.0	$28.7	65	38	$60,356
RBS	$7.4	$1.2	34	29	$15,655
Finexpertiza	$7.1	$1.7	102	74	$12,692
MCF	$6.9	$2.3	21	11	$24,223
ProfAudit	$6.0	$1.6	110	69	$13,351
TehExergo	$5.8	$2.6	5	5	$29,650
NPG	$5.4	$2.4	17	12	$5,812
AVERAGE	$3.6	$2.1	22.6	14.3	$27,464

Table 3: Auditing and Income Diversion

This table describes the relationship between the probability of auditing and income diversion using logistic regressions. *Industry*, *Region*, and *Year* are industry, region, and year dummies, respectively. All of the other variables are defined in Appendix A. Column 1 contains regressions for the entire sample. Column 2 presents regressions for the sample of firms with audited financial statements. Marginal effects are reported. The numbers in parentheses are robust standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	Audited (1)	Audited by Big 4 (2)
ShadowR	-0.1055	-0.3220
	(0.0184)***	(0.1322)**
Log(Revenue)	0.0493	0.0493
	(0.0015)***	(0.0072)***
EBT/Assets	-0.0056	0.1128
	(0.0084)	(0.0307)***
Debt/Assets	-0.0044	0.0575
	(0.0073)	(0.0243)**
Gov Control	0.0345	-0.2883
	(0.0077)***	(0.0752)***
InvRec	-0.0737	-0.0800
	(0.0069)***	(0.0271)***
Loss	0.0118	0.0474
	(0.0047)**	(0.0154)***
CEO_owner	-0.0471	-0.1013
	(0.0057)***	(0.031)***
Log(N_owners)	0.0116	-0.0284
	(0.0036)***	(0.0124)**
Industry dummy	Y	Y
Region dummy	Y	Y
Year dummy	Y	Y
Pseudo R-sq	0.129	0.289
Number of obs.	51815	5766
Number of firms	25824	3221

Table 4: Auditing, Income Diversion, and Audit Fees: Propensity Score Matching

Panel A estimates the difference in income diversion among non-audited, audited and audited by Big 4 firms using propensity score matching (PSM). Columns 1-4 compare audited and non-audited firms. Columns 5-8 compare companies audited by Big 4 firms and those not audited by Big 4 firms in a sample of audited companies. Panel B estimates the difference in fees between companies audited by Big 4 firms and not audited by non-Big 4 firms using PSM. Only audited firms are included. Columns 1-4 compare audit fees. Columns 5-8 compare other fees paid to auditors. *Difference* shows the absolute difference between the treated and control samples. *t-test* indicates t-statistics of the equality of means in the two samples. *%Bias* is the difference of the sample means between the treated and non-treated samples as a percentage of the square root of the average sample variances in the treated and non-treated samples. *Industry*, *Region*, and *Year* are industry, region, and year dummies, respectively. All other variables are defined in Appendix A. The numbers in parentheses are robust standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Panel A: Auditing and Income Diversion

	Audited=1	Audited=0	Difference	t-test	Audited by Big 4 =1	Audited by Big 4 =0	Difference	t-test
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Unmatched sample					
ShadowR	0.0488	0.0762	-0.0274	-17.75	0.0244	0.0528	-0.0284	-8.76
Number of obs.	5,834	45,981			770	4996		
			Matched sample					
ShadowR	0.0488	0.0568	-0.0079	-4.21	0.0244	0.0315	-0.0071	-1.82
Number of obs.	5,834	5,834			770	770		
			Matching variables					
	Treated	Control	%Bias	t-test	Treated	Control	%Bias	t-test
Log(Revenue)	9.0108	8.9899	1.60	0.73	10.4950	10.4770	1.10	0.20
EBT/Assets	0.1245	0.1249	-0.20	-0.11	0.1554	0.1465	4.10	0.72
Debt/Assets	0.1686	0.1694	-0.30	-0.16	0.2480	0.2630	-5.60	-1.03
Gov Control	0.0993	0.1078	-3.30	-1.52	0.0039	0.0039	0.00	0.00
InvRec	0.5070	0.5103	-1.20	-0.64	0.4234	0.4255	-0.80	-0.16
Loss	0.1625	0.1692	-1.80	-0.97	0.1740	0.2221	-12.90	-2.37
CEO_owner	0.3342	0.3240	2.80	1.55	0.2306	0.2117	5.90	1.42
Log(N_owners)	0.8232	0.8137	1.60	0.81	0.7620	0.7371	4.00	0.82
Industry dummy	Y	Y			Y	Y		
Region dummy	Y	Y			Y	Y		
Year dummy	Y	Y			Y	Y		
Number of obs.	5,834	5,834			770	770		

Panel B: Audit and Non-audit Fees for Different Types of Auditors

	Audited by Big 4 =1 (1)	Audited by Big 4 =0 (2)	Diff (3)	t-test (4)	Audited by Big 4 =1 (5)	Audited by Big 4 =0 (6)	Diff (7)	t-test (8)
			Unmatched sample					
Log(Audit fees)	3.8203	1.5059	2.3144	51.31				
Log(Other fees to auditors)					3.6909	1.4348	2.2561	25.61
Number of obs.	770	4,996			300	1631		
			Matched sample					
Log(Audit fees)	3.8203	2.4021	1.4182	17.32				
Log(Other fees to auditors)					3.6909	2.3397	1.3512	7.70
Number of obs.	770	770			300	300		
			Matching variables					
	Treated	Control	%Bias	t-test	Treated	Control	%Bias	t-test
Log(Revenue)	10.4950	10.4770	1.10	0.20	11.0510	11.1630	-6.60	-0.74
EBT/Assets	0.1554	0.1465	4.10	0.72	0.1800	0.1597	9.00	1.01
Debt/Assets	0.2480	0.2630	-5.60	-1.03	0.2515	0.2326	7.50	0.88
Gov Control	0.0039	0.0039	0.00	0.00	0.0033	0.0033	0.00	0.00
InvRec	0.4234	0.4255	-0.80	-0.16	0.4173	0.4029	5.50	0.72
Loss	0.1740	0.2221	-12.90	-2.37	0.1700	0.1733	-0.90	-0.11
CEO_owner	0.2306	0.2117	5.90	1.42	0.2299	0.2009	9.50	1.46
Log(N_owners)	0.7620	0.7371	4.00	0.82	0.8233	0.7975	4.00	0.50
Industry dummy	Y	Y			Y	Y		
Region dummy	Y	Y			Y	Y		
Year dummy	Y	Y			Y	Y		
Number of obs.	770	770			300	300		

Table 5: Fees to Auditors and Income Diversion

The table shows the relationship between auditors' fees and income diversion. Panel A contains regressions with *Audit fees* as a dependent variable. Panel B presents regressions with *Other fees to auditors* as a dependent variable. *Industry*, *Region*, and *Year* are industry, region, and year dummies, respectively. All of the other variables are defined in Appendix A. The numbers in parentheses are robust standard errors clustered at the auditor level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Panel A. Audit Fees and Income Diversion

Dependent variable	Log(Audit fees)			
	(1)	(2)	(3)	(4)
Big 4	0.687	0.687	0.659	0.664
	(0.133)***	(0.133)***	(0.135)***	(0.135)***
ShadowR		-0.101	-0.157	
		(0.17)	(0.176)	
Big 4*ShadowR			1.100	0.948
			(0.411)***	(0.371)**
Auditor tenure	0.095	0.095	0.095	0.095
	(0.017)***	(0.017)***	(0.017)***	(0.017)***
Log(Revenue of auditor)	0.210	0.210	0.210	0.210
	(0.027)***	(0.027)***	(0.027)***	(0.027)***
Log(Revenue)	0.338	0.337	0.337	0.338
	(0.015)***	(0.015)***	(0.015)***	(0.015)***
EBT/Assets	0.228	0.226	0.230	0.233
	(0.079)***	(0.079)***	(0.078)***	(0.078)***
Debt/Assets	0.051	0.052	0.053	0.051
	(0.075)	(0.075)	(0.074)	(0.074)
Gov Control	0.013	0.011	0.010	0.012
	(0.09)	(0.09)	(0.09)	(0.09)
InvRec	-0.383	-0.380	-0.379	-0.383
	(0.067)***	(0.067)***	(0.067)***	(0.067)***
Loss	0.087	0.085	0.085	0.088
	(0.045)*	(0.045)*	(0.045)*	(0.045)*
CEO_owner	-0.139	-0.137	-0.138	-0.141
	(0.049)***	(0.05)***	(0.05)***	(0.049)***
Log(N_owners)	0.025	0.025	0.025	0.025
	(0.028)	(0.028)	(0.028)	(0.028)
Industry dummy	Y	Y	Y	Y
Region dummy	Y	Y	Y	Y
Year dummy	Y	Y	Y	Y
R-sq	0.567	0.567	0.568	0.568
Number of obs.	5834	5834	5834	5834
Number of auditors	264	264	264	264

Panel B. Other Fees to Auditors and Income Diversion

Dependent variable	Log(Other fees to auditors)			
	(1)	(2)	(3)	(4)
Big 4	1.072	1.073	1.009	1.010
	(0.153)***	(0.153)***	(0.15)***	(0.15)***
ShadowR		0.138	-0.030	
		(0.348)	(0.352)	
Big 4*ShadowR			2.956	2.927
			(1.121)***	(1.06)***
Auditor tenure	0.031	0.032	0.031	0.031
	(0.035)	(0.035)	(0.036)	(0.035)
Log(Revenue of auditor)	0.079	0.079	0.079	0.079
	(0.028)***	(0.029)***	(0.029)***	(0.028)***
Log(Revenue)	0.367	0.367	0.366	0.366
	(0.025)***	(0.025)***	(0.026)***	(0.026)***
EBT/Assets	0.100	0.102	0.113	0.114
	(0.153)	(0.154)	(0.151)	(0.15)
Debt/Assets	-0.096	-0.098	-0.110	-0.110
	(0.121)	(0.12)	(0.12)	(0.121)
Gov Control	0.028	0.030	0.025	0.025
	(0.154)	(0.154)	(0.154)	(0.154)
InvRec	-0.321	-0.324	-0.313	-0.314
	(0.17)*	(0.169)*	(0.172)*	(0.173)*
Loss	0.081	0.082	0.086	0.086
	(0.107)	(0.106)	(0.105)	(0.105)
CEO_owner	-0.190	-0.193	-0.197	-0.197
	(0.096)**	(0.096)**	(0.097)**	(0.097)**
Log(N_owners)	-0.032	-0.032	-0.032	-0.032
	(0.062)	(0.062)	(0.062)	(0.062)
Industry dummy	Y	Y	Y	Y
Region dummy	Y	Y	Y	Y
Year dummy	Y	Y	Y	Y
R-sq	0.450	0.450	0.451	0.451
Number of obs.	1955	1955	1955	1955
Number of auditors	216	216	216	216

Table 6: Auditor Propensity for Corruption

Panel A: The table describes the summary statistics of the Propensity to Corrupt measure developed by Mironov (2015). PTC Top 5 is the average PTC of the top 5 highest-paid employees. PTC Top 25% is the average PTC of the top 25% highest-paid employees. PTC Bottom 75% is the average PTC of the 75% lowest-paid employees. Correlation PTC Top 25%, PTC Bottom 75% is the correlation between the PTC Top 25% and PTC Bottom 75%. Standard deviations are reported in parentheses.

	PTC Top 5	PTC Top 25%	PTC Bottom 75%	Correlation PTC Top 25%, PTC Bottom 75%	N obs.
	(1)	(2)	(3)	(4)	(5)
All firms	4.273	4.340	4.447	0.233	30146
	(1.823)	(1.689)	(1.2)		
Non-audited firms	4.285	4.330	4.432	0.232	26192
	(1.841)	(1.744)	(1.236)		
Audited firms, by non-Big 4	4.206	4.411	4.539	0.234	3534
	(1.695)	(1.299)	(0.941)		
Audited firms, by Big 4	4.084	4.365	4.558	0.324	420
	(1.747)	(0.962)	(0.7)		
All auditors	3.943	3.996	4.217	0.138	4730
	(1.6)	(1.438)	(1.06)		
Not Big 4	4.025	4.021	4.222	0.118	4034
	(1.682)	(1.532)	(1.118)		
Big 4	3.462	3.848	4.186	0.595	696
	(0.849)	(0.663)	(0.632)		

Table 6 (continued): Auditor Propensity for Corruption

Panel B: The table describes the relationship between fees paid to auditors and auditors' corruptness (PTC). Auditor PTC is the average propensity to corrupt of the Top 25% highest-paid auditor employees. The PTC measure is available only for Moscow auditors. *High PTC non-Big 4 auditor* is a dummy for non-Big 4 auditors whose PTC is higher than the median PTC of auditors. *High PTC Big 4 auditor* is a dummy for Big 4 auditors whose PTC is higher than the median PTC of auditors. Columns 1 and 2 contain regressions for *Log(Audit fees)* as a dependent variable. Columns 3 and 4 report estimations for *Log(Other fees)* as a dependent variable. *Industry*, *Region*, and *Year* are industry, region, and year dummies, respectively. All of the other variables are defined in Appendix A. The numbers in parentheses are robust standard errors clustered at the auditor level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Dependent variable:	Log(Audit fees)		Log(Other fees to auditors)	
	(1)	(2)	(3)	(4)
Big 4	0.647	0.667	0.924	0.953
	(0.166)***	(0.165)***	(0.18)***	(0.184)***
ShadowR	-0.133	0.031	0.032	0.618
	(0.189)	(0.271)	(0.442)	(0.611)
Big 4*ShadowR	1.357	0.873	3.406	3.049
	(0.301)***	(0.327)***	(1.349)**	(1.433)**
High PTC Non-Big 4 auditor	-0.025	-0.006	-0.043	0.009
	(0.056)	(0.06)	(0.101)	(0.122)
High PTC Big 4 auditor	0.005	-0.029	0.335	0.352
	(0.048)	(0.052)	(0.081)***	(0.074)***
High PTC Non-Big 4 auditor*ShadowR		-0.361		-1.128
		(0.35)		(0.929)
High PTC Big 4 auditor*ShadowR		1.590		-0.837
		(0.331)***		(0.887)
Auditor tenure	0.099	0.099	0.037	0.036
	(0.018)***	(0.018)***	(0.042)	(0.042)
Log(Revenue of auditor)	0.206	0.206	0.076	0.074
	(0.032)***	(0.032)***	(0.03)**	(0.031)**
Log(Revenue)	0.328	0.328	0.356	0.356
	(0.017)***	(0.017)***	(0.029)***	(0.029)***
EBT/Assets	0.206	0.206	-0.111	-0.111
	(0.077)***	(0.077)***	(0.15)	(0.15)
Debt/Assets	0.023	0.023	-0.220	-0.217
	(0.085)	(0.085)	(0.129)*	(0.129)*
Gov Control	-0.021	-0.022	-0.074	-0.071
	(0.088)	(0.088)	(0.155)	(0.155)
InvRec	-0.342	-0.341	-0.302	-0.298
	(0.068)***	(0.068)***	(0.183)*	(0.182)
Loss	0.077	0.077	0.018	0.020
	(0.047)	(0.047)	(0.11)	(0.11)
CEO_owner	-0.204	-0.204	-0.275	-0.273
	(0.053)***	(0.053)***	(0.107)***	(0.107)**
Log(N_owners)	0.024	0.023	-0.021	-0.022
	(0.03)	(0.03)	(0.074)	(0.074)
Industry, Region, Year dummy	Y	Y	Y	Y
R-sq	0.593	0.593	0.469	0.470
Number of obs	4540	4540	1551	1551
Number of auditors	197	197	171	171

Table 7: Auditor Employees Propensity for Corruption and Salary Growth

Panel A: Summary statistics of Big 4 employees. A unit of observation is a year-employee. *Annual income* is a total compensation of an employee in a given year. *Income growth* is defined as *log(Income(t))–log(Income(t-1))*. *Income percentile* is the income percentile of the individual employee in a given year. *PTC* is a propensity to corrupt measure developed by Mironov (2015). *Year of birth* is the year of birth of a given employee.

	Mean	Median	St. dev.	N of obs.	N of employees
	(1)	(2)	(3)	(4)	(5)
Annual income, $000's	$22.39	$13.75	$36.25	3245	1313
Income growth	0.53	0.27	1.07	3245	1313
Income percentile	0.40	0.38	0.26	3245	1313
PTC	3.96	3.20	2.25	3245	1313
Year of birth	1971.5	1973.0	7.74	2809	1231

Panel B: The relationship between income growth of Big 4 employees and propensity to corrupt. *Income growth, income percentile, PTC,* and *Year of birth* are as defined in Panel A. *Auditor dummy* and *Year dummy* are auditor and year dummies, respectively. The numbers in parentheses are robust standard errors clustered at the employee level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Dependent variable	Income growth			
	(1)	(2)	(3)	(4)
PTC	0.028	0.037	0.018	0.020
	(0.007)***	(0.007)***	(0.008)**	(0.008)***
Income percentile		-1.074		-1.108
		(0.065)***		(0.077)***
Y of birth			0.017	0.024
			(0.002)***	(0.003)***
Auditor dummy	Y	Y	Y	Y
Year dummy	Y	Y	Y	Y
R-sq	0.165	0.233	0.244	0.313
Number of obs.	3245	3245	2809	2809
Number of employees	1313	1313	1231	1231

Table 8: Audit and Cost of Debt

The table describes the relationship between the debt interest rate and audit. All variables are defined in Appendix A. [-1] indicates a lag by one year. *Industry*, *Region*, and *Year* are industry, region, and year dummies. Columns (1) – (4) present regressions for the entire sample. Columns (5) – (6) present regressions for the sample of firms with audited financial statements. The numbers in parentheses are robust standard errors clustered at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Dependent variable:	Debt interest rate					
	(1)	(2)	(3)	(4)	(5)	(6)
Audited[-1]	-0.0094	-0.0093	-0.0060	-0.0046		
	(0.0042)**	(0.0047)**	(0.0046)	(0.0052)		
Audited by Big 4[-1]			-0.0190	-0.0239	-0.0193	
			(0.0075)**	(0.0082)***	(0.0091)**	
Log(Rev. of auditor)[-1]						-0.0042
						(0.002)**
Log(Revenue)	-0.0076	-0.0076	-0.0071	-0.0072	-0.0075	-0.0064
	(0.0011)***	(0.0011)***	(0.0012)***	(0.0012)***	(0.0024)***	(0.0025)***
EBT/Assets	-0.0199	-0.0199	-0.0176	-0.0175	-0.0004	-0.0013
	(0.0115)*	(0.0115)*	(0.0115)	(0.0115)	(0.024)	(0.0238)
Debt/Assets	-0.1151	-0.1151	-0.1148	-0.1147	-0.1176	-0.1176
	(0.006)***	(0.006)***	(0.006)***	(0.006)***	(0.0143)***	(0.0143)***
Gov Control	0.0317	0.0317	0.0305	0.0304	0.0505	0.0514
	(0.0094)***	(0.0094)***	(0.0094)***	(0.0094)***	(0.0195)***	(0.0194)***
Loss	-0.0057	-0.0057	-0.0054	-0.0054	-0.0053	-0.0057
	(0.0044)	(0.0044)	(0.0044)	(0.0044)	(0.0106)	(0.0105)
Current Ratio	-0.0015	-0.0015	-0.0016	-0.0016	-0.0023	-0.0021
	(0.0015)	(0.0015)	(0.0015)	(0.0015)	(0.0033)	(0.0033)
PPE	-0.0347	-0.0347	-0.0338	-0.0337	-0.0408	-0.0407
	(0.0081)***	(0.0081)***	(0.0081)***	(0.0081)***	(0.0187)**	(0.0187)**
NegEquity	0.0038	0.0038	0.0044	0.0043	0.0082	0.0092
	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0118)	(0.0117)
CEO_owner	0.0122	0.0122	0.0120	0.0119	0.0089	0.0068
	(0.005)**	(0.005)**	(0.005)**	(0.005)**	(0.0125)	(0.0126)
Log(N_owners)	0.0033	0.0033	0.0032	0.0032	0.0041	0.0042
	(0.0031)	(0.0031)	(0.0032)	(0.0032)	(0.0058)	(0.0058)
ShadowR [-1]	0.0304	0.0306	0.0297	0.0313	0.0059	0.0222
	(0.0179)*	(0.0196)	(0.0179)*	(0.0196)	(0.0454)	(0.043)
ShadowR[-1]*Audited[-1]		-0.0013		-0.0275		
		(0.0458)		(0.0478)		
ShadowR[-1]*Big 4[-1]				0.1601	0.1585	
				(0.1439)	(0.147)	
Industry dummy	Y	Y	Y	Y	Y	Y
Region dummy	Y	Y	Y	Y	Y	Y
Year dummy	Y	Y	Y	Y	Y	Y
R-sq	0.100	0.100	0.101	0.101	0.178	0.178
Number of obs	7437	7437	7437	7437	1308	1308
Number of firms	4668	4668	4668	4668	859	859