Why Do Publicly Listed Firms Evade Taxes? Evidence from China

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ABSTRACT: Taking advantage of the mandatory disclosure of detected corporate tax evasions in China, we examine why publicly listed firms evade taxes. Different from most prior studies that focus on corporate income tax avoidance, we consider tax evasions related to both income taxes and non-income taxes. We also use a bivariate probit model to account for the partial observability of corporate tax evasion. Many of our regression results using the bivariate probit model are different from the results using the reduced form probit model that ignores the partial observability of tax evasion. Many of our results are also different from those of prior research on the determinants of corporate tax avoidance using the traditional effective tax rate as a proxy for tax avoidance.

Key words: tax avoidance; tax evasion; China; SOE

JEL:

1. Introduction

Corporate tax evasion, the most egregious form of corporate tax avoidance, is a worldwide problem. The lost revenues resulting from tax evasion are substantial. Slemrod (2007) estimates that the overall U.S. gross tax gap estimate is $345 billion in 2005, which amounts to 16.3 percent of estimated actual (paid plus unpaid) tax liability. The U.S. Internal Service Revenue (IRS) estimate that the tax gap increases to 458 billion per year between 2008 through 2010. (Internal Revenue Service 2016).[1] In the U.K., the National Audit Office reports that the HM Revenue & Customs (HMRC) loses £16 billion a year due to tax fraud, an amount that is nearly half of HMRC's estimate of the tax gap of £32 billion (National Audit Office 2015). Fisman and Wei (2004) also document indirect evidence of chinese firms' tax evasion based on the discrepancy between Hong Kong's reported exports to China and China's reported imports from Hong Kong. Tax evasion could also cause significant horizontal inequity and efficiency losses, resulting in taxpayers' distrust in a nation's tax system (Feldstein 1999; 2008).

Despite the importance of corporate tax evasion to a variety of stakeholders, there is only limited empirical research on why firms evade taxes for two important reasons. First, there is little publicly available data on corporate tax evasion in most countries. For example, in the U.S. tax examinations are performed in secrecy and firms are not publicly identified even when they are charged with tax deficiencies under the IRS audit (Graham and Tucker (2006). Corporate disclosure of tax-related events is voluntary in nature and thus exhibits substantial cross-sectional variation in terms of completeness. For example, Gleason and Mills (2002) find that firms often fail to disclose IRS claims for tax deficiencies. Blouin, Gleason, Mills, and Sikes (2010) find that not all firms disclose the dollar value of a tax

[1] Dyreng, Hanlon, Maydew, and Thornock (2016) document that the corporate effective tax rates for U.S. firms over the past 25 years have decreased significantly, which cannot be explained by changes in firm characteristics and declining foreign statutory tax rates.

settlement. In the case of a large tax payment recorded on a firm's financial statements, the firm is often not forthcoming about the reasons (Bauer and Klassen 2014).

Second, many corporate tax evasion activities remain undetected due to their inherent secrecy or inadequate enforcement by the resources-constrained tax authority. Hence, the observed tax evasion cases could represent the tip of the iceberg (referred to as the partial observability problem) and it is econometrically challenging to model the determinants of corporate tax evasion using only observed tax evasion cases.

To better understand the economics of corporate tax evasion, the objective of this study is to examine why publicly listed Chinese firms evade taxes. We focus on China because publicly listed Chinese firms have been mandated to disclose all detected tax evasions via tax adjustments in their annual reports since 2002. To deal with the partial observability of corporate tax evasion, we use a bivariate probit model to simultaneously model the determinants of corporate tax evasion (referred to as the commitment model) and the determinants of corporate tax evasion detection conditional on the occurrence of a tax evasion (referred to as the detection model).

Unlike most prior research that focuses on corporate income tax avoidance only, we consider both income tax evasion and non-income tax evasion together. Considering non-income tax evasion is important because in many countries such as China, non-income taxes (e.g., value added taxes) constitute a significant portion of the total corporate tax payment.[2] Moreover, as we show in Table 2, approximately 60% of the detected corporate tax evasions in China are non-income tax related. Hence, omitting non-income tax evasions would significantly underestimate the degree of corporate tax evasion in China.

With regard to our commitment model, we use the motivation-ability-opportunity framework from the criminology literature to select our *causal* explanatory variables.

[2] Using the information provided by China's Tax Yearbook for the most available year 2012, we find that corporate income taxes (value added taxes) constitute approximately 21% (39%) of the total tax payment excluding individual income taxes.

Specifically, we use the following proxies for a firm's tax evasion incentives, including ownership structure (i.e., SOEs vs. non-SOEs), capital structure, corporate tax rate, and external product market competition. We use firm size and accounting profitability to proxy for a firm's tax evasion ability. We use several proxies for tax evasion opportunity, including firm growth, external auditor quality, past tax enforcement intensity, and overall provincial law enforcement quality. While we attempt to develop distinctive proxies for each of the three theoretical constructs, we wish to emphasize that some of the empirical proxies could represent more than one construct and therefore their coefficients should be interpreted with caution.

We consider two types of explanatory variables for the detection model. First, we consider incentive factors that may facilitate or impede the detection of tax evasion, including ownership structure, external auditor quality, local law enforcement quality, and public pressure. Second, we examine the impact of the tax authority's enforcement effort on detection.

With regard to the commitment model, we find evidence consistent with the motivation-ability-opportunity framework. While many explanatory variables are significant, we wish to highlight the following three key results. First, past tax enforcement intensity has a deterrence effect on corporate tax evasion. Second, both central SOEs and local SOEs are more likely to evade taxes than non-SOEs, contrary to the common perception and the results in Bradshaw, Liao, and Ma (2016) and Jian, Li, and Zhang (2013). Third, the presence of a big audit firm helps reduce the likelihood of corporate tax evasion.

With regard to the detection model, we find three key results. First, as expected, the tax authority's enforcement effort has a positive impact on tax evasion detection. Second, conditional on the firms that have committed a tax evasion, both central SOEs and local SOEs are less likely to be detected than non-SOEs. Third, tax evasion is more likely to be

detected when a firm employs a big audit firm. Overall, the results for the detection model are consistent with those for the commitment model.

To demonstrate the importance of adopting a bivariate probit model, we also run a simple probit model of tax evasion without considering the possibility of undetected tax evasion. We find that inferences change significantly using this simple probit model. For example, we no longer find evidence that SOEs or firms with a small audit firm are more likely to evade taxes or past tax enforcement intensity has a significant deterrence effect on corporate tax evasion.

To provide further support for the importance of ownership structure (SOEs vs. non-SOEs) in tax enforcement, we also examine the impact of ownership structure on the magnitude of penalties for the detected tax evasions. We find that even if caught for tax evasion, SOEs are subject to smaller penalties than non-SOEs. Overall, this result along with the results from the commitment and detection models is consistent with the following hypotheses: (1) SOEs are more eager to evade taxes than non-SOEs; and (2) tax enforcement (including the monitoring of tax evasion and punishment for detected violations) are less severe for SOEs than for non-SOEs.

How can we reconcile the conflicting results for SOEs versus non-SOEs in this study and prior research (i.e., Bradshaw et al. 2016 and Jian et al. 2013)? There are two key differences between our study and these prior studies. First, we consider both income taxes and non-income taxes while these two studies examine income taxes only. Second, both Bradshaw et al. (2016) and Jian et al. (2013) use the commonly used effective income tax rate (*ETR*) in the tax literature to proxy for tax avoidance. While *ETR* reflects the effect of legal tax avoidance, it is less certain whether *ETR* can capture most aggressive (or illegal) forms of tax avoidance. Since we have both the frequency of detected tax evasion (*EVASION*) and the predicted probability of the unobservable tax evasion (*EVASION**), we can directly assess the

correlations of these two tax evasion measures with *ETR*. We find that both tax evasion measures are *positively* correlated with *ETR*. Furthermore, we are also able to replicate the results of Bradshaw et al. (2016) using their *ETR*. These results suggest that the conventional tax avoidance proxy *ETR* may not be a reliable proxy for corporate tax evasion, the most aggressive form of tax avoidance.

We contribute to the tax literature in several important ways. First, we contribute to the literature on aggressive corporate tax avoidance. Hanlon and Heitzman (2010) conceptualize corporate tax avoidance along a continuum that ranges from perfectly legal strategies (e.g., investment in tax exempt municipal bonds) at one extreme to illegal strategies such as tax evasion at the other. Due to lack of data, most existing tax research does not distinguish legal tax avoidance from illegal (or aggressive) tax avoidance. A noticeable exception is a few recent studies (e.g., Wilson 2009, Lisowsky 2010; Lisowsky, Robinson, and Schmidt 2013) that examine corporate tax shelters in the U.S., a relatively aggressive form of tax avoidance behavior. However, we wish to note that the tax shelters examined in these prior studies are not necessarily illegal. Using confidential tax audit adjustment data from China's tax authorities, several studies (e.g., Chan and Mo 2000, Chan et al. 2010, Chan et al. 2016, Tang et al. 2017) examine firms' tax noncompliance behavior in China.[3] Our study differs from the afore-mentioned studies in several key aspects. The first difference is that we have access to all detected tax evasion cases, including both income tax evasions and non-income tax evasions, detected not only by the tax authorities but also by other third parties. The second difference is that we use a bivariate probit model to address the problem

[3] Though not explicitly stated in the papers, after discussing with relevant Chinese tax administration officials, we believe the income tax audit adjustments used by Chan and Mo (2000), Chan et al. (2010), Chan et al. (2016), and Tang et al. (2017) are based on the immediate and routine income tax audit adjustments performed by the tax authority at the end of the year based on a firm's submitted annual tax return and other supporting documents. This process is known as the settlement and payment process (*Hui Suan Qing Jiao* in Chinese). In contrast, the tax audit adjustments used in our study occur long after the settlement and payment process because the average time gap between the year of tax evasion and the year of restatement for the tax evasion is 2.3 years. The long time gap also suggests that the tax evasions examined in our study are likely related to more severe tax law violations.

of unobservable tax evasion. The evidence from our study shows that taking into consideration undetected tax evasion could significantly alter a researcher's inferences.

Second, we contribute to a small but growing literature on corporate *non-income* tax avoidance (e.g., Robinson 2012; Hoopes, Thornock, Williams 2016) by considering both income tax and non-income tax evasion together. Non-income tax is a significant source of government revenue in many countries. More importantly, there could be a substitute or complementary relationship between income tax evasion and non-income tax evasion. Hence, omitting corporate non-income tax evasion from an analysis could significantly distort our understanding of many firms' tax evasion behavior.

Third, we contribute to the literature on how tax enforcement affects corporate tax avoidance behavior. Hoopes, Mescall, and Pittman (2012) show that stricter tax enforcement helps deter tax avoidance of publicly traded U.S. firms. Hoopes et al. use the cash ETR to proxy for tax avoidance. In contrast, we examine how tax enforcement affects corporate tax evasion. Moreover, we consider evasion of both income taxes and non-income taxes. We also use a bivariate probit model to address the problem of unobserved tax evasion.

Fourth, we extend the extant tax evasion literature, which is largely limited to U.S. firms, to China, a country with a weak institutional environment and rampant tax evasion. We show that Chinese SOEs are more likely than non-SOEs to not only evade taxes but also avoid detection of tax evasion. This finding is significant because there is a widely held belief that Chinese SOEs have no incentives to evade taxes simply because both the dividends and taxes paid by the SOEs belong to the government. Our finding is consistent with Tang et al. (2017) but opposite to those from Bradshaw et al. (2016) and Jian et al. (2013). An important contribution of our study is to reconcile these conflicting findings by highlighting the differences between legal tax avoidance from illegal or aggressive tax avoidance.

The rest of the paper is organized as follows. Section 2 proposes our conceptual models of corporate tax evasion commitment and corporate tax evasion detection and introduces the proxies for each model construct. Section 3 introduces the bivariate probit model with partial observability. Section 4 discusses and sample selection procedures and data sources. Section 5 presents the regression results for the bivariate probit model and the common reduced form probit model of corporate tax evasion. Section 6 analyzes the determinants of tax evasion penalty and a reconciliation of our results with prior tax avoidance studies using *ETR* as a proxy. Section 7 concludes.

2. Hypothesis development

We examine two interrelated research questions: (1) Why do publicly listed Chinese firms evade taxes (the commitment model)? (2) Limiting to the firms that have committed a tax evasion, which firms are more likely to be detected (the detection model)? We discuss the relevant explanatory variables and hypotheses for the commitment model in section 2.1 and the relevant explanatory variables and hypotheses for the detection model in section 2.2.

2.1. The tax evasion commitment model

To examine the first research question, we adopt the following regression model (firm and year subscripts are omitted for brevity):

$$EVASION^{*} = \alpha + \beta_1 MOTIVATION + \beta_2 ABILITY + \beta_3 OPPORTUNITY + year\,and\,industry\,fixed\,effects + \varepsilon \quad (1)$$

*EVASION** is a dummy variable that equals one if a firm year experiences a tax evasion, and zero otherwise. Please note that *EVASION** is observable only if detected. The choice of model (1)'s explanatory variables follows the popular motivation-ability-opportunity framework from the criminology literature (Cressey 1953; Braithwaite 1985; Fagan and

Freeman 1999; Vaughn 1999).[4] According to this framework, a person's decision to commit a crime depends on whether the person has a motive (e.g., what benefit can the person obtain from the act), the ability (e.g., did the person have a gun), and opportunity (e.g., was the person at the crime scene). Due to the multi-dimensional nature of the three theoretical constructs, we use multiple proxies for each construct (see appendix A for all variable definitions). However, we wish to note that some of the empirical proxies could represent more than one construct and therefore their coefficients should be interpreted with caution.

Below we discuss the prediction for each proxy. One important caveat we wish to highlight is that our predictions are based on existing tax avoidance research which does not make a clear distinction between legal tax avoidance from aggressive (or illegal) tax avoidance. Because of the fundamental differences between these two types of tax avoidance activities, there is a possibility that our predictions based on prior research may not exactly fit the case of tax evasion.

2.1.1. Proxies for *MOTIVATION*

We use various proxies for *MOTIVATION* to assess the impact of firm incentives on tax evasion, including ownership structure (*SOE_CENTRAL*, *SOE_LOCAL*), capital structure (*LEV*, *SEO*), corporate tax rate (*TAXRATE*), and external product market's competitive pressure (*COMP*).

The effect of government ownership (*SOE_CENTRAL*, *SOE_LOCAL*) on tax evasion is difficult to predict due to multiple countervailing institutional forces. On one hand, SOEs may be less aggressive than non-SOEs in tax evasion because both dividends to the SOE parent and taxes paid by the SOEs would eventually flow to the government's coffers. Moreover, as the government's ownership in the publicly listed SOEs is less than 100%, the

[4] A similar framework is also adopted by studies of accounting frauds (Cooper, Dacin, and Palmer 2014; Davis and Pesch 2013; Loebbecke, Eining, and Willingham 1989; Wolfe and Hermanson 2004).

controlling shareholder (i.e., the government) may have a stronger preference for taxes to dividends. This is because dividends have to be shared with minority shareholders while taxes accrue 100% to the government. In addition, both Bradshaw et al. (2016) and Jian et al. (2013) argue that SOE managers may have an incentive to pay more taxes in order to curry favor with government officials who have the ability to influence SOE managers' promotion opportunities. Consistent with this prediction, both Bradshaw et al. (2016) and Jian et al. (2013) find that SOEs face higher effective tax rates (an inverse proxy for tax avoidance) than non-SOEs. However, neither examines tax evasion, the most extreme and more opaque form of tax avoidance.

On the other hand, there are also good reasons to believe that SOEs could be more aggressive in tax avoidance than non-SOEs. First, rather than a monolithic entity, the Chinese government is comprised of a large number of different and equally powerful government agencies with different and often conflicting incentives. For example, the Chinese SOEs are subject to the direct supervision of the State-owned Assets Supervision and Administration Commission (SASAC) who may not share the same agenda as the tax authority. Similarly, since more than half of the taxes paid by an SOE are flown to the central government coffer, local government officials may not be eager to encourage the SOEs within their jurisdictions to pay more taxes (Tang et al. 2017). In addition, each publicly listed SOE has a controlling parent company who may have its own personal agenda different from the SASAC and the tax authority. Moreover, many Chinese SOEs are known for severe managerial agency problems, not only between the top executives and the ultimate controller SASAC but also between the top executives and their subsidiary managers. SOE managers and their subordinates often have an incentive to pursue empire building and therefore they should have a strong desire to reduce taxes in order to have more free cash flows at their disposal (e.g., Sun and Feng 2016).

Second, SOEs have probably the strongest political connection with the government and therefore SOEs are always treated more favorably by government agencies. For this reason, SOEs are less afraid of being investigated for tax evasion. Even if caught with tax evasion, SOEs are less likely to be punished. In addition, an anonymous official from a local tax authority indicates that tax enforcers face a much smaller pressure to detect tax evasion in SOEs because after all both the SOEs and the tax authority are part of the government.

Third, the same anonymous tax official notes that SOEs have already shouldered many political and social responsibilities on behalf of the government and therefore the tax authority may find it much more difficult to strictly enforce the tax code on the SOEs. Because of these conflicting institutional forces, we do not make any predictions for the two ownership structure variables.

We use *LEV* and *SEO* to measure the impact of capital structure (financial leverage and pending equity financing, respectively) on tax evasion. Following Graham and Tucker's (2006) argument for a substitution relation between leverage and non-debt tax shields, we predict a negative coefficient on *LEV*. We predict a negative coefficient on *SEO* because tax evasion, if detected by the securities regulator, would be treated as a red flag and therefore could jeopardize the capital raising effort of the firm (CSRC 2001, 2006).

We include *TAXRATE* because firms facing a higher tax rate could have a stronger incentive to evade taxes.[5] Finally, we include *COMP* to capture the impact of product market competition on tax evasion. Kubick et al. (2015) find that firms with higher product market power are more tax aggressive because these firms are insulated from competitive threats. However, Cai and Liu (2009) find that firms in more competitive environments avoid more taxes, consistent with the interpretation that competitive forces provide firms with stronger

[5] However, Yitzhaki (1974) argues that tax rate should have no impact on tax evasion if one assumes that the penalty for detected evasion is proportional to the tax understated.

incentives to avoid taxes. Because of the conflicting results from prior research, we do not make a prediction for the coefficient on *COMP*.

2.1.2. Proxies for *ABILITY*

We use two proxies for *ABILITY*: *SIZE* and *ROA*. Mills, Erickson, and Maydew (1998) find results consistent with economies of scale in tax planning such that larger firms invest more in tax planning. Manzon and Plesko (2002) argue that profitable firms can make more efficient use of tax deductions, credits, and exemptions relative to less profitable firms, resulting in greater tax avoidance. Rego (2003) also finds consistent results such that larger, more profitable, and multinational corporations exhibit greater tax avoidance than other firms. Consistent with prior research, we expect both *SIZE* and *ROA* to be positively associated with tax evasion.

2.1.3. Proxies for *OPPORTUNITY*

We use several proxies for *OPPORTUNITY*: external auditor quality (*BIGN*), tax enforcement intensity (*TARGET_INDUS*, *AUDIT*), and overall provincial law enforcement environment quality (*LAW*).

We do not make a prediction for the coefficient on *BIGN* due to conflicting institutional forces. On one hand, large audit firms could be more sophisticated tax planners and therefore they may be able to help their clients design more effective tax evasion strategies.[6] Consistent with this argument, Treasury (1999) and U.S. Senate (2003) report that firms' use of tax shelter promoters such as Big 5 auditors could be an indication of tax sheltering. Consistent with Big 5 auditors being active tax shelter promoters, Lisowsky (2010) documents a positive association between the use of a Big Five auditor and tax shelter

[6] Chinese laws do not prohibit audit firms from providing tax consulting services to their audit clients in our sample period.

use in a sample of firms between 2000 and 2004. Using a sample firms that subscribe to auditor-provided tax services, McGuire, Omer, and Wang (2012) find that auditors with stronger tax expertise can help their client firms achieve greater tax avoidance.

On the other hand, aggressive tax avoidance activities may also impose a significant business and regulatory risks to an audit firm (Chan et al. 2016) and therefore big audit firms who are more conscious about their reputation capital (Chan and Wu 2011) should have a stronger incentive to take actions to reduce such risks. Consistent with this argument, Chan et al. (2016) find that high-quality auditors are associated with client firms' better tax compliance in China. Donohoe and Knechel (2014) find a positive association between tax aggressiveness and audit fees. Goh, Lim, Shevlin, and Zang (2014) find that the likelihood of auditor resignation is higher among firms that are more tax aggressive, consistent with auditors' concerns with reputational and litigation risk related to their clients' tax aggressiveness. Klassen, Lisowsky and Mescall (2016) find that clients of Big 4 tax preparers are associated with lower levels of tax avoidance when the tax preparer is also the auditor, compared to when the tax preparer is not the auditor. In addition, increased corporate reporting transparency resulting from a tougher auditor may also facilitate other stakeholders' scrutiny of a firm's questionable tax planning strategies, resulting in a reduction in a firm's tax evasion activities.

We also examine how past tax enforcement intensity affects corporate tax evasion. While there is considerable uncertainty on whether corporate tax avoidance varies systematically with tax enforcement intensity, Hoopes et al. (2012) find that IRS audits deter corporate tax avoidance proxied by the cash ETR. Hence, we hypothesize that publicly listed Chinese firms are less likely to evade taxes if they are domiciled in provinces with tougher tax enforcement. Our tax enforcement intensity proxy is *TARGET_INDUS*, a dummy variable indicating the industries that are subject to stricter scrutiny by the tax authority in a year. The

second tax enforcement intensity is *AUDIT*, which measures the amount of tax revenues collected as a result of tax audits scaled by the total tax revenues collected in a province. To avoid potential endogeneity and consistent with Hoopes et al. (2012), we lag the two tax enforcement variables by one year relative to the dependent variable. Hoopes et al. (2012) show in the U.S. setting that that a substantial number of managers use historical data provided by the tax authority to gauge tax enforcement. In addition, as shown in Table 4 below, the two tax enforcement variables are highly persistent over time.

Finally, we consider the impact of overall provincial law enforcement quality (*LAW*) on tax evasion. Consistent with the argument for the tax enforcement proxies, we predict the coefficient on *LAW* to be negative.

One may have noticed that our model (1) does not include the book-tax-difference (or other similar tax avoidance proxies) commonly used in prior tax avoidance literature. This is because our model (1) is a structural model that attempts to understand the causal drivers of tax evasion. On the other hand, the book-tax-difference is a consequence of corporate tax planning. While the book-tax-difference may be a useful indicator of tax evasion, but it is not a causal determinant of tax evasion.

2.2. The tax evasion detection model

Conditional on the firms that have committed a tax evasion in a year, our second research question examines the types of firms that are more likely to be detected for tax evasion. Specifically, we adopt the following model (firm and year subscripts are omitted for brevity):

$$DETECTION \mid EVASION^{*} = X\beta + year\,and\,industry\,fixed\,effects + \varepsilon \quad (2)$$

DETECTION is a dummy variable that equals one if a tax evasion committed in year *t* is subsequently detected by the tax authority or others. It is important to note that model (2) is

tested using only the firms that have committed a tax evasion, regardless of whether a researcher can observe such tax evasion. Hence, explanatory variables that help identify tax evasion firms only are no longer needed and should be excluded from model (2). For example, *LEV* could causally affect the likelihood of tax evasion. However, since model (2) starts with the tax evasion firms, it is no longer necessary to include *LEV* in model (2) again, unless we argue that *LEV* also has a separate effect on detection. For the same reason, model (2) should not include the non-causal indicators for tax evasion proposed by the extant tax avoidance literature (e.g., the book-tax-difference).

We consider three sets of explanatory variables for model (2). First, we consider incentive factors that may facilitate or impede the detection of tax evasion, including ownership structure (*SOE_CENTRAL* and *SOE_LOCAL*), external audit quality (*BIGN*), local law enforcement environment quality (*LAW*), and effective tax rate (*ETR*). As argued in section 2.1, SOEs have a strong political connection with the government and therefore we expect the SOEs who have committed a tax evasion to be less likely detected. As argued in section 2.1, we expect big audit firms to deter their audit clients from committing tax evasion. However, even if audit clients do commit a tax evasion, the presence of a big audit firm may also help facilitate the tax authority's or other monitors' detection of such tax evasion due to more transparent information disclosure required by big audit firms. Similarly, we also expect the tax authority to find it easier to detect tax evasion in a stronger law enforcement environment (*LAW*). Finally, we include *ETR* as a proxy for public pressure because firms with low *ETR* tends to attract more public attention and therefore the tax authority may be under greater pressure to investigate such firms.

Second, we expect tax evasion detection to depend on the tax authority's ex post enforcement effort, proxied by *TARGET_INDUS*, and *AUDIT*. Because tax audits are typically performed after the submission of a company's tax return, all these enforcement

proxies are measured one year after the dependent variable. We predict the coefficients on all three variables to be positive.

Third, we include *SIZE* as a control variable for size related effects. In addition, we include year and industry fixed effects.

3. Research method

One empirical challenge to estimating the models (1) and (2) is that *EVASION** is not always observable and therefore models (1) and (2) cannot be estimated directly. Prior tax evasion studies simply ignore this problem and instead use a reduced form of model (1) by substituting the detected tax evasions for *EVASION**. Since no one knows for sure the size of *EVASION**, it remains unknown how severe the bias is resulting from using the reduced form model (1). In addition, to our knowledge, no study has estimated model (2) due to the partial observability of *EVASION**.

In this study we address this partial observability problem by estimating models (1) and (2) simultaneously using the bivariate probit model with partial observability. Identification of the partial observability model requires the exclusion restriction for both models (Maddala 1983). Clearly, our models satisfy this condition. More importantly, as we show in the results section, there are at least one significant explanatory variable in one model that is excluded from the other model.

4. Sample selection procedures and data sources

Table 1 reports the sample selection procedures. We begin with an initial sample of 11,981 firm-years for all publicly listed Chinese firms on the Shanghai and Shenzhen stock exchanges from 2003 to 2010. We exclude financial firms due to their unique industry and regulatory differences. We start from 2003 because this is the first year when the *CSMAR*

database starts to collect the original texts of accounting error adjustments from annual reports that are used to determine tax evasion cases.[7] The tax evasion data discussed in details below show that the time gap between the beginning year of a tax evasion case and the subsequent restatement year of the tax evasion is about 2.3 years, on average. Since we started the project in 2013, we end our sample in 2010 to avoid understating the disclosed tax evasion cases for the last few years of the sample period.

We obtain firm-level financial data, including auditor and ownership information, from the *CSMAR* database. We obtain firm income tax rate data from the *IFIND* database, another major database on publicly listed Chinese companies. We exclude 1,804 observations with missing values for the variables used in the analysis, resulting in a sample of 10,177 observations.

Our empirical analyses also require relevant country and state-level variables. We collect the data on tax enforcement measures from the State Administration of Taxation and Tax Bureaus, and the data on legal enforcement from the National Economic Research Institute (NERI) (Fan, Wang, and Zhu 2011).[8] The requirement of non-missing country and state-level information further reduces the sample size to 8,886 observations.

We identify the tax evasion firm years using the *CSMAR* database's original texts of the accounting error adjustments as disclosed in annual reports for all the years since 2003. We also use the *IFIND* database as a supplemental source for accounting error adjustments that could have been missed by the *CSMAR* database. It is important to note that the tax adjustments considered in this study cover a variety of taxes, including corporate income taxes, value added taxes, consumption taxes, property taxes, stamp taxes, etc.

[7] All publicly listed Chinese firms have been required to disclose accounting error adjustments, including tax adjustments, in their annual reports since 2002.

[8] The legal enforcement index, our measure of legal enforcement, is a sub-index of NERI indices, reflecting the strength of law enforcement for each province (Fan et al. 2011; Jian and Wong 2010; Wang et al. 2008).

From the accounting error adjustment disclosures, we manually identify the tax adjustments due to tax evasion between 2003 and 2010 using the following procedures. Our discussions with relevant corporate insiders and anonymous tax officials confirm that our sample selection procedures are reasonable to identify the tax evasion cases. First, we identify all the firm years involving tax adjustments. Second, we exclude the tax adjustments due to the following reasons unrelated to tax evasion: (i) tax adjustments due to the delayed approval or disapproval of tax deductions or exemptions by the relevant tax authorities (e.g., the recognition or derecognition of high-tech company status for tax purposes); (ii) routine year-end tax adjustments by the tax authority resulting from errors in estimated income taxes; and (iii) negative adjustments due to tax overpayment.[9] Our final tax evasion sample contains 339 firm-years for 178 unique firms over the period 2003-2010, representing 3.8% of the full sample in Table 1.

Panel A of Table 2 shows the frequency of detected tax evasion by year in our sample period. Except for the last two years, the tax evasion percentage hovers around 4% each year. The significantly lower tax evasion percentages for the last two years could be due to the fact that it takes time for some tax evasion cases to be detected.

Panel B of Table 2 reports the frequency of detected tax evasion by tax type. While income tax evasions rank first in frequency (41.41%), we also observe significant tax evasions in value added tax, business tax, housing property tax, among others.

Panel C of Table 3 shows the frequency of detected tax evasion by detector identity. While the majority of the detected tax evasions are uncovered by the tax authority, other stakeholders also played a significant role in detection.[10]

[9] It is unlikely that the tax evasion cases in our final sample are due to financial reporting incentives. The reason is that financial reporting incentives would lead to higher taxable income and therefore higher taxes but our tax evasion cases are all about tax understatement.

[10] 6.2% of the tax evasions reported in Panel C of Table 2 are classified as "self-disclosed", which seems to suggest that the detector is the firm itself. However, several tax officials told us that most "self-disclosed" cases

5. Empirical results for the models of commitment and detection

5.1. Descriptive statistics

Table 3 shows the descriptive statistics for the regression variables included in models (1) and (2). During our sample period 4% of the firm years experienced detected tax evasions. This percentage seems high relative to the frequency of reported tax shelters in the U.S. For example, Lisowsky (2010) reported 267 tax shelters out of 9,223 firm years or 2.89%. 17% of our sample firms are central SOEs and 31% are local SOEs. Though not tabulated, the frequency of tax evasion is 3% for central SOEs and 4% for both local SOEs and non-SOEs.

Table 4 reports the Pearson correlation matrix for all the regression variables in models (1) and (2). As expected, the variables *TARGET_INDUS*, *AUDIT*, and *LAW* all exhibit persistence over time as evidenced by the significantly positive correlation for each variable in year *t*-1 and year *t*+1. In addition, the correlations are all very high except for *TARGET_INDUS*.

5.2. Regression results

5.2.1. The results for the commitment model

Table 5 reports the regression results of models (1) and (2) using the bivariate probit model that addresses the partial observability of tax evasion. We report the regression results of model (1) in column (1) and the regression results of model (2) in column (2).

Let's focus on the regression results of model (1) first. We find support for using the motivation-ability-opportunity framework to explain tax evasion. With regard to *MOTIVATION*, the six proxies all load significantly except for *TAXRATE*. Specifically, we find that both central SOEs and local SOEs are more likely to evade taxes than non-SOEs.

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are actually detected by tax authorities. To reduce the tax penalties for the firms, the tax authorities sometimes allow the firms to disclose the detector as "self-disclosed".

This finding is opposite to those documented by Bradshaw et al. (2016) and Jian et al. (2013) using conventional tax avoidance proxies which tend to capture legal tax avoidance. Our results suggest that the drivers of illegal tax avoidance are fundamentally different from the drivers of legal tax avoidance. Contrary to our prediction, the coefficient on *LEV* is significantly positive. One potential interpretation of this positive coefficient is that highly levered firms may face a greater need for cash and therefore would have a stronger incentive to resort to aggressive tax avoidance behavior. As predicted, firms who plan to raise equity capital (*SEO*) are less likely to evade taxes. Interestingly, we find no evidence that a firm's tax rate (*TAXRATE*) affects tax evasion, consistent with the prediction by Yitzhaki (1974) noted in footnote 1. Finally, firms in more competitive industries (*COMP*) are more likely to evade taxes, consistent with Cai and Liu (2009).

With regard to *ABILITY*, we find that *SIZE* is not significantly while *ROA* is significantly negative, contrary to our prediction. Similar to our ex post interpretation of *LEV*, one could argue that low *ROA* firms face a greater need for cash and therefore would have a stronger incentive to evade taxes (Edwards, Schwab, and Shevlin 2016; Law and Mills 2015).

With regard to *OPPORTUNITY*, we find that three of the four proxies are significant and as predicted. Specifically, there is evidence that firms with a big audit firm (*BIGN*) are less likely to evade taxes. The coefficient on *AUDIT* is significantly negative, suggesting that firms operating in regions with tougher tax enforcement are less likely to evade taxes. We also find evidence that firms domiciled in stronger legal enforcement regions (*LAW*) are less likely to evade taxes.

5.2.2. The results for the detection model

Column (2) of Table 5 shows the regression results of the detection model estimated using the bivariate probit model. We find that both incentives and effort matter in tax evasion

detection. Specifically, we find that conditional on the firms that have committed a tax evasion, both central and local SOEs are less likely to be detected for tax evasion. Firms with big audit firms (*BIGN*) or domiciled in stronger legal enforcement environments (*LAW*) are more likely to be detected for tax evasion. Both tax enforcement effort proxies (*TARGET_INDUS* and *AUDIT*) are significantly positive, suggesting that tax evasions are more likely to be detected when the tax authority's enforcement effort is greater.

5.2.3. The results for the reduced form commitment model

Prior tax evasion research models corporate tax evasion using only the detected tax evasion cases, referred to as the reduced form commitment model. Hence, a natural question we would like to ask is whether there are significant differences in inference using the reduced form commitment model versus the bivariate probit model. Column (3) of Table 5 reports the regression results of model (1) where the dependent variable is one if there is a detected tax evasion and zero otherwise. Compared with the coefficients on the same variables in column (1) of Table 5, we notice that the previously significant coefficients on *SOE_CENTRAL*, *SOE_LOCAL*, *BIGN*, and *AUDIT* in column (1) are no longer significant in column (3). These results suggest that we would have drawn substantially different inferences about tax evasion determinants had we used the simple reduced form model.

6. Further analyses

One most striking finding from Table 5 that is significantly different from prior research is that SOEs are not only more likely to evade taxes but also they are less likely to be detected for tax evasion. In this section, we provide further evidence consistent with this finding in section 6.1. In addition, we also attempt to directly reconcile our results for the ownership structure variables with those from prior research in section 6.2.

6.1. Tax evasion penalties

If both SOEs and non-SOEs are caught with tax evasion, which firms are punished more severely? The arguments in section 2 would predict SOEs to be less severely punished because they have the superior political connection with the government. Table 6 shows the OLS regression results for this prediction using only the firm years that have reported a tax evasion. Because we use fewer control variables in Table 6, the number of tax evasion observations is bigger than that in Table 1. The dependent variable is *PENALTY*, defined as the natural logarithm of one plus the amount of tax penalties levied on a firm for committing a tax evasion in year *t*. Our key variables of interest are *SOE_CENTRAL* and *SOE_LOCAL*. We include *SIZE*, the severity of the tax evasion (*EVADEDTAX*), dummies for the type of taxes evaded, dummies for the tax evasion detectors, and year and industry fixed effects as controls. See appendix A for all variable definitions. Consistent with our prediction, the coefficients on *SOE_CENTRAL* and *SOE_LOCAL* are significantly negative.

6.2. Reconciliation with prior tax avoidance literature

Both Bradshaw et al. (2016) and Jian et al. (2013) find that SOEs are less likely to avoid taxes than non-SOEs, contrary to our results in Table 5. How can we reconcile these conflicting results? Our study differs from these two studies in two key aspects. First, we consider both income taxes and non-income taxes whereas these two studies consider income taxes only. Second, these two studies use the effective income tax rate (ETR) as a proxy for tax avoidance while we use tax evasion. Because the effective tax rate could reflect the effects of both legal tax avoidance and some aggressive (or illegal) tax avoidance, the effective tax rate is not comparable to our tax evasion measure.

To check the correlation between common tax avoidance measures and our tax evasion proxy, Table 7 tabulates the summary statistics (panel A) and pairwise Pearson correlations (panel B) of the following variables for the full sample as well as the three subsamples (central SOEs, local SOEs, and non-SOEs): *EVASION* (the detected tax evasion), *PRED_EVASION* (the predicted tax evasion probability based on the commitment model in column (1) of Table 5), *ETR*, and *CashETR* (per Bradshaw et al. 2016). See appendix A for detailed definitions. There are two key findings. First, the predicted tax evasion frequencies are much higher than the observed tax evasion frequencies for both central and local SOEs. Second, the associations between *PRED_EVASION* and *ETR* (or *CashETR*) are all non-negative, suggesting that neither *ETR* nor *CashETR* is a good proxy for tax evasion.

We next replicate the ETR model from Bradshaw et al. (2016) over our sample period 2003-2010. Results are similar if we use *CashETR* as the dependent variable (untabulated). As shown in column (1) of Table 8, the coefficient on *SOE* is significantly positive, consistent with Bradshaw et al. (2016). In column (2), we break down *SOE* into central- and local- government owned (*SOE_CENTRAL* and *SOE_LOCAL*) and the results are also consistent with those reported in Bradshaw et al. (2016). Finally, we estimate the ETR model using the same set of control variables in Table 5 and we continue to find similar results (see columns (3) and (4)). Overall, these multivariate results provide further evidence that caution should be exercised in using *ETR* or *CashETR* as a proxy for aggressive tax avoidance behavior.

7. Conclusion

Taking advantage of the mandatory disclosure of detected corporate tax evasions in China, we examine why publicly listed Chinese firms evade taxes. To deal with the partial observability of corporate tax evasion, we simultaneously model the determinants of

corporate tax evasion (referred to as the commitment model) and the determinants of corporate tax evasion detection conditional on the occurrence of a tax evasion (referred to as the detection model) using a bivariate probit model. Unlike most prior research that focuses on corporate income tax avoidance only, we consider both income tax evasion and non-income tax evasion together.

With regard to the commitment model, we find three interesting results. First, ex ante tax enforcement intensity has a deterrence effect on corporate tax evasion. Second, SOEs are more likely to evade taxes than non-SOEs. Third, the presence of a big audit firm is associated with a reduced likelihood of corporate tax evasion. With regard to the detection model, we find the following interesting results. First, as expected, the tax authority's enforcement effort has a positive impact on tax evasion detection. Second, SOEs are less likely to be detected for tax evasion than non-SOEs. Corporate tax evasion is more likely to be detected when a firm employs a big audit firm. Consistent with the results from the commitment model, we also find that even if caught for tax evasion, SOEs are subject to smaller penalties than non-SOEs.

Overall, our results are inconsistent with Brandshaw et al. (2016) and Jian et al. (2013) who find SOEs to be *less* likely to avoid taxes than non-SOEs. A key difference between these two studies and ours is the definition of tax avoidance. Specifically, we focus on tax evasion, the most opaque and egregious form of tax avoidance, but both Brandshaw et al. (2016) and Jian et al. (2013) use the effective tax rate (ETR) as a proxy for tax avoidance. While ETR can capture the effect of legal tax avoidance, it is less clear whether ETR can capture most egregious forms of tax avoidance. Another key difference is that we consider both income taxes and non-income taxes while these two studies examine income taxes only. We find that our tax evasion measure is *positively* correlated with ETR, suggesting that the conventional ETR may not be a reliable proxy for corporate tax evasion.

We contribute to the existing tax literature in several important ways. First, we contribute to the literature on aggressive corporate tax avoidance by being the first study to use a bivariate probit model to simultaneously model the determinants of partially observable tax evasion and the determinants of tax evasion detection. We show that taking into consideration undetected tax evasion could significantly alter a researcher's inferences. Second, we contribute to a small but growing literature on corporate non-income tax avoidance by considering both income tax evasion and non-income tax evasion together. Third, we contribute to the literature on how tax enforcement affects corporate tax avoidance behavior. To our best knowledge, we are the first study to examine how tax enforcement affects corporate tax evasion. Fourth, we extend the extant tax evasion literature, which is largely limited to U.S. firms, to China, a country with a weak institutional environment and rampant tax evasion. We show that Chinese SOEs are more likely than non-SOEs to not only evade taxes but also avoid detection of tax evasion.

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Appendix. Variable Definitions

Variable name	**Definition**
*EVASION**	An indicator variable that equals one if a firm commits a tax evasion (regardless of whether the evasion is detected or not) in year *t*, and zero otherwise.
EVASION	An indicator variable that equals one if a firm is caught with a tax evasion in year *t*, and zero otherwise.
PRED_EVASION	The predicted value of the partially observable *EVASION** based on the the bivariate probit model.
SOE_CENTRAL	A dummy variable that equals one if the firm's ultimate controller is the central government, and zero otherwise.
SOE_LOCAL	A dummy variable that equals one if the firm's ultimate controller is a local government, and zero otherwise.
LEV	Long-term debt scaled by total assets.
SEO	A dummy variable that equals 1 if the firm has a seasoned equity offering between year *t* and year *t*+2.
TAXRATE	The statutory income tax rate disclosed by the firm in a year.
COMP	The Herfindahl index of sales in different industries, where higher value means lower level of competition.
SIZE	The natural log of total assets.
ROA	Pre-tax income divided by total assets.
BIGN	An indicator variable that equals 1 if the company is audited by a Big 4 firm or one of the Top 10 domestic audit firms in China in a year, according to the audit revenue data compiled by The Chinese Institute of Certified Public Accountants, and zero otherwise.
TARGET_INDUS	An indicator variable that equals 1 if a firm year belongs to one of the industries that are under stricter scrutiny by the tax authority, and zero otherwise.
AUDIT	The tax revenue collected through tax audit as a percentage of total tax revenue for each province year.
LAW	The law enforcement index developed by Fan et al. (2011). Each province receives an index value between 0-10 based on the province's law enforcement strength, with larger value of index indicates better enforcement.
ETR	Tax expense divided by pre-tax book income. Observations with negative pre-tax book income is set to missing. This variable is truncated at 0 and 1.
PENALTY	the natural logarithm of one plus the amount of penalty levied on the firm for tax evasion committed in year *t*
EVADEDTAX	the natural logarithm of the amount of evaded tax for the tax evasion committed in year *t*

Table 1. Sample Selection

	No. of firm-year Observations
A-share companies between 2003 to 2010 in *CSMAR*	11,981
Less: observations with missing firm-level variables	(1,804)
	10,177
Less: observations with missing country and state-level variables	(1,291)
Final sample	8,886

Table 2. Descriptive Statistics for the Detected Tax Evasions

Panel A. Distribution of detected tax evasions by commitment year

Commitment year	Tax evasion observations	Percent of all firms in the year
2003	49	5.93
2004	50	5.79
2005	39	4.44
2006	46	4.83
2007	52	4.13
2008	38	3.09
2009	38	2.80
2010	27	1.78
Total	339	3.81

Panel B. Distribution of detected tax evasions by tax type

Tax type	Percent of tax evasion firm-years*
Enterprise Income Tax	41.41
Value Added Tax	18.35
Business Tax	13.65
Housing Property Tax	12.00
Urban Land Use Tax	10.59
Tax for Maintaining and Building Cities	6.82
Stamp Tax	6.82
Education Supplementary Tax	6.12
Land Value Added Tax	3.76
Vehicle Usage Tax	1.41
Tariff	1.18
Tax Rebate	0.47
Consumption Tax	0.23
Others	22.59
*Do not add up to 100% because a tax evasion firm year may involves more than one type of taxes evaded.	

Panel C. Distribution of detected tax evasions by detectors

Detector	Percent of tax evasion firm-years*
Central Tax Bureau (State Administration of Taxation)	16.47
Local Tax Bureau	20.71
Local or Central Tax Bureau	18.82
Ministry of Finance	7.53
Self-Disclosed	6.12
Department of Audit	4.00
The Customs	0.94
SEC	0.71
Unknown	30.58
*Do not add up to 100% because a tax evasion firm year may involves more than one detecting agencies.	

Table 3. Descriptive Statistics for the Regression Variables

Variable	N	mean	SD	p10	p25	p50	p75	p90
$DETECT_t$	8,886	0.04	0.19	0.00	0.00	0.00	0.00	0.00
$SIZE_t$	8,886	21.53	1.16	20.22	20.75	21.41	22.16	23.01
ROA_t	8,886	0.06	0.05	0.01	0.02	0.05	0.08	0.13
$TAXRATE_{t-1}$	8,886	0.22	0.08	0.15	0.15	0.25	0.33	0.33
LEV_{t-1}	8,886	0.07	0.10	0.00	0.00	0.03	0.11	0.22
SEO_t	8,886	0.24	0.43	0.00	0.00	0.00	0.00	1.00
$BIGN_t$	8,886	0.32	0.47	0.00	0.00	0.00	1.00	1.00
$SOE\_CENTRAL_t$	8,886	0.17	0.38	0.00	0.00	0.00	0.00	1.00
SOE_LOCAL_t	8,886	0.31	0.46	0.00	0.00	0.00	1.00	1.00
$COMP_{t-1}$	8,886	0.13	0.15	0.03	0.05	0.08	0.14	0.30
$AUDIT_{t-1}$	8,886	0.01	0.01	0.00	0.01	0.01	0.02	0.02
$AUDIT_{t+1}$	8,886	0.01	0.01	0.00	0.01	0.01	0.02	0.02
LAW_{t-1}	8,886	8.07	4.49	3.69	4.70	6.61	10.64	14.23
LAW_{t+1}	8,886	8.84	4.91	3.96	5.11	7.32	12.39	16.61
$TARGET\_INDUS_{t-1}$	8,886	0.12	0.32	0.00	0.00	0.00	0.00	1.00
$TARGET\_INDUS_{t+1}$	8,886	0.12	0.33	0.00	0.00	0.00	0.00	1.00
ETR_t	8,886	0.22	0.16	0.03	0.12	0.19	0.29	0.39

This table presents descriptive statistics for the variables used in our analysis. See the appendix for variable definitions. All continuous variables are winsorized at the 1st and 99th percentiles.

Table 4. Pearson Correlations

	1.	*2.*	*3.*	*4.*	*5.*	*6.*	*7.*	*8.*	*9.*	*10.*	*11.*	*12.*	*13.*	*14.*	*15.*	*16.*	*17.*
1. DETECT$_t$	1.00																
2. SIZE$_t$	-0.03	1.00															
3. ROA$_t$	-0.05	0.19	1.00														
4. TAXRATE$_{t-1}$	0.03	0.00	-0.05	1.00													
5. LEVt$_{-1}$	0.03	0.34	-0.04	0.06	1.00												
6. SEOt	-0.03	0.17	0.13	-0.03	0.11	1.00											
7. BIGNt	-0.04	0.04	0.05	-0.10	0.00	0.05	1.00										
8. SOE_CENTRAL$_t$	-0.01	0.18	0.01	-0.11	0.06	0.03	0.11	1.00									
9. SOE_LOCAL$_t$	0.02	0.14	0.03	0.06	0.06	-0.01	-0.06	-0.30	1.00								
10. COMP$_{t-1}$	-0.02	0.01	-0.03	-0.01	0.00	0.00	0.02	0.02	-0.05	1.00							
11. AUDIT$_{t-1}$	0.02	-0.05	-0.04	0.04	0.03	-0.02	-0.03	-0.04	0.02	0.02	1.00						
12. AUDIT$_{t+1}$	0.02	-0.06	-0.04	0.04	0.03	-0.02	-0.03	-0.04	0.02	0.02	0.99	1.00					
13. LAW$_{t-1}$	-0.09	0.18	0.12	-0.13	-0.05	0.08	0.21	0.04	-0.03	-0.01	-0.25	-0.25	1.00				
14. LAW$_{t+1}$	-0.08	0.17	0.12	-0.13	-0.08	0.07	0.22	0.03	-0.05	-0.01	-0.25	-0.25	0.98	1.00			
15. TARGET_INDUS$_{t-1}$	0.02	0.03	-0.00	0.02	0.07	0.05	-0.02	-0.04	0.01	-0.09	-0.09	-0.10	0.10	0.09	1.00		
16. TARGET_INDUS$_{t+1}$	0.03	0.04	-0.01	0.05	0.08	0.04	-0.01	-0.03	0.01	-0.10	-0.05	-0.04	0.10	0.09	0.41	1.00	
17. ETR$_t$	0.03	0.03	-0.16	0.33	0.04	-0.08	-0.07	-0.06	0.04	-0.01	0.03	0.03	-0.05	-0.06	0.07	0.08	1.00

This table presents descriptive statistics for the variables used in our analysis. Shaded cells indicate correlation coefficients that are statistically different from zero at the 10% level. See the appendix for variable definitions. All continuous variables are winsorized at the 1st and 99th percentiles.

Table 5. Determinants of Corporate Tax Evasion Commitment and Detection

	(1)	(2)	(3)
	Bivariate Probit with Partial Observability		Probit
	Pr(*Evasion*$_t$*)	Pr(*Detection* | *Evasion*$_t$*)	Pr(*Evasion$_t$*)
SIZE$_t$	-0.0093	-0.0863	-0.0595**
	(-0.13)	(-0.69)	(-2.15)
ROA$_t$	-2.6011***		-2.4860***
	(-3.37)		(-4.08)
TAXRATE$_{t-1}$	0.2825		0.2320
	(0.87)		(0.72)
LEV$_{t-1}$	0.6303**		0.6669**
	(2.17)		(2.54)
SEO$_t$	-0.1370*		-0.1324**
	(-1.83)		(-1.97)
BigN$_t$	-0.2832*	0.6153**	-0.0228
	(-1.89)	(2.49)	(-0.38)
SOE_CENTRAL$_t$	1.0138**	-2.1738***	-0.0618
	(2.11)	(-3.22)	(-0.79)
SOE_LOCAL$_t$	0.7298**	-1.6083***	0.0322
	(2.34)	(-2.95)	(0.56)
COMP$_{t-1}$	-0.3625*		-0.3924**
	(-1.75)		(-2.03)
AUDIT$_{t-1}$	-12.1344*		2.1078
	(-1.68)		(0.70)
LAW$_{t-1}$	-0.1024***		-0.0520***
	(-4.74)		(-5.88)
TARGET_INDUS$_{t-1}$	-0.0087		0.1148
	(-0.10)		(1.40)
ETR$_t$		0.0014	0.1516
		(0.00)	(0.99)
AUDIT$_{t+1}$		39.6108***	
		(2.83)	
LAW$_{t+1}$		0.1090***	
		(2.83)	
TARGET_INDUS$_{t+1}$		0.5505**	
		(1.97)	
Year & Industry Fixed Effects	Yes	Yes	Yes
Log Likelihood	-1341.15		-1365.17
Prob > χ^2	0.00		0.00
Observations	8,886		8,886
Pseudo R^2	-		0.05

See the appendix for variable definitions. All continuous variables are winsorized at the 1st and 99th percentiles. The *t*-statistics are in parentheses and are based on heteroskedasticity-consistent standard errors adjusted for firm clustering. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6. OLS Regression Results on the Determinants of Tax Evasion Penalty

	Dependent variable = $PENALTY_t$
$SIZE_t$	0.04589
	(0.23)
$SOE\_CENTRAL_t$	-1.9424***
	(-4.04)
SOE_LOCAL_t	-1.0590*
	(-1.83)
EVADEDTAX	0.6722***
	(4.80)
Constant	-9.035*
	(-1.89)
Dummies for Types of Evaded Taxes	Yes
Dummies for Detectors	Yes
Year & Industry Fixed Effects	Yes
Observations	425
Adjusted R^2	0.26

See the appendix for variable definitions. All continuous variables are winsorized at the 1st and 99th percentiles. *t*-statistics are in parentheses and are based on heteroskedasticity-consistent standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7. A Comparison of Tax Evasion, Predicted Tax Evasion, and Effective Tax Rates

Panel A: Descriptive Statistics

	Full Sample			Central SOEs			Local SOEs			Non-SOEs		
Variable	Mean	SD	Med	Mean	SD	Med	Mean	SD	Med	Mean	SD	Med
$EVASION_t$	0.04	0.19	0.00	0.03	0.17	0.00	0.04	0.20	0.00	0.04	0.19	0.00
$PRED\_EVASION_t$	0.13	0.11	0.09	0.23	0.12	0.23	0.19	0.11	0.19	0.06	0.04	0.05
ETR_t	0.20	0.17	0.18	0.19	0.15	0.17	0.22	0.16	0.20	0.19	0.18	0.16
$CashETR_t$	0.20	0.20	0.15	0.19	0.18	0.15	0.22	0.19	0.18	0.19	0.21	0.14

Panel B: Pearson Correlations

Variable	$EVASION_t$	$PRED\_EVASION_t$	ETR_t
Full Sample			
$PRED\_EVASION_t$	0.047 (0.00)		
ETR_t	0.036 (0.00)	0.015 (0.29)	
$CashETR_t$	0.038 (0.00)	0.026 (0.02)	0.609 (0.00)
Central SOEs			
$PRED\_EVASION_t$	0.040 (0.02)		
ETR_t	0.055 (0.03)	0.009 (0.73)	
$CashETR_t$	0.077 (0.00)	0.016 (0.54)	0.660 (0.00)
Local SOEs			
$PRED\_EVASION_t$	0.061 (0.00)		
ETR_t	0.015 (0.44)	0.050 (0.01)	
$CashETR_t$	0.006 (0.76)	0.055 (0.01)	0.587 (0.00)
Non-SOEs			
$PRED\_EVASION_t$	0.133 (0.00)		
ETR_t	0.041 (0.01)	0.107 (0.00)	
$CashETR_t$	0.045 (0.00)	0.075 (0.00)	0.607 (0.00)

This table presents descriptive statistics and Pearson correlations for tax evasion incidents, predicted tax evasion, ETR, and Cash ETR. P-values (based on two-tailed tests) for correlations are in parentheses. See the appendix for variable definitions.

Table 8. Replication of Bradshaw et al.'s (2016) *ETR* Regression

	Dependent variable = ETR_t			
	(1)	(2)	(3)	(4)
SOE_t	0.0135**		0.0084**	
	(2.52)		(2.27)	
$SOE\_CENTRAL_t$		0.0051		0.0067*
		(1.33)		(1.80)
SOE_LOCAL_t		0.0138***		0.0105***
		(3.84)		(3.01)
$SIZE_t$	-0.0021	-0.0030	0.0017	0.0024
	(-0.85)	(-1.61)	(1.03)	(1.60)
ROA_t	0.4163***	0.4090***	-0.0628**	-0.0463
	(13.80)	(16.32)	(-2.04)	(-1.32)
LEV_t	-0.0028***	-0.0027***	0.0287**	0.0294**
	(-5.43)	(-5.45)	(2.56)	(2.37)
MB_t	0.0411***	0.0358***		
	(2.70)	(3.03)		
$CAPEX_t$	-0.1952***	-0.1030***		
	(-5.83)	(-3.79)		
NOL_t	-0.0983***	-0.0962***		
	(-10.64)	(-11.95)		
$M\&A_t$	0.0019	0.0035		
	(0.50)	(0.94)		
$EQUOFFER_t$	-0.0164***	-0.0144***		
	(-3.81)	(-3.56)		
$CROSSLIST_t$	-0.0017	0.0009		
	(-0.18)	(0.12)		
$OWNCONCEN_t$	-0.0278*	-0.0270**		
	(-1.70)	(-2.31)		
$MGMTOWN_t$	-0.0036	-0.0050		
	(-0.74)	(-1.40)		
$DUALCEO_t$	-0.0054	-0.0045		
	(-0.75)	(-0.90)		
$TAXPREFERENCE_t$	-0.0770***	-0.0673***		
	(-16.27)	(-18.70)		
$TAXRATE_{t-1}$			0.5973***	0.5291***
			(29.29)	(24.44)
SEO_t			0.0070	0.0169
			(0.63)	(1.16)
$BigN_t$			-0.0304***	-0.0269***
			(-7.77)	(-8.09)
$COMP_{t-1}$			-0.0113***	-0.0048
			(-3.12)	(-1.34)
$AUDIT_{t-1}$			0.2231	0.4207**
			(1.12)	(2.18)
LAW_{t-1}			-0.0001	0.0006
			(-0.16)	(1.35)
$TARGET\_INDUS_{t-1}$			0.0340***	0.0219***
			(6.52)	(3.19)
Constant	0.2856***	0.3997***	0.0430	0.0429
	(5.63)	(7.73)	(1.30)	(1.13)
Year & Industry Fixed Effects	Yes	Yes	Yes	Yes
Observations	7,856	7,856	8,873	8,873
Adjusted R^2	0.12	0.15	0.11	0.13

This table reports the OLS estimation results of Bradshaw et al.'s (2016) ETR model over our sample period. The *t*-statistics are in parentheses and are based on heteroskedasticity-consistent standard errors adjusted for firm clustering. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. *SOE*

is an indicator variable equal to one if a firm is controlled by the state, and zero otherwise. *MB* is the market to book ratio, defined as the sum of market value of equity at the end of the year, divided by the book value of equity at the end of the year. *CAPEX* is capital expenditure divided by total assets at the end of the year. *NOL* is the accumulated pre-tax losses reported in the prior five years. *NOL* is set to 0 if the accumulated earnings in the prior five years are positive. *M&A* is an indicator variable for merger and acquisitions in the current year. *EQUOFFER* is an indicator variable for seasonal equity offerings in a year. *CROSSLIST* is an indicator variable for firms that are also cross-listed in both A-share and H-Share stock markets. *MGMTOWN* is an indicator variable equal to one if the management has equity ownership, and 0 otherwise. *OWNCONCEN* is the ownership percentage of the largest shareholder. *DUALCEO* is an indicator variable equal to one if the CEO is also the chairman of the board of directors, and zero otherwise. *TAXPREFERENCE* is an indicator variable for firms that potentially enjoy a preferential tax rate. Three major types of firms enjoy preferential tax rates: 1) firms domiciled in special locations, including hi-tech industry development zones and economic development zones (that sometimes receive preferential tax rates); 2) firm-years with foreign ownership (that are eligible for preferential tax rates); 3) observations of firms younger than three years (that receive special deductions for start-up expenses). We exclude *R&D* (research and development expense divided by total assets) and *FORESALE* (The percentage of foreign sales to total sales) included in Bradshaw et al.'s model because these two variables require hand collection. See the appendix for all other variable definitions.