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Bribes and Business Tax Evasion[1]

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Abstract

This paper investigates the role of governance, in particular bribes to tax officials, in shaping business tax compliance behavior in transition economies. The empirical results show that business noncompliance rises with the frequency of tax related bribes. More specifically, the findings from 27 economies suggest that tax evasion thrives when bribes to tax officials are commonplace. These findings are robust to a number of specifications that control for firm and country attributes as well as address the potential endogeneity of bribes.

JEL Classification: H25, H26, H32, D73

Keywords: Tax Evasion, Firm Behavior, Corruption

1. Introduction

Business tax compliance is critical to the fiscal viability of governments. This is particularly true because the bulk of the government's tax revenues, including taxes on profits, VAT and sales taxes, income tax withholding, and employment taxes are collected or paid by business (Joulfaian, 2000). Yet despite its importance, little is known about business tax compliance and the behavioral consequences of the various tax regimes (Cowell 2004). Indeed, the empirical literature on business tax evasion is scant, in sharp contrast to the voluminous work on individual income tax compliance (Clotfelter 1983; Cowell, 1990; Slemrod, 1992).

Tax administration, in particular as it relates to the penalty and detection regimes, figures prominently in determining the level and character of tax evasion (Allingham and Sandmo, 1972). Yet governance may compromise the efficacy of such tax regimes. For example, some of the transition economies of Europe and the former Soviet Union may be characterized as regimes with stiff if not draconian penalties for engaging in tax evasion. But these states are also plagued with serious governance shortcomings, with tax penalties that apply at the discretion of tax officials.[3] This raises the question of whether corruption, and in particular bribes to tax officials, reduces tax compliance as it compromises the statutory detection and penalty regimes.

This paper explores how bribes to tax officials shape business tax evasion in transition economies. The results suggest that governance, particularly as it relates to tax administration, is an important determinant of business tax compliance behavior. Basic sample statistics show that noncompliance is much higher when firms perceive bribes to be widespread than when they are believed never to take place. This is further confirmed using multivariate analysis which shows tax evasion to increase with the frequency of tax related bribes. In addition, the findings suggest that the estimated effects of bribes are likely to be larger when their potential endogeneity is controlled for. The analysis controls for the form of organizational choice and nature of the largest

[1] The paper benefitted from comments by John Anderson, the editor, and two anonymous referees. The views expressed are those of the author and do not necessarily reflect those of the Department of the Treasury.

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3 See Himes and Milliet-Einbinder (1999) for the experience in Russia.

shareholder. It also accounts for the effects of tax rates, firm size, industrial classification, and country effects.

The remainder of the paper is organized as follows. Section 2 presents a brief review of the literature on business tax evasion. Section 3 presents a simple theoretical framework to motivate the empirical modeling of business evasion, and provides a description of the data on 27 economies. These countries cover central and eastern Europe, and the former Soviet Union. Empirical results are reported in Section 4, which also explores the endogeneity of bribes to evasion. Concluding comments are provided in section 5.

2. Literature Review

A large body of the literature has addressed the determinants of personal income tax evasion since the seminal work of Allingham and Sandmo (1972). However, and in contrast to the numerous studies of personal income tax evasion, only a few studies have addressed business tax evasion. Some of the theoretical aspects of business tax evasion have been addressed. Marrelli (1984), for instance, compares tax evasion under a value-added tax to that under a profit tax, and finds that evasion patterns depend on risk aversion assumptions. Marrelli and Martina (1988) analyze tax evasion in the context of an oligopolistic market, while Kreutzer and Lee (1986 and 1988) and Wang and Conant (1988) analyze the effects of opportunities to evade taxes on the optimal output of a monopolist. Cremer and Gahvari (1993) and Virmani (1989) focus on competitive industry. Cowell (2004) provides an extensive review of this literature.

Expanding on the scope of studies on business tax evasion, Chen and Chu (2005) focus on the separation of ownership and control, and how this results in efficiency loss. And, more recently, Crocker and Slemrod (2005) examine corporate tax evasion with agency costs, and conclude that penalties imposed on manager rather than shareholders are more effective in reducing evasion.

Unfortunately, there has been a more limited set of empirical studies on the topic. Rice (1992), for instance, uses the 1981 TCMP data on small corporations in the US to study the determinants of corporate income tax evasion.[4] His findings show that although corporate tax compliance is negatively associated with tax rates, the effects are rather small. Interestingly, Rice also finds a positive association between compliance and disclosure requirements of the sort faced by publicly traded corporations.

Joulfaian (2000) empirically gauges the effects of managerial preferences for tax evasion, as proxied by their noncompliance with the personal income tax, on corporate compliance behavior. Using the 1987 TCMP data, the findings suggest that corporate tax evasion critically depends on managerial preferences. They also suggest that taxes have a positive, albeit small, effect on under reporting of profits.[5]

Others have explored the implications of corruption. Johnson et al (2000), for instance, examine the impact of government corruption on hidden output by comparing data on Poland, Romania, Russia, Slovakia, and the Ukraine. They show that corruption

4 The Taxpayer Compliance Measurement Program (TCMP) data represents a sample of some 18,000 relatively small corporations randomly selected for extensive audit by the Internal Revenue Service.

5 Other empirical studies focused exclusively on the effect of taxes on tax evasion by proprietors. Clotfelter (1983), for instance, addresses noncompliance by proprietors, while Joulfaian and Rider (1998) examine the compliance behavior of proprietors and landlords.

has adverse effects on reported output.[6] Otherwise, the empirical literature on business tax evasion is quite thin, indeed.

3. Modeling Business Tax Evasion

3.1 Theoretical Framework

To motivate the paper, consider a simple framework where a firm is owned by a risk-neutral shareholder. If at the end of the fiscal year the firm reports the correct profits to tax authorities, then the after tax income is simply $y(1-\tau)$, where y is pre-tax profits, defined as sales or revenues (r) less costs (c), and τ is the tax rate. If the firm engages in tax evasion, however, the expected profit will also depend on the probability of detection and penalty rate.[7]

More specifically, the firm, with some re-arranging, maximizes expected profits:

$$E\Pi(y, e, p) = (r - c)(1 - \tau) + er\tau - p(e)\gamma er\tau \tag{3.1}$$

where Π is profits, e the fraction of sales or output not reported, p the probability of detection, such that $p_e>0$, and $p_{ee}>0$, and $\gamma>1$ is the penalty rate. This assumes that tax evasion primarily takes the form of concealing sales, and not inflating deductible expenses (Yaniv, 1996).[8] The first order condition is:

$$r\tau - p_e\,\gamma\, er\tau - p(e)\,\gamma\, r\tau = 0 \tag{3.2}$$

with an optimum level of evasion of:

$$e^* = \frac{1}{p_e\,\gamma} - \frac{p(e)}{p_e} \tag{3.3}$$

and the familiar $\partial e/\partial\gamma<0$ and $\partial e/\partial p<0$ (Clotfelter, 1983). Evasion is expected to decline with detection and penalty rates.

Next, modify the tax regime by introducing bribes to tax officials. For simplicity assume that bribes are an exogenously determined fixed cost to the firm, and that they may influence the penalty regime for detected evasion. With bribes in the picture, the expected profit in (3.1) may be re-written as:

$$(r - c)(1 - \tau) + er\tau - p(e)[\gamma(b)er\tau + b] \tag{3.1'}$$

6 Hindriks, Keen, Muthoo (1999) explore the implications of corruption for the effects and optimal design of tax collection schemes, while Anderson (2005, 2006) examines the determinants of bribes to tax officials. Gorodnichenkoa and Sabirianova-Peter (2007) address the effects of bribes on individual evasion.

7 This ignores the trade-off between evasion and avoidance, as well as the possibility that tax departments may be treated as money makings centers throughout the year which may very well influence pre-tax earnings y. See Desai (2005) for a general discussion.

8 This can be further modified by assuming costs to be a constant fraction of sales. See Cowell (2004).

such that $\gamma_b<0$; the larger the bribe the smaller the penalty rate (note that $\gamma>1$). The optimum evasion in (3.3) becomes:

$$e^* = \frac{1}{p_e\,\gamma(b)} - \frac{p(e)}{p_e} - \frac{b}{\gamma(b)\,\tau} \qquad (3.3')$$

where $\partial e/\partial b$ is ambiguous and depends on the size of the bribe and its influence on the penalty regime.

The bribes regime may also be altered so that the size of the bribe is directly related to the firm's noncompliance, $b(e)$, and possibly the penalty regime as well, $b(e,\gamma)$, further adding to the above ambiguity. This simple framework can be expanded to incorporate a Nash Equilibrium of the game between an entrepreneur and an imperfectly monitored tax official where the businessman pays the bribe and the official accepts it for not revealing the "dishonest" behavior and levying a penalty (Bilotkach, 2006). But ultimately, the sign, as well as the magnitude, of the effect of bribes to the taxman remains an empirical question. Indeed, even under the most basic assumption as in (3.1'), the impact of bribes is ambiguous.

The empirical challenge is to locate appropriate data where noncompliance and the various features of tax regimes are observed. The next section provides a description of such available data and construction of the variables used to model business evasion.

3.2 Data Sources and Construction of Variables

Data on business noncompliance are obtained from a sample of firms in the 26 transition economies of Central and Eastern Europe and the Former Soviet Union, as well as Turkey. This data, obtained from the 2002 EBRD-World Bank Business Environment and Enterprise Survey (BEEPS) II, consists of 6,667 business entities stratified by country, size, and type of ownership.[9]

The BEEPS survey provides extensive information on the profile of surveyed businesses as well as governance related conditions in which these firms operate. The two critical variables of interest in the BEEPS data are the fraction of sales concealed from tax authorities (e) and the frequency of "unofficial gifts" or bribes for tax purposes, a proxy for b in (3.3').

A number of observations from the sample of 6,667 observations are excluded. For instance, I exclude 927 public enterprises so as to focus on the private sector. As shown in Table 1, the resulting sample consists of 5,740 businesses, of which 1,766 are sole proprietorships, followed by 1,517 partnerships, and 1,508 corporations of which 161 are listed on an exchange. The majority of these entities are in the trade (34 percent) and manufacturing (25 percent) sectors. About 2300 firms reported total sales of under $250,000, and 25 reported sales over $50 million.

The following is a brief description of the key variables of interest in this paper, and their construction:

9 For a description and access to BEEPS visit http://www.ebrd.com/country/sector/econo/surveys/beeps.htm. This data has been used extensively to model the effects of corruption and other aspects of firm behavior in transition economies. See Hellman, Jones, Kaufmann, and Schankerman (2000) and Anderson (2005, 2006) for two of many examples. A similar dataset for Uganda was employed in Svensson (2003).

Evasion: Noncompliance is measured as the fraction of sales concealed. In particular the survey questionnaire asks firm representatives to respond the following question:

Q58. "… what per cent of total annual sales would you estimate the typical firm in your area of business reports for tax purposes?"

The survey poses a non-self-incriminating question on such a delicate issue to elicit the desired information. Obviously a firm observes its own evasion level, and is unlikely to have any direct information on the compliance level of other firms in its line of business. As such the response to the questionnaire is likely to be informed by its own compliance level. Nevertheless, the reported evasion may very well be measured with error. Consequently, it is very important to control for firm attributes such as industry, size, organizational form, among others.

Of the 5,740 observations, 643 (11 percent) respondents failed to answer this question. One estimation option is to exclude observations with missing responses. However, if the nonresponse is endogenous to governance and other variables related to firm behavior, then their exclusion may bias estimates. Instead, these observations are retained and used later to test for potential bias resulting from not controlling for missing values. The conditional average fraction of sales concealed in the sample is 17.7 percent (sd=24.7).

The Tax Regime: Comprehensive data on actual audit and detection rates do not exist. Statutory penalty rates vary from one country to another, and there is no easy way of summarizing and comparing these penalty regimes. Some of these penalties seem to apply at the discretion of tax officials (Himes and Milliet-Einbinder, 1999). Indeed, the conduct of the latter may have much bearing on the efficacy of the detection and penalty regimes. If they are more likely to demand or accept gifts and kickbacks, and share the fruits of tax evasion, then they may very well exacerbate the problem of noncompliance.

The following question is asked in the BEEPS questionnaire:

Q56g: "Thinking now of unofficial payments/gifts that a firm like yours would make in a given year, could you please tell me how often would they make payments/gifts for the following purposes … To deal with taxes and tax collection."

Seven possible answers are reported in the data: (1) never, (2) seldom, (3) sometimes, (4) frequently, (5) usually, (6) always, and (7) missing. The distribution of these responses is provided in Table 1 which shows 2,760 observations with zero gifts, 834 where gifts seldom take place, and as few as 150 where gifts always take place; 401 firms refused to respond.

In addition to tax administration, marginal tax rates potentially play an important role in influencing taxpayer behavior. The marginal tax rate is defined as the maximum statutory profit or corporate tax rate for each country. Conceptually, the effects of such tax rates could be absorbed by country specific effects (dummies) in a cross sectional data, which preempt their use. Fortunately, the survey provides indicators of the profit margin, i.e., the ratio of profits to sales. Hence, the statutory tax rates are set to zero when the firm is not profitable.[10] With a zero tax rate there should not be tax motivated concealments. The sample average tax rate is about 24 percent (sd=0.10).

Ownership and Control: Indicators of organizational choice (question S2a), summarized earlier in Table 1, are employed to account for the degree of control

10 Statutory tax rates are obtained from the IBFD European Tax Handbook, PriceWaterHouse Corporate Taxes – Worldwide Summaries, and various online sources.

owners have over the firm's operations. As an alternative, the nature of the largest shareholders (question Q4a) is also considered. As shown in Table 1, a majority of the firms (3,812) report individuals and family as their largest shareholders. Another 1,154 firms report corporate shareholders, of which 700 are foreign corporations.

Other: Other variables include industrial classification, measured as a fraction of output, total sales for size, which is available as a categorical variable. Country fixed effects is employed to control for cross country differences in tax administration and governance (institutions), culture, and tax morale (Alm and Togler, 2006), as well as unobservable attributes.

4. Empirical Results

4.1 Basic Statistics

Table 2 examines the pattern of evasion by the frequency of gifts. On average, noncompliance rises with the reported frequency of such "bribes." The mean fraction of sales concealed is 12 percent (sd=21) where bribes are reported to never take place. This rises with the frequency of such bribes up to 31 percent (sd=28) when they are reported to "always" take place. Note, however, that the fraction evaded is 18 percent (sd=28) when the indicator for bribes is missing.

Table 3 summarizes the trend in noncompliance by form of organizational choice. For proprietors, the mean concealment rate is 21 percent (sd=26). There is a slight decrease for cooperatives, followed by partnerships and unlisted corporations where the rate is 14 percent (sd=23). For corporations listed on an exchange, the rate drops to an average of 9 percent (sd=20) a pattern consistent with that in Rice (1982).

Table 4 explores the pattern of evasion by the nature of the largest shareholders of the firm. Sales are under reported by 19 percent (sd=25) when an individual/family represents the largest shareholder. Similarly, firms with managers representing the largest shareholders report an understatement of 20 percent (sd=25). This fraction declines to 16 percent (sd=24) for firms with domestic corporate shareholders. For firms with foreign corporations as the largest shareholders, the mean rate is only 11 percent (sd=20), a pattern consistent with that in Joulfaian (2000). In general, it seems organizational choice has significant implications for tax evasion.

The reported evasion also varies by country, as shown in Table 5 for the 27 countries. This highlights the importance of controlling for country specific effects. In particular, the Balkan countries exhibit large gaps in reporting. The year 2001 was particularly a difficult period coming shortly after the wars of the late 1990s.

The statistics reported in Tables 2 through 4 suggest that noncompliance is likely to be greatest in the presence of corrupt tax officials, which may be partly checked by the separation of ownership and control. To shed further light on this relationship and to control for other firm attributes, multivariate analysis estimates are provided below.

4.2 Multivariate Analysis

Tax evasion by its very nature is censored, as not all businesses report or engage in tax evasion. Conceptually, we are interested in modeling the gap in reported sales, e, a latent variable, as:

$$
\begin{aligned}
e^{*} &= \beta' x + \varepsilon \\
e &= 0 \ if \ \ e^{*} \leq 0
\end{aligned}
\tag{4.1}
$$

where x is a set of exogenous variables. However, the presence of missing responses complicates the modeling of compliance, as e is observed only when the firm responds to the survey questionnaire. The firm's participation (or response) is determined by:

$$
\begin{aligned}
z^{*} &= \alpha' v + u \\
z &= 1 \ if \ \ z^{*} > 0 \\
z &= 0 \ if \ \ z^{*} \leq 0
\end{aligned}
\tag{4.2}
$$

with v independent variables. Hence, not controlling for missing values may bias estimates of e in (4.1). However, this should not be a concern if $cov(\varepsilon,u)$=0.

Given the available data, the empirical strategy is to model the participation decision, i.e. the absence of missing values for e, using Probit. Conditional on a positive response, the amount evaded is estimated using a Tobit equation for the fraction under reported. The estimates for this sample selection model are in the spirit of Heckman (1979) extended to the Tobit model setting using FIML (Greene, 1997, pp. 624).

I first begin with the effects of gifts only, and report the results in the left panel of Table 6.[11] The Probit or participation equation is reported in the first column, and the Tobit or evasion level equation in the second column. The Probit equation contains two additional variables or indicators that reflect a degree of openness, comfort with preparing and sharing financial reports, among others, which may influence the response rate but not necessarily the outcome. These are the title or position of the interviewee and a flag for if a firm has engaged outside financial expertise in reviewing its books (questions Q1 and Q74). The former includes (1) president/Chief Executive Officer/Vice President, (2) Owner/proprietor, (3) Partner, (4) Director, (5) General Manager, (6) Manager, (7) and Finance Officer.[12]

The Probit estimates of participation show that the probability of responding to the evasion question rises with the frequency of bribes. In contrast, it is lowest for those who fail to respond to the question related to bribes. Also, firms that engage an outside auditor also seem more likely to respond to the questionnaire. However, the coefficients on the title or position of the interviewee are note precisely measured.

Conditional on responding to the evasion question, the Tobit estimates show that the gap rises with the frequency of bribes. For those who report gifts seldom to take place, the estimated coefficient is positive with a value of 0.22 (se=0.02). This suggests that concealments are 11 percentage points higher compared to the state of gifts never taking place; $\Phi(\gamma)$=0.5. This coefficient rises to 0.38 (se=0.04), suggesting

11 I exclude all 7 firms that have banks as their largest shareholders to aid in the estimation (convergence) below. It is not possible to estimate the generalized Tobit equations (two step criterion and level equations) with industry dummies in the presence of these of observations (no missing values for evasion in case of banks). Including these observations in a standard Tobit, which ignores nonresponses, has no material effect on the findings reported below.

12 The frequency of these positions are 916, 1583, 328, 1155, 435, 487, and 829, respectively.

that the fraction concealed increases by 19 percentage points when gifts are reported to take place regularly.

The value of σ suggests that the Tobit model is appropriate, given the censored nature of reported evasion. Similarly, the estimated correlation (ρ) between the residuals, ε and u, in (4.1) and (4.2) is statistically significant, suggesting a need to control for missing values in the dependent variable.

The second panel of Table 6 augments these estimates with the organizational form of the firm, its tax rate, and other attributes (size, industry, country). There is little change in the estimated coefficients reported earlier for the participation equation, except that ρ is no longer significant. Also, organizational form and the tax rate seem to have little effect. Moving to the evasion equation, the estimated coefficients on gifts change little; the size of concealed sales continues to rise with the frequency of bribes. As for the coefficients on the organizational form of the firm, the estimates point to smaller tax evasion by corporations. This is particularly true for those listed on an exchange, when compared to proprietorships, consistent with the pattern observed in Table 2 and the findings in Rice (1992). The estimated coefficient is -0.04 (se=0.016) for partnerships, followed by an estimate of -0.05 (se=0.02) for closely held or private corporations. This estimate rises, in absolute value, to -0.15 (se=0.04) for the exchange listed corporations, and implies that the fraction evaded by these firms is 7 percentage points smaller than that of proprietorships. The tax rate enters with a positive sign, as implied in (3.3'), with an estimated coefficient of 0.32 (se=0.07). This suggests that the fraction of sales concealed rises by 1.6 percentage points for every 10 percentage point increase in tax rates.[13]

The third or right panel of Table 6 replaces the organizational choice with the underlying nature of the largest shareholders of the firm. Compared to individual/family owners, again less evasion is reported by corporate owners. The estimated coefficient for domestic corporations is -0.03 (se=0.02), which rises in absolute value to -0.11 (se=0.02) for foreign corporations where the concealment fraction is eight percentage points lower. One possible interpretation of this outcome is that corporate governance is less of a problem in the case of foreign owned entities. Another interpretation may point to a greater separation between ownership and control. Regardless, the finding is in harmony with that in Joulfaian (2000) who finds that noncompliance is smaller for foreign owned corporations in the US. Noncompliance by employee owned firms is also smaller, with an estimated coefficient of -0.10 (se=0.03).

4.3 Are Bribes Endogenous?

The observed pattern of bribes to tax officials is potentially endogenous to evasion, and the estimated coefficients on gifts reported above may very well be biased. [14] The challenge here is to find an instrument that captures institutionalized corruption or demand for bribes, controlling for taxpayer specific induced incentives.

13 Value added taxes were also considered (except for Bosnia and Yugoslavia) but discarded as they are highly collinear with country effects.

14 For the sake of curiosity, I swapped the dependent variable and the gifts indicator and estimated an Ordered Probit equation. The estimated coefficient on evasion, now a right hand side variable, is 0.985 (se=0.069), suggesting that bribes rise with evasion; it is difficult to establish the direction of causality between bribes and tax evasion. These estimates are available upon request.

The survey provides a potential candidate for such an instrument. Question 51 of the survey inquires about the possibility of getting corrective treatment from another official or superiors when a government agent acts against the rules without resorting to bribes. More specifically, the survey asks:

Q51: "How often is the following statement true? "If a government agent acts against the rules I can usually go to another official or to his superior and get the correct treatment without recourse to unofficial payments/gifts."

In addition to missing responses, there are six possible answers to this question: (1) never where the firm is unable to find a corrective remedy, (2) seldom, (3) sometimes, (4) frequently, (5) usually, and (6) always where other officials remedy transgressions without resorting to bribes.

Table 7 provides the frequency distribution of the responses to question 51 of the survey, and how evasion varies with these responses. The figures show that noncompliance is greatest when bribes are the only way to get problems resolved (n=976). The fraction of sales concealed declines from a high of 20 percent down to 11 percent when problems are corrected without resorting to bribes (n=349).

The attractiveness of this indicator, sorted in reverse order, is that it is a broad measure of corruption, one that is less specific to tax administration and more likely to be exogenous to the size of tax evasion of a particular firm. However, given its qualitative nature, to instrument the gifts indicator, itself with values that range from 1 (gifts never take place) to 6 (gifts always take place), including missing, is a difficult task.

In order to replicate the earlier estimates of the determinants of evasion, but this time using an instrument for bribes, I first exclude all observations where missing values are reported for concealed sales and gifts. For the reduced sample of 4,802 firms, I reproduce the estimates reported in the center panel of Table 6 in order to explore any potential bias from these deletions. The estimated coefficients on the explanatory variables, reported in the first panel of Table 8, are almost identical to those reported earlier, which is very reassuring. As before, evasion rises with the frequency of gifts. Also evasion is smallest for listed corporations, and rises with tax rates.

Using the reduced sample, I reproduce the above estimates but this time using a linear measure of gifts. In other words, rather than the reported 6 categories, now gifts enters as a continuous variable with values that range from one to 6. To derive an instrument for the linear measure of gifts, I first estimate an ordered probit equation for gifts which is regressed on the exogenous gifts measure of Table 7 and the remaining variables. The latter, however, exclude firm specific variables such as organizational form, tax rate, and size. The predicted probabilities for the six outcomes from the Ordered Probit are correlated with the gifts variable but in no way correlated with firm attributes and behavior. These predicted probabilities are employed as instruments in estimating Tobit IV.

The middle and right panels of Table 8 report estimates that employ the linear measure of gifts, using both standard Tobit and Tobit IV. Beginning with the former, not surprisingly and consistent with the earlier estimates, evasion rises with bribes; the estimated coefficient is 0.07 (se=0.005). While the implications are qualitatively similar to those in the first panel, the quantitative effects are different; concealment increases monotonically by about 3.5 percentage, or $0.07*\Phi(z)$, as the severity of bribes rises. The coefficients on the remaining variables are unaffected.

Moving to the Tobit IV equation in the last panel of table 8 where predicted gifts are used as instruments, the estimated coefficient on gifts is now much larger. In

contrast to the earlier estimate of 0.07 (se=0.005) in the middle panel, the new estimate is 0.27 (se=0.04). In other words, the fraction of output concealed increases by about 13 percentage points as the severity of bribes rises from one category to another, other things equal. The remaining variables are slightly affected, but for the most part retain their qualitative effects.[15]

In a perfect world, the amount or size of bribes to tax officials would have been the ideal measure to test for its endogeneity to tax evasion. Nevertheless, and notwithstanding the less than ideal data available, the above findings suggest that gifts to tax officials are potentially endogenous to noncompliance. Concealing business sales and the severity of bribes do seem to go hand in hand. While not controlling for this potential endogeneity has little effect on the qualitative findings, the effects on the level of noncompliance may very well be biased.

5. Conclusion:

This paper investigates the determinants of business tax evasion with a special emphasis on the role of governance. It employs data from a sample of businesses in 26 transition economies in Europe and the Former Soviet Union and Turkey.[16] The data provide information on the severity of bribes as well as firm and country attributes.

The results suggest that governance, as measured by the frequency of tax related bribes, is a significant determinant of compliance behavior. Basic statistics show that, when compared to tax regimes with no bribes, noncompliance is larger under where bribes are common. Multivariate analyses further confirm these estimates and show that evasion rises with bribes to tax officials. The estimated effects, however, are much larger when the endogeneity of bribes is corrected for. The findings also suggest that organizational choices may have important implications for compliance. Corporations, particularly those listed on an exchange or of foreign nationality, conceal less of their activities than other forms of businesses.

A potential limitation of this paper is its inability to address how particular institutions (e.g. rule of law) or variations in income (e.g. per capita income) affect compliance patterns in the various countries. The presence of country fixed effects preempts the undertaking of such a task. One is tempted to augment the data employed in this paper with surveys from additional years to tease out the changes in institutional settings. The 2005 BEEPS survey, for instance, represents one such opportunity. Unfortunately, this latest survey makes it rather difficult to control for tax rate effects as information on firm profitability is not captured. Because tax evasion is not a serious option for loss-making firms, the survey update is not very useful in addressing tax evasion and its determinants.

15 The organizational form was replaced with the nature of the largest shareholder, as in the right panel of Table 6. The findings on bribes remain invariant to this specification. These estimates are not reproduced here in the interest of space, but are available upon request.

16 Excluding Turkey and limiting the sample to transition economies does not alter the findings.

References

Allingham, M. G. and Agnar Sandmo (1972). "Income Tax Evasion: A Theoretical Analysis," Journal of Public Economics, **1(3/4)**, 323-338.

Alm, James and Benno Torgler (2006). "Culture Differences and Tax Morale in the United States and in Europe," Journal of Economic Psychology **27(2)**, 224-246.

Anderson, John E. (2005). "Fiscal Reform and its Firm-Level Effects in Eastern Europe and Central Asia," William Davidson Institute Working Paper No. 800.

Anderson, John E. (2006). "Tax Bribes in Transition Countries," Department of Economics, University of Nebraska, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=943051.

Bilotkach, Volodymyr (2006). "A Tax Evasion - Bribery Game: Experimental Evidence from Ukraine," European Journal of Comparative Economics **3(1)**, 31-49.

Chen, Kong-Pin and C. Y. Cyrus Chu (2005). "Internal Control and External Manipulation: A Model of Corporate Income Tax Evasion," RAND Journal of Economics **26**, 151-164.

Clotfelter, Charles T. (1983). "Tax Evasion and Tax Rates: An Analysis of Individual Returns, " The Review of Economics and Statistics **65(3)**, 363-373.

Cowell, Frank A. (2004). "Carrots and Sticks in Enforcement," in Henry J Aaron and Joel Slemrod (eds.), Crisis in Tax Administration, 230-58. Washington, DC: The Brookings Institution.

Cowell, Frank A. (1990). Cheating the Government: The Economics of Evasion. Cambridge, Massachusetts: The MIT Press.

Cremer, Helmuth, and Firouz Gahvari (1993). "Tax Evasion and Optimal Commodity Taxation," Journal of Public Economics **50(2)**, February, 261-75.

Crocker, Keith J. and Joel Slemrod (2005). "Corporate Tax Evasion with Agency Costs," Journal of Public Economics **89(9-10)**, 1593-1610.

Desai, Mihir A. (2005). "The Degradation of Reported Corporate Profits," Journal of Economic Perspectives **19(4, Fall)**, 171-192.

Gorodnichenkoa, Yuriy and Klara Sabirianova Peter (2007). "Public sector pay and corruption: Measuring bribery from micro data," Journal of Public Economics **91**, 963-991.

Greene, William H. (1995). Limdep Version 7.0. User's Manual. Bellport, NY: Econometric Software Inc.

Heckman, James J. (1979). "Sample Selection Bias as a Specification Error", Econometrica, **47(1)**, 153-161.

Hellman, Joel S., Jones, Geraint, Kaufmann, Daniel, and Schankerman, Mark (2000). "Measuring Governance, Corruption, and State Capture: How Firms and Bureaucrats Shape the Business Environment in Transition Economies," The World Bank, Policy Research Working Paper Series No. 2312.

Himes, Susan and Martine Milliet-Einbinder (1999). "Russia's Tax Reform," OECD Observer, 215, January, http://www1.oecd.org/publications/observer/215/e-himes.htm

Hindriks, Jean, Michael Keen, and Abhinay Muthoo (1999). "Corruption, Extortion and Evasion," Journal of Public Economics **74(3)**, 395-430.

Johnson, Simon, Daniel Kaufman, John McMillan, and Christopher Woodruff (2000). "Why Do Firms Hide? Bribes and Unofficial Activity after Communism," Journal of Public Economics **76(3)**, 495-520.

Joulfaian, David (2000). "Corporate Income Tax Evasion and Managerial Preferences," Review of Economics and Statistics **82(4)**, November, 698-701.

Joulfaian, David and Mark Rider (1998). "Differential Taxation and Tax Evasion by Small Business," National Tax Journal **51(4)**, December, 675-87.

Kreutzer, David and Dwight R. Lee (1986). "On Taxation and Understated Monopoly Profits," National Tax Journal, 241-243.

Kreutzer, David and Dwight R. Lee (1988). "Tax Evasion and Monopoly Output Decisions: A Reply, " National Tax Journal, 583-584.

Marrelli, Massimo (1984). "On Indirect Tax Evasion," Journal of Public Economics, **25**, 181-196.

Marrelli, Massimo and Ricardo Martina (1988). "Tax Evasion and Strategic Behavior of the Firms," Journal of Public Economics, **37**, 55-69.

Rice, Eric M. (1992). "The Corporate Tax Gap: Evidence on Tax Compliance by Small Corporations," in Joel Slemrod (ed.), Why People Pay Taxes. Ann Arbor: University of Michigan.

Slemrod, Joel (1992). Why People Pay Taxes. Ann Arbor: University of Michigan.

Svensson, Jakob (2003). "Who Must Pay Bribes and How Much? Evidence from a Cross-Section of Firms," Quarterly Journal of Economics, **118(1)**, February.

Viramin, Arvind (1989) "Indirect Tax Evasion and Production Efficiency," Journal of Public Economics, **39(2)**, July, 223-37.

Wang, Leonard F. S. and John L. Conant (1988). "Corporate Tax Evasion and Output Decisions of the Uncertain Monopolist," National Tax Journal, **December**, 579-581.

Yaniv, Gideon (1996). "Tax Evasion and Monopoly Output Decisions: Note," Public Finance Quarterly **24(4)**, October, 501-05.

Appendix

Table 1. Summary Statistics for Select of Variables

Variable	Sample		Sample when Evasion is Not Missing	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**
Sales Evaded (%)	--	--	17.72	24.68
Tax Rate (%)	23.67	9.84	23.78	9.39
Mining (%)	0.78	8.15	0.81	8.30
Construction (%)	11.64	30.66	11.78	30.80
Manufacturing (%)	24.77	40.35	24.77	40.33
Transportation (%)	6.29	23.32	6.27	23.26
Trade (%)	34.02	44.37	34.37	44.47
Business Services (%)	9.58	28.38	9.24	27.90
Hotels and restaurants (%)	7.18	25.15	7.12	25.05
Other (%)	5.76	21.67	5.63	21.47
Observations	5,740		5,097	
Number of Observations by Gift Frequency				
Never	2,763		2,445	
Seldom	836		763	
Sometimes	800		729	
Frequently	498		455	
Usually	252		236	
Always	190		181	
Not Reported	401		288	
Number of Observations by Organizational Form				
Sole Proprietorship	1,981		1,766	
Partnership	1,714		1,517	
Cooperative	143		121	
Corporation, privately held	1,524		1,347	
Corporation, listed on an exchange	184		161	
Other	194		185	
Number of Observations by Largest Shareholders				
Individual/Family	3,812		3,374	
Domestic corporation	453		405	
Foreign Corporation	700		629	
Banks	7		7	
Investment fund	32		27	
Managers	191		174	
Employees	213		186	
Government	25		22	
Other	34		30	
Mixed	134		122	
Not Reported	139		121	
Number of Observations by Sales ($000s)				
>	250	2,305	2,088	
250 >	500	564	522	
500 >	1,000	424	386	
1,000 >	2,000	332	303	
2,000 >	5,000	286	249	
5,000 >	10,000	127	108	
10,000 >	20,000	90	83	
20,000 >	50,000	52	48	
50,000	and over	25	22	
Not Reported		1,535	1,288	

Table 2. Fraction of Sales Concealed by Frequency of Bribes to Tax Officials

	Variable	Mean	Std. Dev.	n
1	Never	0.12	0.21	2,445
2	Seldom	0.21	0.25	763
3	Sometimes	0.21	0.24	729
4	Frequently	0.28	0.27	455
5	Usually	0.31	0.27	236
6	Always	0.31	0.28	181
7	Not Reported	0.18	0.28	288
	Total	0.18	0.25	5,097
	Missing	--	--	643

Table 3. Fraction of Sales Concealed by Organizational Form

	Variable	Mean	Std. Dev.	n
1	Sole Proprietor	0.21	0.26	1766
2	Partnership	0.18	0.25	1517
3	Cooperative	0.15	0.24	121
4	Corporation, privately held	0.14	0.23	1347
5	Corporation, listed on an exchange	0.09	0.20	161
6	Other	0.15	0.21	185
	Total	0.18	0.25	5097
	Missing	--	--	643

Table 4. Fraction of Sales Concealed by Type of Largest Shareholders

	Variable	Mean	Std. Dev.	n
1	Individual/Family	0.19	0.25	3,374
2	Domestic corporation	0.16	0.24	405
3	Foreign corporation	0.11	0.20	629
4	Banks	0.16	0.18	7
5	Investment fund	0.21	0.32	27
6	Managers	0.20	0.25	174
7	Employees	0.13	0.24	186
8	Government	0.17	0.27	22
9	Other	0.09	0.19	30
10	Mixed	0.15	0.23	122
11	Not reported	0.22	0.28	121
	Total	0.18	0.25	5,097
	Missing	--	--	643

Table 5. Fraction of Sales Concealed and Tax Rates, by Country

Country	Mean	Std. Dev.	Tax Rate	Statutory Tax Rate	N
Albania	0.25	0.23	0.248	0.250	147
Armenia	0.09	0.17	0.162	0.200	130
Azerbaijan	0.15	0.25	0.229	0.270	127
Belarus	0.10	0.18	0.231	0.240	202
Bosnia	0.33	0.34	0.258	0.300	130
Bulgaria	0.17	0.23	0.185	0.200	179
Croatia	0.13	0.18	0.175	0.200	117
Czech Republic	0.11	0.17	0.285	0.310	202
Estonia	0.08	0.13	0.295	0.350	117
Macedonia	0.37	0.30	0.138	0.150	158
Georgia	0.39	0.28	0.174	0.200	144
Hungary	0.12	0.20	0.167	0.180	204
Kazakhstan	0.17	0.26	0.235	0.300	186
Kyrgyzstan	0.26	0.29	0.245	0.300	118
Latvia	0.14	0.22	0.202	0.250	132
Lithuania	0.16	0.25	0.123	0.150	151
Moldova	0.23	0.25	0.267	0.280	141
Poland	0.11	0.18	0.234	0.280	399
Romania	0.15	0.20	0.243	0.250	200
Russia	0.19	0.25	0.305	0.350	368
Slovakia	0.14	0.19	0.272	0.290	115
Slovenia	0.19	0.29	0.208	0.250	137
Tajikistan	0.29	0.30	0.291	0.300	126
Turkey	0.17	0.21	0.316	0.330	432
Ukraine	0.16	0.27	0.281	0.300	365
Uzbekistan	0.10	0.21	0.243	0.260	210
Yugoslavia	0.26	0.30	0.131	0.140	160
Total	0.18	0.25	0.237	0.264	5,097
Missing	--	--	0.228	0.262	643

Table 6. Determinants of Tax Evasion[a] (Probit Equation for Survey Response, Followed by a Tobit Equation for Evasion)

	(1)				(2)				(3)			
	Participation Equation		Evasion Equation		Participation Equation		Evasion Equation		Participation Equation		Evasion Equation	
Variable	**Coefficient**	**s.e**	**Coefficient**	**s.e**	**Coefficient**	**s.e**	**Coefficient**	**s.e**	**Coefficient**	**s.e**	**Coefficient**	**s.e**
Constant	1.1108*	0.0660	-0.1673*	0.0185	0.8548*	0.1426	0.0971	0.0549	0.8003*	0.1398	0.0869	0.0559
Gifts (Never excluded)												
2. Seldom	0.1595*	0.0692	0.2235*	0.0196	0.1552*	0.0731	0.1844*	0.0178	0.1558*	0.0731	0.1829*	0.0179
3. Sometimes	0.1611*	0.0703	0.2342*	0.0209	0.1564*	0.0759	0.1832*	0.0189	0.1605*	0.0760	0.1813*	0.0191
4. Frequently	0.1690*	0.0863	0.3290*	0.0244	0.1229	0.0937	0.2441*	0.0221	0.1178	0.0938	0.2419*	0.0223
5. Usually	0.3333*	0.1278	0.3765*	0.0334	0.3111*	0.1369	0.2929*	0.0302	0.3199*	0.1373	0.2902*	0.0302
6. Always	0.4803*	0.1597	0.3771*	0.0371	0.4832*	0.1694	0.2777*	0.0349	0.4846*	0.1692	0.2797*	0.0351
7. Missing	-0.6255*	0.0737	0.0563**	0.0290	-0.5461*	0.0794	0.0365	0.0338	-0.5475*	0.0794	0.0384	0.0342
Organizational Form												
2. Partnership	--	--	--	--	-0.1063	0.0674	-0.0418*	0.0158	--	--	--	--
3. Cooperative	--	--	--	--	-0.1787	0.1477	-0.0035	0.0391	--	--	--	--
4. Private corporation	--	--	--	--	-0.0564	0.0751	-0.0483*	0.0172	--	--	--	--
5. Listed corporation	--	--	--	--	0.0430	0.1459	-0.1452*	0.0382	--	--	--	--
6. Other	--	--	--	--	0.0974	0.1902	-0.0667**	0.0373	--	--	--	--
Largest Shareholders												
2. Domestic corporation	--	--	--	--	--	--	--	--	0.0549	0.0924	-0.0293	0.0219
3. Foreign corporation	--	--	--	--	--	--	--	--	0.0517	0.0800	-0.1072*	0.0196
5. Investment fund	--	--	--	--	--	--	--	--	0.0694	0.2876	-0.0059	0.0616
6. Managers	--	--	--	--	--	--	--	--	0.0268	0.1438	0.0256	0.0327
7. Employees	--	--	--	--	--	--	--	--	-0.0853	0.1214	-0.0955*	0.0306
8. Government	--	--	--	--	--	--	--	--	-0.0263	0.3488	-0.0785	0.0724
9. Other	--	--	--	--	--	--	--	--	-0.0554	0.3028	-0.1251	0.0794
10. Mixed	--	--	--	--	--	--	--	--	0.1886	0.1631	-0.0741	0.0408
11. Missing	--	--	--	--	--	--	--	--	0.2206	0.1523	-0.0305	0.0405
Tax Rate	--	--	--	--	0.2046	0.2695	0.3155*	0.0723	0.2275	0.2697	0.3118*	0.0722
Title of Interviewee												
2. Owner/proprietor	0.0121	0.0706	--	--	-0.0075	0.0808	--	--	0.0159	0.0792	--	--
3. Partner	0.1629	0.1146			0.1923	0.1257	--	--	0.1700	0.1252		
4. Director	0.0379	0.0750			0.0945	0.0808	--	--	0.0939	0.0809		
5. General Manager	-0.1128	0.0953	--	--	-0.0219	0.1021	--	--	-0.0284	0.1023	--	--
6. Manager	-0.0751	0.0920	--	--	-0.0095	0.0990	--	--	-0.0205	0.0992	--	--
7. Finance Officer	0.1195	0.0831	--	--	0.1865*	0.0891	--	--	0.1778*	0.0894	--	--
Outside Auditor	0.1361*	0.0460	--	--	0.0813	0.0515	--	--	0.0775	0.0518	--	--
σ	--	--	0.4183*	0.0124	--	--	0.3637*	0.0090	--	--	0.3637*	0.0092
ρ (1,2)	--	--	0.6348*	0.2382	--	--	-0.2435	03454	--	--	-0.2474	03495
Observations	5,733		5,090		5,733		5,090		5,733		5,090	

a Estimates in second and third panel include industry, size and country control variables.
** Significant at the 5 percent level, ** at 10 percent level.*

Table 6A. Determinants of Tax Evasion: Country Effects (From Panels 2 and 3 in Table 6)

	Participation Equation			Evasion Equation			Participation Equation			Evasion Equation		
Country	**Coefficient**	**s.e**		**Coefficient**	**s.e**		**Coefficient**	**s.e**		**Coefficient**	**s.e**	
Albania	0.7914	0.2319	*	-0.1305	0.0565	*	0.7899	0.2325	*	-0.1183	0.0575	*
Armenia	0.5823	0.1923	*	-0.3065	0.0549	*	0.5784	0.1918	*	-0.2925	0.0552	*
Azerbaijan	0.2341	0.1734		-0.2901	0.0478	*	0.2378	0.1733		-0.2819	0.0481	*
Belarus	1.0295	0.2351	*	-0.2975	0.0544	*	1.0163	0.2344	*	-0.2926	0.0546	*
Bosnia	0.0047	0.1604		-0.0030	0.0409		-0.0069	0.1631		-0.0096	0.0417	
Bulgaria	-0.0097	0.1478		-0.1662	0.0424	*	0.0011	0.1477		-0.1709	0.0424	*
Croatia	-0.2138	0.1560		-0.1860	0.0503	*	-0.2761	0.1539	**	-0.2080	0.0507	*
Czech Republic	0.2559	0.1537	**	-0.2254	0.0482	*	0.2353	0.1525		-0.2395	0.0483	*
Estonia	-0.0628	0.1760		-0.2655	0.0575	*	-0.1025	0.1722		-0.2573	0.0568	*
FYROM	1.0487	0.2116	*	0.1522	0.0558	*	1.0167	0.2105	*	0.1512	0.0559	*
Georgia	0.9993	0.2716	*	0.0680	0.0573		0.9736	0.2714	*	0.0723	0.0578	
Hungary	0.1950	0.1521		-0.1604	0.0431	*	0.1333	0.1491		-0.1677	0.0428	*
Kazakhstan	0.1253	0.1572		-0.2348	0.0423	*	0.0938	0.1567		-0.2285	0.0423	*
Kyrgyz Rep.	-0.2070	0.1648		-0.1611	0.0442	*	-0.2268	0.1652		-0.1460	0.0444	*
Latvia	0.3785	0.1866	*	-0.1783	0.0515	*	0.3143	0.1832	**	-0.1738	0.0508	*
Lithuania	0.1887	0.1710		-0.1100	0.0452	*	0.1927	0.1687		-0.1271	0.0457	*
Moldova	0.6408	0.2223	*	-0.1499	0.0531	*	0.6537	0.2205	*	-0.1527	0.0536	*
Poland	0.5482	0.1399	*	-0.2291	0.0432	*	0.5347	0.1399	*	-0.2294	0.0440	*
Romania	0.4152	0.1748	*	-0.1779	0.0484	*	0.4323	0.1657	*	-0.2048	0.0478	*
Russia	0.0171	0.1373		-0.1924	0.0380	*	-0.0316	0.1341		-0.1954	0.0376	*
Slovak Republic	-0.1689	0.1664		-0.1934	0.0533	*	-0.1642	0.1637		-0.2072	0.0525	*
Slovenia	-0.2248	0.1576		-0.0562	0.0423		-0.2450	0.1575		-0.0557	0.0427	
Tajikistan	0.2320	0.1923		-0.1539	0.0484	*	0.2019	0.1926		-0.1475	0.0486	*
Turkey	0.7401	0.1618	*	-0.1592	0.0486	*	0.7417	0.1596	*	-0.1726	0.0486	*
Ukraine	0.3692	0.1484	*	-0.2882	0.0413	*	0.3610	0.1468	*	-0.2858	0.0414	*
Uzbekistan	0.4513	0.1761	*	-0.3705	0.0466	*	0.4358	0.1763	*	-0.3555	0.0469	*

*Significant at the 5 percent level, ** at 10 percent level.*

Table 7. Fraction of Sales Concealed by Possibility of Corrective Action without Bribes

	Outcome	Mean	Std. Dev.	n
1	Never Possible	0.202	0.265	976
2	Seldom	0.199	0.253	1,175
3	Sometimes	0.179	0.245	1,294
4	Frequently	0.172	0.246	519
5	Usually	0.135	0.216	508
6	Always Possible	0.110	0.199	349
7	Missing/No Response	0.163	0.251	269
	Total	0.177	0.247	5,090
	Missing	--	--	643

Note: The seven indicators above are the responses to the survey question:

How often is the following statement true? "If a government agent acts against the rules I can usually go to another official or to his superior and get the correct treatment without recourse to unofficial payments/gifts."

Table 8. Determinants of Tax Evasion [a]

Variable	Tobit		Tobit		Tobit IV	
	Coefficient	s.e.	Coefficient	s.e.	Coefficient	s.e.
Constant	-0.0501	0.0489	0.0841	0.0500**	-0.7034	0.1444*
Gifts (Never =1 excluded)						
2. Seldom	0.1996	0.0175**	--	--	--	--
3. Sometimes	0.2000	0.0180*	--	--	--	--
4. Frequently	0.2667	0.0216*	--	--	--	--
5. Usually	0.3149	0.0282*	--	--	--	--
6. Always	0.2940	0.0317*	--	--	--	--
Gifts (linear)	--	--	0.0733	0.0046*	0.2668	0.0415*
Organizational Form						
2. Partnership	-0.0407	0.0168*	-0.0427	0.0169*	-0.0328	0.0199**
3. Cooperative	-0.0058	0.0419	-0.0043	0.0420	0.0442	0.0499
4. Private corporation	-0.0488	0.0187*	-0.0490	0.0187*	-0.0394	0.0219**
5. Listed corporation	-0.1494	0.0417*	-0.1513	0.0417*	-0.1276	0.0480*
6. Other	-0.0709	0.0370**	-0.0672	0.0371**	-0.0679	0.0435
Tax Rate	0.3875	0.0793*	0.4018	0.0795**	0.3482	0.0921*
σ	0.3759	0.0059*	0.3753	0.0059*	0.3766	0.0060*
Wald test: $\chi^2(1)$ [p-val] [b]	--	--	--	--	16.53 [0.000]	
LL	-2586.1		-2589.4		-10692.7	
Observations	4,802		4,802		4,802	
Positive Observations	2,448		2,448		2,448	

a Estimates control for industry, size and country.
b Bribes indicator is endogenous to evasion.
** Significant at the 5 percent level, ** at 10 percent level.Reply to Comments on "Bribes and Business Tax Evasion"*