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Corruption and Firm Tax Evasion in Transition Economies: Results from Censored Quantile Instrumental Variables Estimation

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Abstract This study examines the relationship between firm-level tax evasion and corruption. The literature has considered the corruption-firm tax evasion nexus to some extent, however, the heterogeneous impact of bribes on tax evasion has been largely ignored. We posit that the impact of bribes on tax evasion is conditional on the prevalence of tax evasion. Using firm-level information from the Business Environment and Enterprise Performance Survey (BEEPS) across 25 transition economies for the years 2002 and 2005, we estimate the heterogeneous impact of bribes on tax evasion using the censored quantile instrumental variables technique. The results show that corruption has a larger impact when tax evasion is more widespread. Among other results, firm-level characteristics also show heterogeneous effects across the conditional distribution of tax evasion. In terms of the policy implications, the results suggest that policies that focus on reducing the tax burden and controlling corruption will be more effective when tax evasion is more prevalent.

Keywords Corruption · Firm-level tax evasion · Transition economies · Censored quantile instrumental variables

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Introduction

The abuse of power by public officials for private gain characterizes corrupt behavior, whereas the intended and illegal actions by individuals or firms to avoid their legal tax obligations is considered tax evasion. Indeed, some may argue that corruption and tax evasion are to some extent reinforcing behaviors at the intersection of the willingness of governmental tax administration to accept bribes and the propensity to evade taxes (Tanzi and Davoodi 2001; Alm et al. 2016). Seminal work by Rose-Ackerman (1978, 1999); Shleifer and Vishny (1993); Bardham (1997); Jain (2001); Tanzi and Davoodi (2001); Svensson (2005); and Banerjee et al. (2012); among others, highlights the causes and consequences of corruption. Likewise, Allingham and Sandmo (1972); Clotfelter (1983); Cowell (1990); Andreoni et al. (1998); Slemrod and Yitzhaki (2002); Sandmo (2005); and Alm (2012) are representative of the literature on the motives and policy implications associated with tax evasion.

There is a fairly large literature showing that tax evasion is quite prevalent among transition economies in particular (e.g., Martinez-Vazquez and McNab 2000; Alm and Martinez-Vazquez 2003; Alon and Hageman 2013). As noted by Abdixhiku et al. (2017), transition economies encounter a number of institutional, behavioral, and cultural challenges in moving from a more centralized planning model to a market-oriented structure. Within the centralized planning model, tax collection was not an issue as the government garnered the profits and taxes of state-owned enterprises, in turn providing public goods and social services. On the other hand, the move towards a market-oriented structure requires the development of new institutions, the creation of market mechanisms, and changes in the legal and judicial system while at the same time managing the same demands for public goods and social services. This shift in the economic system also requires citizens to gain trust in the role of government within a market-oriented structure. In this regard, transition economies provide a unique perspective on the determinants of tax evasion and the role of corruptive behavior (Blakes 1991).

More specific to firm-level tax evasion and corruption, Bilotkach (2006) demonstrated, within a game theoretical framework and verified in an experimental setting, the conditions under which tax evasion and bribery permeate an economy. Goerke (2008) presented a theoretical model illustrating that tax evasion and corruption are related to the extent that the substitution of corruption expenses for expenditures associated with legal actions can influence the costs of tax evasion. Using a two-agent model (firms and tax inspectors), Cule and Fulton (2005) revealed that though higher profits and tax obligations result in more tax evasion and greater corruption, the enhanced auditing of firms and assessment of greater penalties reduces evasion only when both tax evasion and corruption reside at low levels. On the other hand, if tax evasion and corruption are pervasive, then enhanced auditing and greater penalties will lead to more tax evasion and corruption.

With respect to the empirical literature on the relationship between corruption and tax evasion, especially at the firm level, research on this front is quite limited. Using firm-level survey data compiled from five Eastern European countries, Johnson et al. (2000) found a significant relationship between bureaucratic corruption and the underreporting of sales by firms. In a comprehensive study of 69 countries, Friedman et al. (2000) argued that the tendency of firms to operate in the shadow economy does

not necessarily reflect their desire to evade taxes, but minimizes their exposure to excessive bureaucracy and corruption. Joulfain (2009) used the 2002 Business Environment and Enterprise Performance Survey (BEEPS) (2019) data associated with transition economies to show that bribes to tax officials influence business tax evasion.

Nur-tegin (2008) examined the determinants of business tax evasion using Heckman's two-stage estimation procedure applied to the 2002 BEEPS data for 23 transition economies, and found that the extent of corruption was a key component in limiting tax evasion. Alm et al. (2016) investigated the interaction between corruption and firm tax evasion for 32 countries using the BEEPS data. Through the use of instrumental variables and propensity-match scoring methods, Alm et al. (2016) found that corruption among tax officials reduced the amount of sales reported for tax purposes (i.e. tax evasion). Along these lines, Abdixhiku et al. (2017) employed data from the 2002 and 2005 BEEPS related to transition economies and showed there was a positive relationship between perceived tax burden and firm tax evasion. Moreover, the results also indicated a positive and statistically significant relationship between corruption and tax evasion at the firm level.

This study contributes to the emerging literature on the relationship between corruption and firm-level tax evasion by addressing the heterogeneity of corruption's impact across the conditional distribution of tax evasion. Countries with a deeply-rooted culture of evasive behavior may possess unique institutional and cultural aspects that lead to disparate determinants of tax evasion. For example, in countries with a lower prevalence of tax evasion, such behavior might be confined to a few sectors, whereas with widespread tax evasion, most sectors likely participate in evasive behavior (Goel and Saunoris 2016). Therefore, to account for this heterogeneity, the censored quantile instrumental variables (CQIV) technique was utilized (Chernozhukov et al. 2015). Unlike previous studies, the CQIV approach permits estimation of the impact of bribery across the conditional distribution of tax evasion. In contrast to mean estimates, CQIV estimates are impervious to extreme values or outliers. Furthermore, the CQIV technique addresses the endogeneity of bribery through instrumental variables as well as censoring non-parametrically.

Data, Model Specification, and Methodology

Data are based on survey responses from firms in 25 countries characterized in large measure as transition economies within Eastern Europe and Central Asia. All 25 were included in the analysis (Table 1). The BEEPS (European Bank for Reconstruction and Development 2019) is comprised of several survey rounds: 1999–2000, 2002, 2005, 2008–2009, and 2011–2014. Due to the variation in questions across surveys, our attention focused on the 2002 and 2005 surveys to align comparable questions. The 2002 and 2005 surveys included 6667 and 9961 firms, respectively, across 25 countries in Eastern Europe and Central Asia. Table 2 lists the survey questions and corresponding variable definitions.

The main dependent variable of interest was tax evasion (*TaxEvasion*), constructed from the following BEEPS question (Table 2): "Recognizing the difficulties that many firms face in fully complying with taxes and regulations, what percentage of total annual sales would you estimate the typical firm in your area of business reports for tax

Table 1 List of countries in the CQIV analysis

Albania	Georgia	Slovak Republic
Armenia	Hungary	Slovenia
Azerbaijan	Kazakhstan	Tajikistan
Belarus	Kyrgyz Republic	Ukraine
Bosnia and Herzegovina	Latvia	Uzbekistan
Bulgaria	Lithuania	
Croatia	Moldova	
Czech Republic	Poland	
Estonia	Romania	
FYR Macedonia*	Russia	

* includes only 2005 BEEPS (European Bank for Reconstruction and Development 2019)

purposes?" This number was then subtracted from 100 to ascertain the perceived level of tax evasion.[1] This question has been used by others to measure tax evasion (e.g., Alm et al. 2016). According to these data, approximately 39% of the firms sampled reported some level of tax evasion. The main independent variable was a measure of corruption (*Bribery*) based on the following question: "On average, what percent of total annual sales do firm's like yours typically pay in unofficial payments/gifts to public officials?"

Of course, other factors contribute to the severity of tax evasion (e.g. institutional and firm-specific aspects), thus were broadly controlled for in the tax environment and firm characteristics paralleling Alm et al. (2016) and Adbixhiku et al. (2017). More specifically, the analysis included a measure of tax burden (*TaxBurden*) to capture the perceived level of difficulty that taxes impose on business operations, and tax compliance (*TaxComp*), measured by the percent of senior management devoted to dealing with public officials. The perception of higher tax burden and compliance costs increased the likelihood of evading taxes among firms (Nur-tegin 2008; Alm and McClellan 2012; Abdixhiku et al. 2017).

Firm characteristics such as size, legal status, industry, and ownership were controlled for. Firm size was separated into three categories (small, medium and large) based on the number of employees. The modeling included dummy variables for medium and large firms, leaving small firms as the base case. Conceivably, smaller firms can more easily escape detection and hide funds from authorities (Nur-tegin 2008; Abdixhiku et al. 2017). Legal status included sole-proprietors, partnerships, and other. Sole-proprietors tend to have a higher propensity to evade taxes relative to other forms of ownership (Slemrod 2007). Dummy variables were included for sole-proprietors and partnerships with the base case being other. Firms with more trust in their government, in order to obtain important information related to laws and regulations are less likely to evade taxes, therefore a measure was included for trust in the government (Abdixhiku et al. 2017). Ownership of the firm, whether domestic or foreign, also may affect a firm's decision to evade taxes. Thus, a dummy variable

[1] Notice that the phrasing of the question on tax evasion and bribery refers to a typical firm as opposed to your firm, which should help mitigate, at least to some degree, concerns of dishonesty.

Table 2 Survey question and variable descriptions for each variable in the CQIV analysis

Variable	Description	Survey question
BribeCON	Bribery measured as unofficial payments to obtain government contracts.	Q56C (Q41C). "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 obtain government contracts" 1 Never 2 Seldom 3 Sometimes 4 Frequently 5 Usually 6 Always
BribeLIC	Bribery measured as unofficial payments to obtain licenses and permits.	Q56B (Q41B). "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 obtain business licenses and permits" 1 Never 2 Seldom 3 Sometimes 4 Frequently 5 Usually 6 Always
BribePUB	Bribery measured as unofficial payments to obtain public services.	Q56A (Q41A). "Thinking now of unofficial payments/gifts that a firm like yours make in a given year, could you please tell me how often would they make payments/gifts for the following purposes… To get connected to and maintain public services (electricity and telephone)" 1 Never 2 Seldom 3 Sometimes 4 Frequently 5 Usually 6 Always
Bribery	Bribery measured as the percent of annual sales.	Q55 (Q40). "On average, what percent of total annual sales do firms like yours typically pay in unofficial payments/gifts to public officials?"
Construct *Hotel* *Mining* *Manuf* *RealEst* *Transport* *WholeRetail*	Industry dummy. For each industry the variable is equal to one and zero otherwise.	S3 (S3). "How would you best describe your firm's main area of activity in terms of annual sales?" Mining and quarrying Construction Manufacturing Transport and retail trade; repair of motor vehicle, motorcycles and personal and household goods Real estate, renting and business services Hotels and restaurants Other services
Foreign	Percentage of foreign ownership of the firm.	S4C1 (S5B). "What percentage of your firm is owned by: Private foreign individual(s)/company(s)/organization(s)?"
GovTrust	Sharing of information on laws and regulations	Q46a (Q34a). "To what degree do you agree with the following statements?... Information on the laws and regulations affecting my firm is easy to obtain." 1 Strongly disagree 2 Disagree in most cases

Table 2 (continued)

Variable	Description	Survey question
		3 Tend to disagree 4 Tend to agree 5 Agree in most cases 6 Strongly agree
Large	Size of the firm measured by the number of employees, Large firm 250–9999.	S2A2 (S4B). "How many full-time employees work for this company today?" Small firm 2–49 Medium firm 50–249 Large firm 250–9999
Medium	Size of the firm measured by the number of employees, Medium firm 50–249.	S2A2 (S4B). "How many full-time employees work for this company today?" Small firm 2–49 Medium firm 50–249 Large firm 250–9999
Partner	Legal status as partnership.	S2A (S2A). "What is the legal status of this company?" 1 Single proprietorship 2 Partnership 3 Cooperative 4 Corporation, privately held 5 Corporation listed on a stock exchange 6 Other private sector 7 State/municipal/district-owed enterprise 8 Corporatized state-owned enterprise 9 Other state owned
SoleProp	Legal status as a sole proprietor.	S2A (S2A). "What is the legal status of this company?" 1 Single proprietorship 2 Partnership 3 Cooperative 4 Corporation, privately held 5 Corporation listed on a stock exchange 6 Other private sector 7 State/municipal/district-owed enterprise 8 Corporatized state-owned enterprise 9 Other state owned
TaxBurden	Perceived degree of tax burden.	Q80G (Q54H). "Can you tell me how problematic are these different factors for the operation and growth of your business…Tax Rates?" 1 no obstacle 2 minor obstacle 3 moderate obstacle 4 major obstacles
TaxComp	Tax compliance cost measured as the percent of senior management time.	Q50 (Q35A). "What percent of senior management's time over the last 12 months was spent in dealing with public officials about the application and interpretation of laws and regulations and to get or to maintain access to public services?"
TaxEvasion	100 minus the percent of sales that are reported for tax purposes.	Q58 (Q43A). "Recognizing the difficulties that many firms face in fully complying with taxes and regulations, what percentage of total annual sales would you estimate the typical firm in your area of business reports for tax purposes?"

Sources: Variables are from the BEEPS 2002 and BEEPS 2005 surveys with each question preceded by the corresponding variable name (2005 question number in parentheses) BEEPS (European Bank for Reconstruction and Development 2019)

was included for whether a firm was foreign-owned or not (Joulfain 2009; Alm et al. 2016; Abdixhiku et al. 2017). Finally, to account for industry-specific aspects of tax evasion, an industry dummy variable was included for mining, construction, manufacturing, transportation, wholesale and retail, real estate, and hotel and restaurants (Joulfain 2009; Abdixhiku et al. 2017). Table 3 reports the summary statistics associated with the variables described.

To determine the effect of corruption on tax evasion, the following regression model was specified:

$$TaxEvasion_{ijt} = \beta_0 + \beta_1 Bribery_{ijt} + \beta_2 TaxBurden_{ijt} + \beta_3 TaxComp_{ijt} + \gamma X^{k}_{ijt} + \varepsilon_{ijt} \quad (1)$$

where *i*, *j*, and *t* index the firm, country and year, respectively. The CQIV technique was used to estimate the model (Chernozhukov et al. 2015). The main advantage of the CQIV estimation technique is that it permits estimation of the impact of bribery across the conditional distribution of tax evasion. Moreover, the CQIV technique controls for the endogeneity of bribery by using instrumental variables, not to mention handles censoring non-parametrically.

CQIV is a conditional quantile estimator developed by Chernozhukov et al. (2015) that combines Powell's (1986) censored quantile regression (CQR) and the control variable approach (Hausman 1978) to address censoring and endogeneity,

Table 3 Summary statistics of the variables in the CQIV analysis

Variable	Observations	Mean	Median	Standard Deviation	Minimum	Maximum
TaxEvasion	13,601	12.550	0	21.164	0	99
Bribery	13,435	1.277	0	2.859	0	50
TaxBurden	14,472	2.750	3	1.108	1	4
TaxComp	14,162	6.050	1	10.787	0	95
Foreign	11,210	0.076	0	0.265	0	1
Medium	14,701	0.192	0	0.394	0	1
Large	14,701	0.112	0	0.316	0	1
SoleProp	14,701	0.340	0	0.474	0	1
Partner	14,701	0.255	0	0.436	0	1
GovTrust	14,385	3.935	4	1.459	1	6
Mining	14,701	0.010	0	0.102	0	1
Construct	14,701	0.110	0	0.313	0	1
Manuf	14,701	0.339	0	0.473	0	1
Transport	14,701	0.071	0	0.257	0	1
WholeRetail	14,701	0.264	0	0.441	0	1
RealEst	14,701	0.094	0	0.292	0	1
Hotel	14,701	0.055	0	0.228	0	1
BribePUB	13,584	1.463	1	0.947	1	6
BribeLIC	13,464	2.014	1	1.344	1	6
BribeCON	12,699	1.911	1	1.453	1	6

Sources: Data are from BEEPS for 2002 and 2005 (European Bank for Reconstruction and Development 2019)

respectively.[2] The model is comprised of a triangular system of three quantile equations in general form below[3]:

$$Y = max\left(Y^{*}, C\right) \tag{2}$$

$$Y^{*} = Q_{Y}{}^{*}(U|D, W, V) = X^{'}\beta_{0}(U) \tag{3}$$

$$D = Q_{D}(V|W, Z) \tag{4}$$

where Y is the observable response variable obtained by censoring the latent response variable Y^{*} at level C; D is the explanatory variable of interest that is potentially endogenous; W is a vector of explanatory variables; Z is a vector of excludable instruments; and V is the latent unobserved regressor that accounts for the endogeneity of D. The second equation is the conditional quantile function of Y^{*} and the third equation is the conditional quantile function of D. Both U and V are Skorohod disturbances of Y and D, respectively.

The CQIV estimator is estimated in two stages where the first stage estimates a quantile regression for the control variable. The second stage estimates the censored quantile regression model that accounts for endogeneity by including the estimated control variable. In contrast to Blundell and Powell (2007), CQIV does not require additive errors in the first or second stage estimation. Because of the computational difficulty of Powell's (1986) CQR estimator, CQIV uses Chernozhukov and Hong's (2002) algorithm for CQR to account for endogeneity.[4]

Empirical Results

To instrument *Bribery*, three alternate measures of bribery were used that are not related to tax evasion (Alm et al. 2016): the frequency of unofficial payments to obtain government contracts (*BribeCON*), licenses and permits *(BribeLIC*), and connection to public services (*BribePUB*). Of particular interest were the determinants of tax evasion when tax evasion is more prevalent (most firms report zero tax evasion). Thus eq. (1) was estimated using CQIV at the 60th, 70th, 80th and 90th percentile (Table 4). To obtain the upper and lower bounds of the 95% confidence interval, the bootstrap procedure with 10 iterations was used. Censoring in these data arises from a corner solution decision (Wooldridge 2010). Consequently, marginal effects based on a corner calculation were reported (Kowalski 2016).

The point estimates are reported along with the lower and upper bounds of the 95% confidence interval. Consistent with the main hypothesis and current literature, the

[2] For more details on the CQIV technique see Kowalski (2016).

[3] See Eqs. 2.1, 2.2 and 2.3 in Chernozhukov et al. (2015).

[4] As an example, Kowalski (2016) provided a recent application of the CQIV estimator with respect to the estimation of the price elasticity of medical care expenditures and allowed this estimate to vary across the distribution of medical care expenditures while also accounting for endogeneity and censoring. The results suggest that price elasticity varies significantly across the conditional distribution of medical expenditures and highlights the importance of accounting for this heterogeneity, which has important policy implications.

Table 4 Impact of bribery on tax evasion: CQIV regression

Variables	Q(60)	Lower	Upper	Q(70)	Lower	Upper	Q(80)	Lower	Upper	Q(90)	Lower	Upper
Bribery	**2.066**	1.612	2.390	**2.883**	2.305	3.352	**3.221**	2.831	4.050	**2.771**	1.901	3.785
TaxBurden	**1.033**	0.591	1.380	**1.759**	1.027	1.997	**2.149**	1.083	3.431	**2.579**	0.768	2.928
TaxComp	**0.051**	0.000	0.108	**0.083**	0.040	0.154	**0.213**	0.072	0.298	**0.188**	0.001	0.258
Foreign	**−3.415**	−7.514	−1.924	**−3.717**	−8.504	−2.447	**−6.115**	−6.841	−2.739	**−9.640**	−14.150	−2.664
Medium	**−1.614**	−3.124	−0.949	**−2.913**	−4.280	−0.883	**−4.951**	−7.073	−3.139	**−4.269**	−8.635	−1.343
Large	**−2.406**	−4.668	−1.839	**−4.745**	−6.483	−1.815	**−5.789**	−7.102	−2.651	**−5.705**	−9.654	2.780
SoleProp	**3.111**	1.492	4.097	**5.144**	3.569	5.916	**6.544**	2.153	8.755	**9.459**	4.475	12.657
Partner	**1.714**	0.484	2.869	**3.519**	1.914	5.258	**3.448**	0.427	9.029	**5.582**	1.150	11.280
GovTrust	**−0.474**	−0.678	−0.142	**−0.742**	−1.042	0.003	**−0.876**	−1.420	0.282	**−1.345**	−2.131	−0.697
Mining	**−9.778**	−29.233	2.879	**−7.354**	−25.564	5.489	**−7.533**	−23.888	7.891	**−6.847**	−18.510	15.231
Construct	**−3.435**	−7.251	−0.694	**−2.449**	−5.772	1.121	**−2.130**	−7.271	3.673	**−1.792**	−10.957	9.696
Manufac	**−3.120**	−6.431	−0.578	**−2.352**	−4.552	0.530	**−1.443**	−3.756	2.362	**−2.199**	−8.153	3.768
Transport	**−3.005**	−6.458	1.207	**−2.751**	−5.289	0.860	**−4.503**	−7.351	0.686	**−3.216**	−13.722	2.725
WholeRetail	**−2.650**	−7.464	0.427	**−1.484**	−5.508	0.715	**−1.868**	−5.483	2.358	**−1.434**	−8.425	6.643
RealEst	**−3.728**	−6.503	−0.312	**−2.839**	−6.342	−0.162	**−2.030**	−6.840	3.669	**0.842**	−5.843	7.695
Hotel	**0.231**	−2.358	2.540	**3.188**	−0.386	6.866	**6.800**	−2.288	11.078	**3.442**	−4.574	14.670
Year (2005)	**−3.351**	−4.095	−2.273	**−5.286**	−6.111	−3.666	**−7.524**	−8.780	−5.123	**−11.736**	−13.903	−9.278
Constant	**−22.647**	−24.809	8.047	**−0.620**	−33.181	5.853	**7.181**	−9.138	12.313	**15.334**	8.913	22.384
ehat	**0.037**	−1.473	1.606	**−1.483**	−4.069	0.815	**−1.760**	−5.296	1.563	**−2.945**	−4.870	0.405

Sources: Data are from BEEPS for years 2002 and 2005 BEEPS (European Bank for Reconstruction and Development 2019). Notes: The model includes country-fixed effects, but they are not reported. The 95% confidence intervals are calculated using bootstrap procedure with 10 repetitions. Excluded instruments for Bribery include *BribePUB, BribeLIC,* and *BribeCON*

coefficient on *Bribery* is positive and significant across all quantiles (i.e. zero is not within the 95% confidence interval). That is, an increase in bribe demands increases the propensity to evade taxes. However, the impact of bribery varies across the prevalence of tax evasion. In particular, the impact of bribery shows an increasing effect as the prevalence of tax evasion increases and then falls at the 90th percentile consistent with an inverted "U" shape. *Bribery* has the largest impact on tax evasion at the 80th percentile and the smallest impact at the 60th percentile. In terms of magnitude, the effect of bribery on tax evasion is more than a third smaller at the 60th percentile relative to the 80th percentile. This result reveals that the corruption "tax" promotes tax evasion, especially when evasion is more pervasive. Conceivably, countries with extensive tax evasion possess greater networks and knowledge on ways to evade taxes that make it easier to hide income. However, as tax evasion becomes a chronic problem, this prompts government to crack down on evading behavior. That is, beyond some threshold, the government is forced to take action to reduce tax evasion and corruption.

Turning to the two other widely used determinants of tax evasion, tax burden and tax compliance cost, the coefficients on each are statistically significant and show the expected positive sign consistent with greater tax burden and compliance costs increasing tax evasion. As with corruption, these effects are dependent on the degree of tax evasion. For instance, increases in the tax burden have a larger impact on tax evasion as the prevalence of tax evasion increases, whereas, the effect of compliance cost shows a similar inverted "U" shape compared to bribery.

Regarding firm characteristics, the results suggests that foreign-owned firms relative to domestic-owned firms are less likely to evade taxes. The propensity not to evade taxes increases with higher prevalence of tax evasion. Medium and large firms are less likely to evade taxes relative to small firms. Larger firms are less likely to evade relative to medium firms. These effects increase across the prevalence of tax evasion with a slight dip at the 90th percentile, and for larger firms the effect becomes statistically insignificant. Moreover, the effect of larger and medium firms relative to smaller firms is more than double at the 90th percentile relative to the 60th percentile. Sole proprietors and partnerships are more likely to evade taxes relative to corporations and these effects increase across the distribution of tax evasion having the largest impact at the 90th percentile. Firms that have greater trust in government exhibit a reduction in tax evasion behavior, given the negative coefficient on *GovTrust*. This effect is larger when tax evasion is more widespread. However, the effect is statistically significant at the 60th and 90th percentile.

With respect to the inclusion of industry dummy variables, with the exception of the hotel and restaurant industry, all industries show a negative propensity to evade taxes when the prevalence of tax evasion is low. Interestingly, when tax evasion is most prevalent, the real estate industry shows a positive impact. In terms of statistical significance, construction, manufacturing and real estate are statistically significant at the 60th percentile (real estate is also significant at the 70th percentile), whereas, mining, transportation, and hotel are statistically insignificant across all quantiles. Our results are in agreement with Abdixhiku et al. (2017) that the mining industry is least likely to evade taxes. Finally, the negative coefficient on the year dummy variable suggest that the prevalence of tax evasion decreased in 2005 relative to 2002.

These results suggest existing levels of tax evasion are an important consideration in developing policies to control tax evasion. That is, the effectiveness of policy is conditional on the prevalence of tax evasion. For example, policies that aim to control corruption and reduce the tax burden and tax compliance costs will be more effective when tax evasion is more widespread.

Concluding Remarks

With the literature on corruption and tax evasion well established, researchers have embarked on analyzing the relationship between corruption and tax evasion at the firm level. Indeed, the presence of corruption and tax evasion in general hamper economic growth and limit the ability of government to provide public goods and services necessary to provide support for market-based institutions and societal well-being. Our study contributes to the existing literature on the relationship between corruption and tax evasion at the firm level by investigating the heterogeneous impact of corruption on firm-level tax evasion, which has not been explored in the literature.

We essentially argue that bribes on firm-level tax evasion are conditional on the prevalence of tax evasion in a country. Using-firm level data for 25 transition economies from the BEEPS (European Bank for Reconstruction and Development 2019), we specified a model where firm tax evasion is a function of bribes, perceived tax burden, tax compliance, government trust, and firm characteristics (firm size, type of ownership, and industry sector). The CQIV estimation procedure was used to analyze the impact of bribery across the conditional distribution of firm-level tax evasion. Our findings reveal that the impact of corruption on tax evasion increases as tax evasion becomes more prevalent consistent with an inverted "U" shape relationship. The results also indicate that the impact of firm-level characteristics varies across the conditional distribution of tax evasion. As such, policy recommendations vary in response to the extent of the tax evasion, such that polices that focus on reducing tax burden and controlling corruption will be more effective when tax evasion is more widespread.

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