Tax Inspections and Tax Administration Obstacle Reported in Developing Economies

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By analyzing data from the World Bank, the study first examines the impact of tax inspections or visits on tax administration obstacles reported by firms. The results show that firms that reported tax visits by tax officials are more likely to reply with tax administration obstacles. The results provide evidence that the more the tax inspections or visits, the higher the probability that firms will reply with major or severe tax administration obstacles. The results also show that firms with government ownership are less likely to reply with severe tax administration obstacles. In addition, the results provide evidence that firms operating in higher GDP per Capita economies and/or firms operating in transition economies have a higher probability of replying with severe tax administration obstacles. When the countries examined are categorized into different groups, tax visits/inspections of tax officials are significant in all country groups. The study would be beneficial in helping policy makers and/or tax authorities to alleviate a firm's stress or obstacles related with tax administration.

Keywords: tax visit, tax inspection, corruption obstacle, tax obstacle

INTRODUCTION

There have been numerous studies focusing on tax rate, tax avoidance, and tax behavior during past decades (see Dyreng, Hanlon, & Maydew, 2008; Graham, 1996; Minnick & Noga, 2010; Rego, 2003 as examples). Some researchers focus on tax rate changes. Lin, Mills, and Zhang (2014) study how public firms and private firms react differently to the tax rate decrease in 2008. They find that when anticipating a tax rate change, private firms are more likely to take advantage of tax shifting (by shifting high taxable income from high-tax-rate year to low-tax-rate year) when compared with public firms. They then warn the government to reconsider when planning to have any tax rate change because the firms can save more than 8% of tax expenses when taking advantage of tax shifting. Following their study, Höglund and Sundvik (2019) investigate income shifting when firms anticipate tax rate change and the efficiency of external auditing. Their results show that auditors generally focus on questionable selling, management expenses, and administrative expenses when doubting a firm's income shifting. They find that firms without external auditing tend to have more income shifting than their peers.

Some other researchers study tax avoidance (Armstrong, et al., 2015; Dyreng, et al., 2010; McGuire, Omer, & Wang, 2012). Dyreng, et al. (2010) study the role of individual executives on a firm's tax avoidance behavior. The results show that firm executives play a significant role in determining the level of tax avoidance. Guenther, Matsunaga, and Williams (2017) investigate the relationship between tax

avoidance and firm risk. They reached the conclusion that tax avoidance is generally related with persistent strategies like low tax rate. They also show that tax avoidance does not affect firm risk level.

Other research concentrates on examining the impact of public stress and firm tax behavior (Chyz & Gaertner, 2018; Davis, et al., 2016). Dyreng, et al. (2016) did a study focusing on public stress and the effect of public stress on business' tax behavior. They provide evidence that pressure from external activist groups has a significant impact on a business's tax behavior. Based on their study, there are many studies focusing on various tax issues: Davis, et al. (2016) examines the relationship between social responsibility and a company's tax payments. Drake, Lusch, and Stekelberg (2019) study the effect of tax risk on an investor's valuation of tax avoidance. Chyz and Gaertner (2018) researches the relationship between tax payments and CEO turnover. Law and Mills (2015) study the relationship between tax and financial constraint from the point of linguistic cue - by examining the key words used in firm's annual reports. They find that firms that use more negative words in their annual reports (which they defined as financially constrained firms) are more likely to use more aggressive tax planning strategies. Though there are many extant studies researching issues related with tax risk (see Drake, et al., 2019 as an example) and tax payment (Chyz & Gaertner, 2018; Davis, et at., 2016), there is very limited research examining tax related obstacles (e.g., tax rate obstacle, tax administrative obstacle, or tax related stress). This is what the current study focuses on.

The purpose of the current study is to investigate the impact of tax inspections/visits from tax officials on tax administration obstacles reported by the visited firm. So far, there are very few studies examining the topic above. Therefore, the study is not only significant for researchers, but also for policy makers, government authorities, and of course firms themselves.

The results of the study show that firms with visits/inspections by tax authorities are more likely to self-report severe tax administration obstacles. The more visits/inspections, the higher the probability the firm will self-report severe tax administration obstacles. The study also provides evidence that the more gifts and/or informal payments that are expected in the visits/inspections by tax officials, the higher the probability firms will reply with severe tax administration obstacles. In addition, when the examined countries are categorized into different groups, the visits/inspections, the number of times of tax visits, and the gifts or informal payments expected during the tax visits/inspections are significant. Hence these important factors in explaining the probability for firms to reply with severe tax administration obstacles.

The results would be useful for policy makers/government agencies when designing policies for businesses. The study provides evidence that when firms confirm tax visits/inspections by tax officials, firms with more visits/inspections by tax authorities, and/or the more gifts or informal payments that are expected from the firm, the higher probability that firms will report severe tax administration obstacles. Therefore, the government may need to find a way to balance supervising and respect of the freedom/space of firms. This way, firms can focus on the operation, innovation, and improvement of products or services instead of exhausting themselves dealing with governments.

The results would also be important to businesses themselves. Hopefully, because of the current study, firms may find some tax stress alleviated and hence, put more time and effort in business operation and product innovation. This way, a positive and healthy operating cycle can be achieved which would benefit the economy as a whole.

The rest of the study is as follows: The next section reviews related literature. Section III introduces the dataset used. Section IV presents the model of the study. Section V shows the analysis results, including both univariate and multivariate results. Section VI presents the robustness analysis to support the basic results. The last section concludes.

BACKGROUND

Firm's Tax Related Obstacles

There have been many extant studies on tax stress or tax burden on firm behavior. Dyreng, et al. (2016) study firms in the United Kingdom and find that public scrutiny and public pressure can impose significant effects on a firm's political/reputational cost. Hence, affecting a firm's activities (e.g., tax avoidance). They

find that public pressure from outside can have a significant effect on the behavior of firms. Li, et al. (2018) follow the study and examine the impact of political uncertainty on a firm's tax behavior. They examine firms in 30 countries and provide evidence that tax as an outcome of a political process, a firm's tax behavior is closely related with political uncertainty: A firm's tax planning or strategy can be significantly affected by political uncertainty (e.g., election).

Dang, Fang, and He (2019) study the relationship between economic uncertainty and firm tax burden. They present that there is a positive relationship between economic uncertainty and firm tax burden: The higher the tax quotes, the stronger the relationship. They also provide evidence that the relationship is particularly strong for state-owned firms, firms operating in a non-high-tech area, and firms in a service area. Chen, et al. (2020) study the large state-owned companies in China to examine the impact of new government officials on the tax behavior like tax avoidance of the companies. Their results show that there is a significant relationship between the two factors: When firms are anticipating new government officials taking office, they decrease their tax avoidance behavior. This is especially true when there is a relationship between a government official and a firm's top manager or when a government official has power over a firm manager. When tax avoidance decreases, firms pay more tax which would bring more fiscal support from the government. This is known as a "two way favor exchange".

Firm's Financing and Other Obstacles

Firm obstacles are more and more studied by many researchers (Beck, Demirgüç-Kunt, & Maksimovic, 2004; Binks, & Ennew, 1996; De Meza, & Webb, 2000; Law & Singh, 2014). Beck, et al. (2006A) examine a firm's financing obstacles and find that firm age, size, and ownership are important factors in explaining a firm's financing obstacle: Younger, smaller firms and firms without foreign ownership are, in general, more likely to report higher financing obstacles. They also study the effect of country variables on a firm's likeliness to report financing obstacles. Their results show that GDP per capita, whether it's a liquid stock market, institutional development, or legal system, are important country variables related with a firm's probability of replying with financing obstacles. In particular, they provide evidence that institutional development is a crucial country variable to explain the financing obstacles firms confront.

Focusing on Russian small and medium enterprises (SME), Zhuplev and Shtykhno (2009) study a firm's obstacles (mostly financing obstacles), once in 1994 and another time in 2008. They find that firm age, size, and female ownership are important factors in explaining a firm's obstacles and operating issues. They find that the gap between the obstacles of the two years is diminishing. Chakravarty and Xiang (2013) study discouraged firms in developing economies and find that firm size and firm age are factors in explaining why a firm will not apply for credit despite financing needs. They also find that a positive bank-firm relationship can encourage a firm to apply for credit. Saeed and Vincent (2011) investigate the impact of financing obstacles on firm's export performance. Their results show that the cost of financing and a financial institution's perception or bias are the main factors that can affect a firm's export performance.

Firm's Obstacles in Country Level

There is also a broad rubric of extant research examining financing obstacles on a country level. Beck, Demirgüç-Kunt, and Maksimovic (2005) provide evidence that firms operating in countries with a lower level of financial development are more likely to be burdened with financing obstacles. They also show that the improvement of financial and institutional development can alleviate the constraining effect of financing obstacles. Beck, et al. (2008) study a set of country variables (e.g., institutional development, GDP per capita, legal system) and find that all country variables examined are significant and therefore are factors in explaining a firm's financing obstacles. In particular, they provide evidence that institutional development is more significant than any other country variable, as it can explain a significant cross-country variation related to financing obstacles. Chakravarty and Xiang (2013) include some country variables (GDP per Capita, country growth rate, & institutional development) in their study. Their results show that country growth rate is significantly related with a firm's financing obstacles: Firms operating in economies with higher country growth rate are less likely to be discouraged (or have lower amounts of financing obstacles).

DATA DESCRIPTION

The 2006-2019 wave of the World Bank Enterprise Surveys is the data used in the study. Following a uniform and stratified random sampling method, the Enterprise Surveys collects information about a firm's operating/investing results. It also collects information about the climate within which it operates. One purpose for doing so is to find more information about the operating environment, investment environment, and the effect of these environments on a firm's productivity.

The 2006-2019 wave of the Enterprise Surveys provides a wide variety of information. For example, basic firm information like firm characteristics and location, human resources information like the number of employees, financing information like auditing and investments, firm-government relationship information like tax visits by governmental officials, and legal information like lawsuit history. Hence, it provides detailed qualitative and quantitative firm-level data about firm operating results, and the environment in which it operates.[1] In the current study, the information from the database about general firm characteristics, information about the obstacles firms report, tax inspections, visits information, and information about firm owner(s) and/or top manager(s) are used and analyzed.

The number of firms used in the study is 66,434 from over 140 countries: The original total number of firms provided by the 2006-2019 wave of the Enterprise Surveys is over 144,000. It has to be pointed out that if one country has survey data for two or more years, only the information in the most recent year is used. Therefore, over 61,000 firms with duplicated information in more than one year are deleted. Another more than 17,000 firms' information are excluded from the study because of missing information (e.g., tax visits, information related with obstacles). It hence leaves over 66,000 firms included in the study.

DEFINING THE CANDIDATE EXPLANATORY VARIABLES AND THE EMPIRICAL MODEL

The current study follows the extant research of Beck, et al. (2005), Chakravarty and Xiang (2013), and Dyreng, et al. (2016), in which they study firm obstacles and stress that firms face, respectively. Following their steps, the regression model can be described as following:

$$\text{Tax\_Adminis\_Obstacle}_{i,k} = \alpha + \beta_1 \text{ Firm Characteristics}_{i,k} + \beta_2 \text{ Tax\_Visit}_{i,k} + \beta_3 \text{ Corruption\_Obstacle}_{i,k} + \beta_4 \text{ Female\_Owner}_{i,k} + \gamma \text{ Country}_{k} + \varepsilon_{i,k} \quad (1)$$

where the dependent variable, *Tax_Adminis_Obstacle,* is defined as a dummy variable taking the value one if the firm replies that tax administration is a major/very severe/most severe obstacle to their current operations, and zero otherwise. The independent variables are chosen to follow the extant literature on credit constraints of small and medium size businesses (Carpenter & Petersen, 2002; Chakravarty & Xiang, 2013; Chakravarty & Yilmazer, 2009; Gelos & Werner, 2002; Laeven, 2003).

Firm age, size, legal status, and firm ownership belong to the general firm characteristics. *Ln_Age* refers to the (natural) logarithm of the number of years the firm has been operating. In general, younger firms are more likely to reply with severe obstacles (e.g., as to the financing obstacles studied by Beck & Demirgüç-Kunt, 2006; Beck, et al., 2005; Chakravarty & Xiang, 2013). *Ln_Size* is defined as the (natural) logarithm of the number of employees. Smaller firms may be more likely to reply with severe obstacles (e.g., as to the financing obstacles studied by Beck, et al., 2005 and 2006A; Chakravarty & Xiang, 2013). However, Belz, Hagen, and Steffens (2019) study the relationship between tax and firm size because of two controversial theories: a negative tax-size relationship based on political power theory and a positive cost-tax relationship based on political power theory. In their study, they find that some factors like corruption and culture issues may explain the variation between tax and firm size relationship. Therefore, as to the relationship between firm size and the tax administration obstacles, it may be positive or negative because new businesses, which are relatively small, may have few assets/equity while old and large firms, which have more assets, are more likely to reply if they're being annoyed by corruption. Following Chakravarty and Xiang (2013), *Legal_Status* is included in the analysis. It is defined from one to five with one referring

to a public/listed company, two as a privately traded company, three as a sole proprietorship, four as a partnership, and five as other status. Similar to firm age and size, *Legal_Status* may have a positive relationship with the probability of replying with tax administration obstacles, which means a sole proprietorship and a partnership are more likely to reply with higher tax administration obstacles. However, the companies with stocks traded on public or private markets may be more likely to be the target of corruption. For this reason, *Legal_Status* may also have a negative relationship in the model.

Following the studies of Beck, et al. (2006B) and Chakravarty and Xiang (2013), *Govern_Owned* and *Foreign_Owned* are included in the study. *Govern_Owned* is a dummy variable taking the value one if the firm has at least 10% government ownership, and zero otherwise. Dang, et al. (2019) show that the positive relation between political policy and a firm's tax burden are particularly significant for government owned firms. However, Chakravarty and Xiang (2013) provide evidence that government owned firms are less likely to reply with severe financing or constraint obstacles. Therefore, the relationship here for *Govern_Owned* is uncertain, though it is possible that *Govern_Owned* may be negatively associated with the probability of firms replying with severe tax administration obstacles because the government ownership itself may work as a cushion for corruption. *Foreign_Owned* is also a dummy variable taking the value one if the firm has 10% or more owned by foreign individuals, companies, or organizations, and zero otherwise. Similarly, *Foreign_Owned* is anticipated to be positively associated with the probability for firms to reply with severe tax administration obstacles, because firms with foreign ownership may have more channels to receive information and more experience operating in various countries.

Tax_Visit is a dummy variable taking a value of one if the firm was visited by tax officials during the past surveyed year, and zero otherwise. It is anticipated to have a positive relationship with the probability of firms replying with severe tax administration obstacles. Following the study of Chakravarty and Xiang (2013), *Corruption_Obstacle* is defined as a dummy variable taking the value one if the firm replied that corruption is a major/very severe obstacle for their operation and growth, and zero otherwise. *Corruption_Obstacle* is anticipated to have a positive relationship with the probability of firms replying with main/very severe tax administration obstacles.

Female_Owner is included in the matrix to define firm owner characteristics. It is defined as a dummy variable taking the value one if any of the principal owners are female. It is anticipated that firms with female owner(s) are more likely to reply with severe tax administrative obstacles.

RESULTS

Univariate Results

Panel A in Table 1 presents the summary statistics for all of the explanatory variables. Panel B provides the *t*-test results related with the significance of firm age/size and the probability of firms reporting severe tax administrative obstacles. Panel C presents the *chi*-square results. Overall, the results from Panel B and Panel C show that variables like firm age, firm size, legal status, and tax visits by government officials have significant relationships with a firm's probability of reporting severe tax administration obstacles. Table 2 provides the correlation matrix for the main variables used in the current study. The correlation results show that the majority of the variables have a significant relationship with the dependent variable (*Tax_Adminis_Obstacle)*. For example, *Tax_Visit* has a positive and significant (at the 1% level) relationship with *Tax_Adminis_Obstacle* while *Govern_Owned* has a negative and significant (at the 1% level) relationship with *Tax_Adminis_Obstacle*. The correlation results also provide information that there is no excessive significant correlation among the main factors. However, Table 2 shows that larger firms are more likely to be owned by foreign organizations. Firms that confirm tax visits by government officials are more likely to reply with corruption obstacles. Because of the presence of systematic correlations across certain characteristics, the multivariate analyses is necessary to tease out factors that can explain a firm's probability of replying with severe tax administration obstacles while simultaneously controlling all possible correlates of the tax administration obstacle.

TABLE 1
PANEL A: SUMMARY STATISTICS OF EXPLANATORY VARIABLES

Variable	Mean	Median	SD	Max	Min	Obs.
Tax_Adminis_Obstacle	0.235	0	0.424	1	0	66434
Ln_Age	3.067	3.045	0.538	5.459	0.693	66434
Ln_Size	3.321	3.045	1.319	10.309	0.693	66434
Legal_Status	3.811	3	0.871	5	1	66434
Govern_Owned	0.014	0	0.116	1	0	66434
Foreign_Owned	0.090	0	0.286	1	0	66434
Tax_Visit	0.572	1	0.495	1	0	66434
Times_of_Tax_Visit	3.300	2	4.779	96	0	36,440
Gift_to_Tax_Officials	0.137	0	0.344	1	0	35,745
Informal_Payments	1.118	0	5.686	100	0	47,948
Corruption_Obstacle	0.378	0	0.485	1	0	66434
Female_Owner	0.324	0	0.468	1	0	66434
Ln_GDP_Per_Capita	8.947	9.057	0.839	10.394	6.597	65,682
Income_Group	1.997	2	1.153	5	1	66434
Transition_Country	0.219	0	0.413	1	0	66434
Average_Growth_Rate	4.554	4.578	2.426	10.095	-4.925	65682

PANEL B: *t*-TEST FOR SIGNIFICANCE ON FIRM AGE AND FIRM SIZE BETWEEN FIRMS WITH/WITHOUT SEVERE TAX ADMINISTRATIVE OBSTACLE (*n*=66,434)

	Mean (With Severe *Tax_Adminis_Obstacle*)	Mean (Without Severe *Tax_Adminis_Obstacle*)	SD	*t*-Value
Ln_Age	3.084	3.062	0.538	-4.50***
Ln_Size	3.287	3.331	1.319	3.69***

Note: ***, **, and * indicate statistical significance at the 0.01, 0.05, or 0.10 level, respectively.

PANEL C: CHI-SQUARE ANALYSIS (n=66,434)

Variable	Severe Tax_Adminis_Obstacle		*df*	$\chi 2$	*p*
	Yes	*No*			
Legal_Status					
Publicly Listed	593(3.80%)	2,053(4.04%)			
Privately Held LLC	5921(37.96%)	17754(34.92%)			
Sole Proprietorship	5404(34.65%)	19298(37.96%)	5	75.373	<0.001
Partnership	3468(22.23%)	10919(21.48%)			
Other	212(1.36%)	812(1.60%)			
Govern_Owned					
Yes	130(0.83%)	775(1.52%)			
No	15,468(99.17%)	50,061(98.48%)	2	42.422	<0.001
Foreign_Owned					
Yes	1,350(8.65%)	4,627(9.10%)			
No	14,248(91.35%)	46,209(90.90%)	2	2.911	0.087
Tax_Visit					
Yes	9,783(62.72%)	28,244(55.56%)			
No	5,815 (37.28%)	22,592 (44.44%)	2	250.036	<0.001
Corruption_Obstacle					
Yes	9,754(62.53%)	15,350(30.20%)			
No	5,844(37.47%)	35,486(69.80%)	2	5309.611	<0.001
Female_Owner					
Yes	5,212(33.41%)	16,287 (32.04%)			
No	10,386(66.59%)	34,549 (67.96%)	2	10.328	<0.001

TABLE 2
CORRELATION MATRIX OF MAIN VARIABLES (*n*=66,434)

Variable	*Tax_Adminis_Obstacle*	*Ln_Age*	*Ln_Size*	*Legal_Status*	*Govern_Owned*	*Foreign_Owned*	*Tax_Visit*	*Corruption_Obstacle*	*Female_Owner*	*Ln_GDP_Per_Capita*
Ln_Age	0.017***									
Ln_Size	-0.014***	0.269***								
Legal_Status	-0.011***	-0.072***	-0.088***							
Govern_Owned	-0.025***	0.042***	0.078***	-0.040***						
Foreign_Owned	-0.007*	-0.003	0.161***	-0.056***	0.104***					
Tax_Visit	0.061***	-0.016***	0.082***	0.018***	0.002	0.050***				
Corruption_Obstacle	0.282***	0.026***	-0.016***	0.026***	-0.014***	-0.021***	0.012***			
Female_Owner	0.012***	0.062***	0.052***	-0.053***	0.030***	0.005	-0.022***	-0.033***		
Ln_GDP_Per_Capita	0.007	0.124***	0.073***	-0.289***	-0.006*	-0.068***	-0.169***	-0.077***	0.098***	
Transition_Country	-0.092***	-0.116***	-0.002	-0.229***	0.047***	-0.040***	0.002	-0.162***	0.090***	0.345***

Note: ***, **, and * indicate statistical significance at the 0.01, 0.05, or 0.10 level, respectively.

Multivariate Results

Baseline Results

Table 3 provides the regression results of the study. Logistic regression analysis is used as the dependent variable is a dummy variable. There are three columns in the table. Column (1) presents the baseline results when the key variables (such as *Tax_Visit*) are included in the model. Column (2) uses *Gift_to_Tax_Officials* to replace *Tax_Visit*. *Gift_to_Tax_Officials* is a dummy variable taking the value one if the firm replies with a gift or informal payment is expected during meetings/inspections with tax officials, and zero otherwise. While Column (3) shows the results when country-level variables are included in the baseline model.

TABLE 3
FIRMS REPLIED WITH MAJOR/SEVERE TAX ADMINISTRATION OBSTACLE

Variable	(1)	(2)	(3)
Ln_Age	0.068 (0.019)***	0.024 (0.024)	0.009 (0.019)
Ln_Size	-0.039 (0.008)***	-0.028 (0.010)	-0.039 (0.008)***
Legal_Status	-0.058 (0.011)***	-0.059 (0.015)***	-0.030 (0.012)**
Govern_Owned	-0.595 (0.100)***	-0.665 (0.128)***	-0.455 (0.100)***
Foreign_Owned	0.005 (0.035)	0.003 (0.043)	0.002 (0.035)
Tax_Visit	0.319 (0.020)***		0.386 (0.020)***
Gift_to_Tax_Officials		0.252 (0.035)***	
Corruption_Obstacle	1.356 (0.019)***	1.357 (0.026)***	1.347 (0.020)***
Female_Owner	0.124 (0.021)***	0.028 (0.028)	0.119 (0.021)***
Ln_GDP_Per_Capita			0.221 (0.010)***
Transition_Country			-0.616 (0.029)***
Intercept	<0.001	<0.001	<0.001
Number of Observations	66,434	35,745	66,434
Adjusted R^2	0.122	0.125	0.137

Note: The regressions are estimated with Logistic regression. *Tax_Adminis_Obstacle* is the dependent variable. Standard errors are in parentheses. ***, **, and * indicate that the coefficient is significant at the 0.01, 0.05, or 0.10 level, respectively.

The baseline results in Column (1) show *Ln_Age* is positive and significant at the 1% level. This indicates that older firms (who tend to have more complicated tax issues and hence, have to be more interactive with tax authorities) are more likely to reply with severe tax administrative obstacles than younger firms. It is consistent with the prior studies such as Beck, et al. (2008) and Chakravarty and Xiang (2013). The results show that *Ln_Size* is negative and significant at the 1% level, indicating that larger firms (who are more likely to have clear government regulations to follow) are less likely to report severe tax

administrative obstacles. *Govern_Owned* is negative and significant at the 1% level, indicating government-owned firms, who are more likely to have close relationships with other government department(s), are less likely to report severe tax obstacles. This is consistent with extant literature (Beck, et al., 2005; Chakravarty & Xiang, 2013). *Tax_Visit* is also positive and significant at the 1% level which indicates firms confirming tax visits by government officials are more likely to reply with severe tax obstacles. In addition, *Corruption_*Obstacle and *Female_Owner* are both positive and significant (both at the 1% level), showing that firms that replied with severe corruption obstacles and/or firms with female owner(s) are more likely to report severe tax administrative obstacles.

In Column (2), all main variables are included in the model except *Tax_Visit* which is replaced by *Gift_to_Tax_Officials*. The results of the regression show the results are very similar with those reported in the baseline results presented in column (1). Specifically, *Gift_to_Tax_Officials*[2] is positive and significant (at the 1% level). This shows that firms confirming gifts or informal payments to tax officials during the tax inspections or meetings are more likely to reply with severe tax obstacles.

Columns (3) presents the results when the country-level variables are included into the baseline. Two country-level variables are included here: *Ln_GDP_Per_Capita* refers to the natural logarithm of the average GDP per Capita during 2006 -2019. Yearly GDP per Capita information is provided by the World Bank.[3] The other country-level variable, *Transition_Country,* is a dummy variable taking the value one if the country is in the process of making the transition to a market economy, and zero otherwise.[4] When the country-level variables are included, the results are very similar to those presented in the baseline results: For example, *Tax_Visit* has a positive and significant (at the 1% level) relationship with the probability of a firm replying with severe tax administration obstacles. In addition, the results show that *Ln_GDP_Per_Capita* has a positive and significant (at the 1% level) relationship with the probability of a firm replying with severe tax administration obstacles. This indicates that firms operating in higher GDP per Capita are more likely to report severe tax administration obstacles. *Transition_Country* is negative and significant (at the 1% level) indicating firms operating in transition economies (the transition economy may provide more freedom when transferring to market economy) are less likely to report severe tax administrative obstacles.

In sum, the results from the regressions show that older firms, firms that confirm tax visits, firms providing gifts or informal payments to tax officials during the inspections or meetings, and firms that report severe corruption obstacles are more likely to reply with severe tax administration obstacles. Meanwhile, larger firms and firms with government ownership are less likely to report severe tax administration obstacles. The next subsection provides some supplementary analysis focusing on the effect of firm age and/or firm size.

Tax Administration Obstacle Across Countries

In the regression results reported in Table 3, a few country variables have been included to examine the impact of country characteristics on a firm's probability of replying with severe tax administration obstacles. The results show that firms operating in economies with higher GDP per Capita tend to have a higher probability of replying with severe tax administration obstacles. It also shows that firms operating in transition economies are less likely to reply with severe tax administration obstacles. To further examine the impact of country variables on tax administration obstacles, especially whether there are any differences in a firm's probability of replying with severe tax administration obstacles, it is now appropriate to sort the country variables into a few groups: 1). The first scale used here is *INCOME_GROUP*. All countries included in the current study are divided into Higher Income Group or Lower Income Group. According to the World Bank, economies around the world are divided into groups according to the 2018 GNI per capita scale: high income, $50,631.00; upper middle income, $19,028.90; middle income, $12,983.20; lower middle income, $7,655.10; and low income, $2,287.80. It is calculated using the World Bank Atlas method, which smoothes exchange rate fluctuations by using a three year moving average, price-adjusted conversion factor. In the current study, the first three groups (high income, upper middle income, and middle income) are categorized as Higher Income Group while the latter two groups (lower middle income and low income) are defined as Lower Income Group. 2). *Transition_Country* is the other scale used here. All countries are

divided into Transition or Non-Transition based on their transition status defined by the World Bank and IMF. The regression results of each group are reported in Table 4.

TABLE 4
DIFFERENCE OF FIRMS REPLIED WITH MAJOR/SEVERE TAX ADMINISTRATION OBSTACLE ACROSS COUNTRY GROUPS

Variable	(1) Lower Income Group	(2) Higher Income Group	(3) Transition	(4) Non-transition
Ln_Age	0.062 (0.022)***	-0.009 (0.034)	0.241 (0.057)***	0.004 (0.020)
Ln_Size	-0.058 (0.009)***	0.042 (0.015)***	-0.128 (0.020)***	-0.025 (0.009)***
Legal_Status	-0.031 (0.014)**	0.152 (0.022)***	-0.060 (0.031)*	-0.105 (0.013)***
Govern_Owned	-0.471 (0.110)***	-0.937 (0.241)***	-0.535 (0.207)***	-0.533 (0.115)***
Foreign_Owned	0.117 (0.040)***	-0.235 (0.071)***	0.150 (0.093)	-0.061 (0.037)
Tax_Visit	0.354 (0.024)***	0.385 (0.035)***	0.301 (0.048)***	0.333 (0.022)***
Corruption_Obstacle	1.348 (0.024)***	1.482 (0.035)***	1.095 (0.049)***	1.354 (0.021)***
Female_Owner	0.027 (0.025)	0.267 (0.036)***	-0.141 (0.084)***	0.207 (0.023)***
Intercept	<0.001	<0.001	<0.001	<0.001
Number of Observations	47,149	19,285	14,521	51,913
Adjusted R^2	0.117	0.156	0.076	0.126

Note: The regressions are estimated with Logistic regression. *Tax_Adminis_Obstacle* is the dependent variable. Standard errors are in parentheses. ***, **, and * indicate that the coefficient is significant at the 0.01, 0.05, or 0.10 level, respectively.

The first two columns are Lower Income Group and Higher Income Group respectively. For firms operating in Lower Income Group countries, older firms and/or smaller firms are more likely to reply with severe tax administration obstacles. Firms with foreign ownership, with tax visits, and reporting severe corruption obstacles are more likely to reply with severe tax administration obstacles. However, for firms operating in the Higher Income Group countries, firm age is not significant while older firms are more likely to report severe tax administration obstacles. Unlike those operating in the Lower Income Group, firms with foreign ownership are less likely to report severe tax administration obstacles when operating in the Higher Income Group. Similar to the firms operating in Lower Income Group, firms with confirmed tax visits or reporting severe corruption obstacles are more likely to reply with severe tax administration obstacles. Unlike the firms operating in Lower Income Group (not significant), firms with female owner(s) are more likely to report severe tax administration obstacles when operating in Higher Income Group economies.

Columns (3) and (4) show the results of the Transition Group and Non-Transition Group. Both columns show that firms with government ownership (negative and significant at 1% level), firms reporting tax visits (positive and significant at 1% level), and firms reporting severe corruption obstacles (positive and significant at 1% level) are associated with the possibility of replying with severe administration obstacles.

One difference between the two columns is *Ln_Age*: It is positive and significant at 1% level in column (3), which is for the Transition Group, while in column (4) it is not significant for the Non-Transition Group.

In summary, when countries are divided into different groups, the results show that there are some differences (e.g., firm age) among different country groups. However, overall, the results show that *Tax_Visit, Govern_Owned*, and *Corruption_Obstacle* are generally significant factors in explaining the probability of firms replying with severe tax administration obstacles.

ROBUSTNESS ANALYSIS

This section is to provide some robustness of the results reported above by re-estimating the regressions. To verify that the results presented above are not off track, three robustness tests are pursued: 1). *Times_of_Tax_Visit* is used to replace *Tax_Visit*. *Times_of_Tax_Visit* is based on the survey question "Over the last 12 months, how many times was this establishment either inspected by tax officials or required to meet with them?" 2). *Informal_Payments* is used to replace *Tax_Visit* and/or *Times_of_Tax_Visit*. *Informal_Payments* is based on the survey question "We've heard that establishments are sometimes required to make gifts or informal payments to public officials to 'get things done' with regard to customs, taxes, licenses, regulations, services etc. On average, what percent of total annual sales, or estimated total annual value, do establishments like this one pay in informal payments or gifts to public officials for this purpose?" The variable refers to the percentage of total annual sales paid as informal payments. 3). Two country variables (*Country_Growth_Rate* and *Inflation*) are used to replace the country variables used in Table 4. *Country_Growth_Rate* is defined as the average GDP growth rate during 2006 -2019 which was provided by the World Bank. *Inflation* refers to the average inflation rate during 2006 -2019 collected and issued by the World Bank. The results in Table 5 show that firms with more tax visits and/or firms with a higher percentage of informal payments are more likely to reply with severe tax administration obstacles. The results also show that firms operating in economies with a higher average country growth rate are less likely to reply with severe tax administration obstacles.

TABLE 5
ROBUSTNESS ANALYSIS

Variable	(1)	(2)	(3)
Ln_Age	0.020 (0.024)	0.004 (0.022)	0.012 (0.019)
Ln_Size	-0.041 (0.010)***	-0.024 (0.009)***	-0.011 (0.008)
Legal_Status	-0.061 (0.015)***	-0.017 (0.013)	-0.039 (0.012)*
Govern_Owned	-0.622 (0.126)***	-0.591 (0.113)***	-0.503 (0.101)***
Foreign_Owned	0.022 (0.043)	0.029 (0.041)	-0.019 (0.036)***
Tax_Visit			0.315 (0.020)***
Times_of_Tax_Visit	0.017 (0.002)***		
Informal_Payments		0.013 (0.002)***	
Corruption_Obstacle	1.375 (0.025)***	1.304 (0.023)***	1.300 (0.020)***

Female_Owner	0.031 (0.027)	0.094 (0.025)***	0.125 (0.021)***
Country_Growth_Rate			-0.089 (0.004)***
Inflation			-0.418 (0.027)***
Intercept	<0.001	<0.001	<0.001
Number of Observations	36,440	47,948	65,682
Adjusted R^2	0.126	0.107	0.135

Note: The regressions are estimated with Logistic regression. *Tax_Adminis_Obstacle* is the dependent variable. Standard errors are in parentheses. ***, **, and * indicate that the coefficient is significant at the 0.01, 0.05, or 0.10 level, respectively.

To summarize, the robustness analysis shows that the main factors are still key to explain a firm's probability of replying with severe tax administration obstacles: Firms with confirmed tax visits (with more tax visits) and firms that reply with severe corruption obstacles have a higher probability of replying with severe tax administration obstacle. In addition, firms with government ownership are less likely to reply with severe tax administration obstacles. The robustness tests give more confidence to the audience about the results provided in the study.

CONCLUSION

This study examines the impact of tax inspections or visits by tax officials to a firm's probability of replying with severe tax administration obstacles. The results show that tax visits and government owned firms are key factors that have an effect on the probability for firms to reply with severe tax administration obstacles: Firms that confirm tax visits/inspections are more likely to reply with severe tax administration obstacles. The more tax visits or inspections, the more likely firms would reply with severe tax administration obstacles. In addition, the firms with government ownership are less likely to reply with severe tax administration obstacles. When country variables are added, the results show that firms operating in economies with higher GDP per Capita are more likely to report severe tax administration obstacles. Firms operating in transition economies are less likely to reply with severe tax administration obstacles. However, no matter which economy a firm operates within, the factor of tax visits or inspections is always significant in explaining the probability of firms replying with severe tax administration obstacles.

The current study is significant in helping policy makers understand the importance of alleviating stress and obstacles. When firms have to spend time and energy to confront the inspections or visits from tax authorities, firms operating with little stress may find themselves burdened. The results would also be useful for government authorities like the tax department to balance the times of tax inspection or visits. However, among the very first group of research focusing on tax administration obstacles, the current study is far from perfect and some caveats should be noted: 1). There are more developing economies than developed economies included in the study. Whether the results stay the same when information from the developed economies is added is hard to tell. 2). There may be other factors (e.g., cultural background) affecting the probability of a firm replying with severe tax administration obstacles. However at present, it is hard to find information and include it in the current study. Hence, the current study is just a test stone and many related questions are left for future studies.

ENDNOTES

1. More details can be got from https://www.enterprisesurveys.org/methodology/
2. *Gift_to_Tax_Officials* is not included in the baseline model is because of many missing information. Hence, it is included in a separate regression to verify the baseline results.
3. https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD
4. According to IMF and the World Bank, the list of transition countries can be obtained from: https://en.wikipedia.org/wiki/Transition_economy

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