

## How Tax Enforcement Disparately Affects Domestic Corporations around the World

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**Abstract:** Tax enforcement around the world has received increased attention since the Global Financial Crisis, with much focus on curbing the potentially harmful tax practices of multinational entities. Yet it is likely that multinational entities can better respond to home-country enforcement efforts than domestic firms because multinationals have opportunities for tax avoidance in multiple jurisdictions whereas domestic firms do not. We therefore examine whether there is a differential relation between changes in enforcement spending and the tax avoidance of domestic versus multinational entities. Using OECD data on tax enforcement spending by 46 countries from 2005 to 2013, we find that although increases in enforcement spending are related to less firm-level tax avoidance on average, the negative relation is concentrated among domestic firms; we find no evidence that changes in enforcement spending are associated with tax avoidance for multinationals. Results are most pronounced in recent years as income shifting strategies have become more common. Although we find this disproportionate effect occurs in countries with both low and high levels of corruption, domestic firms appear even more disproportionately affected by enforcement changes in *less* corrupt countries, including the U.S. Thus, we provide some evidence that the incrementally negative relation between changes in enforcement and tax avoidance for domestic firms is not limited to countries with weak governance.

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“Congress should level the playing field for small businesses. Small companies in Massachusetts don’t stash profits in the Netherlands. They can’t hire a team of accountants to set up a “reverse hybrid mismatch” to slash their taxes. This puts small businesses at a competitive disadvantage as they end up shouldering more of the burden of paying for education, infrastructure, research, the military and everything else our nation relies on to succeed.”  
Senator Elizabeth Warren – NY Times OpEd 9/6/2016

## I. INTRODUCTION

Recent years have brought increased discussion of the potentially harmful tax practices of large multinational entities (MNE). Enhanced tax enforcement is one tool that countries around the globe rely on to stem tax avoidance and evasion, and to increase tax collections. Indeed, tax enforcement changes are expected to be one of the two biggest drivers of near-term tax burden increases worldwide (EY 2017). In light of the growing importance of worldwide tax enforcement to curb potentially aggressive tax avoidance, we examine the association between changes in tax enforcement spending and corporate tax avoidance. In particular, we investigate whether changes in tax enforcement impact domestic corporations and locally-headquartered MNEs equally.<sup>1</sup> We believe addressing this question is important because although MNEs are largely the stated focus of many increased enforcement actions, they are also presumably better equipped to mitigate the negative effects of increased local tax enforcement by shifting income and operations out of their home country and exploiting tax avoidance opportunities in other jurisdictions. Thus, it is an empirical question whether increased global tax enforcement affects domestic firms and MNEs similarly.

To address our research question, we exploit annual data on tax administration expenditures across 33 OECD and 13 non-OECD countries from 2005 through 2013. These data were collected by the OECD and reported in *Tax Administration 2015* with the support of the

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<sup>1</sup> We define a firm as “domestic” if its operations are almost entirely in its “home” country. For example a firm incorporated in France with operations only in France would be defined as domestic, while a French corporation with operations in countries other than France would be defined as a multinational corporation.

Forum on Tax Administration, which the OECD created in 2002 to provide an opportunity for tax commissioners from both OECD and non-OECD countries to discuss global trends in tax enforcement and compliance, and to improve tax administration around the world. Tax administration expenditures vary over time and across countries, allowing for strong identification. Thus, we believe our findings should be of interest to researchers, policy makers, and tax authorities because we can speak to how real enforcement spending affects tax avoidance.

We acknowledge, however, that the effectiveness of a country's tax administration does not depend solely on the amount of financial resources allocated to its tax enforcement efforts. The level of tax compliance within a country also varies with other factors such as economic incentives for avoidance (e.g., the statutory tax rate), opportunities for avoidance (e.g., how the tax base is defined), and the strength of local institutions. We aim to address these issues by including country-level fixed effects in all specifications to control for time-invariant country-level characteristics that affect tax compliance, controlling for the statutory tax rate, and examining cross-sectional differences in governmental institutions. However, we acknowledge that if changes in enforcement spending are correlated with other changes that impact corporate tax compliance, we could overstate the extent to which our results are attributable to enforcement spending.

We begin with a descriptive analysis of trends in enforcement spending across countries. We observe an increase in tax enforcement spending consistent with much press coverage and other anecdotal evidence that countries worldwide are ramping up enforcement efforts (e.g., Warren 2016). In our sample, we document an average annual increase in enforcement spend of 2.8 percent. The increase in enforcement spending is significantly larger for non-OEDC

countries. Only six countries in our sample report an average decline in enforcement expenditures; Denmark reports the highest average decline at 3.7 percent and the U.K. is second with a 1.9 percent decline. In contrast, 40 countries report average annual increases in enforcement spending with Argentina having the largest increase of 29.2 percent.

In our multivariate analyses, we estimate corporate tax avoidance as a function of changes in enforcement spending, firm and country-level controls, and country, industry, and year fixed effects. We measure corporate tax avoidance similarly to Atwood et al. (2012) as the firm's pretax income times the statutory tax rate, less the current taxes paid (all scaled by book income). Our multi-level fixed effect structure affords a particularly strong research design because it allows us to control for time-invariant country-level characteristics that could influence the level of corporate tax avoidance and to isolate how within-country changes in enforcement affect tax payments. To establish a baseline result, we estimate a negative association between changes in enforcement spending and tax avoidance in the full sample. In terms of economic magnitude, a one standard deviation increase in enforcement spend is associated with about a five percent decrease in tax avoidance relative to the sample mean.

Our research question asks whether there is a differential relation between changes in home-country tax enforcement spending and corporate tax avoidance across domestic and multinational firms. We find the entire effect of enforcement is concentrated among domestic firms; we find no evidence of a relation between enforcement spending and the level of MNE tax avoidance. We confirm this finding is not an artifact of firm size and is therefore not attributable to the fact that MNEs are typically larger than domestic firms. Thus, it appears domestic entities bear the brunt of increased enforcement spending while MNEs maintain their level of tax avoidance despite increased home-country enforcement spending. This pattern of results could

reflect MNEs shifting income out of their home country or otherwise increasing tax avoidance in other countries to mitigate or avoid increases in the cost of home-country tax avoidance, which domestic firms cannot do. In short, domestic firms have fewer tax planning opportunities because all of their operations are concentrated in their home country. As a result, domestic firms appear to be disproportionately affected by increases in tax enforcement.

We also explore time trends in the differential effect of enforcement on domestic and multinational firms. We conduct this analysis because much of the focus on curbing the harmful tax practices of MNEs arose after the Global Financial Crisis. We find that the differential impact of changes in tax enforcement for domestic firms relative to MNEs is *larger* in magnitude in the years following the Financial Crisis. Thus, despite MNEs' tax avoidance being more closely scrutinized during this period, MNEs do not appear to bear the consequences of increased tax enforcement spend.

Our final tests focus on whether cross-sectional differences in country-level corruption affect the relative impact of enforcement spending changes on domestic firms versus MNEs. Corruption arises when both parties to the corruption (e.g., a firm and a tax administrator) lack respect for the stated rules that govern their interactions (Kaufmann, Kraay and Mastruzzi 2010). With respect to taxes, DeBacker, Heim and Tran (2015) conclude taxpayers are more resistant to enforcement in corrupt countries. Thus, although domestic firms do not have as many *legal* tax planning opportunities as MNEs, domestic firms in more corrupt countries may be willing to evade taxes in response to increased enforcement spend such that the differential effect of enforcement is smaller. Consistent with this conjecture, we find a *smaller* differential effect of enforcement spending changes on tax avoidance for domestic firms (relative to MNEs) in countries with high levels of corruption. These results are potentially surprising because they

reveal that domestic firms are even more disproportionately affected by enforcement increases in *less* corrupt countries. We find similarly striking results when we examine government effectiveness: domestic firms are more disproportionately affected by enforcement spending in countries that are highly effective. Even in the U.S., which has a below-average level of corruption and an above-average level of effectiveness, we find some evidence that domestic firms are disproportionately affected by enforcement spending changes.<sup>2</sup> These results illustrate that our main findings are not isolated within countries with weak government institutions.

Our study makes several contributions to the literature. First, we illuminate what types of firms bear the incidence of increased tax enforcement around the globe. Specifically, we document a differential response to changes in tax enforcement based on firms' relative ability to avoid tax in their home jurisdiction. On average, we find no relation between the level of MNE tax avoidance and changes in tax enforcement spending. In stark contrast, domestic corporations reduce their tax avoidance following increased tax enforcement spending. Thus, we show a mitigated effect of tax enforcement on MNEs, who are the firms best suited to avoid local-country enforcement actions through location decisions and transfer pricing, or to offset increased tax liabilities in one country with greater tax avoidance in another. In future work, we intend to explore these mechanisms.

Second, our results inform policy makers. One policy implication of our findings is that making changes to reduce the harmful practices of one type of corporation (e.g., MNEs) may leave them unscathed if they are able to nimbly respond. In this case, country-level actions potentially disadvantage domestic corporations that are less able to engage in the harmful

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<sup>2</sup> One possible explanation for this result is that some tax administrations in countries with lower levels of corruption or higher levels of government effectiveness have performance metrics, such as processing speeds, that could result in enforcement agents focusing more attention on the tax returns of less complex companies (see e.g., National Taxpayer Advocate, 2010).

practices the reforms were intended to target. Our findings also potentially speak to the benefits of tax harmonization. Unilateral (i.e., single-country) actions to reduce tax avoidance potentially accelerate a “race to the bottom” if a sufficient number of companies can avoid the negative effects of those actions by shifting income, production, or tax avoidance to other jurisdictions.

Finally, in examining the differential impact of tax enforcement policies on domestic versus multinational firms, we extend the literature that examines taxpayer behavior in response to enforcement. Although prior studies have examined the relation between perceived enforcement strength and corporate tax burdens (e.g., Atwood, Drake, Myers and Myers 2012), we test whether there is a differential relation between actual enforcement expenditures and corporate tax avoidance across domestic firms and MNEs. Additionally, in contrast to single-country studies (e.g., Hoopes, Mescall and Pittman 2012; Gupta and Lynch 2016, Nessa, Schwab, Stomberg and Towery 2018), we exploit a cross-country setting to enhance our understanding of the enforcement-avoidance relation around the world. This feature of our study is particularly important because businesses in the U.S. and worldwide continue to expand and operate globally. Our rich data also allow us provide insight into the incidence of tax enforcement on different types of firms, triangulate inferences from prior work, and strengthen estimates of the economic effects of increased enforcement on tax avoidance.

We conclude with two caveats. First, we measure enforcement with noise because we observe only enforcement spending. Although this approach is consistent with prior work (Gupta and Lynch 2018; Nessa et al., 2018), it does not allow us to speak to the relative effectiveness of individual enforcement techniques. Further, if enforcement spending changes are not highly correlated with increases in actual enforcement actions (e.g., if a small change in enforcement spending for automation yields a significant increase in compliance), we may fail to document

the true association between enforcement and tax avoidance. Second, we examine the effect of one-year changes in enforcement spending with current-year tax avoidance. Our results therefore are most likely to capture the immediate deterrence effect of enforcement; we likely understate the effects of increased compliance through audits. Nonetheless, we believe our findings are useful to researchers, policy makers, shareholders, citizens, and tax administrators globally (e.g., the Forum on Tax Administration).

## **II. BACKGROUND AND HYPOTHESIS DEVELOPMENT**

### **Related Literature**

Enforcement is a critical component to any tax system because it enumerates the rules and procedures that taxpayers and tax authorities follow to ensure compliance (Slemrod and Gillitzer 2014). Enforcement efforts can be targeted at increasing compliance by simplifying reporting requirements, involving third-party agents in the tax remittance process, etc. Enforcement efforts also involve actions to improve detection and punishment of non-compliance through greater information reporting, random and targeted audits, and penalty assessments. Tax authority initiatives can deter evasion and promote compliance through both general deterrence, which influences taxpayers' *perceived* probability of detection, and specific deterrence, which influences the behavior of those taxpayers that have *actually* been audited (Slemrod 2015).

Specific attention to corporate tax enforcement has increased over time, particularly after the Global Financial Crisis of 2008 (Slemrod 2015). In both the U.S. and abroad, the notion that paying income taxes is an element of good corporate citizenship has emerged along with a culture of shaming large MNEs for their aggressive tax practices. In the U.K., Starbucks, Google and Amazon all came under fire in 2012 and 2013 for seemingly paying insufficient tax on their

British profits. Similarly in the U.S., companies like Walgreens and Pfizer have been labelled corporate tax dodgers for considering inversions, and other multinational entities like Caterpillar, HP and Microsoft have been scrutinized (and subjected to Senate inquiry) for tax-motivated income shifting and tax haven operations.<sup>3</sup>

In response, tax administrators worldwide have taken steps to stem the potentially abusive tax practices of multinational corporations. For example, Stephen Timms, financial secretary to the Treasury in the U.K. characterized tax as a moral issue in a 2009 speech and pledged U.K. tax administrators would take action to combat tax avoidance by increasing disclosure requirements and penalties (Treanor 2009). In the U.S., the IRS launched several initiatives in 2010 specifically aimed at targeting transfer pricing. These efforts included identifying personnel with transfer pricing specialization to deploy on key audits, establishing a transfer pricing practice in the large taxpayer division and establishing a dedicated transfer pricing council (PwC 2010). Finally, the OECD developed Base Erosion and Profit Shifting (BEPS) recommendations and reports, including revised standards for transfer pricing documentation, requirements for economic activities to be co-located with profits, and country-by-country (CbC) reporting. According to the OECD, BEPS more generally “provides governments with solutions for closing the gaps in existing international rules that allow corporate profits to “disappear” or be artificially shifted to low/no tax environments.” The CbC reporting standards “give tax administrations a global picture of the operations of multinational enterprises.”<sup>4</sup> As of May 16, 2018, 69 countries have signed the multilateral agreement on the

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<sup>3</sup> See, for example, “Google, Amzaon, Starbucks: The rise of ‘tax shaming’” in BBC News Magazine and “Walgreens Ponders \$4 Billion Tax Dodge” in HuffPost.

<sup>4</sup>Both quotes from a May 10, 2015 OECD press release available at <http://www.oecd.org/tax/oecd-presents-outputs-of-oecd-g20-beps-project-for-discussion-at-g20-finance-ministers-meeting.htm>.

exchange of CbC reports.<sup>5</sup> In short, tax administrators around the globe recognize potential problems related to MNE tax avoidance and have begun taking steps to curb potentially aggressive or abusive practices.

Because of the recent focus on corporate tax avoidance and enforcement efforts, a growing stream of literature in accounting examines the relation between various tax authority enforcement initiatives and corporate taxpayer behavior. Interestingly, some of these studies document that the benefits of effective corporate tax enforcement reach beyond increased tax compliance to have positive effects on other aspects of corporate behavior such as financial reporting quality (Hanlon, Hoopes and Shroff 2014) and increased shareholder returns (Desai, Dyck and Zingales 2007). Below, we summarize related accounting studies that investigate the relation between enforcement and corporate taxpayer behavior regarding income taxes.<sup>6</sup>

Atwood et al. (2012) examine how various home-country tax system characteristics across 22 countries affect corporate tax avoidance. Using a measure of perceived enforcement for a single year, they find that tax avoidance is lower in countries where perceived enforcement is stronger; when perceived enforcement increases from the 25<sup>th</sup> to the 75<sup>th</sup> percentile, tax avoidance decreases by roughly 19 percent relative to the sample mean.<sup>7</sup> These findings are consistent with the beneficial effects of general deterrence – an increased expected probability of detection, interest and penalties deters tax evasion by increasing the expected cost of evasion. The authors also document lower levels of tax avoidance in countries with higher levels of book-

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<sup>5</sup> From “Signatories of the Multilateral Competent Authority Agreement on the Exchange of Country-by-Country reports (CbC MCAA) and Signing Dates.” Available from the OECD at: <http://www.oecd.org/tax/automatic-exchange/about-automatic-exchange/CbC-MCAA-Signatories.pdf>.

<sup>6</sup> See Slemrod (2015) for a detailed review of economics studies that examine the impact of various tax enforcement efforts on a broad range of taxpayers, including individuals.

<sup>7</sup> Atwood et al. (2012) measure perceived tax enforcement using the tax evasion index from the 1996 *World Competitiveness Report*. The index is derived from a survey of 2,000 executives per country who respond on a scale of 1 to 6 their agreement with the statement “Tax evasion is minimal in your country.”

tax conformity and in countries that use a worldwide (as opposed to territorial) system of taxation. Similarly, Hoopes et al. (2012) provide evidence that tax avoidance among public U.S. corporations decreases when the probability of audit is higher. Using TRAC data on audit rates by firm size, the authors estimate that an increase in audit probability from the 25<sup>th</sup> to 75<sup>th</sup> percentile increases cash effective tax rates (ETR) by seven percent relative to the sample mean. Both studies focus on the effects of perceived detection at the country-level, and both samples largely predate the Global Financial Crisis.

Gupta and Lynch (2016) focus on the effect of changes in state-level tax enforcement expenditures on aggregate state tax collections. The authors estimate that a one dollar increase in current period state tax expenditures is associated with an eight to eleven dollar increase in state tax collections two years in the future. Additionally, the authors provide evidence that the magnitude of the effect of enforcement spending varies by state; future collections are lower in states with more restrictive tax policies. Similarly, Nessa et al. (2018) document a positive association between IRS enforcement expenditures and aggregate collections from large public taxpayers corporate taxpayers.<sup>8</sup> Although Nessa et al. (2018) focus on a sample of audited returns to examine the association between IRS enforcement spending and audit outcomes, their study does not address specific deterrence because they do not examine taxpayer behavior after audit. Shevlin, Thornock and Williams (2017) address specific deterrence by examining how firms respond to tax forgiveness. Using state tax amnesties as a setting, the study finds that firms headquartered in states that have previously granted tax amnesty increase their state income tax avoidance relative to firms in other states. The authors conclude that amnesty programs, which

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<sup>8</sup> The authors document similar results when using actual audit hours per audited return in lieu of total enforcement expenditures.

jurisdictions offer with the objective of expanding the tax base and increasing compliance, can have a negative impact on corporate tax collections.

Our study extends this line of literature in the following ways. First, we examine how enforcement effects differ for domestic versus multinational firms. Our analysis of how enforcement spending differentially affects domestic and multinational firms is timely and important given much public outrage, media coverage and tax administrator focus related to the tax avoidance of MNEs. Second, our research design leverages a country-year measure of enforcement spending to exploit cross-sectional and time series variation and focus on actual enforcement spending instead of perceived enforcement. In doing so, we improve identification to refine our understanding of the effect of tax enforcement on tax avoidance and improve estimation of the economic effects of tax enforcement on corporate tax avoidance.

### **Hypothesis Development**

Our research design assumes that higher enforcement spending is positively correlated with increased enforcement actions such as more frequent or more in-depth audits, increased automation to better detect noncompliance and select returns or issues for review, development of new forms or schedules for increased reporting and associated taxpayer education, etc. Thus, we assume increased enforcement spending increases the average corporate taxpayer's expected cost of tax avoidance. We also assume the average corporate taxpayer will engage in tax avoidance until the expected cost of doing so exceeds the benefit. As the expected cost of tax avoidance increases, we expect taxpayers will avoid less tax.

However, if the tax authority is at a local optimum with respect to the level of tax enforcement, small changes in enforcement spending may have insignificant effects on corporate tax avoidance. Indeed, Ayers, Seidman and Towery (2018) find no change in the level of tax

avoidance for large corporate taxpayers that become part of the IRS' Coordinated Industry Case program, under which taxpayers are essentially under continuous audit. The authors conclude this enforcement program does not have incremental deterrence effects relative to the standard enforcement actions to which large corporations are already subject.

Although this prediction speaks to the effect of enforcement on the “average” corporate taxpayer, the effects could vary based on whether the average taxpayer is a domestic entity or a MNE. For example, in the U.S., large corporate taxpayers (that also tend to be multinational) face a higher probability of audit (e.g., Hoopes et al. 2012). Further, Ayers et al. (2018) find that geographic segments, foreign sales and foreign tax expense are all significant predictors of a corporation's inclusion in the IRS' Coordinated Industry Case program. Thus, if existing enforcement efforts are already predominately focused on MNEs, increased enforcement spending may have little incremental effect on those taxpayers. Instead, the tax authority may experience greater returns on enforcement spending by targeting previously unaudited domestic corporations.

Additionally, by nature of their business operations, MNEs can shift income out of their home country to other jurisdictions or otherwise use their foreign operations to avoid more tax in countries where the cost of tax avoidance is lower. MNEs can achieve this objective through production location decisions (e.g., relocating labor and capital) and through strategic transfer pricing. In contrast, domestic entities' business activities are entirely contained in their home country. Thus, these entities face a greater cost of restructuring their business operations to reduce the amount of income reported in their home country relative to MNEs. Overall, domestic entities face a more restrictive set of tax planning opportunities because all of their income and opportunities for income tax avoidance are concentrated in one country. Although many recent

enforcement efforts have been targeted at MNEs, MNEs are the entities best suited to quickly and agilely respond to an increased cost of home-country tax avoidance.

On the other hand, because MNEs have been the stated focus of increased global enforcement, it could be the case that additional enforcement spending is targeted toward MNE tax avoidance (e.g., income shifting). In this case, we would expect no effect of the enforcement spending increases on domestic companies. Further, the effect on MNEs would depend on how nimbly those entities can respond to and circumvent these incremental and targeted enforcement actions. Because there is justification in support of multiple outcomes, we state our hypothesis in the null:

***H:** The effect of changes in tax enforcement spending on corporate tax avoidance is the same for both domestic and multinational corporations.*

### III. RESEARCH DESIGN

#### Research Design

We test our hypothesis using the following regression:

$$\begin{aligned}
 Tax\ Avoid = & \alpha + \beta_1 \% \text{ Change in Enforcement} + \beta_2 Domestic\ Firm \\
 & + \beta_3 \% \text{ Change in Enforcement} * Domestic\ Firm \\
 & + \gamma Controls + Country\ Fixed\ Effects \\
 & + Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon
 \end{aligned} \tag{1}$$

We follow Atwood et al. (2012) in the construction of our outcome variable, *Tax Avoid*. The variable captures tax avoidance by measuring actual cash taxes paid in year  $t$  relative to an expected amount. Specifically, *Tax Avoid* is increasing in tax avoidance and equals the expected tax on pre-tax earnings computed using the “home-country statutory corporate tax rate less the

taxes actually paid, expressed as a percentage of pre-tax earnings” (Atwood et al. 2010, p. 1837).

This measure is therefore increasing in tax avoidance. We denote firm and year subscripts with  $i$  and  $t$ , respectively, and estimate *Tax Avoid* as:

$$Tax\ Avoid_{it} = \frac{(PTI * \tau)_{it} - CTP_{it}}{PTI_{it}} \quad (2)$$

Where:

$PTI$  = pre-tax earnings less special items (PI-SPI)

$\tau$  = home-country statutory corporate income tax rate (STR), obtained from KPMG

$CTP$  = current taxes paid, measured as total tax expense less deferred taxes (TXT-TXDI)

This measure is particularly useful in cross-country analysis because effective tax rate (ETR) measures are not comparable across countries due to differences in statutory tax rates. Whereas Atwood et al. (2012) measure *Tax Avoid* over three years, we compute *Tax Avoid* every year in order to exploit our data on the annual variation in enforcement spending and thus improve identification.

We measure changes in enforcement spending (*% Change in Enforcement*) as the change from year  $t-1$  to  $t$  in total country-level tax enforcement expenditures. Our hypothesis predicts the relation between *% Change in Enforcement* and *Tax Avoid* does not vary based on whether the firm is domestic or multinational. Our variable of interest is therefore *% Change in Enforcement \* Domestic Firm*. Estimating  $\beta_3 \neq 0$  in equation (1) allows us to reject the null hypothesis of no differential effect. Estimating  $\beta_3 < 0$  would be consistent with a negative association between tax enforcement and domestic firm tax avoidance. We classify firms as domestic if they have zero or missing values for foreign currency adjustments (Compustat Global *FCA*), or if firms are incorporated in the U.S. or Canada, and have zero or missing values for pre-tax foreign income (Compustat North America *PIFO*).

We also include a robust set of control variables to account for both firm and country characteristics, and fixed effects. We control for firm profitability (*Pre-Tax ROA*, *Prior Year Loss*, *Sales Growth*) and the country-level statutory tax rate (*Statutory Tax Rate*) to control for firms' incentives to avoid tax. Data for statutory tax rates come from KPMG and take into account all income taxes a firm is subject to, including those at different levels of government jurisdictions (e.g., federal, state, county, and municipal levels). We also control for tax avoidance opportunities. *PP&E*, *Leverage* and *R&D* control for tax incentives typically associated with investments in capital assets, research and development activities, and the for tax benefits of debt. We also include controls for cash holdings (*Cash*) and firm size ( $\ln(\text{Assets})$ ) because these factors have been shown in prior literature to affect incentives for tax avoidance (e.g., Edwards et al. 2016; Law and Mills 2016; Zimmerman 1983).

We obtain a measure of *Income Inequality* from the World Bank to capture overall public sentiment about corporate tax avoidance, which could influence enforcement. The measure is increasing in income inequality, and ranges from zero to 100, with 100 representing a single individual holding the entirety of a country's wealth and zero representing a perfectly equal distribution of wealth among every citizen in the country. We also control for country-level GDP per capita ( $\ln(\text{GDP per capita})$ ) and *GDP Growth* to account for overall economic activity within the country. Country-level data on the annual level of GDP per capita and annual GDP growth come from the World Bank. Finally, we include country, year, and industry fixed effects computed using two digit SIC codes. This fixed effects structure affords a strong research design because it allows us to hold constant various unobservable or difficult-to-measure, time-invariant country-level characteristics that could influence our results. Because we include these fixed effects, we are estimating the effects of within-country variation in year-over-year enforcement

spending changes on corporate tax avoidance. All continuous variables in our regressions (including *Tax Avoid*) are winsorized at the 1<sup>st</sup> and 99<sup>th</sup> percentiles, and we include t-statistics based on standard errors clustered by firm.

## **Sample**

Our data on enforcement expenditures come from the OECD's Tax Administration Comparative Information Series and are available from 2005 to 2013. The stated purpose of the Series is to "share information that will facilitate dialogue among tax officials and other stakeholders on important tax administration issues." We obtain firm-level data from Compustat Global and Compustat North America. Country-level data on per capita GDP comes from the World Bank. Our final dataset consists of 110,480 firm-year observations from 46 different countries. Because our variable of interest captures one-year changes in enforcement spending, our analysis spans from 2006 through 2013. We retain only those countries with at least 50 observations in the sample.

Figure 1 presents the simple average of tax enforcement spending as a percentage of the 2006 level of spending for each year in our sample period. On average across the 46 countries in our sample, tax enforcement spending has monotonically increased over our sample period. For comparison, we limit the sample to the U.S. in Figure 2 and find that the increasing trend of tax enforcement spending was disrupted and ultimately reversed following the Financial Crisis, consistent with a wave of significant reductions to the IRS' budget.<sup>9</sup>

[Insert Figures here]

Table 1 describes the sample. On average and at the median *Tax Avoid* is positive, suggesting some level of tax avoidance in our sample. Comparing our values to Atwood et al.

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<sup>9</sup> See Nessa et al. (2018) for further detail on recent IRS budget cuts.

(2012), we report a mean of 0.152 whereas they report a smaller mean of 0.084. Because of differences in sample composition both in terms of the years and countries included, we are not able to reconcile these differences.<sup>10</sup> About 45 percent of firms in the sample are domestic. Sample firms report average (median) *Pre-Tax ROA* of 9.7 (0.067) and *Sales Growth* of 16.6 (7.7) percent. 12.3 percent of observations report a loss (i.e., pre-tax income less than zero) in year *t-1*. Sample firms are also large, with over \$1 billion of assets on average (untabulated).

[Insert Table 1 here]

Panel B of Table 1 shows descriptive statistics for key variables by country. We comment on a few select observations. First, the three countries with the most observations in our sample are the U.S. (23,600 firm years; 21.3 percent of the sample), Japan (19,034 firm-years; 17.2 percent of the sample), and India (10,826 observations; 9.8 percent of the sample). Fourteen other countries contribute at least one percent of observations to the sample. Thus, we have substantial variation in the country-level composition of our sample. The average value of % *Change in Enforcement* is positive for 40 of the 46 countries in the sample, with Argentina reporting the largest average annual increase of 29.2 percent. Argentina increased its enforcement spending by almost 20 percent each year from 2006 through 2013. This statistic is not surprising given Argentina's struggle to combat evasion; some estimates suggest evasion was as high as 30 percent in the early 2000s (Altman 2002) and remains high today (GAN 2016). Six countries report an average decline in enforcement spending, including the U.K. *Tax Avoid* is positive on average in a majority of sample countries.

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<sup>10</sup> We note that only 30 percent of observations in Atwood et al. (2012) report multinational activities whereas nearly 55 percent of our sample does. Thus, one potential explanation for the larger amount of tax avoidance we observe in our sample could be due to the presence of more multinational firms. We note that the percentage of multinational firms in our sample also increases over time, with about 48 percent of the sample consisting of multinational firms in the earlier years of our sample and 61 percent of the sample consisting of multinational firms in the final year of our sample (2013).

We note substantial variation in the statutory corporate tax rate, from a high of 40 percent for both the U.S. and Japan, to a low of 10.4 percent for Cyprus and Bulgaria. Recall that the reported statutory rate of 40 percent for the U.S. is higher than the Federal rate of 35 percent because in their determination of corporate tax rates across countries, KPMG takes into account federal, state, county and municipal taxes. The percentage of domestic firms also varies substantially by country, from a low of only 3.8 percent of Korean firms to a high of 74.9 percent of firms in the U.K.. Finally, we note wide variation in our measure of *Corruption*, with Denmark, New Zealand, and Finland ranked by the Kaufman Indices at the World Bank as being, on average, the least corrupt countries in our sample during the sample period, and Argentina, India, and Russia ranked as the most corrupt countries in our sample during the sample period. We provide more detail on this measure of corruption in Section IV.

Table 2 provides Pearson correlations. We observe a small but significantly negative correlation of -0.006 percent between *% Change Tax Enforcement* and *Tax Avoid*. As expected, we note that *Tax Avoid* is positively correlated with the statutory corporate tax rate (*STR*) consistent with firms avoiding more tax when the economic benefits of tax avoidance are greater. We also note positive correlations between *Tax Avoid* and *PP&E*, *Leverage*, and *R&D*. Finally, we document a positive correlation between *Income Inequality* and *Tax Avoid*. For a more robust analysis of how tax enforcement affects domestic vs. multinational firms, we next turn to multivariate regression analysis.

[Insert Table 2 here]

## IV. RESULTS

### Primary Analysis

Table 3 presents results of our primary analysis. In column (1), we estimate equation (1) without including the interaction of *% Change in Enforcement* and *Domestic*. This baseline analysis allows us to provide evidence of the average global effect of enforcement changes on corporate tax avoidance. We estimate a significant negative coefficient on *% Change in Enforcement* consistent with general deterrence resulting in a decrease in tax avoidance. The coefficient estimate of -0.095 suggests that a one standard deviation increase in enforcement spending is associated with about a 4.8 percent reduction in *Tax Avoid* relative to the mean.<sup>11</sup> Thus, increases in enforcement spending have both a statistically and economically significant effect on corporate tax avoidance.

In column (2), we formally test our hypothesis, which predicts an insignificant coefficient estimate on *% Change in Enforcement \* Domestic*. However, we estimate a negative and significant coefficient of -0.275 (two-tailed p-value < 0.01). This coefficient estimate suggests that a one standard deviation increase in enforcement spending is associated with an approximate 13.9 percent decrease in *Tax Avoid* for domestic firms, relative to no effect for multinational

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<sup>11</sup> We estimate this magnitude by multiplying the estimated coefficient (-0.095) by the standard deviation of *% Change in Enforcement* (0.077), then dividing by the sample mean of *Tax Avoid* (0.152). Atwood et al. (2010) estimate that moving from the 25<sup>th</sup> to 75<sup>th</sup> percentile of perceived enforcement is associated with a 19 percent decrease in *Tax Avoid* relative to the mean. We estimate an interquartile change in enforcement spend is associated with a 4.2 percent reduction in *Tax Avoid* relative to the mean. The differences in estimated economic effects could reflect differences in research designs (e.g., the fact that we include time- and country-fixed effects), differences in the effects of actual versus perceived enforcement or differences in enforcement effects over time.

firms.<sup>12</sup> In raw terms, a one standard deviation increase in enforcement spending is associated with an approximate 11.8 percent decrease in *Tax Avoid* for domestic firms.<sup>13</sup>

To validate the robustness of our results, in columns (3) and (4) of Table 3 we re-estimate equation (1) using *Log(Enforcement)* as an alternative measure of enforcement spending.

*Log(Enforcement)* is the natural log of total country-level tax enforcement expenditures in year *t*.

We continue to observe a negative and significant relation between the interaction

*Log(Enforcement) \* Domestic Firm* and *Tax Avoid* when using this alternative measure.

We therefore reject the null hypothesis that global changes in tax enforcement do not differentially impact domestic and multinational firms. Instead, we find the effect is concentrated among domestic firms in the sample. This result is consistent with the notion that MNEs can more nimbly respond to changes in tax enforcement than domestic entities. Thus, despite much public discussion of increased enforcement efforts being necessary to curb the harmful tax practices of MNEs, our evidence suggests that on average, from 2006 through 2013, increases in tax enforcement expenditures did not alter the total tax avoidance of MNEs. Instead, the increase in tax payments was borne solely by domestic firms.

[Insert Table 3 here]

An alternate explanation for the results in Table 3 is that domestic firms are simply smaller than multinational firms, and that larger firms in general (and not specifically MNEs) are better able to avoid taxes because they have more resources to devote to tax planning. To test whether our results are simply an artifact of firm size, we re-estimate equation (1) after replacing

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<sup>12</sup> We multiply the estimated coefficient (-0.275) by the standard deviation of % *Change in Enforcement* (0.077), then divide by the sample mean of *Tax Avoid* (0.152).

<sup>13</sup> We multiply the sum of the estimated coefficient on the main effect of % *Change in Enforcement* (0.042) and the estimated coefficient on the interaction term (-0.275) by the standard deviation of % *Change in Enforcement* (0.077), then divide by the sample mean of *Tax Avoid* (0.152).

*% Change in Enforcement \* Domestic* with *% Change in Enforcement \* Small* (untabulated). We set *Small* equal to one if the firm-year observation has below median sample assets. We find no differential effect based on firm size in the full sample, in a subsample of domestic firms, or in a subsample of MNEs. We also re-estimate equation (1) after partitioning the full sample based on above- or below-median firm size (untabulated) and inferences are consistent with results presented in Table 3. Specifically, we estimate negative and significant coefficients on the interaction term *% Change in Enforcement \* Domestic* in both the above- (-0.339,  $p < .01$ ) and below-median (-0.250,  $p < .05$ ) size subsamples, but no statistically significant relation between the change in enforcement spending and tax avoidance for MNEs. Given the results of these falsification tests, we conclude that results in Table 3 are more consistent with MNEs having the ability to circumvent increased enforcement in their home country than with firm size driving the result.

[Insert Table 4 here]

### **Time-Series Analysis**

In our next set of tests, we explore how the relation between changes in enforcement spending and tax avoidance has evolved over time. Given increased public outrage over MNE tax avoidance activities following the Financial Crisis, we examine whether the differential effect of tax enforcement spending increases on corporate tax avoidance is attenuated in more recent years. In Table 4, we report results of re-estimating equation (1) after bifurcating the sample to include observations from 2006 through 2009 in one subsample and observations from 2010 through 2013 in another. We note that in both time periods, domestic firms are differentially more affected by tax enforcement than multinational firms. However, contrary to the supposed increased focus on the tax avoidance activities of multinational firms in recent

years, we find that the effects on enforcement changes on domestic firms increases in the more recent time period by over 30 percent, from -0.238 (two-tailed p-value < 0.10) to -0.310 (two-tailed p-value < 0.01). In terms of economic magnitudes, using (untabulated) sub-sample descriptive statistics for the early versus later sample years, these coefficient estimates suggest that a one standard deviation increase in enforcement spending is associated with an approximate 12.3 percent decrease in *Tax Avoid* for domestic firms in the early period versus an approximate 15.2 percent decrease in the later period, relative to no effect for multinational firms in either period.<sup>14</sup> In raw terms, a one standard deviation increase in enforcement spending is associated with an approximate 10.9 percent decrease in *Tax Avoid* for domestic firms in the early period, versus an approximate 16.2 percent decrease in the later period.<sup>15</sup> We interpret this result as evidence that relative to multinational firms, domestic firms are affected even *more* by changes in enforcement in recent years following the Global Financial Crisis.

[Insert Table 4 here]

### **Strength of Government Institutions as a Moderator**

Procedural fairness is a fundamental pillar of tax compliance. To explore whether our results are driven by countries with weak government institutions that lack procedural fairness, we next examine how our main results vary with country-level corruption. Corruption in a country can undermine tax compliance, both directly through bribes or exchanges of favors, and

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<sup>14</sup> For the early period, we multiply the estimated coefficient (-0.238) by the standard deviation of % *Change in Enforcement* for this sub-sample (0.076), then divide by the sub-sample mean of *Tax Avoid* (0.148). For the later period, we multiply the estimated coefficient (-0.310) by the standard deviation of % *Change in Enforcement* for this sub-sample (0.076), then divide by the sub-sample mean of *Tax Avoid* (0.156).

<sup>15</sup> For the early period, we multiply the sum of the estimated coefficient on the main effect of % *Change in Enforcement* (0.026) and the estimated coefficient on the interaction term (-0.238) by the sub-sample standard deviation of % *Change in Enforcement* (0.076), then divide by the sample mean of *Tax Avoid* (0.148). For the later period, we multiply the sum of the estimated coefficient on the main effect of % *Change in Enforcement* (-0.021) and the estimated coefficient on the interaction term (-0.310) by the sub-sample standard deviation of % *Change in Enforcement* (0.076), then divide by the sample mean of *Tax Avoid* (0.156).

indirectly through its effect on voluntary compliance. Corruption often arises when citizens and government officials lack respect for the stated rules that govern their interactions. Corruption also measures the extent to which public officials are captured or controlled by private interests (Kaufman et al. 2010). Beck et al. (2011) document a positive association between corruption and tax evasion. Further, DeBacker et al. (2015) find that U.S. corporations with owners from more corrupt countries evade more tax in the U.S., and that increased enforcement efforts measured using the implementation of Sarbanes-Oxley and Schedule M-3 were less effective in reducing tax evasion by corporations whose owners are from corrupt countries. The authors conclude these results indicate the “resistance of corruption norms against legal enforcement” (p. 124).

Given these prior findings, we expect a smaller differential effect of changes in enforcement on domestic firms in countries with high levels of corruption because these firms have more opportunities to evade tax to substitute for a reduction in the ability to legitimately avoid taxes arising from increased enforcement spending. To test this conjecture, we re-estimate equation (1) after partitioning the sample based on below- or above-median measures of corruption. We use data on “Control of Corruption” from the World Bank Indices as developed by Kaufman et al. (2010). Control of corruption represents perceptions of corruption within a country or the extent to which individuals and entities can use their public power for private gains. We multiply “Control of Corruption” from Kaufmann et al. (2010) by negative one such that *Corruption* is increasing in government corruption.

We present results in Table 5. In columns (1) and (2), we split our sample based on median *Corruption*. We first note that in both the high and low corruption subsamples we continue to find a negative and significant coefficient on the interaction % *Change in*

*Enforcement \* Domestic Firm*. However, we also note that in terms of absolute value, we estimate a smaller effect of % *Change in Enforcement* on the tax avoidance of domestic firms in countries with high levels of corruption. Although this result is consistent with prior literature, it highlights a surprising and potentially counterintuitive finding that domestic firms suffer a greater effect of enforcement changes in *less* corrupt countries. This result also demonstrates that our main finding that domestic firms are disproportionately affected by increases in tax enforcement is not isolated within countries lacking strong institutions. To gauge the sensitivity of this analysis, we re-perform the test splitting the sample based on median *Government Effectiveness*, which represents the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. These data are also from the World Bank Indices as developed by Kaufman et al. (2010); countries are assigned a score ranging from -2.5 to 2.5.

We present results in columns (3) and (4). We estimate a negative and significant coefficient in the interaction % *Change in Enforcement \* Domestic Firm* in the high government effectiveness subsample. Thus, consistent with results obtained using *Corruption*, we find the disproportionate effect of increased tax enforcement on domestic firms is evident in countries with strong government institutions. We also confirm in untabulated analysis that our main results (Table 3) are robust to controlling for a firm's political connectedness within its home country. Furthermore, we find no differential effect of tax enforcement changes based on the extent to which a firm is politically connected. Thus, it appears that even politically connected domestic firms cannot can mitigate the incrementally negative effects of increased tax

enforcement on their tax avoidance. These results suggest it is the opportunities to avoid tax in the home country, and not the opportunity to gain political favors, that explains our main result.

[Insert Table 5 here]

### **Analysis Using a Subsample of only U.S. Incorporated Firms**

One possible concern is that our analysis is driven by firms in countries with non-comparable regulatory environments. We attempt to control for cross-country differences by including the statutory tax rate, per capita GDP, growth in total GDP, and country-level income inequality in all specifications. We also include country-level fixed effects in our analyses to control for time-invariant unobservable differences across countries. Nonetheless, to demonstrate that our results are not driven by countries with poor regulatory environments, we conduct our final set of analysis using a single-country setting. In particular, we re-estimate equation (1) using a subsample of firms incorporated in the U.S. Table 6 presents the results of this single-country analysis.<sup>16</sup>

In Table 6, column (1) presents the results of estimating equation (1) using *Tax Avoid* as the dependent variable. We note a negative and significant coefficient on our variable of interest, *% Change in Enforcement \* Domestic Firm*, suggesting that relative to U.S. multinational firms, U.S. domestic firms bear a greater burden of increased U.S. tax enforcement spending. Conversely, because U.S. tax enforcement spend has generally decreased since the Financial Crisis (Figure 2), one potential implication of this result is that U.S. domestic firms benefited the *most* from decreases in tax enforcement in recent years.

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<sup>16</sup> As there is no variation in the statutory tax rate in the U.S. during our sample, we omit *Statutory Tax Rate* from the regression. Similarly, as it is in a single-country analysis, we omit country fixed effects.

Although *Tax Avoid* is useful in cross-country analyses, we exploit the U.S., single-country setting to investigate whether our inferences are robust to an alternative measure of tax avoidance. We believe using an alternative measure is important because much of the literature on corporate tax avoidance is focused on U.S. firms and uses cash ETR as a primary measure of tax avoidance. We follow prior research (Dyreng et al. 2008) and measure the cash ETR as cash taxes paid (Compustat TXPD), scaled by pre-tax income (PI). We also follow prior research in winsorizing the cash ETR at 0 and 1.

Column (2) of Table 6 presents the results of re-estimating equation (1) on the sample of U.S. firms using the one-year *Cash ETR*, instead of *Tax Avoid*, as the dependent variable. Unlike *Tax Avoid*, a measure that is increasing in tax avoidance, *Cash ETR* is decreasing in tax avoidance. We find consistent results when using the *Cash ETR* as an alternative measure of tax avoidance; relative to U.S. multinational firms, U.S. domestic firms bear a greater burden of increased tax enforcement (i.e., we estimate a positive and significant coefficient on *% Change in Enforcement \* Domestic Firm*). We also note that when using *Cash ETR* as an alternative measure of tax avoidance, we estimate a positive and significant coefficient on *% Change in Enforcement*, suggesting that increases in tax enforcement in the U.S. are associated with a higher Cash ETRs, and thus a decrease in tax avoidance, for MNEs on average.

To estimate economic magnitudes, we use (untabulated) descriptive statistics for the sub-sample of U.S. firms. Using *Tax Avoid* as the measure of tax avoidance, the coefficient estimate suggests that a one standard deviation increase in U.S. enforcement spending is associated with an approximate 6.1 percent decrease in *Tax Avoid* for U.S. domestic firms relative to U.S. MNEs.<sup>17</sup> In raw terms, a one standard deviation increase in U.S. enforcement spending is

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<sup>17</sup> We multiply the estimated coefficient on the interaction term (-0.805) by the standard deviation of *% Change in Enforcement* for this sub-sample (0.031), then divide by the sub-sample mean of *Tax Avoid* (0.405).

associated with an approximate 11.1 percent decrease in *Tax Avoid* for U.S. domestic firms, versus an approximate 5.0 percent decrease for U.S. MNEs.<sup>18</sup> Using *Cash ETR* as the measure of tax avoidance, we estimate an approximate 5.5 percent decrease in *Cash ETR* for U.S. domestic firms relative to U.S. MNEs.<sup>19</sup> In raw terms, a one standard deviation increase in U.S. enforcement spending is associated with an approximate 13.8 percent decrease in *Cash ETR* for U.S. domestic firms, versus an approximate 8.2 percent decrease for U.S. MNEs.<sup>20</sup>

[Insert Table 6 here]

## V. CONCLUSIONS AND FUTURE WORK

In light of a recent, heightened focus on the tax avoidance of large MNEs, we examine whether changes in tax enforcement spending affects domestic corporations and locally-headquartered MNEs equally. To address this question, we use annual data on tax administration expenditures by 46 countries from 2006 through 2013. These data allow for strong identification because they provide both time-series and cross-country variation in actual enforcement expenditures. Thus, we can exploit a multi-level fixed effect design that includes both country- and year- fixed effects, and allows us to draw more causal inferences. Consistent with prior work (e.g., Atwood et al. 2012), we estimate a negative association between changes in enforcement spending and the level of subsequent tax avoidance on average. However, this entire effect is

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<sup>18</sup> For U.S. domestic firms, we multiply the sum of the estimated coefficient on the main effect of % *Change in Enforcement* (-0.664) and the estimated coefficient on the interaction term (-0.805) by the sub-sample standard deviation of % *Change in Enforcement* (0.031), then divide by the sample mean of *Tax Avoid* (0.405). For U.S. MNEs, we multiply the estimated coefficient on the main effect of % *Change in Enforcement* (-0.664) by the sub-sample standard deviation of % *Change in Enforcement* (0.031), then divide by the sample mean of *Tax Avoid* (0.405).

<sup>19</sup> We multiply the estimated coefficient on the interaction term (0.419) by the standard deviation of % *Change in Enforcement* for this sub-sample (0.031), then divide by the sub-sample mean of *Cash ETR* (0.233).

<sup>20</sup> For U.S. domestic firms, we multiply the sum of the estimated coefficient on the main effect of % *Change in Enforcement* (0.624) and the estimated coefficient on the interaction term (0.419) by the sub-sample standard deviation of % *Change in Enforcement* (0.031), then divide by the sample mean of *Cash ETR* (0.233). For U.S. MNEs, we multiply the estimated coefficient on the main effect of % *Change in Enforcement* (0.624) by the sub-sample standard deviation of % *Change in Enforcement* (0.031), then divide by the sample mean of *Cash ETR* (0.233).

concentrated among *domestic* firms. It therefore appears that, despite increased international focus on the tax avoidance activities of MNEs, domestic entities bear the brunt of increased enforcement spending. We attribute the result to domestic firms having fewer tax planning opportunities. Specifically, domestic firms cannot shift income out of their home country to avoid the increased expected costs of heightened enforcement or offset an increased domestic tax burden with reduced tax liabilities elsewhere. In future work, we intend to test the mechanisms through which MNEs maintain their level of tax avoidance even when home-country tax enforcement is increasing.

Additional findings suggest that the negative relation between changes in tax enforcement spending and domestic tax avoidance has increased in magnitude in recent years. Furthermore, the differential effect of enforcement on domestic firms is attenuated in more corrupt countries and those with less effective governments where domestic firms are more likely able to evade taxes or resources are spent inefficiently. Finally, we find these effects generally hold in a single-country analysis of U.S. firms. In future extensions, we intend to exploit the richness of our data by examining different components of enforcement spending to determine which appear to have the most impact on corporate tax avoidance.

A unique feature of our study is that we test for differential responses to increases in tax enforcement based on firms' relative ability to avoid tax in one specific jurisdiction. Our findings have policy implications; single-country tax enforcement actions potentially disadvantage domestic firms such that there may be benefits to multi-country tax harmonization. Our study also extends the literature that examines taxpayer behavior in response to enforcement (e.g., Atwood et al. 2012; Hoopes et al. 2012; Gupta and Lynch 2016) by exploiting cross-country and

time-series changes in real enforcement spending and expanding the sample to include more recent years.

Although we measure enforcement with error and cannot address the relative effectiveness of individual enforcement techniques, we nonetheless believe our findings are useful to researchers, policy makers, shareholders, citizens, and tax administrators. We hope future studies can further extend our work by studying the effects of additional enforcement measures.

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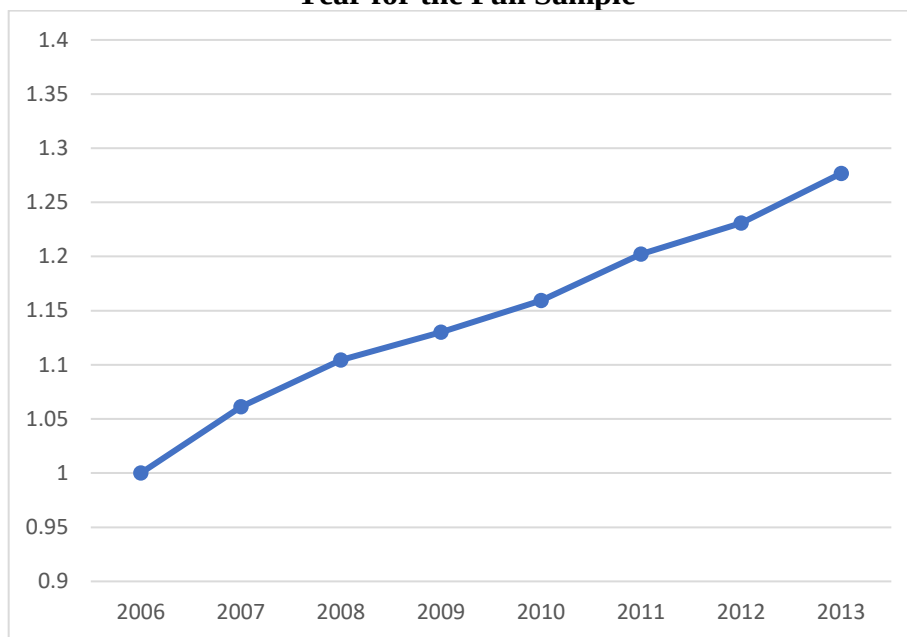
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## Appendix A: Variable Definitions

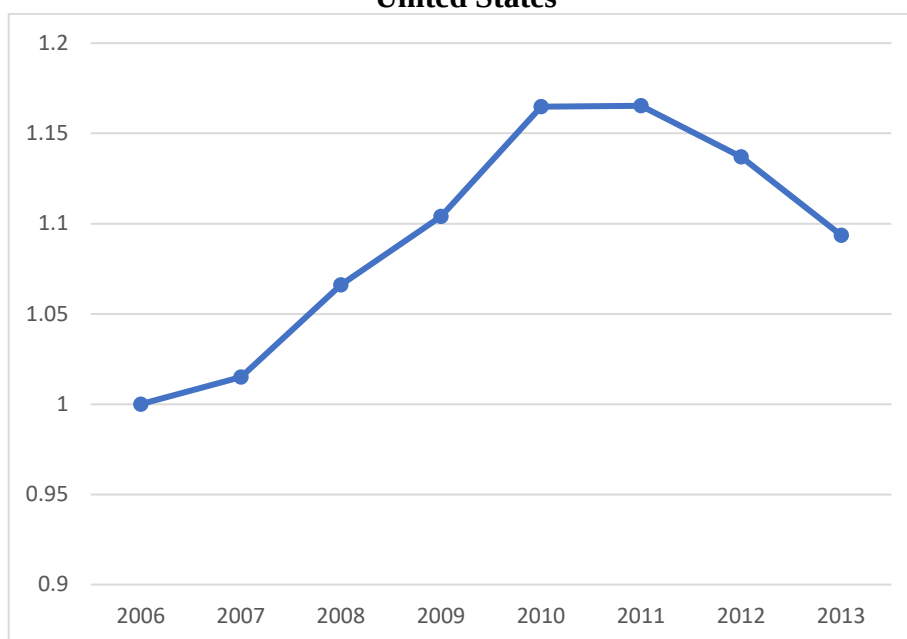
| Variable                    | Definition                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Dependent Variables</b>  |                                                                                                                                                                                                                                                                                                                                                                                   |
| Tax Avoid                   | $[(PTI * \text{Statutory Tax Rate}) - CTP] / PTI$ , where PTI = pre-tax earnings (PI) less special items (SPI), Statutory Tax Rate is the combined average statutory corporate income tax rate at all layers of government in the country during the year $t$ , obtained from KPMG, and CTP = current taxes paid, measured as total tax expense (TXT) less deferred taxes (TXDI). |
| Cash ETR                    | Cash taxes paid (TXPD) scaled by pre-tax income (PI).                                                                                                                                                                                                                                                                                                                             |
| <b>Enforcement Measures</b> |                                                                                                                                                                                                                                                                                                                                                                                   |
| % Change in Enforcement     | Percentage change in Total Spending on Tax Enforcement from year $t-1$ to year $t$ . We obtain data on Total Spending on Tax Enforcement from the OECD's Tax Administration Comparative Information Series.                                                                                                                                                                       |
| Log(Enforcement)            | Natural log of Total Spending on Tax Enforcement. We obtain data on Total Spending on Tax Enforcement from the OECD's Tax Administration Comparative Information Series.                                                                                                                                                                                                          |
| <b>Other Variables</b>      |                                                                                                                                                                                                                                                                                                                                                                                   |
| Domestic Firm               | An indicator variable equal to one if the firm is domestic, and zero otherwise. We classify a firm as domestic if it has a non-zero value for foreign currency translation (FCA from Compustat Global) or a nonzero value for pre-tax foreign income (PIFO from Compustat NA).                                                                                                    |
| Pre-Tax ROA                 | Pre-tax Income (PI) scaled by lagged total assets (AT).                                                                                                                                                                                                                                                                                                                           |
| Prior Year Loss             | An indicator variable equal to one if the firm had negative <i>Pre-Tax ROA</i> in year $t-1$ , and zero otherwise.                                                                                                                                                                                                                                                                |
| Sales Growth                | Percentage change in Sales (SALE) from year $t-1$ to year $t$ .                                                                                                                                                                                                                                                                                                                   |
| Statutory Tax Rate          | The combined average statutory corporate income tax rate at all layers of government in the country during the year $t$ , obtained from KPMG.                                                                                                                                                                                                                                     |
| PP&E                        | Net property, plant, and equipment (PPENT) scaled by lagged total assets (AT). We reset missing values to zero.                                                                                                                                                                                                                                                                   |
| Leverage                    | Sum of long-term debt (DLTT) and short-term debt (DLC), scaled by lagged total assets (AT). We reset missing values to zero.                                                                                                                                                                                                                                                      |
| R&D                         | R&D Expense (XRD) scaled by lagged total assets (AT). We reset missing values to zero.                                                                                                                                                                                                                                                                                            |
| Cash                        | Cash and equivalents (CHE) scaled by lagged total assets. We reset missing values to zero.                                                                                                                                                                                                                                                                                        |
| Ln(Assets)                  | Natural log of total assets (AT).                                                                                                                                                                                                                                                                                                                                                 |
| Income Inequality           | The GINI coefficient of income inequality from the Standardized World Income Inequality Database (Solt 2016), which measures income inequality ranging from a theoretical maximum of 100 if one individual within a country-year earns all of the income, to a                                                                                                                    |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          | theoretical minimum of zero if all of the income within a country-year is equally distributed.                                                                                                                                                                                                                                                                                                                                                                                                            |
| Ln(GDP per capita)       | Natural logarithm of per-capita GDP, obtained from the World Bank.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| GDP Growth               | The Country's percentage change in GDP from year $t-1$ to year $t$ . We obtain GDP Growth from the World Bank.                                                                                                                                                                                                                                                                                                                                                                                            |
| Corruption               | “Control of Corruption” measure from the World Bank's Indices as developed by Kaufman, Kraay, and Mastruzzi (2011) multiplied by negative one. Control of Corruption is defined as the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests. Higher values indicate better control of corruption; multiplying by negative one results in a measure increasing in corruption. |
| Government Effectiveness | “Government Effectiveness” from the World Bank, as developed by Kaufman, Kraay, and Mastruzzi (2011). Government Effectiveness is defined as the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Countries are assigned a score from a theoretical minimum of -2.5 to a theoretical maximum of 2.5.  |

**Figure 1: Average Enforcement Spending as a Percentage of the 2006 Level of Spending by Year for the Full Sample**



**Figure 2: Raw Enforcement Spending as a Percentage of 2006 Spending by Year for the United States**



These figures present the raw amount of tax enforcement spending as a percentage of the 2006 level of enforcement spending by year. Figure 1 presents the simple average of 46 country observations per year. Figure 2 presents enforcement spending figures for the United States.

**Table 1: Descriptive Statistics**  
**Panel A: Full Sample**

| <b>Variable</b>                 | <b>N</b> | <b>Mean</b> | <b>Std Dev</b> | <b>P25</b> | <b>P50</b> | <b>P75</b> |
|---------------------------------|----------|-------------|----------------|------------|------------|------------|
| <i>Tax Avoid</i>                | 110,480  | 0.152       | 0.965          | -0.073     | 0.195      | 0.628      |
| <i>% Change in Enforcement</i>  | 110,480  | 0.028       | 0.077          | -0.012     | 0.015      | 0.055      |
| <i>Domestic Firm</i>            | 110,480  | 0.451       | 0.498          | 0.000      | 0.000      | 1.000      |
| <i>Pre-Tax ROA</i>              | 110,480  | 0.097       | 0.109          | 0.031      | 0.067      | 0.127      |
| <i>Prior Year Loss</i>          | 110,480  | 0.123       | 0.329          | 0.000      | 0.000      | 0.000      |
| <i>Sales Growth</i>             | 110,480  | 0.166       | 0.452          | -0.010     | 0.077      | 0.207      |
| <i>Statutory Tax Rate</i>       | 110,480  | 0.327       | 0.072          | 0.270      | 0.335      | 0.400      |
| <i>PP&amp;E</i>                 | 110,480  | 0.316       | 0.268          | 0.097      | 0.255      | 0.468      |
| <i>Leverage</i>                 | 110,480  | 0.241       | 0.232          | 0.042      | 0.196      | 0.364      |
| <i>R&amp;D</i>                  | 110,480  | 0.014       | 0.036          | 0.000      | 0.000      | 0.007      |
| <i>Cash</i>                     | 110,480  | 0.171       | 0.193          | 0.040      | 0.106      | 0.228      |
| <i>Ln(Assets)</i>               | 110,480  | 7.467       | 2.919          | 5.291      | 7.225      | 9.548      |
| <i>Income Inequality</i>        | 110,480  | 35.997      | 7.264          | 30.390     | 33.560     | 37.790     |
| <i>Ln(GDP per capita)</i>       | 110,480  | 10.101      | 1.130          | 9.506      | 10.703     | 10.795     |
| <i>GDP Growth</i>               | 110,480  | 2.473       | 3.174          | 1.420      | 2.224      | 4.080      |
| <i>Corruption</i>               | 110,480  | -1.066      | 0.844          | -1.627     | -1.353     | -0.452     |
| <i>Government Effectiveness</i> | 110,480  | 1.220       | 0.639          | 1.027      | 1.512      | 1.614      |

Table 1 describes the sample. Panel A provides descriptive statistics for key variables. *Tax Avoid* is pre-tax income multiplied by the *Statutory Tax Rate* less current taxes paid, all scaled by pre-tax income. We measure pre-tax income as pre-tax earnings (PI) less special items (SPI). *Statutory Tax Rate* is the combined average statutory corporate income tax rate at all layers of government in the country during the year  $t$ , obtained from KPMG. We measure current taxes paid as total tax expense (TXT) less deferred taxes (TXDI). *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year  $t-1$  to year  $t$ . *Domestic Firm* is an indicator variable equal to one if the firm is domestic, and zero otherwise. We classify a firm as domestic if it has a non-zero value for foreign currency translation (FCA from Compustat Global) or a nonzero value for pre-tax foreign income (PIFO from Compustat NA). *Pre-Tax ROA* is pre-tax earnings (PI) scaled by lagged total assets (AT). *Prior Year Loss* is an indicator variable equal to one if the firm had negative *Pre-Tax ROA* in year  $t-1$  and zero otherwise. *Sales Growth* is the percentage change in Sales (SALE) from year  $t-1$  to year  $t$ . *PP&E* is net property, plant, and equipment (PPENT) scaled by lagged total assets (AT). *Leverage* is the sum of long-term debt (DLTT) and short-term debt (DLC), scaled by lagged total assets (AT). *R&D* is R&D expense (XRD) scaled by lagged total assets (AT). *Cash* is cash and equivalents (CHE) scaled by lagged total assets. *Ln(Assets)* is the natural log of total assets (AT). *Income Inequality* is the GINI coefficient of income inequality from the Standardized World Income Inequality Database (Solt 2016). *Ln(GDP per capita)* is the natural logarithm of per-capita GDP. *GDP Growth* is the country's percentage change in GDP from year  $t-1$  to year  $t$ . We obtain GDP per capita and GDP Growth from the World Bank. *Corruption* is the "Control of Corruption" measure from the World Bank, as developed by Kaufman, Kraay, and Mastruzzi (2011), multiplied by negative one such that it is increasing in corruption. We also obtain *Government Effectiveness* from the World Bank's Indices as developed by Kaufman, Kraay, and Mastruzzi (2011).

**Table 1: Descriptive Statistics**  
**Panel B: Mean of Variables of Interest by Country**

| Country        | OECD? | No. of Obs. | Enforcement as % of GDP<br>(*100) | % Change in<br>Enforcement | Tax Avoid | Statutory<br>Tax Rate | Domestic<br>Firm | Corruption |
|----------------|-------|-------------|-----------------------------------|----------------------------|-----------|-----------------------|------------------|------------|
| ARGENTINA      |       | 388         | 23.4%                             | 29.2%                      | -0.139    | 0.350                 | 0.049            | 0.392      |
| AUSTRALIA      | Yes   | 3,972       | 20.8%                             | 3.5%                       | 0.277     | 0.300                 | 0.638            | -1.991     |
| AUSTRIA        | Yes   | 417         | 15.8%                             | 4.3%                       | 0.002     | 0.250                 | 0.300            | -1.689     |
| BELGIUM        | Yes   | 625         | 32.7%                             | 0.8%                       | 0.156     | 0.340                 | 0.334            | -1.476     |
| BRAZIL         |       | 569         | 18.7%                             | 3.0%                       | 0.141     | 0.340                 | 0.424            | -0.018     |
| BULGARIA       |       | 217         | 22.8%                             | 2.4%                       | -0.230    | 0.104                 | 0.180            | 0.210      |
| CANADA         | Yes   | 4,774       | 21.9%                             | 2.7%                       | 0.403     | 0.312                 | 0.425            | -1.985     |
| CHILE          | Yes   | 930         | 11.4%                             | 9.2%                       | -0.002    | 0.179                 | 0.101            | -1.471     |
| CHINA          |       | 2,931       | 12.1%                             | 2.1%                       | 0.231     | 0.250                 | 0.317            | 0.358      |
| COLOMBIA       |       | 88          | 7.0%                              | 14.1%                      | -0.109    | 0.303                 | 0.125            | 0.362      |
| CYPRUS         |       | 143         | 22.5%                             | 6.2%                       | -0.684    | 0.104                 | 0.238            | -1.027     |
| CZECH REPUBLIC | Yes   | 87          | 19.0%                             | 2.5%                       | 0.187     | 0.209                 | 0.437            | -0.325     |
| DENMARK        | Yes   | 385         | 27.8%                             | -3.7%                      | -0.021    | 0.257                 | 0.255            | -2.433     |
| ESTONIA        | Yes   | 82          | 16.8%                             | 5.1%                       | 0.263     | 0.216                 | 0.122            | -1.040     |
| FINLAND        | Yes   | 689         | 20.0%                             | 2.4%                       | -0.115    | 0.256                 | 0.247            | -2.286     |
| FRANCE         | Yes   | 3,523       | 22.1%                             | -1.3%                      | 0.170     | 0.333                 | 0.341            | -1.447     |
| GERMANY        | Yes   | 3,508       | 27.7%                             | 1.8%                       | 0.064     | 0.319                 | 0.378            | -1.777     |
| HONG KONG      |       | 350         | 5.6%                              | 4.9%                       | -0.253    | 0.165                 | 0.354            | -1.744     |
| HUNGARY        | Yes   | 108         | 33.4%                             | 9.9%                       | -0.252    | 0.173                 | 0.287            | -0.469     |
| INDIA          |       | 10,830      | 3.3%                              | 6.9%                       | 0.250     | 0.334                 | 0.416            | 0.496      |
| IRELAND        | Yes   | 265         | 24.8%                             | 1.0%                       | -0.199    | 0.125                 | 0.540            | -1.653     |
| ISRAEL         | Yes   | 1,095       | 15.9%                             | 7.9%                       | 0.040     | 0.250                 | 0.268            | -0.837     |
| ITALY          | Yes   | 1,321       | 20.3%                             | -1.7%                      | -0.508    | 0.331                 | 0.255            | -0.224     |
| JAPAN          | Yes   | 19,036      | 14.4%                             | 0.2%                       | -0.048    | 0.400                 | 0.492            | -1.464     |
| KOREA          | Yes   | 4,288       | 10.4%                             | 4.0%                       | -0.037    | 0.249                 | 0.038            | -0.524     |
| LATVIA         | Yes   | 159         | 30.2%                             | 12.7%                      | 0.105     | 0.150                 | 0.252            | -0.296     |
| LITHUANIA      | Yes   | 192         | 18.8%                             | -1.6%                      | -0.393    | 0.155                 | 0.234            | -0.278     |

**Table 1: Descriptive Statistics (continued)**  
**Panel B: Mean of Variables of Interest by Country**

| Country        | OECD? | No. of Obs.    | Enforcement as % of GDP<br>(*100) | % Change in<br>Enforcement | Tax Avoid    | Statutory<br>Tax Rate | Domestic<br>Firm | Corruption    |
|----------------|-------|----------------|-----------------------------------|----------------------------|--------------|-----------------------|------------------|---------------|
| LUXEMBOURG     | Yes   | 236            | 23.0%                             | 4.7%                       | -0.119       | 0.291                 | 0.203            | -2.042        |
| MALAYSIA       |       | 4,885          | 11.2%                             | 14.2%                      | 0.082        | 0.258                 | 0.699            | -0.130        |
| MALTA          |       | 52             | 32.8%                             | 2.1%                       | 0.366        | 0.350                 | 0.423            | -0.928        |
| MEXICO         | Yes   | 640            | 7.2%                              | 4.8%                       | -0.169       | 0.292                 | 0.047            | 0.350         |
| NETHERLANDS    | Yes   | 845            | 32.5%                             | -0.2%                      | 0.137        | 0.259                 | 0.342            | -2.113        |
| NEW ZEALAND    | Yes   | 656            | 20.4%                             | 4.7%                       | 0.167        | 0.301                 | 0.576            | -2.333        |
| NORWAY         | Yes   | 824            | 16.0%                             | 1.0%                       | 0.125        | 0.280                 | 0.263            | -2.105        |
| POLAND         | Yes   | 2,659          | 24.4%                             | 2.3%                       | -0.047       | 0.190                 | 0.302            | -0.498        |
| PORTUGAL       | Yes   | 258            | 24.0%                             | 1.3%                       | -0.199       | 0.253                 | 0.217            | -1.042        |
| RUSSIA         |       | 924            | 16.8%                             | 0.1%                       | -0.241       | 0.200                 | 0.416            | 1.068         |
| SLOVENIA       | Yes   | 157            | 28.5%                             | 0.6%                       | -0.120       | 0.209                 | 0.439            | -0.945        |
| SOUTH AFRICA   |       | 1,640          | 26.3%                             | 9.3%                       | 0.151        | 0.344                 | 0.674            | -0.146        |
| SPAIN          | Yes   | 684            | 12.6%                             | 0.3%                       | 0.222        | 0.311                 | 0.168            | -1.098        |
| SWEDEN         | Yes   | 2,012          | 17.7%                             | 2.2%                       | 0.121        | 0.264                 | 0.373            | -2.250        |
| SWITZERLAND    | Yes   | 1,226          | 2.8%                              | 0.4%                       | -0.196       | 0.192                 | 0.172            | -2.104        |
| THAILAND       |       | 412            | 8.7%                              | 5.3%                       | 0.104        | 0.200                 | 0.619            | 0.344         |
| TURKEY         | Yes   | 1,339          | 15.0%                             | 8.9%                       | -0.043       | 0.200                 | 0.170            | -0.083        |
| UNITED KINGDOM | Yes   | 6,459          | 27.5%                             | -1.9%                      | 0.226        | 0.276                 | 0.749            | -1.685        |
| UNITED STATES  | Yes   | <u>23,600</u>  | <u>7.7%</u>                       | <u>1.5%</u>                | <u>0.405</u> | <u>0.400</u>          | <u>0.526</u>     | <u>-1.344</u> |
| <b>Total</b>   |       | <b>110,480</b> | <b>14.44%</b>                     | <b>2.81%</b>               | <b>0.152</b> | <b>0.327</b>          | <b>0.451</b>     | <b>-1.066</b> |

Table 1 describes our sample. Panel B provides detail by country. OECD membership is determined as of 2017. We require each country to have at least 50 firm-year observations to remain in the sample. *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year  $t-1$  to year  $t$ . *Tax Avoid* is pre-tax income multiplied by the *Statutory Tax Rate* less current taxes paid, all scaled by pre-tax income. We measure pre-tax income as pre-tax earnings (PI) less special items (SPI). We measure current taxes paid as total tax expense (TXT) less deferred taxes (TXDI). *Domestic Firm* is an indicator variable equal to one if the firm is domestic, and zero otherwise. We classify a firm as domestic if it has a non-zero value for foreign currency translation (FCA from Compustat Global) or a nonzero value for pre-tax foreign income (PIFO from Compustat NA). *Corruption* is the “Control of Corruption” measure from the World Bank, as developed by Kaufman, Kraay, and Mastruzzi (2011), multiplied by negative one such that it is increasing in corruption.

**Table 2: Correlations**

|                                     | 1             | 2             | 3             | 4             | 5             | 6             | 7             | 8             | 9             | 10            | 11            | 12            | 13            | 14            | 15            | 16            |
|-------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 1. <i>Tax Avoid</i>                 |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 2. <i>% Change in Enforcement</i>   | <b>-0.006</b> |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 3. <i>Domestic Firm</i>             | <b>0.061</b>  | <b>-0.006</b> |               |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 4. <i>Pre-Tax ROA</i>               | <b>0.074</b>  | <b>0.037</b>  | <b>0.023</b>  |               |               |               |               |               |               |               |               |               |               |               |               |               |
| 5. <i>Prior Year Loss</i>           | <b>0.038</b>  | <b>-0.005</b> | <b>0.012</b>  | <b>-0.109</b> |               |               |               |               |               |               |               |               |               |               |               |               |
| 6. <i>Sales Growth</i>              | <b>0.047</b>  | <b>0.025</b>  | <b>0.034</b>  | <b>0.263</b>  | <b>0.125</b>  |               |               |               |               |               |               |               |               |               |               |               |
| 7. <i>Statutory Tax Rate</i>        | <b>0.085</b>  | <b>-0.149</b> | <b>0.124</b>  | <b>-0.048</b> | 0.002         | <b>-0.060</b> |               |               |               |               |               |               |               |               |               |               |
| 8. <i>PP&amp;E</i>                  | <b>0.043</b>  | <b>0.062</b>  | <b>0.017</b>  | <b>-0.007</b> | <b>-0.028</b> | <b>0.112</b>  | <b>-0.075</b> |               |               |               |               |               |               |               |               |               |
| 9. <i>Leverage</i>                  | <b>0.025</b>  | <b>0.013</b>  | <b>0.012</b>  | <b>-0.129</b> | <b>0.054</b>  | <b>0.146</b>  | <b>0.010</b>  | <b>0.318</b>  |               |               |               |               |               |               |               |               |
| 10. <i>R&amp;D</i>                  | <b>0.041</b>  | <b>-0.071</b> | <b>-0.127</b> | <b>0.088</b>  | <b>0.065</b>  | <b>0.033</b>  | <b>0.106</b>  | <b>-0.199</b> | <b>-0.148</b> |               |               |               |               |               |               |               |
| 11. <i>Cash</i>                     | 0.003         | <b>-0.022</b> | <b>-0.011</b> | <b>0.398</b>  | <b>0.019</b>  | <b>0.186</b>  | <b>0.044</b>  | <b>-0.231</b> | <b>-0.255</b> | <b>0.283</b>  |               |               |               |               |               |               |
| 12. <i>Ln(Assets)</i>               | <b>-0.086</b> | <b>-0.040</b> | <b>-0.224</b> | <b>-0.188</b> | <b>-0.124</b> | <b>-0.122</b> | <b>0.188</b>  | <b>0.175</b>  | <b>0.134</b>  | <b>-0.103</b> | <b>-0.133</b> |               |               |               |               |               |
| 13. <i>Income Inequality</i>        | <b>0.059</b>  | <b>0.303</b>  | <b>0.039</b>  | <b>0.062</b>  | <b>-0.049</b> | <b>0.065</b>  | <b>-0.068</b> | <b>0.096</b>  | <b>0.066</b>  | <b>-0.102</b> | <b>-0.051</b> | <b>-0.068</b> |               |               |               |               |
| 14. <i>Ln(GDP per capita)</i>       | 0.002         | <b>-0.313</b> | <b>0.048</b>  | <b>-0.008</b> | <b>0.059</b>  | <b>-0.077</b> | <b>0.270</b>  | <b>-0.110</b> | <b>-0.067</b> | <b>0.163</b>  | <b>0.095</b>  | <b>-0.017</b> | <b>-0.777</b> |               |               |               |
| 15. <i>GDP Growth</i>               | <b>0.033</b>  | <b>0.214</b>  | <b>-0.052</b> | <b>0.066</b>  | <b>-0.056</b> | <b>0.147</b>  | <b>-0.252</b> | <b>0.098</b>  | <b>0.060</b>  | <b>-0.101</b> | <b>-0.030</b> | <b>-0.027</b> | <b>0.534</b>  | <b>-0.650</b> |               |               |
| 16. <i>Corruption</i>               | <b>-0.027</b> | <b>0.281</b>  | <b>-0.069</b> | <b>-0.004</b> | <b>-0.062</b> | <b>0.049</b>  | <b>-0.224</b> | <b>0.113</b>  | <b>0.061</b>  | <b>-0.151</b> | <b>-0.068</b> | <b>0.094</b>  | <b>0.783</b>  | <b>-0.887</b> | <b>0.548</b>  |               |
| 17. <i>Government Effectiveness</i> | <b>0.033</b>  | <b>-0.255</b> | <b>0.088</b>  | <b>-0.004</b> | <b>0.060</b>  | <b>-0.058</b> | <b>0.259</b>  | <b>-0.110</b> | <b>-0.059</b> | <b>0.162</b>  | <b>0.079</b>  | <b>-0.059</b> | <b>-0.753</b> | <b>0.902</b>  | <b>-0.545</b> | <b>-0.945</b> |

Table 2 provides Pearson correlations for key variables. *Tax Avoid* is pre-tax income multiplied by the *Statutory Tax Rate* less current taxes paid, all scaled by pre-tax income. We measure pre-tax income as pre-tax earnings (PI) less special items (SPI). We measure current taxes paid as total tax expense (TXT) less deferred taxes (TXDI). *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year  $t-1$  to year  $t$ . *Domestic Firm* is an indicator variable equal to one if the firm is domestic, and zero otherwise. We classify a firm as domestic if it has a non-zero value for foreign currency translation (FCA from Compustat Global) or a nonzero value for pre-tax foreign income (PIFO from Compustat NA). *Pre-Tax ROA* is pre-tax earnings (PI) scaled by lagged total assets (AT). *Prior Year Loss* is an indicator variable equal to one if the firm had negative *Pre-Tax ROA* in year  $t-1$  and zero otherwise. *Sales Growth* is the percentage change in Sales (SALE) from year  $t-1$  to year  $t$ . *Statutory Tax Rate* is the combined average statutory corporate income tax rate at all layers of government in the country during the year  $t$ , obtained from KPMG. *PP&E* is net property, plant, and equipment (PPENT) scaled by lagged total assets (AT). *Leverage* is the sum of long-term debt (DLTT) and short-term debt (DLC), scaled by lagged total assets (AT). *R&D* is R&D expense (XRD) scaled by lagged total assets (AT). *Cash* is cash and equivalents (CHE) scaled by lagged total assets. *Ln(Assets)* is the natural logarithm of total assets (AT). *Income Inequality* is the GINI coefficient of income inequality from the Standardized World Income Inequality Database (Solt 2016). *Ln(GDP per capita)* is the natural logarithm of per-capita GDP. *GDP Growth* is the country's percentage change in GDP from year  $t-1$  to year  $t$ . We obtain GDP per capita and GDP Growth from the World Bank. *Corruption* is the "Control of Corruption" measure from the World Bank, as developed by Kaufman, Kraay, and Mastruzzi (2011), multiplied by negative one such that it is increasing in corruption. We also obtain *Government Effectiveness* from the World Bank's Indices as developed by Kaufman, Kraay, and Mastruzzi (2011). Bolded values indicate statistical significance at (at least) the 10% confidence level.

**Table 3: Relation between Tax Enforcement and Tax Avoidance**  
**Dependent Variable: *Tax Avoid***

| Enforcement variable:       | 1<br>% Change in<br>Enforcement | 2<br>% Change in<br>Enforcement | 3<br>Log(Enforcement) | 4<br>Log(Enforcement) |
|-----------------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Enforcement                 | -0.095**<br>(-2.03)             | 0.042<br>(0.67)                 | 0.060*<br>(1.79)      | 0.068**<br>(2.00)     |
| Enforcement * Domestic Firm |                                 | -0.275***<br>(-3.36)            |                       | -0.017***<br>(-5.11)  |
| Domestic Firm               | 0.059***<br>(7.40)              | 0.067***<br>(7.96)              | 0.059***<br>(7.39)    | 0.223***<br>(6.47)    |
| Pre-Tax ROA                 | 0.585***<br>(14.29)             | 0.585***<br>(14.28)             | 0.585***<br>(14.28)   | 0.582***<br>(14.21)   |
| Prior Year Loss             | 0.091***<br>(7.07)              | 0.091***<br>(7.06)              | 0.091***<br>(7.04)    | 0.091***<br>(7.01)    |
| Sales Growth                | 0.018**<br>(2.14)               | 0.019**<br>(2.19)               | 0.018**<br>(2.13)     | 0.018**<br>(2.06)     |
| Statutory Tax Rate          | 3.472***<br>(14.13)             | 3.471***<br>(14.12)             | 3.406***<br>(13.68)   | 3.410***<br>(13.70)   |
| PP&E                        | 0.196***<br>(10.50)             | 0.195***<br>(10.43)             | 0.196***<br>(10.49)   | 0.197***<br>(10.56)   |
| Leverage                    | -0.017<br>(-0.97)               | -0.017<br>(-0.98)               | -0.017<br>(-0.96)     | -0.016<br>(-0.89)     |
| R&D                         | 0.771***<br>(6.41)              | 0.776***<br>(6.46)              | 0.772***<br>(6.41)    | 0.779***<br>(6.48)    |
| Cash                        | -0.134***<br>(-6.10)            | -0.135***<br>(-6.13)            | -0.135***<br>(-6.11)  | -0.134***<br>(-6.07)  |
| Ln(Assets)                  | -0.013***<br>(-6.16)            | -0.013***<br>(-6.14)            | -0.013***<br>(-6.18)  | -0.013***<br>(-6.15)  |
| Income Inequality           | -0.007<br>(-0.65)               | -0.007<br>(-0.66)               | -0.001<br>(-0.13)     | -0.001<br>(-0.11)     |
| Ln(GDP per capita)          | -0.033<br>(-0.28)               | -0.025<br>(-0.21)               | -0.111<br>(-0.89)     | -0.113<br>(-0.91)     |
| GDP Growth                  | 0.015***<br>(6.94)              | 0.016***<br>(6.98)              | 0.015***<br>(6.59)    | 0.014***<br>(6.49)    |
| Industry, Year, & Country?  | Yes                             | Yes                             | Yes                   | Yes                   |
| Observations                | 110,480                         | 110,480                         | 110,480               | 110,480               |
| R-squared                   | 0.066                           | 0.066                           | 0.065                 | 0.065                 |

This table presents results from estimating Equation (1) using two measures of enforcement. *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year  $t-1$  to year  $t$ . *Log(Enforcement)* is the logarithm of Total Spending on Tax Enforcement in year  $t$ . The dependent variable *Tax Avoid* is pre-tax income multiplied by the *Statutory Tax Rate* less current taxes paid, scaled by pre-tax income. *Domestic Firm* is an indicator variable equal to one if the firm is domestic and zero otherwise. *Pre-Tax ROA* is pre-tax earnings (PI) scaled by lagged total assets (AT). *Prior Year Loss* is an indicator variable equal to one if the firm had negative *Pre-Tax ROA* in year  $t-1$  and zero otherwise. *Sales Growth* is the percentage change in Sales (SALE) from year  $t-1$  to year  $t$ . *Statutory Tax Rate* is the combined average statutory corporate income tax rate in the country during year  $t$ , obtained from KPMG. *PP&E* is net property, plant, and equipment (PPENT) scaled by lagged total assets (AT). *Leverage* is the sum of long-term (DLTT) and short-term debt (DLC), scaled by lagged total assets (AT). *R&D* is R&D expense (XRD) scaled by lagged total assets (AT). *Cash* is cash and equivalents (CHE) scaled by lagged total assets. *Ln(Assets)* is the natural logarithm of total assets (AT). *Income Inequality* is the GINI coefficient of income inequality from the Standardized World Income Inequality Database. *Ln(GDP per capita)* is the natural logarithm of per-capita GDP. *GDP Growth* is the country's percentage change in GDP from year  $t-1$  to year  $t$ . We obtain GDP per capita and GDP Growth from the World Bank. We present robust t-statistics in parentheses, calculated based on standard errors clustered by firm. \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% level, respectively.

**Table 4: Relation between Tax Enforcement and Tax Avoidance over Time**  
**Dependent Variable: *Tax Avoid***

|                                         | 1                    | 2                    |
|-----------------------------------------|----------------------|----------------------|
| Sample period:                          | 2006-2009            | 2010-2013            |
| % Change in Enforcement                 | 0.026<br>(0.21)      | -0.021<br>(-0.25)    |
| % Change in Enforcement * Domestic Firm | -0.238*<br>(-1.93)   | -0.310***<br>(-2.80) |
| Domestic Firm                           | 0.063***<br>(5.03)   | 0.070***<br>(6.80)   |
| Pre-Tax ROA                             | 0.505***<br>(9.17)   | 0.662***<br>(11.85)  |
| Prior Year Loss                         | 0.129***<br>(6.62)   | 0.064***<br>(3.75)   |
| Sales Growth                            | 0.005<br>(0.36)      | 0.027**<br>(2.45)    |
| Statutory Tax Rate                      | 3.302***<br>(6.54)   | 3.039***<br>(6.27)   |
| PP&E                                    | 0.188***<br>(7.36)   | 0.201***<br>(8.60)   |
| Leverage                                | -0.019<br>(-0.78)    | -0.018<br>(-0.76)    |
| R&D                                     | 0.609***<br>(3.75)   | 0.975***<br>(6.26)   |
| Cash                                    | -0.100***<br>(-3.48) | -0.175***<br>(-5.80) |
| Ln(Assets)                              | -0.009***<br>(-2.99) | -0.017***<br>(-6.22) |
| Income Inequality                       | -0.063**<br>(-2.11)  | -0.044**<br>(-2.02)  |
| Ln(GDP per capita)                      | -0.502*<br>(-1.71)   | 0.133<br>(0.49)      |
| GDP Growth                              | 0.025***<br>(4.65)   | 0.003<br>(0.78)      |
| Industry, Year, & Country?              | Yes                  | Yes                  |
| Observations                            | 48,999               | 61,481               |
| R-squared                               | 0.063                | 0.075                |

This table presents results from estimating Equation (1) after partitioning our sample into two time periods. The dependent variable *Tax Avoid* is pre-tax income multiplied by the *Statutory Tax Rate* less current taxes paid, scaled by pre-tax income. *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year  $t-1$  to year  $t$ . *Domestic Firm* is an indicator variable equal to one if the firm is domestic and zero otherwise. *Pre-Tax ROA* is pre-tax earnings (PI) scaled by lagged total assets (AT). *Prior Year Loss* is an indicator variable equal to one if the firm had negative *Pre-Tax ROA* in year  $t-1$  and zero otherwise. *Sales Growth* is the percentage change in Sales (SALE) from year  $t-1$  to year  $t$ . *Statutory Tax Rate* is the combined average statutory corporate income tax rate in the country during year  $t$ , obtained from KPMG. *PP&E* is net property, plant, and equipment (PPENT) scaled by lagged total assets (AT). *Leverage* is the sum of long-term (DLTT) and short-term debt (DLC), scaled by lagged total assets (AT). *R&D* is R&D expense (XRD) scaled by lagged total assets (AT). *Cash* is cash and equivalents (CHE) scaled by lagged total assets. *Ln(Assets)* is the natural logarithm of total assets (AT). *Income Inequality* is the GINI coefficient of income inequality from the Standardized World Income Inequality Database. *Ln(GDP per capita)* is the natural logarithm of per-capita GDP. *GDP Growth* is the country's percentage change in GDP from year  $t-1$  to year  $t$ . We obtain GDP per capita and GDP Growth from the World Bank. We present robust t-statistics in parentheses, calculated based on standard errors clustered by firm. \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% level, respectively.

**Table 5: Role of Institutions in the Relation between Tax Enforcement and Tax Avoidance**  
**Dependent Variable: *Tax Avoid***

|                                         | 1                    | 2                    | 3                               | 4                                |
|-----------------------------------------|----------------------|----------------------|---------------------------------|----------------------------------|
| Partitioning variable:                  | Low<br>Corruption    | High<br>Corruption   | Low Government<br>Effectiveness | High Government<br>Effectiveness |
| % Change in Enforcement                 | 0.021<br>(0.14)      | 0.006<br>(0.08)      | -0.074<br>(-0.99)               | 0.166<br>(1.06)                  |
| % Change in Enforcement * Domestic Firm | -0.367**<br>(-1.98)  | -0.205**<br>(-2.23)  | -0.138<br>(-1.50)               | -0.406**<br>(-2.08)              |
| Domestic Firm                           | 0.068***<br>(6.10)   | 0.068***<br>(5.77)   | 0.030**<br>(2.53)               | 0.093***<br>(8.38)               |
| Pre-Tax ROA                             | 0.449***<br>(8.33)   | 0.740***<br>(12.42)  | 0.899***<br>(13.86)             | 0.365***<br>(7.15)               |
| Prior Year Loss                         | 0.129***<br>(7.76)   | 0.043**<br>(2.14)    | 0.078***<br>(3.84)              | 0.103***<br>(6.12)               |
| Sales Growth                            | 0.004<br>(0.27)      | 0.032***<br>(3.03)   | 0.032***<br>(2.79)              | 0.005<br>(0.35)                  |
| Statutory Tax Rate                      | 3.090***<br>(9.94)   | 4.018***<br>(7.09)   | 3.569***<br>(7.99)              | 3.557***<br>(10.81)              |
| PP&E                                    | 0.173***<br>(6.48)   | 0.207***<br>(8.35)   | 0.188***<br>(7.25)              | 0.177***<br>(6.83)               |
| Leverage                                | -0.004<br>(-0.15)    | -0.031<br>(-1.25)    | -0.056**<br>(-2.12)             | 0.020<br>(0.89)                  |
| R&D                                     | 0.939***<br>(6.25)   | 0.640***<br>(3.47)   | 1.269***<br>(6.67)              | 0.737***<br>(5.10)               |
| Cash                                    | -0.084***<br>(-2.86) | -0.214***<br>(-6.72) | -0.161***<br>(-4.90)            | -0.099***<br>(-3.50)             |
| Ln(Assets)                              | -0.021***<br>(-7.40) | -0.003<br>(-1.05)    | -0.013***<br>(-4.30)            | -0.014***<br>(-4.85)             |
| Income Inequality                       | -0.019<br>(-1.08)    | 0.027<br>(1.64)      | 0.024<br>(1.58)                 | -0.025<br>(-1.09)                |
| Ln(GDP per capita)                      | -0.367<br>(-1.26)    | 0.612***<br>(3.50)   | 0.241<br>(1.41)                 | -0.490<br>(-1.30)                |
| GDP Growth                              | 0.026***<br>(6.05)   | 0.007**<br>(2.01)    | 0.011***<br>(3.69)              | 0.026***<br>(5.53)               |
| Industry, Year, & Country?              | Yes                  | Yes                  | Yes                             | Yes                              |
| Observations                            | 55,423               | 55,057               | 55,491                          | 54,989                           |
| R-squared                               | 0.056                | 0.082                | 0.056                           | 0.070                            |

This table presents results from estimating Equation (1) after partitioning the sample based on local country institutions. Columns (1) and (2) partition the sample based on below- and above-median *Corruption*, the “Control of Corruption” multiplied by negative one such that it is increasing in corruption. Columns (3) and (4) partition the sample based below- and above-median *Government Effectiveness*. We obtain both measures from the World Bank World Bank's Indices, as developed by Kaufman, Kraay, and Mastruzzi (2011). The dependent variable *Tax Avoid* is pre-tax income multiplied by the *Statutory Tax Rate* less current taxes paid, scaled by pre-tax income. *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year  $t-1$  to year  $t$ . *Domestic Firm* is an indicator variable equal to one if the firm is domestic and zero otherwise. *Pre-Tax ROA* is pre-tax earnings (PI) scaled by lagged total assets (AT). *Prior Year Loss* is an indicator variable equal to one if the firm had negative *Pre-Tax ROA* in year  $t-1$  and zero otherwise. *Sales Growth* is the percentage change in Sales (SALE) from year  $t-1$  to year  $t$ . *Statutory Tax Rate* is the combined average statutory corporate income tax rate in the country during year  $t$ , obtained from KPMG. *PP&E* is net property, plant, and equipment (PPENT) scaled by lagged total assets (AT). *Leverage* is the sum of long-term (DLTT) and short-term debt (DLC), scaled by lagged total assets (AT). *R&D* is R&D expense (XRD) scaled by lagged total assets (AT). *Cash* is cash and equivalents (CHE) scaled by lagged total assets. *Ln(Assets)* is the natural logarithm of total assets (AT). *Income Inequality* is the GINI coefficient of income inequality from the Standardized World Income Inequality Database. *Ln(GDP per capita)* is the natural logarithm of per-capita GDP. *GDP Growth* is the country's percentage change in GDP from year  $t-1$  to year  $t$ . We obtain GDP per capita and GDP Growth from the World Bank. We present robust t-statistics in parentheses, calculated based on standard errors clustered by firm. \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% level, respectively.

**Table 6: Relation between Tax Enforcement and Tax Avoidance for U.S. MNEs**

| Dependent variable:                     | 1                    | 2                     |
|-----------------------------------------|----------------------|-----------------------|
|                                         | Tax Avoid            | Cash ETR              |
| % Change in Enforcement                 | -0.664<br>(-0.63)    | 0.624**<br>(2.27)     |
| % Change in Enforcement * Domestic Firm | -0.805**<br>(-2.18)  | 0.419***<br>(4.31)    |
| Domestic Firm                           | 0.143***<br>(7.50)   | -0.037***<br>(-7.08)  |
| Pre-Tax ROA                             | 0.151**<br>(2.09)    | 0.015<br>(0.82)       |
| Prior Year Loss                         | 0.083***<br>(3.38)   | -0.070***<br>(-12.80) |
| Sales Growth                            | 0.028*<br>(1.74)     | -0.037***<br>(-6.79)  |
| Statutory Tax Rate                      | 0.162***<br>(4.14)   | -0.054***<br>(-4.45)  |
| PP&E                                    | 0.125***<br>(3.93)   | -0.029***<br>(-3.21)  |
| Leverage                                | 0.247<br>(1.20)      | -0.362***<br>(-6.87)  |
| R&D                                     | -0.115***<br>(-2.93) | -0.012<br>(-1.00)     |
| Cash                                    | -0.001<br>(-0.23)    | -0.000<br>(-0.20)     |
| Ln(Assets)                              | 0.194**<br>(2.02)    | 0.014<br>(0.56)       |
| Income Inequality                       | -9.802***<br>(-7.81) | 2.098***<br>(6.06)    |
| Ln(GDP per capita)                      | -0.022<br>(-0.80)    | -0.005<br>(-0.61)     |
| GDP Growth                              | 0.143***<br>(7.50)   | -0.037***<br>(-7.08)  |
| Industry & Year?                        | Yes                  | Yes                   |
| Observations                            | 23,600               | 22,472                |
| R-squared                               | 0.065                | 0.087                 |

This table presents results from estimating Equation (1) on the sample of U.S. MNEs using two dependent variables. The dependent variable in column (1) is *Tax Avoid*, pre-tax income multiplied by the *Statutory Tax Rate* less current taxes paid, scaled by pre-tax income. The dependent variable in column (2) is *Cash ETR*, cash taxes paid (TXPD) scaled by pre-tax earnings (PI). *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year  $t-1$  to year  $t$ . *Domestic Firm* is an indicator variable equal to one if the firm is domestic and zero otherwise. *Pre-Tax ROA* is pre-tax earnings (PI) scaled by lagged total assets (AT). *Prior Year Loss* is an indicator variable equal to one if the firm had negative *Pre-Tax ROA* in year  $t-1$  and zero otherwise. *Sales Growth* is the percentage change in Sales (SALE) from year  $t-1$  to year  $t$ . *Statutory Tax Rate* is the combined average statutory corporate income tax rate in the country during year  $t$ , obtained from KPMG. *PP&E* is net property, plant, and equipment (PPENT) scaled by lagged total assets (AT). *Leverage* is the sum of long-term (DLTT) and short-term debt (DLC), scaled by lagged total assets (AT). *R&D* is R&D expense (XRD) scaled by lagged total assets (AT). *Cash* is cash and equivalents (CHE) scaled by lagged total assets. *Ln(Assets)* is the natural logarithm of total assets (AT). *Income Inequality* is the GINI coefficient of income inequality from the Standardized World Income Inequality Database. *Ln(GDP per capita)* is the natural logarithm of per-capita GDP. *GDP Growth* is the country's percentage change in GDP from year  $t-1$  to year  $t$ . We obtain GDP per capita and GDP Growth from the World Bank. We present robust t-statistics in parentheses, calculated based on standard errors clustered by firm. \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% level, respectively.