Does Tax Enforcement Disparately Affect Domestic versus Multinational Corporations around the World?

Lisa De Simone*
Associate Professor
University of Texas at Austin
Email: Lisa.DeSimone@mccombs.utexas.edu

Bridget Stomberg
Associate Professor
Kelley School of Business
Email: bstomber@indiana.edu

Brian Williams
Assistant Professor
Kelley School of Business
Email: bw63@indiana.edu

March 2021

Keywords: Tax avoidance; Tax enforcement; Income shifting

Abstract: Global tax enforcement has received increased attention since the Financial Crisis, with much stated focus on curbing perceived harmful tax practices of multinational entities. Yet multinationals can avoid tax in multiple countries whereas domestic firms cannot. We therefore examine whether there is a differential relation between changes in home-country enforcement and the tax avoidance of domestic versus multinational entities. Using OECD data on 47 countries from 2005 to 2013, we find greater home-country enforcement is related to less firm-level tax avoidance for domestic firms relative to multinational entities. We find no differential relation between changes in tax enforcement and *home*-country tax avoidance, suggesting that even single-country efforts are not more successful at curbing multinationals' tax avoidance. Moreover, multinationals increase their tax avoidance in *foreign* countries when home-country enforcement increases. Thus, multinationals circumvent the negative effects of home-country enforcement and maintain a consistent level of worldwide tax avoidance. Results are robust to multiple measures of tax enforcement and avoidance across multiple countries and databases. These findings have implications for policymakers and highlight the importance of coordinated enforcement efforts across jurisdictions.

Acknowledgements: The authors gratefully acknowledge helpful comments and suggestions from: Shannon Chen, Brad Hepfer, Jeff Hoopes (discussant), Michelle Hutchens (discussant), Peter Merrill, Michelle Nessa, Sonja Rego, Casey Schwab, Jee-Eun Shin, Brady Williams, and participants at the 2020 Workshop on Corporate Taxation in a Globalized World, the 2019 National Tax Association Annual Meeting, the 2019 Journal of the American Taxation Association Conference, WU Vienna University of Economics and Business, Augsburg University, the Rotman School of Management, and the 2018 Indiana University Spring Tax Camp. Stomberg acknowledges funding from the Weimer Fellowship.

1. Introduction

Tax enforcement is one tool jurisdictions use to stem tax avoidance and evasion, and to increase tax collections. Allingham and Sandmo's (1972) rational theory of tax avoidance suggests increased enforcement reduces tax avoidance by increasing its expected cost. Countries have taken a renewed focus on enforcement since the Global Financial Crisis (Slemrod 2015) and 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 global efforts to curb potentially aggressive tax avoidance — particularly that of multinational entities (MNE) — we investigate the association between worldwide tax avoidance and home-country tax enforcement for domestic corporations versus locally-headquartered MNEs.[1]

Although prior empirical work examines enforcement effects within a single jurisdiction, firms' increasing cross-border operations make it important to understand how enforcement actions in one jurisdiction affect the level of tax avoidance in *all* jurisdictions. Despite much discussion of increased enforcement being targeted at MNEs' tax avoidance, it is not clear ex ante how effectively increasing home-country enforcement curbs MNEs' tax avoidance, either at home or abroad. If existing home-country enforcement is already focused on MNEs, increased enforcement may have little incremental effect. Moreover, MNEs can exploit tax planning opportunities in multiple countries. Thus home-country enforcement actions could exacerbate MNEs' tax avoidance in other countries, thereby shifting the cost of tax avoidance across jurisdictions rather than effectively reducing it.[2] Our study therefore has important implications

[1] We define a firm as "domestic" if its operations are almost entirely in its "home" country. The term "worldwide" encompasses tax avoidance across all jurisdictions. For domestic firms "worldwide" avoidance is limited to the home-country.

[2] This statement assumes taxpayers cannot exploit all possible tax avoidance strategies at any given time due to resource constraints. Thus when the cost of avoidance becomes relatively higher in one jurisdiction, companies may rationally increase tax avoidance in other jurisdictions that was previously relatively less beneficial.

for reconsidering the predicted effects of enforcement on entities operating in multiple jurisdictions (e.g., states or countries).

To address our research question, we exploit annual data on tax enforcement expenditures across 47 countries from 2005 through 2013. These data were collected by the OECD with support from the Forum on Tax Administration, which the OECD created in 2002 to provide an opportunity for tax commissioners around the globe to discuss trends in tax enforcement and compliance, and to improve tax administration worldwide. Descriptive statistics reveal an average increase in inflation-adjusted enforcement spending in our sample, consistent with press coverage and other anecdotal evidence that countries worldwide are ramping up enforcement efforts (e.g., Warren 2016).

Our primary tests estimate corporate tax avoidance as a function of changes in home-country tax enforcement spending. We measure corporate tax avoidance using modified measures of estimated book-tax differences (Atwood et al. 2012) and cash effective tax rates. Our identification strategy leverages changes in tax enforcement spending that are staggered across time and countries and that vary in magnitude. The data allow us to capture short-term responses to changes in home-country enforcement spending and therefore speak to its deterrence effect. We include inflation-adjusted firm- and country-level controls, and country, industry, and year fixed effects to account for observable and unobservable differences in tax avoidance across firms, countries, industries, and time. This multi-level fixed effect structure controls for time-invariant country-level characteristics that could influence the level of corporate tax avoidance so that we can isolate the relation between within-country changes in enforcement and tax avoidance.

To establish a baseline result, we estimate a negative association between changes in enforcement spending and tax avoidance in the full sample of domestic and multinational firms, which is consistent with prior theoretical and empirical work on the relation between tax avoidance and enforcement (e.g., Allingham and Sandmo 1972; Atwood et al. 2012; Hoopes, Mescall, and Pittman 2012; Gupta and Lynch 2016; Nessa, Schwab, Stomberg, and Towery 2019). We estimate a one standard deviation increase in our measure of enforcement spending is associated with about a 1.22 percent decrease in tax avoidance relative to the sample mean.

Our research question asks whether there is a differential relation between home-country tax enforcement and corporate tax avoidance across domestic and multinational firms. We find domestic firms decrease tax avoidance to a greater degree than MNEs when home-country enforcement spending increases. To gauge the robustness of this result, we use alternative measures of tax enforcement and tax burdens across different samples. First, we use World Bank data to construct a measure of tax evasion and two alternative measures of tax enforcement. Second, we restrict the sample to U.S. firms to hold constant the regulatory environment and use IRS audit rates as an alternative measure of enforcement. In both samples, we continue to find a differential effect of home-country enforcement that favors MNEs. Third, we use affiliate-level data from Bureau van Dijk (BvD) to identify companies as domestic or multinational more precisely. We find domestic entities avoid less tax than MNEs when faced with increased home-country enforcement. Finding similar results across multiple samples and multiple measures of enforcement, avoidance, and evasion lends credibility to our inferences.

We further exploit BvD data to understand *how* MNEs maintain a higher level of worldwide tax avoidance in the face of stronger home-country enforcement. We find the home-country tax avoidance of MNEs is not differentially affected by home-country tax enforcement

relative to domestic firms. Thus, despite a stated focus on MNEs, we find no evidence of a larger deterrence effect of home-country enforcement for MNEs. However, MNEs increase foreign tax avoidance following a home-country enforcement spending increase; a one standard deviation increase in enforcement spending is associated with a 2.0 percent decrease in MNEs' foreign effective tax rates (ETR). This evidence is consistent with MNEs offsetting higher home-country tax burdens by decreasing their tax burdens abroad. Documenting greater foreign-country tax avoidance for MNEs when home-country enforcement spending increases helps explain our main finding that the negative relation between home-country enforcement and worldwide tax avoidance is mitigated (and sometimes entirely absent) for MNEs relative to domestic firms.

Our study extends the literature on tax enforcement effects by identifying which firms are most sensitive to increased tax enforcement (e.g., Hoopes, Robinson, and Slemrod 2018) and by examining how domestic firms and MNEs respond to deterrence efforts. Additionally, we build on previous single-country studies (e.g., Hoopes et al. 2012; Gupta and Lynch 2016; Nessa et al. 2019) by exploiting a cross-country setting to enhance our understanding of the enforcement-avoidance relation around the world. We also corroborate results from Atwood et al. (2012), who use a measure of managers' perceived enforcement based on assumed levels of tax evasion by testing the relation between actual enforcement expenditures and corporate tax avoidance. These features of our study are particularly important as businesses continue to expand global operations. Our results also suggest researchers using worldwide measures of tax avoidance potentially underestimate the effect of single-country changes in enforcement: total tax avoidance can stay constant while the mix of avoidance across countries changes.

Our results also inform policymakers regarding the effectiveness of efforts to mitigate some MNE tax practices. Our finding that MNEs offset the effect of home-country tax

enforcement with greater tax avoidance in other countries is particularly important in light of growing research on the effectiveness of new enforcement regimes such as country-by-country reporting as well as efforts by policymakers to coordinate enforcement. One implication of our findings is that making changes to reduce the practices of one type of corporation (e.g., MNEs) may leave them unscathed if they are able to nimbly respond (e.g., Joshi, Outslay, and Persson 2018). In this case, country-level actions (1) could result in the likely unintended consequence of disadvantaging domestic corporations, and (2) impose costs on other jurisdictions in the form of increased MNE tax avoidance and thus lower tax revenues. Furthermore, MNEs' ability to offset the negative consequences of increased home-country enforcement by increasing tax avoidance abroad could represent a significant cost advantage relative to domestic firms (Dyreng, Hanlon, Maydew, and Thornock 2017). Our findings therefore potentially speak to the benefits of tax harmonization not just across countries but also across separate taxing jurisdictions with a single country. Single-jurisdiction actions to reduce tax avoidance can exacerbate perceived harmful tax practices if a sufficient number of entities avoid the effects of those actions by engaging in more tax avoidance in other jurisdictions.

2. Related literature and hypothesis development

2.1 Related literature

Enforcement is critical to any tax system because it enumerates the rules and procedures taxpayers and tax authorities follow to ensure compliance (Slemrod and Gillitzer 2014).[3] Specific attention to corporate tax enforcement has increased over time, particularly after the

[3] A vast literature examines the role of enforcement in the development and regulation of financial markets (e.g., La Porta, Lopez-De-Silanes, and Shleifer 2006; Coffee 2007). We focus our discussion on tax enforcement, which differs in many ways from securities enforcement, particularly because required tax disclosures are typically confidential (that is, only privately disclosed to the relevant tax authorities) and information sharing between tax authorities is rare during our sample period.

Global Financial Crisis of 2008 (Slemrod 2015). In the United States 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 addition, several studies point to consequences of MNE tax avoidance, such as increasing foreign cash balances and investments by U.S. MNEs (Foley, Hartzell, Titman, and Twite 2007; Hanlon, Lester, and Verdi 2015), and changes in the location of debt (Faulkender and Smith 2016).

Tax administrators worldwide have responded by taking steps to stem the potentially abusive tax practices of MNEs. Stephen Timms, former financial secretary to the Treasury in the U.K., pledged U.K. tax administrators would combat tax avoidance by increasing disclosure requirements and penalties (Treanor 2009). The IRS launched several initiatives in 2010 targeting multinational transfer pricing. Finally, the OECD developed Base Erosion and Profit Shifting recommendations and reports, including revised standards for transfer pricing documentation, requirements for economic activities to be co-located with profits, and country-by-country reporting. In short, tax administrators around the globe recognize potential problems of MNE tax avoidance and are taking steps to curb potentially aggressive or abusive practices. Yet it remains unclear if single-country efforts are successful at curbing the total level of global tax avoidance.

A growing literature examines the relation between tax authority enforcement initiatives and corporate taxpayer behavior.[4] Some 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 increased disclosures (Bozanic, Hoopes, Thornock, and Williams 2017; Dyreng, Hoopes, and Wilde 2016), improved financial reporting quality (Hanlon, Hoopes,

[4] 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.

and Shroff 2014), and increased shareholder returns (Desai, Dyck, and Zingales 2007). Atwood et al. (2012) examine how various home-country tax system characteristics affect corporate tax avoidance. Using single-year measure, they find tax avoidance is lower in countries where perceived enforcement is stronger.[5] Similarly, Hoopes et al. (2012) use data on IRS audit rates to provide evidence that public U.S. corporations avoid less tax when the probability of audit is higher. We extend these studies in several ways. First, we use country-year measures of tax enforcement to allow both time-series and cross-country variation. Second, we extend the sample period beyond the Global Financial Crisis during which countries have expressed a renewed interest in using tax enforcement to curb harmful tax practices. Third, we test for differential effects of home-country tax enforcement on domestic and multinational firms. This feature of our study offers new insights into the potentially harmful effects of single-country enforcement efforts on other countries.

Our paper is similar to Gupta and Lynch (2016), who focus on the effect of changes in state-level tax enforcement expenditures on aggregate state tax collections. The authors provide evidence that the magnitude of the enforcement spending effect varies by state with lower future collections in states with more restrictive tax policies. Similarly, Nessa et al. (2019) document a positive association between IRS enforcement expenditures and aggregate collections from large public corporate taxpayers.[6] Together, these studies offer precedent for the use of tax enforcement spending as a measure of overall enforcement. Shevlin, Thornock, and Williams (2017) examine how firms respond to tax forgiveness using state tax amnesties as a setting. The

[5] 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."

[6] The authors document similar results when using actual audit hours per audited return in lieu of total enforcement expenditures.

authors conclude that amnesty programs, which jurisdictions offer with the objective of expanding the tax base and increasing compliance, can have a negative impact on corporate tax collections. Hoopes et al. (2018) investigate how firms respond to public disclosure of their tax information in Australia, an initiative intended to "improve accountability and educate the public about [companies'] compliance with tax laws" (p. 143). The authors find evidence of a differential impact based on a firm's public status: private firms increased tax payments while public firms decreased tax payments consistent with different disclosure costs for public and private firms. Relatedly, we investigate whether domestic firms and MNEs respond differentially to increased tax enforcement as a result of their different tax planning opportunities.

2.2 Hypothesis development

Rational corporate taxpayers engage in tax avoidance until the expected costs exceed the benefits. As the expected cost of tax avoidance increases, we expect taxpayers to avoid less tax.[7] Our primary measure of enforcement captures changes in country-level spending on tax enforcement. In these tests, we assume an increase in enforcement spending is positively correlated with increased corporate enforcement actions (e.g., more frequent or more in-depth audits, better detection of noncompliance, increased reporting requirements, etc.) and therefore an increased cost of tax avoidance for the average corporate taxpayer. [8] However, if the tax

[7] Mills, Erickson, and Maydew (1998) estimate that on average firms get a 300 percent return on investments in tax planning, suggesting firms on average do not engage in all possible tax planning opportunities with positive expected net present values. However, even if firms do engage in all possible tax planning on opportunities with positive expected net present values, an increase in the cost of home-country tax avoidance should lead to a re-evaluation of the cost-benefit tradeoff of the firm's tax avoidance activities. In particular, an increase in the cost of home-country tax avoidance should lower the *relative* cost of foreign country tax avoidance, making foreign country tax avoidance more appealing.

[8] Data are scarce on which types of taxpayers (e.g., corporations vs. individuals, domestic corporations vs. MNEs) are the focus of tax authority expenditures. It is therefore not possible to construct a measure of increased corporate enforcement spending or increased spending on domestic firms versus MNEs. To provide anecdotal evidence that the total enforcement spending we observe is at least partially targeted at corporate taxpayers, we searched tax authority websites and practitioner guidance for spending details in our largest sample countries (by number of observations). In the United States (21.4 percent of our sample), the IRS Data Book confirms that the rate of audits for large corporate taxpayers (those with over $10M in total assets) is positively correlated with the total IRS budget.

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. For example, Ayers, Seidman, and Towery (2019) 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. We therefore gauge the robustness of results to alternative measures of the level of enforcement and expect higher levels of enforcement should be associated with lower levels of tax avoidance.

In addition to on-average effects, the consequences of enforcement could vary based on whether the taxpayer is a domestic entity or an MNE. Ayers et al. (2019) 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 focused on MNEs, increased enforcement spending may have little incremental effect on those taxpayers at home or abroad. Instead, the tax authority may experience greater returns on enforcement spending by targeting previously unaudited domestic corporations. Additionally, MNEs can exploit tax planning opportunities in multiple countries. However, given resource constraints and other frictions, it is unlikely they exploit all positive NPV tax avoidance strategies at any given time. Thus, an increase in enforcement in one jurisdiction may make the relative cost of avoiding tax in that jurisdiction too high; increasing tax avoidance in another jurisdiction may become relatively more beneficial. In contrast, domestic entities face a more restrictive set of tax avoidance options because all of their income and opportunities for tax

In Japan (17.2 percent of our sample), EY (2013) notes for corporate taxpayers "the Japanese tax authorities have a robust and aggressive enforcement mechanism, and tax audits are a regular tool of enforcement."

avoidance are concentrated in one country. MNEs are therefore better suited to respond to an increased cost of home-country tax avoidance because they can offset increases in home-country tax burdens with increased avoidance abroad.

On the other hand, because MNEs often have been the stated focus of increased global enforcement, additional enforcement spending could target MNE tax avoidance. In this case, we would expect little effect of enforcement spending increases on domestic companies. Further, the effect on MNEs would depend on how nimbly those entities can respond to targeted enforcement actions and mitigate their effects on worldwide tax avoidance through increased avoidance in other jurisdictions. Finally, Dyreng et al. (2017) provide evidence of a similar decline in effective tax rates over time for domestic firms and MNEs, noting that "there are significant and increasing opportunities [for domestic firms] to reduce effective tax rates." Because there is justification in support of multiple outcomes, we state our hypothesis in the null:

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

3. Research design and sample

3.1 Research design

Our primary hypothesis tests rely on the following regression:

$$Tax\ Avoid_{ft} = \alpha + \beta_1 Enforcement_{ct} + \beta_2 MNE_{ft} + \beta_3 Enforcement_{ct} * MNE_{ft} + \gamma Controls_{it} + \delta Controls_{ct} + Fixed\ Effects_t + Fixed\ Effects_c + Fixed\ Effects_i + \varepsilon \quad (1)$$

where subscripts *f, t, c,* and *i* denote firm, year, country, and industry, respectively. We base *Tax Avoid* on Atwood et al. (2012).[9] The variable captures worldwide tax avoidance by measuring

[9] Atwood et al. (2012) compare the expected tax burden ($PTI * \tau$) to cash taxes paid (TXPD). We instead compare the expected burden to current tax expense (TXT-TXDI) to maximize the number of observations we retain in our sample. Using the measure as constructed by Atwood et al. (2012) results in a 30 percent reduction in sample size. However, we confirm in untabulated analysis that results are robust to using this measure in the smaller sample.

the current tax burden in year *t* relative to an expected amount. *Tax Avoid* is increasing in tax avoidance and equals the expected tax on worldwide pre-tax earnings computed using the home-country statutory corporate tax rate less current tax expense, scaled by pre-tax income. We compute *Tax Avoid* annually to exploit the OECD data on annual variation in enforcement spending, which improves identification.

We denote firm and year subscripts with *f* and *t,* respectively, and measure *Tax Avoid* as:

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

Where:

PTI = pre-tax income (PI)
τ = home-country statutory corporate income tax rate (STR), obtained from KPMG
CTE = current tax expense, or total tax expense less deferred taxes (TXT-TXDI)

We also use *Cash ETR_TA* as an alternative measure of tax avoidance. We calculate this measure as taxes paid scaled by pre-tax income times negative one. We multiply the cash ETR by negative one so the measure is increasing in tax avoidance like *Tax Avoid.* We do not consider this our primary measure because approximately 35 percent of the sample does not have required data from Compustat to compute *Cash ETR_TA.* We can use *Cash ETR_TA* as an alternative measure of tax avoidance because our tax enforcement measures vary over time within country, which allows us to include country-level fixed effects in our regression. Without this feature of our data, a measure of tax avoidance relative to the statutory tax rate (like *Tax Avoid*) would be required.

We measure changes in *Enforcement* in multiple ways across tests. Our primary measure is *% Change in Enforcement*, the change from year *t-1* to *t* in total home-country tax enforcement expenditures.[10] Focusing on how one-year changes in home-country enforcement

[10] *% Change in Enforcement* only varies by country-year whereas our unit of observation is the firm-year. Our tests are therefore equivalent to country-year regressions weighted by the number of firms in each country-year (Guenther

spending affect current-year tax avoidance allows us to speak to the deterrence effect of recent changes in enforcement more precisely. A limitation of this enforcement measure is that it understates longer-term specific deterrence effects that manifest through audit efforts after year *t.* In additional tests, we use the level of home-country enforcement spending, audit rates, and the taxpayer's burden of compliance as alternative measures of enforcement.

We focus on home-country tax enforcement for two reasons. First, changes in tax enforcement in other jurisdictions are irrelevant to domestic firms. Because our research question asks whether there is a differential relation between changes in enforcement spending and the tax avoidance of domestic versus multinational entities, we restrict our analysis to changes in tax enforcement that could impact both sets of firms. Second, because MNEs have a large portion of their income and operations in their home country, changes in home-country enforcement are more salient to MNEs than changes in enforcement in other countries. Thus, MNEs are likely more responsive to changes in home-country enforcement than changes in other jurisdictions. In subsequent tests, we examine the robustness of inferences across different settings and use different measures of enforcement and tax avoidance.

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 *% Change in Enforcement * MNE.* Estimating $\beta_3 \neq 0$ in equation (1) allows us to reject the null hypothesis of no differential effect. We consider firms incorporated in the United States or Canada to be domestic if they have zero or missing values for pre-tax foreign income. We classify other firms as domestic if they have zero or missing values for foreign currency

(2019)). Such weighting alleviates problems caused in OLS when the homoscedasticity assumption is violated. We examine the robustness of our results to this weighting in Section 4.1.

adjustments.[11] We acknowledge this is an imperfect way to identify domestic firms and conduct additional analyses to gauge the sensitivity of these results. To strengthen our identification of MNEs, in supplemental tests we (1) eliminate firms in the European Union from our sample because sharing a common currency across countries can lead to misclassification of MNEs as domestic, (2) examine a subsample of U.S. incorporated firms using Compustat North America data that provide better identification of MNEs based on the presence of pre-tax foreign income (PIFO), and (3) use BvD data, which provide the country location of affiliates.

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." To our knowledge, these data have not been widely used in the literature; Robinson and Slemrod (2012) is a notable exception. Those authors remark that, "[w]ith the release of the OECD data, the state of reliable cross-country information has gone from a near-vacuum to a situation approaching information overload" (p.249). However, because these data are self-reported by individual tax administrations, they could contain errors, which would create noise in our measure of enforcement. To validate the reliability of the data, we confirm the enforcement spending amounts included in the OECD series for the United States agree to enforcement spending data provided by the IRS.[12] To further address potential data issues or outliers in the OECD data, we use robust regression in all analyses that rely on OECD data to measure enforcement (Leone, Minutti-Meza, and Wasley

[11] Unlike Compustat North America, Compustat Global does not provide information about where pre-tax income is earned (i.e., there is no equivalent to PIFO or PIDOM in Compustat Global.)

[12] The OECD data show "administrative costs for tax administration" as a percentage of GDP. We recompute this ratio using Total IRS Costs from Table 28 of the IRS data book and obtain no difference between this ratio and that computed using OECD enforcement expenditure data.

2017). Therefore, the number of observations used in each regression varies based on how many observations receive a zero weight. Further, because our variable of interest is an annual change, we inflation-adjust all firm-year financial variables to ensure our measure captures constant-dollar changes in enforcement. To do so, we generate inflation adjustment ratios using information on nominal and constant GDP from the World Bank.[13]

We include controls to account for firm and country characteristics. We obtain firm-level data from Compustat Global and Compustat North America. We include firm profitability (*Pre-Tax ROA, Prior Year Loss, Sales Growth*) and the country-level statutory tax rate (*STR*) 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 the 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, the tax benefits of debt, and research and development activities. We also include controls for cash holdings (*Cash*) and firm size (*Ln(Assets)*) because these factors have been shown in prior literature to affect incentives for tax avoidance (e.g., Edwards, Schwab, and Shevlin 2016; Law and Mills 2015; Zimmerman 1983).

We control for country-level GDP per capita (*Ln(GDP per capita)*) and *GDP Growth* to account for economic activity in each country. Country-level data on annual GDP per capita and annual GDP growth come from the World Bank. When *Cash ETR_TA* is the dependent variable, we include only those control variables identified by the literature as determinants of cash

[13] Firms listed in Compustat Global as being incorporated in the same country often report financial figures in different currency units. To address this issue, we manually match the inflation-adjustment ratios to their respective currency units and inflation adjust using the firm's respective reported currency unit, rather than the country of incorporation. When inflation adjusting the financial statement information of firms that report in Euros rather than the currency unit of a sovereign nation, we use data on nominal and constant GDP for the European Union as reported by the World Bank.

ETRs.[14] Finally, we include country, year, and industry fixed effects using two-digit SIC codes. This fixed-effects structure 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 the level of worldwide corporate tax avoidance. We report t-statistics based on standard errors clustered by firm.

3.2 Sample

Our dataset includes 109,535 firm-year observations from 47 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 inflation-adjusted average tax enforcement spending as a percentage of the 2006 level of spending for each year in our sample. On average, tax enforcement spending increases over our sample period. No country-year change in enforcement is equal to zero, which provides adequate variation in enforcement to leverage in regression analysis. For comparison, we limit the sample to the United States in Figure 2. We graph two trends – one using OECD data and one using data from the IRS data book. We obtain similar patterns with both data sources: the increasing trend of tax enforcement spending in the United States was disrupted following the Financial Crisis, consistent with a wave of significant reductions to the IRS' budget. This analysis provides comfort as to the accuracy of the OECD enforcement spending data at least for one country.

Table 1 describes the sample. On average and at the median *Tax Avoid* is positive, suggesting some level of tax avoidance in the sample. We classify about 52 percent of firms in

[14] Specifically, we exclude country-level controls for *Ln(GDP per capita), GDP Growth,* and *STR.* We confirm in untabulated analyses that tests using *Cash ETR_TA* as the dependent variable are robust to including these controls.

the sample as *MNEs*. Sample firms report average (median) *Pre-Tax ROA* of 10.1 (6.8) percent and *Sales Growth* of 14.3 (5.9) percent. 12.3 percent of observations report pre-tax income less than zero in year *t-1.* Sample firms are also large, with over $1 billion of assets on average (untabulated).

Table 2 shows descriptive statistics for key variables by country. We show whether the country is a member of the OECD and the number of observations per country. The three countries with the most observations in the sample are the United States (22,434 firm years; 20.5 percent of the sample), Japan (18,978 firm years; 17.3 percent of the sample), and India (11,000 firm years; 10.0 percent of the sample). Several 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. We also report country averages of enforcement spending as a percentage of GDP, *Tax Avoid*, *Cash ETR_TA*, and *STR.* We note substantial variation in tax avoidance across countries and in the statutory corporate tax rate, from a high of 40 percent for both the United States (federal, state, and local) and Japan, to a low of 10.4 percent for Cyprus and Bulgaria. We observe a correlation of -0.013 (-0.016) between *% Change Tax Enforcement* and our tax avoidance measures (untabulated). These correlations suggest that increases in enforcement spending as a percentage of GDP are associated with lower levels of tax avoidance.

4. Results

4.1 Analysis using Compustat data

Table 3 presents results of our analysis using Compustat data. Columns (1) and (2) use *Tax Avoid* as the dependent variable and columns (3) and (4) use *Cash ETR_TA.* In columns (1) and (3), we estimate equation (1) without including the interaction of *% Change in Enforcement* and *MNE.* This baseline analysis allows us to provide evidence of the average association

between enforcement changes and corporate tax avoidance. We estimate a significant negative coefficient on *% Change in Enforcement* in columns (1) and (3), consistent with the result in Atwood et al. (2012) that corporations avoid more tax in countries where perceived enforcement is weaker. Because this test replicates findings from prior literature of a negative relation between enforcement and tax avoidance (e.g., Atwood et al. 2012; Hoopes et al. 2012; Gupta and Lynch 2016), it alleviates further concerns about the reliability of the OECD tax enforcement data. It also corroborates that inferences from the Atwood et al. (2012) study, which uses perceptions of enforcement as its variable of interest, are robust to using measures of actual enforcement spending. The coefficient estimate of -0.009 in column (1) suggests that a one standard deviation increase in our measure of enforcement spending is associated with about a 1.22 percent reduction in *Tax Avoid* relative to the mean.[15] Thus, increases in enforcement spending have a statistically and economically significant effect on corporate tax avoidance.

In columns (2) and (4), we test our hypothesis, which predicts an insignificant coefficient on *% Change in Enforcement * MNE*. We estimate significant positive coefficients in both columns thereby rejecting the null hypothesis of no differential relation between tax enforcement and avoidance for MNEs. Focusing on column (2), we estimate that a one standard deviation increase in *% Change in Enforcement* is associated with a decrease in *Tax Avoid* that is 2.31 percent smaller for MNEs relative to domestic firms. An F-test reveals there is no statistically significant relation between *% Change in Enforcement* and *Tax Avoid* for MNEs. These results

[15] We estimate these magnitudes by multiplying the relevant estimated coefficient by the standard deviation of *% Change in Enforcement* for the subsample of observations with non-zero weights in the robust regression (0.118, untabulated), then dividing by the sample mean of *Tax Avoid* for the subsample of observations with non-zero weights in the robust regression (0.087, untabulated). Atwood et al. (2012) estimate that moving from the 25th to 75th percentile of perceived enforcement is associated with a 19 percent decrease in *Tax Avoid* relative to the mean.

suggest MNEs reduce their level of worldwide tax avoidance (if at all) to a lesser extent than domestic firms in response to increases in home-country tax enforcement spending.

To validate the robustness of our results, we conduct several additional tests (untabulated). First, we re-estimate results in Table 3 using *Enforcement Budget as % of GDP* as an alternative measure of enforcement spending. *Enforcement Budget as % of GDP* is the total country-level tax enforcement expenditures in year *t* scaled by country-level GDP in year *t.* We estimate a positive and significant coefficient on *Enforcement Budget as % of GDP * MNE* using both measures of tax avoidance. A one standard deviation increase in *Enforcement Budget as % of GDP* is associated with 5.81 percent decrease in *Tax Avoid* on average. Similarly, a one standard deviation increase in *Enforcement Budget as % of GDP* is associated with an incremental 4.12 percent decrease in *Tax Avoid* for domestic firms relative to multinational firms. Using this alternative measure highlights that our results are robust to estimating a level-on-level regression and addresses concerns about inflation because this measure captures the ratio of two country-level variables measured concurrently.

Second, we obtain positive coefficients on the interaction of *MNE* with both *% Change in Enforcement* and *Enforcement Budget as % of GDP* if we exclude countries in the European Union that share a common currency, which can lead to potential misclassification of MNEs as domestic firms. Third, because our enforcement measures are country-year (not firm-year) measures, we gauge the robustness of our results using a single observation for each country-year (Guenther 2019). We continue to find positive and significant coefficients on *% Change in Enforcement * MNE* (0.062, t-stat = 2.01) for this sample of 327 equally-weighted country-year observations.[16] Finally, to address the concern that a correlated omitted variable drives our

[16] We find similar results when using this country-year estimation and *Cash ETR_TA* as the dependent variable.

observed relation between tax avoidance and enforcement, we conduct a Frank (2000) test. First, we find that to invalidate the inference, 52.05 percent of the estimated effect of *% Change Enforcement* would have to be due to bias. Second, we find that for a correlated omitted variable to explain our results, it would have to have more power to jointly explain tax avoidance and tax enforcement than any of our existing covariates.

Across all tests, we find the effect of tax enforcement changes is greater among domestic firms. This result is consistent with the notion that MNEs can more nimbly respond to changes in home-country tax enforcement than domestic entities because they can increase tax avoidance in other jurisdictions. Thus, despite much public discussion of increased enforcement efforts to curb the tax practices of MNEs, our evidence suggests that on average, from 2006 through 2013, increases in tax enforcement expenditures are relatively less effective at altering the worldwide tax avoidance of MNEs. Instead, the change in total avoidance is significantly greater for domestic firms.

4.2 Analysis using World Bank data

A potential concern with the analysis in Table 3 is that the OECD data on enforcement expenditures are self-reported by countries' tax administrators. Figure 2 validates the accuracy of these data for the United States because they are similar to amounts publicly reported by the IRS. However, it is unclear how reliable these data are for other countries. For this reason, we re-estimate tests using multiple measures of tax avoidance and enforcement from different datasets and across multiple settings to triangulate results and strengthen inferences.

We first use World Bank survey data from 2002 to 2005 to construct alternative measures of tax enforcement and evasion. We use responses to survey questions to construct two measures

of tax enforcement.[17] First, *Business Constraint* is the firm's response to the survey question, "Please tell us if (tax administration is) a problem for the operation and growth of your business." Reponses are given on a five-point scale from no problem (0) to very severe obstacle (5) such that enforcement is increasing in *Business Constraint.* Second, *Time Spent* is the firm's response to the question, "In a typical week, what percentage of senior management's time is spent in dealing with requirements imposed by government regulations [e.g. taxes, customs, labor regulations, licensing, and registration] including dealings with officials, completing forms, etc.?" Enforcement is therefore also increasing in *Time Spent.* Following prior literature (e.g., Beck, Lin, and Ma (2014)), we measure tax evasion as one minus the firm's response to the question, "Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your area of activity reports for tax purposes?" Thus, tax evasion is increasing *Tax Evade.* Because the dependent variable is tax evasion, not tax *avoidance*, we include standard controls from empirical models of tax evasion including number of employees, firm age, and country-level controls including the level of crime, economic development (e.g., access to electricity), the statutory tax rate, etc. Following prior literature that uses these data, we estimate regressions that include World Bank data as a dependent variable using Tobit regression (Beck et al. (2014); Mason, Utke, and Williams (2019)).

Table 4 reports the results of our analysis of the relation between tax enforcement and tax evasion using the World Bank survey data. In column (1), we measure enforcement with *Business Constraint* and find a positive association between tax evasion and the extent to which

[17] Because the survey does not have a question directly addressing real or perceived tax enforcement, we construct these measures of tax enforcement using survey questions most relevant to this construct.

firms view tax administration as an impediment to business growth and operations. This positive association is larger for MNEs. In column (2), we measure enforcement with *Time Spent.* On average, we find no relation between enforcement measured as *Time Spent* and evasion. However, we find a positive coefficient on *Enforcement*MNE*. Thus, MNEs report incrementally greater levels of evasion relative to domestic firms when enforcement is greater. These results corroborate results in Table 3 for an alternative sample of global firms by revealing a different association between tax evasion and tax enforcement for domestic firms and MNE, although we acknowledge tax evasion is the most aggressive way companies can reduce their explicit tax burdens.

4.3 Analysis using Compustat data for a subsample of U.S. incorporated firms

Another concern is that results in Tables 3 and 4 are driven by firms in countries with non-comparable regulatory environments. We attempt to control for cross-country differences and include country-level fixed effects to control for time-invariant unobservable differences across countries. Nonetheless, to demonstrate that our results are not driven by countries with poor regulatory environments, our next set of tests repeat our analysis using a single-country setting. We re-estimate equation (1) using robust regression and a subsample of firms incorporated in the United States. Table 5 presents results.[18]

Panel A presents results of using *% Change in Enforcement* as a measure of enforcement and using both *Tax Avoid* and *Cash ETR_TA* as measures of tax avoidance. We estimate significant positive coefficients on *% Change in Enforcement * MNE* in both columns, suggesting that relative to U.S. domestic firms, U.S. multinational firms reduce their tax

[18] Because there is no variation in the statutory tax rate in the United States during our sample, we omit *STR* from the regression. We also omit country fixed effects because this is a single-country analysis and year fixed effects because the enforcement variables are measured annually.

avoidance to a lesser extent following increased U.S. tax enforcement. Using *Tax Avoid* as the measure of tax avoidance, the coefficient estimate in column (1) suggests that a one standard deviation increase in U.S. enforcement spending is associated with a decrease in *Tax Avoid* that is 3.08 percent smaller for U.S. MNEs relative to U.S. domestic firms.[19]

We also use another alternative measure of enforcement to further triangulate our identification strategy. We follow Hoopes et al. (2012) and use data from the Transactional Records Access Clearinghouse (TRAC) to examine the relation between IRS audit rates and tax avoidance.[20] Results in Panel B suggest that relative to U.S. multinational firms, U.S. domestic firms engage in less tax avoidance than MNEs as IRS audit rates increase. Thus, results in Table 5 use a single-country setting (United States) and an alternative measure of tax enforcement (IRS audit rates) to further corroborate our conclusion that multinational firms decrease tax avoidance to a lesser degree than domestic firms in response to enforcement.

4.4 Analysis using BvD data

In our final set of analyses, we use data on publicly traded MNEs and their worldwide affiliates from BvD's Osiris database. First, we re-estimate equation (1) using these data to further demonstrate that our finding of a differential response to tax enforcement changes by domestic firms is not an artifact of our potential misclassification of firms as domestic versus MNE. Second, these data allow us to better understand the differential responses of domestic

[19] We estimate these magnitudes by multiplying the relevant estimated coefficient by the standard deviation of *% Change in Enforcement* for this robust regression sub-sample (0.032, untabulated), then dividing by the same sub-sample mean of *Tax Avoid* (0.180, untabulated).

[20] For firm-years more than 50 percent likely to be in Coordinated Industry Case program according to the CIC prediction model from Ayers et al. (2019), we reset the TRAC audit rate to one. Results are robust to using 75 percent and 90 percent as alternative predicted likelihood thresholds. Results are also robust to setting the TRAC audit rate to one for firm-years with the highest 500 or 1,000 CIC likelihood scores.

firms and MNEs to increased tax enforcement. In particular, we examine whether increases in tax enforcement spending are associated with home- versus foreign-country tax avoidance.

We construct a sample of BvD observations using unconsolidated company information from 2002 to 2014 and identify affiliates within the same MNE group-year using BvD's ownership information. We classify a firm as domestic if the parent and all affiliates are located in the same country; if a firm has an affiliate in another country, it is an MNE. We make this classification before imposing any sample restrictions. To remain in the sample for regression analysis, we require the affiliates to be profitable (De Simone, Klassen, and Seidman 2017) and to have information necessary to construct regression variables. Tests using BvD data include observations from 33 countries that are mainly in Europe, with the United Kingdom, France, and Spain contributing the most observations. Japan has the fourth largest number of observations.

4.4.1 Replicating our main findings

One concern with results in Table 3 is that our classification of domestic and MNE firms using Compustat Global data is imperfect. We address this concern in prior tests by eliminating firms in the European Union from our Compustat Global sample (because sharing a common currency across countries can lead to misclassification of MNEs as domestic) and examining a subsample of U.S. incorporated firms using Compustat North America data (because this dataset provides better identification of MNEs than Compustat Global). We address this concern in a third way by using BvD data.

In Panel A of Table 6, we re-estimate tax avoidance as a function of *% Change in Enforcement* and controls. This analysis includes domestic firms and MNEs. BvD data prohibit us from constructing tax avoidance measures identical to those used in our prior tests. We therefore construct a unique measure of tax avoidance for these tests. Total *BVD_ETR_TA* is tax

expense (*TAXA*) scaled by earnings before interest and taxes (*EBIT*).[21] We construct control variables that are analogous to those in equation (1) for which we have adequate data from BvD. We aggregate affiliate-year data to construct firm-year measures of all variables.

Results are similar to those reported in columns (1) and (2) of Table 3; we estimate lower levels of tax avoidance in response to increased enforcement spending that is greater for domestic firms. F-tests reveal that MNEs maintain the same level of worldwide tax avoidance when home-country enforcement spending increases. Because our identification of domestic firms using Compustat Global data is noisy, finding similar results using an alternative database that allows for more accurate identification of domestic firms supports our conclusion that domestic firms respond differently to increased enforcement spending and that findings in Table 3 are not attributable to a misclassification of domestic firms.

4.4.2 Responses of home- and foreign-country tax avoidance to enforcement

The distinct advantage of the BvD affiliate-level data (relative to consolidated data from Compustat) is that they allow us to separately examine firm operations by country. Above, we exploit this advantage to examine whether there are differential effects on home-country avoidance for domestic and multinational firms following changes in home-country enforcement spending. We also examine the relation between foreign-country tax avoidance and home-country enforcement spending in our sample of MNEs.

For all firms, we measure *BvD Home_ETR_TA* as the sum of tax expense reported by the firm's affiliates in its home country scaled by the sum of *EBIT* for the firm's affiliates in its home country. For MNEs, we measure *BvD Away_ETR_TA* as the sum of tax expense reported

[21] We are unable to construct *Tax Avoid* in these tests because there are multiple STRs applied to MNE operations worldwide. BvD provides only one aggregate tax expense number – data on taxes paid or current verses deferred taxes are not available.

by the MNE's affiliates outside its home country scaled by the sum of *EBIT* for the MNE's affiliates outside its home country. As before, we multiple the ETR measure by negative one so that it is increasing in tax avoidance. We then estimate these tax avoidance variables as a function of *% Change in Enforcement* and controls for firm profitability, tax avoidance opportunities, and other economic factors. For consistency, we measure all control variables in the same jurisdiction as the dependent variable for this test (i.e., home or away).

Panel B of Table 6 presents the results of this analysis. In column (1), we find a negative and significant coefficient on *% Change Enforcement,* consistent with home-country enforcement leading to a decrease in home-country tax avoidance for all firms. In column (2), the coefficient on *% Change Enforcement * MNE* is positive but insignificant at conventional levels (two-tailed p-value = 0.197). This result suggests that changes in home-country tax enforcement have a similar effect on domestic and multinational firms.[22] Thus, our prior results that document a mitigated effect of tax enforcement on tax avoidance for multinational firms relative to domestic firms appears to be driven by MNE's tax avoidance opportunities outside of the home country. In Column (3), we test this intuition by estimating the effect of changes in home-country tax enforcement on the foreign tax avoidance of MNEs. We estimate a positive and significant coefficient on *% Change in Enforcement*. Because we multiple the tax burden by negative one, these findings are consistent with MNEs avoiding more tax outside their home country in response to increased home-country tax enforcement. In contrast, domestic firms lack the opportunity to offset increased enforcement at home with more aggressive tax reporting abroad. A one standard deviation increase in home-country tax enforcement (*% Change in*

[22] In untabulated tests, we examine home tax avoidance for U.S. firms (using TXFED from Compustat NA). Although we are unable to measure the control variables at the home-country level, we find an insignificant coefficient on *% Change Enforcement * Domestic*.

Enforcement) is associated with about a 2.0 percent increase in *Foreign BvD ETR_TA* for sample MNEs.[23] These results suggest MNEs bear a higher tax burden in their home country when enforcement increases and mitigate these negative consequences by being more aggressive in their tax avoidance abroad.

5. Conclusion

In light of a recent, heightened focus on the tax avoidance of large MNEs, we examine whether changes in tax enforcement spending affect domestic corporations and locally-headquartered MNEs equally. To address this question, we primarily use annual data on tax administration expenditures by 47 countries from 2005 through 2013. These data 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, allowing for tighter identification. Consistent with prior work (e.g., Atwood et al. 2012), we estimate a negative association between changes in enforcement spending and tax avoidance on average. However, we provide some of the first evidence that this effect is concentrated among *domestic* firms. Despite increased international focus on the tax avoidance activities of MNEs, domestic firms' total tax avoidance is more sensitive to increased enforcement spending. These effects hold across alternative measures of enforcement and evasion, in a single-country analysis of U.S. firms, and in a dataset that allows more precise identification of domestic firms versus MNEs.

Additional tests suggest our results are driven by MNEs firms having tax planning opportunities in multiple jurisdictions. Using affiliate-level data from BvD, we find MNEs' home country effective tax rates do not respond differentially to changes in tax enforcement

[23] We multiply the estimated coefficient on *% Change in Enforcement* (0.046) by the standard deviation of *% Change in Enforcement* for this sub-sample (0.101), then divide by the sub-sample mean of *Foreign BvD ETR_TA* (-0.233).

relative to domestic firms, but MNEs offset their increased home-country tax burdens by reporting a lower effective tax rate on foreign earnings. In short, MNEs avoid less tax at home and more tax abroad when home-country enforcement increases. This is a strategy domestic firms cannot exploit. Our findings therefore have policy implications: single-jurisdiction (e.g., country or state) tax enforcement actions potentially disadvantage domestic firms and other-jurisdiction tax revenues such that there may be benefits to multi-jurisdictional tax harmonization.

We acknowledge the following limitations of our analysis. Although consistent with prior work (Gupta and Lynch 2016; Nessa et al. 2019), measuring enforcement with total spending or audit rates does not allow us to speak to the effectiveness of specific enforcement techniques. Second, the effectiveness of a country's tax administration does not depend solely on the amount of financial resources allocated to enforcement but varies with economic incentives for avoidance, opportunities for avoidance, etc. We attempt to mitigate these limitations by including country-level fixed effects in all specifications and using alternative enforcement measures. Third, the actual target of enforcement spending (i.e., domestic companies or MNEs) is not publicly observable. Despite these limitations, our findings should be useful to researchers, policymakers, shareholders, citizens, and tax administrators globally.

References

Allingham M. G., and A. Sandmo. Income tax evasion: a theoretical analysis. *Journal of Public Economics* 1 (1972): 323–338.

Atwood, T.J., M. Drake, J. Myers, and L. Myers. 2012. Home country tax system characteristics and corporate tax avoidance: International evidence. *The Accounting Review* 87 (6): 1831-1860.

Ayers, B., J. Seidman, and E. Towery. 2019. Tax reporting behavior under audit certainty. *Contemporary Accounting Research* 36: 326-357.

Beck, T., C. Lin, and Y. Ma. 2014. Why do firms evade taxes? The role of information sharing and financial sector outreach. *Journal of Finance* 69 (2):763-817.

Beuselinck, C. and J. Pierk. 2019. On the dynamics between local and international tax planning in multinational corporations. Working paper.

Bozanic, Z., J. Hoopes, J. Thornock, and B. Williams. 2017. IRS attention. *Journal of Accounting Research* 55 (1): 79-114.

Coffee. 2007. Law and the market: The impact of enforcement. *University of Pennsylvania Law Review* 156 (2): 229-311.

Collins, J, D. Kemsley, and M. Lang. 1998. Cross-jurisdictional income shifting and earnings valuation. *Journal of Accounting Research* 36 (2): 209-229.

De Simone, L. (2016). Does a common set of accounting standards affect tax-motivated income shifting for multinational firms? *Journal of Accounting and Economics*, 61(1), 145-165.

De Simone, L., K. Klassen, and J. Seidman. 2017. Unprofitable affiliates and income shifting behavior. *The Accounting Review* 92: 113-136.

Desai, M. A. Dyck, and L. Zingales. 2007. Theft and taxes. *Journal of Financial Economics* 84: 591-623.

Durlauf, S. N., and D. S. Nagin. The deterrent effect of imprisonment. Pages 43–94 Controlling Crime: Strategies and Tradeoffs University of Chicago Press.

Dyreng, S., M. Hanlon, E. Maydew, and J. Thornock. 2017. Changes in corporate effective tax rates over the past 25 years. *Journal of Financial Economics:* 124: 441-463.

Dyreng, S., J. Hoopes, and J. Wilde. 2016. Public pressure and corporate tax behavior. *Journal of Accounting Research* 54 (1): 147-186.

Edwards, A., C. Schwab, and T. Shevlin. 2016. Financial constraints and tax savings. *The Accounting Review* 91 (3): 859-881.

EY. 2013. Transfer pricing global reference guide.

EY. 2017. The outlook for global tax policy in 2017.

Faulkender, M. and J. Smith. 2016. Taxes and leverage at multinational corporations. *Journal of Financial Economics* 122: 1-20.

Foley, F., J. Hartzell, S. Titman, and G. Twite. 2007. Why do firms hold so much cash? A tax-based explanation. *Journal of Financial Economics* 86: 579-607.

FRANK, K. 2000. Impact of a confounding variable on a regression coefficient. *Sociological Methods & Research* 29 (2): 147-194.

Guenther, D.A. 2019. On the (somewhat puzzling) relation between human organ donations and tax avoidance but U.S. public corporations. *Working paper.*

Gupta, S. and D. Lynch. 2016. The effects of changes in state tax enforcement on corporate income tax collections. *Journal of the American Taxation Association* 38 (1): 125-143.

Hanlon, M., J. Hoopes, and N. Shroff. 2014. The effect of tax authority monitoring and enforcement on financial reporting quality. *Journal of the American Taxation Association* 36 (2): 137-170.

Hanlon, M., R. Lester, and R. Verdi. 2015. The effect of repatriation tax costs on U.S. multinational investment. *Journal of Financial Economics* 116: 179-196.

Hines, J. and E.M. Rice. 1994. Fiscal paradise: Foreign tax havens and American business. *Quarterly Journal of Economics* February: 149-182.

Hoopes, J., D. Mescall, and J. Pittman. 2012. Do IRS audits deter corporate tax avoidance? *The Accounting Review* 87 (5): 1603-1639.

Hoopes, J., L. Robinson, and J. Slemrod. 2018. Public tax-return disclosure. *Journal of Accounting and Economics* 66: 142-162.

Huizinga, H. Laeven, L. 2008. International profit shifting within multinationals: a multi-country perspective. *Journal of Public Economics.* 92, 1164-1182.

Joshi, P., Outslay, E., Persson, A. 2018. Does public Country-by-Country Reporting deter tax avoidance and income-shifting? Evidence from Capital Requirements Directive IV. *Working Paper.*

Kinsey, K. A. Deterrence and alienation effects of IRS enforcement: An analysis of survey data. Pages 259–285 Why People Pay Taxes The University of Michigan Press.

Klassen, K., M. Lang, and M. Wolfson. 1998. Geographic income shifting by multinational corporations in response to tax rate changes. *Journal of Accounting Research* 31: 141-173.

Klassen, K. and S. Laplante. 2012. Are U.S. multinational corporations becoming more aggressive income shifters? *Journal of Accounting Research* 50 (5): 1245-1286.

La PORTA, R., F. Lopez-de-silanes, and A. Shleifer. 2006. What works in securities laws? *Journal of Finance* LXI (1): 1-32.

Law, K. and L. Mills. 2015. Taxes and financial constraints: Evidence from linguistic cues. *Journal of Accounting Research* 53 (4): 777-819.

Leone, A., Minutti-Meza, M., Wasley, C. 2017. Influential observations and inference in accounting research. *The Accounting Review,* forthcoming.

Markle, K. 2016. A comparison of the tax-motivated income shifting of multinationals in territorial and worldwide countries. *Contemporary Accounting Research* 33(1): 7-43.

Mason, P., S. Utke, B. Williams. 2019. Why pay our fair share? How perceived influence over laws affects tax evasion. *Journal of the American Taxation Association,* forthcoming.

Mills, L., M. Erickson, E. Maydew. 1998. Investments in tax planning. *Journal of the American Taxation Association.* 20 (1). 1-20.

Nessa, M., C. Schwab, B. Stomberg, and E. Towery. 2019. How do IRS resources affect the corporate audit process? *The Accounting Review,* forthcoming.

Robinson, L. and J. Slemrod. 2012. Understanding multidimensional tax systems. *International Tax and Public Finance* 19: 237-267.

Sheffrin, S. M., and R. K. Triest. Can brute deterrence backfire? Perceptions and attitudes in taxpayer compliance. Pages 193–218 Why People Pay Taxes The University of Michigan Press.

Shevlin, T., J. Thornock, and B. Williams. 2017. An examination of firms' responses to tax forgiveness. *Review of Accounting Studies* 22: 577-607.

Slemrod, J. 2015. Tax compliance and enforcement: New research and its policy implications. *Working Paper*.

Slemrod, J. 2018. Tax compliance and enforcement. NBER *Working Paper*. http://www.nber.org/papers/w24799.

Slemrod, J. and C. Gillitzer. 2014. *Tax Systems.* Oxford: Oxford University Press.

Treanor, J. 2009. Avoiding tax robs our public services, declares minister. *The Guardian.* Sept. 19th, 2009. Available online at: https://www.theguardian.com/business/2009/sep/20/tax-avoidance-penalties

Warren, E. 2016. "Elizabeth Warren: What Apple teaches us about taxes". *The New York Times,* Sept. 8, 2006. Available online at: https://www.nytimes.com/2016/09/08/opinion/elizabeth-warren-what-apple-teaches-us-about-taxes.html.

Zimmerman, J. 1983. Taxes and firm size. *Journal of Accounting and Economics* 5 (2): 119-149.

Figure 1: Average Inflation-Adjusted Enforcement Spending as a % of 2006 Spending for the Full Sample

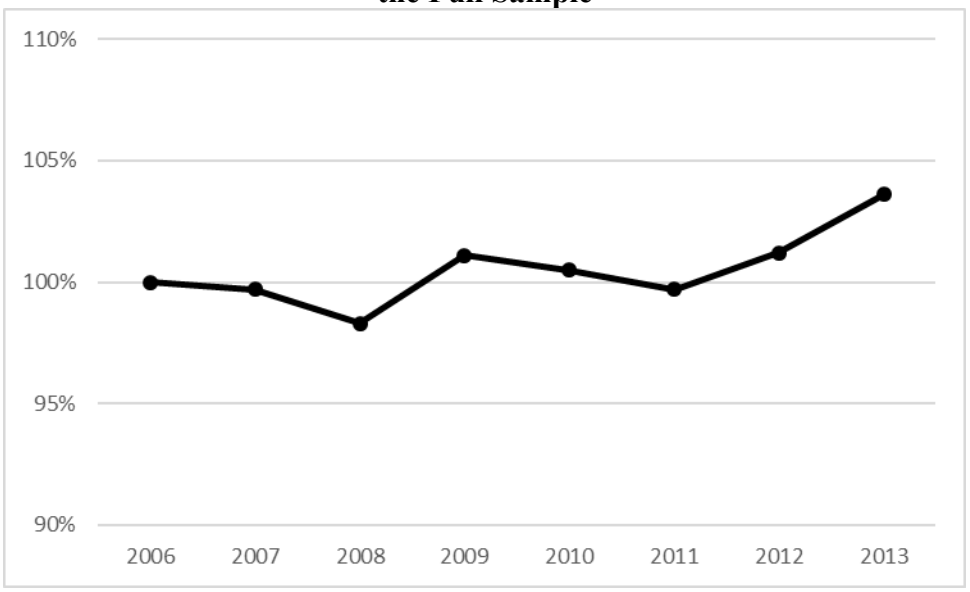

Figure 1 presents the annual simple average inflation-adjusted tax enforcement spending as a percentage of the 2006 level of enforcement spending across 47 country observations per year.

Figure 2: Inflation-Adjusted Enforcement Spending as a % of 2006 Spending for the United States

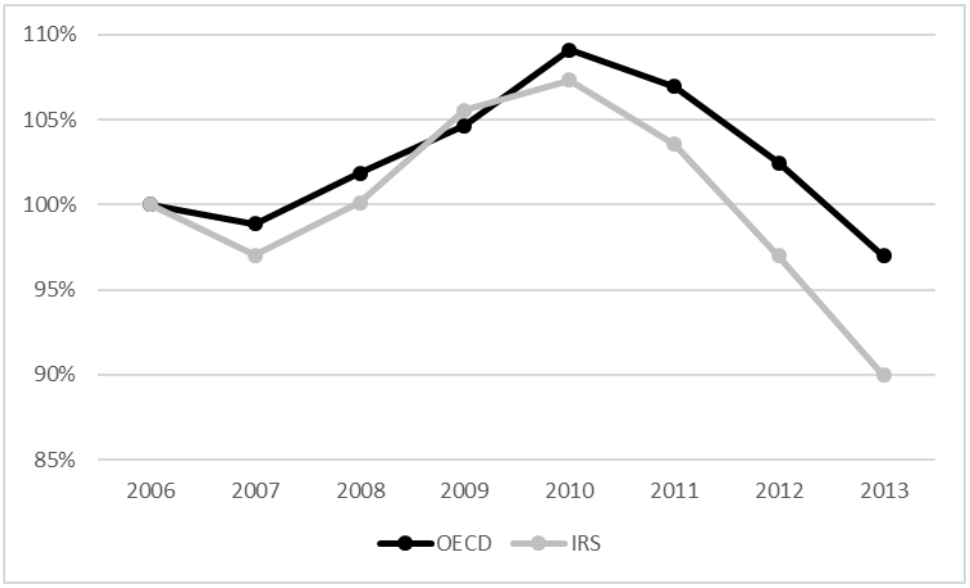

Figure 2 presents inflation-adjusted tax enforcement spending for the United States using two sources of data – the OECD and the IRS.

Table 1: Full Sample Descriptive Statistics

Variable	N	Mean	Std Dev	P25	P50	P75
Tax Avoid	109,535	0.050	0.308	-0.026	0.059	0.196
Cash ETR_TA	70,906	-0.251	0.234	-0.337	-0.215	-0.073
% Change in Enforcement	109,535	0.008	0.108	-0.054	-0.011	0.052
Enforcement Budget as % of GDP	109,535	0.144	0.080	0.077	0.138	0.206
MNE	109,535	0.519	0.500	0.000	1.000	1.000
Pre-Tax ROA	109,535	0.101	0.111	0.033	0.068	0.127
Prior Year Loss	109,535	0.123	0.329	0.000	0.000	0.000
Sales Growth	109,535	0.143	0.458	-0.046	0.059	0.201
PP&E	109,535	0.313	0.263	0.097	0.254	0.462
Leverage	109,535	0.236	0.229	0.040	0.191	0.355
R&D	109,535	0.013	0.035	0.000	0.000	0.006
Cash	109,535	0.169	0.192	0.039	0.104	0.225
Ln(Assets)	109,535	7.475	2.950	5.286	7.219	9.596
STR	109,535	0.326	0.072	0.263	0.333	0.400
Ln(GDP per capita)	109,535	10.082	1.137	9.473	10.703	10.794
GDP Growth	109,535	2.529	3.188	1.420	2.224	4.192

Table 1 provides descriptive statistics for key variables. For descriptive purposes variables are winsorized at the 1% level (two tailed). *Tax Avoid* is pre-tax income multiplied by the *STR* less current taxes paid, scaled by pre-tax income (PI). We measure current taxes paid as total tax expense (TXT) less deferred taxes (TXDI). *STR* is the combined average statutory corporate income tax rate at all layers of government in the country during the year *t. Cash ETR_TA* is taxes paid (TXPD) scaled by pre-tax income (PI) multiplied by negative one to be increasing in tax avoidance. *% Change in Enforcement* is the percentage change in total spending on tax enforcement as reported by the OECD scaled by GDP from *t-1* to *t*. *Enforcement Budget as % of GDP (*100)* is the country-year tax enforcement budget as a percentage of GDP, multiplied by 100. *MNE* is equal to one if the firm is multinational and zero otherwise. We classify a firm as multinational 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 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 *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 logarithm of total assets (AT). *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 *t*. We obtain GDP per capita and GDP Growth from the World Bank.

Table 2: Variables of Interest by Country

Country	OECD?	No. Obs.	*Enforcement Budget as a % of GDP*	*Tax Avoid*	*Cash ETR_TA*	*STR*
ARGENTINA		394	0.233%	-0.045	-0.324	0.350
AUSTRALIA	Yes	3,952	0.208%	0.084	-0.272	0.300
AUSTRIA	Yes	424	0.158%	0.009	-0.246	0.250
BELGIUM	Yes	618	0.327%	0.059	-0.274	0.340
BRAZIL		577	0.186%	0.057	-0.263	0.340
BULGARIA		218	0.228%	-0.039	-0.211	0.104
CANADA	Yes	4,587	0.219%	0.122	-0.212	0.312
CHILE	Yes	940	0.114%	0.000	-0.178	0.180
CHINA		2,940	0.121%	0.060	-0.097	0.250
COLOMBIA		88	0.070%	-0.029	-0.277	0.303
CYPRUS		145	0.226%	-0.117	-0.229	0.104
CZECH REPUBLIC	Yes	88	0.190%	0.023	-0.222	0.209
DENMARK	Yes	380	0.278%	-0.016	-0.283	0.257
ESTONIA	Yes	85	0.168%	0.061	-0.156	0.216
FINLAND	Yes	674	0.200%	-0.035	-0.294	0.256
FRANCE	Yes	3,439	0.222%	0.042	-0.310	0.333
GERMANY	Yes	3,514	0.277%	0.027	-0.284	0.319
HONG KONG		357	0.056%	-0.032	-0.191	0.165
HUNGARY	Yes	109	0.334%	-0.088	-0.207	0.173
INDIA		11,000	0.033%	0.094	-0.286	0.334
IRELAND	Yes	250	0.247%	-0.046	-0.190	0.125
ISRAEL	Yes	1,116	0.159%	0.023	-0.235	0.250
ITALY	Yes	1,328	0.204%	-0.181	-0.448	0.331
JAPAN	Yes	18,978	0.144%	-0.019	-0.092	0.400
KOREA	Yes	4,287	0.104%	-0.011	-0.359	0.249
LATVIA	Yes	167	0.301%	0.019	-0.267	0.150
LITHUANIA	Yes	192	0.189%	-0.062	-0.232	0.155
LUXEMBOURG	Yes	226	0.231%	0.020	-0.275	0.291
MALAYSIA		4,948	0.112%	0.027	-0.228	0.258
MALTA		52	0.328%	0.137	-0.176	0.350
MEXICO	Yes	629	0.072%	-0.036	-0.266	0.292
NETHERLANDS	Yes	806	0.325%	0.005	-0.240	0.260
NEW ZEALAND	Yes	654	0.204%	0.051	-0.274	0.301
NORWAY	Yes	820	0.160%	0.028	-0.241	0.280
POLAND	Yes	2,722	0.244%	-0.007	-0.215	0.190
PORTUGAL	Yes	272	0.240%	-0.070	-0.296	0.253
RUSSIA		921	0.168%	-0.064	-0.390	0.200
SAUDI ARABIA		161	0.284%	-0.018	-0.274	0.210
SLOVENIA	Yes	669	0.024%	0.097	-0.067	0.200
SOUTH AFRICA		1,613	0.263%	0.056	-0.292	0.345
SPAIN	Yes	689	0.126%	0.068	-0.276	0.311
SWEDEN	Yes	1,972	0.177%	0.036	-0.270	0.264
SWITZERLAND	Yes	1,211	0.026%	-0.046	-0.245	0.192
THAILAND		423	0.087%	0.036	-0.219	0.200
TURKEY	Yes	1,358	0.150%	0.001	-0.217	0.200
UNITED KINGDOM	Yes	6,108	0.275%	0.029	-0.257	0.276
UNITED STATES	Yes	22,434	0.077%	0.146	-0.245	0.400
Total		**109,535**	**0.144%**	**0.050**	**-0.251**	**0.326**

Table 2 provides detail by country. For descriptive purposes variables are winsorized at the 1% level (two tailed). OECD membership is as of 2017. *Enforcement Budget as % of GDP (*100)* is the country-year tax enforcement budget as a percentage of GDP, multiplied by 100. *Tax Avoid* is pre-tax income multiplied by the *STR* less current

Table 2 (continued): Variables of Interest by Country

taxes paid, scaled by pre-tax income (PI). We measure current taxes paid as total tax expense (TXT) less deferred taxes (TXDI). *STR* is the combined average statutory corporate income tax rate at all layers of government in the country during the year *t*. *Cash ETR_TA* is taxes paid (TXPD) scaled by pre-tax income (PI) multiplied by negative one to be increasing in tax avoidance.

Table 3: Relation between Tax Enforcement and Tax Avoidance – Compustat Data

	1	2	3	4
Dependent variable:	Y= *Tax Avoid*		Y= *Cash ETR_TA*	
% Change in Enforcement	-0.009***	-0.018***	-0.023***	-0.034***
	(-3.28)	(-4.88)	(-5.96)	(-6.96)
*% Change in Enforcement * MNE*		0.017***		0.024***
		(3.40)		(3.61)
MNE	-0.009***	-0.009***	-0.014***	-0.014***
	(-7.62)	(-7.73)	(-9.24)	(-9.34)
Pre-Tax ROA	0.001***	0.001***	-0.050***	-0.050***
	(3.89)	(3.85)	(-19.32)	(-19.32)
Prior Year Loss	0.120***	0.120***	0.100***	0.100***
	(92.83)	(92.79)	(65.29)	(65.17)
Sales Growth	-0.000***	-0.000***	-0.000***	-0.000***
	(-3.45)	(-3.43)	(-8.47)	(-18.75)
PP&E	0.048***	0.048***	0.048***	0.047***
	(20.97)	(20.93)	(21.22)	(21.18)
Leverage	0.036***	0.036***	0.027***	0.027***
	(18.27)	(18.25)	(14.02)	(14.02)
R&D	0.184***	0.184***	0.147***	0.148***
	(17.09)	(17.09)	(11.43)	(11.43)
Cash	-0.010***	-0.010***	0.029***	0.029***
	(-8.08)	(-8.10)	(11.46)	(11.37)
Ln(Assets)	-0.007***	-0.007***	-0.005***	-0.005***
	(-21.96)	(-21.96)	(-13.00)	(-12.98)
STR	0.880***	0.879***		
	(31.17)	(31.14)		
Ln(GDP per capita)	-0.050***	-0.050***		
	(-4.38)	(-4.37)		
GDP Growth	0.002***	0.002***		
	(11.08)	(11.09)		
F Test *% Change Enforcement +*		F=0.03		F=3.26*
*% Change Enforcement * MNE = 0*		P=0.853		P=0.071
Country, Industry, Year FE?	Yes	Yes	Yes	Yes
Observations	103,291	103,293	66,948	66,950

Table 3 presents results from estimating equation (1) using robust regression. The number of observations reflects the number of observations given non-zero weight in the final analysis. *Tax Avoid* is pre-tax income multiplied by *STR* less current taxes paid, scaled by pre-tax income (PI). We measure current taxes paid as total tax expense (TXT) less deferred taxes (TXDI). *STR* is the combined average statutory corporate income tax rate at all layers of government in the country during the year *t*. *Cash ETR_TA* is taxes paid (TXPD) scaled by pre-tax income (PI) multiplied by negative one to be increasing in tax avoidance. *% Change in Enforcement* is the percentage change in total spending on tax enforcement reported by the OECD scaled by GDP from year *t-1* to *t*. *MNE* is equal to one if the firm is multinational and zero otherwise. We classify a firm as multinational 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 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 *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 logarithm of total assets (AT). *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 *t*. We obtain GDP per capita and GDP Growth from the World Bank. We present robust t-statistics in parentheses and cluster standard errors by firm. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 4: Relation between Tax Enforcement and Tax Evasion – World Bank Data
Dependent Variable: *Tax Evade*

Enforcement variable:	*Business Constraint*	*Time Spent*
Enforcement	0.014***	-0.001
	(4.17)	(-1.55)
*Enforcement * MNE*	0.013**	0.002**
	(2.11)	(2.27)
MNE	-0.055**	-0.051**
	(-2.34)	(-2.13)
Log(Employment)	-0.033***	-0.031***
	(-4.69)	(-4.05)
Log(Firm Age)	-0.018***	-0.018***
	(-3.18)	(-2.77)
Corruption	0.017**	0.020**
	(2.23)	(2.32)
Crime	-0.000	0.004
	(-0.02)	(0.74)
Access to Electricity	-0.011**	-0.009**
	(-2.20)	(-1.97)
Externally Audited Financial Statements	-0.041***	-0.033**
	(-3.07)	(-2.14)
STR	-0.028***	-0.033***
	(-4.01)	(-4.71)
Private Firm	-0.022*	-0.021
	(-1.81)	(-1.64)
Foreign Ownership	-0.001***	-0.001***
	(-2.77)	(-2.69)
Ln(GDP per Capita)	0.372***	0.396***
	(13.10)	(16.51)
GDP Growth	-0.225***	-0.233***
	(-13.31)	(-14.84)
F Test *Enforcement + Enforcement * MNE = 0*	F=4.44** P=0.035	F=2.24 P=0.134
Country, Industry, Year FE?	Yes	Yes
Observations	6,871	6,495

Table 4 presents results from estimating tax evasion as a function of enforcement using data from the World Bank from 2002 through 2005 using tobit regression. The dependent variable *Tax Evade* is one minus the firm's answer to the question, "Recognizing the difficulties many enterprises face in fully complying with taxes and regulations, what percentage of total sales would you estimate the typical establishment in your area of activity reports for tax purposes?" *Business Constraint* is the firm's response to the survey question regarding the extent to which the firm views the tax administration as a problem for the operation and growth of the business. Responses are given on a 0 to 5 scale ranging from no problem (0) to very severe obstacle (5) such that the measure is increasing in enforcement. *Time Spent* is the percentage of senior management's time spent dealing with requirements imposed by government regulations, including taxes. *MNE* is equal to one if the firm is multinational and zero otherwise, where firms are classified as multinational if they have sales outside of their home country. *Ln(# of Employees)* is the natural logarithm of the number of employees at the firm. *Ln (Firm Age)* is the natural logarithm of the firm's age. *Corruption, Crime,* and *Access to Electricity* are the firm's response to the question, "Please tell us if any of the following issues are a problem for the operating and growth of your business", where responses are given on a 0 to 5 scale ranging from no problem (0) to very severe obstacle (5), for the items "Corruption", "Crime, theft, and disorder", and "Electricity", respectively. *Externally Audited Financial Statements* is equal to one if the firm has externally audited financial statements and zero otherwise. *STR* is the combined average statutory corporate income tax rate in the country during year *t*. *Private Firm* is equal to one if the firm identifies its legal status as "Privately held, limited company". *Foreign Ownership* is the percentage of the firm owned by foreign investors. *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 *t*. We present robust t-statistics in parentheses and cluster standard errors by industry because we have only one observation per firm identifier. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 5: Relation between Tax Enforcement and Tax Avoidance for U.S. Firms – Compustat Data

Panel A: *% Change in Enforcement*

Dependent variable:	1 *Tax Avoid*	2 *Cash ETR_TA*
% Change in Enforcement	-0.726***	-0.271***
	(-15.95)	(-7.56)
*% Change in Enforcement * MNE*	0.173***	0.190***
	(3.33)	(3.77)
MNE	-0.033***	-0.033***
	(-8.95)	(-9.43)
Pre-Tax ROA	-0.093***	-0.124***
	(-17.06)	(-17.31)
Prior Year Loss	0.122***	0.107***
	(38.64)	(39.37)
Sales Growth	0.000***	0.003***
	(4.09)	(6.54)
PP&E	0.083***	0.051***
	(16.69)	(7.73)
Leverage	0.048***	0.055***
	(15.28)	(18.15)
R&D	0.194***	0.243***
	(10.96)	(11.79)
Cash	0.008	0.040***
	(1.57)	(8.79)
Ln(Assets)	-0.004***	-0.003***
	(-4.13)	(-3.29)
Ln(GDP per capita)	-1.717***	
	(-21.21)	
GDP Growth	0.003***	
	(5.97)	
F Test *% Change Enforcement +*	F=177.5***	F=5.38**
*% Change Enforcement * MNE = 0*	P=0.000	P=0.021
Industry FE?	Yes	Yes
Observations	20,631	20,243

Table 5 presents results from estimating equation (1) on the sample of U.S. firms using robust regression. We report the number of observations with non-zero weight in the final analysis. *Tax Avoid* is pre-tax income multiplied by *STR* less current taxes paid, scaled by pre-tax income (PI). We measure current taxes paid as total tax expense (TXT) less deferred taxes (TXDI). *STR* is the combined average statutory corporate income tax rate at all layers of government in the country during the year *t*. *Cash ETR_TA* is taxes paid (TXPD) scaled by pre-tax income (PI) multiplied by negative one to be increasing in tax avoidance. *% Change in Enforcement* is the percentage change in total spending on tax enforcement reported by the OECD scaled by GDP from year *t-1* to *t*. *MNE* is equal to one if the firm is multinational and zero otherwise. We classify a firm as multinational if it has a non-zero value for pre-tax foreign income. *Pre-Tax ROA* is pre-tax earnings (PI) scaled by lagged total assets (AT). *Prior Year Loss* is 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 *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 logarithm of total assets (AT). *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 *t*. We obtain GDP per capita and GDP Growth from the World Bank. We present robust t-statistics in parentheses and cluster standard errors by firm. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 5 (continued): Relation between Tax Enforcement and Tax Avoidance for U.S. Firms – Compustat Data

Panel B: *IRS Audit Rate*

Dependent variable:	1 *Tax Avoid*	2 *Cash ETR_TA*
IRS Audit Rate	-0.065***	-0.070***
	(-4.99)	(-5.46)
*IRS Audit Rate * MNE*	0.074***	0.055***
	(5.76)	(4.42)
MNE	-0.054***	-0.040***
	(-10.15)	(-7.92)
Pre-Tax ROA	-0.098***	-0.086***
	(-17.90)	(-16.79)
Prior Year Loss	0.122***	0.115***
	(38.24)	(42.38)
Sales Growth	0.000***	0.000***
	(4.16)	(3.59)
PP&E	0.087***	0.077***
	(17.53)	(16.31)
Leverage	0.049***	0.042***
	(16.32)	(17.26)
R&D	0.192***	0.246***
	(10.99)	(11.72)
Cash	0.010**	0.040***
	(2.08)	(8.90)
Ln(Assets)	-0.002	-0.001
	(-1.58)	(-0.64)
Ln(GDP per capita)	-0.872***	
	(-13.99)	
GDP Growth	0.004***	
	(7.06)	
F Test *% Change Enforcement +*	F=1.25	F=3.63*
*% Change Enforcement * MNE = 0*	P=0.263	P=0.057
Industry FE?	Yes	Yes
Observations	20,639	19,624

Table 5 presents results from estimating equation (1) on the sample of U.S. firms using robust regression. We report the number of observations with non-zero weight in the final analysis. *Tax Avoid* is pre-tax income multiplied by *STR* less current taxes paid, scaled by pre-tax income (PI). We measure current taxes paid as total tax expense (TXT) less deferred taxes (TXDI). *STR* is the combined average statutory corporate income tax rate at all layers of government in the country during the year *t*. *Cash ETR_TA* is taxes paid (TXPD) scaled by pre-tax income (PI) multiplied by negative one to be increasing in tax avoidance. *IRS Audit Rate* is the number of corporate returns in each IRS size class audited in year *t* scaled by the number of corporate returns in the same size class filed in year *t*. *MNE* is equal to one if the firm is multinational and zero otherwise. We classify a firm as multinational if it has a non-zero value for pre-tax foreign income. *Pre-Tax ROA* is pre-tax earnings (PI) scaled by lagged total assets (AT). *Prior Year Loss* is 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 *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 logarithm of total assets (AT). *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 *t*. We obtain GDP per capita and GDP Growth from the World Bank. We present robust t-statistics in parentheses and cluster standard errors by firm. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 6: BvD Analysis
Panel A: Relation between Tax Enforcement and Tax Avoidance – BvD Data (Worldwide Avoidance)

	1	2
Dependent variable:	Total *BvD ETR_TA*	
% Change in Enforcement	-0.042***	-0.051***
	(-4.68)	(-5.19)
*% Change in Enforcement * MNE*		0.035*
		(1.82)
MNE	0.003	0.003
	(0.84)	(0.95)
EBIT/Assets	-0.015***	-0.015***
	(-4.09)	(-4.10)
Sales Growth	-0.000	-0.000
	(-0.71)	(-0.71)
Tangible Asset %	0.007***	0.007***
	(6.35)	(6.36)
Leverage	0.084***	0.084***
	(11.93)	(11.92)
Ln(GDP)	-0.064	-0.065
	(-1.35)	(-1.38)
GDP Growth	0.293***	0.304***
	(3.62)	(3.75)
F-Test *% Change Enforcement* + *% Change Enforcement * MNE*		F=0.80 P=0.37
Country, Industry, Year FE?	Yes	Yes
Observations	8,051	8,050

Table 6, Panel A presents results of testing the association between worldwide tax avoidance and changes in home-country enforcement spending using robust regression. We use firm-year data from the Bureau van Dijk database from 2006-2013 in this analysis. We report the number of observations with non-zero weight in the final analysis. The dependent variable in all columns, *BvD ETR_TA*, is tax expense (TAXA) scaled by earnings before interest and taxes (OPPL). *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year *t-1* to year *t*. *MNE* is an indicator variable equal to one if the firm has foreign affiliates and zero otherwise. *EBIT/Assets* is earnings before interest and taxes (OPPL) scaled by lagged total assets (TOAS). *Sales Growth* is current year operating revenue (OPRE) less prior year operating revenue (OPRE), scaled by prior year operating revenue. *Tangible Asset %* is tangible fixed assets (TFAS) scaled by lagged total assets (TOAS). *Leverage* is the sum of non-current liabilities (NCLI) and current liabilities (CULI), scaled by lagged total assets (TOAS). *Ln(GDP)* is the natural logarithm of GDP. *GDP Growth* is the country's percentage change in GDP from year *t-1* to *t*. We present robust t-statistics in parentheses and cluster standard errors clustered by firm. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.

Table 6 (continued): BvD Analysis
Panel B: Relation between Tax Enforcement and Tax Avoidance – BvD Data
(Home- and Foreign-Country Avoidance)

	1	2	3
			MNEs Only
Dependent variable:	*BvD Home ETR TA*		*BvD Away ETR TA*
% Change in Enforcement	-0.039***	-0.045***	0.046***
	(-4.09)	(-4.39)	(2.83)
*% Change in Enforcement * MNE*		0.028	
		(1.29)	
MNE	-0.011***	-0.011***	
	(-4.25)	(-4.25)	
EBIT/Assets	-0.000	-0.000	0.000
	(-0.19)	(-0.18)	(0.39)
Sales Growth	-0.000	-0.000	0.000
	(-0.71)	(-0.71)	(0.59)
Tangible Asset %	0.004***	0.004***	0.003***
	(5.73)	(5.68)	(4.17)
Leverage	0.086***	0.086***	0.049***
	(11.61)	(11.58)	(5.01)
Ln(GDP)	-0.014	-0.015	-0.039***
	(-0.29)	(-0.31)	(-15.43)
GDP Growth	0.246***	0.253***	0.505***
	(2.86)	(2.95)	(4.15)
F Test *% Change Enforce +*		F=0.704	
*% Change Enforce * MNE = 0*		P=0.402	
Country, Industry, Year FE?	Yes	Yes	
Observations	8,022	8,022	2,715

Table 6, Panel B presents results of testing the association between home-country tax avoidance and changes in home-country enforcement spending using robust regression. Column (3) presents the results of investigating foreign-country tax avoidance within MNEs. We use firm-year data from the Bureau van Dijk database from 2006-2013 in this analysis. We report the number of observations with non-zero weight in the final analysis. All control variables are measured in the home country. The dependent variable in all columns, *BvD HOME_ETR_TA*, is tax expense (TAXA) scaled by earnings before interest and taxes (OPPL). *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year *t-1* to year *t*. *MNE* is an indicator variable equal to one if the firm has foreign affiliates and zero otherwise. *EBIT/Assets* is earnings before interest and taxes (OPPL) scaled by lagged total assets (TOAS). *Sales Growth* is current year operating revenue (OPRE) less prior year operating revenue (OPRE), scaled by prior year operating revenue. *Tangible Asset %* is tangible fixed assets (TFAS) scaled by lagged total assets (TOAS). *Leverage* is the sum of non-current liabilities (NCLI) and current liabilities (CULI), scaled by lagged total assets (TOAS). *Ln(GDP)* is the natural logarithm of GDP. *GDP Growth* is the country's percentage change in GDP from year *t-1* to *t*. We present robust t-statistics in parentheses and cluster standard errors clustered by firm. ***, **, and * represent significance at the 1%, 5%, and 10% level, respectively.