Does Tax Enforcement Disparately Affect Domestic versus Multinational 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 stated focus on curbing perceived harmful tax practices of multinational entities. Yet 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 increases in home-country enforcement spending are related to less firm-level worldwide tax avoidance on average, but this negative relation is concentrated among domestic firms. Multinationals engage in less tax-motivated income shifting out of their home country when enforcement increases, suggesting an increase in domestic tax payments. However, multinationals also increase tax avoidance in foreign countries, which allows them to maintain their level of worldwide avoidance. In contrast, we document that domestic firms report higher effective tax rates and decrease investments in labor following an increase in home-country enforcement, consistent with these firms experiencing negative liquidity shocks.

I. INTRODUCTION

Recent years have brought increased discussion of the tax practices of large multinational entities (MNE). Tax enforcement is one tool countries around the globe use 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.[1] 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 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 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. An analysis of tax authority publications and practitioner guidance supports that a non-trivial portion of

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[1] 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.

enforcement is directed towards corporate taxpayers. Furthermore, tax administration

expenditures vary over time and across countries, allowing for strong identification. Thus, 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.

Descriptive statistics reveal an average increase in enforcement spending in our sample,

consistent with much press coverage and other anecdotal evidence that countries worldwide are

ramping up enforcement efforts (e.g., Warren 2016). 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 inflation-adjust all firm-year financial measures and measure

corporate tax avoidance similarly to Atwood, Drake, Myers and Myers (2012) as the firm's pre-

tax book income times the statutory tax rate, less the current taxes paid (all scaled by pre-tax

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,

consistent with prior work on the relation between tax avoidance and enforcement (e.g., Atwood

et al. 2012; Hoopes, Mescall and Pittman 2012; Gupta and Lynch 2016; Nessa, Schwab,

Stomberg and Towery 2018). For our sample firms, we find that a one standard deviation

increase in enforcement spending is associated with about a 1.3 to 8.0 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 negative relation between enforcement spending and tax avoidance is concentrated among domestic firms; we find little evidence of a relation between enforcement spending and worldwide tax avoidance for MNEs. Similarly, we find domestic firms report lower levels of tax avoidance relative to MNEs following an increase in enforcement spending when we restrict our sample to U.S. firms. Thus, at first glance it appears domestic entities reduce their level of tax avoidance when faced with increased enforcement spending while MNEs maintain their level of worldwide tax avoidance despite increased home-country enforcement spending.

In exploratory analysis, we use affiliate-level financial statement and ownership data from Bureau van Dijk to validate these findings and examine how MNEs maintain their level of worldwide tax avoidance when faced with increased home-country enforcement. We find no relation between home-country tax enforcement spending and global or home-country tax avoidance. However, we find a *positive* relation between home-country tax enforcement spending and *foreign*-country tax avoidance: a one standard deviation increase in enforcement spending is associated with a 2.3 to 11.5 percent increase in foreign-country tax avoidance by MNEs. We also find that MNEs engage in less tax-motivated income shifting out of the home country when home-country enforcement spending increases. These results collectively suggest that although MNEs do not pay a higher rate of tax on home-country income following increased enforcement, they do report more income in the home country and, therefore, face a higher tax burden domestically. Yet they offset the effects of increased home-country tax enforcement through more aggressive tax avoidance abroad.

Because domestic firms cannot similarly offset increased home-country tax burdens through greater tax avoidance in other jurisdictions, our last set of tests examines how domestic

firms' real decisions are affected (Slemrod 2018). We test whether domestic firms reduce local investments in labor and capital in response to higher tax burden (Hines 1997; Grubert and Mutti 2000; Hines and Rice 1994; Giroud and Rauh 2018). Consistent with domestic firms experiencing a negative shock to their capital due to increased tax payments after enhanced tax enforcement, we find evidence that domestic firms decrease employee compensation following increased enforcement. We find no such corresponding decrease among MNEs, which helps us attribute these results to the disproportionate effects of increased home-country enforcement spending on domestic firms.

Our study extends the literature on enforcement effects by illuminating what types of firms are most sensitive to increased tax enforcement and by examining *how* domestic firms and MNEs respond to increased deterrence efforts. We document a mitigated effect of home-country tax enforcement on MNEs, and provide evidence that they offset increased home-country tax liabilities with greater tax avoidance in other jurisdictions. Furthermore, although prior studies in the enforcement literature examine the relation between *perceived* enforcement and corporate tax burdens (e.g., Atwood et al. 2012), we test whether there is a differential relation between *actual* enforcement expenditures and corporate tax avoidance across domestic firms and MNEs. Thus, our study corroborates prior results. Additionally, we build on previous single-country studies (e.g., Hoopes et al. 2012; Gupta and Lynch 2016; Nessa et al. 2018) by exploiting a cross-country setting to enhance our understanding of the enforcement-avoidance relation around the world. This feature of our study is particularly important as businesses continue to expand and operate globally.

Our findings also contribute to two other streams of research. First, we extend the literature on tax-motivated income shifting by identifying an additional determinant of MNE

income shifting behavior: changes in home-country tax enforcement spending. Second, our study improves our understanding of how tax policy affects economic growth, corporate location decisions, and real effects by focusing on changes in enforcement instead of changes in tax rates. As such, we further our understanding of the multi-dimensional aspects of tax policies and enforcement (Robinson and Slemrod 2012). Further, to the extent policy-makers in our sample set enforcement budgets in response to what they view as the harmful tax practices of MNEs (Treanor 2009), our observed changes in enforcement are plausibly exogenous "shocks" to domestic corporations, thus providing improved identification of tax policy effects and allowing causal inferences. In sum, our rich data allow us to 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 tax policies on tax avoidance.

Finally, our results inform policy makers, particularly regarding the effectiveness of efforts to mitigate some MNE tax practices. 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) potentially 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 – abroad. Our findings therefore 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 engaging in more tax avoidance in other jurisdictions.

We conclude with 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, and we are unable to test the effect of legislation aimed at curbing tax avoidance if there is no corresponding increase in enforcement spending. The effectiveness of a country's tax administration also does not depend solely on the amount of financial resources allocated to enforcement efforts. It varies with economic incentives for avoidance, opportunities for avoidance, etc. We address these issues by including country-level fixed effects in all specifications. 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 association between one-year changes in enforcement spending and *current-year* tax avoidance. Our results therefore are most likely to capture the immediate deterrence effect of enforcement and could 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).

I.   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.[2]

In response, tax administrators worldwide have taken steps to stem the potentially abusive tax practices of MNEs. 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 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

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[2] See, for example, "Google, Amazon, Starbucks: The rise of 'tax shaming'" in BBC News Magazine and "Walgreens Ponders $4 Billion Tax Dodge" in HuffPost.

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."[3] As of May 16, 2018, 69 countries have

signed the multilateral agreement on the exchange of CbC reports.[4] 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. 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.[5]

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[3] 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.

[4] 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.

[5] 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.

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.[6] 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-tax conformity and in countries that use a worldwide (as opposed to territorial) system of taxation. Similarly, Hoopes et al. (2012) use TRAC data on audit rates by firm size to provide evidence that tax avoidance among public U.S. corporations decreases when the probability of audit is higher. 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 provide evidence that the magnitude of the effect of enforcement spending varies by state with future collections being 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 corporate taxpayers.[7] 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

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

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 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 whether and how enforcement effects differ for domestic versus multinational firms. Our analysis of domestic versus multinational firms is timely and important given public outrage, media coverage and tax administrator focus on the tax avoidance of MNEs. Second, our research design leverages a country-year measure of actual enforcement spending to exploit cross-sectional and time series variation. 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. Third, we extend our analysis to examine additional consequences of increased enforcement spending, which allows us to answer *how* domestic firms and MNEs respond to increased deterrence efforts. Finally, to the extent enforcement budgets increase in response to what many stakeholders view as harmful tax practices of MNEs, our observed changes in enforcement are plausibly exogenous "shocks" to domestic corporations, thus providing improved identification of enforcement effects and allowing causal inferences.

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. We

further assume that increased enforcement spending is allocated at least in part to corporations.[8] Consequently, increased enforcement spending increases the average corporate taxpayer's expected cost of tax avoidance. Rational corporate taxpayers 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., MNEs face a higher probability of audit simply due to their size (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

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[8] Data on which types of taxpayers (e.g., corporations vs. individuals, domestic corporations vs. MNEs) are the focus of tax authority expenditures are scarce. It is therefore difficult for us to construct a measure of increased corporate enforcement spending or, more specifically, of increased spending on MNEs. To provide some anecdotal evidence that the total enforcement spending that 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 U.S. (21.4% of our sample), the IRS Data Book confirms that the rate of audit for large corporate taxpayers (those with over $10M in total assets) is positively correlated with the total IRS budget. In Japan (17.2% of our sample), EY (2013) notes "the Japanese tax authorities have a robust and aggressive enforcement mechanism, and tax audits are a regular tool of enforcement…tax examinations will usually include a review of transfer pricing issues." According to PwC, transfer pricing is the most important tax issue affecting MNEs in India (9.8% of our sample).

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 use their foreign operations to avoid more tax in countries where the cost of tax avoidance is lower. In contrast, domestic entities' business activities are entirely contained in their home country. 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. MNEs are better 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 these targeted enforcement actions and mitigate their effect on worldwide tax avoidance through increased avoidance in other jurisdictions. 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.

II.   RESEARCH DESIGN

Research Design

We test our hypothesis using the following regression:

$$Tax\ Avoid = \alpha + \beta_1 \%\ Change\ in\ Enforcement\ +\ \beta_2 Domestic\ Firm$$

$$+\ \beta_3 \%\ Change\ in\ Enforcement * Domestic\ Firm$$

$$+ \gamma Controls + Country\ Fixed\ Effects$$

$$+ Industry\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon \qquad (1)$$

We follow Atwood et al. (2012) in the construction of our outcome variable, *Tax Avoid*.

The variable captures worldwide tax avoidance by measuring 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 worldwide 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. 2012, 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:

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

Where:

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

Whereas Atwood et al. (2012) measure *Tax Avoid* over three years, we compute *Tax*

Avoid every year 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. We focus on how one-year

changes in enforcement spending affect current-year tax avoidance. One strength of this research

design is that, by examining a short window, we can more precisely speak to the deterrence

effect of recent changes in enforcement. A limitation of this measure is that is understates longer-

term specific deterrence effects that manifest themselves through audit efforts after year *t.* 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. 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.) We therefore classify firms as domestic if they have zero or missing values for foreign currency adjustments (Compustat Global *FCA).* We consider firms incorporated in the U.S. or Canada to be domestic if they have zero or missing values for pre-tax foreign income (Compustat North America *PIFO).* We acknowledge this is an imperfect way to identify domestic firms and conduct additional analyses using BvD data to gauge the sensitivity of these results (discussed below).

We also include a robust set of control variables to account for both firm and country characteristics, and fixed effects. 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 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(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 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(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 the level of worldwide corporate tax avoidance. To address potential

outliers, we use robust regression (Leone, Minutti-Meza, and Wasley 2017). 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." 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 provide some comfort about the reliability of the data, we confirmed the enforcement spending amounts included in the OECD series for the U.S. agree to enforcement spending data provided by the IRS.[9] We also take additional steps, outlined below, to increase our comfort in the reliability of the data and the robustness of results obtained. We also use robust regression to mitigate issues with potential data errors.

Further, because our variable of interest is an annual change, we inflation-adjust all amounts 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. Firms that are listed in Compustat Global as being incorporated in the same country often report financial figures in different currency units.[10] 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.

We obtain firm-level data from Compustat Global and Compustat North America. Country-level data on per capita GDP and GDP Growth comes from the World Bank. Our final dataset consists of 110,481 firm-year observations from 46 different countries. Because our

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[9] The OECD data show "administrative costs for tax administration" as a percentage of GDP. We recompute these ratios using Total IRS Costs from Table 28 of the IRS data book and obtain no differences between these ratios and those reported by the OECD.

[10] The average (median) country-year in our sample has firms that report in 2.37 (2) different currency units. Great Britain in 2013 exhibits the largest variation with 11 different reporting currency units.

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 inflation-adjusted 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 increased over our sample period.

For comparison, we limit the sample to the U.S. 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 U.S. was disrupted and

ultimately reversed following the Financial Crisis, consistent with a wave of significant

reductions to the IRS' budget.[11]

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.

(2012), we report a mean of 0.056 whereas they report a larger mean of 0.084. We classify about

45 percent of firms in the sample as domestic. Sample firms report average (median) *Pre-Tax*

ROA of 9.5 (6.6) percent and *Sales Growth* of 14.1 (5.8) 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).

Table 2 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. (23,601 firm years; 21.4 percent of the sample), Japan (19,036 firm-years; 17.2 percent of

the sample), and India (10,830 observations; 9.8 percent of the sample). Several other countries

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[11] See Nessa et al. (2018) for further detail on recent IRS budget cuts.

contribute at least one percent of observations to the sample. Thus, we have substantial variation in the country-level composition of our sample.

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 firms we classify as domestic 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. Recall that we make these classifications based on the presence or absence of foreign currency adjustments for each firm in Compustat Global. Because our classification system is imperfect, we also conduct additional analyses using country-level BvD financial statement data that allow for cleaner identification of whether a firm has multinational operations.

Table 3 provides Pearson correlations. We observe a small but significantly negative correlation of -0.013 percent between *% Change Tax Enforcement* and *Tax Avoid*. The negative correlation between avoidance and enforcement increases in magnitude to -0.074 percent when examining the *level* of enforcement spending (*Enforcement Budget as % of GDP*). This suggests that on average, higher enforcement spending as a percentage of GDP is associated with lower tax avoidance. 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 versus multinational firms, we next turn to regression analysis.

III.   RESULTS

Primary Analysis

Table 4 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 association between enforcement changes on corporate tax avoidance around the world. We estimate a significant negative coefficient on *% Change in Enforcement* 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 helps alleviate 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. The coefficient estimate of -0.008 suggests that a one standard deviation increase in enforcement spending is associated with about a 1.5 percent reduction in *Tax Avoid* relative to the mean.[12] 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 on *% Change in Enforcement * Domestic*. However, we estimate a negative and significant coefficient of -0.015 (two-tailed p-value < 0.01). This coefficient estimate suggests that a one standard deviation increase in enforcement spending is associated with an approximate 2.9

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[12] We estimate this magnitude by multiplying the estimated coefficient (-0.008) by the standard deviation of *% Change in Enforcement* (0.107), then dividing by the sample mean of *Tax Avoid* (0.056).

percent decrease in *Tax Avoid* for domestic firms, relative to no effect for multinational firms.[13]

In raw terms, a one standard deviation increase in *% Change in Enforcement* is associated with

an approximate 3.1 percent decrease in *Tax Avoid* for domestic firms.[14]

To validate the robustness of our results, in columns (3) and (4) we re-estimate equation

(1) 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 continue to observe a negative and significant

relation between the interaction of *Enforcement Budget as % of GDP * Domestic Firm* and *Tax*

Avoid when using this alternative measure. We note that the magnitude of the effects are

substantially larger when using *level* of enforcement spending (*Enforcement Budget as % of*

GDP), rather than the change in enforcement spending *(% Change in Enforcement).* A one

standard deviation increase in *Enforcement Budget as % of GDP* is associated with about an 8.0

percent decrease in *Tax Avoid.*[15] Similarly, a one standard deviation increase in *Enforcement*

Budget as % of GDP is associated with about a 6.7 percent decrease in *Tax Avoid* for domestic

firms, *relative* to multinational firms, and about an 11.1 percent *total* decrease in *Tax Avoid* for

domestic firms.[16] Using this alternative measure highlights that our results are robust to

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[13] We multiply the estimated coefficient (-0.015) by the standard deviation of *% Change in Enforcement* (0.107), then divide by the sample mean of *Tax Avoid* (0.056).

[14] We multiply the sum of the estimated coefficient on the main effect of *% Change in Enforcement* (-0.001) and the estimated coefficient on the interaction term (-0.015) by the standard deviation of *% Change in Enforcement* (0.107), then divide by the sample mean of *Tax Avoid* (0.056).

[15] We multiply the estimated coefficient (-0.057) by the standard deviation of *Enforcement Budget as % of GDP* (0.079), then divide by the sample mean of *Tax Avoid* (0.056). Atwood et al. (2010) 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.

[16] To calculate the *relative* effect for domestic firms we multiply the estimated coefficient on the interaction of *Enforcement*Domestic Firm* (-0.048) by the standard deviation of *Enforcement Budget as % of GDP* (0.079), then divide by the sample mean of *Tax Avoid* (0.056). To calculate the *total* effect for domestic firms multiply the sum of the estimated coefficients on the interaction of *Enforcement*Domestic Firm* (-0.048), and on *Enforcement* (-0.031), by the standard deviation of *Enforcement Budget as % of GDP* (0.079), then divide by the sample mean of *Tax Avoid* (0.056).

estimating a level-on-level regression (as opposed to a change-on-level regression) and further address concerns about inflation because this measure captures the ratio of two country-level variables measured concurrently.

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 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 being necessary to curb the tax practices of MNEs, our evidence suggests that on average, from 2006 through 2013, increases in tax enforcement expenditures did little to alter the worldwide tax avoidance of MNEs. Instead, the change in total avoidance is driven primarily by domestic firms.

Analysis Using a Subsample of 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 repeat our analysis using a single-country setting. In particular, we re-estimate equation (1) using a subsample of firms incorporated in the U.S. Table 5 presents the results of this single-country analysis.[17]

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[17] Because there is no variation in the statutory tax rate in the U.S. during our sample, we omit *STR* from the regression. We also omit country fixed effects.

In Table 5, column (1) presents the results of estimating equation (1) using *Tax Avoid* as the dependent variable. We note a negative and significant coefficient on *% Change in Enforcement * Domestic Firm*, suggesting that relative to U.S. multinational firms, U.S. domestic firms reduce their worldwide tax avoidance to a greater extent in periods of increased U.S. tax enforcement. Conversely, because U.S. tax enforcement spending 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.

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 5 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 reduce their tax avoidance by a greater amount when U.S. enforcement spending increases (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 3.9 percent decrease in *Tax Avoid* for U.S. domestic firms relative to U.S.

MNEs.[18] In raw terms, a one standard deviation increase in U.S. enforcement spending is

associated with an approximately a 0.3 percent decrease in *Tax Avoid* for U.S. domestic firms,

versus an approximate 3.6 percent *increase* for U.S. MNEs.[19] Using *Cash ETR* as the measure of

tax avoidance, we estimate an approximate 3.4 percent increase in *Cash ETR* for U.S. domestic

firms relative to U.S. MNEs.[20] In raw terms, a one standard deviation increase in U.S.

enforcement spending is associated with an approximate 7.1 percent increase in *Cash ETR* for

U.S. domestic firms, versus an approximate 3.7 percent increase for U.S. MNEs.[21]

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[18] We multiply the estimated coefficient on the interaction term (-0.197) by the standard deviation of *% Change in Enforcement* for this sub-sample (0.032), then divide by the sub-sample mean of *Tax Avoid* (0.163).
[19] For U.S. domestic firms, we multiply the sum of the estimated coefficient on the main effect of *% Change in Enforcement* (0.183) and the estimated coefficient on the interaction term (-0.197) by the sub-sample standard deviation of *% Change in Enforcement* (0.032), then divide by the sub-sample mean of *Tax Avoid* (0.163). An F-Test indicates this 0.3 percent decrease in *Tax Avoid* for domestic firms is not significantly different from zero. For U.S. MNEs, we multiply the estimated coefficient on the main effect of *% Change in Enforcement* (0.183) by the sub-sample standard deviation of *% Change in Enforcement* (0.032), then divide by the sub-sample mean of *Tax Avoid* (0.163).
[20] We multiply the estimated coefficient on the interaction term (0.247) by the standard deviation of *% Change in Enforcement* for this sub-sample (0.032), then divide by the sub-sample mean of *Cash ETR* (0.233).
[21] For U.S. domestic firms, we multiply the sum of the estimated coefficient on the main effect of *% Change in Enforcement* (0.268) and the estimated coefficient on the interaction term (0.247) by the sub-sample standard deviation of *% Change in Enforcement* (0.032), 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* (0.268) by the sub-sample standard deviation of *% Change in Enforcement* (0.032), then divide by the sample mean of *Cash ETR* (0.233).

Analysis of Multinational Firms' Response to Enforcement

In contrast to domestic firms, MNEs have more tax planning opportunities because they operate in multiple jurisdictions in which they can avoid tax. Our main results suggest MNEs do not pay more tax on worldwide income following increases in home-country tax enforcement. In our next set of tests, we conduct exploratory analyses using affiliate-level data to separately examine the domestic versus foreign operations of MNEs to better understand why these firms' total tax avoidance is less impacted by increases in home-country tax enforcement.

We obtain data on publicly traded MNEs and their worldwide affiliates from Bureau van Dijk's (BvD) Osiris database. The BvD Osiris database contains financial, operating, and ownership information on independent and affiliated companies worldwide. We use unconsolidated company information, including annual ownership information, from Osiris over the period 2002 to 2014. These data permit us to separately examine country-level tax avoidance and operations of MNEs. To remain in the sample, we require the affiliates to be profitable (De Simone 2016) and to have the information necessary to construct the variables in our analysis. Our tests using the BvD dataset include observations from 33 countries. These counties are mainly in Europe, with Great Britain, France, and Spain contributing the most observations. However a notable exception is Japan, which has the fourth largest amount of observations.

We first re-examine our main results using these country-level data on MNEs. Following prior work using these data, for these tests we aggregate each MNE's operations by country-year (e.g., Huizinga and Laeven 2008; Markle 2016; Chen, De Simone, Hanlon and Lester 2018). We construct a measure of tax avoidance using BvD data: tax payments subtracted from pre-tax income multiplied by the statutory corporate tax rate, all scaled by total pre-tax income. The BvD separate-entity data allow us to construct three versions of this measure: (1) a measure of

total avoidance for all observable affiliates of an MNE worldwide (*Total Tax Avoid)*, (2) a measure of domestic tax avoidance for affiliates within the home country (*Home Tax Avoid)*, and (3) a measure of foreign tax avoidance for affiliates in all countries outside of the home country (*Foreign Tax Avoid)*. We also use the BvD to construct three parallel measures of ETR based on tax payments in a jurisdiction scaled by earnings before interest and taxes (*EBIT*) in that same jurisdiction. For example *Home ETR* is the sum of tax payments by the firm's affiliates in its home country scaled by the sum of *EBIT* for the firm's affiliates in its home country. 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.

Table 6, Panel A presents these results. Columns (1) to (3) use *Tax Avoid* measures whereas Columns (4) to (6) use the ETR measures. In Columns (1) and (4), the tax avoidance measures represent the sum of total worldwide operations of MNEs, and thus are analogous to results presented in Table 4. We observe a negative but insignificant coefficient on *% Change in Enforcement* when re-estimating our main results on the sample of MNEs using BvD data, suggesting MNE tax avoidance activities are not statistically different following an increase in tax enforcement. This result is consistent with our findings of no relation between tax avoidance and tax enforcement for MNEs using Compustat Global data. 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 versus multinational firms provides comfort. Across all tests, our finding of no relation between tax enforcement and tax avoidance of MNEs also complements concurrent work that finds no relation between an

increase in public disclosure requirements for MNEs (i.e., country-by-country reporting) and tax avoidance (Joshi et al. 2018).

We next separately examine the home-country and foreign-country tax avoidance of MNEs. In columns (2) and (5) of Table 6, Panel A, we focus on the home-country operations of MNEs. We estimate an insignificant coefficient on *% Change in Enforcement* in both columns, suggesting MNEs do not pay a differential average rate of tax on home-country income following an increase in home-country tax enforcement. Columns (3) and (6) test the relation between foreign-country tax avoidance and changes in home-country tax enforcement. Across both columns, we find a positive relation between foreign-country tax avoidance and home-country tax enforcement (i.e., *Foreign Tax Avoid* increases, *Foreign ETR* decreases). These findings are consistent with MNEs becoming more aggressive in their tax reporting outside the 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 in home-country tax enforcement (*% Change in Enforcement*) is associated with about an 11.5 (2.3) percent increase (decrease) in the foreign-country *Tax Avoid* (*Foreign ETR*) of our sample MNEs.[22]

We next use the separate-entity financials from BvD to examine whether MNEs alter their tax-motivated income shifting following increased home-country enforcement. To do so, we use an income prediction model that allows for tests of income shifting at the firm-country-year level. Prior work documents a negative relation between reported income in a jurisdiction

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[22] For *Foreign Tax Avoid* (column 3) we multiply the estimated coefficient on *% Change in Enforcement* (0.034) by the standard deviation of *% Change in Enforcement* for this sub-sample (0.098), then divide by the sub-sample mean of *Foreign Tax Avoid* (0.029). For *Foreign ETR* (column 6) we multiply the estimated coefficient on *% Change in Enforcement* (-0.055) by the standard deviation of *% Change in Enforcement* for this sub-sample (0.098), then divide by the sub-sample mean of *Foreign ETR* (0.236).

and tax incentives in a pooled cross-section of firm-country-years across countries (e.g., Hines and Rice 1994, Huizinga and Laeven 2008, Markle 2016). The negative relation is indicative of income shifting because these models control for other observable determinants of income, including employment, invested capital, and the gross domestic product (GDP) of the country. We augment these models by including the measure of home-country tax enforcement and its interaction with the tax incentive variable.

We use two measures of tax incentives. The first measure is *STR*, the affiliate-level statutory corporate income tax rate. The second measure is *C,* the weighted-average statutory corporate tax rate differential between the affiliate's country and the countries of all other observable affiliates of the same MNE group in the same year (Huizinga and Laeven 2008). We identify affiliates within the same MNE group-year using BvD's ownership information. Following prior work, a negative coefficient on the tax incentive variable suggests reported profits in the home country are negatively associated with the statutory tax rate in the country, consistent with firms engaging in tax-motivated income shifting. The coefficient of interest is the interaction between the tax incentive variable and the tax enforcement spending variable (i.e., *Increase Enforcement * STR* or *Increase Enforcement * C*), where *Increase Enforcement* is equal to one in any country-year where inflation-adjusted enforcement spending increased from the prior year (*% Change in Enforcement* is positive). We use a binary measure of enforcement here to simplify interpretation of the interaction with continuous measures of tax incentives.

We present results in Table 6, Panel B. Columns (1) and (2) estimate the income shifting model on the home-country operations of MNEs. Column (1) uses *STR* as the measure of tax incentives and column (2) uses the weighted-average tax rate differential *C.* Across both models, we find a positive and significant coefficient on the interaction of *Increase Enforcement* and the

tax incentive variable, suggesting that MNE tax-motivated income shifting out of the home country *decreases* following an increase in enforcement in the home country.

Columns (3) and (4) re-estimate the model on the *foreign-country* operations of the same MNEs. As before, we examine whether there is a change in tax-motivated income shifting following changes in *home-country* enforcement. We estimate an insignificant coefficient on the interaction between the tax incentives of foreign operations and increases in home-country tax enforcement. We therefore find no evidence that there is a change in the tax-motivated income shifting among foreign operations of MNE following changes in home-country enforcement. Although all separate-entity affiliate income within an MNE must sum to the group's total worldwide income, the fact that we find a decrease in tax-motivated income shifting out of the home country but no offsetting income in income shifting to foreign countries has at least two explanations. First, as with all studies using BvD data, we are unable to observe *all* affiliates of an MNE due to heterogenous reporting requirements across countries. Second, it is possible that only small amounts of income are shifted out of each of a large number of foreign affiliates into the home country, making detection of the foreign-country shifting using an income shifting model difficult.

To summarize across all tests, in Table 4 we use Compustat Global data and find no evidence that the level of worldwide tax avoidance changes for MNEs following an increase in home-country tax enforcement. We validate that this result holds using BvD data. We then use these separate-entity financials to document that there is no difference in the rate of tax paid on *home-country* income but there is a decrease in the rate of tax paid on *foreign-country* income following an increase in home-country tax enforcement. Our tests of tax-motivated income shifting suggest that MNEs report more income into their home country following an increase in

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tax enforcement, controlling for tax incentives and other economic factors. Thus, although the rate of taxes paid on home-country income is not associated with home-country tax enforcement, the amount of home-country income reported increases, suggesting an increase in tax payments to the home country. Further, we observe a lower rate of tax paid on *foreign-country* income following an increase in home-country tax enforcement, suggesting that MNEs mitigate increased home-country tax enforcement by being more aggressive in their tax planning abroad.

Analysis of Domestic Firms' Response to Enforcement

In our last tests, we separately examine domestic firms using BvD data because these data allow us to cleanly identify domestic firms. To the extent policy-makers set enforcement budgets in response to the harmful tax practices of MNEs, our observed changes in enforcement are plausibly exogenous "shocks" to domestic corporations. A separate examination of domestic firms thus has the potential to provide improved identification of enforcement effects and to allow causal inferences.

We present results in Table 7. As before, we begin by validating our main results. In column (1), we estimate the relation between changes in tax enforcement and the effective tax rates of domestic firms in our sample. Consistent with results in Table 4, we find that domestic firms' tax avoidance decreases following an increase in tax enforcement. Specifically, we find a one standard deviation increase in *% Change in Enforcement* is associated with about a 1.3 percent increase in the ETRs of domestic firms.[23] This result compares to our earlier tests using Compustat Global of a 1.5 percent change in *Tax Avoid* for the full sample and a 3.1 percent change in *Tax Avoid* for domestic firms. The fact that we find an effect using multiple databases provides some comfort about the robustness of our results. To the extent that changes in tax

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[23] We multiply the estimated coefficient on *% Change in Enforcement* (0.028) by the standard deviation of *% Change in Enforcement* for this sub-sample (0.121), then divide by the sub-sample mean of *ETR* (0.259).

enforcement budgets are targeted primarily at MNEs, these findings suggest a negative causal effect of tax enforcement on domestic firms' tax avoidance. Further, an increase in effective tax rates (tax payments) would represent an exogenous shock to these firms' liquidity.

In columns (2) through (4), we examine whether domestic firms' investments in physical and human capital change following an increase in tax enforcement. Prior literature motivates a negative relation between corporate taxes and various measures of corporate economic activity, such as the number of local establishments and employees. For example, studies find that firms respond to country-level tax rates when making location decisions (e.g., Hines 1997; Grubert and Mutti 2000; Hines and Rice 1994). Similarly, Giroud and Rauh (2018) find that business establishments and employment are negatively associated with state corporate income tax rates. To the extent increased tax enforcement increases corporate tax burdens within the jurisdiction as our results suggest, we expect domestic firms to respond by reducing their investments. We therefore examine whether domestic firm investments in tangible fixed assets, number of employees, and employee compensation are associated with changes in tax enforcement. We measure all outcome variables in $t+1$ to allow the year t changes in enforcement to be realized by the firm, and therefore to potentially affect their investment decisions.

We find no evidence that domestic firm investments in tangible assets and number of employees are different in the year following increased enforcement. However, we estimate a negative and significant coefficient on *% Change in Enforcement* when testing employee compensation. This pattern of results could represent a rational short-term response by domestic corporations because scaling back capital expenditures and the number of employees are relatively more drastic cost-cutting techniques than trimming employee compensation. Specifically, we find that a one standard deviation in *% Change in Enforcement* is associated

with about a 3.1 percent decrease in future employee compensation.[24] We therefore interpret

these results as consistent with domestic firms experiencing a negative liquidity shock due to

increased tax payments after enhanced tax enforcement. In an untabulated falsification test, we

find no comparable decrease in employee compensation among the home-country operations of

MNEs. This falsification test provides support that the reduced investment in compensation we

observe among domestic firms is not driven by other confounding factors.

IV.   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 affect domestic corporations and locally-

headquartered MNEs equally. To address this question, we use annual data on tax administration

expenditures by 46 countries from 2005 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 draw more causal inferences, particularly to the extent that tax

enforcement changes aimed at MNEs are exogenous to domestic firms. 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. This effect is concentrated among *domestic*

firms. It therefore appears that, despite increased international focus on the tax avoidance

activities of MNEs, domestic firms' total tax avoidance is more sensitive to increased

enforcement spending than that of MNEs. 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

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[24] The estimated coefficient (-0.305) suggests a one-unit change in *% Change in Enforcement* is associated with a $[\exp(-0.305)-1] = -26.29\%$ decrease in *Ln(Compensation)$_{t+1}$*. We multiply the 26.29% decrease by the sample standard deviation of *% Change in Enforcement* (0.119).

examining different components of enforcement spending to determine which appear to have the most impact on corporate tax avoidance.

We find some support for our results being driven by domestic firms having fewer tax planning opportunities. Specifically, domestic firms cannot offset an increased domestic tax burden with reduced tax liabilities elsewhere. Using affiliate-level data in exploratory tests, we examine the mechanisms through which MNEs maintain their level of worldwide tax avoidance even when home-country tax enforcement is increasing. We find that MNE tax-motivated income shifting out of the home country decreases following increased home country enforcement and that MNEs experience no change in the rate of taxation on home-country income. These results collectively suggest an increase in home-country tax payments following increased enforcement. However, we also find *increased* foreign-country tax avoidance by MNEs as evidenced by lower foreign effective tax rates. Taken together, these findings suggest MNEs report more income (and pay more tax) in their home country, but offset their increased home-country tax burden by avoiding more tax abroad. This is a strategy domestic firms cannot exploit. Our findings have policy implications: single-country tax enforcement actions potentially disadvantage domestic firms and other-country tax revenues such that there may be benefits to multi-country tax harmonization.

Finally, we test the consequences of increased enforcement for domestic firms. Results suggest domestic firms decrease employee compensation following an increase in enforcement, consistent with these firms responding to the negative liquidity shock of an increased tax liability. To the extent policy-makers in our sample set enforcement budgets in response to what they view as the harmful tax practices of *MNEs* (Treanor 2009), our observed changes in enforcement are plausibly exogenous "shocks" to domestic corporations. We thus provide some

preliminary evidence on the role of tax policies in spurring (or inhibiting) economic growth and how tax enforcement contributes to taxpayers' real decisions (Slemrod 2018)

Our study has several 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 encompass all elements of enforcement nor does it allow us to speak to the relative effectiveness of individual enforcement techniques. To the extent changes in enforcement spending are not correlated with increases in enforcement actions, we may fail to document the true association between enforcement and tax avoidance. Second, we examine the association between one-year changes in enforcement spending and current-year tax avoidance. Therefore, our results are most likely to capture the immediate deterrence effect of enforcement, and we likely understate the effects of increased compliance through audits.

Our study 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) in multiple ways. First, we test for differential responses to tax enforcement spending based on firms' relative ability to avoid tax. Second, we examine *how* domestic and multinational firms respond to increased enforcement spending. Third, we exploit cross-country and time-series changes in real enforcement spending and expand the sample to include more recent years. Our analyses also contribute to the literatures examining determinants of income shifting and the real effects of tax policies. Although we measure enforcement with error, 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.

References

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. 2018. Tax reporting behavior under audit certainty. *Contemporary Accounting Research*, forthcoming.

Chen, S., L. De Simone, M. Hanlon, and R. Lester. 2018. The effect of innovation box regimes on income shifting and real activity. *Working Paper*.

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

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

Dyreng, S., M. Hanlon, and E. Maydew. 2008. Long run corporate tax avoidance. *The Accounting Review* 83: 61-82.

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.

Giroud, X. and Rauh, J. State taxation and the reallocation of business activity: Evidence from establishment-level data. *Journal of Political Economy*, forthcoming.

Grubert, H. and Mutti, 2000. Do Taxes Influence Where U.S. Corporations Invest? *National Tax Journal* 53, 825-839.

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.

Hines, J. 1997. Altered states: Taxes and the location of foreign direct investment in America. *American Economic Review* 86: 1076-1094.

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.

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.*

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. *Working Paper*

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.

Nessa, M., C. Schwab, B. Stomberg and E. Towery. 2018. How do IRS resources affect the corporate audit process? *Working Paper*.

PwC. 2010. The IRS's renewed emphasis on transfer pricing.

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

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.

Solt, F. 2016. The standardized world income inequality database. Social Science Quarterly 97(5):1267-1281.

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.

Appendix A: Variable Definitions

Variable	Definition
Dependent Variables	
Tax Avoid	[(PTI * Statutory Tax Rate) - CTP] / PTI, where PTI = pre-tax earnings (PI) less special items (SPI), STR 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).
Enforcement Measures	
% 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.
Enforcement Budget as % of GDP	Total Spending on Tax Enforcement as a percentage of the country-year GDP. We obtain this figure from the OECD's Tax Administration Comparative Information Series.
Other Variables	
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 *Pre-Tax ROA* in year *t-1*, and zero otherwise.
Sales Growth	Percentage change in Sales (SALE) from year *t-1* to year *t*.
STR	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.

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

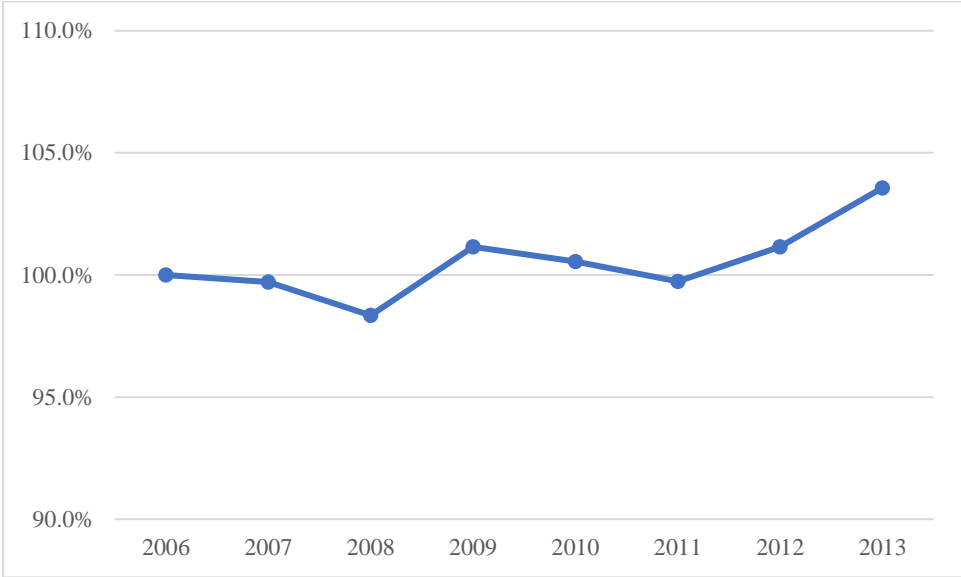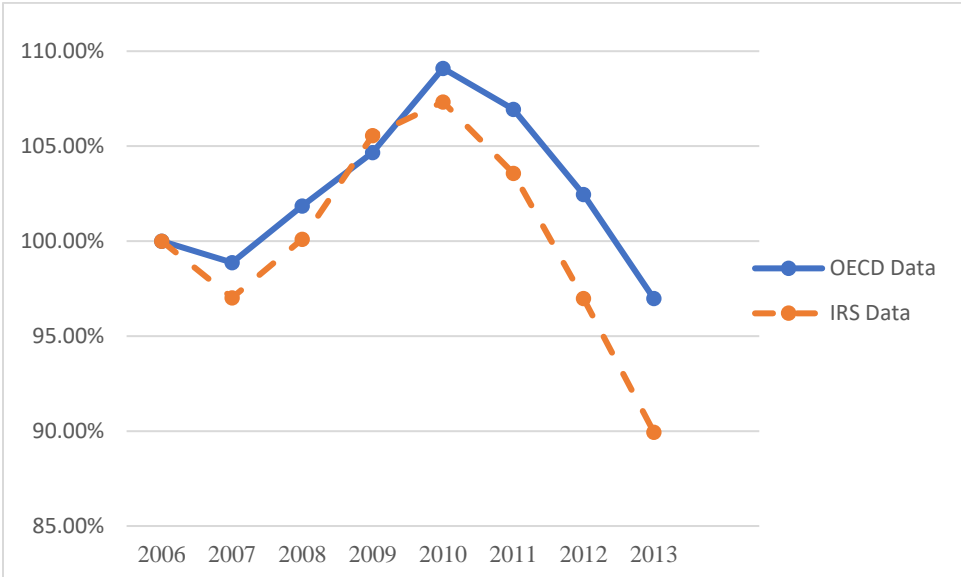**Figure 2: Inflation-Adjusted Enforcement Spending as a % of 2006 Spending for the United States**

These figures present inflation-adjusted 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 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	110,481	0.056	0.305	-0.022	0.062	0.200
% Change in Enforcement	110,481	0.007	0.107	-0.054	-0.011	0.042
Enforcement Budget as % of GDP (*100)	110,481	0.144	0.079	0.028	0.138	0.334
Domestic Firm	110,481	0.449	0.497	0.000	0.000	1.000
Pre-Tax ROA	110,481	0.095	0.106	0.031	0.066	0.123
Prior Year Loss	110,481	0.123	0.329	0.000	0.000	0.000
Sales Growth	110,481	0.141	0.446	-0.046	0.058	0.199
PP&E	110,481	0.309	0.262	0.094	0.250	0.457
Leverage	110,481	0.236	0.227	0.041	0.192	0.355
R&D	110,481	0.013	0.035	0.000	0.000	0.007
Cash	110,481	0.168	0.190	0.039	0.104	0.224
Ln(Assets)	110,481	7.478	2.935	5.295	7.215	9.583
STR	110,481	0.327	0.072	0.270	0.335	0.400
Income Inequality	110,481	35.998	7.264	30.390	33.560	37.790
Ln(GDP per capita)	110,481	10.101	1.130	9.506	10.703	10.795
GDP Growth	110,481	2.473	3.173	1.420	2.224	4.080

Table 1 provides descriptive statistics for key variables. *Tax Avoid* is pre-tax income multiplied by the *STR* less current taxes paid, all scaled by pre-tax income. We measure pre-tax income as pre-tax earnings (PI) less special items (SPI). *STR* 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*. *Enforcement Budget as % of GDP (*100)* is the country-year tax enforcement budget as a percentage of GDP, multiplied by 100. *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.

Table 2: Mean of Variables of Interest by Country

Country	OECD?	No. Obs.	Enforcement Budget as a % of GDP (*100)	Tax Avoid	STR	Domestic Firm
ARGENTINA		388	23.4%	-0.047	0.350	0.049
AUSTRALIA	Yes	3,972	20.8%	0.083	0.300	0.638
AUSTRIA	Yes	417	15.8%	-0.005	0.250	0.300
BELGIUM	Yes	625	32.7%	0.055	0.340	0.333
BRAZIL		569	18.7%	0.050	0.340	0.424
BULGARIA		217	22.8%	-0.033	0.104	0.180
CANADA	Yes	4,774	21.9%	0.129	0.312	0.397
CHILE	Yes	930	11.4%	-0.001	0.179	0.101
CHINA		2,931	12.1%	0.058	0.250	0.317
COLOMBIA		88	7.0%	-0.022	0.303	0.125
CYPRUS		143	22.5%	-0.128	0.104	0.238
CZECH REPUBLIC	Yes	87	19.0%	0.042	0.209	0.437
DENMARK	Yes	385	27.8%	-0.003	0.257	0.256
ESTONIA	Yes	82	16.8%	0.052	0.216	0.122
FINLAND	Yes	689	20.0%	-0.032	0.256	0.245
FRANCE	Yes	3,523	22.1%	0.057	0.333	0.340
GERMANY	Yes	3,508	27.7%	0.027	0.319	0.378
HONG KONG		350	5.6%	-0.045	0.165	0.354
HUNGARY	Yes	108	33.4%	-0.063	0.173	0.287
INDIA		10,830	3.3%	0.085	0.334	0.416
IRELAND	Yes	265	24.8%	-0.047	0.125	0.540
ISRAEL	Yes	1,095	15.9%	0.008	0.250	0.268
ITALY	Yes	1,321	20.3%	-0.161	0.331	0.255
JAPAN	Yes	19,036	14.4%	-0.014	0.400	0.492
KOREA	Yes	4,288	10.4%	-0.010	0.249	0.038
LATVIA	Yes	159	30.2%	0.021	0.150	0.252
LITHUANIA	Yes	192	18.8%	-0.080	0.155	0.234
LUXEMBOURG	Yes	236	23.0%	-0.039	0.291	0.203
MALAYSIA		4,885	11.2%	0.020	0.258	0.699
MALTA		52	32.8%	0.128	0.350	0.423
MEXICO	Yes	640	7.2%	-0.051	0.292	0.047
NETHERLANDS	Yes	845	32.5%	0.037	0.259	0.342
NEW ZEALAND	Yes	656	20.4%	0.051	0.301	0.576
NORWAY	Yes	824	16.0%	0.034	0.280	0.263
POLAND	Yes	2,659	24.4%	-0.015	0.190	0.302
PORTUGAL	Yes	258	24.0%	-0.057	0.253	0.217
RUSSIA		924	16.8%	-0.055	0.200	0.416
SLOVENIA	Yes	157	28.5%	-0.032	0.209	0.439
SOUTH AFRICA		1,640	26.3%	0.055	0.344	0.672
SPAIN	Yes	684	12.6%	0.072	0.311	0.168
SWEDEN	Yes	2,012	17.7%	0.033	0.264	0.373
SWITZERLAND	Yes	1,226	2.8%	-0.043	0.192	0.172
THAILAND		412	8.7%	0.021	0.200	0.619
TURKEY	Yes	1,339	15.0%	-0.017	0.200	0.170
UNITED KINGDOM	Yes	6,459	27.5%	0.063	0.276	0.749
UNITED STATES	Yes	23,601	7.7%	0.163	0.400	0.526
Total		**110,481**	**14.44%**	**0.056**	**0.327**	**0.451**

Table 2 (continued): Mean of Variables of Interest by Country

Table 2 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. *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 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).

Table 3: Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Tax Avoid															
2. % Change in Enforcement	-0.013														
3. Enforcement Budget as % of GDP	-0.074	-0.069													
4. Domestic Firm	0.064	-0.015	0.037												
5. Pre-Tax ROA	0.068	0.034	0.045	0.022											
6. Prior Year Loss	0.042	0.002	0.036	0.012	-0.108										
7. Sales Growth	0.043	0.112	0.008	0.032	0.260	0.126									
8. PP&E	0.046	0.086	-0.053	0.016	-0.010	-0.027	0.113								
9. Leverage	0.034	0.048	-0.075	0.010	-0.130	0.056	0.148	0.321							
10. R&D	0.045	-0.031	-0.002	-0.127	0.090	0.065	0.039	-0.196	-0.146						
11. Cash	-0.002	0.034	0.021	-0.012	0.399	0.019	0.194	-0.228	-0.250	0.285					
12. Ln(Assets)	-0.086	0.054	-0.242	-0.222	-0.179	-0.124	-0.098	0.186	0.140	-0.101	-0.123				
13. STR	0.111	-0.052	-0.312	0.124	-0.041	0.002	-0.042	-0.067	0.015	0.108	0.050	0.197			
14. Income Inequality	0.063	0.181	-0.472	0.041	0.060	-0.049	0.053	0.089	0.062	-0.103	-0.056	-0.071	-0.068		
15. Ln(GDP per capita)	0.015	-0.208	0.369	0.046	-0.006	0.059	-0.069	-0.106	-0.065	0.164	0.098	-0.016	0.270	-0.777	
16. GDP Growth	0.024	-0.010	-0.289	-0.052	0.047	-0.056	0.097	0.073	0.041	-0.104	-0.044	-0.029	-0.252	0.534	-0.650

Table 3 provides Pearson correlations for key variables. *Tax Avoid* is pre-tax income multiplied by the *STR* 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*. *Enforcement Budget as % of GDP* is the country-year tax enforcement budget as a percentage of GDP. *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*. *STR* 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.

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

	1	2	3	4
Enforcement variable:	% Change in Enforcement	% Change in Enforcement	Enforcement Budget as % of GDP	Enforcement Budget as % of GDP
Enforcement	-0.008***	-0.001	-0.057***	-0.031
	(-2.79)	(-0.13)	(-2.61)	(-1.32)
Enforcement * Domestic Firm		-0.015***		-0.048***
		(-3.01)		(-3.56)
Domestic Firm	0.007***	-0.001	0.007***	0.014***
	(5.66)	(-0.13)	(6.20)	(6.09)
Pre-Tax ROA	-0.073***	0.007***	-0.072***	-0.071***
	(-22.06)	(5.75)	(-21.73)	(-24.58)
Prior Year Loss	0.111***	-0.073***	0.110***	0.110***
	(85.94)	(-22.00)	(85.70)	(85.59)
Sales Growth	-0.000**	0.111***	-0.000	0.000***
	(-2.46)	(85.90)	(-1.48)	(23.56)
PP&E	0.050***	-0.000**	0.050***	0.050***
	(23.39)	(-2.40)	(23.31)	(23.44)
Leverage	0.039***	0.050***	0.038***	0.037***
	(19.71)	(23.32)	(19.63)	(21.84)
R&D	0.216***	0.039***	0.210***	0.210***
	(19.01)	(19.70)	(18.58)	(18.62)
Cash	-0.001	0.216***	-0.003**	-0.003***
	(-0.77)	(19.00)	(-2.40)	(-2.78)
Ln(Assets)	-0.007***	-0.001	-0.007***	-0.007***
	(-21.05)	(-0.76)	(-21.91)	(-21.69)
STR	0.896***	-0.007***	0.874***	0.877***
	(31.93)	(-21.06)	(30.80)	(30.85)
Income Inequality	0.003***	0.896***	0.003***	0.003***
	(2.77)	(31.91)	(2.76)	(2.92)
Ln(GDP per capita)	-0.034***	0.003***	-0.035***	-0.033***
	(-2.89)	(2.78)	(-3.03)	(-2.87)
GDP Growth	0.002***	-0.034***	0.002***	0.002***
	(10.51)	(-2.89)	(10.08)	(9.97)
Country, Industry, Year FE?	Yes	Yes	Yes	Yes
Observations	110,481	110,481	110,481	110,481

Table 4 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*. *Enforcement Budget as % of GDP* is the country-year tax enforcement budget as a percentage of GDP, multiplied by 100. The dependent variable *Tax Avoid* is pre-tax income multiplied by the *STR* 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*. *STR* 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: Relation between Tax Enforcement and Tax Avoidance for U.S. Firms

	1	2
Dependent variable:	Tax Avoid	Cash ETR
% Change in Enforcement	0.183**	0.268***
	(2.13)	(2.94)
% Change in Enforcement * Domestic Firm	-0.197***	0.247***
	(-4.11)	(5.10)
Domestic Firm	0.035***	-0.023***
	(9.78)	(-7.46)
Pre-Tax ROA	-0.209***	0.377***
	(-20.66)	(39.55)
Prior Year Loss	0.085***	-0.082***
	(29.27)	(-32.78)
Sales Growth	0.000***	-0.020***
	(4.25)	(-27.80)
PP&E	0.058***	-0.046***
	(8.82)	(-7.44)
Leverage	0.072***	-0.056***
	(14.59)	(-16.67)
R&D	0.223***	-0.231***
	(12.35)	(-12.13)
Cash	0.014***	-0.057***
	(2.67)	(-11.79)
Ln(Assets)	-0.003***	0.005***
	(-3.94)	(6.92)
Income Inequality	0.083***	-0.016*
	(9.84)	(-1.88)
Ln(GDP per capita)	-1.968***	1.477***
	(-10.19)	(7.39)
GDP Growth	-0.014***	0.005
	(-4.79)	(1.55)
Industry & Year?	Yes	Yes
Observations	23,601	22,473

Table 5 presents results from estimating Equation (1) on the sample of U.S. firms using two dependent variables. The dependent variable in column (1) is *Tax Avoid*, pre-tax income multiplied by the *STR* 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*. *STR* 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: MNEs' Response to Increased Enforcement
Panel A: Worldwide, Home-Country, and Foreign-Country Tax Avoidance

	1	2	3	4	5	6
		Tax Avoid			*ETR*	
Dependent Variable:	Total	Home	Foreign	Total	Home	Foreign
% Change in Enforcement	-0.014	-0.001	0.034*	-0.009	-0.016	-0.055***
	(-0.57)	(-0.06)	(1.84)	(-0.39)	(-0.58)	(-2.59)
EBIT/Assets	-0.056**	-0.002	-0.010***	0.088***	-0.013***	0.012***
	(-2.27)	(-0.39)	(-3.47)	(3.53)	(-4.25)	(3.36)
Sales Growth	0.007**	0.000	-0.001**	-0.005*	-0.000	0.001**
	(2.47)	(0.12)	(-1.98)	(-1.73)	(-0.50)	(2.22)
Tangible Asset %	-0.014**	0.001	0.033***	-0.011	0.005***	-0.037***
	(-2.42)	(0.79)	(5.56)	(-0.96)	(5.03)	(-5.64)
Leverage	0.011	0.065***	0.036***	-0.013	-0.060***	-0.039***
	(0.76)	(4.42)	(3.77)	(-0.91)	(-3.90)	(-3.47)
Ln(GDP)	0.187	0.345**	-0.002	-0.139	-0.321**	0.040***
	(1.51)	(2.41)	(-0.76)	(-1.03)	(-2.04)	(13.81)
GDP Growth	0.013	-0.083	0.085	-0.049	0.026	-0.478***
	(0.06)	(-0.34)	(0.66)	(-0.24)	(0.10)	(-3.17)
Country, Industry, Year FE?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,863	1,863	1,863	1,863	1,863	1,863

Table 6, Panel A presents results of testing the association between total, home-country and foreign-country tax avoidance and changes in home-country enforcement spending. The sample is 1,863 affiliated group-year observations from the Bureau van Dijk database from 2006 through 2013. The dependent variable in columns (1) through (3) is *Tax Avoid*, pre-tax income multiplied by the *STR* less current taxes paid, scaled by pre-tax income. The dependent variable in columns (4) through (6) is *ETR*, measured as tax payments scaled by EBIT. *% 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. *EBIT/Assets* is earnings before interest and taxes scaled by lagged total assets. *Tangible Asset %* is tangible fixed assets scaled by lagged total assets. *Leverage* is the sum of non-current liabilities and current liabilities, scaled by lagged total assets. *Ln(GDP)* is the natural logarithm of GDP. *GDP Growth* is the country's percentage change in GDP from year *t-1* to year *t*. 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: MNEs' Response to Increased Enforcement
Panel B: Tax-Motivated Income Shifting

Dependent Variable:	1 Ln(EBIT)	2 Ln(EBIT)	3 Ln(EBIT)	4 Ln(EBIT)
	Home		Foreign	
Increase Enforcement *C	1.337*		-0.038	
	(1.83)		(-0.17)	
Increase Enforcement * STR		1.926***		0.033
		(4.65)		(0.14)
Increase Enforce	-0.032	-0.620***	-0.020	-0.026
	(-1.37)	(-4.80)	(-0.96)	(-0.39)
C	-0.449		0.083	
	(-0.69)		(0.21)	
STR		-1.720**		-0.514
		(-2.30)		(-0.86)
Ln(# Employees)	0.544***	0.543***	0.585***	0.586***
	(43.52)	(43.40)	(36.87)	(36.87)
Ln(GDP)	-0.079	-0.044	0.543***	0.475***
	(-0.50)	(-0.28)	(3.46)	(2.93)
Ln(Tangible assets)	0.266***	0.265***	0.208***	0.208***
	(28.95)	(28.93)	(23.51)	(23.52)
Country, Industry, Year FE?	Yes	Yes	Yes	Yes
Observations	16,131	16,131	19,276	19,276

Table 6, Panel B presents results of testing the association between tax-motivated income shifting and changes in home-country enforcement spending. The sample is composed of 35,407 affiliate-year observations the Bureau van Dijk database from 2006 through 2013. The dependent variable in all columns is the natural log of income before interest and taxes (*Ln(EBIT))*. *Increase Enforcement* is an indicator variable equal to one if inflation adjusted enforcement spending increased form year t-1 to t and zero otherwise. *C* is the weighted-average affiliate-level tax incentive variable derived by Huizinga and Laeven (2008). *STR* is the statutory tax rate in the affiliate's country. *Ln(# Employees)* is the natural logarithm of the number of employees. *Ln(GDP)* is the natural logarithm of GDP. *Ln(Tangible Assets)* is the natural logarithm of fixed tangible assets. 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 7: Domestic Firms' Response to Increased Enforcement

	1	2	3	4
Dependent Variable:	ETR_{t+1}	$Ln(Tangible\ Assets)_{t+1}$	$Ln(\#\ Employees)_{t+1}$	$Ln(Compensation)_{t+1}$
% Change in Enforcement	0.028*	0.040	-0.054	-0.305**
	(1.80)	(0.17)	(-0.45)	(-2.31)
Ln(Tangible Assets)	-0.003***		0.247***	0.196***
	(-4.02)		(22.17)	(15.59)
Ln(EBIT)		0.427***	0.318***	0.446***
		(14.43)	(23.54)	(28.92)
Ln(# Employees)		0.796***		
		(21.29)		
Ln(GDP)	0.040	-0.059	-0.232	0.165
	(1.54)	(-0.14)	(-1.11)	(0.68)
STR	0.474***	0.709	0.893	-0.098
	(3.11)	(0.40)	(0.89)	(-0.09)
EBIT/Assets	0.006***			
	(3.02)			
Leverage	-0.081***			
	(-10.16)			
Country, Industry, Year FE?	Yes	Yes	Yes	Yes
Observations	3,927	3,927	3,927	3,927

Table 7 presents results of testing domestic firms' responses to changes in home-country enforcement spending. The sample is 3,927 domestic firm years from the Bureau van Dijk database from 2006 through 2013. *% Change in Enforcement* is the percentage change in Total Spending on Tax Enforcement from year *t-1* to year *t*. *Ln(Tangible Assets)* is the natural logarithm of fixed tangible assets. *Ln(EBIT)* is the natural log of income before interest and taxes. *Ln(# Employees)* is the natural logarithm of the number of employees. *Ln(GDP)* is the natural logarithm of GDP. We obtain GDP information the World Bank. *STR* is the statutory tax rate in the affiliate's country. *EBIT/Assets* is earnings before interest and taxes scaled by lagged total assets. *Leverage* is the sum of non-current liabilities and current liabilities, scaled by lagged total assets. 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.