

# Home Country Tax System Characteristics and Corporate Tax Avoidance: International Evidence

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**ABSTRACT:** We examine whether three tax system characteristics—required book-tax conformity, worldwide versus territorial approach, and perceived strength of enforcement—impact corporate tax avoidance across countries after controlling for firm-specific factors previously shown to be associated with tax avoidance (i.e., performance, size, operating costs, leverage, growth, the presence of multinational operations, and industry) and for other cross-country factors (i.e., statutory corporate tax rates, earnings volatility, and institutional factors). We find that, on average, firms avoid taxes less when required book-tax conformity is higher, a worldwide approach is used, and tax enforcement is perceived to be stronger. However, the relations between tax avoidance and all three tax systems characteristics are contextual and depend on the extent to which management compensation comes from variable pay, including bonuses, stock awards, and stock options.

**Keywords:** *tax avoidance; tax systems; book-tax conformity; managerial incentives.*

**Data Availability:** *Data are available from sources identified in the text.*

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## I. INTRODUCTION

We examine the impact of three tax system characteristics—required book-tax conformity, worldwide versus territorial approach, and perceived strength of tax enforcement—on corporate tax avoidance across countries. Prior research identifies firm-specific determinants of cross-sectional variation in tax avoidance within a given country but few studies examine the impact of tax system characteristics on tax avoidance, primarily because all firms in a given country are subject to the same tax system and because changes to tax systems are infrequent.<sup>1</sup> We fill this void by examining tax avoidance across countries and we focus on the effects of the firm’s home-country tax system characteristics.<sup>2</sup>

We follow Hanlon and Heitzman (2010) and define corporate tax avoidance broadly as the reduction in explicit taxes paid, and we measure tax avoidance as the difference between the firm’s “unmanaged tax amount” (the home-country statutory corporate tax rate times pre-tax earnings before exceptional items) and its “managed tax amount” (current taxes paid). This difference reflects how aggressively managers pursue strategies that reduce taxes paid. As in Dyreng et al. (2008), our measure of corporate tax avoidance does not necessarily imply that firms are engaging in improper behavior since managing tax costs is a necessary and appropriate component of a firm’s long-term strategy.<sup>3</sup> Moreover, since CEOs have incentives to both increase earnings and lower taxable income, earnings management and tax avoidance are like two sides of the same coin. Thus, in our tests, we do not distinguish earnings management from tax avoidance. Rather, we assume that managers’ decisions simultaneously consider the effects of planning strategies on both book income (i.e., financial earnings) and taxable income.<sup>4</sup>

Our study is motivated by calls for corporate tax reform in the U.S., specifically, proposals to increase required book-tax conformity (Desai 2005; Joint Committee on Taxation [JCT] 2006; Whitaker 2006), adopt a territorial approach (Avi-Yonah 2010; Hines 2011; Hufbauer 2011), and increase enforcement actions (Shulman 2009; Department of the Treasury [DOT] 2011; Keener 2011), and by calls for more research on factors influencing tax avoidance (Shackelford and Shevlin 2001; Graham 2003; Dyreng et al. 2008; Hanlon and Heitzman 2010). Understanding the impact of tax system characteristics on corporate tax avoidance is important to governments in designing tax systems and to investors in interpreting differences in firms’ corporate tax avoidance across countries.

We conduct our empirical analyses using a sample of more than 69,000 firm-year observations from 22 countries from 1995 through 2007. We regress our measure of corporate tax avoidance (*TaxAvoid*) on home-country tax system characteristics (i.e., required book-tax conformity, worldwide versus territorial approach, and perceived strength of tax enforcement) while controlling for statutory corporate tax rates as well as various country- and firm-specific variables that have

<sup>1</sup> See Hanlon and Heitzman (2010) for a recent review of the tax avoidance literature.

<sup>2</sup> We use the term “home country” to refer to the country in which the parent is incorporated. The home-country tax system plays a primary role in determining how much tax a firm pays because it dictates the final layer of tax that the firm must pay on any repatriated earnings before they can be paid out as dividends to shareholders.

<sup>3</sup> The terms “tax avoidance,” “tax aggressiveness,” “tax sheltering,” “tax noncompliance,” and “tax evasion” are all used in academic literature to describe various aspects of tax avoidance. We use the term “tax avoidance” to refer to all reductions of taxes paid below the “unmanaged tax amount.” As such, we do not differentiate between actions that would be considered prudent tax planning versus those that would be considered abusive tax sheltering.

<sup>4</sup> Consistent with the idea that earnings management and tax avoidance decisions are made concurrently, Desai (2005) argues that the degradation of both financial earnings and taxable income stems from an increase in managers’ ability to exploit differences between financial and tax accounting rules by structuring transactions to create advantageous book-tax differences (e.g., using derivatives, special purpose entities, etc.). Likewise, Hanlon and Heitzman (2010) assert that differences between financial earnings and taxable income are driven by a wide variety of factors and that these factors likely operate simultaneously to generate the level of book-tax differences that a firm reports.

been shown to influence tax avoidance in prior research. Results from our empirical analyses reveal that tax avoidance is lower, on average, for firms in home-countries with higher required book-tax conformity, a worldwide (rather than territorial) approach, and stronger perceived tax enforcement.

We further investigate whether the associations between tax avoidance and tax system characteristics differ when the variable pay portion of management compensation (*VarComp*) is high (above the median) versus low (below the median). We suggest that managers have stronger incentives to increase after-tax returns (including lowering taxes) when the variable pay component of management compensation is high. Consistent with this, we find that the association between tax avoidance and required book-tax conformity is less negative when the variable portion of management compensation is high. Moreover, the negative relation between tax avoidance and the perceived strength of tax enforcement is driven by firms in countries where the variable portion of management compensation is high. Finally, the worldwide tax approach is associated with lower tax avoidance only when the variable portion of management compensation is low. These results provide evidence that the influence of tax system characteristics on tax avoidance depends on the strength of management's incentives to avoid taxes.

Overall, our results contribute to the literature that investigates **cross-sectional variation in tax avoidance**. We extend prior research, which generally focuses on firms within a single country, by providing evidence that cross-country differences in tax systems as well as firm-specific factors impact the extent to which firms avoid taxes. Our study should be of interest to tax policymakers concerned about declining corporate tax revenues and the increasing gap between reported earnings and taxable income since they suggest that increasing tax enforcement is likely to result in lower tax avoidance as proponents argue (Shulman 2009; DOT 2011; Gravelle 2011; Hufbauer 2011; Keener 2011; Zrust 2011). However, our results also suggest that, while proposals to require greater book-tax conformity (Desai and Dharmapala 2009) may reduce tax avoidance, incentives underlying management compensation contracts may mitigate these effects. Indeed, our results suggest that increasing book-tax conformity is unlikely to significantly reduce tax avoidance unless managers' variable compensation, as a percentage of total compensation, is also reduced.

Our results should also be of interest to investors in global markets. Prior research suggests that information about tax expense and tax disclosures in the financial statements may provide information about current and/or future earnings (Hanlon and Heitzman 2010). Understanding how tax system characteristics impact tax avoidance should help investors to better interpret the tax information contained in the financial statements when comparing firms across countries.

The remainder of this paper is organized as follows. Section II discusses prior research and develops our hypotheses, while Section III describes our research design. Section IV presents our sample selection, descriptive statistics, and test results. Section V describes robustness tests and Section VI concludes.

## II. PRIOR RESEARCH AND DEVELOPMENT OF HYPOTHESES

### Prior Research

Prior research documents considerable cross-sectional **variation in tax avoidance and identifies firm-specific factors that explain this** variation.<sup>5</sup> Cross-sectional differences in tax avoidance are influenced by firm-level factors such as **leverage** (Graham and Tucker 2006; Joulfaian 2010; Lisowsky 2010), the scale of **international operations** (Rego 2003; Dyreng and Lindsey 2009), and

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<sup>5</sup> Shackelford and Shevlin (2001) and Hanlon and Heitzman (2010) provide extensive reviews of prior research on tax avoidance, including studies of marginal tax rates, effective tax rates, book-tax differences, tax shelters, and uncertain tax benefits.

management incentives (Phillips 2003; Hanlon et al. 2007; Rego and Wilson 2008; Gaertner 2010; Robinson et al. 2010; Armstrong et al. 2012).

Prior studies primarily explore tax aggressiveness across firms within one country (and mainly within the U.S.), where all firms operate under the same tax system, financial accounting standards, and institutional factors. Although tax system characteristics likely have a strong impact on tax avoidance, these characteristics have little or no variation within countries. Thus, we examine whether three tax system characteristics—required book-tax conformity, worldwide versus territorial approach, and strength of tax enforcement—impact corporate tax avoidance across countries.

## Development of Hypotheses

Our conceptual definition of tax avoidance is very broad. Specifically, we follow Hanlon and Heitzman (2010) and define tax avoidance as the reduction of explicit taxes. This definition includes tax avoidance strategies that create permanent or temporary book-tax differences as well as those that do not create any book-tax differences.<sup>6</sup> This definition also includes the full range of tax reduction strategies including those that are clearly legal (such as investing in tax-exempt bonds), those with uncertain tax benefits but for which minimal penalties would be assessed upon discovery by taxing authorities (such as U.S. tax return reporting positions that are undisclosed but are supported by substantial authority, or that are disclosed but have a reasonable basis), those for which more substantial penalties would be assessed but that would not be subject to criminal penalties (such as undisclosed U.S. tax return reporting positions that meet the reasonable basis standard), and those that are clearly illegal and could subject taxpayers to criminal penalties (such as abusive tax shelters and/or fraud).

We view tax system characteristics as determinants of differences in the availability of tax avoidance strategies, as well as determinants of differences in the expected costs and/or benefits of implementing tax avoidance strategies. We predict that **these differences in costs and benefits will influence tax avoidance decisions** even after controlling for corporate statutory tax rates and firm-specific characteristics identified in prior research.

The first tax system characteristic that we examine is the level of required book-tax conformity in the firm's home country. Firms in countries with higher required book-tax conformity have fewer opportunities to avoid taxes without decreasing reported earnings. Moreover, tax authorities act as an additional monitor of reported earnings when higher conformity between earnings and taxable income is required. Desai (2005) argues that these constraints (decreased opportunity and increased monitoring) on managers would result in less overall tax avoidance if required book-tax conformity were increased in the U.S.

Prior research suggests the amount of flexibility that firms have to report differences between taxable income and pre-tax earnings per the financial statements differs across countries (Ali and Hwang 2000; Hung 2001; Atwood et al. 2010; Lang et al. 2011). When constrained from taking tax positions that create differences between reported earnings and taxable income, managers may implement other tax-reducing strategies, such as locating more operations in tax havens or shifting more income into lower tax jurisdictions (JCT 2006). However, these alternative tax avoidance strategies are more costly to implement than strategies that create differences between reported earnings and taxable income. Thus, we conjecture that tax avoidance is more costly in countries that require

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<sup>6</sup> For example, the decision to locate a subsidiary in a foreign country with a lower statutory tax rate and shifting income to that subsidiary may reduce explicit taxes paid without creating a difference between pre-tax earnings and the sum of the firm's taxable incomes reported in the home country and in the foreign country. That is, taxes may be avoided without creating either permanent or temporary book-tax differences in the financial statements.

more book-tax conformity than in countries that require less book-tax conformity, all else equal. For this reason, we predict a negative relation between tax avoidance and required book-tax conformity.

Our first hypothesis is formally stated in the alternative form as follows:

**H1:** Firms in home countries with higher required book-tax conformity engage in less tax avoidance.

The second tax system characteristic that we examine is the use of a worldwide versus territorial tax system in the home country. For parent firms located in countries with worldwide tax systems, such as the U.S., income earned by foreign subsidiaries is potentially subject to additional tax in the home country when it is repatriated via dividend payments. This additional tax is not imposed on parent firms located in countries with territorial tax systems.

Under the territorial approach, income received from foreign subsidiaries in the form of dividend payments is partially or wholly excluded from the parent firm's taxable income. For example, assume a parent in Country Y has a subsidiary in Country X. This subsidiary earns \$100 in pre-tax profits, pays \$20 in Country X taxes, and remits an \$80 dividend to the Country Y parent. If Country Y has a territorial tax system, then the dividend from the Country X subsidiary is excluded from the parent's taxable income. Thus, the consolidated firm as a whole pays only the Country X tax on income earned in Country X.

Under the worldwide approach, dividends received from foreign subsidiaries are included in the parent firm's taxable income but foreign income taxes paid can be claimed as either a deduction or a credit (subject to limitations) to mitigate the double taxation of foreign-source income. For example, assume a U.S. parent with a 35 percent statutory corporate tax rate has a subsidiary in Country X, and the subsidiary earns \$100 in pre-tax profits, pays \$20 in Country X taxes, and remits an \$80 dividend to the U.S. parent. The U.S. parent includes the \$100 of pre-tax Country X earnings in its U.S. taxable income, which increases U.S. taxes due before credits by \$35 ( $\$100 \times 0.35$ ), but it receives a \$20 foreign tax credit. Thus, the U.S. parent must remit the \$15 difference between the U.S. tax and the Country X tax to the U.S. tax authorities. As a result, the after-tax income from an investment in Country X is higher for multinationals with parent firms located in countries using the territorial approach than for multinationals with parent firms located in countries using the worldwide approach.

Proponents of adopting a territorial approach in the U.S. claim that U.S. multinationals are at a competitive disadvantage, relative to multinationals in other countries, because of the additional taxes imposed in a worldwide tax system (Hines 2006; Hubbard 2006; Ousterhuis 2006). However, opponents of adopting a territorial approach in the U.S. argue that U.S. multinational firms have a number of options available to minimize or eliminate the perceived disadvantage of the worldwide tax system. For example, firms can defer paying U.S. tax by delaying payments of dividends to the U.S. parent. This deferral can be indefinite if the earnings are reinvested in the foreign country in which they are generated or invested in other foreign countries. When earnings are designated as permanently reinvested abroad, the potential future tax liability is also not recorded in the financial statements (Accounting Standard Codification Section 740). Consistent with this view, Markle (2010) finds no difference in income shifting among foreign affiliates by firms in worldwide tax systems that consistently reinvest earnings abroad versus firms in territorial tax systems. In addition, Lokken (2006) and Mandolfo (2007) argue that U.S. multinationals have refined international tax planning "to a fine art" (using deferral provisions, tax havens, hybrid entities, transfer pricing, cost-sharing arrangements, cross-crediting, etc.) so that they actually pay less in taxes than they would under a territorial approach. Fleming et al. (2008) further suggest that foreign tax credits go beyond what is required to eliminate double taxation and effectively result in a home-country subsidy on the activity that produces the foreign-source income. Thus, multinational firms in home countries with worldwide tax systems may have the ability to use international tax-planning techniques to

achieve levels of tax avoidance that are at least as high as those of multinational firms resident in countries that use territorial tax systems.

Hicks et al. (2009) argue that parent firms in countries with territorial tax systems can achieve greater tax benefits from shifting income to low-tax jurisdictions because the dividends received from foreign subsidiaries are permanently exempt from tax in the home country, whereas in countries with worldwide tax systems, shifting income merely defers home-country tax. Consistent with this, Markle (2010) finds that multinational firms with home-country territorial tax regimes shift more income among their foreign affiliates overall than do firms with home-country worldwide tax regimes. This result, combined with the Hicks et al. (2009) point that tax savings from income shifting are permanent under territorial tax systems but are merely deferred under worldwide tax systems, suggests that less tax avoidance is possible for firms in home countries with worldwide tax systems. Therefore, we predict that tax avoidance will be lower among firms in home countries using a worldwide approach compared with firms in home countries using a territorial approach.

Our second hypothesis is formally stated in the alternative form as follows:

**H2:** Firms in home countries with a worldwide approach engage in less tax avoidance than do firms in home countries with a territorial approach.

The third tax system characteristic that we examine is the perceived strength of tax enforcement. When managers perceive that government enforcement of tax rules is stronger, the higher expected probability of detection and potential for imposition of penalties may discourage tax avoidance. That is, managers may decrease tax avoidance when they believe tax authorities are more likely to detect the avoidance and impose additional taxes plus penalties.

Slemrod (2004) suggests that insights from standard deterrence models of the demand for tax avoidance—that higher penalties and higher probabilities of penalties being imposed deter tax avoidance—may not apply to corporate taxpayers because of the separation of ownership and management. Specifically, while the manager may be risk-averse, shareholders with diversified portfolios are risk-neutral. Thus, shareholders should want the manager to pursue all legal tax avoidance opportunities, including those that are very aggressive. However, there is often no clear, bright line between very aggressive tax avoidance and tax evasion. To align managers' incentives with the shareholders' interests, management compensation is tied to measures such as the effective tax rate or after-tax earnings. In this setting, enforcement efforts directed at the corporation may not deter the manager's tax avoidance decisions because the manager's contract compensates him *ex ante* for the risks of detection and, thus, may offset the deterrence effects of increased enforcement.

Chen and Chu (2005) and Crocker and Slemrod (2005) both develop formal principal-agent models of illegal corporate tax evasion when the principal (owner) is risk-neutral and the agent (manager) is risk-averse. Chen and Chu (2005) find that there is an efficiency loss due to the separation of ownership and control, while Crocker and Slemrod (2005) show that penalties imposed directly on the manager would be more effective in reducing tax evasion than penalties imposed on the corporation. Both models predict that firms evade taxes less when expected costs are higher (e.g., when the expected probability of detection and/or the penalties imposed are higher). However, a key assumption in both models is that tax evasion is illegal and management compensation contracts cannot be based on illegal actions because courts will not enforce such contracts. Thus, compensation contracts cannot be written based on the amount of tax evaded. However, these models do not address less extreme forms of tax avoidance, which may result in additional taxes paid with interest and penalties, but are not illegal. Therefore, it is not clear whether increased enforcement will deter tax avoidance overall.

Slemrod (2004) points out that the basic predictions of the deterrence model have not been subject to much empirical testing. However, two recent working papers use Internal Revenue Service (IRS) data to examine the impact of differences in the probability that a firm will be subject to a tax

audit. When the probability of a tax audit is higher, [Hanlon et al. \(2011\)](#) find that accrual quality is higher and [Hoopes et al. \(2011\)](#) find that public firms take less aggressive tax positions. In addition, [Desai et al. \(2007\)](#) examine a sample of Russian firms following an increase in tax enforcement after the 2000 election of Vladimir Putin. They find that tax payments increased, related party trades were curtailed, and tax haven entities were abandoned. Consistent with these prior studies, we predict a negative relation between the perceived strength of tax enforcement and tax avoidance.

Our third hypothesis is formally stated in the alternative form as follows:

**H3:** Firms resident in countries where tax enforcement is perceived to be stronger engage in less tax avoidance.

### III. RESEARCH DESIGN

#### Measure of Tax Avoidance

Recall that we define tax avoidance broadly as the reduction in explicit taxes paid.<sup>7</sup> We measure tax avoidance as the tax on pre-tax earnings computed at the home-country statutory corporate tax rate less the taxes actually paid, expressed as a percentage of pre-tax earnings.<sup>8</sup> We sum each element in the computation over three years.<sup>9</sup> Our measure of tax avoidance (*TaxAvoid*) for firm *i* in year *t* is calculated as follows:

$$TaxAvoid_{it} = \frac{\left[ \sum_{t-2}^t (PTEBX \times \tau)_{it} - \sum_{t-2}^t CTP_{it} \right]}{\sum_{t-2}^t PTEBX_{it}} \quad (1)$$

where:

*PTEBX* = pre-tax earnings before exceptional items (Item 21 – Item 57);<sup>10</sup>

$\tau$  = home-country statutory corporate income tax rate;<sup>11</sup> and

*CTP* = current taxes paid (Item 24 – the change in Item 100).<sup>12</sup>

<sup>7</sup> We focus on a measure of the total amount of taxes avoided, rather than on specific actions taken to avoid taxes (e.g., the strategic location of subsidiaries in foreign countries, the decision not to repatriate dividends, the amount of income shifted, investments in tax shelters, use of derivatives) because specific actions taken are differentially costly to implement and provide different benefits across countries. Moreover, specific actions taken are often unobservable in our setting.

<sup>8</sup> This measure is in the spirit of measuring tax avoidance using cash effective tax rates (ETRs, i.e., taxes actually paid divided by pre-tax income) for samples of U.S.-only firms (see [Dyreg et al. 2008](#)). We take the difference between taxes computed at the statutory tax rate and taxes actually paid because we draw our sample from different countries. As a result, firms from different countries face different statutory tax rates and, hence, taxes paid must be compared with “unmanaged taxes” at the home-country statutory tax rate to cross-sectionally measure the amount of taxes avoided.

<sup>9</sup> [Dyreg et al. \(2008\)](#) use one-year, five-year, and ten-year tax avoidance measures. They find that one-year measures are highly variable and are not as predictive of long-run tax avoidance as five-year or ten-year measures. Thus, we compute our tax avoidance measure over multiple years. Here, we compute a three-year measure because this time period is adequate to reduce the effects of items that reverse in just one year, but is not as limiting to our sample size as is a five-year window.

<sup>10</sup> Item numbers reference the Compustat Global database.

<sup>11</sup> We hand-collected these statutory rates from a KPMG LLP online summary, PricewaterhouseCoopers LLP’s online information, and Coopers & Lybrand LLP’s worldwide tax summary guides.

<sup>12</sup> When current tax expense (Item 24) is missing, we replace it with total tax expense less deferred taxes (Item 23 – Item 25) when available. We delete observations where current tax expense (Item 24) is missing and either total tax expense (Item 23) or deferred taxes (Item 25) is missing.

This measure of tax avoidance indicates the total amount of taxes the firm is able to avoid, relative to the tax computed at the home-country statutory corporate tax rate, regardless of whether such tax avoidance creates a book-tax difference.<sup>13</sup>

### Tax Avoidance Model

We test for the main effects of tax system characteristics on tax avoidance (H1 through H3) with the following model, estimated using ordinary least squares (firm and year subscripts are suppressed):

$$TaxAvoid = \alpha_{year} + \alpha_{ind} + \alpha_1 BTaxC + \alpha_2 WW + \alpha_3 TaxEnf + \sum_{\kappa} \alpha_{\kappa} Control_{\kappa} + e, \quad (2)$$

where:

*TaxAvoid* = tax avoidance measure from Model (1);

$\alpha_{year}$  = year fixed-effects;

$\alpha_{ind}$  = industry fixed-effects, based on the Fama-French 30 industry classification scheme;

*BTaxC* = a measure of the level of required book-tax conformity from Atwood et al. (2010);

*WW* = 1 for firms in home countries with a worldwide approach, and 0 for firms in home countries with a territorial approach;

*TaxEnf* = a measure of managers' perceptions of the strength of tax enforcement in the country, from the 1996 *World Competitiveness Report*; and

*Control* = country-level controls (consisting of the statutory corporate tax rate in the home country [*TaxRate*], the average of variable pay as a percentage of total compensation for firms in the country [*VarComp*], the cross-sectional earnings volatility [*Earnvol*], and institutional factors [*Factor*]) and firm-level controls (consisting of pre-tax return on assets [*Pre-Tax ROA*], firm size [*LogSize*], research and development expenditures [*R&D*], leverage [*Leverage*], sales growth [*SalesGrth*], and an indicator variable for multinational operations [*Multi*]).

To ensure that our results are not due to currency changes within a given country, we convert all data to U.S. dollars (using the currency translation rates available from Compustat) before computing the variables in the model.

We use the *BTaxC* measure of required book-tax conformity developed in Atwood et al. (2010).<sup>14</sup> This measure is based on the conditional variance of current tax expense (*CTE*) for a given level of pre-tax book income (*PTBI*) in a given country-year (i.e.,  $Var(CTE|PTBI)$ ). This measure captures the required level of book-tax conformity in the firm's home country.<sup>15</sup> Countries

<sup>13</sup> Under U.S. Generally Accepted Accounting Principles (GAAP), the cash tax savings from stock options are not included in current tax expense (Hanlon and Shevlin 2002). These cash tax savings arise from the corporate tax deduction allowed when a manager exercises a nonqualified stock option. This deduction is compensation expense for tax purposes and equals the difference between the stock's fair market value on the date the stock is exercised and the price the manager paid for the stock. This tax benefit is recorded directly to equity and does not reduce income tax expense reported in the financial statement. Thus, tax avoidance by firms reporting under U.S. GAAP is likely understated by the amount of the tax savings from stock options deductions.

<sup>14</sup> Atwood et al. (2010) provide evidence that increasing the required level of book-tax conformity in the home country is associated with lower earnings quality, where earnings quality is measured as earnings persistence and the association between current earnings and future cash flows. They do not address whether increased required book-tax conformity is associated with more or less tax avoidance or whether firms use other mechanisms to achieve tax avoidance when required book-tax conformity is higher.

<sup>15</sup> Note that the *BTaxC* measure in Atwood et al. (2010) includes multinational firms. However, we find that when we eliminate all multinational firms and the foreign pre-tax income variable (*ForPTBI*) and reestimate the *BTaxC* model, the ranking of the *BTaxC* is the same. Thus, the *BTaxC* variable reflects the level of home-country book-tax conformity.



with a lower conditional variance are presumed to allow less flexibility in the reporting of taxable income for a given level of reported pre-tax earnings and, thus, have higher required book-tax conformity. To compute *BTaxC*, we use the conditional variance of current tax expense from the following model, estimated by country-year:

$$CTE_t = \theta_0 + \theta_1 PTBI_t + \theta_2 ForPTBI_t + \theta_3 DIV_t + e_t.$$

Here,  $t$  is a year indicator; *CTE* is current tax expense (Item #23 – Item #25);<sup>16</sup> *PTBI* is pre-tax book income (Item #21); *ForPTBI* is estimated foreign pre-tax book income (foreign tax expense (Item #51)/total tax expense (Item #23)  $\times$  *PTBI*); *DIV* is total dividends (Item #34);<sup>17</sup> and  $e$  is the error term. We divide *CTE*, *PTBI*, *ForPTBI*, and *DIV* by average total assets (Item #89) to control for cross-sectional scale differences. *BTaxC* is computed as the scaled ranking of the root mean squared errors (RMSEs) from these country-year regressions. RMSEs are ranked so that countries with higher rankings in a given year have higher required book-tax conformity, i.e., we use descending ranks so that the highest RMSE in the year is ranked 0 and the lowest RMSE in the year is ranked  $n-1$ , where  $n$  is the number of included countries in that year. Firms in countries with higher *BTaxC* have less of an ability to avoid taxes using strategies that create book-tax differences in the home country. As a result, these firms may engage in less tax avoidance because tax-planning strategies that are available outside of the home country (e.g., locating operations in tax havens or shifting income to lower-tax jurisdictions) may be fewer and/or more costly to implement. Thus, H1 predicts that the association between tax avoidance and *BTaxC* will be negative ( $\alpha_1 < 0$ ).

We use an indicator variable (*WW*) to distinguish between firms in home countries with a worldwide versus territorial approach to taxing foreign income. We hand-collected these data from *PricewaterhouseCoopers Corporate Taxes: A Worldwide Summary* guides and from the *Ernst & Young Worldwide Corporate Tax Guide* for years 1990 through 2008. These guides indicate the percentage of dividends from foreign subsidiaries that are subject to tax. In most countries, dividends are either fully taxable or fully exempt, but during our sample period, Belgium, France, Germany, and Italy exempted 95 percent of dividends from foreign subsidiaries (E&Y 2008) and in 2004, Finland adopted a system in which dividends from subsidiaries in European Union (EU) countries are tax-exempt, but dividends from subsidiaries in non-EU countries are 75 percent tax-exempt (E&Y 2004). We code countries as territorial if they exempt from tax at least 75 percent of foreign subsidiary dividends. H2 predicts that the association between tax avoidance and *WW* will be negative ( $\alpha_2 < 0$ ).

To measure perceived tax enforcement (*TaxEnf*), we use the tax evasion index from the 1996 *World Competitiveness Report*. This index is derived from a survey of more than 2,000 business executives per country. Respondents report their agreement with the statement “Tax evasion is minimal in your country” on a scale from 1 through 6 (where 1 indicates strongly disagree and 6 indicates strongly agree). Thus, higher numbers indicate that tax evasion is perceived to be lower, so the strength of tax enforcement is perceived to be higher.<sup>18</sup> Dyck and Zingales (2004) find a negative relation between this measure and private benefits of control (i.e., the private benefits that controlling shareholders can extract from non-controlling shareholders) across countries, suggesting

<sup>16</sup> As in Atwood et al. (2010), when total tax expense or deferred tax expense is missing, we use current tax expense, if available, otherwise we delete the observation.

<sup>17</sup> Dividends are included in the model to control for those countries with tax rates that depend on whether the earnings are distributed (e.g., during the transition from an imputation system to the current system in Germany). As part of our robustness tests, we estimate *BTaxC* without including dividends in the model and find that the country-year rankings are identical.

<sup>18</sup> We are unable to locate similar surveys in other years in order to determine whether perceptions of the strength of tax enforcement have changed over time.

that additional monitoring by tax authorities reduces these benefits. H3 predicts that the association between tax avoidance and *TaxEnf* will be negative ( $\alpha_3 < 0$ ).

We include the statutory corporate tax rate as an important control variable in determining the impact of tax system characteristics on tax avoidance. In general, the benefits of engaging in tax-planning strategies are higher when the statutory tax rate is higher, suggesting a positive relation between tax avoidance and statutory tax rates. However, prior empirical research does not provide strong evidence on the relation between statutory corporate tax rates and corporate tax avoidance. Kamdar (1997) uses time-series data from IRS audits to examine corporate tax avoidance. He finds a weak negative relation between statutory corporate tax rates and corporate tax compliance measured as the percentage of “true” income voluntarily reported, and finds no relation using four of six alternative measures. Thus, we make no specific prediction about the relation between our tax avoidance measure and statutory corporate tax rates.

We hand-collected the statutory corporate tax rates (*TaxRate*) from a KPMG LLP online summary, PricewaterhouseCoopers LLP’s online information, and Coopers & Lybrand LLP’s worldwide tax summary guides. These statutory corporate tax rates include both the federal income tax rate and the average effects of state, provincial, and other local government income tax rates. Since *TaxRate* is included in the calculation of *TaxAvoid*, the association between these variables may be partially mechanical. Because *TaxAvoid* includes the effects of both book-tax differences and tax-planning strategies that do not create book-tax differences (e.g., location decisions, income shifting, repatriation strategies), *TaxAvoid* can be broken down into two components. That is,  $TaxAvoid = (BTD \times \tau) + (S \times (\tau - \tau^*))$ , where *BTD* equals total book income less total taxable income across all jurisdictions,  $\tau$  equals the statutory tax rate in the home country, *S* equals income shifted to lower tax jurisdictions, and  $\tau^*$  equals the tax rate in the jurisdiction to which income is shifted. If one assumes that *BTD* and *S* are determined independently of the tax rate (i.e.,  $\partial BTD/\partial\tau = 0$  and  $\partial S/\partial\tau = 0$ ), then the relation between *TaxAvoid* and  $\tau$  is purely mechanical (i.e.,  $\partial TaxAvoid/\partial\tau = BTD + Shift$ ). However, if one assumes that *BTD* and *S* are functions of the home-country and foreign-country statutory tax rates (that is,  $BTD = f(\tau)$ , and  $S = g(\tau, \tau^*)$ ), then  $TaxAvoid = g(\tau, \tau^*) \times (\tau - \tau^*) + f(\tau) \times \tau$  and  $\partial TaxAvoid/\partial\tau = (\tau - \tau^*) \times g'(\tau, \tau^*) + g(\tau, \tau^*) + \tau \times f'(\tau) + f(\tau)$ . Under these assumptions, the relation between *TaxAvoid* and  $\tau$  is not purely mechanical. However, because of the potential for a mechanical relation, we include the home-country statutory tax rate as a control variable.<sup>19</sup>

With respect to the other country-level control variables, prior research provides evidence that management incentives impact tax avoidance (Phillips 2003; Rego and Wilson 2008; Hanlon and Heitzman 2009; Gaertner 2010). Because data on individual manager salary, bonus, equity, stock options, and/or other compensation components are not available for non-U.S. firms, we use the country average of managers’ variable pay as a percentage of management compensation (*VarComp*) from Towers Perrin (2005) to measure management incentives from compensation contracts.<sup>20</sup> This percentage is calculated as all performance-based compensation (i.e., bonuses and stock-related compensation) divided by total compensation.<sup>21</sup> Towers Perrin (2005) reports

<sup>19</sup> We suggest, however, that future research should further examine the relation between statutory tax rates and tax avoidance.

<sup>20</sup> Towers Perrin maintains databases for compensation-planning purposes of executive compensation for both local and multinational companies in 97 countries. We believe that the broad cross-section of firms included in the Towers Perrin survey is comparable to the cross-section of firms included in our sample, and are unable to obtain similar surveys for years prior to 2005 in order to determine whether the percentage of compensation from variable pay varied for a given country over time.

<sup>21</sup> The understatement of tax avoidance due to the reporting of tax benefits from stock options under U.S. GAAP (see footnote 13) may induce a negative correlation between tax avoidance and the variable portion of management compensation (*VarComp*), but we note that the correlation between tax avoidance and *VarComp* is positive so this potential effect does not seem to be problematic.

significant differences in the pay components of CEOs across 26 countries (22 of which are included in our sample). Specifically, average variable pay as a percentage of total compensation ranges from a high of 62 percent in the U.S. to a low of 14 percent in India. [Desai and Dharmapala \(2006\)](#) and [Hanlon et al. \(2007\)](#) suggest that incentive compensation is positively associated with tax avoidance in the U.S., so we predict that firms in countries where variable pay is a larger portion of CEO compensation will engage in more tax avoidance.

*Earnvol* is the scaled descending decile rank of cross-sectional pre-tax earnings volatility by country-year, which controls for differences in the cross-sectional variance in pre-tax earnings. As reported in [Atwood et al. \(2010\)](#), *BTaxC* is positively correlated with the cross-sectional variance in pre-tax earnings. Thus, we include earnings volatility as a control in our model to ensure that the results for required book-tax conformity are not overstated due to the effects of cross-country differences in earnings volatility. We follow [Atwood et al. \(2010\)](#) and control for cross-country institutional factors (*Factor*) using the results of a factor analysis (untabulated) of the country's legal tradition (common law versus code law), strength of investor rights, and ownership concentration as developed by [La Porta et al. \(1998\)](#). We find that these variables converge to one significant factor (eigenvalue = 1.96), which explains 65 percent of the variation in the component variables. We extract this principal component (*Factor*) and include it as a control variable in our models.

Our firm-level control variables are shown in prior research to be associated with tax avoidance.<sup>22</sup> We control for firm profitability using pre-tax return on assets (*Pre-Tax ROA*), measured as pre-tax income before exceptional items (Item 21 – Item 57) divided by lagged total assets (Item 89). We control for firm size (*LogSize*) by taking the natural log of total assets. Our measure of intangible intensity or investment in research and development (*R&D*) is calculated as research and development expense (Item 52) divided by lagged total assets (Item 89). Leverage (*Leverage*) is calculated as total long-term liabilities (Item 108 + Item 94) divided by total assets (Item 89). Sales growth (*SalesGrth*) is the three-year average change in sales (Item 5). Finally, our multinational operations indicator (*Multi*) is set equal to 0 when foreign income taxes (Item 51) is missing or 0, and set to 1 otherwise.<sup>23</sup> We use an indicator variable rather than the ratio of foreign pre-tax income to total pre-tax income because Compustat Global does not provide a breakdown of domestic and foreign pre-tax income for non-U.S. multinationals. This indicator variable approach is similar to that used by [Hanlon et al. \(2007\)](#).<sup>24</sup>

### Tax Avoidance Model with Incentive Compensation

We further investigate the relations between tax avoidance and tax system characteristics by allowing the coefficients to vary when the variable pay component of compensation is a higher versus lower portion of managers' total compensation. Prior research provides evidence that incentives under management compensation contracts affect tax avoidance decisions. Specifically, prior research finds that: tax avoidance is positively associated with the level of management

<sup>22</sup> See, for example, [Hanlon et al. \(2007\)](#), [Dyreg et al. \(2008\)](#), [Rego and Wilson \(2008\)](#), [Cazier et al. \(2009\)](#), [Khurana and Moser \(2009\)](#), [Chen et al. \(2010\)](#), [Gaertner \(2010\)](#), [Hogan and Noga \(2010\)](#), [Lisowsky \(2010\)](#), [Badertscher et al. \(2011\)](#), [Cook and Omer \(2011\)](#), and [McGuire et al. \(2012\)](#).

<sup>23</sup> We note that the Japanese companies in our sample all report missing values for foreign tax expense. We perform a search of *Mergent Online* and *Lexis Nexis Academic Universe* to identify Japanese firms with foreign subsidiaries and, in all tabulated tests, we reclassify these as multinationals. This results in the reclassification of 5,622 Japanese observations (33.8 percent of the total Japanese sample) as multinationals. We note, however, that the results for *Multi* are consistent with and without this correction.

<sup>24</sup> [Hanlon et al. \(2007\)](#) use U.S. tax return data to create an indicator variable equal to 1 if the taxpayer claimed a foreign tax credit or filed a Form 5471, whereas we base our indicator variable on the existence of a foreign income tax expense amount.

compensation (Rego and Wilson 2008); effective tax rates are lower when managers' incentive compensation is based on after-tax versus pre-tax performance measures (Phillips 2003; Gaertner 2010); proposed IRS deficiencies are positively associated with the percentage of annual compensation that is in the form of bonuses and with the level of equity incentives from exercisable stock options (Hanlon et al. 2007); and tax avoidance is positively associated with equity risk incentives (Rego and Wilson 2011).

Recent models of corporate tax evasion that allow for agency costs also suggest that managerial incentives influence tax avoidance. Desai and Dharmapala (2006) show that increases in higher-powered incentives (e.g., stock option grants as a percentage of total compensation) may induce managers to engage in more or less tax-sheltering activity, and Crocker and Slemrod (2005) show that the optimal management compensation contract adjusts to offset, at least partially, the effect of sanctions against tax evasion.

These studies suggest that managers' tax avoidance decisions may be influenced by the proportion of their compensation that is comprised of bonuses, stocks, and stock options rather than fixed salaries. Moreover, the implementation of tax avoidance strategies and the receipt of any related incentive compensation generally occur several years before any related audit by taxing authorities, and even further from the payment of any additional taxes and penalties. As such, potential future audit adjustments and penalties may be less salient to managers than are the prospects for increased current incentive pay. For these reasons, we include the proportion of the manager's total compensation that is in the form of variable pay (i.e., bonus, stock, and stock options) in our tax avoidance model and allow the coefficients on the tax characteristic variables to differ when variable compensation as a percent of total compensation is high versus low. We test for the influence of variable compensation using the following model:

$$\begin{aligned} TaxAvoid = & \beta_{year} + \beta_{ind} + \beta_1 BTaxC \times High + \beta_2 BTaxC \times Low + \beta_3 WW \times High \\ & + \beta_4 WW \times Low + \beta_5 TaxEnf \times High + \beta_6 TaxEnf \times Low + \beta_7 TaxRate \times High \\ & + \beta_8 TaxRate \times Low + \sum \alpha_{\kappa} Control_{\kappa} + e \end{aligned} \quad (3)$$

where:

*High* = 1 if *VarComp* is above the median (0 otherwise);  
*Low* = 1 if *VarComp* is below the median (0 otherwise); and  
 All other variables are as previously defined.

We expect that the coefficients will differ across the *High* and *Low* categories, but make no prediction about the signs of these differences.

### Tax Avoidance Model with Accruals Components

We further investigate the relations between tax avoidance and tax system characteristics after controlling for accruals components. We do this to determine whether our tax system characteristics impact tax avoidance accomplished through accruals management alone or whether they also impact tax avoidance accomplished through other tax-planning strategies. Our approach is similar in spirit to that in Desai and Dharmapala (2006) who attempt to isolate the portion of tax aggressiveness that is attributable to tax sheltering as opposed to accruals management.

In our models, we allow the coefficients on the accruals components to vary based on the reliability classifications developed in Richardson et al. (2005). This allows us to investigate whether tax avoidance is more closely associated with certain types of accruals. Richardson et al. (2005) measure total accruals (*ACC*) as the sum of the change in net non-cash working capital ( $\Delta WC$ ), the change in net noncurrent operating assets ( $\Delta NCO$ ), and the change in net financial assets ( $\Delta FIN$ ), so  $ACC = \Delta WC + \Delta NCO + \Delta FIN$ . Here,  $\Delta$  is the change operator, *WC* is current

operating assets (Item 75 – Item 60) minus current operating liabilities (Item 104 – Item 94), *NCO* is noncurrent operating assets (Item 89 – Item 75 – Item 80 – Item 81) minus noncurrent operating liabilities (Item 118 – Item 104 – Item 106), and *FIN* is financial assets (Item 62 + Item 80 + Item 81) minus financial liabilities (Item 106 + Item 94 + Item 199). We add the separate accruals measures to the tax avoidance models above. The augmented models (with firm and year subscripts suppressed) are as follow:

$$\begin{aligned} TaxAvoid = & \alpha_{year} + \alpha_{ind} + \alpha_1 BTaxC + \alpha_2 WW + \alpha_3 TaxEnf + \alpha_4 \Delta WC + \alpha_5 \Delta NCO \\ & + \alpha_6 \Delta FIN + \sum \alpha_k Control_k + e \end{aligned} \quad (4)$$

$$\begin{aligned} TaxAvoid = & \beta_{year} + \beta_{ind} + \beta_1 BTaxC \times High + \beta_2 BTaxC \times Low + \beta_3 WW \times High \\ & + \beta_4 WW \times Low + \beta_5 TaxEnf \times High + \beta_6 TaxEnf \times Low + \beta_7 TaxRate \times High \\ & + \beta_8 TaxRate \times Low + \beta_9 \Delta WC + \beta_{10} \Delta NCO + \beta_{11} \Delta FIN + \sum \alpha_k Control_k + e \end{aligned} \quad (5)$$

All variables are as previously defined.

We expect a positive relation between *TaxAvoid* and accruals because prior research indicates that accruals are positively related to tax sheltering (Wilson 2009; Lisowsky 2010), but we allow this relation to vary with the reliability of the accruals. With the accruals variables included in the model, we interpret our results for *BTaxC*, *WW*, and *TaxEnf* as their impact on non-accrual-related tax avoidance.

#### IV. SAMPLE SELECTION, DESCRIPTIVE STATISTICS, AND TEST RESULTS

We select our sample from all firm-year observations in the Compustat Global Industrial/Commercial database from 1993 through 2007 with sufficient data to calculate the variables in Models (1) through (5).<sup>25</sup> We apply several data filters. First, we limit our sample to the 33 countries included in Atwood et al. (2010) because these are the countries for which we can estimate required book-tax conformity. Second, we limit our sample to the 22 countries included in Towers Perrin (2005) because these are the countries for which we can estimate CEO variable pay. Third, we require three years of positive pre-tax earnings before exceptional items (*PTEBX*) for our calculations of tax aggressiveness. Thus, for all of our observations,  $\sum_{t-2}^t (PTEBX \times \tau)_{it}$  will be greater than zero. Fourth, we delete all firm-year observations from countries that do not have at least 20 firms with available data in the year.<sup>26</sup> This sample selection procedure yields 69,301 firm-year observations from 22 countries.<sup>27</sup> Table 1 presents a list of the countries in our sample, their corresponding sample periods, and the number of total observations per country<sup>28</sup> as well as the country medians for each of the variables in Models (2) and (3).

Table 1 reveals considerable variation in the number of observations per country, ranging from 323 observations from India to 18,454 observations from the U.S. Thus, in a sensitivity test we also examine whether sample concentration influences our results by calculating the median for each variable by country-industry-year and entering the resulting median value into Models (2) and (3).

<sup>25</sup> Our sample period is as in Atwood et al. (2010) since we use their methodology to estimate book-tax conformity.

<sup>26</sup> Atwood et al. (2010) require 40 usable observations per country-year. Given that we have greater time-series data requirements, we relax this restriction to 20 usable observations.

<sup>27</sup> To remove the influence of potential outliers, we winsorize all continuous variables at the top and bottom 1 percent for each year.

<sup>28</sup> The earliest year reported in Table 1 is 1995 because we require three years of data to construct our tax aggressiveness variables.

**TABLE 1**  
**Sample Composition and Median Characteristics by Country**

**Panel A: Selected Variables, Part I**

Country	Time Period	n	TaxAvoid	BTaxC	WW	TaxEnf	TaxRate	VarComp	Earnvol	Pre-TaxROA	LogSize
Australia	1995-2007	2,510	0.233	0.125	1	4.580	0.300	0.300	0.032	0.108	5.109
Belgium	1996-2007	517	0.130	0.219	0	2.270	0.402	0.280	0.242	0.078	5.893
Brazil	1995-2007	537	0.122	0.406	1	2.140	0.340	0.360	0.625	0.107	6.953
Canada	1997-2007	2,547	0.156	0.031	0	3.770	0.421	0.510	0.441	0.098	6.334
France	1995-2007	3,123	0.086	0.783	0	3.860	0.343	0.410	0.719	0.081	5.984
Germany	1995-2007	2,533	0.180	0.118	0	3.410	0.384	0.520	0.531	0.078	6.181
Hong Kong	1995-2007	712	0.053	0.906	0	4.560	0.165	0.280	0.531	0.080	6.298
India	2004-2006	323	0.185	0.063	1	2.160	0.359	0.140	0.063	0.138	6.073
Italy	1995-2007	1,008	0.112	0.563	1	1.770	0.383	0.350	0.875	0.073	6.662
Japan	1995-2007	16,615	-0.008	0.706	1	4.410	0.420	0.220	0.906	0.046	6.072
Korea	2002-2007	894	0.216	0.594	1	3.290	0.275	0.390	0.500	0.091	6.821
Malaysia	1995-2007	3,029	0.060	0.719	0	4.340	0.280	0.460	0.839	0.074	4.730
Mexico	1997-2007	440	0.141	0.406	1	2.460	0.340	0.400	0.625	0.105	7.350
The Netherlands	1995-2007	1,067	0.114	0.652	0	3.400	0.350	0.410	0.355	0.100	6.444
Singapore	1995-2007	1,745	0.047	0.750	0	5.050	0.220	0.580	0.656	0.075	4.991
South Africa	1995-2007	993	0.244	0.094	1	2.400	0.378	0.570	0.156	0.147	5.949
Spain	1995-2007	946	0.163	0.906	0	1.910	0.350	0.420	0.688	0.076	6.783
Sweden	1995-2007	1,079	0.065	0.424	0	3.390	0.280	0.180	0.438	0.102	6.036
Switzerland	1995-2007	1,255	0.088	0.875	0	4.490	0.247	0.460	0.903	0.076	6.319
Taiwan	2000-2007	2,254	0.123	0.645	1	3.250	0.250	0.240	0.344	0.093	5.187
U.K.	1995-2007	6,720	0.064	0.469	1	4.670	0.300	0.360	0.375	0.108	5.525
U.S.	1995-2007	18,454	0.095	0.130	1	4.470	0.400	0.620	0.273	0.115	6.582
Total		69,301									

(continued on next page)

TABLE 1 (continued)

Panel B: Selected Variables, Part II

Country	Time Period	n	R&D	Leverage	SalesGrth	Multi	Common-Law	InvRights	OwnCon	Factor
Australia	1995-2007	2,510	0.000	0.214	0.155	0	1	4,000	0.280	0.254
Belgium	1996-2007	517	0.000	0.202	0.088	0	0	0.000	0.620	-2.947
Brazil	1995-2007	537	0.000	0.223	0.179	0	0	3,000	0.630	-1.694
Canada	1997-2007	2,547	0.000	0.259	0.151	0	1	5,000	0.240	0.762
France	1995-2007	3,123	0.000	0.199	0.125	0	0	3,000	0.240	-0.882
Germany	1995-2007	2,533	0.000	0.174	0.109	0	0	1,000	0.500	-2.273
Hong Kong	1995-2007	712	0.000	0.088	0.083	1	1	5,000	0.540	0.137
India	2004-2006	323	0.000	0.207	0.223	0	1	5,000	0.430	0.366
Italy	1995-2007	1,008	0.000	0.238	0.131	0	0	1,000	0.600	-2.481
Japan	1995-2007	16,615	0.002	0.071	0.034	0	0	4,000	0.130	-0.229
Korea	2002-2007	894	0.006	0.172	0.155	0	0	2,000	0.200	-1.224
Malaysia	1995-2007	3,029	0.000	0.081	0.113	0	1	4,000	0.520	-0.246
Mexico	1997-2007	440	0.000	0.196	0.122	0	0	1,000	0.670	-2.627
The Netherlands	1995-2007	1,067	0.000	0.227	0.105	0	0	2,000	0.310	-1.453
Singapore	1995-2007	1,745	0.000	0.138	0.111	0	1	4,000	0.530	-0.266
South Africa	1995-2007	993	0.000	0.060	0.122	0	1	5,000	0.520	0.179
Spain	1995-2007	946	0.000	0.259	0.133	0	0	4,000	0.500	-0.999
Sweden	1995-2007	1,079	0.000	0.143	0.121	0	0	3,000	0.280	-0.965
Switzerland	1995-2007	1,255	0.000	0.198	0.103	0	0	2,000	0.480	-1.806
Taiwan	2000-2007	2,254	0.011	0.043	0.119	0	0	3,000	0.140	-0.674
U.K.	1995-2007	6,720	0.000	0.229	0.116	1	1	5,000	0.150	0.949
U.S.	1995-2007	18,454	0.000	0.223	0.105	0	1	5,000	0.120	1.012
Total		69,301								

This procedure results in a sample of 6,119 country-industry-year observations. While this procedure reduces the influence that any particular country has on the results, it also removes much of the variation in the dependent variable (*TaxAvoid*) and in the firm-specific control variables (*Pre-TaxROA*, *LogSize*, *R&D*, *Leverage*, *SalesGrth*, and *Multi*). Thus, we draw our main inferences from the results that use the full sample, and view the results that use the country-industry-year medians sample as a very conservative robustness test.

Table 2, Panel A provides descriptive statistics for the full sample. The median level of *TaxAvoid* is 7.9 percent of pre-tax earnings. Dyreng et al. (2008) report median annual cash effective tax rates of 25.6 percent. This would imply a median level of tax avoidance of about 9.4 percent of pre-tax earnings (i.e., the 35 percent statutory corporate tax rate less the 25.6 percent cash effective tax rate). Thus, the median *TaxAvoid* for our sample of multinational firms is lower than that for the sample of U.S. firms in Dyreng et al. (2008). However, Table 1 indicates that the median *TaxAvoid* for U.S. firms in our sample is 9.5 percent, so our median tax avoidance measure for U.S. firms is consistent with the median reported by Dyreng et al. (2008). We also note that 73.7 percent of our sample observations are from countries with a worldwide tax approach, and 30.2 percent of our sample observations have multinational operations.

Panels B and C of Table 2 provide Pearson (above the diagonal) and Spearman (below the diagonal) correlations among the variables. All reported correlations are statistically significant at the 5 percent level or better with the exception of the correlations in bold. For both the Pearson and Spearman correlations, *BTaxC*, *WW*, and *TaxEnf* are negatively correlated with our tax avoidance variable, while *VarComp* is positively correlated with tax avoidance. Our tax enforcement variable (*TaxEnf*) is very highly correlated (Pearson Rho = 0.63) with our control variable for institutional factors (*Factor*). Following Gleason and Lee (2003), we conduct a test of collinearity (untabulated) by regressing the dependent variable (*TaxAvoid*) on all of the independent variables and calculating the variance inflation factors (VIFs) for each variable. We find that the average VIF is 2.5 and the highest VIF across the three regressions is 7.5, which is well below the generally accepted threshold of 10. This suggests that multicollinearity is not a problem in our model.

We now turn to the main tests of our hypotheses. We estimate all regressions models using ordinary least squares regression and we assess statistical significance using standard errors adjusted for firm clustering of residuals when using the full sample and for industry clustering of residuals when using the medians sample.<sup>29</sup>

Table 3 presents the results from estimating Model (2). Columns A and B present the results from estimating Model (2) using the full sample and the country-industry-year medians, respectively. Consistent with H1, tax avoidance is negatively associated with *BTaxC* in both samples, indicating that firms engage in less tax avoidance on average when their home countries have higher required book-tax conformity. An increase from the 25th percentile to the 75th percentile of required book-tax conformity results in a 23.74 percent decrease in *TaxAvoid* for the full sample (and a 35.76 percent decrease for the country-year medians sample).<sup>30</sup> These results suggest that firms in home countries with greater required book-tax conformity engage in significantly less tax avoidance.

<sup>29</sup> For regressions estimated using the medians sample, we do not adjust for firm clustering of residuals because individual firm-year observations do not appear in this country-industry-year sample.

<sup>30</sup> We calculate the percent increase in tax avoidance from moving from the 25th percentile to the 75th percentile as follows:  $[0.706 (BTaxC \text{ at Q3 per Table 2, Panel A}) - 0.152 (BTaxC \text{ at Q1 per Table 2, Panel A})] \times -0.036$  (the coefficient on *BTaxC* per Table 3, Column A)  $\div 0.084$  (mean *TaxAvoid* per Table 2, Panel A) = 23.67 percent. We perform similar calculations for our variables of interest below, but we do not provide the details of each calculation for parsimony.



**TABLE 2**  
**Descriptive Statistics and Correlations**

**Panel A: Descriptive Statistics**

<u>Variable</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Q1</u>	<u>Median</u>	<u>Q3</u>
<i>TaxAvoid</i>	0.084	0.172	-0.007	0.079	0.188
<i>BTaxC</i>	0.451	0.299	0.152	0.478	0.706
<i>WW</i>	0.737	0.440	0.000	1.000	1.000
<i>TaxEnf</i>	4.147	0.688	3.860	4.410	4.470
<i>TaxRate</i>	0.372	0.074	0.310	0.400	0.407
<i>VarComp</i>	0.415	0.160	0.220	0.410	0.620
<i>Factor</i>	0.000	1.000	-0.266	-0.229	1.012
<i>Earnvol</i>	0.504	0.305	0.261	0.438	0.788
<i>Pre-TaxROA</i>	0.108	0.089	0.046	0.084	0.143
<i>LogSize</i>	6.228	1.752	4.997	6.092	7.350
<i>R&amp;D</i>	0.014	0.033	0.000	0.000	0.011
<i>Leverage</i>	0.225	0.281	0.030	0.152	0.318
<i>SalesGrth</i>	0.133	0.250	-0.011	0.098	0.222
<i>Multi</i>	0.302	0.459	0.000	0.000	1.000
$\Delta WC$	0.012	1.541	-0.077	0.043	0.208
$\Delta NCO$	0.264	2.495	-0.056	0.118	0.442
$\Delta FIN$	-0.043	1.337	-0.224	-0.006	0.152
<i>CommonLaw</i>	0.534	0.499	0.000	1.000	1.000
<i>InvRights</i>	4.033	1.162	4.000	4.000	5.000
<i>OwnCon</i>	0.231	0.160	0.120	0.130	0.280
n	69,301				

Our measure of tax aggressiveness (*TaxAvoid*) for firm *i* in year *t* is calculated as follows:

$$TaxAvoid_{it} = \frac{\left[ \sum_{t-2}^t (PTEBX \times \tau)_{it} - \sum_{t-2}^t CTP_{it} \right]}{\sum_{t-2}^t PTEBX_{it}} \quad (1)$$

*PTEBX* = pre-tax earnings before exceptional items (Item 21 – Item 57);

$\tau$  = statutory tax rate;

*CTP* = current taxes paid (Item 24 – the change in Item 100);

*BTaxC* = proxy for the level of required book-tax conformity, following [Atwood et al. \(2010\)](#);

*WW* = 1 for firms in countries with worldwide tax systems, and 0 for firms in countries with territorial tax systems;

*TaxEnf* = proxy for the level of tax enforcement in the country, from the 1996 *World Competitiveness Report*;

*TaxRate* = statutory tax rate;

*VarComp* = average of variable pay as a percentage of total compensation for firms in the country, from the Towers Perrin *Worldwide Total Remuneration Report, 2005–2006*;

*Factor* = control for cross-country institutional factors using the results of a factor analysis of the country's legal tradition (common law versus code law), strength of investor rights, and ownership concentration as developed by [La Porta et al. \(1998\)](#);

*Earnvol* = country-level control variable for earnings volatility;

*Pre-TaxROA* = pre-tax return on assets;

*LogSize* = log of assets;

*R&D* = research and development expenditures;

*Leverage* = leverage;

*SalesGrth* = sales growth;

*Multi* = indicator variable for multinational operations;

(continued on next page)

TABLE 2 (continued)

$\Delta$  = change operator;

*WC* = current operating assets (Item 75 – Item 60) minus current operating liabilities (Item 104 – Item 94);

*NCO* = noncurrent operating assets (Item 89 – Item 75 – Item 80 – Item 81) minus noncurrent operating liabilities (Item 118 – Item 104 – Item 106);

*FIN* = financial assets (Item 62 + Item 80 + Item 81) minus financial liabilities (Item 106 + Item 94 + Item 199);

*CommonLaw* = 1 if the country's legal tradition is common-law, 0 if code-law;

*InvRights* = the investors' rights score developed by La Porta et al. (1998); and

*OwnCon* = the ownership concentration variable developed by La Porta et al. (1998).

### Panel B: Pearson (Above) and Spearman (Below) Correlations, 1–10

	Variable	1	2	3	4	5	6	7	8	9	10
1	<i>TaxAvoid</i>		-0.27	-0.09	-0.17	-0.09	0.23	-0.27	0.16	0.02	0.03
2	<i>BTaxC</i>	-0.26		-0.17	<b>0.00</b>	-0.11	-0.65	0.75	-0.29	-0.07	-0.13
3	<i>WW</i>	-0.10	-0.16		0.28	0.41	-0.03	-0.09	-0.01	0.08	0.11
4	<i>TaxEnf</i>	-0.05	-0.19	0.32		0.03	0.11	<b>0.00</b>	-0.02	-0.06	0.06
5	<i>TaxRate</i>	-0.17	-0.04	0.42	-0.15		-0.02	0.24	-0.14	0.16	0.06
6	<i>VarComp</i>	0.24	-0.60	-0.03	0.29	-0.18		-0.56	0.25	0.09	0.12
7	<i>Earnvol</i>	-0.26	0.71	-0.08	-0.30	0.32	-0.57		-0.34	<b>0.00</b>	-0.10
8	<i>Pre-TaxROA</i>	0.16	-0.31	-0.03	0.13	-0.23	0.31	-0.37		-0.11	0.23
9	<i>LogSize</i>	0.04	-0.08	0.09	-0.03	0.15	0.09	<b>0.00</b>	-0.09		<b>0.00</b>
10	<i>R&amp;D</i>	-0.03	-0.03	0.21	<b>0.00</b>	0.14	-0.05	<b>0.00</b>	0.09	0.08	
11	<i>Leverage</i>	0.15	-0.14	-0.07	0.09	-0.07	0.18	-0.16	-0.14	0.37	-0.14
12	<i>SalesGrth</i>	0.18	-0.15	-0.09	0.02	-0.17	0.13	-0.17	0.38	<b>0.00</b>	0.02
13	<i>Multi</i>	-0.07	-0.07	0.20	0.25	0.09	0.11	-0.04	0.06	0.21	0.25
14	$\Delta$ <i>WC</i>	0.04	0.01	0.02	-0.09	0.04	-0.04	0.01	-0.01	-0.07	0.06
15	$\Delta$ <i>NCO</i>	0.14	-0.13	-0.08	0.06	-0.04	0.13	-0.11	-0.01	0.09	-0.07
16	$\Delta$ <i>FIN</i>	-0.04	0.07	0.08	-0.01	0.08	-0.07	0.09	0.04	-0.06	0.08
17	<i>CommonLaw</i>	0.16	-0.60	0.08	0.63	-0.31	0.68	-0.63	0.31	-0.03	-0.10
18	<i>InvRights</i>	0.04	-0.52	0.39	0.62	0.08	0.51	-0.49	0.22	0.06	0.02
19	<i>OwnCon</i>	0.08	0.29	-0.64	-0.37	-0.51	-0.31	0.20	-0.05	-0.15	-0.25
20	<i>Factor</i>	0.04	-0.58	0.50	0.65	0.19	0.52	-0.52	0.22	0.09	0.09

### Panel C: Pearson (Above) and Spearman (Below) Correlations, 11–20

	Variable	11	12	13	14	15	16	17	18	19	20
1	<i>TaxAvoid</i>	0.09	0.18	-0.07	0.01	0.06	-0.03	0.17	-0.03	0.12	0.01
2	<i>BTaxC</i>	-0.07	-0.14	-0.07	-0.01	-0.02	0.02	-0.62	-0.30	0.13	-0.44
3	<i>WW</i>	-0.01	-0.09	0.20	<b>0.00</b>	-0.02	0.03	0.08	0.38	-0.60	0.42
4	<i>TaxEnf</i>	-0.01	-0.05	0.25	<b>0.00</b>	-0.01	0.02	0.41	0.58	-0.54	0.63
5	<i>TaxRate</i>	0.03	-0.14	0.08	-0.01	0.01	0.01	-0.25	0.06	-0.39	0.06
6	<i>VarComp</i>	0.08	0.11	0.11	0.01	0.02	-0.03	0.68	0.31	0.05	0.40
7	<i>Earnvol</i>	-0.07	-0.16	-0.05	-0.02	-0.01	0.03	-0.65	-0.34	0.13	-0.47
8	<i>Pre-Tax ROA</i>	-0.10	0.35	0.05	0.01	-0.02	0.01	0.27	0.13	-0.01	0.17
9	<i>LogSize</i>	0.34	-0.01	0.20	-0.05	0.04	-0.02	-0.04	<b>0.00</b>	-0.07	0.01
10	<i>R&amp;D</i>	-0.09	0.09	0.20	<b>0.00</b>	<b>-0.01</b>	0.03	0.05	0.07	-0.16	0.10
11	<i>Leverage</i>		0.17	-0.02	-0.16	0.24	-0.20	0.06	0.03	-0.02	0.05
12	<i>SalesGrth</i>	0.13		-0.02	0.03	0.07	-0.09	0.13	0.03	0.05	0.05
13	<i>Multi</i>	<b>0.01</b>	-0.01		<b>0.00</b>	-0.01	0.01	0.20	0.29	-0.19	0.29
14	$\Delta$ <i>WC</i>	-0.01	0.11	-0.01		-0.76	0.29	0.01	0.01	<b>0.00</b>	0.01
15	$\Delta$ <i>NCO</i>	0.30	0.17	-0.02	-0.37		-0.73	0.02	<b>0.00</b>	<b>0.00</b>	<b>0.01</b>

(continued on next page)

TABLE 2 (continued)

Variable	11	12	13	14	15	16	17	18	19	20
16 $\Delta FIN$	-0.35	-0.14	0.03	-0.10	-0.55		-0.03	<b>0.00</b>	-0.02	<b>0.00</b>
17 <i>CommonLaw</i>	0.14	0.14	0.20	-0.04	0.11	-0.07		0.71	-0.09	0.78
18 <i>InvRights</i>	0.10	0.06	0.31	-0.04	0.09	-0.03	0.83		-0.57	0.97
19 <i>OwnCon</i>	<b>0.00</b>	0.04	-0.24	-0.02	-0.01	-0.05	-0.23	-0.58		-0.65
20 <i>Factor</i>	0.09	0.05	0.30	-0.03	0.08	-0.02	0.76	0.94	-0.77	

All reported correlations in Panels B and C are statistically significant at the 5 percent level or better with the exception of the correlations in bold. Pearson correlations are reported above the diagonal and Spearman correlations are reported below the diagonal.

All variables are as defined in Table 2, Panel A.

Consistent with H2, we find that firms in home countries with a worldwide approach engage in less tax avoidance than do firms in home countries with a territorial approach for both the full and medians sample. Using the full sample, the results suggest that firms in home countries with a worldwide approach avoid taxes by 13.10 percent less than do firms in home countries with a territorial approach (and 12.66 percent less using the median sample). Contrary to suggestions in Lokken (2006), Mandolfo (2007), and Fleming et al. (2008), we find no evidence that firms resident in countries with worldwide tax systems use sophisticated international tax-planning techniques to produce results that are better (i.e., that avoid more taxes) on average than those produced by firms resident in countries with territorial tax systems. Rather, our results suggest that on average, the worldwide approach results in less tax avoidance than does the territorial approach. Our results are consistent with those of Markle (2010), who finds that multinational firms subject to the worldwide approach engage in less tax-motivated income shifting than do multinational firms subject to the territorial approach. The results suggest that this reduced income shifting contributes to lower tax avoidance by multinational firms subject to the worldwide approach.

Consistent with H3, we find that tax avoidance is negatively associated with managers' perceptions of the strength of tax enforcement (*TaxEnf*). When perceived tax enforcement increases from the 25th percentile to the 75th percentile, tax avoidance decreases by 18.88 percent of the average for the full sample (and 16.22 percent for the medians sample). This overall result is consistent with the standard deterrence model of tax evasion—that higher penalties and higher probabilities of penalties being imposed deter evasion—and with the empirical results in Desai et al. (2007), Hanlon et al. (2011), and Hoopes et al. (2011).

We also find that tax avoidance is positively associated with the statutory corporate tax rate (*TaxRate*). When the statutory corporate tax rate increases from the 25th percentile (31 percent) to the 75th percentile (40.7 percent), tax avoidance increases by 6.58 percent of the average for the full sample (and 6.26 percent for the medians sample). However, we interpret this result with caution due to the potential for a mechanical relation between our tax avoidance measure and statutory tax rates (as previously discussed).

Consistent with prior research, we also find that manager incentives (*VarComp*) are positively associated with tax avoidance. Specifically, when the variable component of management compensation increases from the 25th percentile (22.0 percent) to the 75th percentile (62.0 percent), tax avoidance increases by 68.57 percent of the average for the full sample (and 66.33 percent for the medians sample). We further explore this effect below by allowing the associations between the tax system characteristics and tax avoidance to vary across firms where *VarComp* is above versus below the median.

With respect to the remaining country-level control variables in Model (2), we first find that tax avoidance is lower when the level of cross-sectional pre-tax earnings volatility within a country

**TABLE 3**  
**Tax Avoidance Regressions**

Variable	Hypo.	Pred.	Dependent Variable: <i>TaxAvoid</i>			
			Column A		Column B	
			Full Sample		Country-Industry-Year Medians	
			Coef.	t-stat	Coef.	t-stat
<i>BTaxC</i>	H1	Neg.	-0.036	-5.34***	-0.051	-5.49***
<i>WW</i>	H2	Neg.	-0.011	-3.56***	-0.010	-2.16***
<i>TaxEnf</i>	H3	Neg.	-0.026	-11.86***	-0.021	-5.69**
Controls						
<i>TaxRate</i>			0.057	2.86***	0.051	1.57*
<i>VarComp</i>			0.144	15.50***	0.131	8.41***
<i>Earnvol</i>			-0.095	-15.51***	-0.065	-6.22***
<i>Factor</i>			-0.011	-5.55***	-0.002	-0.32
<i>Pre-Tax ROA</i>			0.044	3.55***	0.023	0.35
<i>LogSize</i>			-0.002	-2.17**	0.003	0.92
<i>R&amp;D</i>			-0.040	-1.23	-0.128	-0.87
<i>Leverage</i>			0.032	8.06***	0.031	2.01*
<i>SalesGrth</i>			0.065	20.17***	0.056	4.12***
<i>Multi</i>			-0.014	-5.91***	-0.035	-4.96***
Industry Fixed-Effects			Yes		Yes	
Year Fixed-Effects			Yes		Yes	
n			69,301		6,119	
Adjusted R <sup>2</sup>			34.7%		21.2%	

\*, \*\*, \*\*\* Indicate significance at 10, 5, and 1 percent, respectively.

In all regressions, we assess statistical significance using standard errors adjusted for firm clustering for the full sample (Column A) and industry clustering for the medians sample (Column B). We use one-tailed tests when a sign is predicted.

All variables are as defined in Table 2, Panel A.

(*Earnvol*) is higher. As discussed in [Atwood et al. \(2010\)](#), *BTaxC* is highly positively correlated with cross-sectional pre-tax earnings volatility.<sup>31</sup> By including *Earnvol* in our regression, we ensure that our *BTaxC* results are not driven by differences in the cross-sectional volatility of pre-tax earnings rather than required book-tax conformity. Next, we find that cross-country institutional factors (*Factor*) are also negatively associated with tax avoidance, suggesting that tax avoidance is lower in common law countries with stronger investor rights and lower ownership concentration. Including this variable ensures that our tax system characteristics results are not due solely to their correlation with this set of institutional features across countries.

With respect to firm-level control variables, we find that tax avoidance is higher for firms with higher pre-tax return on assets (*Pre-Tax ROA*). Consistent with prior research ([Rego 2003](#); [Cazier et](#)

<sup>31</sup> In our sample, the Pearson correlation is 0.75 (see Table 2, Panel B).

al. 2009; Wilson 2009), this result indicates that more profitable firms, which have the greatest incentive to reduce taxes, engage in more tax avoidance. We also find that tax avoidance is lower for large firms (*LogSize*), consistent with Rego (2003), who finds that, for a broad sample of U.S. firms, worldwide effective tax rates (ETRs) increase with firm size. These results are consistent with larger firms engaging in less tax avoidance, as well as with prior literature suggesting that larger firms may act to reduce potential political costs (Zimmerman 1983; Omer et al. 1993).<sup>32</sup> Contrary to prior research that finds a positive relation between R&D expenditures and tax avoidance (Dyreng et al. 2008) and between R&D expenditures and uncertain tax benefits (Cazier et al. 2009), we find no association between tax avoidance and research and development (*R&D*) in our models. However, consistent with prior research that finds a positive association between tax avoidance and leverage (Dyreng et al. 2008) and between uncertain tax benefits and leverage (Cazier et al. 2009), we find that tax avoidance is increasing in leverage (*Leverage*).<sup>33</sup> We also find that firms with higher *SalesGrth* engage in more tax avoidance, consistent with Badertscher et al. (2011) who find that sales growth is negatively associated with annual cash ETRs, suggesting that firms with higher sales growth engage in more tax avoidance.<sup>34</sup> Finally, we find less tax avoidance in firms with multinational operations (*Multi*). Prior research provides mixed evidence on the relation between multinational operations and tax avoidance. Rego (2003) finds that the more extensive a multinational's foreign operations, the higher its ETR, suggesting lower tax avoidance, but Wilson (2009) finds that firms with foreign income are more likely to be tax-shelter participants and Cazier et al. (2009) find that U.S. firms with more extensive foreign operations have greater uncertain tax benefits. Our results are more consistent with those in Rego (2003), suggesting that multinationals engage in less tax avoidance overall than do solely domestic firms.<sup>35</sup>

### The Effect of Variable Compensation on the Relations between Tax Avoidance and Tax System Characteristics

Table 4 explores the relations between tax avoidance and tax system characteristics by allowing these relations to vary for firms in countries with high versus low variable compensation (i.e., *VarComp* above and below the median). Columns A and B present the results from estimating Model (3) for the full and medians samples, respectively. Our focus is on the tests of coefficient equality presented at the bottom of the table.

With respect to the relation between tax avoidance and book-tax conformity, the tests of coefficient equality reveal that, for both the full and medians samples, the association between tax avoidance and required book-tax conformity is significantly less negative for firms in countries where the proportion of compensation that is variable (*VarComp*) is high. In fact, when using the full sample, the relation is positive for firms with high *VarComp*. When using the medians sample,

<sup>32</sup> Note, however, that prior research provides mixed evidence on the relation between firm size and tax avoidance. Contrary to findings in Rego (2003), Cazier et al. (2009) find that larger firms report greater uncertain tax benefits under FIN 48 and Wilson (2009) finds that they are more likely to be tax-shelter participants, consistent with the argument that larger firms engage in more complex tax avoidance transactions.

<sup>33</sup> Note, however, that findings in prior research do not suggest a clear relation between leverage and tax avoidance. In contrast with findings in Dyreng et al. (2008) and Cazier et al. (2009), leverage is negatively associated with tax sheltering (Graham and Tucker 2006; Wilson 2009) and with corporate tax evasion (Joulfaian 2010).

<sup>34</sup> Note, however, that Cazier et al. (2009) find that sales growth is negatively associated with uncertain tax benefits, suggesting that firms with higher sales growth engage in less tax avoidance.

<sup>35</sup> We note that Wilson (2009) uses a sample of 59 firms accused of tax-shelter participation and Cazier et al. (2009) use a sample 578 firm-years that first reported uncertain tax benefits under FIN 48 in 2007. Both are small sample studies where observations are drawn from a population of firms that are considered to be tax aggressive by definition. On the other hand, the sample used in Rego (2003) includes a broad cross-section of U.S. firms (5,379 firm-years). Similarly, our sample includes a broad cross-section of firms from 22 countries. We suggest that this is likely why our results are more consistent with Rego (2003).

**TABLE 4**  
**Tax Avoidance Regressions with Equity Compensation Interactions**  
**Dependent Variable: TaxAvoid**

Variable	Hypo.	Column A: Full Sample			Column B: Country-Industry- Year Medians		
		Coef.	t-stat	F-stat	Coef.	t-stat	F-stat
<i>BTaxC</i> × <i>HighVarComp</i>	H1	0.029	3.38***		-0.038	-3.12***	
<i>BTaxC</i> × <i>LowVarComp</i>	H1	-0.051	-6.11***		-0.074	-5.87***	
<i>WW</i> × <i>HighVarComp</i>	H2	-0.005	-1.06		-0.015	-1.45	
<i>WW</i> × <i>LowVarComp</i>	H2	-0.018	-4.25***		0.005	0.68	
<i>TaxEnf</i> × <i>HighVarComp</i>	H3	-0.054	-19.89***		-0.038	-8.10***	
<i>TaxEnf</i> × <i>LowVarComp</i>	H3	-0.001	-0.26		0.001	0.18	
Controls							
<i>TaxRate</i> × <i>HighVarComp</i>		0.316	12.84***		0.213	5.26***	
<i>TaxRate</i> × <i>LowVarComp</i>		-0.034	-1.38		-0.139	-3.71***	
<i>VarComp</i>		0.348	14.73***		0.220	4.40***	
<i>Earnvol</i>		-0.066	-10.85***		-0.044	-3.94***	
<i>Factor</i>		-0.015	-7.22***		-0.010	-2.21**	
<i>Pre-Tax ROA</i>		0.034	2.82***		0.016	0.26	
<i>LogSize</i>		-0.001	-1.94*		0.002	0.66	
<i>R&amp;D</i>		-0.021	-0.64		-0.099	-0.68	
<i>Leverage</i>		0.029	7.36***		0.029	1.90*	
<i>SalesGrth</i>		0.066	20.79***		0.057	4.04***	
<i>Multi</i>		-0.017	-7.14***		-0.041	-5.51***	
Industry Fixed-Effects		Yes			Yes		
Year Fixed-Effects		Yes			Yes		
n		69,301			6,119		
Adjusted R <sup>2</sup>		35.8%			24.1%		
Tests of Coefficient Equality							
<i>BTaxC</i> × <i>HighVarComp</i> =				66.25***			4.21*
<i>BTaxC</i> × <i>LowVarComp</i>							
<i>WW</i> × <i>HighVarComp</i> = <i>WW</i>				4.48**			3.74*
× <i>LowVarComp</i>							
<i>TaxEnf</i> × <i>HighVarComp</i> =				405.22***			48.81***
<i>TaxEnf</i> × <i>LowVarComp</i>							
<i>TaxRate</i> × <i>HighVarComp</i> =				151.70***			53.86***
<i>TaxRate</i> × <i>LowVarComp</i>							

\*, \*\*, \*\*\* Indicate significance at 10, 5, and 1 percent, respectively.

In all regressions, we assess statistical significance using standard errors adjusted for firm clustering for the full sample (Column A) and industry clustering for the medians sample (Column B). We use one-tailed tests when a sign is predicted.

All variables are as defined in Table 2, Panel A.

the relation is still negative but it is significantly less negative for firms in home countries with high variable compensation. Thus, book-tax conformity has less of an influence on managers' tax avoidance decisions when managers' compensation contracts provide them with greater incentives to avoid taxes. This result is consistent with results in [Hanlon et al. \(2007\)](#) and [Rego and Wilson \(2011\)](#), which examine tax deficiencies and effective tax rates among U.S. firms. Our results suggest that bonus and equity compensation arrangements motivate managers to undertake more risky tax-planning strategies when countries allow less flexibility in reporting differences between earnings and taxable income.

The tests of coefficient equality reveal that, for the full sample, the negative association between tax avoidance and the use of a worldwide approach is driven by firms in countries with low variable compensation. In addition, for firms in countries where *VarComp* is above the median, the tax approach in the home country (worldwide versus territorial) has no effect on tax avoidance. Note, however, that when we use the medians sample, we find no evidence of a relation between tax avoidance and the tax approach regardless of the level of variable compensation. Overall, these results provide some evidence of a relation between a worldwide approach and tax avoidance, but we refrain from drawing strong inferences given the medians sample results.

With respect to the relation between tax avoidance and the perceived strength of tax enforcement, tests of coefficient equality reveal that tax avoidance is decreasing in the strength of tax enforcement only when the variable portion of compensation is high. This result holds for both the full and the medians samples. A possible explanation for this result is that managers in countries with low variable pay are not motivated to engage in tax avoidance activities even when the strength of enforcement is lower and, as a result, stronger enforcement has no effect.

Finally, tests of coefficient equality indicate that tax avoidance is increasing in the statutory corporate tax rate only when the variable portion of compensation is high. In fact, when *VarComp* is below the median, the relation between tax avoidance and the statutory corporate tax rate is not significant in the full sample and is negative in the medians sample. This result suggests that tax avoidance is increasing in the statutory tax rate only when management compensation is strongly tied to reported earnings, as is bonus and equity compensation. Overall, the results from our medians tests confirm that the variable pay portion of management compensation impacts the relation between tax avoidance and tax system characteristics because managers are incentivized to engage in more tax avoidance when tax avoidance leads to higher compensation.

### The Effects of Accruals Components

We now analyze the relations between accruals components and tax avoidance. Table 5, Panel A, Columns A and B present the results of Model (4) for the full and medians samples, respectively. Here, we find that all three accruals components are positively associated with tax avoidance, indicating that some tax avoidance is achieved through accruals management. However, the results for the tax systems characteristics are essentially the same as in Model (2). The only exception is that the relation between tax avoidance and *TaxRate* is no longer significant for the medians sample.

Table 5, Panel B, Columns C and D present the results of Model (5) for the full and medians samples, respectively. Again, all three accruals components are positively associated with tax avoidance and the results for the tax systems characteristics are essentially the same as in Model (3). Thus, the relations between tax avoidance and the tax systems characteristics are not driven solely by tax avoidance through accruals management. This result suggests that altering home-country tax system characteristics not only impacts managers' tax avoidance through accruals management, but also tax avoidance through other mechanisms such as the use of tax havens, transfer pricing, cost sharing arrangements, tax shelters, etc.

TABLE 5

## Tax Avoidance Regressions with Controls for Accruals Components

## Panel A: Results for Model (4)

Variable	Hypo.	Pred.	Dependent Variable: <i>TaxAvoid</i>			
			Column A: Full Sample		Column B: Country-Industry- Year Medians	
			Coef.	t-stat	Coef.	t-stat
<i>BTaxC</i>	H1	Neg.	-0.035	-5.25***	-0.052	-5.60***
<i>WW</i>	H2	Neg.	-0.010	-3.30***	-0.008	-1.84**
<i>TaxEnf</i>	H3	Neg.	-0.026	-11.80***	-0.021	-5.75***
Controls						
<i>TaxRate</i>			0.051	2.58**	0.039	1.20
<i>VarComp</i>			0.143	15.42***	0.126	8.36***
<i>Earnvol</i>			-0.096	-15.84***	-0.065	-6.46***
<i>Factor</i>			-0.012	-5.89***	-0.002	-0.51
<i>Pre-Tax ROA</i>			0.055	4.38***	0.032	0.50
<i>LogSize</i>			-0.001	-2.12**	0.002	0.86
<i>R&amp;D</i>			-0.051	-1.58	-0.156	-1.04
<i>Leverage</i>			0.031	6.96***	0.031	1.63
<i>SalesGrth</i>			0.057	17.35***	0.048	3.35***
<i>Multi</i>			-0.013	-5.70***	-0.034	-4.89***
$\Delta WC$			0.017	9.00***	0.023	2.90***
$\Delta NCO$			0.016	10.15***	0.021	2.41**
$\Delta FIN$			0.017	9.48***	0.024	2.26**
Industry Fixed-effects			Yes		Yes	
Year Fixed-effects			Yes		Yes	
n			69,301		6,119	
Adjusted R <sup>2</sup>			35.4%		22.5%	

## Panel B: Results for Model (5)

Variable	Hypo.	Dependent Variable: <i>TaxAvoid</i>					
		Column C: Full Sample			Column D: Country-Industry- Year Medians		
		Coef.	t-stat	F-stat	Coef.	t-stat	F-stat
<i>BTaxC</i> × <i>HighVarComp</i>	H1	0.030	3.54***		-0.039	-3.22***	
<i>BTaxC</i> × <i>LowVarComp</i>	H1	-0.052	-6.21***		-0.075	-5.96***	
<i>WW</i> × <i>HighVarComp</i>	H2	-0.004	-0.76		-0.013	-1.33	
<i>WW</i> × <i>LowVarComp</i>	H2	-0.018	-4.08***		0.007	0.89	
<i>TaxEnf</i> × <i>HighVarComp</i>	H3	-0.054	-19.80***		-0.037	-8.22***	
<i>TaxEnf</i> × <i>LowVarComp</i>	H3	-0.001	-0.35		0.001	0.15	
Controls							
<i>TaxRate</i> × <i>HighVarComp</i>		0.307	12.52***		0.198	4.95***	
<i>TaxRate</i> × <i>LowVarComp</i>		-0.036	-1.47		-0.146	-3.76***	

(continued on next page)



TABLE 5 (continued)

Variable	Hypo.	Dependent Variable: <i>TaxAvoid</i>					
		Column C: Full Sample			Column D: Country-Industry- Year Medians		
		Coef.	t-stat	F-stat	Coef.	t-stat	F-stat
<i>VarComp</i>		0.343	14.57***		0.211	4.44***	
<i>Earnvol</i>		-0.068	-11.18***		-0.045	-4.11***	
<i>Factor</i>		-0.015	-7.51***		-0.011	-2.41**	
<i>Pre-Tax ROA</i>		0.045	3.67***		0.025	0.41	
<i>LogSize</i>		-0.001	-1.88*		0.002	0.61	
<i>R&amp;D</i>		-0.032	-0.98		-0.127	-0.82	
<i>Leverage</i>		0.028	6.33***		0.029	1.56	
<i>SalesGrth</i>		0.059	17.91***		0.050	3.34***	
<i>Multi</i>		-0.016	-6.91***		-0.039	-5.47***	
$\Delta WC$		0.017	8.93***		0.021	2.79***	
$\Delta NCO$		0.016	9.99***		0.020	2.32**	
$\Delta FIN$		0.017	9.30***		0.023	2.22**	
Industry Fixed-effects		Yes			Yes		
Year Fixed-effects		Yes			Yes		
n		69,301			6,119		
Adjusted R <sup>2</sup>		36.4%			25.2%		
Tests of Coefficient Equality							
$BTaxC \times HighVarComp =$				69.83***			4.42**
$BTaxC \times LowVarComp$							
$WW \times HighVarComp = WW$				5.06***			3.94*
$\times LowVarComp$							
$TaxEnf \times HighVarComp =$				400.22***			49.78***
$TaxEnf \times LowVarComp$							
$TaxRate \times HighVarComp =$				146.40***			52.94***
$TaxRate \times LowVarComp$							

\*, \*\*, \*\*\* Indicate significance at 10, 5, and 1 percent, respectively.

In all regressions, we assess statistical significance using standard errors adjusted for firm clustering for the full sample (Columns A and C) and industry clustering for the medians sample (Columns B and D). We use one-tailed tests when a sign is predicted.

All variables are as defined in Table 2, Panel A.

In sum, we provide evidence that three tax system characteristics—required book-tax conformity, worldwide versus territorial approach, and the perceived strength of tax enforcement—impact tax avoidance after controlling for the statutory corporate tax rate and for firm-specific factors identified in prior studies. Moreover, the degree to which tax system characteristics impact tax avoidance depends on the structure of management compensation contracts—specifically the extent to which management compensation comes from variable pay. We suggest that this occurs because bonus and equity compensation provides greater incentives for managers to avoid taxes regardless of the tax system characteristics in the home country.

## V. ROBUSTNESS TESTS

In this section, we report the results of a number of untabulated robustness tests of our main model estimated with the full sample. First, we re-estimate our tax avoidance variable using pre-tax earnings *unadjusted* for exceptional items in order to investigate whether the results are influenced by our decision to use pre-tax earnings *before* these exceptional items. We find that all results for our tax systems characteristics are robust.<sup>36</sup>

Second, to test whether associations between tax avoidance and the tax system characteristics are driven solely by multinational firms, we remove all firms with multinational operations (where *Multi* = 1) and estimate our models without the *Multi* variable. We find that the results for *BTaxC* and *TaxEnf* are robust, but the coefficient for *WW* is not significant at conventional levels. However, when we estimate the model with only the multinational firms in the sample, we find that the results for *WW* and *TaxEnf* are robust, but the coefficient on *BTaxC* becomes positive and significant, indicating that the negative relation between tax avoidance and *BTaxC* is driven by domestic-only firms. This suggests that firms without foreign operations have available fewer tax avoidance strategies that do not create book-tax differences and, thus, higher required book-tax conformity is a more effective deterrent to tax avoidance for firms with only domestic operations.

Prior studies examining cross-country differences in the properties of accounting earnings use an indicator variable approach to measure book-tax conformity (e.g., [Ali and Hwang 2000](#); [Hung 2001](#); [Leuz et al. 2003](#)) where the indicator variable is based on subjective assessments of each country's book-tax conformity level.<sup>37</sup> Therefore, as a robustness test, we replace our *BTaxC* variable with the indicator variable used in those studies and find that all of our inferences about the effects of book-tax conformity and the remaining tax system characteristics hold.

Finally, we consider the impact of firms reporting under International Financial Reporting Standards (IFRS) versus domestic accounting standards. We find that the results for all three of our tax system characteristics hold when we add an indicator variable for firm-years reported under IFRS to both Models (2) and (4).

## VI. CONCLUSIONS

This study examines whether tax system characteristics (i.e., required book-tax conformity, worldwide versus territorial approach, and perceived strength of tax enforcement) impact tax avoidance. We find that firms avoid more taxes, on average, when the home country has lower required book-tax conformity, a worldwide approach, and a lower perceived strength of tax enforcement. Moreover, the extent to which tax avoidance is associated with these tax system characteristics depends on the portion of management compensation that is from variable pay (i.e., bonuses, stocks, and stock options).

Our paper responds to proposals for tax reform in the U.S. and to calls for more research on the determinants of tax avoidance. Our results suggest that, in addition to firm-specific factors identified in prior research (i.e., performance, size, intangibles, debt financing, growth, and the presence of

<sup>36</sup> For all of our additional tests, we define results as "robust" when inferences drawn from coefficient sign and statistical significance (using  $p < 0.10$  or better) are the same as those drawn from coefficients reported in the main tables. We discuss all results that are not robust in the text.

<sup>37</sup> [Hung \(2001\)](#) constructs the book-tax conformity variable using five factors derived from international tax and accounting summaries: the existence of deferred taxes; whether additional accelerated depreciation is allowed; whether amortization periods depend on tax laws; whether lease capitalization depends on tax laws; and a subjective determination of the relation between book and tax income. These factors may be suggestive, but many other factors result in differences between accounting earnings and taxable income in countries with low required book-tax conformity, and their measure is very highly correlated with an indicator variable for common versus code law countries.

multinational operations), tax avoidance is driven by home-country tax system characteristics and the interaction between those characteristics and the structure of management compensation contracts.

Our paper has implications for tax policymakers in evaluating proposed tax reforms. First, our results provide evidence that supports proposals to decrease tax avoidance in the U.S. by increasing the strength of enforcement efforts. Second, proposals to increase required book-tax conformity may deter tax avoidance for domestic-only firms, but are likely to be less effective for multinational firms that have more opportunities to avoid taxes using strategies that do not create book-tax differences in the home country. Third, if the U.S. adopted a territorial approach, then tax avoidance is likely to increase, rather than decrease. Finally, the structure of management compensation contracts (specifically, the proportion of compensation that is variable) significantly impacts managers' tax avoidance responses to tax system characteristics.

We suggest two caveats regarding our results. First, using an indicator variable for the worldwide versus territorial tax system is a very simple test of differences across these two systems and we view our results as a first step in understanding the impact of this tax system characteristic on tax avoidance. We suggest that further research is needed in this area. Second, there is the potential for a mechanical relation between our tax avoidance measure and the statutory tax rate. Thus, we include the statutory tax rate as an important control variable, but we suggest this is an important area that should be addressed by future research.

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