Corporate Tax Avoidance and Managerial Incentives Generated by Shareholder Dividend Tax Policy

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This draft: October 06, 2013

Keywords: corporate tax avoidance, shareholder dividend tax, managerial incentives, agency costs, imputation, tax policy

JEL: G38, G32, G15 H26

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We thank Rosanne Altshuler (discussant), Razi Avram, Jenny Brown (discussant), James Chyz (discussant), Alex Edwards, Ian Gow, Trevor Harris, Paul Healy, Shane Heitzman, Justin Hopkins, Glenn Hubbard, Martin Jacob, Dimitra Koutsantoni, Marc Lipson, Pete Lisowsky, Elena Loutskina, Chris Mayer, Per Olsson, Tatiana Sandino, Cathy Schrand, Eugene Soltes, Jake Thornock, Jaron Wilde (discussant), Daniel Wolfenzon and Jerry Zimmerman for helpful discussions and comments. We appreciate the comments received from conference participants at the UNC Tax Symposium, Ben Gurion University, Harvard University, the University of Rochester, Tsinghua University, the American Accounting Association Annual Meeting, the American Taxation Association Mid-Year Meeting, the CAAA Annual Conference and the European Accounting Association Annual Congress. We gratefully acknowledge the financial support provided by the University of Virginia Darden School Foundation.

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Abstract

We exploit exogenous changes in a country's shareholder dividend tax policy to examine managerial incentives for corporate tax avoidance. Specifically, we examine changes in corporate tax avoidance after the elimination, as well as enhancement, of imputation systems using a difference-in-difference design. Under full imputation systems, corporate tax avoidance reduces after-tax cash flows available to shareholders, while still increasing cash in the corporate coffers. Therefore, corporate tax avoidance does not provide shareholder benefits under full imputation systems, but does provide managers, who engage in corporate tax avoidance, larger cash holdings to exploit for their own private benefits. We find that corporate tax avoidance significantly increases (decreases) after an exogenous elimination (enhancement) of an imputation system. These results are consistent with managers engaging in corporate tax avoidance to benefit shareholders, not themselves. Consistent with this conclusion, we also find in cross-sectional tests that closely-held firms in countries where shareholder benefits exist (do not exist) engage in more (less) corporate tax avoidance. Our findings have implications for our understanding of why managers engage in corporate tax avoidance and the debates over tax reform in various countries around the world.

Corporate Tax Avoidance and the Managerial Incentives Generated by Shareholder Dividend Tax Policy

1. Introduction

Accusations of corporate tax avoidance have thrust many reputable companies onto the front page and before government hearings. Whether it is Apple Inc. in the United States, Starbucks Corp. in the United Kingdom or all multinationals at the G8 summit, commentators in the press, public interest groups and politicians vilify corporations that appear to proactively lower their tax liabilities. The discussions addressing the reduction of corporate tax avoidance center on enhancing transparency, raising penalties, expanding monitoring and closing "loopholes". Yet bettering corporations' tax compliance through increased enforcement ignores the incentives that the corporate decision makers face. The corporate tax strategies that generate this public unrest are delegated by the shareholders to managers, who have their own private interests in addition to those of their shareholders. Therefore, understanding managerial incentives is central to understanding corporate tax avoidance. This study exploits a unique setting exogenous to the firm to examine why managers avoid corporate taxes.

Influenced by research on individual tax evasion, early studies on corporate tax avoidance assume that the manager and the shareholder are the same decision maker who will engage in corporate tax avoidance when the tax savings outweigh the costs of tax avoidance such as fees, expected probability of detection and penalties. While this assumption may be true for small businesses, the corporate tax avoidance that generates much of the public unrest is concentrated among larger, more widely-held corporations where principal-agent conflicts exist (Crocker and Slemrod, 2005). Like other agency conflicts, the agent possesses private

information about the aggressiveness of the corporation's tax positions and can also engage in risky tax strategies where shareholders will bear the costs if detected. Therefore, managers may not engage in corporate tax avoidance for the shareholders' benefit but for their own benefits. The poster child for the agency costs related to corporate tax avoidance is Enron. Enron management engaged in aggressive tax strategies that helped build an empire, which provided them with extensive perks, until those strategies unraveled and helped destroy the company.

This corporate anecdote, as well as many others documented in government hearings in the U.S. and abroad (e.g. WorldCom, Dynegy), show that managers engage in tax avoidance not only for their shareholders' benefits but also for their own. Those events have also generated new research exploring the private benefits that corporate tax avoidance provides management. Chen and Chu (2002) conclude shareholders' lose the ability to control managers' efforts because the lack of transparency, which is needed to avoid detection by government authorities, also weakens firms' internal controls and allows self-serving abuses of power by managers.[1] Consistent with opportunistic managers engaging in corporate tax avoidance, Kim, Li, and Zhang (2010) posit that managers engage in corporate tax avoidance to obfuscate bad news, which leads to greater risk of stock price crashes, and find evidence consistent with their hypothesis. Desai and Dharamapala (2006) also argue that synergies between managers' efforts to divert rents for private benefits and corporate tax avoidance can lead managers to engage in more corporate tax avoidance. Consistent with private benefits incentivizing corporate tax avoidance, they find that U.S. managers, who receive less equity compensation, engage in more corporate tax avoidance on average and that this relation is affected by firms' corporate governance.

[1] Frank, Lynch and Rego (2009) and Frank, Lynch, Rego and Zhang (2013) provide evidence consistent with aggressive corporate tax avoidance being associated with earnings management.

However, additional research examining the relation between equity compensation and corporate tax avoidance for U.S. firms finds conflicting results (Hanlon, Mills and Slemrod, 2005; Armstrong, Blouin and Larcker, 2012; Rego and Wilson, 2012). For example, Rego and Wilson (2012) hypothesize and find that higher equity risk incentives motivate managers to engage in aggressive tax strategies for the benefit of shareholders. The contrasting results across these studies could arise because corporate tax avoidance, equity compensation, and governance are firm-level decisions which are endogenously determined. In this study, we exploit exogenous changes in countries' shareholder dividend tax policy, which occurred over different years with opposite effects on managerial incentives for corporate tax avoidance, through difference-in-difference analyses. This research design provides identification of shifts in shareholders' benefits from corporate tax avoidance while holding constant other reasons such as managers' private benefits.

Firms in the United States, such as the ones examined in the prior literature, are subject to a classical tax system. Corporate earnings are taxed at the firm level and then again at the shareholder level when they are distributed as a dividend (i.e., double taxation). Therefore, costly tax planning, which saves corporate taxes, increases after-tax cash flows to the corporation and shareholders. Other countries around the world employ an imputation tax system. In contrast to a classical system, an imputation system imposes taxes on corporate earnings at the firm level, but these corporate taxes paid are credited against the shareholders' taxes when earnings are distributed as dividends. This credit causes the total tax paid on earnings to be equal to the

shareholders' tax (i.e., single taxation), so costly tax planning increases after-tax corporate cash flows but decreases the after-tax cash flows to shareholders.[2, 3]

The difference between the effects of corporate tax avoidance on shareholders' after-tax cash flows in imputation countries as compared to classical countries creates a unique setting to examine why managers engage in corporate tax avoidance. For managers of firms residing in countries with classical systems, shareholder benefits from corporate tax avoidance exist while those same benefits do not exist for firms in countries with imputation systems. Therefore if managers engage in corporate tax avoidance primarily to benefit shareholders, less tax avoidance should exist in imputation countries and corporate tax avoidance should increase for firms residing in countries that switch from an imputation to a classical tax system.[4,5]

We use a sample of 52,895 firm-year observations from 1994 through 2008 across 28 OECD countries to examine the effect of countries' shareholder dividend tax policies on corporate tax avoidance. To minimize the effect of confounding variables, our primary analyses use difference-in-difference estimations to examine the effects of changes in countries' imputation systems on corporate tax avoidance. As predicted, we find that in the years after a country eliminates its imputation system, firms from these countries increase their corporate tax avoidance activities relative to firms from countries that did not change their shareholder dividend tax policy. We extend this analysis by examining the differential impact of the

[2] Corporate tax avoidance is costly; therefore, it reduces the after-tax cash flows to shareholders under an imputation system making them worse off. Costs of tax avoidance include, but are not limited to, advisors fees, the incorporation and maintenance of offshore subsidiaries, operational changes and the risk of reputation loss.
[3] Appendix A provides a stylized numerical example of the after-tax cash flows available to shareholders and managers from corporate tax avoidance under the classical and imputation regimes.
[4] This prediction assumes that the firms' ability to align managers with shareholders through incentives is constant across countries.
[5] We note that some corporate tax avoidance may still arise under imputation systems due to incentives such as the desire to boost earnings per share or to reduce ETR. However, our predictions are with regards to amount of tax avoidance in an imputation system relative to classical systems. Both systems have earnings related incentives for tax avoidance, but only the classical system has incentives for tax avoidance for the cash flow benefit to shareholders.

elimination of the imputation systems on firms, based on dividend payout and multinational operations and find results consistent with shareholder benefits driving corporate tax avoidance. In addition, we find evidence of a decrease in corporate tax avoidance for firms from Australia as compared to other countries beginning in 2003, following an exogenous increase in the availability of imputation credits in Australia. Our results are robust to the use of different common measures of corporate tax avoidance and the inclusion of controls shown to affect corporate tax avoidance in an international setting.

Results from sensitivity tests using pooled, cross-sectional analyses confirm that corporate tax avoidance for firms from countries with full imputation systems is lower than for firms from partial imputation systems; both are lower than firms from non-imputation systems. Moreover, within classical countries, corporate tax avoidance is higher for firms with a greater percentage of closely-held shares, while firms with more closely-held shares from imputation countries exhibit less corporate tax avoidance. These results suggest that firm characteristics that create stronger alignment between managers and shareholders accentuate managers' efforts to engage in corporate tax avoidance that benefits shareholders. In classical countries, corporate tax avoidance increases as alignment increases and in imputation countries corporate tax avoidance decreases as alignment increases.

The main contribution of this study is that our findings provide compelling evidence that managers engage in corporate tax avoidance primarily to benefit shareholders as opposed to other incentives such as private benefits. While recent studies and anecdotal cases in the press highlight the managerial incentives that private benefits provide to avoid corporate taxes, we conclude that the primary incentive for corporate tax avoidance in the developed world is shareholder benefits. Examining country-level policy shifts on firm-level tax avoidance provides

our study with the unique ability to identify the shareholder benefits from corporate tax avoidance. The results contribute to the current debate on corporate tax avoidance in the media, policy circles and the academic literature and suggest that a key aspect of reducing corporate tax avoidance could be to examine the government policy that originates the shareholder benefits: double taxation.

This study makes further contribution by connecting two streams of literature on corporate tax avoidance. The literature, which considers corporate tax avoidance under a principal-agent framework, focuses exclusively on firms from one country and ignores the variation in managerial incentives around the world. On the other hand, Atwood, Drake, Myers and Myers (2012) examine the effect of four country-specific tax system characteristics (worldwide system, corporate statutory tax rates, enforcement and book-tax conformity) on corporate tax avoidance, but ignore the agency framework inherent in corporate decision making. Thus, they ignore the effect of shareholder dividend policy on shareholder benefits from corporate tax avoidance and implicitly assume that the benefits are constant across countries.[6]

Finally, this study sheds light on potential unintended consequences of the European Union's effort to harmonize the tax consequences of its residents. In 2004 and 2005, the European Court of Justice (ECJ) ruled that several imputation systems in place throughout Europe were discriminatory. That is, the countries' imputation systems favored their residents over non-residents. To avoid discrimination, many European countries began to eliminate their imputation systems, but at what cost? While the objective of the ECJ's ruling is well-intended, it

[6] These four tax system characteristics are included in current corporate tax reform proposals in the United States. In October 2011, House Ways and Means Committee Chairman, David Camp, proposed tax reforms, which include a reduction of the corporate tax rate and implementation of a territorial tax system, to increase the global competitiveness of U.S. businesses. The Business Roundtable and the National Foreign Trade Council, among others, welcomed the proposal. However, many groups, including Citizens for Tax Justice, labor unions and small business coalitions wrote letters urging the members of the Joint Select Committee of Deficit Reduction to oppose a move to a territorial system because it favors multinationals, which generally already enjoy lower corporate effective tax rates due to their overseas operations.

may have unknowingly increased corporate tax avoidance in Europe. Our evidence speaks to concerns over the ECJ's attempts to harmonize tax policy, through its rulings at the expense of its member states, and the potential negative impact on members' tax revenues (Graetz and Warren, 2006).[7]

While the findings in this study have important policy implications, we offer several caveats. Our study speaks to one aspect of tax policy; however, tax policy is a complex issue in a global economy with many competing objectives. For example, Amiram and Frank (2013) show that imputation systems deter foreign equity portfolio investors. In addition, any declines in corporate tax avoidance under an imputation system may increase the shareholders' incentives to avoid personal taxes.

The remainder of this paper is organized as follows. Section 2 briefly discusses the different taxation of dividends around the world and develops our research design. Section 3 describes the data, sample selection, and descriptive statistics. Section 4 presents the results of our analyses. Section 5 concludes.

2. Background, predictions and research design

2.1 The debate over corporate tax avoidance

For the purpose of this study, we follow Dyreng et al. (2008) and define corporate tax avoidance as any corporate activity, legal or illegal, designed to reduce the corporate tax burden relative to the statutory rate. In a heavily cited and debated study, the Citizens for Tax Justice (CTJ) reports that 280 of the largest U.S. publicly-traded companies have an effective tax rate

[7] Our evidence also provides support for prior research that finds that imputation is associated with lower tax minimization in New Zealand (Wilkinson et al. 2001) and higher capital investment in Australia (Jugurnath et al. 2008). Whereas these prior studies have relatively small sample sizes (N < 310) and focus on one imputation country, our study uses an extensive sample of firms – both imputation and classical – in a uniquely international setting.

during 2009 - 2010 that is less than half of the U.S. corporate statutory tax rate.[8] The CTJ argues that the companies in their study are not paying their "fair share" of tax, stating that a quarter of the companies pay tax on less than 10% of profits and thirty companies pay no tax at all. The CTJ also advocates that "closing corporate tax loopholes will have real benefits, including a fairer system, reduced federal budget deficits, and more resources to improve roads and schools – things that are really important for economic development here in the United States."[9]

While corporate tax avoidance has social costs and is met with negative press and government scrutiny, not engaging in tax avoidance potentially reduces the after-tax cash flows to the U.S. firm's shareholders.[10] With international tax competition increasing as countries lower their corporate tax rates to attract mobile capital (Avi-Yonah 2000), some stakeholders in the debate argue that managers of U.S. firms are incentivized, and even have the fiduciary duty, to avoid taxes if it increases their shareholders' value.[11,12] However, there is no consensus in the empirical research that managers of U.S. firms engage in corporate tax avoidance because it benefits shareholders.

In an imputation system, costly tax avoidance reduces the after-tax cash flows available to shareholders. Thus comparing corporate tax avoidance across country-level, shareholder dividend tax policies creates a unique setting to determine if shareholder benefits motivate managers to engage in corporate tax avoidance. If managers engage in corporate tax avoidance

[8] "Corporate Taxpayers & Corporate Tax Dodgers 2008-2010" by R. McIntyre, M. Gardner, R. Wilkins, and R. Phillips, published in November 2011 by the Citizens for Tax Justice and the Institute for Taxation and Economic Policy.
[9] "Biggest Public Firms Paid Little in U.S. Tax Study Says" by D. Kocieniewski published in *The New York Times* on November 3, 2011.
[10] Other examples include a story aired March 27, 2011 on 60 Minutes entitled "The New Tax Havens" and a story on ABC World News aired October 21, 2010 building on an article entitled "Google 2.4% Rate Shows How $60 Billion Lost to Tax Loopholes" by Jesse Drucker published by Bloomberg.
[11] "U.S. Corporations Suffer High Effective Tax Rates by International Standards" by P. Dittmer and published by the Tax Foundation on September 2011.
[12] "Who Could Blame G.E.?" by Joe Nocera in the New York Times on April 4, 2011.

for the benefit of shareholders, we expect to see lower corporate tax avoidance by firms in imputation countries.

2.2 The taxation of dividends

Each country's tax system comprises different policies that affect taxpayer behavior and government revenue. This study focuses on the policy applicable to the taxation of corporate income paid from a corporation to its shareholders through dividends. The taxation of corporate income can be split into two major categories: classical and imputation. These major categories lead to very different incentives for managers to engage in corporate tax avoidance. The United States and many other countries have some version of a "classical" tax system for corporate income. A classical system imposes tax on income at the corporate level and then again at the shareholder level on the dividend distributed. This tax system results in economic double taxation: different taxpayers are taxed on the same income.

In a classical tax system, a dollar saved through corporate tax avoidance reduces the overall tax burden, increases the after-tax cash flows to shareholders and gives managers an incentive to avoid taxes on the shareholders' behalf. Modified classical systems, which have preferential shareholder tax rates on dividends relative to interest, provide managers with the same incentive for corporate tax avoidance.[13] While the shareholder-level tax burden is reduced by the preferential tax rate, the corporate-level tax burden is not, and a dollar saved through corporate tax avoidance still reduces the overall tax burden and increases after-tax cash flow to shareholders. Another tax system, an inclusion system, also lowers shareholder-level taxes but not corporate-level taxes. Rather than having preferential shareholder tax rates for dividends like the modified classical system, shareholders receive a preferential tax base in an inclusion system because only a portion of the dividend is included in their taxable income. As a result, inclusion

[13] The United States has a modified classical system.

systems, modified classical and classical tax systems, incentivize managers to engage in corporate tax avoidance in order to return more after-tax cash to their shareholders. For the remainder of the study we refer to all of these tax systems as classical systems unless otherwise noted.

Other countries impose only a single layer of taxation on corporate income through an imputation system, also known as an integrated system. An imputation system imposes a tax on corporate income, but the shareholder receives credits for the taxes paid by the corporation such that the shareholder pays only the difference between the corporate tax rate and the shareholder's tax rate on dividends. As a result, the overall tax burden on dividends in an imputation system is equivalent to the shareholder's tax burden and corporate tax avoidance simply shifts the tax payments from the corporation to the shareholder.[14] Moreover, corporate tax avoidance is costly, so under an imputation system corporate tax avoidance makes shareholders worse off relative to no tax avoidance. Australia, Chile, Mexico, and New Zealand have a full imputation system where a tax credit is given to shareholders for the full corporate tax. Canada, the United Kingdom and South Korea have partial imputation systems where shareholders receive a tax credit for only a portion of the corporate tax. The United Kingdom is the only member of the EU that has maintained some form of an imputation system. France, Germany, Spain, Italy, Ireland and Finland have all had imputation systems at one time, but between 1999 and 2007 they eliminated their imputation systems.[15]

[14] For a more detailed example, see the illustration in the section 2.3.

[15] In most cases the treatment of capital gains is very similar across the countries in our sample and has not been subject to significant changes during our sample years (Amiram and Frank, 2013). This observation, together with our difference-in-differences research design, mitigates possible confounding effects of any capital gains taxes, including share repurchase decisions in our setting. The capital gains rates of the countries, which changed their imputation systems, did not change.

2.3 An illustration of the taxation of dividends

To demonstrate the incentives for corporate tax avoidance under classical and imputation systems of taxation, we develop the following example. A corresponding numerical illustration of this example can be found in Appendix A. Assume that two identical "all equity" firms exist in two different countries. One operates under a classical system (Firm C) and one operates under an imputation system (Firm I).[16] Both countries have a corporate tax rate of 30% and the shareholders of the firm in each country face a dividend tax rate of 50%. We also assume that each firm earns $100 in taxable income annually, pays all taxes in cash and distributes any remaining after-tax income as cash dividends.[17]

2.3.1 Scenario 1: Without corporate tax avoidance

In our first scenario, we assume that firms cannot engage in tax avoidance. Both firms earn $100 of taxable income and pay $30 in corporate taxes. Thus each firm distributes a $70 cash dividend to their respective shareholders. In the country with a classical system, Shareholder C pays $35 in individual taxes on that $70 dividend. In total, the government with the classical system receives $65 in taxes ($30 corporate, $35 individual) and Shareholder C receives $35 after all taxes are paid. In the country with an imputation system, Shareholder I receives the same $70 cash dividend but pays a different amount of individual taxes. First, Shareholder I's taxes are determined based on Firm I's taxable income (i.e. the entire $100 of taxable income). In other words, Shareholder I pays tax on the dividend, which is "grossed-up" to account for the corporate taxes. The tax owed on the grossed-up dividend is $50 ($100*50%) before any imputation credits. Second, Shareholder I receives imputation credits equal to the

[16] Alternatively, assume that a firm operates in a country with an imputation system and then exogenously the country shifts to a classical system. This scenario is consistent with the strategy we implement in our empirical analysis.

[17] As we will demonstrate, most of the assumptions in this paragraph are only to make the calculations tractable. Alternative assumptions do not change the spirit of this illustration.

corporate taxes paid ($30) which reduces Shareholder I's tax burden from $50 to $20. In total, the government with the imputation system receives only $50 in taxes ($30 corporate, $20 individual), which is equivalent to the shareholder tax burden and Shareholder I receives $50 after-taxes. In the absence of corporate tax avoidance, Shareholder I receives more after-tax cash than Shareholder C because the imputation system avoids the double-taxation penalty of a classical system.

2.3.2 Scenario 2: With corporate tax avoidance

We assume that managers from Firm C and Firm I choose to engage in corporate tax avoidance that costs $10 and generates a non-cash deduction of $90 for tax purposes. At the corporate-level, Firm C and Firm I continue to be identical. Each firm still earns $100, but now spends $10 to engage in corporate tax avoidance. The $10 is deductible and yields an additional $90 deduction for tax purposes with no additional cash outflow. Therefore, taxable income is zero for both firms ($100-$10-$90), but after-tax cash flow is $90 to each firm.[18] Under the classical system, Shareholder C receives a cash dividend of $90 and pays taxes of $45. Under the imputation system, Shareholder I also receives a $90 cash dividend and pays the same $45 in taxes as Shareholder C. The dividend gross-up is not used and the imputation credit is not available to Shareholder I because Firm I did not pay any corporate taxes. In this tax avoidance scenario, both firms reduce the corporate tax rate from 30% to 0% and report higher after-tax cash flow but only Shareholder C is better off relative to Scenario 1 ($45- 35 = $10); Shareholder I is worse off ($45-50 = -$5). If the managers of Firm I are strongly aligned with Shareholder I's interests, they will not engage in the corporate tax avoidance. Conversely, the

[18] For ease of illustration, we assume zero taxable income, which best captures the spirit of imputation systems to treat corporate income as if it been earned directly by the shareholder. Corporations can have zero taxable income and a non-zero balance of tax "retained earnings", thus allowing for our illustrated result. However, even with a rare zero balance of tax "retained earnings", and thus a liquidating dividend with alternative tax treatment, the net benefits (and tax planning incentives) would be higher under a classical system than an imputation system.

managers of Firm C have incentives to engage in corporate tax avoidance to benefit Shareholder C. Thus, firms in imputation countries have lower incentives for corporate tax avoidance than firms in classical countries.

2.4 Difference-in-difference

Based on the difference between country-level shareholder dividend tax policies, we predict that firms from countries with imputation systems have less corporate tax avoidance than firms from classical systems. To test this prediction, while controlling for confounding variables, we employ two difference-in-difference analyses as our primary research designs. First, we examine whether countries that eliminate their imputation systems have increased levels of corporate tax avoidance after the change relative to countries that do not change their shareholder dividend tax policies. We examine this prediction using equation (1):

$$TAX\_AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP_i + \gamma_2 * IMP\_POST_{it} + \gamma_{3\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it} \qquad (1)$$

where

$TAX\_AVOIDANCE_{it}$ is the amount of corporate tax avoidance. IMP_i equals one if a firm's country of residence has ever had an imputation system in any year of the sample, zero otherwise.[19] IMP_POST_{it} is our main variable of interest and an interaction variable that equals one in the years after a country eliminates its imputation system, zero otherwise. X_{it} represents a set of firm-year control variables, and ψ_i and ξ_t represent industry and year fixed-effects, respectively. We estimate equation (1) with year fixed-effects because countries in our sample eliminate imputation systems in different years. In this specification, the main effect for years after the elimination of the imputation system is redundant because of the year fixed-effects and

[19] If a country has a non-zero and non-missing imputation rate in our OECD data, then we consider that country to have ever had an imputation system and *IMP* equals one.

thus is omitted. We expect corporate tax avoidance to increase after countries eliminate their imputation systems ($\gamma_2 > 0$).

One concern with the difference-in-difference design in equation (1) is that it only captures increases in managerial incentives to avoid corporate taxes because it examines the elimination of imputation systems. However, a policy change that implements an imputation system may not reduce managerial incentives to avoid corporate taxes if managers have already made the investment in corporate tax avoidance, and the investment is more costly to unwind than keep in place. Therefore, we implement a second difference-in-difference design to test the effect of a reduction in managerial incentives to avoid corporate taxation by examining legislation enacted in Australia. During 2002, Australia passed legislation to simplify and enhance the availability of imputation credits in its current system for shareholders. The increased availability of the imputations credits potentially reduces managers' incentives for corporate tax avoidance in Australia after the change (i.e., 2003 and beyond) relative to firms in other countries. We examine this prediction using equation (2):

$$TAX\_AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP\_YR_{it} + \gamma_2 * AUS_i + \gamma_3 * AUS\_POST03_{it} + \gamma_{4\text{-}k} * X_{it} + \psi_i + \xi_t + \mu_{it} \quad (2)$$

where

IMP_YR_{it} equals one if the country of a firm in year t has an imputation system, and zero otherwise. We expect $\gamma_1 < 0$ if managers of firms incorporated in countries with imputation systems have less incentive to avoid corporate taxes. AUS_i equals one if a firm resides in Australia, and zero otherwise. Our variable of interest, AUS_POST03_{it} equals one for Australian firms in the period following the legislative action in 2002, and zero otherwise. We expect corporate tax avoidance to decrease in Australia beginning in 2003 after the enactment of the

Australian simplified imputation system ($\gamma_4 < 0$). Although we have one single time period partition in this model, to be consistent with equation (1) we simply include $POST03_t$ among the other year fixed-effects (ξ_t). All the remaining variables are as defined in equation (1).

3. Data and Sample

3.1 Data sources

To construct the tax-related variables in our empirical models, we require data on three tax policies of each country: the shareholder dividend tax policy, the corporate statutory tax rate and the imputation rate. We obtain these data from the OECD and, when necessary, hand collection. The system for corporate taxation includes categories such as classical, full and partial imputation, inclusion, etc. The remainder of our independent variables are constructed from data available in the Thompson Reuters *Datastream Advance Database* (*Datastream)*. Finally, for brevity we provide Appendices B and C to summarize the details and individual sources of data needed to construct our variables.

3.2 Sample

We begin by collecting data available from *Datastream*. We rely primarily on accounting data from *Worldscope* (WC), although market-level data is available through *Datastream*. We restrict our selection to securities that contain primary quotes, but we allow for all major security types, equity instruments and American or Global Depository Receipts. Next, we eliminate observations that have missing fiscal year-end dates (WC05350) and thus missing accounting data. Further, we restrict our sample to the fiscal years 1993 through 2008. These criteria result in 479,376 firm-year observations.

Following a match of our country-level tax data from the OECD to our *Datastream* sample of firm-years, we have 362,930 observations remaining. After eliminating observations where *CSTR* or the type of tax system is missing, we have 336,816 observations. Finally, in order to use a consistent sample across our empirical tests, we eliminate observations with missing values in any of our variables or with missing industry values. Because we require one-year lag values of total assets to scale our continuous variables, the year 1993 is effectively removed from our dataset. Our final sample includes 52,895 firm-year observations from 1994 through 2008.[20] We attempt to minimize the undue influence of outlier observations by winsorizing all continuous variables in the 1st and 99th percentiles of their respective distribution.

3.3 Measures of Tax Avoidance

We use four measures of corporate tax avoidance (*TAX_AVOIDANCE)* based on variations of *Cash ETR* from Dyreng et al. (2008). *Cash ETRs* are less sensitive to home-country financial accounting standards than other tax avoidance measures such as effective tax rates or book-tax differences reported in the financial statements. In our main analyses, we use measures of annual *Cash ETR*, instead of the long run measures recommended by Dyreng at al. (2008) because of data restrictions that substantially reduce the size of the sample. In sensitivity tests, we examine the effects of other corporate tax avoidance measures.[21] Finally, we winsorize the *Cash ETR* measures before we calculate our spreads and ratios discussed below.

The first variable, *SPREAD_INC*, subtracts a firm's annual *Cash ETR* from the corporate statutory tax rate (*CSTR*) of the country in which it resides. In this specification, *Cash ETR*

[20] Not all countries require that taxes paid be reported on the cash flow statement, leading to missing values for the *Cash ETR* measure and the potential for self-selection issues. However, as we identify subsequently in our robustness checks, we obtain similar inferences from our models if we use a more readily available dependent variable like *ETR* rather than *Cash ETR*.

[21] Although long-run *Cash ETR* is a measure of corporate tax avoidance that contains less measurement error than annual *Cash ETR*, our difference-in-difference design investigating changes in shareholder dividend tax policy precludes the use of long-run *Cash ETR*. Annual *Cash ETR*, however, is suitable in this context. Our use of annual *Cash ETR* in a changes specification is consistent with Dyreng et al. (2010).

equals cash taxes paid divided by pre-tax income adjusted for special items. The second variable, *SPREAD_CF*, also subtracts a firm's annual *Cash ETR* from the *CSTR* of the country in which it resides. However in *SPREAD_CF*, *Cash ETR* equals cash taxes paid divided by net operating cash flows with cash taxes paid added back. Therefore, the first set of tax constructs, *SPREAD_INC* and *SPREAD_CF*, represent the spread between what a benchmark firm would pay in tax in its resident country and what a firm actually pays in tax. We interpret that larger spreads imply *more* corporate tax avoidance relative to the corporate statutory tax rate benchmark.

As an alternative to tax spreads, the second set of measures consists of tax ratios. *RATIO_INC (RATIO_CF)* divides *Cash ETR*, calculated with income (cash flows) in the denominator, by *CSTR*. We interpret that larger ratios imply *less* corporate tax avoidance relative to the corporate statutory tax rate benchmark. We adjust all of these measures for the firm's respective corporate statutory tax rate because countries that implement imputation systems could have lower corporate statutory tax rates and thus less incentive to avoid corporate taxes driven simply by the tax rate. Thus, our dependent variables implicitly control for this country-level characteristic and are algebraically similar to Atwood et al. (2012).[22]

3.4 Definition of Control Variables

Consistent with prior studies in the tax avoidance literature (e.g. Gupta and Newberry, 1997; Mills et al., 1998; Rego, 2003; Dyreng et al,. 2008; Frank, Lynch and Rego, 2009; Wilson, 2009; Chen et al., 2010), we include an extensive list of additional variables in our models to control for other factors that are associated with various types of tax avoidance. *ROA* is measured using pre-tax income and captures the profitability of firms while *LEV* represents financial

[22] Our *SPREAD* measures are algebraically identical to the proxy used in Atwood et al. (2012), at the annual level. Our exposition differs in that we illustrate each individual element as a tax rate.

leverage. Profitable firms and firms with greater leverage or complex financing arrangements have greater incentives and opportunities, respectively, to avoid taxes. However, Graham and Tucker (2006) find that leverage is negatively related to tax shelters suggesting that certain corporate tax avoidance activities and leverage are substitutes.

The natural log of total assets (*SIZE*) controls for the influence of firm size while *FOROPS* captures the presence of operations in foreign jurisdictions. Book-market ratio (*BM*) controls for a firm's growth opportunities. Although larger firms can have greater incentives to tax plan (Rego, 2003), they can face higher political costs also (Zimmerman, 1983), and thus we do not predict a direction of association between *TAX_AVOIDANCE* and *SIZE*. Firms taking advantage of foreign tax rate differentials in the locations of their foreign operations (*FOROPS*) as well as those firms with stable growth (i.e. higher *BM*) should avoid more tax on average.

Firms that perform poorly have fewer financial resources to allocate to their various functions, often because their primary concern is to remain in business. Such firms will likely allocate fewer resources to their tax function and have a rate closer to the prevailing statutory tax rate while they attempt to return the business to profitability. Consistent with Bauer (2013), we control for consecutive accounting losses (*AGGR_LOSS*) and constrained operating cash flow resources (*COCF*).[23]

We include *INTANG* and *R&D* to control for intangible asset and R&D intensity. We would expect that the more intensely a firm's business model is driven by intangible assets, which are easier to shift to low tax rate jurisdictions, the higher the level of tax avoidance. *R&D* and *PPE* are also expected to lead to lower taxes relative to the statutory tax rate benchmark and create a positive relation for *SPREAD_INC* and *SPREAD_CF* (a negative relation for

[23] Tax loss carryovers represent an additional control that would be appropriate in this setting. Tax losses can be used to reduce tax payments in subsequently profitable periods. However, such data is not separately identifiable in *Datastream*.

RATIO_INC and *RATIO_CF*) because these assets generate large tax deductions which decrease the tax base in OECD countries. Finally, we control for financial reporting aggressiveness and include the performance-adjusted discretionary accruals variable *DAP* in our models. Frank et al. (2009) show that financial reporting aggressiveness and tax aggressiveness are positively related, thus we expect *DAP* to be positively associated with tax avoidance. We provide more details on variable construction in Appendices B and C.

3.5 Descriptive statistics

Table 1 presents the various countries in our dataset. Twelve countries have an imputation system during our sample. Australia, Canada, Chile, New Zealand and the United Kingdom have imputation systems throughout the sample period. Finland, France, Germany, Italy, Norway and Spain eliminated their imputation system during our sample period.[24] The countries with imputation systems comprise 14,389 firm-year observations or 27% of the sample.[25]

Table 2, Panels A and B provide descriptive statistics for our sample of firm-years. As a reference, Panel A reports statistics for the entire sample. Panel B compares the mean and median values of our dependent and independent variables across imputation and non-imputation countries. For all four of our dependent variables, the differences in mean and median values are significant at the 1% level. Firms in non-imputation countries have a mean (median) *SPREAD_INC* value of 0.031 (0.087) while firms in imputation countries have a mean (median) *SPREAD_INC* value of 0.016 (0.062). Likewise, mean (median) *SPREAD_CF* values are higher

[24] Although South Korea and Mexico implement an imputation system during our sample period, the firm-year observations are from the period prior to imputation or are too infrequent to adequately analyze. Both countries are thus labeled as having a classical system. Our subsequent empirical results are unaffected if these countries are excluded from the analysis or labeled as imputation countries.

[25] Table 1 reveals that certain countries are more strongly represented in our sample compared to others. As we report in section 4, choosing 50 observations randomly from each country and repeating our analysis using the randomly selected observations yields similar inferences.

in non-imputation countries, 0.135 (0.187), than imputation countries, 0.085 (0.128). Higher spreads in non-imputation countries are consistent with higher tax avoidance in those countries. When we examine the ratios, we find the mean (median) *RATIO_INC* of 0.922 (0.768) in non-imputation countries is lower than the mean (median) *RATIO_INC* of 0.957 (0.796) in imputation countries. The differences in the mean and median values of *RATIO_CF* are also significantly lower. Consistent with the conclusions from the spreads, lower ratios in non-imputation countries also suggest higher corporate tax avoidance in those countries.

Reviewing the independent variables in Panel B of Table 2, we see significant variation in most of the mean and median values. Mean *ROA* and *LEV* values are lower in non-imputation countries, suggesting less profitability and leverage on average in these countries. Firms tend to be larger in non-imputation countries; however, there is no difference in the presence of foreign operations (*FOROPS*) across shareholder dividend tax systems. Non-imputation countries also have more stable growth, but resources (*AGGR_LOSS* and *COCF*) appear to be more constrained in non-imputation countries. Imputation countries appear to use intangible assets and capital assets more intensely than non-imputation countries, but the opposite is true of *R&D*.[26] *FOROPS* and *DAP* are not significantly different across the two tax systems. The significant differences in most of these independent variables support the importance of controlling for these factors in our empirical models.

[26] The difference in intangible assets could also be driven by differences in financial accounting standards across countries.

4. Results

4.1 Corporate tax avoidance following the elimination of an imputation system

We take advantage of the presence of several countries that eliminated their imputation systems during our sample period in our first difference-in-difference analysis. We predict that firms, which are residents of countries that eliminated their imputation systems, will have more corporate tax avoidance after the elimination of the imputation system.[27]

Table 3 reports the results of the difference-in-difference estimation represented by equation (1). The table contains four columns for each measure of *TAX_AVOIDANCE* used as the dependent variable. In Models 1 and 2, when *SPREAD_INC* and *SPREAD_CF* are the dependent variables, the coefficients on *IMP* are negative and statistically significant at the 1% level as predicted in the cross-section. In Models 3 and 4, when *RATIO_INC* and *RATIO_CF* are the dependent variables, the coefficients on *IMP* are positive and statistically significant at the 1% level, as expected. These coefficients imply that the difference between the country's corporate statutory tax rate and the cash taxes paid by firms residing in that country is smaller on average when the firm resides in a country with an imputation system. Thus, firms, which are residents of countries with imputation systems, appear to avoid less tax than firms in countries without an imputation system, consistent with our predictions. More importantly for our research question, the coefficients on *IMP_POST* represent our key variable of interest in the difference-in-difference design. Across all four models, the coefficients are as predicted. More specifically, the coefficients on *IMP_POST* are positive and statistically significant in Models 1 and 2 and negative and statistically significant in Models 3 and 4 at 1% levels, as predicted.

[27] In sensitivity tests, we remove observations from Spain and Italy because these countries had a significant tax rate reduction after the elimination of the imputation system. Our results are robust to removing these observations.

Therefore, the evidence across the four models is consistent with corporate tax avoidance increasing in countries following the elimination of their imputation system.

Our results suggest that the average spread between a country's corporate statutory tax rate and the firm's tax rate is 2.8% to 5.8% lower in countries with imputations systems, depending on the dependent variable. For those countries that eliminate their imputation systems, the average spread increases 3.8% to 4.8%, completely eliminating the difference in corporate tax avoidance in the pre-elimination period. The significance of the combined coefficients on *IMP* and *IMP_POST* ($\gamma_1+\gamma_2 = 0$) is no longer significantly different from zero. Similarly, the average ratio is 7.2% to 10.1% higher for firms from imputation countries depending on the dependent variable, and the elimination of the imputation system removes the positive differential.

Table 3 shows that the coefficients for *SIZE, COCF, PPE, R&D* and *DAP* are statistically significant across Models 1 through 4 in the directions predicted. Therefore, we conclude that robust evidence exists that corporate tax avoidance is associated with larger firms with more capital and R&D intensity, lower cash flow constraints and larger discretionary accruals. The conclusions drawn from the coefficients on *ROA, LEV, AGGR_LOSS*, *BM, FOROPS* and *BM* depend on the model. The coefficients on *ROA, LEV, AGGR_LOSS*, and *BM* are in the predicted direction and statistically significant in Model 1 and 3 only, while the coefficient on *FOROPS* is in the predicted direction and statistically significant in Models 2 and 4 only. Given the difference in the dependent variables in Model 1 (Model 3) as compared to Model 2 (Model 4) is the denominator, we conclude that using net income versus cash flow from operations affects the interpretation of some of the firm-level independent variables but not the country-

level variables of interest. The coefficient on *INTANG* varies across all four models and is significant and in the predicted direction in Model 2 only.

4.1.1 Cross-sectional differences in corporate tax avoidance following the elimination of an imputation system

Our illustration in Section 2.3 demonstrates that the manager of a firm, which generates earnings domestically and pays them out currently as dividends, has more incentive to engage in corporate tax planning if the firm is located in a country with a classical system relative to an imputation system. We examine this prediction in Table 3 by examining the effect of the elimination of imputations systems on corporate tax avoidance. As an extension of this difference-in-differences analysis, we consider the effect of relaxing the assumptions of 100% dividend payout and 100% domestic earnings in our Section 2.3 illustration.

In these additional analyses, we assume that firms have optimal dividend payouts, multinational operations and corporate tax avoidance before countries eliminate their imputation systems. While the change from an imputation system to a classical system provides a shock to firms that could affect dividend payouts, multinational operations and corporate tax avoidance, we assume that changes in dividend payouts and multinational operations have higher costs that limit the responses to the change relative to corporate tax avoidance. For example, firms that reduce dividends in response to a country's move to a classical system have to address signalling costs, and firms that change operational locations have strategic, political and infrastructure costs.

First, we relax the 100% dividend payout assumption. In imputation countries, firms with high dividend payouts distribute more of their accumulated imputation credits to their shareholders compared to low dividend payout firms. Therefore, a shift from an imputation

system to a classical system creates more immediate incentives to avoid corporate taxes for high dividend payout firms. The more immediate incentives for high dividend payout firms arise because firms with low dividend payouts are more likely to have retained earnings associated with undistributed imputation credits after a shift to a classical system. Assuming countries that eliminate their imputation system provide transitional rules similar to Germany, low dividend payout firms will be able to use the undistributed imputation credits to mitigate the impact of double taxation resulting from the change to a classical system. The undistributed imputation credits reduce the immediate need for corporate tax avoidance relative to high dividend payout firms in countries that eliminate their imputation system.

To test this prediction, we split our sample into low and high dividend payout firms and estimate separate regressions of equation (1) on each subsample. Firms that do not pay dividends are considered to be low dividend payout firms while firms that pay any dividends are considered high dividend payout firms.[28] We expect that high dividend payout firms will have the most dramatic increase in tax avoidance after the elimination of the imputations system because they have fewer remaining imputation credits available to offset double taxation under the new classical system. For brevity, we present the results with respect to *SPREAD_INC* only.

As reported in the two leftmost columns of Table 4 (1 and 2), we find that high dividend payout firms in countries that eliminate an imputation system have higher levels of tax avoidance after the change. More specifically, the coefficient on *IMP_POST* is positive and statistically significant for high dividend payout firms. In our low dividend payout subsample, we do not find a statistically significant association between the change in tax system and corporate tax avoidance. Using a non-parametric Monte-Carlo simulation test of *IMP_POST* coefficients, we

[28] In untabulated sensitivity analysis, we examine a subsample of dividend paying firms only. We split this sample into firms with high and low payout and find quantitative inferences are consistent with those from the analysis presented.

find the difference across the subsamples is significant at the 1% level. Such findings are consistent with our expectations.

Second, our illustration in Section 2.3 demonstrates that the shareholder of a firm in an imputation country receives a higher after-tax dividend relative to a classical country. This analysis assumes that the operations of the firm earn income domestically. However as firms invest abroad for non-tax reasons, imputation and classical countries provide more equivalent incentives to tax plan because foreign corporate taxes do not generate imputation credits. Thus, a country with an imputation system for domestic earnings is in essence a classical system for foreign earnings. Therefore, the more a firm's earnings are foreign-sourced, the less impact a change from an imputation system to a classical system will have on the incentives for tax planning. To examine this prediction, we examine the association between corporate tax avoidance and the elimination of imputation systems for firms based on multinational operations.

Again, we split our sample into two respective groups and estimate separate regressions of equation (1) on each subsample. The first subsample consists of firms with no foreign assets. Firms that have any foreign assets are considered to be relatively more multinational.[29] For brevity, we present the results with respect to *SPREAD_INC* only.

In the two rightmost columns of Table 4 (3 and 4), our low and high multinational subsamples have a significant coefficient on *IMP_POST*. However, the coefficient for the domestic subsample (*Low MNC*) is significantly larger than the coefficient for the multinational subsample (*High MNC*) at the 5% level. We conclude that firms with domestic operations have the greatest increase of corporate tax avoidance after the elimination of the country's imputation system, consistent with expectations.

[29] In untabulated sensitivity analysis, we examine a subsample of firms that have positive foreign assets. We split the subsample into firms with high and low foreign assets and find quantitative inferences are consistent with those from the analysis presented.

4.2 Corporate tax avoidance following an increase in imputation benefits in Australia

Through equation (2) we implement the second difference-in-difference model to examine the implementation of enhanced imputation credits for Australian firms. We expect to see a decrease in tax avoidance for firms incorporated in Australia beginning in 2003 after a 2002 change in legislation, relative to firms from other countries during the same period. Table 5 reports the results. Of particular interest, *AUS_POST03* is negative (positive) and statistically significant in columns 1 and 2 (3 and 4), which is consistent with our prediction. Australian firms appear to have decreased the spread between the corporate statutory tax rate and the firm's tax rate beginning in 2003 following the legislative changes in 2002. This evidence suggests that implementing an imputation system could provide incentives to reduce corporate tax avoidance despite the prior use of tax planning structures. The negative (positive) coefficients in columns 1 and 2 (3 and 4) on *IMP_YR* are consistent with less tax avoidance by firms residing in imputation countries relative to classical countries.

4.3 Additional tests

4.3.1 Cross-sectional: Partial and full imputation systems

After establishing the difference-in-difference results, we test several cross-sectional predictions. Partial and full imputation systems reduce shareholder benefits from corporate tax avoidance to different degrees. Thus if managers' incentives are aligned with those of shareholders then tax avoidance should vary with the level of imputation credits. The higher the credits provided by the imputation system then the more corporate tax avoidance the imputation system will likely deter. We examine this prediction using equation (3):

$$TAX\_AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP\_PARTIAL_{it} + \gamma_2 * IMP\_FULL_{it} + \gamma_{3\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it} \quad (3)$$

where

$IMP\_PARTIAL_{it}$ and IMP_FULL_{it} equal one if a firm's country of residence has a partial or full imputation tax system, respectively, during the year, and zero otherwise. While we expect a negative relation between corporate tax avoidance and the presence of full and partial imputation systems, we expect the negative relation to be larger in the presence of a full imputation system relative to a partial imputation system. All the remaining variables are as defined in equation (1).

Table 6 presents the results of this estimation, including F-tests comparing the coefficients of the partial and full imputation tax systems. In Models 1 and 2 of Table 6, the coefficients on *IMP_PARTIAL* and *IMP_FULL* are negative and significant. Furthermore in Models 1 and 2, the *IMP_FULL* coefficients of -0.064 and -0.065 are larger than the respective *IMP_PARTIAL* coefficients of -0.019 and -0.055. However, only the F-test in Model 1 significantly rejects the null that the two coefficients are equal (Model 1: F-statistic 21.991, probability 0.000; Model 2: F-statistic 2.015, probability 0.156). Nevertheless, these tests provide some evidence that the higher the level of imputation within a country, the less tax firms avoid.

Models 3 and 4 of Table 6 provide similar evidence. The coefficients on *IMP_PARTIAL* and *IMP_FULL* are positive and statistically significant. Furthermore, like Models 1 and 2, the coefficients of *IMP_FULL* (0.178 and 0.115, respectively) are larger than the coefficients of *IMP_PARTIAL* (0.045 and 0.097, respectively) in Models 3 and 4. The F-statistic of 18.142 (probability 0.000) rejects the null for Model 3, but the F-statistic of 0.697 (probability 0.404) does not reject the null for Model 4. Overall, our expectations about the relation between tax avoidance and the type of imputation system are supported, regardless of whether the dependent measure is a spread or a ratio. This evidence also provides support that tax avoidance on average is lowest in full imputation countries.

4.3.2 Cross-sectional analysis: Closely-held shares

We also consider the differential effect that the proportion of closely-held shares of a firm has on corporate tax avoidance depending on the country's shareholder dividend tax policy. Firms that are closely-held by shareholders have more alignment between managers and shareholders; therefore, we expect that firms in imputation (classical) countries with a higher proportion of closely-held shares will have lower (higher) levels of tax avoidance. We consider firms that have an above-median proportion of closely-held shares to have relatively more alignment between managers and shareholders. *CLSHLD* is equal to one if firms have an above-median proportion of closely-held shares, 0 otherwise. *IMP_CLHD* is the interaction variable between *IMP_YR* and *CLSHLD*, which represents closely-held firms in imputation countries.

Table 7 presents evidence consistent with our expectations. The coefficients on *IMP_CLHD* are negative (positive) and significant at conventional levels in Models 1 and 2 (3 and 4) with our *SPREAD* (*RATIO*) measures. This evidence is consistent with closely-held firms that reside in imputation countries engaging in less tax avoidance than other firms in imputation countries. In contrast, the coefficients on *CLSHLD* are positive (negative) and significant at conventional levels in Models 1 and 2 (3 and 4) with our *SPREAD* (*RATIO*) measures. This evidence is consistent with closely-held firms that reside in classical countries engaging in more tax avoidance than other firms in classical countries. Combining these results, we conclude that stronger manager-shareholder alignment accentuates the corporate tax avoidance incentives created by a country's shareholder dividend policy.

4.3.3 Inclusion of additional control variables

Our models control for two country-level factors examined by Atwood et al. (2012) by estimating *DAP* at the year-industry-country level and by benchmarking our dependent variables

against country-level statutory tax rates. However, to examine the sensitivity of our results to additional country-level control variables that may influence our inferences, we include an extensive set of variables that are included in prior literature, specifically Atwood et al. (2012). We do not include these variables in our main tests because doing so significantly reduces the number of countries in our sample and thus reduces the generalizability of our results. We also include changes in corporate statutory tax rates (*CHG_CSTR*) as an additional control to further mitigate concerns regarding bias from changing tax rates during our sample period. As discussed below, inclusion of these variables does not change any of our inferences.

In addition to *CHG_CSTR*, the results in Table 8 include the variables *BTAXC* (country-level book-tax conformity), *WW* (worldwide tax system), *TAXENF* (tax enforcement index), *COMLAW* (common law legal system), *INVRIGHTS* (investor rights index), *OWNCON* (ownership concentration index), *POPGRT* (population growth) and *GDP* (index in constant $2005). While these variables are generally statistically significant and have the expected signs, our main variables of interest also remain statistically significant and have the expected signs. Specifically, Table 8 replicates the analysis of Table 3, and we continue to find that the interaction variable *IMP_POST* is associated with less tax avoidance. In summary, increasing the internal validity of our results relative to their external validity yields consistent evidence.

4.3.4 Effective tax rate (ETR)

Given our international setting, it is difficult to identify tax avoidance measures that can be consistently estimated across countries. One reason is that the financial statement data reported for our global sample in *Datastream* is not as readily available as it is for U.S. companies reported in *Compustat.* Therefore, the calculation of common measures of tax

avoidance, such as book-tax differences, requires several variables to be ignored in their estimation or the observations must be dropped from the analysis.

The data to calculate effective tax rates (*ETR*) is readily available, but the differences in accounting standards across countries create inconsistencies in reported tax expense, limiting the suitability of ETRs. However, to be complete we replicate our analyses in Table 3 using *ETR* in place of *Cash ETR*. In untabulated tests, we find that our results hold in general. The coefficients of -0.008 for *IMP* and 0.022 for *IMP_POST* are statistically significant (at the 5% level or above) with a *SPREAD* tax avoidance variable while the coefficient of -0.050 for *IMP_POST* is statistically significant (at the 5% level) when we use a *RATIO* variable.

4.3.5 Additional country-level influences

All of our empirical models include year and industry fixed effects, and the estimation of these models relies on standard errors clustered by firm. Our empirical models do not include country fixed effects. Inclusion of these fixed effects would subsume the influence of country-level imputation systems that we are interested in. Our imputation variables are generally static and resemble fixed effects by construction, except for the subset of countries that change their tax system. Estimation of a model that includes country-level fixed effects effectively removes the influence of countries with imputation systems that never change. Thus, cross-sectional imputation variables (*IMP_FULL*, etc.) become factors which capture only the influence of countries that change imputation systems when fixed effects are added. Consistent with our analysis in Section 4.3.1, untabulated analysis shows that positive and significant coefficients for *IMP_FULL* are estimated when country-level fixed effects are included in Models 1 and 2.[30] These coefficients reflect that firms in countries that eliminate their imputation systems avoid more tax on average than firms that do not change tax systems.

[30] Within our sample of firms that eliminate imputation, 95% of the firm-years exist under a full imputation system.

In addition, to mitigate concerns that our results stem from an imbalance between the numbers of observations within each country, we replicate our main findings with a randomly-selected set of 50 firms (at maximum) from each country. Our untabulated results are consistent with our results in Table 3. On average, firms from imputation countries demonstrate lower levels of tax avoidance but then demonstrate higher levels of tax avoidance following the elimination of imputation. For example, with *SPREAD_INC* (*RATIO_INC*) as the dependent variable, *IMP* is negative (positive) at the 5% (5%) level and *IMP_POST* is positive (negative) at the 1% (1%) level.

Finally, we conduct a sensitivity analysis to ensure that our difference-in-difference evidence is not the result of other unobserved changes during our sample period. We restrict our sample to firm-year observations that occur during the window from *t-2* to *t+2*, where *t* is either the year a country changes its imputation system or a randomly-determined year for countries that never change their tax system. Again, the untabulated results are consistent with our results from Table 3. For example, with *SPREAD_INC* as the dependent variable, *IMP* is negative and *IMP_POST* is positive (both significant at the 1% level).

5. Conclusions

This study adds to the debate and growing empirical research on managers' incentives to engage in corporate tax avoidance. Managers could engage in corporate tax avoidance to benefit shareholders or for reasons such as private benefits. We examine a unique setting that enables us to easily identify changes in shareholder benefits from corporate tax avoidance: a country's shareholder dividend tax policy. Consistent with shareholder benefits incentivizing managers to engage in corporate tax avoidance, our evidence suggests that firms in countries with imputation systems have lower tax avoidance than other firms and once they switch to a classical system

they experience an increase in corporate tax avoidance. This result is potentially an unintended consequence of the rulings made by the ECJ to encourage tax harmonization among its members. Our finding that corporate tax avoidance decreased in Australia following increases in the imputation credits available to shareholders implies that corporate tax avoidance could decrease as a result of the implementation of an imputation system. The differential in corporate tax avoidance between imputation and classical tax systems is accentuated in closely-held companies where the manager-shareholder alignment is stronger, supporting the conclusion that managers engage in corporate tax avoidance to benefit shareholders.

Our study is the first to provide evidence that shareholder dividend tax policy, which has been the focus of extensive research for its effects on firm value and investment, significantly relates to corporate-level tax planning. While the results suggest benefits to an imputation system and have important policy implications, more research is needed to consider the trade-offs with other consequences of implementing an imputation system. We leave for future research the potential effect of this reduction of corporate tax avoidance on firm value.

Appendix A
Imputation Tax Policy vs. Classical Tax Policy: Illustrative Examples

For purposes of the following illustrative examples, we assume that two identical "all equity" firms exist in two different countries. One operates under a classical system of dividend taxation and one operates under an imputation system of dividend taxation. Both countries have a corporate tax rate of 30% and the shareholder of each firm faces a dividend tax rate of 50%. Annually, each firm earns $100 in pre-tax income, pays all taxes in cash and fully distributes any after-tax income as dividends. In Panel A, we assume that neither firm engages in a tax avoidance/minimization strategy. In Panel B, we extend the example and assume that a tax minimization strategy exists that both firms purchase. A tax promoter will sell the strategy at a cost of $10 and the strategy will generate a tax deduction on pre-tax income of $90.

Panel A: The Baseline Case

Corporate Level		**Imputation**	**Classical**
Pre-tax corporate-level income (before tax planning)		100	100
Less: Tax planning cost		0	0
Pre-tax corporate-level income		100	100
Less: Company tax (see tax return)		30	30
After-tax income		***70***	***70***
Corporate Tax Return			
Pre-tax corporate-level income		100	100
Less: Tax deduction bought		0	0
Taxable income		100	100
Company tax	30%	***30***	***30***
Individual/Shareholder Level			
Dividend received by individual		70	70
Gross-up for corporate tax		30	-
Individual taxable income		100	70
Individual tax before credit	50%	50	35
Less: Imputation credit		30	-
Net shareholder-level tax		*20*	*35*
Total tax: corporate and shareholder		*50*	*65*
Net shareholder income after-tax		***50***	***35***
Comparison			
Corporate tax rate paid		30%	30%
Statutory rate		30%	30%
Corporate tax minimization		***0%***	***0%***

Appendix A – *continued*

Panel B: The Tax Minimization Strategy Case

Corporate Level		**Imputation**	**Classical**
Pre-tax corporate-level income (before tax planning)		100	100
Less: Tax planning cost		10	10
Pre-tax corporate-level income		90	90
Less: Company tax (see tax return)		0	0
After-tax income		***90***	***90***
Corporate Tax Return			
Pre-tax corporate-level income		90	90
Less: Tax deduction bought		90	90
Taxable income		0	0
Company tax	30%	***0***	***0***
Individual/Shareholder Level			
Dividend received by individual		90	90
Gross-up for corporate tax		0	-
Individual taxable income		90	90
Individual tax before credit	50%	45	45
Less: Imputation credit		0	-
Net shareholder-level tax		*45*	*45*
Total tax: corporate and shareholder		*45*	*45*
Net shareholder income after-tax		***45***	***45***
Comparison			
Corporate tax rate paid		0%	0%
Statutory rate		30%	30%
Corporate tax minimization		***30%***	***30%***
Net income available to shareholder: Baseline		*50*	*35*
Net income available to shareholder: Tax strategy		*45*	*45*
Net benefit to shareholder: tax strategy vs. no tax strategy		***-5***	***10***

Appendix B
Definition of Variables

Tax Avoidance	***Description and/or Data***	***Details and Source***
SPREAD_INC	$CSTR_{jt}$ - $CASH\_ETR\_INC_{ijt}$	Annual tax avoidance spread, calculated as the corporate statutory tax rate in country *j* less the annual income-based *Cash ETR* value for firm *i* in country *j.*
SPREAD_CF	$CSTR_{jt}$ - $CASH\_ETR\_CF_{ijt}$	Annual tax avoidance spread, calculated as the corporate statutory tax rate in country *j* less the annual cash flow-based *Cash ETR* value for firm *i* in country *j.*
RATIO_INC	$CASH\_ETR\_INC_{ijt}$ / $CSTR_{jt}$	Annual tax avoidance ratio, calculated as the annual income-based *Cash ETR* value for firm *i* in country *j* divided by the corporate statutory tax rate in country *j.*
RATIO_CF	$CASH\_ETR\_CF_{ijt}$ / $CSTR_{jt}$	Annual tax avoidance ratio, calculated as the annual cash flow-based *Cash ETR* value for firm *i* in country *j* divided by the corporate statutory tax rate in country *j.*
CASH_ETR_INC	$TXPD_{ijt}$ / ($PINC_{ijt}$ – $DOPSCF_{ijt}$ – $XITEMS_{ijt}$)	Annual *Cash ETR*, calculated as taxes paid (WC04150) divided by [pre-tax income (WC01401) less discontinued operations (WC04054) & extraordinary items (WC04225)]. Set to missing if denominator <= 0. Source: Datastream (DS) / Worldscope (WC)
CASH_ETR_CF	$TXPD_{ijt}$ / ($NCFO_{ijt}$ + $TXPD_{ijt}$)	Alternative annual *Cash ETR*, calculated as taxes paid divided by [net cash flow from operations (WC04860) plus taxes paid]. Set to missing if denominator <= 0. Source: Datastream (DS) / Worldscope (WC)
CSTR	Corporate statutory tax rate	Collected as reported by source. Source: OECD and hand collection
Tax System	***Description and/or Data***	***Details and Source***
IMP	Indicator variable for a country that has ever had an imputation system	Equal to 1 if country *j* has ever had an imputation system at any time during the sample period, 0 otherwise. Source: OECD and hand collection
IMP_POST	Indicator variable for c*ountries that eliminate imputation after elimination (i.e. acts like an interaction variable)*	Equal to 1 if year *t* is after or includes the year country *j* changes its imputation system, 0 otherwise. Source: OECD and hand collection
AUS	Indicator variable for Australia	Equal to 1 if country *j* is Australia, 0 otherwise. Source: OECD and hand collection
AUS_POST03	Indicator variable for Australian firms for the period after and including 2003 (i.e. acts like an interaction variable)	Equal to 1 if country *j* is Australia and year *t* is after or includes 2003, 0 otherwise. Source: OECD and hand collection
IMP_YR	Indicator variable for the presence of imputation	Equal to 1 if country *j* in year *t* has a non-zero imputation rate, 0 otherwise. Source: OECD and hand collection
IMP_PARTIAL	Indicator variable for the presence of partial imputation	Equal to 1 if country *j* in year *t* has a non-zero imputation rate and participates in partial imputation, 0 otherwise. Source: OECD and hand collection

IMP_FULL	Indicator variable for the presence of full imputation	Equal to 1 if country *j* in year *t* has a non-zero imputation rate and participates in full imputation, 0 otherwise. Source: OECD and hand collection
Control Variables	***Description and/or Data***	***Details and Source***
ROA	$(PINC_{ijt} - XITEMS_{ijt}) / TA_{ijt-1}$	Return on Assets, calculated as pre-tax income less extraordinary income divided by lagged assets (WC02999). Source: Datastream (DS) / Worldscope (WC)
LEV	LTD_{ijt} / TA_{ijt-1}	Leverage, calculated as long-term debt (WC03251) divided by lagged assets. Source: Datastream (DS) / Worldscope (WC)
SIZE	Natural log (TA_{ijt})	Firm size, calculated as the natural logarithm of total assets. Source: Datastream (DS) / Worldscope (WC)
FOROPS	Indicator variable for foreign operations	Equals 1 if foreign income (WC07126) is non-missing and non-zero, 0 if missing or zero. Source: Datastream (DS) / Worldscope (WC)
BM	$CEQ_{ijt-1} / MKTCAP_{ijt-1}$	Book-market ratio, calculated as opening common equity (WC03501) at *t* divided by opening market capitalization (WC08002) at *t*. Source: Datastream (DS) / Worldscope (WC)
AGGR_LOSS	Indicator variable for consecutive accounting losses	Equals 1 if the sum of earnings before extraordinary items and dividends (WC01551) at t and t-1 < 0, 0 otherwise. Source: Datastream (DS) / Worldscope (WC)
COCF	$1 - (NCFO_{ijt} / TA_{ijt-1})$	Cash flow constraint, calculated as 1 minus (net cash flow from operations divided by lagged assets). Source: Datastream (DS) / Worldscope (WC)
INTANG	$OIAN_{ijt} / TA_{ijt-1}$	Intangible intensity, calculated as intangible assets (WC02649) divided by lagged assets. Source: Datastream (DS) / Worldscope (WC)
PPE	$PPEN_{ijt} / TA_{ijt-1}$	Capital intensity, calculated as capital assets (WC02501) divided by lagged assets. Source: Datastream (DS) / Worldscope (WC)
R&D	RD_{ijt} / TA_{ijt-1}	R&D intensity, calculated as R&D expense (WC01201) divided by lagged assets. Source: Datastream (DS) / Worldscope (WC)
DAP	Performance-adjusted discretionary accruals	See Appendix C.

Additional Control Variables	***Description and/or Data***	***Details and Source***
DIV (Low vs. High)	Relative level of dividends paid per firm	*Low DIV* equals 1 if a firm pays no dividends, 0 otherwise. *High DIV* equals 1 if a firm pays a non-zero level of dividends, 0 otherwise. Source: Datastream (DS) / Worldscope (WC)
MNC (Low vs. High)	Relative level of multinational operations per firm	*Low MNC* equals 1 if a firm has no foreign assets (WC07151), 0 otherwise. *High MNC* equals 1 if a firm has a non-zero level of foreign assets, 0 otherwise. Source: Datastream (DS) / Worldscope (WC)
CLSHLD	Ratio of closely-held shares per firm	Equals 1 if a firm has an above-median ratio of closely-held shares (WC05475) to shares outstanding (WC05301), 0 otherwise. Source: Datastream (DS) / Worldscope (WC)
IMP_CLHD	Interaction variable: *IMP_YR * CLSHLD*	Equal to 1 if a firm in an imputation system has an above-median ratio of closely-held shares to shares outstanding. Source: OECD and Datastream (DS) / Worldscope (WC)
CHG_CSTR	Annual change in the corporate statutory tax rate	*CSTR* in year *t* less *CSTR* in year *t-1*. Source: OECD and hand collection
BTAXC	Country-level book-tax conformity index	A proxy for the level of required book-tax conformity measured at the country-level. Source: Atwood et al. (2012)
WW	Indicator variable for the presence of a worldwide tax system	Equals 1 if country *j* has a worldwide tax system, 0 otherwise. Source: Atwood et al. (2012)
TAXENF	Country-level tax enforcement index	A proxy for the level of tax enforcement measured at the country-level. Source: Atwood et al. (2012)
COMLAW	Indicator variable if a country has a common law legal system	Equals 1 if country *j* has a common law legal system, 0 otherwise. Source: La Porta et al. (2011)
INVRIGHTS	Country-level strength of investor rights index	A proxy for the strength of investor rights measured at the country-level. Source: La Porta et al. (2011)
OWNCON	Country-level ownership concentration index	A proxy for the country-level ownership concentration. Source: La Porta et al. (2011)
POPGRT	Annual percentage change in country population	Population growth, calculated as the year-to-year percentage change in the population of country *j*. Source: OECD
GDP	GDP index in constant $2005	Gross Domestic Product of country *j* in year *t* in constant 2005 US dollars. Source: OECD

*All continuous variables are winsorized at the 1st and 99th percentile (for dependent variables, before the ratios are formed) to mitigate the influence of outliers.

Appendix C
Performance-Adjusted Discretionary Accruals

We calculate the independent variable *DAP* as the performance-adjusted discretionary accruals measure of financial reporting aggressiveness consistent with Kothari et al. (2005) and Frank et al. (2009). This measure requires calculation of discretionary accruals, which we base on the modified-Jones model (Dechow et al. 1995). First, we estimate total accruals (*TACC*) using the following model by two-digit ICB code (from *Worldscope*), fiscal year and country, where all variables (including the intercept) are scaled by lagged total assets.

$$TACC_{ijt} = \beta_0 + \beta_1(\Delta REV_{ijt} - \Delta AR_{ijt}) + \beta_2 PPE_{ijt} + \mu_{ijt} \qquad (C.1)$$

Where:
$TACC_{ijt} = [NICF_{ijt} + TX_{ijt} - (NCFO_{ijt} + TXPD_{ijt} - DOPSCF_{ijt} - XITEMS_{ijt})]$;
$NICF_{ijt}$ = income before extraordinary items from the statement of cash flows (WC04001) for firm *i* of country *j* in year *t*;
TX_{ijt} = total tax expense (WC01451) for firm *i* of country *j* in year *t*;
$NCFO_{ijt}$ = net cash flows from operations as detailed in Appendix B;
$TXPD_{ijt}$ = taxes paid as detailed in Appendix B;
$DOPSCF_{ijt}$ = discontinued operations from the cash flow statements as detailed in Appendix B;
$XITEMS_{ijt}$ = extraordinary items from the statement of cash flows as detailed in Appendix B;
ΔREV_{ijt} = sales (WC01001) of firm *i* of country *j* in year *t* less its sales in year *t-1*;
ΔAR_{it} = total receivables (WC02051) of firm *i* of country *j* in year *t* less its total receivables in year *t-1*;
PPE_{it} = capital assets as detailed in Appendix B;
μ_{it} = the unadjusted discretionary accruals measure of firm *i* in year *t*, a residual value.

Second, after estimating the discretionary accruals residual μ from Equation (C.1) we rank *ROA* by industry-year-country, put them into *ROA* deciles and determine the median discretionary accrual value. Individual values of μ are set to missing if less than 10 observations exist for a particular industry-year-country decile. We then subtract the median industry-year-country-ROA_decile discretionary accrual value from each observation's residual value to get the performance-adjusted discretionary accrual measure *DAP*. We adjust the median values of each industry-year-country-ROA_decile group such that no median value is calculated while including the specific observation for which we are estimating *DAP* (i.e. we use an out-of-sample measure). Overall, *DAP* is an annual value calculated for each firm-year-country observation in our sample (where data is available). *DAP* is winsorized after estimation at the 1st and 99th percentile to mitigate any undue influence of outlier observations.

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Table 1
Country Composition

The table presents the 52,895 firm-year observations used in the analyses by country. Observations span the years 1994 through 2008 and are limited to the OECD countries for which tax data is available. Superscripts [a, b, c] refer to countries that are labeled as imputation, classical or "eliminated imputation", respectively, during their inclusion within our sample period.

COUNTRY	TOTAL FIRM-YEARS
Australia [a]	2,393
Austria [b]	54
Belgium [b]	46
Canada [a]	2,225
Chile [a]	169
Czech Republic [b]	4
Denmark [b]	268
Finland [c]	355
France [c]	846
Germany [c]	1,040
Greece [b]	137
Ireland [b]	9
Israel [b]	53
Italy [c]	233
Japan [b]	11,059
Korea (South) [b]	2
Mexico [b]	16
Netherlands [b]	265
New Zealand [a]	27
Norway [c]	228
Poland [b]	27
Portugal [b]	22
Spain [c]	14
Sweden [b]	861
Switzerland [b]	925
Turkey [b]	158
United Kingdom [a]	9,128
United States [b]	22,331
TOTAL	52,895

Table 2
Descriptive Statistics

The table presents descriptive statistics for the 52,895 firm-year observations from year 1994 through 2008 used in the analyses. Panel A reports the descriptive statistics for the entire pooled sample. Panel B compares the mean and median values for firm-years with and without an imputation tax system. The last two columns in Panel B report the two-sided p-values for the difference between the mean and medians of the two groups, respectively. T-tests are used to test the difference in means and Wilcoxon rank tests, with continuity correction, are used to test the difference in medians. See Appendices B and C for detailed variable definitions.

Panel A: Full Sample

N = 52,895	Mean	Median	Std Dev	Min	Max
Dependent Variables					
Tax Avoidance Spreads					
SPREAD_INC	0.027	0.080	0.415	-3.046	0.676
SPREAD_CF	0.121	0.170	0.313	-2.302	0.625
Tax Avoidance Ratios					
RATIO_INC	0.932	0.777	1.161	-0.984	16.232
RATIO_CF	0.674	0.526	0.876	-0.933	12.511
Independent Variables					
IMP	0.315	0.000	0.464	0	1
IMP_YR	0.272	0.000	0.445	0	1
IMP_PARTIAL	0.215	0.000	0.411	0	1
IMP_FULL	0.057	0.000	0.232	0	1
ROA	0.115	0.088	0.101	0.000	0.590
LEV	0.177	0.119	0.214	0.000	1.616
SIZE	13.574	13.318	2.440	4.288	24.701
FOROPS	0.336	0.000	0.472	0	1
BM	5.657	0.543	19.723	-3.096	149.374
AGGR_LOSS	0.063	0.000	0.243	0	1
COCF	0.880	0.900	0.094	0.466	1.404
INTANG	0.162	0.055	0.247	0.000	1.649
PPE	0.339	0.274	0.284	0.000	1.854
R&D	0.022	0.000	0.049	0.000	0.629
DAP	-0.010	-0.002	0.176	-1.182	1.129

Table 2 – *continued*

Panel B: Comparison of firm-years across the presence of an imputation system

	Non-Imputation			Imputation			P-value of difference	
Dependent Variables	N	Mean	Median	N	Mean	Median	Mean	Median
Tax Avoidance Spreads								
SPREAD_INC	38,506	0.031	0.087	14,389	0.016	0.062	0.00	0.00
SPREAD_CF	38,506	0.135	0.187	14,389	0.085	0.128	0.00	0.00
Tax Avoidance Ratios								
RATIO_INC	38,506	0.922	0.768	14,389	0.957	0.796	0.00	0.00
RATIO_CF	38,506	0.652	0.507	14,389	0.734	0.581	0.00	0.00
Independent Variables								
ROA	38,506	0.111	0.084	14,389	0.127	0.098	0.00	0.00
LEV	38,506	0.173	0.117	14,389	0.186	0.126	0.00	0.00
SIZE	38,506	13.841	13.547	14,389	12.860	12.525	0.00	0.00
FOR_OPS	38,506	0.336	0.000	14,389	0.337	0.000	0.70	0.71
BM	38,506	6.625	0.562	14,389	3.066	0.488	0.00	0.00
AGGR_LOSS	38,506	0.065	0.000	14,389	0.060	0.000	0.04	0.04
COCF	38,506	0.884	0.903	14,389	0.868	0.893	0.00	0.00
INTANG	38,506	0.156	0.057	14,389	0.180	0.048	0.00	0.00
PPE	38,506	0.313	0.260	14,389	0.410	0.326	0.00	0.00
R&D	38,506	0.025	0.001	14,389	0.013	0.000	0.00	0.00
DAP	38,506	-0.010	-0.002	14,389	-0.010	-0.002	0.89	0.83

Table 3
Tax Avoidance following Changes from an Imputation to a Non-Imputation System

This table presents the results of the estimation of the following equation:

$$TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP_j + \gamma_2 * IMP\_POST_{it} + \gamma_{3\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it}.$$

The dependent variable, $TAX\ AVOIDANCE_{it}$, varies between $SPREAD\_INC_{it}$ and $SPREAD\_CF_{it}$, which are larger the more a firm avoid taxes, and $RATIO\_INC_{it}$ and $RATIO\_CF_{it}$, which are smaller the more a firm avoids taxes. IMP_i equals 1 if a firm's country of residence has ever had an imputation system in any year of the sample, 0 otherwise. IMP_POST_{it} equals 1 for firms in a country that eliminates its imputation system in the period after imputation is eliminated, 0 otherwise. X_{it} represents a set of control variables included in the model and ψ_i and ξ_t represent untabulated industry and year fixed effects. Further variable descriptions are reported in Appendices B and C. Standard errors have been adjusted for clustering within firm and the related t-statistics are reported in parentheses. *, **, *** refer to significance at the 10%, 5% and 1% levels, respectively. Significance for all variables is calculated using two-tailed tests.

	Firms from countries that eliminate their imputation systems are predicted to have larger tax spreads after the change.		Firms from countries that eliminate their imputation systems are predicted to have smaller tax ratios after the change.	
	(1)	(2)	(3)	(4)
Variables	*SPREAD_INC*	*SPREAD_CF*	*RATIO_INC*	*RATIO_CF*
IMP	-0.028***	-0.058***	0.072***	0.101***
	(-5.65)	(-16.21)	(4.74)	(9.18)
IMP_POST	**0.038*** **	**0.048*** **	**-0.104*** **	**-0.100*** **
	(3.85)	**(6.53)**	**(-3.60)**	**(-4.57)**
ROA	0.537***	-1.506***	-1.551***	4.155***
	(17.43)	(-51.86)	(-18.04)	(50.96)
LEV	0.078***	0.013	-0.220***	-0.035
	(6.17)	(1.45)	(-6.28)	(-1.34)
SIZE	0.003**	0.008***	-0.008**	-0.022***
	(2.55)	(9.82)	(-2.52)	(-9.89)
FOROPS	-0.001	0.012***	0.008	-0.028***
	(-0.30)	(3.82)	(0.60)	(-3.15)
BM	0.000***	-0.000	-0.001***	0.000
	(3.41)	(-0.85)	(-3.63)	(0.71)
AGGR_LOSS	-0.027**	0.079***	0.092**	-0.209***
	(-1.99)	(13.65)	(2.38)	(-13.00)
COCF	-0.404***	-2.220***	1.027***	6.154***
	(-12.21)	(-57.20)	(11.21)	(56.31)
INTANG	-0.002	0.014**	0.039	-0.026
	(-0.14)	(2.04)	(1.27)	(-1.30)
PPE	0.037***	0.037***	-0.115***	-0.099***
	(3.66)	(4.86)	(-3.88)	(-4.52)
R&D	0.181***	0.125***	-0.501***	-0.271**
	(3.33)	(3.02)	(-3.45)	(-2.28)

DAP	0.135***	0.051***	-0.359***	-0.144***
	(10.12)	(6.74)	(-10.24)	(-7.01)
Intercept	0.230***	2.103***	0.454***	-4.816***
	(6.36)	(57.49)	(4.53)	(-46.65)
Observations	52,895	52,895	52,895	52,895
Adjusted R^2	0.059	0.276	0.058	0.266

Table 4
Cross-Sectional Differences in the Reaction to the Elimination of an Imputation System

This table presents the results from several unpooled regression estimates of the following equation:

$$TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP_j + \gamma_2 * IMP\_POST_{it} + \gamma_{3\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it}.$$

The first two columns of results contain estimates for *Low DIV* and *High DIV,* split according to whether or not a firm pays dividends in the year. The second two columns of results contain estimates for *Low MNC* and *High MNC,* split according to the absence or presence of foreign assets within a firm. The dependent variable, $TAX\ AVOIDANCE_{it}$, varies between $SPREAD\_INC_{it}$ (larger the more a firm avoid taxes) and $RATIO\_INC_{it}$, (smaller the more a firm avoids taxes). IMP_i equals 1 if a firm's country of residence has ever had an imputation system in any year of the sample, 0 otherwise. IMP_POST_{it} equals 1 for firms in a country that eliminates its imputation system in the period after imputation is eliminated, 0 otherwise. X_{it} represents a set of control variables included in the model and ψ_i and ξ_t represent untabulated industry and year fixed effects. Further variable descriptions are reported in Appendices B and C. Standard errors have been adjusted for clustering within firm and the related t-statistics are reported in parentheses. *, **, *** refer to significance at the 10%, 5% and 1% levels, respectively. Significance for all variables is calculated using two-tailed tests. Non-parametric tests of the difference between IMP_POST_{it} in low and high subsamples are reported at the bottom of the table.

	Firms from countries that eliminate their imputation systems are predicted to have larger tax spreads after the change.		Firms from countries that eliminate their imputation systems are predicted to have larger tax spreads after the change.	
	(1) ***Low DIV***	(2) ***High DIV***	(3) ***Low MNC***	(4) ***High MNC***
Variables	*SPREAD_INC*	*SPREAD_INC*	*SPREAD_INC*	*SPREAD_INC*
IMP	-0.030***	-0.001	-0.016**	-0.049***
	(-2.78)	(-0.19)	(-2.50)	(-6.06)
IMP_POST	**-0.000**	**0.036*** **	**0.043*** **	**0.029***
	(-0.02)	**(3.55)**	**(3.19)**	**(1.94)**
ROA	0.431***	0.688***	0.431***	0.804***
	(10.15)	(15.56)	(11.90)	(14.12)
LEV	0.057***	0.065***	0.098***	0.038*
	(3.21)	(3.89)	(6.10)	(1.90)
SIZE	-0.001	0.013***	0.002	0.003
	(-0.72)	(8.59)	(1.53)	(1.53)
FOROPS	-0.006	0.001	0.020**	-0.020***
	(-0.73)	(0.27)	(2.19)	(-2.70)
BM	0.001***	-0.000	0.000**	0.001***
	(4.04)	(-0.18)	(2.36)	(3.13)
AGGR_LOSS	-0.058***	-0.048**	0.041**	-0.128***
	(-3.37)	(-2.13)	(2.45)	(-5.63)
COCF	-0.386***	-0.308***	-0.487***	-0.178***
	(-8.30)	(-6.53)	(-12.15)	(-3.14)
INTANG	-0.043***	-0.013	-0.004	-0.000
	(-3.02)	(-0.90)	(-0.32)	(-0.02)

PPE	0.010	0.068***	0.038***	0.041**
	(0.59)	(5.70)	(3.06)	(2.42)
R&D	0.121*	-0.056	0.181***	0.096
	(1.81)	(-0.66)	(2.65)	(1.12)
DAP	0.112***	0.164***	0.152***	0.099***
	(6.59)	(8.31)	(9.24)	(4.56)
Intercept	0.352***	-0.058	0.301***	0.055
	(6.89)	(-1.14)	(6.80)	(0.88)
Observations	19,332	33,563	32,278	20,617
Adjusted R^2	0.047	0.076	0.058	0.073
(Prob > F)	(0.001)		(0.024)	

Table 5
Tax Avoidance Following Changes in the Australian Imputation System

This table presents the results of the estimation of the following equation:

$$TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP\_YR_{it} + \gamma_2 * AUS_j + \gamma_3 * AUS\_POST03_{it} + \gamma_{4\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it}.$$

The dependent variable, $TAX\ AVOIDANCE_{it}$, varies between $SPREAD\_INC_{it}$ and $SPREAD\_CF_{it}$, which are larger the more a firm avoid taxes, and $RATIO\_INC_{it}$ and $RATIO\_CF_{it}$, which are smaller the more a firm avoids taxes. IMP_YR_i equals 1 if a firm's country of residence has an imputation tax system during the year, 0 otherwise. AUS_j equals 1 if a firm's country of residence is Australia, 0 otherwise. $POST03_{it}$ equals 1 for the period after and including 2003, which corresponds to the inclusion of an additional imputation credit for public companies in Australia, 0 otherwise. AUS_POST03_{it} equals 1 if a firm's country of residence is Australia in the period after and including 2003, 0 otherwise. The year 2003 corresponds to the inclusion of an additional imputation credit for public companies in Australia. X_{it} represents a set of control variables included in the model and ψ_i and ξ_t represent untabulated industry and year fixed effects. Further variable descriptions are reported in Appendices B and C. Standard errors have been adjusted for clustering within firm and the related t-statistics are reported in parentheses. *, **, *** refer to significance at the 10%, 5% and 1% levels, respectively. Significance for all variables is calculated using two-tailed tests.

	Firms from Australia, where enhanced imputation credits are available starting in 2003, are predicted to have smaller tax spreads after the change.		Firms from Australia, where enhanced imputation credits are available starting in 2003, are predicted to have larger tax ratios after the change.	
	(1)	(2)	(3)	(4)
VARIABLES	*SPREAD_INC*	*SPREAD_CF*	*RATIO_INC*	*RATIO_CF*
IMP_YR	-0.019***	-0.055***	0.044***	0.094***
	(-3.63)	(-14.59)	(2.77)	(7.95)
AUS	0.005	0.034***	0.018	-0.083***
	(0.32)	(3.69)	(0.35)	(-3.02)
AUS_POST03	**-0.099*** **	**-0.071*** **	**0.244*** **	**0.193*** **
	(-5.19)	**(-6.44)**	**(4.05)**	**(5.66)**
ROA	0.548***	-1.501***	-1.582***	4.140***
	(17.75)	(-51.66)	(-18.36)	(50.75)
LEV	0.080***	0.014	-0.227***	-0.037
	(6.34)	(1.52)	(-6.45)	(-1.41)
SIZE	0.003**	0.008***	-0.008**	-0.022***
	(2.29)	(9.62)	(-2.27)	(-9.73)
FOROPS	-0.002	0.012***	0.011	-0.026***
	(-0.51)	(3.71)	(0.80)	(-2.99)
BM	0.000***	-0.000	-0.001***	0.000
	(3.52)	(-0.77)	(-3.74)	(0.64)
AGGR_LOSS	-0.027**	0.079***	0.092**	-0.210***
	(-1.97)	(13.70)	(2.37)	(-13.05)
COCF	-0.406***	-2.221***	1.031***	6.155***
	(-12.28)	(-57.25)	(11.27)	(56.36)

INTANG	0.000	0.015**	0.033	-0.028
	(0.04)	(2.12)	(1.10)	(-1.41)
PPE	0.036***	0.036***	-0.110***	-0.098***
	(3.52)	(4.82)	(-3.74)	(-4.48)
R&D	0.170***	0.122***	-0.470***	-0.262**
	(3.14)	(2.95)	(-3.24)	(-2.21)
DAP	0.136***	0.051***	-0.360***	-0.145***
	(10.15)	(6.74)	(-10.27)	(-7.04)
Intercept	0.239***	2.106***	0.429***	-4.826***
	(6.61)	(57.58)	(4.28)	(-46.78)
Observations	52,895	52,895	52,895	52,895
Adjusted R-squared	0.061	0.276	0.059	0.266

Table 6
The Relation between Tax Avoidance and the Type of Country-Level Imputation System

This table presents the results of the estimation of the following equation:

$$TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP\_PARTIAL_{it} + \gamma_2 * IMP\_FULL_{it} + \gamma_{3\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it}.$$

The dependent variable, $TAX\ AVOIDANCE_{it}$, varies between $SPREAD\_INC_{it}$ and $SPREAD\_CF_{it}$, which are larger the more a firm avoid taxes, and $RATIO\_INC_{it}$ and $RATIO\_CF_{it}$, which are smaller the more a firm avoids taxes. $IMP\_PARTIAL_{it}$ and IMP_FULL_{it} equal 1 if a firm's country of residence has a partial or full imputation tax system, respectively, during the year, 0 otherwise. X_{it} represents a set of control variables included in the model and ψ_i and ξ_t represent untabulated industry and year fixed effects. Further variable descriptions are reported in Appendices B and C. Standard errors have been adjusted for clustering within firm and the related t-statistics are reported in parentheses. *, **, *** refer to significance at the 10%, 5% and 1% levels, respectively. Significance for all variables is calculated using two-tailed tests. F-tests of the difference between $IMP\_PARTIAL_{it}$ and IMP_FULL_{it} are reported at the bottom of the table.

	Firms from countries with full imputation systems are predicted to have smaller tax spreads.		Firms from countries with full imputation systems are predicted to have larger tax ratios.	
Variables	(1) *SPREAD_INC*	(2) *SPREAD_CF*	(3) *RATIO_INC*	(4) *RATIO_CF*
IMP_PARTIAL	**-0.019*** **	**-0.055*** **	**0.045*** **	**0.097*** **
	(-3.56)	**(-14.20)**	**(2.77)**	**(8.00)**
IMP_FULL	**-0.064*** **	**-0.065*** **	**0.178*** **	**0.115*** **
	(-7.20)	**(-10.48)**	**(6.17)**	**(5.93)**
ROA	0.541***	-1.505***	-1.565***	4.153***
	(17.57)	(-51.77)	(-18.19)	(50.83)
LEV	0.080***	0.014	-0.226***	-0.036
	(6.32)	(1.50)	(-6.43)	(-1.37)
SIZE	0.003**	0.008***	-0.008**	-0.022***
	(2.55)	(9.77)	(-2.52)	(-9.90)
FOROPS	-0.003	0.012***	0.011	-0.027***
	(-0.54)	(3.83)	(0.85)	(-3.11)
BM	0.000***	-0.000	-0.001***	0.000
	(3.53)	(-0.80)	(-3.76)	(0.69)
AGGR_LOSS	-0.028**	0.079***	0.093**	-0.209***
	(-2.01)	(13.63)	(2.41)	(-12.98)
COCF	-0.405***	-2.221***	1.030***	6.154***
	(-12.26)	(-57.23)	(11.26)	(56.34)
INTANG	-0.002	0.014**	0.039	-0.026
	(-0.15)	(2.00)	(1.27)	(-1.29)
PPE	0.036***	0.036***	-0.110***	-0.099***
	(3.51)	(4.80)	(-3.74)	(-4.49)
R&D	0.176***	0.124***	-0.486***	-0.269**
	(3.24)	(2.99)	(-3.35)	(-2.27)

DAP	0.136***	0.051***	-0.360***	-0.145***
	(10.16)	(6.74)	(-10.29)	(-7.02)
Intercept	0.233***	2.103***	0.445***	-4.817***
	(6.45)	(57.49)	(4.44)	(-46.69)
Observations	52,895	52,895	52,895	52,895
Adjusted R^2	0.060	0.276	0.058	0.266
F-test	21.991	2.015	18.142	0.697
(Prob > F)	(0.000)	(0.156)	(0.000)	(0.404)

Table 7
The Relation between Tax Avoidance and Closely-Held Firms in Imputation Systems

This table presents the results of the estimation of the following equation:

$$TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP\_YR_j + \gamma_2 * CLSHLD_{it} + \gamma_3 * IMP\_CLHD_{it} + \gamma_{4\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it}.$$

The dependent variable, $TAX\ AVOIDANCE_{it}$, varies between $SPREAD\_INC_{it}$ and $SPREAD\_CF_{it}$, which are larger the more a firm avoid taxes, and $RATIO\_INC_{it}$ and $RATIO\_CF_{it}$, which are smaller the more a firm avoids taxes. IMP_YR_i equals 1 if a firm's country of residence has an imputation tax system during the year, 0 otherwise. $CLSHLD_{it}$ equals 1 if a firm has an above-median ratio of closely-held shares to shares outstanding, 0 otherwise. IMP_CLHD_{it} is the interaction between IMP_YR_i and $CLSHLD_{it}$. X_{it} represents a set of control variables included in the model and ψ_i and ξ_t represent untabulated industry and year fixed effects. Further variable descriptions are reported in Appendices B and C. Standard errors have been adjusted for clustering within firm and the related t-statistics are reported in parentheses. *, **, *** refer to significance at the 10%, 5% and 1% levels, respectively. Significance for all variables is calculated using two-tailed tests.

	Closely-held firms from countries with imputation systems are predicted to have smaller tax spreads.		Closely-held firms from countries with imputation systems are predicted to have larger tax ratios.	
	(1)	(2)	(3)	(4)
Variables	*SPREAD_INC*	*SPREAD_CF*	*RATIO_INC*	*RATIO_CF*
IMP_YR	0.022***	-0.040***	-0.050***	0.059***
	(3.47)	(-9.03)	(-2.68)	(4.40)
CLSHLD	**0.086*** **	**0.029*** **	**-0.212*** **	**-0.071*** **
	(16.16)	**(8.43)**	**(-14.83)**	**(-7.70)**
IMP_CLHD	**-0.051*** **	**-0.019*** **	**0.112*** **	**0.043***
	(-5.16)	**(-2.70)**	**(3.66)**	**(1.93)**
ROA	0.522***	-1.521***	-1.514***	4.193***
	(16.93)	(-52.90)	(-17.59)	(51.89)
LEV	0.066***	0.009	-0.191***	-0.023
	(5.30)	(0.95)	(-5.51)	(-0.89)
SIZE	0.005***	0.009***	-0.014***	-0.024***
	(4.45)	(10.69)	(-4.19)	(-10.67)
FOROPS	-0.003	0.012***	0.013	-0.026***
	(-0.70)	(3.70)	(0.95)	(-2.99)
BM	0.000***	-0.000	-0.001***	0.000
	(2.67)	(-1.32)	(-2.94)	(1.15)
AGGR_LOSS	-0.027**	0.079***	0.093**	-0.210***
	(-1.97)	(13.66)	(2.39)	(-12.99)
COCF	-0.381***	-2.223***	0.969***	6.162***
	(-11.53)	(-57.24)	(10.57)	(56.36)
INTANG	-0.021**	0.008	0.086***	-0.012
	(-1.98)	(1.18)	(2.85)	(-0.60)

PPE	0.041***	0.038***	-0.124***	-0.102***
	(4.10)	(5.01)	(-4.26)	(-4.65)
R&D	0.163***	0.118***	-0.457***	-0.253**
	(3.04)	(2.85)	(-3.18)	(-2.13)
DAP	0.135***	0.052***	-0.359***	-0.147***
	(10.17)	(6.88)	(-10.28)	(-7.16)
Intercept	0.116***	2.074***	0.738***	-4.746***
	(3.16)	(55.62)	(7.26)	(-45.22)
Observations	52,771	52,771	52,771	52,771
Adjusted R^2	0.066	0.278	0.063	0.267

Table 8
The Relation between Tax Avoidance and Country-Level Imputation Systems
Additional Control Variables

This table presents the results of the estimation of the following equation:

$$TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP_j + \gamma_2 * IMP\_POST_{it} + \gamma_{3\text{-}k} Z_{it} + \psi_i + \xi_t + \mu_{it}.$$

The dependent variable, $TAX\ AVOIDANCE_{it}$, varies between $SPREAD\_INC_{it}$ and $SPREAD\_CF_{it}$, which are larger the more a firm avoid taxes, and $RATIO\_INC_{it}$ and $RATIO\_CF_{it}$, which are smaller the more a firm avoids taxes. IMP_i equals 1 if a firm's country of residence has ever had an imputation system in any year of the sample, 0 otherwise. IMP_POST_{it} equals 1 for firms in a country that eliminates its imputation system in the period after imputation is eliminated, 0 otherwise. Z_{it} represents a set of control variables that includes X_{it}, the annual change in corporate statutory tax rates (*CHG_CSTR*) and the following additional country-level control variables suggested in the extant literature, including Atwood et al. (2012): $BTAXC_j$, WW_j, $TAXENF_j$, $COMLAW_j$, $INVRIGHTS_j$, $OWNCON_j$, $POPGRT_{jt}$ and GDP_{jt}. Untabulated industry and year fixed effects are represented by ψ_i and ξ_t, respectively. Further variable descriptions are reported in Appendices B and C. Standard errors have been adjusted for clustering within firm and the related t-statistics are reported in parentheses. *, **, *** refer to significance at the 10%, 5% and 1% levels, respectively. Significance for all variables is calculated using two-tailed tests.

	Firms from countries that eliminate their imputation systems are predicted to have larger tax spreads after the change.		Firms from countries that eliminate their imputation systems are predicted to have smaller tax ratios after the change.	
	(1)	(2)	(3)	(4)
Variables	*SPREAD_INC*	*SPREAD_CF*	*RATIO_INC*	*RATIO_CF*
IMP	-0.101***	-0.064***	0.245***	0.136***
	(-9.66)	(-9.89)	(6.88)	(6.31)
IMP_POST	**0.124*** **	**0.098*** **	**-0.326*** **	**-0.169*** **
	(6.07)	**(6.82)**	**(-5.04)**	**(-3.88)**
CHG_CSTR	-1.052***	-0.340**	2.719***	1.047**
	(-4.60)	(-2.44)	(3.79)	(2.47)
BTAXC	0.066***	-0.097***	-0.115	0.167***
	(2.59)	(-5.43)	(-1.44)	(2.96)
WW	-0.070***	-0.017*	0.188***	0.094***
	(-5.44)	(-1.92)	(4.67)	(3.41)
TAXENF	-0.027**	0.001	0.079*	0.003
	(-2.00)	(0.16)	(1.82)	(0.09)
COMLAW	0.215***	-0.000	-0.506***	-0.083
	(8.87)	(-0.01)	(-7.02)	(-1.58)
INVRIGHTS	-0.022	0.009	0.044	0.024
	(-1.35)	(0.75)	(0.86)	(0.68)
OWNCON	-0.190	-0.129	0.650	0.552*
	(-1.50)	(-1.48)	(1.51)	(1.96)
POPGRT	-2.230***	-1.322**	6.476**	3.473**
	(-2.63)	(-2.39)	(2.46)	(2.06)
GDP	-0.013***	0.001	0.027***	-0.002
	(-5.60)	(0.64)	(4.06)	(-0.50)

ROA	0.549***	-1.593***	-1.609***	4.360***
	(14.22)	(-48.33)	(-14.92)	(48.02)
LEV	0.048***	0.001	-0.146***	0.004
	(3.39)	(0.05)	(-3.71)	(0.13)
SIZE	0.007***	0.009***	-0.020***	-0.023***
	(5.82)	(10.19)	(-5.55)	(-9.79)
FOROPS	-0.006	0.009***	0.020	-0.025***
	(-1.23)	(2.65)	(1.40)	(-2.63)
BM	0.000*	-0.000	-0.001**	0.000
	(1.94)	(-1.24)	(-2.01)	(1.11)
AGGR_LOSS	-0.076***	0.072***	0.219***	-0.198***
	(-3.92)	(9.87)	(4.02)	(-9.82)
COCF	-0.302***	-2.291***	0.749***	6.321***
	(-7.16)	(-49.16)	(6.47)	(48.94)
INTANG	-0.055***	0.002	0.171***	-0.005
	(-4.36)	(0.22)	(4.66)	(-0.20)
PPE	0.059***	0.050***	-0.181***	-0.143***
	(5.32)	(5.92)	(-5.60)	(-5.68)
R&D	0.143**	0.095*	-0.413***	-0.187
	(2.42)	(1.93)	(-2.59)	(-1.32)
DAP	0.127***	0.049***	-0.336***	-0.136***
	(8.96)	(6.10)	(-9.12)	(-6.30)
Intercept	1.608***	2.119***	-2.544***	-5.101***
	(5.92)	(13.35)	(-3.09)	(-10.74)
Observations	41,424	41,424	41,424	41,424
Adjusted R^2	0.079	0.295	0.074	0.283