Corporate tax avoidance, shareholder dividend tax policy, and manager-shareholder alignment

Dan Amiram

Columbia Business School
Columbia University

Andrew M. Bauer

Department of Accountancy
University of Illinois at Urbana-Champaign

Mary Margaret Frank[*]

Darden School of Business
The University of Virginia

Draft from: December 28, 2012

Keywords: principal-agent, managerial incentives, imputation, corporate tax avoidance, dividend taxation, tax policy

[*] Corresponding author: Mary Margaret Frank, Darden School of Business, The University of Virginia, 100 Darden Boulevard, Charlottesville, VA 22903, tel: +1-434-924-4432, email: frankm@darden.virginia.edu.
We thank Rosanne Altshuler (discussant), Razi Avram, Jenny Brown (discussant), James Chyz (discussant), Trevor Harris, Shane Heitzman, Justin Hopkins, Glenn Hubbard, Dimitra Koutsantoni, Pete Lisowsky, Chris Mayer, Jake Thornock, Jaron Wilde (discussant) and Jerry Zimmerman for helpful discussions and comments. We appreciate the comments received from conference participants at the UNC Tax Symposium, the University of Rochester, the American Accounting Association Annual conference, the American Taxation Association Mid-Year Meeting and the CAAA Annual Conference. We gratefully acknowledge the financial support provided by the University of Virginia Darden School Foundation.

Corporate tax avoidance, shareholder dividend tax policy, and manager-shareholder alignment

Abstract

This study uses a unique international setting to examine managerial incentives to avoid corporate taxes. We exploit changes in a country's shareholder dividend tax policy, which are exogenous to the firm, to examine if managers engage in corporate tax avoidance to increase shareholder value, consistent with manager-shareholder alignment. Specifically, we examine changes in corporate tax avoidance after the elimination, as well as enhancement, of imputation systems around the world. Our results are consistent with managers engaging in corporate tax avoidance to benefit shareholders. In cross-sectional tests, we find evidence consistent with higher corporate tax avoidance for closely-held firms in countries where a shareholder benefit exists. Our findings have implications for our understanding of the effect of manager-shareholder alignment on corporate tax avoidance and the debate over tax reform.

Corporate tax avoidance, shareholder dividend tax policy, and manager-shareholder alignment

I. Introduction

Corporate tax avoidance is widely discussed in the press, around the business community, among policymakers, and within academia. Scandals involving corporate tax shelters have hurt the public's trust in the business community, and countries facing financial instability are proposing to eliminate corporate tax "loopholes". Many journalists in the press, public interest groups and politicians vilify corporations that proactively lower their tax liabilities. However, these corporate actions, which generate this public unrest, are likely a product of the incentives that managers face.

Influenced by research on individual tax evasion, early research on corporate tax avoidance simply assumes that the manager and the owner are the same decision maker who trades off corporate tax savings with the costs of tax avoidance. While this assumption may be true for small businesses, the corporate tax avoidance that generates much of the public unrest is concentrated among large, widely-held corporations where principal-agent conflicts exist (Crocker and Slemrod, 2005). The limited research that explicitly addresses the effect of the principal-agent dilemma on corporate tax avoidance provides conflicting predictions. Consistent with much of the finance literature on agency conflicts, one stream of research predicts firms use incentives to encourage managers to engage in corporate tax avoidance on behalf of shareholders. However, Desai and Dharamapala (2006) incorporate managers' private benefits from diverting corporate resources, as well as the shareholders' benefits from corporate tax avoidance, into their principal-agent model and find the effect of incentives on corporate tax

avoidance is ambiguous. Their empirical results suggest that aligning managers with shareholders' interests through equity compensation leads to lower corporate tax avoidance for the average firms from the United States. However, other empirical research on corporate tax avoidance, which examines the manager-shareholder alignment through equity compensation, finds conflicting results (Hanlon, Mills and Slemrod, 2005; Armstrong, Blouin and Larcker, 2012; Rego and Wilson, 2012).

In this study, we move away from equity compensation as a measure of manager-shareholder alignment and exploit a unique setting exogenous to the firm to assess the effect that agency conflicts have on managers' willingness to engage in corporate tax avoidance. Our setting capitalizes on variation in the benefits to shareholders from corporate tax avoidance, which is driven by a country's shareholder dividend tax policy. 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, corporate tax avoidance increases after-tax cash flows creating either more private benefits for managers or higher after-tax cash flows to 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 corporate tax avoidance increases after-tax cash flows available for managers' private benefits but does not increase the after-tax cash flows to

shareholders. Because corporate tax avoidance is costly, it actually reduces the after-tax cash flows to shareholders under an imputation system and makes them worse off.[1]

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 the role of the manager in corporate tax avoidance. For managers of firms residing in countries with imputation systems as compared to a classical system, corporate tax avoidance provides the private benefits assumed in Desai and Dharmapala (2006), but reduced, if any, benefits to shareholders. If managers engage in corporate tax avoidance because of manager-shareholders alignment, we will find corporate tax avoidance is higher for firms residing in countries with classical tax systems as compared to imputation tax systems.[2]

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, we use difference-in-differences estimations to examine the effect 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 elimination of the imputation systems on firms, based on dividend payout and multinational operations and find results consistent with shareholder alignment driven avoidance. Moreover, we find evidence of decrease in corporate tax avoidance for firms from Australia as compared to other countries beginning in

[1] 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.
[2] This prediction assumes that the firms' ability to motivate managers through incentives is constant across countries.

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 imputation countries, corporate tax avoidance is lower for firms with a greater percentage of closely-held shares, while firms with more closely-held shares from classical systems exhibit more corporate tax avoidance. These results suggest firm characteristics that create a stronger alignment between managers and shareholders accentuate the shareholders' interest (or disinterest) in corporate tax avoidance created by a country's tax system.

The main contribution of the study is that our findings provide evidence that corporate tax avoidance by managers is driven by the alignment of their interest with shareholders. Furthermore, when the shareholders' incentive for lower corporate taxes is eliminated, corporate tax avoidance falls. This evidence contributes to the debate on corporate tax avoidance in the media, policy circles and the academic literature.

This study also contributes to the finance and economic policy literature. First, it shows that in the equilibrium contracting environment around the world, managers act as if they are well aligned with shareholders by reducing tax avoidance activities when it is against shareholders' benefit but still increase managers' benefits. How well managers and shareholders are aligned is still an open question in the finance literature. Second, the findings of the paper suggest that it may be possible to design a policy that reduces tax avoidance by taking advantage of the alignment between managers and shareholders.

This study makes further contribution by connecting two streams of literature on corporate tax avoidance. The literature on the effect of managerial incentives on corporate tax avoidance focuses exclusively on firms from the United States and ignores the variation in managerial incentives for corporate tax avoidance around the world, which is driven by country-level tax policies. On the other hand, Atwood et al. (2012) is the first study to analyze the effect of country-specific tax system characteristics on corporate tax avoidance, but ignores the agency conflicts inherent in corporate tax avoidance. Specifically, they examine the effects of a country's international tax system (worldwide versus territorial) and corporate statutory tax rates, as well as a country's level of enforcement and book-tax conformity, on corporate tax avoidance.[3] They implicitly assume manager-shareholder alignment across countries in their analysis of the effect of a country's tax system on corporate tax avoidance. Our results provide evidence that their implicit assumption is descriptive.

This study also 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 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

[3] 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.

its member states, through the potential negative impact on members' tax revenues (Graetz and Warren 2006).[4]

While the findings in this study have important policy implications, we offer a word of caution. 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 (2012) 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 II briefly discusses the different taxation of dividends around the world and develops our research design. Section III describes the data, sample selection, and descriptive statistics. Section IV presents the results of our analyses. Section V concludes.

II. Background, predictions and research design

A. The debate over corporate tax avoidance

For the purpose of this study, we 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 during 2009 - 2010 that is less than half of the U.S. corporate statutory tax rate.[5] 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

[4] 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.

[5] "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.

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." [6]

While corporate tax avoidance has social costs and is met with negative press and government scrutiny,[7] not engaging in tax avoidance potentially reduces the after-tax cash flows to the U.S. firm's shareholders. 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.[8,9] However, there is no consensus in the empirical research that managers of U.S. firms engage in corporate tax avoidance because it benefits shareholders. Imputation systems do not provide shareholders' benefits to corporate tax avoidance, thus comparing corporate tax avoidance across country-level shareholder dividend tax policies creates a unique setting to determine if increasing shareholder value motivates managers to engage in corporate tax avoidance. If managers engage in corporate tax avoidance for the benefit of shareholders, we expect to see lower corporate tax avoidance by firms in imputation countries.

B. 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

[6] "Biggest Public Firms Paid Little in U.S. Tax Study Says" by D. Kocieniewski published in *The New York Times* on November 3, 2011.
[7] 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.
[8] "U.S. Corporations Suffer High Effective Tax Rates by International Standards" by P. Dittmer and published by the Tax Foundation on September 2011.
[9] "Who Could Blame G.E.?" by Joe Nocera in the New York Times on April 4, 2011.

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.[10] 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 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.

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

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.[11] Conceptually, 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.

C. 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).[12] Both countries have a corporate tax rate of 30% and the

[11] For a more detailed example, see the illustration in the next subsection.
[12] 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.

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.[13]

C.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 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.

[13] 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.

C.2 Scenario 2 - With corporate tax avoidance

We assume that managers from Firm C and Firm I chose to engage in corporate tax avoidance that costs $10 and generate 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. 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 needed 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 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.

D. Difference-in-differences

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-differences 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 the equation (1):

$$TAX\_AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP_i + \gamma_2 * POST_{it} + \gamma_3 * IMP\_POST_{it} + \gamma_{4\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it} \quad (1)$$

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.[14] $POST_{it}$ equals one for every year after a firm's country of residence eliminates its imputation system, and zero otherwise. For firms that reside in countries that never change their shareholder dividend tax policy $POST_{it}$ equals one in each year after a randomly selected year, and zero otherwise. We randomly chose a year for *POST* for these firms because *POST* and *IMP_POST,* the interaction of *IMP* and *POST,* are collinear for these observations. We cannot use one year as a simple partition for all firms in the sample as done in a typical pre-post analysis because countries eliminate their imputation systems in different years. IMP_POST_{it} is an interaction variable that represents the years after the countries eliminate their imputation system and is our main variable of interest. We expect corporate tax avoidance to increase after countries eliminate their imputation systems ($\gamma_3 > 0$). X_{it} represents a set of firm-year control variables, and ψ_i and ξ_t represent industry and year fixed-effects, respectively.

One concern with the difference-in-differences 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

[14] 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.

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-differences 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 in 2002 relative to firms in other countries. We examine this prediction using equation (2):

$$TAX\_AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP\_YR_t + \gamma_2 * AUS_i + \gamma_3 * POST03_{it} + \gamma_4 * AUS\_POST03_{it} + \gamma_{5\text{-}k} * X_{it} + \psi_i + \xi_t + \mu_{it} \quad (2)$$

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. $POST03_{it}$ equals one for the period following the legislative action in 2002, and zero otherwise. Our variable of interest, AUS_POST03_{it} is the interaction between AUS_i and $POST03_{it}$. We expect corporate tax avoidance to decrease in Australia beginning in 2003 after the enactment of the Australian simplified imputation system ($\gamma_4 < 0$). All the remaining variables are as defined in equation (1).

III. Data and Sample

A. 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 *Datastream*. Finally, for brevity we provide Appendices B and C to summarize the details and individual sources of data needed to construct our variables.

B. Sample

We begin by collecting data available from the Thompson Reuters *Datastream Advance Database*. 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.[15] 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.

C. 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 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.[16] 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* 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

[15] 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*.

[16] In Section IV D, we report results using measures of long-term Cash ETR (Dyreng et al. 2008) and other non-cash based measures of tax avoidance. Inferences are unchanged using these measures.

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).[17]

D. 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 et al., 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 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 corporate tax avoidance 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*)

[17] 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.

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 their 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 (2012), we control for consecutive accounting losses (*AGGR_LOSS*) and constrained operating cash flow resources (*COCF*).[18]

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 *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.

[18] 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*.

E. Descriptive statistics

Table 1 presents the various countries in our dataset and whether or not they have an imputation system. Our sample is comprised of 14,389 firm-year observations from imputation countries (27% of the sample). Twelve countries have an imputation system during our sample, including Finland, France, Germany, Italy, Mexico, Norway and Spain, all of which eliminated their imputation system during our sample period.[19] Australia, Canada, Chile, New Zealand and the United Kingdom have imputation systems throughout the sample period and no country implemented an imputation system during our sample period.

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 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.

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

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.[20] *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.

IV. Results

A. 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-differences 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.[21]

Table 3 reports the results of the difference-in-differences 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

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

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

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. Across all four models, *POST* is not statistically significant. More importantly for our research question, the coefficients on *IMP_POST* represent our key variable of interest in the difference-in-differences 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. 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 4.0% to 4.6%, completely eliminating the difference in corporate tax avoidance in the pre-elimination period. The significance of the combined coefficients on *IMP, POST* and *IMP_POST* 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 only Model 2.

A.1 Cross-section difference in corporate tax avoidance following the elimination of an imputation system

Our illustration in Section II C 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 the Section II 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. 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 Table 4 Panel A, 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 generally 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 find the difference across the subsamples is significant at the 1% level. Such findings are consistent with our expectations.

Second, our illustration in Section II C 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. For brevity, we present the results with respect to *SPREAD_INC* only.

In Table 4 Panel B, our low and high multinational subsamples have a significant coefficient on *IMP_POST*. However, the coefficient for the domestic subsample is significantly larger than the coefficient for the multinational subsample 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.

B. Corporate tax avoidance following an increase in imputation benefits in Australia

Through equation (2) we implement the second difference-in-differences 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 and statistically significant, 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 by 35% 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 coefficient on *IMP_YR* is consistent with less tax avoidance by firms residing in other imputation countries.

C. Additional tests

C.1Cross-sectional: Partial and full imputation systems

After establishing the difference-in-differences 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.

C.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 better 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_CLSHD* 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 *CHSLD* 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.

C.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 *CHG_CSTR* as an additional control to further mitigate concerns regarding bias in our results from changes in corporate statutory 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.

C.4 Long-run cash ETR

Our main analyses use firm-year *Cash ETRs* in the construction of the *SPREAD_INC, SPREAD_CF, RATIO_INC* and *RATIO_CF* measures, which are noisy approximations of tax avoidance. However, we use them to preserve the size of the rich international sample of firm-years. To address the measurement error in firm-year *Cash ETRs*, Dyreng et al. (2008) use five-year averages. Therefore, we also conduct our cross-sectional analysis using long-run *Cash ETR*, which we calculate as the five-year average Cash ETR subsequently subtracted from or divided by the respective five-year average corporate statutory tax rate in each country. We also construct five-year averages for all of our independent variables. In this analysis, our sample size is reduced from 52,895 observations to as few as 18,355 observations, but the untabulated results are consistent with the main findings in Table 6.

C.5 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 analysis in Tables 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 0.032 for *IMP_POST* are statistically significant (at the 5% level or above) with a *SPREAD* tax avoidance variable while the coefficient of -0.077 for *IMP_POST* is statistically significant (at the 1% level) when we use a *RATIO* variable.

C.6 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 relatively small 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, *IMP_YR* becomes a variable which captures only the influence of countries that change imputation systems. Consistent with our analysis in Section IV C, untabulated analysis shows that positive and significant coefficients for *IMP_YR* are estimated when country-level fixed effects are included in Models 1 and 2. These coefficients reflect that firms in countries that eliminate imputation avoid more tax on average than firms that do not change tax systems.

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 primary difference-in-differences analysis. 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 1% (5%) level and *IMP_POST* is positive (negative) at the 1% (1%) level.

Finally, we conduct one additional sensitivity analysis to ensure that our difference-in-differences 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 the randomly-determined year for countries that never change their tax system. Again, the untabulated results are consistent with our primary difference-in-differences analysis. For example, with *SPREAD_INC* as the dependent variable, *IMP* is negative and *IMP_POST* is positive (both significant at the 1% level).

V. 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 the firm's shareholders or to divert rents for their own benefits. Imputation systems remove the shareholders' incentive for corporate tax avoidance without affecting managers' private benefits. Our findings provide evidence consistent with shareholders' incentives driving managers to avoid corporate taxes. Firms, which reside in countries with an imputation system, where the shareholders do not have the incentive to avoid corporate tax, have less corporate tax avoidance. This differential in corporate tax avoidance between imputation and classical tax systems is

accentuated in closely-held companies where the manager-shareholder alignment is stronger. Furthermore, our evidence suggests that firms in countries that switch from an imputation to classical system experience an increase in corporate tax avoidance – potentially an unintended consequence of the rulings made by the ECJ to encourage tax harmonization among its members. Our finding of a decrease in tax avoidance in Australia following the increased availability of imputation credits to shareholders implies that tax avoidance could decrease as a result of the implementation of an imputation system.

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
POST	Indicator variable for the period after an actual or "induced" elimination of an imputation system	Equal to 1 if year *t* is after or includes the year country *j* eliminates its imputation system or if year *t* is after or includes the randomly selected year for all countries that never change their imputation system, 0 otherwise. Source: OECD and hand collection
IMP_POST	Interaction variable: *Countries that eliminate imputation* POST*	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
POST03	Indicator variable for the period after and including 2003	Equal to 1 if year *t* is after or includes 2003, which corresponds to the inclusion of an additional imputation credit for public companies in Australia, 0 otherwise. Source: OECD and hand collection

AUS_POST03	Interaction variable: *AUS * POST03*	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 has a below-median ratio of dividends to pre-tax income (WC01401), 0 otherwise. *High DIV* equals 1 if a firm has an above-median level of dividends to total assets, 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_DUM * 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 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*. 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.

References

Amiram, D. and M.M. Frank. 2012. “The Effects of the Taxation of Dividends on the Allocation of Foreign Portfolio Investment around the World.” Working paper, Columbia University.

Armstrong, C., J. Blouin, and D. Larcker. 2012. “The Incentives for Tax Planning”. *Journal of Accounting and Economics.* 53(1–2): 391.

Atwood, T., M. Drake, J. Myers and L. Myers. 2012. “Home Country Tax System Characteristics and Corporate Tax Avoidance: International Evidence.” *The Accounting Review.* 87 (6): 1831

Avi-Yonah, R. S. 2000. “Globalization, Tax Competition and the Fiscal Crisis of the Welfare State.” *Harvard Law Review* 113 (7): 1573.

Babcock, J. 2000. “The Effects of Imputation Systems on Multinational Investment, Financing, and Income-Shifting Strategies.” *Journal of the American Taxation Association* 22(2): 1.

Bauer, A. 2012. “Are Internal Control Weaknesses a Signal of Tax Avoidance?” Working paper, University of Illinois.

Chen, S., X. Chen, Q. Cheng and T. Shevlin. 2010. "Are family firms more tax aggressive than non-family firms?" *Journal of Financial Economics* 95(1):41.

Citizens for Tax Justice. 2011. "Corporate Taxpayers and Corporate Tax Dodgers 2008-2010".

Crocker and Slemrod 2005. “Corporate tax evasion with agency costs” *Journal of Public Economics 89(9): 1593-1610*

Dechow, P. M., R. G. Sloan and A. P. Sweeney. 1995. “Detecting earnings management.” *The Accounting Review* 70(2):193.

Desai, M.A. and D. Dharmapala. 2006. “Corporate tax avoidance and high-powered incentives.” *Journal of Financial Economics* 79(1): 145.

Dittmer, P., “U.S. Corporations Suffer High Effective Tax Rates by International Standards” *The Tax Foundation* (September 2011).

Drucker, J. “Google 2.4% Rate Shows How $60 Billion Lost to Tax Loopholes” *Bloomberg*

Dyreng, S., M. Hanlon and E. Maydew. 2008. "Long-Run Corporate Tax Avoidance." *The Accounting Review* 83(1):61.

Dyreng, S., M. Hanlon and E. Maydew. 2010. “The Effects of Executives on Corporate Tax Avoidance.” *The Accounting Review* 85(4): 1163.

Frank, M., L. Lynch and S. Rego. 2009. "Tax Reporting Aggressiveness and Its Relation to Aggressive Financial Reporting." *The Accounting Review* 84(2):467.

Frank, M., L. Lynch., R, Zhao, and S. Rego. 2011. "Are Aggressive Reporting Practices Indicative of an Aggressive Corporate Culture?” Working paper, Indiana University.

Graetz, M. and A. Warren. 2006. “Income Tax Discrimination and the Political and Economic Integration of Europe.” *Yale Law Journal* 115 (April): 1186

Graham, J. and A. Tucker, 2006, “Tax shelters and corporate debt policy” *Journal of Financial Economics* 81 (3): 563–594.

Gupta, S. and K. Newberry. 1997. "Determinants of the variability in corporate effective tax rates: Evidence from longitudinal data." *Journal of Accounting and Public Policy* 16(1):1.

Hanlon Mills and Slemrod 2005. “An empirical examination of corporate tax noncompliance”. Working Paper University of Michigan

Jugurnath, B., M. Stewart and R. Brooks. 2008. “Dividend taxation and corporate investment: a comparative study between the classical system and imputation system of dividend taxation in the United States and Australia.” *Review of Quantitative Finance and Accounting* 31(2): 209.

Kim, J., Y. Li, and L. Zhang. 2011, “Corporate Tax Avoidance and Stock Price Crash Risk: Firm-Level Analysis.” *Journal of Financial Economics* 100: 639.

Kocieniewski. D., “Biggest Public Firms Paid Little in U.S. Tax Study Says”. *The New York Times* (November 3, 2011)

Kothari, S. P., A. J. Leone and C. E. Wasley. 2005. “Performance matched discretionary accrual measures.” *Journal of Accounting & Economics* 39(1):163.

McIntyre, R., M. Gardner, R. Wilkins, and R. Phillips. “Corporate Taxpayers & Corporate Tax Dodgers 2008-2010” The Citizens for Tax Justice and the Institute for Taxation and Economic Policy (November 2011)

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

Nocera, J., “Who Could Blame G.E.?” *The New York Times* (April 4, 2011)

Rego, S. 2003. "Tax-Avoidance Activities of U.S. Multinational Corporations." *Contemporary Accounting Research* 20(4):805.

Rego, S. and R.J. Wilson. 2012. “Equity Risk Incentives and Corporate Tax Aggressiveness.” *Journal of Accounting Research* 50(3): 775

Wilkinson, B. R., S.F. Cahan and G. Jones. 2001. “Strategies and dividend imputation: the effect of foreign and domestic ownership on average effective tax rates.” *Journal of International Accounting, Auditing and Taxation* 10(2): 157.

Wilson, R. 2009. "An Examination of Corporate Tax Shelter Participants." *The Accounting Review* 84(3): 969.

Table 1
Country Composition by Imputation System

The table presents the 52,895 firm-year observations used in the analyses by country and presence of an imputation tax system. Observations span the years 1994 through 2008 and are limited to the OECD countries for which tax data is available.

	IMPUTATION FIRM-YEARS		
COUNTRY	NO	YES	TOTAL FIRM-YEARS
Australia	0	2,393	2,393
Austria	54	0	54
Belgium	46	0	46
Canada	0	2,225	2,225
Chile	0	169	169
Czech Republic	4	0	4
Denmark	268	0	268
Finland	161	194	355
France	822	24	846
Germany	977	63	1,040
Greece	137	0	137
Ireland	9	0	9
Israel	53	0	53
Italy	223	10	233
Japan	11,059	0	11,059
Korea (South)	2	0	2
Mexico	14	2	16
Netherlands	265	0	265
New Zealand	0	27	27
Norway	78	150	228
Poland	27	0	27
Portugal	22	0	22
Spain	10	4	14
Sweden	861	0	861
Switzerland	925	0	925
Turkey	158	0	158
United Kingdom	0	9,128	9,128
United States	22,331	0	22,331
TOTAL	38,506	14,389	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 Appendix B 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:

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

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_i equals 1 if a firm's country of residence has ever had an imputation system in any year of the sample, 0 otherwise. $POST_{it}$ equals 1 for the period after a firm's country of residence eliminates its imputation system or for the period after a randomly selected year for all countries that never their change tax system, 0 otherwise. IMP_POST_{it} is the interaction between $POST_{it}$ and countries that eliminate their imputation system. 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)
POST	-0.005	0.006	0.011	0.003
	(-0.30)	(0.61)	(0.24)	(0.11)
IMP_POST	0.040***	0.046***	-0.107***	-0.101***
	(3.46)	(5.31)	(-3.14)	(-3.85)
ROA	0.537***	-1.506***	-1.551***	4.155***
	(17.42)	(-51.86)	(-18.04)	(50.95)
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***
	(2.56)	(9.82)	(-2.53)	(-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)	(13.64)	(2.38)	(-13.00)
COCF	-0.404***	-2.220***	1.027***	6.154***
	(-12.21)	(-57.19)	(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)	(-3.89)	(-4.52)

RND	0.181***	0.125***	-0.501***	-0.271**
	(3.34)	(3.02)	(-3.45)	(-2.28)
DAP	0.135***	0.051***	-0.359***	-0.144***
	(10.12)	(6.73)	(-10.24)	(-7.01)
Intercept	0.235***	2.097***	0.443***	-4.820***
	(5.90)	(54.91)	(4.01)	(-44.86)
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:

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

The first two columns of results contain estimates for *Low DIV* and *High DIV,* split according to the median ratio of dividends to pre-tax income across the sample. 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. $POST_{it}$ equals 1 for the period after a firm's country of residence eliminates its imputation system or for the period after a randomly selected year for all countries that never their change tax system, 0 otherwise. IMP_POST_{it} is the interaction between $POST_{it}$ and countries that eliminate their imputation system. 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.	
Variables	(1) ***Low DIV*** *SPREAD_INC*	(2) ***High DIV*** *SPREAD_INC*	(1) ***Low MNC*** *SPREAD_INC*	(2) ***High MNC*** *SPREAD_INC*
IMP	-0.030***	-0.001	-0.015**	-0.048***
	(-2.78)	(-0.19)	(-2.39)	(-5.95)
POST	-0.034	0.009	-0.027	0.010
	(-0.77)	(0.54)	(-1.06)	(0.44)
IMP_POST	0.011	0.033***	0.052***	0.032*
	(0.43)	(2.75)	(3.69)	(1.82)
ROA	0.431***	0.688***	0.430***	0.804***
	(10.15)	(15.56)	(11.87)	(14.11)
LEV	0.057***	0.065***	0.098***	0.040**
	(3.20)	(3.89)	(6.07)	(2.04)
SIZE	-0.001	0.013***	0.003*	0.002
	(-0.72)	(8.58)	(1.91)	(1.34)
FOROPS	-0.006	0.001	0.000**	0.001***
	(-0.75)	(0.27)	(2.27)	(3.37)
BM	0.001***	-0.000	0.041**	-0.128***
	(4.04)	(-0.18)	(2.49)	(-5.62)
AGGR_LOSS	-0.058***	-0.048**	-0.490***	-0.179***
	(-3.35)	(-2.13)	(-12.21)	(-3.16)
COCF	-0.386***	-0.308***	-0.003	0.002

	(-8.31)	(-6.52)	(-0.26)	(0.15)
INTANG	-0.043***	-0.013	0.037***	0.040**
	(-3.02)	(-0.90)	(2.98)	(2.35)
PPE	0.010	0.068***	0.192***	0.098
	(0.59)	(5.70)	(2.82)	(1.14)
R&D	0.122*	-0.056	0.152***	0.100***
	(1.82)	(-0.66)	(9.24)	(4.58)
DAP	0.113***	0.164***	0.325***	0.037
	(6.60)	(8.31)	(6.46)	(0.55)
Intercept	0.386***	-0.067	0.430***	0.804***
	(5.79)	(-1.24)	(11.87)	(14.11)
Observations	19,332	33,563	32,278	20,617
Adjusted R^2	0.047	0.076	0.058	0.073
(Prob > F)	(0.009)		(0.036)	

Table 5
Tax Avoidance Following Changes in the Australian Imputation System

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

$$TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP\_YR_{it} + \gamma_2 * AUS_j + \gamma_3 * POST03_{it} + \gamma_4 * AUS\_POST03_{it} + \gamma_{5\text{-}k} X_{it} + \psi_i + \xi_t + \mu_{it}.$$

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_NOAUS_{it} equals one if a firm's country of residence has an imputation tax system and is not Australia 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} is the interaction between AUS_i and $POST03_{it}$. 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.

	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)
POST03	-0.054***	-0.035***	0.158***	0.088***
	(-3.89)	(-3.77)	(4.25)	(3.57)
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	0.293***	2.141***	0.271***	-4.914***
	(7.77)	(56.99)	(2.62)	(-46.23)
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 one 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 one 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_DUM_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_DUM	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 equations:

$TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP_j + \gamma_2 * POST_{it} + \gamma_3 * IMP\_POST_{it} + \gamma_{4\text{-}k} Z_{it} + \psi_i + \xi_t + \mu_{it}$
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. In panel A, 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. $POST_{it}$ equals 1 for the period after a firm's country of residence eliminates its imputation system or for the period after a randomly selected year for all countries that never their change tax system, 0 otherwise. IMP_POST_{it} is the interaction between $POST_{it}$ and countries that eliminate imputation. 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.

Panel A: $TAX\ AVOIDANCE_{it} = \gamma_0 + \gamma_1 * IMP_j + \gamma_2 * POST_{it} + \gamma_3 * IMP\_POST_{it} + \gamma_{4\text{-}k} Z_{it} + \psi_i + \xi_t + \mu_{it}$.

	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***	-0.065***	0.246***	0.136***
	(-9.72)	(-9.91)	(6.93)	(6.32)
POST	0.067***	0.018	-0.183***	-0.034
	(2.86)	(1.30)	(-2.86)	(-0.89)
IMP_POST	0.112***	0.095***	-0.292***	-0.163***
	(5.30)	(6.32)	(-4.40)	(-3.58)
CHG_CSTR	-1.127***	-0.360**	2.922***	1.085**
	(-4.87)	(-2.54)	(4.04)	(2.53)
BTAXC	0.081***	-0.093***	-0.157*	0.159***
	(3.14)	(-5.03)	(-1.93)	(2.75)
WW	-0.075***	-0.018**	0.202***	0.097***
	(-5.85)	(-2.04)	(5.01)	(3.44)
TAXENF	-0.027**	0.001	0.079*	0.003
	(-2.07)	(0.16)	(1.86)	(0.09)
COMLAW	0.222***	0.002	-0.523***	-0.086
	(9.08)	(0.09)	(-7.22)	(-1.63)
INVRIGHTS	-0.023	0.008	0.049	0.025
	(-1.46)	(0.71)	(0.95)	(0.70)
OWNCON	-0.223*	-0.137	0.739*	0.568**

	(-1.76)	(-1.57)	(1.71)	(2.00)
POPGRT	-1.828**	-1.215**	5.385**	3.269*
	(-2.14)	(-2.16)	(2.02)	(1.91)
GDP	-0.014***	0.001	0.030***	-0.001
	(-5.85)	(0.44)	(4.33)	(-0.37)
ROA	0.550***	-1.593***	-1.610***	4.360***
	(14.23)	(-48.32)	(-14.93)	(48.02)
LEV	0.048***	0.001	-0.147***	0.004
	(3.41)	(0.06)	(-3.73)	(0.12)
SIZE	0.007***	0.009***	-0.020***	-0.023***
	(5.81)	(10.18)	(-5.54)	(-9.79)
FOROPS	-0.006	0.009***	0.020	-0.025***
	(-1.26)	(2.64)	(1.42)	(-2.62)
BM	0.000*	-0.000	-0.001**	0.000
	(1.96)	(-1.24)	(-2.04)	(1.11)
AGGR_LOSS	-0.076***	0.072***	0.219***	-0.198***
	(-3.93)	(9.86)	(4.03)	(-9.82)
COCF	-0.301***	-2.291***	0.746***	6.320***
	(-7.14)	(-49.14)	(6.45)	(48.93)
INTANG	-0.055***	0.002	0.171***	-0.005
	(-4.36)	(0.22)	(4.65)	(-0.20)
PPE	0.060***	0.051***	-0.181***	-0.143***
	(5.34)	(5.93)	(-5.61)	(-5.69)
R&D	0.141**	0.095*	-0.408**	-0.186
	(2.40)	(1.92)	(-2.56)	(-1.31)
DAP	0.127***	0.049***	-0.336***	-0.136***
	(8.95)	(6.10)	(-9.11)	(-6.30)
Intercept	1.647***	2.129***	-2.648***	-5.120***
	(6.02)	(13.32)	(-3.19)	(-10.72)
Observations	41,424	41,424	41,424	41,424
Adjusted R^2	0.079	0.295	0.074	0.283