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# How does mandatory IFRS adoption affect tax planning decision? Evidence from tax avoidance distributions

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## ABSTRACT

The extant literature has provided much evidence on the consequences of adopting the International Financial Reporting Standards (IFRS), but studies that pertain to taxes and the IFRS are rare. This study investigates whether IFRS adoption affects corporate tax avoidance and how the impact of IFRS varies with country-level institutions. We find that the effect of an IFRS mandate on corporate tax avoidance is conditional; that is, firms with a lower (higher) initial level of tax avoidance tend to be more (less) tax aggressive after IFRS adoption. In addition, this conditional impact is more pronounced in regimes with higher levels of investor protection. We also find that the strength of country-level tax enforcement might erode (bolster) the positive (negative) effects of IFRS adoption.

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## 1. Introduction

The International Financial Reporting Standards (IFRS) have been widely accepted around the globe. To date, 87% of the member jurisdictions require most domestically accountable companies to adopt the IFRS.<sup>1</sup> In considering the continued trend of increase towards adopting the IFRS worldwide, a better understanding of the related economic consequences is essentially important to researchers, policy makers and regulators. While a large body of academic research has addressed the effects of IFRS mandate on financial reporting quality, capital market outcomes, corporate decision making, stewardship and governance, debt contracting and auditing in the last decade, studies that pertain to taxes and the IFRS are still scarce (Brüggemann et al., 2013; Emmanuel et al., 2016).<sup>2</sup> This study intends to address this knowledge gap by exploring the impact of IFRS adoption on corporate tax avoidance in an international setting.

The primary objective of the IFRS is to ensure transparency and comparability of financial statements and hence the efficient functioning of the capital market. However, the impacts of a transition to the IFRS adoption (hereinafter the adoption) are not only limited to accounting numbers, but also concerned with tax saving

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<sup>1</sup>The IFRS Foundation, Use of IFRS Standards around the world: <http://go.ifrs.org/iasb-profiles>.

<sup>2</sup>Brüggemann et al. (2013) and Emmanuel et al. (2016) review studies on IFRS adoption.

opportunities and managerial incentives which in turn can impact the engagement of a firm in tax avoidance.

On one hand, the harmonisation of accounting standards facilitates comparable financial information, which in turn motivates compensation committees to put more weight on accounting-based performance evaluations in post-IFRS periods (Ozkan et al., 2012; Wu & Zhang, 2009, 2019). To receive higher income and compensation benefits, managers are more likely to report less taxes (Graham et al., 2014; Powers et al., 2016). In addition, investors can better detect a firm's under sheltering when its financial statements are comparable. They would then increase the pressure on managers to enhance tax avoidance (Khan et al., 2017). In short, the increase in comparability after the adoption may encourage corporate tax avoidance.

On the other hand, the increased transparency after an IFRS transition could also challenge tax avoidance activities. From the agency perspective, environment which falls short on transparency might be used to conceal managerial rent extraction (Hanlon & Heitzman, 2010). Therefore, a more transparent information environment after IFRS adoption tends to increase the risk of detection, which discourages tax sheltering.

In summary, given the potential risk and return of tax avoidance mentioned above, managers need to trade off the benefits and costs following IFRS adoption when making tax decisions. In fact, firms avoid taxes at different levels even if offered similar tax codes (Dyreng et al., 2017) because tax avoidance is a high-risk activity, and managers have individual incentives and different adversities to risk when making decisions (Armstrong et al., 2015; Kovermann & Velte, 2019). Hence, the initial level of tax aggressiveness in the pre-adoption period should be considered when exploring the effect of IFRS adoption on tax avoidance.

For firms that engage less in tax avoidance prior to IFRS adoption, the existing tax risk is lower. Managers tend to take advantage of potential tax opportunities that arise from the adoption and avoid more taxes.

In contrast, for firms that have achieved higher levels of tax avoidance prior to IFRS adoption, the existing tax risk is higher. The enhanced transparency resulted from IFRS adoption may greatly increase the visibility of tax avoidance strategies to shareholders and tax authorities. Thus, reducing engagement in tax avoidance seems to be a feasible option for managers after the adoption.

Furthermore, the pre-existing country-level institutional environment may also impact the effectiveness of IFRS adoption (Wu & Zhang, 2019). Previous studies in the literature have indicated that investor protection and tax enforcement play essential roles in corporate tax avoidance (Atwood et al., 2012; Kovermann & Velte, 2019). Hence, we proceed to test cross-sectional predictions based on these two country-level institutions.

Using a sample that consists of firms in 23 countries with mandatory IFRS adoption, we find that firms with a lower (higher) initial level of tax avoidance tend to be more (less) tax aggressive after IFRS adoption. These results hold in a propensity-score-matched (PSM)-difference-in-difference (DID) analysis.<sup>3</sup> In addition, this impact is found to be more pronounced in countries with strong investor protection. Meanwhile,

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<sup>3</sup>Firms in 13 countries that have not adopted IFRS on a mandatory basis during the sample period (2003–2009) comprise the benchmark sample in the PSM-DID analysis. The results hold even if we include the tax avoidance variable in the matching process, as shown in Table 13.

the strength of country-level tax enforcement might erode (bolster) the positive (negative) effects of IFRS adoption.

We make several contributions to the literature. First, this study addresses the research gap about impacts of IFRS adoption on corporate tax avoidance. Emmanuel et al. (2016) find that a large body of academic research has addressed the effects of global accounting standard transition in many areas, but there are a paucity of studies that focus on taxes and IFRS adoption. Amidu et al. (2016) use a small sample (119 non-financial firms in Ghana) and argue that the tax avoidance decision of firms depends on the effect of IFRS adoption on the earnings quality. In contrast, we investigate both the potential opportunities and the challenges for tax planning that stem from IFRS adoption.

Second, this paper extends the emerging research work on tax avoidance distribution. We take managerial incentives and risk preference into consideration and examine how the adoption is related to the observed levels of tax avoidance. Our research design is more accurate than those that only estimate the average effect of IFRS adoption on tax avoidance for all firms.

Third, this study adds to the literature by examining the role of investor protection in corporate tax avoidance. Armstrong et al. (2015) prove that the relationship between firm-level corporate governance and tax avoidance differs with the degree of tax aggressiveness. Our finding demonstrates a similar phenomenon at the country-level investor protection when local accounting standards switch to IFRS.

Finally, this study responds to the increased attention on tax enforcement worldwide (Atwood et al., 2012; De Simone et al., 2018). We show that country-level tax enforcement has a critical role in determining the consequences of an IFRS mandate for different levels of tax avoidance. Our finding aligns with the argument that high tax enforcement is a means of inhibiting tax avoidance and increasing tax collection (Atwood et al., 2012; De Simone et al., 2018). Our study emphasises the role that tax enforcement plays in constraining tax avoidance resulting from IFRS adoption, thus is a valuable reference source for tax policy makers. Our findings help practitioners, regulators and researchers to better understand the tax effects of IFRS adoption.

The rest of the paper is organised as follows. Section 2 discusses the literature and develops the hypotheses. Section 3 outlines the research design and construction of the sample. The primary results are reported in Section 4, and robustness tests are presented in Section 5. Section 6 concludes.

## **2. Related literature and hypothesis development**

### ***2.1. The opposite impacts of IFRS adoption on tax avoidance***

Two oft-stated objectives of IFRS adoption are to enhance reporting quality and improve comparability of financial statements across countries. However, the transition to IFRS not only greatly changes financial reporting, but also leads to unintended outcomes which may influence the decisions of stakeholders (Brüggemann et al., 2013).

#### ***2.1.1. IFRS adoption may increase tax avoidance***

The adoption of IFRS enhances the comparability of financial information across countries, which facilitates compensation committees to choose proper peers (both

domestic and foreign) as a benchmark to evaluate the performance of the managers. Ozkan et al. (2012) examine how the mandatory adoption of IFRS affects the contractual usefulness of accounting information in executive compensation. They find a weak increase in accounting based pay-performance sensitivity and a significant increase in accounting-based RPE using foreign peers in the post-adoption period. Wu and Zhang (2009) find that the voluntary adoption of IFRS is associated with changes in the firm's internal performance evaluation process; in particular, it is associated with increases in the sensitivities of CEO turnover and employee layoffs to accounting earnings. In a setting of mandatory IFRS adoption, Wu and Zhang (2019) find similar results.<sup>4</sup>

Previous studies also show that if compensation packages are more correlated with accounting earnings, especially after-tax earnings, managers might implement tax planning strategies to reduce tax expenses and improve performance, such as higher earnings per share (EPS). For example, in a survey study, Graham et al. (2014) show that 57 percent of public firms say that increase in earnings per share is an important outcome from a tax planning strategy. Rego and Wilson (2012) find that stock option convexity is positively related to tax aggressiveness. Gaertner (2014) examines and finds the use of after-tax accounting earnings in CEO bonus compensation leads to greater corporate tax avoidance.

Kubick et al. (2015) show that firms imitate the tax strategies of their product market leaders. The enhanced comparability and transparency following IFRS adoption can help under-sheltered firms to identify, investigate, and learn from peer tax strategies. In addition, investors better detect a firm's under sheltering when its financial statements are comparable. They would then increase the pressure on managers to enhance tax avoidance (Khan et al., 2017).

### ***2.1.2. IFRS adoption may decrease tax avoidance***

The increased transparency in financial reporting and disclosure after IFRS adoption may lay extra burdens on tax planning. Kerr (2019) mentions that transparent environment can increase tax-related costs in many areas. For instance, if the information of firms is transparent, tax authorities can monitor and police firms within its jurisdiction more efficiently. Besides, public interest groups, such as tax watchdog groups and business journalists, are also interested in the tax-related behaviours of firms. They seek to identify firms that actively avoid taxes and then petition policy makers to enact policy responses. The ability of such groups to identify tax sheltering activities is positively related to the transparency of corporate information.

## ***2.2. Trade-off between the risk and return of tax avoidance after IFRS adoption***

Due to the both effects of IFRS adoption, managers need to trade off the risk and return of tax avoidance after the mandate of IFRS adoption.

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<sup>4</sup>The existing literature also provides mixed evidence on whether the adoption of IFRS has improved earnings comparability (e.g. Lang et al., 2010; DeFond et al., 2011; Fargher & Zhang, 2014). Moreover, if IFRS improves earnings quality, the increased informativeness of earnings for evaluation of management's effort might reduce the need for the use of RPE (Sloan, 1993).

For firms with lower level of tax avoidance prior to the adoption, on one hand, the existing tax risk is low. On the other hand, the increased comparability of earnings across peer firms resulted from IFRS adoption motivates compensation committees to increase their reliance on accounting earnings for managerial monitoring and compensation purposes. Thus, managers can benefit more from tax avoidance. In this case, the return of tax avoidance dominates risk in the post-adoption period.

For firms with higher level of tax avoidance prior to the adoption, the existing tax risk is already high. The heightened transparency in financial reporting and disclosure after IFRS adoption would exacerbate the likelihood of detection, and thus inhibit engagement in tax avoidance activities (Kerr, 2019). Hence, even though IFRS can bring about some tax sheltering opportunities, the incremental risk of tax avoidance that arise from the enhanced transparency after IFRS transition for these firms may exceed the corresponding return. In this case, the risk of tax avoidance dominates return in the post-adoption period.

Based on the arguments above, we argue that managers' risk and return of tax avoidance following IFRS adoption depends on the level of their tax avoidance prior to the adoption. We propose the following hypotheses based the initial level of tax avoidance prior to the adoption:

**H1a:** Firms with a lower initial level of tax avoidance tend to be more tax aggressive after IFRS adoption.

**H1b:** Firms with a higher initial level of tax avoidance tend to be less tax aggressive after IFRS adoption.

### **2.3. The role of country-level institutional environment**

Previous studies show that corporate tax avoidance might be impacted by the institutional environment (Atwood et al., 2012; Kanagaretnam et al., 2016). It would be interesting to examine whether and how country-level institutions shape the effects of IFRS adoption on tax avoidance.

#### **2.3.1. Investor protection institutions**

La Porta et al. (1998) argue that fundamentally important corporate governance mechanisms depend on the extent to which a country's laws protect investor rights, and the extent to which those laws are enforced. Previous studies in the literature documents that external governance mechanisms such as country-level investor protection institutions have crucial influence on corporate insiders' incentives and behaviour (DeFond & Huang, 2004; Doidge et al., 2007; Hail & Leuz, 2006; Haw et al., 2004, 2011; La Porta et al., 2000). For instance, La Porta et al. (2000) argue that strong investor protection can provide a good governance environment and then help to deter managers from opportunistic and inefficient behaviour. DeFond and Huang (2004) demonstrate the greater tendency to shield poorly performing CEOs in countries with strong investor protection. Consistent with this argument, Armstrong et al. (2015) find that good (internal) corporate governance mechanism encourages tax avoidance, but discourages extreme tax avoidance due to the tax risk. Siekkinen (2016) examines whether the value relevance of fair values varies across investor protection environments and finds

that fair values are relevant in countries with a strong or medium investor protection environment.

In line with this argument, for firms with lower initial levels of tax avoidance prior to the adoption, managers tend to avoid risk, are passive, and work inefficiently. Strong investor protection institutions can align the interests of managers with those of shareholders, and mitigate managerial risk-averseness. In this regard, inefficient managers would be encouraged to use more tax opportunities that arise from the adoption and save more on taxes to report higher earnings. We thus infer that the positive effect of IFRS adoption on tax avoidance in H1a will be more pronounced in countries with stronger investor protection regimes in place.

However, for firms with higher initial levels of tax avoidance prior to the adoption, managers tend to take risk, are active, and work efficiently. Given a higher level of tax risk, stronger investor protection would constrain managers' incentives for tax avoidance as well as managerial diversion (Armstrong et al., 2015; Atwood & Lewellen, 2019), resulting in a more pronounced negative relationship between IFRS adoption and tax avoidance.

Taken together, we propose that the conditional effects of IFRS adoption on corporate tax avoidance vary among the levels of investor protection.

**H2a:** For firms with a lower initial level of tax avoidance, the positive effect of IFRS adoption on corporate tax avoidance is more pronounced in countries with stronger investor protection institutions.

**H2b:** For firms with a higher initial level of tax avoidance, the negative effect of IFRS adoption on corporate tax avoidance is more pronounced in countries with stronger investor protection institutions.

### 2.3.2. Tax enforcement

Enforcement is a critical process for tax systems (Basri et al., 2021). On the one hand, enforcement ensures the compliance of taxpayers and tax authorities with mandatory rules and procedures. On the other hand, enforcement also involves actions that identify and punish noncompliance through random and targeted audits, penalty assessments, and so on and so forth (De Simone et al., 2018). In a recent study, Basri et al. (2021) emphasise the importance of tax enforcement and find that improved tax administration is equivalent to raising tax rates in increasing tax revenue.

The arguments above imply that the effect of IFRS adoption on tax avoidance may vary across countries with different tax enforcement environments. Atwood et al. (2012) demonstrate that stronger tax enforcement is perceived to increase the likelihood of detection and penalty, which ultimately reduces corporate tax avoidance. A regime with strong tax enforcement appears to discourage those who take advantage of tax-related opportunities. Accordingly, we propose that:

**H3a:** For firms with a lower initial level of tax avoidance, the positive effect of IFRS adoption on tax avoidance decreases with the strength of tax enforcement.

**H3b:** For firms with a higher initial level of tax avoidance, the negative effect of IFRS adoption on tax avoidance increases with the strength of tax enforcement.

### 3. Research design and sample construction

#### 3.1. Research design

##### 3.1.1. Measurement of tax avoidance (*TaxAvoid*)

Following Atwood et al. (2012), we calculate the tax avoidance level (*TaxAvoid*) of firm  $i$  in year  $t$  as follows:

$$TaxAvoid_{it} = \frac{[\sum_{t-2}^t (PTEBX \times TaxRate)_{it} - \sum_{t-2}^t CTP_{it}]}{\sum_{t-2}^t PTEBX_{it}} \times 100 \quad (1)$$

where *PTEBX* are the pre-tax earnings before extraordinary items (Item #01401); *TaxRate* is the statutory corporate income tax rate;<sup>5</sup> and *CTP* denotes the current income taxes paid.<sup>6</sup> This measure indicates the total amount of income tax that the firm can avoid, and a larger value signifies a greater likelihood that this firm will engage in tax avoidance activities.

##### 3.1.2. Model specifications and other variables

Following Atwood et al. (2012), we test the effect of IFRS adoption on corporate tax avoidance by using the following model:

$$\begin{aligned} TaxAvoid_{it} = & \beta_0 + \beta_1 Mandatory_i + \beta_2 Post_{it} + \beta_3 Mandatory_i * Post_{it} \\ & + \beta_4 BTaxC_{it} + \beta_5 TaxRate_{it} + \beta_6 EarnVol_{it} + \beta_7 ROA_{it} \\ & + \beta_8 Size_{it} + \beta_9 R\&D_{it} + \beta_{10} Leverage_{it} + \beta_{11} PPE_{it} \\ & + \beta_{12} SalesGrow_{it} + \beta_{13} OwnerCon_{it} + \beta_{14} Multi_{it} \\ & + FixedEffects + \varepsilon_{i,t} \end{aligned}$$

where *TaxAvoid* is the tax avoidance measure from Equation (1), and *Mandatory* equals one for those who make it mandatory to adopt IFRS and zero for the benchmark firms. *Post* equals one in the post-IFRS period and zero otherwise.

The country-level control variables are defined as follows: (1) *BTaxC* is a measure of the required book-tax conformity from Atwood et al. (2010); (2) *TaxRate* (statutory corporate income tax rate) is the tax system characteristic associated with the tax avoidance tendencies of a firm. Generally, firms in countries with a higher statutory corporate income tax rate would be more incentivised to implement tax planning; and (3) *EarnVol* is the scaled descending decile rank of cross-sectional pre-tax earnings volatility by country-year, which controls for changes in pre-tax earnings.

We also include firm-level control variables commonly used in previous tax studies, such as firm profitability (*ROA*), firm size (*Size*), research and development expenses

<sup>5</sup>We manually collected these statutory rates from the official website of the Organization for Economic Co-operation and Development (<https://data.oecd.org/>), Ernst & Young Worldwide corporate tax guide and KPMG LLP online summary. This represents the basic combined central and sub-central (statutory) corporate income tax rate given by the adjusted central government rate plus the sub-central rate.

<sup>6</sup>*CTP* = total tax expense (Item #01451) – deferred taxes (Item #04199) – changes of tax payable (Item #03063). If missing, it is replaced with Current taxes paid (Item #04150) in the Worldscope Database which represents the amount of income taxes paid as reported on the cash flow statement.



(*Re&D*), capital structure (*Leverage*), property, plant and equipment (*PPE*), sales growth (*SalesGrow*), ownership structure (*OwnerCon*), and multinational operations (*Multi*). All variables are defined in Appendix A.

### 3.1.3. Country-level institutional environment indices

We use the modified “anti-director rights index” (*ADRI*) in Spamann (2010) as a proxy for investor protection institutions. A larger index indicates stronger investor protection.

Following Atwood et al. (2012), we use the tax evasion index from the 1996 *World Competitiveness Report* as the proxy of perceived tax enforcement (*TaxEnf*) in a country. A higher index value means that the level of tax evasion is lower, so then the strength of tax enforcement is perceived to be higher.

## 3.2. Sample selection

All financial reporting data to calculate the variables are obtained from the *Worldscope* Database. We apply several data filters as follows: first, all the financial institutions (Standard Industrial Classification Code 6000-6099) are excluded. Second, following Tan et al. (2011), we define those who adopt the IFRS based on “Accounting Standards Followed” (#07536) and exclude the ambiguous IFRS users.<sup>7</sup> Third, following Atwood et al. (2012), we exclude firm-year observations without three years of positive pre-tax earnings before extraordinary items (*PTEBX*) and current income tax paid (*CTP*) to calculate *TaxAvoid*. Lastly, all firm-level variables are winsorised at 1% for two tails.

Our full sample consists of 9782 firm-year observations from 23 countries that have made the IFRS mandatory for fiscal years ending in December 2005. To capture the effect of IFRS adoption on corporate tax avoidance, the sample period covers two years before and after the adoption. Specifically, since the dependent variable, *TaxAvoid*, is a long-run tax avoidance measure which is calculated by using three years of financial data, the pre-IFRS period is 2003 and 2004, and post-IFRS period is 2008 and 2009.<sup>8</sup> Following current mainstream studies on IFRS adoption (Emmanuel et al., 2016), we eliminate observations in 2005 to avoid the potentially confounding effects in the transition year. In addition, we further categorise all of the firms into 4 groups based on the 25th, 50th and 75th percentiles of the mean tax avoidance level before IFRS adoption<sup>9</sup> because we intend to explore the conditional effect of the adoption on corporate tax avoidance.

In addition, we construct a PSM sample to match firms in IFRS countries with those in 13 non-IFRS countries. Our PSM analysis begins by estimating a firm-level logistic model with data from 2004 (one year immediately prior to the adoption). To be included in our PSM sample, a firm must appear both in the pre- and post-adoption periods.<sup>10</sup> We

<sup>7</sup>We exclude: (1) firms that have voluntarily used IFRS before they are adopted on a mandatory basis in their resident country, (2) firms that switched from IFRS to local standards or the U.S. GAAP, and (3) firms that switch between IFRS and the U.S. GAAP from time to time. The specific accounting standard code and the classification criteria to identify IFRS users in *Worldscope* are shown in Appendix B.

<sup>8</sup>The dependent variable, *TaxAvoid*, is a long-run tax avoidance measure which is calculated by using 3 years of financial data. For example, *TaxAvoid* in 2008 captures the 3-year average tax avoidance level (from 2006 to 2008) after IFRS adoption.

<sup>9</sup>The cut off points to categorize the groups are  $-0.021$ ,  $0.068$  and  $0.214$  respectively.

<sup>10</sup>In other words, we exclude firms that do not show up in the pre- or post-IFRS periods. As firms may show up once or twice in the pre-IFRS (or post-IFRS) period, the sample constructed here is unbalanced. In addition, we also use the firms that show up in all four years of our sample period to construct a balanced sample in a robustness check.

match, without replacement, each firm-year in 2004 where *Mandatory* is coded 1 with a firm-year in 2004 with *Mandatory* equal to 0 and having the closest propensity score. This procedure results in a PSM sample of 9918 firm-year observations.<sup>11</sup>

### 3.3. Descriptive statistics

Table 1 presents the sample distribution by country. Panel A provides the composition of the main sample of the 23 countries or economies. The panel shows that the United Kingdom (UK), France and Hong Kong account for 42.6% of the sample. Panel B presents the distribution of the PSM sample. The UK and United States (US) account for the largest share of the treatment and benchmark groups respectively.

Table 2 shows the value of the modified *ADRI* and *TaxEnf* of the 23 countries with mandatory adoption of the IFRS. The median of *ADRI* and *TaxEnf* is 4 and 3.41 respectively.

Table 3 presents the descriptive statistics of our two samples. Panel A shows that in general, there is no significant difference in the *TaxAvoid* between the two periods in the main sample.

In Panel B, we break down the main sample into four groups based on the average *TaxAvoid* of 2003 and 2004. In doing so, we show that the mean and median of *TaxAvoid* increase significantly after the adoption for firms with a lower (bottom 25%, 25%–50%) initial level of tax avoidance. In contrast, the mean and median of *TaxAvoid* decrease significantly for firms with a higher (top 25%, 50%–75%) initial level of tax avoidance. This phenomenon is further demonstrated in Figure 1. We do not observe a trend of increase or decrease for *TaxAvoid* in the pre- or post-adoption period. However, *TaxAvoid* experiences a significant change during the transition period. This phenomenon is in agreement with the predictions of H1a and H1b.

Panel C presents the covariate balance metrics of the PSM sample (unbalanced).<sup>12</sup> The mean differences of the firm-level control variables between the treatment and benchmark groups prior to the adoption are insignificant across all of the covariates in the four groups.<sup>13</sup> This indicates that the pair-matched firms have similar characteristics and the common support of the PSM analysis is satisfied.

Table 4 shows the Pearson correlation matrix of the variables in the main sample. The proxy of tax avoidance, *TaxAvoid*, is significantly and negatively related to the measure of book-tax conformity (*BTaxC*) and strength of *TaxEnf*, which is consistent with previous tax studies (for e.g. Atwood et al., 2012).

<sup>11</sup>Our sample period covers two years before and after the transition to IFRS. Hence, if we only implement propensity score matching year by year, the firms in the control group may not be consistent. To deal with this concern, we use the financial data of 2004 to conduct the matching procedure to determine the paired firms to construct the PSM sample. Consequently, the above one-to-one nearest neighbor matching will result in the same number of firms as opposed to the firm-years in the treatment and control groups.

<sup>12</sup>We also use a balanced PSM sample, i.e. to be included in the balanced PSM sample, a firm must show up in all the four years of our sample period.

<sup>13</sup>As we have defined above, all the firms in the IFRS mandatory countries will be categorized based on the 25th, 50th and 75th percentiles of the mean tax avoidance level before IFRS adoption, and the main sample is split into 4 sub-groups in which the hypotheses are tested respectively.

**Table 1.** Sample distribution by country.

Panel A. Main sample composition					
IFRS country	No. of observations	Percent			
Australia	865	8.8%			
Austria	144	1.5%			
Belgium	164	1.7%			
Czech Rep	26	0.3%			
Denmark	231	2.4%			
Finland	247	2.5%			
France	1272	13.0%			
Germany	913	9.3%			
Greece	350	3.6%			
Hong Kong	1198	12.2%			
Hungary	42	0.4%			
Ireland	72	0.7%			
Luxembourg	56	0.6%			
Netherlands	285	2.9%			
Norway	195	2.0%			
Philippines	204	2.1%			
Poland	116	1.2%			
Portugal	83	0.8%			
South Africa	477	4.9%			
Spain	255	2.6%			
Sweden	462	4.7%			
Switzerland	422	4.3%			
UK	1703	17.4%			
Total	9782	100%			

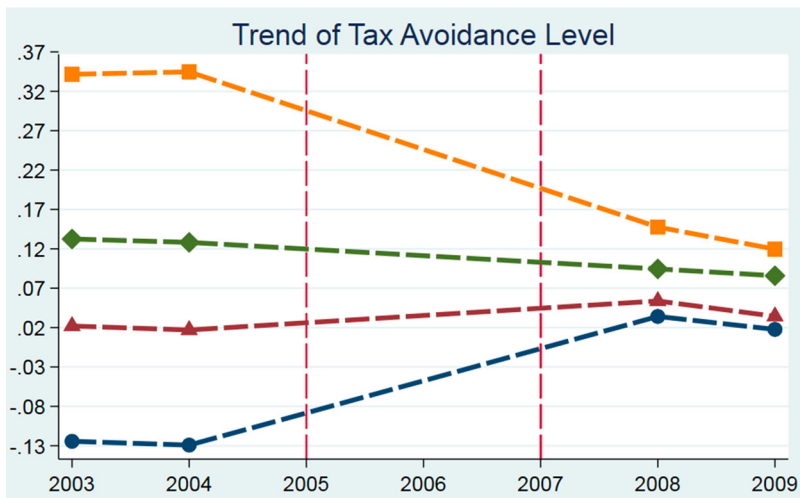
Panel B. PSM sample composition					
Treatment	No. of Obs.	Percent	Benchmark	No. of Obs.	Percent
Australia	412	7.8%	Argentina	28	0.6%
Austria	80	1.5%	Brazil	113	2.4%
Belgium	83	1.6%	Canada	228	4.9%
Czech Rep	25	0.5%	Chili	42	0.9%
Denmark	102	1.9%	India	132	2.8%
Finland	150	2.8%	Indonesia	10	0.2%
France	552	10.5%	Japan	662	14.3%
Germany	471	8.9%	Malaysia	451	9.7%
Greece	171	3.2%	Mexico	35	0.8%
Hong Kong	908	17.2%	Pakistan	29	0.6%
Hungary	33	0.6%	Peru	39	0.8%
Ireland	36	0.7%	Russia	3	0.1%
Luxembourg	28	0.5%	Sri Lanka	14	0.3%
Netherlands	135	2.6%	Taiwan	393	8.5%
Norway	110	2.1%	Thailand	194	4.2%
Philippines	155	2.9%	Turkey	82	1.8%
Poland	68	1.3%	US	2190	47.1%
Portugal	53	1.0%			
South Africa	301	5.7%			
Spain	140	2.7%			
Sweden	269	5.1%			
Switzerland	245	4.6%			
UK	746	14.1%			
Total	5273	100%	Total	4645	100%

Note: All countries have adopted IFRS for fiscal years that end in December 2005 on mandatory basis  
This table gives the number and percentage of firm-year observations by country.

**Table 2.** Country-level institutional environment proxies.

	<i>ADRI</i>	<i>TaxEnf</i>
Australia	4	4.58
Austria	4	3.6
Belgium	2	2.27
Czech Rep	–	2.54
Denmark	4	3.7
Finland	4	3.53
France	5	3.86
Germany	4	3.41
Greece	3	2.36
Hong Kong	4	4.56
Hungary	–	1.97
Ireland	4	3.55
Luxembourg	–	4.25
Netherlands	4	3.4
Norway	4	3.96
The Philippines	5	1.83
Poland	–	2.19
Portugal	4	2.18
South Africa	5	2.4
Spain	6	1.91
Sweden	4	3.39
Switzerland	3	4.49
UK	5	4.67

The modified anti-director rights index (*ADRI*) drawn from Spamann (2010) measures how shareholders and creditors are protected by law from expropriation by managers and controlling shareholders of firms. A higher index indicates stronger investor protection. The tax evasion index (*TaxEnf*) from the 1996 World Competitiveness Report is used as the proxy of perceived tax enforcement in a country. A larger value means that the level of tax evasion is lower, which means that the strength of tax enforcement is perceived to be higher.

**Figure 1.** Tax avoidance around the adoption of IFRS.

**Table 3.** Descriptive statistics.

Panel A. Descriptive statistics of the main sample												
Treatment	Pre-IFRS adoption period (N = 4984)					Post-IFRS adoption period (N = 4798)					Mean differences	Median differences
	Mean	Median	Std.	P25	P75	Mean	Median	Std.	P25	P75	t-stat	$\chi^2$
<i>TaxAvoid</i>	0.076	0.055	0.191	-0.028	0.179	0.072	0.051	0.174	-0.017	0.155	-1.163	0.792
<i>BTaxC</i>	0.319	0.239	0.244	0.130	0.522	0.364	0.289	0.267	0.178	0.533	8.676***	49.241***
<i>TaxRate</i>	0.304	0.300	0.065	0.280	0.354	0.273	0.280	0.056	0.250	0.302	-25.477***	194.481***
<i>EarnVol</i>	0.333	0.304	0.278	0.065	0.500	0.417	0.370	0.281	0.174	0.630	14.838***	129.040***
<i>ROA</i>	0.109	0.082	0.093	0.046	0.142	0.105	0.077	0.095	0.041	0.138	-2.170**	12.385***
<i>Size</i>	13.340	13.240	2.279	11.700	14.880	13.750	13.720	2.309	12.070	15.310	8.749***	56.608***
<i>R&amp;D</i>	0.012	0.000	0.034	0.000	0.003	0.012	0.000	0.032	0.000	0.004	0.708	10.371***
<i>Leverage</i>	0.128	0.094	0.130	0.011	0.206	0.135	0.101	0.137	0.009	0.221	2.730***	2.489
<i>PPE</i>	0.332	0.281	0.249	0.132	0.477	0.302	0.244	0.249	0.099	0.445	-6.046***	36.326***
<i>SalesGrow</i>	0.269	0.127	0.623	-0.011	0.332	0.254	0.145	0.567	-0.006	0.352	-1.236	10.207***
<i>OwnerCon</i>	0.412	0.433	0.289	0.149	0.646	0.410	0.422	0.293	0.139	0.647	-0.211	0.561
<i>Multi</i>	0.285	0	0.451	0	1	0.263	0	0.440	0	1	-2.404**	5.778**

Panel B. <i>TaxAvoid</i> distribution in the main sample						
	Pre-IFRS adoption period (N = 4984)		Post-IFRS adoption period (N = 4798)		Mean differences	Median differences
	Mean	Median	Mean	Median	t-stat	$\chi^2$
<i>TaxAvoid</i>						
Top 25%	0.341	0.312	0.135	0.130	-29.658***	582.670***
50%-75%	0.130	0.126	0.090	0.073	-7.903***	113.472***
25%-50%	0.019	0.017	0.045	0.026	5.617***	11.610***
Bottom 25%	-0.124	-0.091	0.027	0.190	26.178***	538.504***

Panel C. Covariate balance metrics of the PSM sample (unbalanced)												
Groups	Group 1: Bottom 25%			Group 2: 25-50 percentiles			Group 3: 50-75 percentiles			Group 4: Top 25%		
	Treatment	Benchmark	Differences	Treatment	Benchmark	Differences	Treatment	Benchmark	Differences	Treatment	Benchmark	Differences
	N = 664	N = 571	t-stat	N = 711	N = 592	t-stat	N = 823	N = 707	t-stat	N = 450	N = 433	t-stat
<i>ROA</i>	0.100	0.103	-0.680	0.126	0.133	-0.878	0.118	0.124	-1.211	0.107	0.112	-0.270
<i>Size</i>	13.794	13.877	-0.626	13.798	13.735	0.531	13.830	13.761	0.615	13.855	13.756	0.593
<i>R&amp;D</i>	0.016	0.015	0.494	0.011	0.014	-1.601	0.010	0.012	-0.836	0.014	0.020	-1.585
<i>Leverage</i>	0.126	0.127	-0.076	0.122	0.113	1.199	0.117	0.116	0.202	0.177	0.162	1.174
<i>PPE</i>	0.318	0.326	-0.621	0.336	0.325	0.615	0.394	0.406	-0.746	0.451	0.425	1.126
<i>SalesGrow</i>	0.308	0.313	-0.891	0.405	0.390	0.081	0.378	0.366	0.327	0.637	0.462	0.527

Note: All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption.

**Table 4.** Pearson correlation matrix of the main sample.

	<i>TaxAvoid</i>	<i>Post</i>	<i>BTaxC</i>	<i>TaxRate</i>	<i>EarnVol</i>	<i>ROA</i>	<i>Size</i>	<i>R&amp;D</i>	<i>Leverage</i>	<i>PPE</i>	<i>SalesGrow</i>	<i>OwnerCon</i>	<i>Multi</i>	<i>ADRI</i>
<i>Post</i>	-0.008													
<i>BTaxC</i>	-0.047***	0.177***												
<i>TaxRate</i>	0.037***	-0.251***	-0.262***											
<i>EarnVol</i>	-0.018*	0.156***	0.683***	0.098***										
<i>ROA</i>	-0.011	-0.023**	-0.118***	0.018*	-0.111***									
<i>Size</i>	-0.059***	0.089***	0.019*	-0.198***	0.062***	-0.077***								
<i>R&amp;D</i>	-0.003	-0.007	0.001	0.041***	0.021**	0.152***	-0.067***							
<i>Leverage</i>	0.055***	0.029***	0.091***	0.049***	0.088***	-0.233***	0.306***	-0.121***						
<i>PPE</i>	0.090***	-0.063***	0.038***	-0.060***	-0.008	-0.000	0.199***	-0.173***	0.313***					
<i>SalesGrow</i>	0.111***	-0.007	-0.072***	-0.083***	-0.124***	0.214***	0.007	-0.029***	-0.011	0.089***				
<i>OwnerCon</i>	0.025**	-0.004	-0.043***	-0.092***	-0.018*	-0.004	0.014	-0.086***	-0.082***	0.073***	0.026**			
<i>Multi</i>	-0.017*	-0.025**	-0.134***	-0.332***	-0.272***	0.018*	0.204***	0.052***	-0.044***	-0.006	0.044***	-0.020*		
<i>ADRI</i>	0.048***	-0.033***	-0.212***	0.330***	-0.156***	0.001	-0.033***	-0.046***	0.013	-0.027***	0.014	-0.012	0.118***	
<i>TaxEnf</i>	-0.033***	-0.006	-0.290***	-0.446***	-0.545***	0.015	-0.115***	0.049***	-0.046***	-0.038***	0.073***	-0.000	0.294***	0.028***

Note: All variables are defined in Appendix A. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels respectively (two-tailed).

## 4. Empirical results

### 4.1. Effect of the IFRS adoption on corporate tax avoidance

Table 5 reports the empirical results from Equation (2) by using the main sample which includes 23 IFRS mandated. Groups 1–4 are the four groups which consist of firms with different initial levels of tax avoidance prior to IFRS adoption respectively. Our variable of interest, *Post*, is significantly positive in Groups 1 and 2, and significantly negative in Groups 3 and 4. Moreover, the magnitude of the coefficients on *Post* is larger in Groups 1 (0.133) and 4 (−0.202). This finding supports H1a and H1b, suggesting that IFRS adoption does not have a uniform effect on corporate tax avoidance, and the effect differs according to the initial level of tax avoidance of firms prior to the adoption.

Table 6 presents the PSM-DID analysis results. Panel A shows the empirical results from the unbalanced PSM sample. It can be observed that the coefficients on *Mandatory* are insignificant in Columns (1), (2), and (4), thus indicating that the *treatment* and *benchmark* groups have similar tax avoidance behaviour in the pre-adoption period. However, the coefficients on the interaction item, *Mandatory\*Post*, are significantly positive in Columns (1) and (2), but significantly negative in Column (4). This suggests that, compared to the benchmark firms, the treatment firms with a lower initial level of tax avoidance tend to be more tax aggressive, whereas the opposite is true of those with a higher level of initial tax avoidance after the adoption. Even though the coefficient on *Mandatory\*Post* is insignificant, it is still negative with a *t* value of 1.38.

Furthermore, we also conduct a PSM-DID analysis in a strictly balanced sample which only includes firms with four-year observations in our sample period.<sup>14</sup> The results reported in Panel B are consistent (except group 2). In summary, these findings provide convincing evidence to support H1a and H1b.

### 4.2. IFRS adoption, tax avoidance and investor protection

Panel A of Table 7 provides evidence of how engagement in tax avoidance after an IFRS mandate varies with investor protection institutions. In these tests, each group is further divided into two sub-groups based on the median of the modified *ADRI*, i.e. 4.<sup>15</sup> The coefficient on *Post* is 0.156 in Column 1 and 0.113 in Column 2 (both are significant at the 1% level), and the difference of the coefficients is 0.043, with significance at the 5% level. The result supports H2a in that the positive effect of IFRS adoption on corporate tax avoidance for firms with a lower initial level of tax avoidance is more pronounced in countries with stronger investor protection institutions.

Meanwhile, the coefficient on *Post* is −0.225 in Column 7 and −0.168 in Column 8 (both are significant at the 1% level). The difference of the coefficients is 0.057, with significance at the 5% level. The result indicates that the negative effect of IFRS adoption on corporate tax avoidance for firms with a higher initial level of tax avoidance is more pronounced in countries with stronger investor protection, consistent with H2b.

<sup>14</sup>We realize that the coefficients on *Mandatory* are significant in Columns (2) to (4), indicating the difference in *TaxAvoid* between the treatment and control groups prior to the adoption. This is because we do not control *TaxAvoid* in the matching process. We address this issue in Table 13 by considering *TaxAvoid* in the matching process.

<sup>15</sup>Countries with *ADRI* value of 4 are included in “Low *ADRI*” group. We obtain consistent results if we use Revised Anti-Direct Rights from Djankov et al. (2008) to proxy for investor protection (untabulated).

**Table 5.** Multivariate analysis of the effect of IFRS adoption on tax avoidance in the main sample.

	Dependent variable: <i>TaxAvoid</i>			
	Low level	Moderate level		High level
	Group 1 (1)	Group 2 (2)	Group 3 (3)	Group 4 (4)
<i>Post</i>	<b>0.133***</b> <b>(12.88)</b>	<b>0.032***</b> <b>(4.16)</b>	<b>-0.035***</b> <b>(-4.31)</b>	<b>-0.202***</b> <b>(-16.53)</b>
<i>BTaxC</i>	0.044 (1.41)	0.027 (1.32)	-0.013 (-0.48)	-0.037 (-1.07)
<i>TaxRate</i>	-0.407* (-1.76)	0.269 (1.56)	0.174 (0.77)	-0.059 (-0.25)
<i>EarnVol</i>	0.032 (1.58)	-0.001 (-0.04)	0.023 (1.08)	0.017 (0.55)
<i>ROA</i>	0.173*** (3.35)	0.027 (0.77)	-0.006 (-0.18)	-0.099** (-2.30)
<i>Size</i>	0.002 (0.65)	0.000 (0.16)	-0.001 (-0.33)	-0.006** (-2.16)
<i>R&amp;D</i>	0.129 (1.15)	-0.039 (-0.48)	0.016 (0.14)	0.124 (1.21)
<i>Leverage</i>	-0.004 (-0.11)	0.070*** (2.68)	0.048 (1.35)	-0.004 (-0.12)
<i>PPE</i>	0.004 (0.17)	0.024 (1.36)	-0.004 (-0.23)	0.029 (1.52)
<i>SalesGrow</i>	0.027*** (2.60)	0.013 (1.43)	0.017*** (4.16)	0.007 (1.33)
<i>OwnerCon</i>	-0.005 (-0.34)	-0.002 (-0.21)	-0.008 (-0.67)	-0.027* (-1.74)
<i>Multi</i>	-0.033** (-2.57)	0.014 (1.34)	-0.008 (-0.88)	0.004 (0.28)
<i>Constant</i>	0.049 (0.62)	-0.048 (-0.69)	0.172** (2.07)	0.415*** (5.17)
<i>Fixed effects</i>	Country, Industry	Country, Industry	Country, Industry	Country, Industry
<i>S.E. cluster</i>	Firm	Firm	Firm	Firm
<i>N</i>	2617	2554	2460	2151
<i>Adj. R<sup>2</sup></i>	0.26	0.06	0.07	0.31

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.



**Table 6.** PSM-DID analysis of the effect of IFRS adoption on tax avoidance.

Panel A. Unbalanced PSM sample				
Dependent variable: <i>TaxAvoid</i>				
	Low level	Moderate level		High level
	Group 1 (1)	Group 2 (2)	Group 3 (3)	Group 4 (4)
<i>Post</i>	0.049*** (4.17)	0.014 (1.28)	-0.020* (-1.91)	-0.149*** (-12.22)
<i>Mandatory</i>	-0.067 (-0.76)	0.068 (0.87)	0.142*** (3.44)	0.078 (0.94)
<i>Mandatory*Post</i>	<b>0.085***</b> <b>(4.94)</b>	<b>0.028**</b> <b>(2.04)</b>	<b>-0.019</b> <b>(-1.38)</b>	<b>-0.029*</b> <b>(-1.82)</b>
<i>BTaxC</i>	-0.024 (-0.56)	0.002 (0.08)	0.027 (0.72)	0.057 (1.52)
<i>TaxRate</i>	-0.152 (-0.53)	0.351* (1.77)	-0.050 (-0.21)	0.439* (1.76)
<i>EarnVol</i>	0.012 (0.44)	0.012 (0.53)	-0.003 (-0.14)	-0.069*** (-2.60)
<i>ROA</i>	0.117** (2.32)	0.006 (0.17)	-0.019 (-0.52)	-0.129*** (-3.35)
<i>Size</i>	0.002 (0.82)	0.001 (0.42)	0.001 (0.34)	-0.009*** (-3.62)
<i>R&amp;D</i>	0.212* (1.72)	0.076 (0.49)	0.153 (0.95)	0.223** (2.06)
<i>Leverage</i>	0.040 (1.09)	0.104*** (3.20)	0.104*** (3.33)	0.072** (2.34)
<i>PPE</i>	-0.013 (-0.55)	0.008 (0.42)	0.020 (1.08)	0.002 (0.15)
<i>SalesGrow</i>	0.027* (1.75)	0.039*** (3.53)	0.022*** (3.36)	0.022*** (3.62)
<i>OwnerCon</i>	-0.000 (-0.81)	-0.000 (-0.10)	-0.000 (-0.89)	-0.000 (-1.53)
<i>Multi</i>	-0.019* (-1.68)	-0.007 (-0.63)	0.002 (0.20)	-0.019* (-1.82)
<i>Constant</i>	0.119 (0.83)	-0.236** (-2.07)	-0.005 (-0.05)	0.383*** (3.73)
<i>Fixed effects</i>	Country, Industry	Country, Industry	Country, Industry	Country, Industry
<i>S.E. cluster</i>	Firm	Firm	Firm	Firm
<i>N</i>	2489	2605	3053	1771
<i>Adj. R<sup>2</sup></i>	0.16	0.11	0.13	0.41

Panel B. Balanced PSM sample				
Dependent variable: <i>TaxAvoid</i>				
	Low level	Moderate level		High level
	Group 1	Group 2	Group 3	Group 4
	(1)	(2)	(3)	(4)
<i>Post</i>	0.027*** (2.66)	0.011 (1.14)	-0.007 (-0.67)	-0.021 (-1.44)
<i>Mandatory</i>	-0.042 (-0.56)	0.170*** (4.55)	0.314*** (7.90)	0.181** (2.40)
<i>Mandatory*Post</i>	<b>0.080***</b> <b>(5.30)</b>	<b>0.004</b> <b>(0.25)</b>	<b>-0.030**</b> <b>(-2.06)</b>	<b>-0.159***</b> <b>(-7.51)</b>
<i>Fixed effects</i>	Country, Industry	Country, Industry	Country, Industry	Country, Industry
<i>S.E. cluster</i>	Firm	Firm	Firm	Firm
<i>N</i>	1552	1600	1432	848
<i>Adj. R<sup>2</sup></i>	0.27	0.16	0.25	0.51

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. All of the control variables are included. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.

**Table 7.** The role of country-level institutional environment.

Panel A. Investor protection								
Dependent variable: <i>TaxAvoid</i>								
	Low level		Moderate level				High level	
	Group 1		Group 2		Group 3		Group 4	
	High ADRI (1)	Low ADRI (2)	High ADRI (3)	Low ADRI (4)	High ADRI (5)	Low ADRI (6)	High ADRI (7)	Low ADRI (8)
<i>Post</i>	0.156*** (8.06)	0.113*** (9.75)	0.025** (2.09)	0.024** (2.53)	-0.032* (-1.83)	-0.032*** (-3.07)	-0.225*** (-8.50)	-0.168*** (-14.73)
<i>Difference (Prob &gt; chi2)</i>		<b>0.043** (0.048)</b>		0.001 (0.958)		0.000 (0.995)		<b>-0.057** (0.040)</b>
<i>Fixed effects</i>	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry
<i>S.E. cluster</i>	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
<i>N</i>	990	1554	1161	1331	880	1528	880	1218
<i>Adj. R<sup>2</sup></i>	0.26	0.36	0.10	0.05	0.09	0.08	0.31	0.48
Panel B. Tax enforcement								
	High TaxEnf	Low TaxEnf	High TaxEnf	Low TaxEnf	High TaxEnf	Low TaxEnf	High TaxEnf	Low TaxEnf
<i>Post</i>	<b>0.123*** (10.01)</b>	<b>0.162*** (7.97)</b>	0.031*** (3.02)	0.048*** (3.12)	-0.055*** (-2.90)	-0.017 (-1.52)	-0.200*** (-12.59)	-0.158*** (-9.33)
<i>Difference (Prob &gt; chi2)</i>		<b>0.039* (0.086)</b>		0.170 (0.354)		-0.190* (0.073)		<b>-0.042* (0.059)</b>
<i>Fixed effects</i>	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry
<i>S.E. cluster</i>	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
<i>N</i>	1777	840	1691	863	1636	824	1301	850
<i>Adj. R<sup>2</sup></i>	0.35	0.33	0.07	0.08	0.09	0.06	0.33	0.42

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. All of the control variables are included. Country and industry fixed effects are included. Standard errors are clustered by firm. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.

### 4.3. IFRS adoption, tax avoidance and tax enforcement

Panel B of Table 7 shows the impacts of tax enforcement on the relationship between IFRS adoption and corporate tax avoidance. Similar to the tests discussed above, each group is divided into two sub-groups based on the median of the *TaxEnf*, i.e. 3.41. The coefficient on *Post* in Column 2 is 0.162, which is significantly larger than that in Column 1 (0.123) with a coefficient *p*-value difference of 0.086. This suggests that tax enforcement is a constraint mechanism, and the positive effect of IFRS adoption on firms with a lower initial level of tax avoidance will be reduced in regimes with stronger tax enforcement, consistent with H3a.

The coefficient on *Post* is  $-0.200$  in Column 7 and  $-0.158$  in Column 8 and both are significant at the 1% level. Moreover, the difference between the coefficients is significant with a *p*-value of 0.059. Therefore, the negative effect of IFRS adoption on tax avoidance for firms with a higher initial level of tax avoidance will be more pronounced in countries where the tax enforcement mechanism is efficient. This finding therefore supports H3b.

## 5. Robustness checks

### 5.1. Alternative measures of tax avoidance

In the earlier empirical tests of this study, the level of *TaxAvoid* is estimated by using the accounting data from the balance sheet and income statement because tax return information is not publicly available. Although this measure is widely used in tax research work in international settings (Atwood et al., 2012; Kanagaretnam et al., 2018), measurement errors may occur because IFRS adoption can significantly impact accounting earnings. Therefore, this measure is modified based on cash flow statement data as follows:

$$CashTaxAvoid_{it} = \frac{[\sum_{t-2}^t (OCF \times TaxRate)_{it} - \sum_{t-2}^t CTP_{it}]}{\sum_{t-2}^t OCF_{it}} \times 100 \quad (3)$$

where *TaxRate* is the statutory corporate income tax rate; *CTP* are current income taxes paid in cash (Item #04150) and *OCF* is the cash flow from operating activities (Item #04860). A larger value indicates more prevalent use of tax avoidance strategies.

In addition, we construct another alternative tax avoidance measure (*TaxExpTaxAvoid*) given the potential effects of IFRS on tax expense reporting (i.e. managerial rewards based on after-tax earnings):

$$TaxExpAvoid_{it} = \frac{[\sum_{t-2}^t (PTEBX \times TaxRate)_{it} - \sum_{t-2}^t TaxExp_{it}]}{\sum_{t-2}^t PTEBX_{it}} \times 100 \quad (4)$$

where *PTEBX* denotes the pre-tax earnings before extraordinary items (Item #01401); *TaxRate* is the statutory corporate income tax rate; and *TaxExp* is the reported tax expense in the current year. A large value indicates that there is a greater likelihood that the firm engages in tax avoidance activities.

**Table 8.** Alternative measures of tax avoidance.

	Low level	Moderate level		High level
	Group 1 (1)	Group 2 (2)	Group 3 (3)	Group 4 (4)
Panel A. Main sample with <i>CashTaxAvoid</i> as a dependent variable				
<i>Post</i>	<b>0.079***</b> (5.26)	<b>0.004</b> (0.50)	<b>-0.042***</b> (-4.49)	<b>-0.111***</b> (-7.13)
<i>N</i>	1751	1583	1696	1196
<i>Adj. R</i> <sup>2</sup>	0.21	0.05	0.15	0.22
Panel B. PSM sample (unbalanced) with <i>CashTaxAvoid</i> as a dependent variable				
<i>Post</i>	-0.006 (-1.01)	-0.012* (-1.75)	-0.008 (-1.18)	-0.005 (-0.63)
<i>Mandatory</i>	0.036 (0.40)	-0.010 (-0.27)	0.083*** (2.88)	0.133* (1.92)
<i>Mandatory*Post</i>	<b>0.059***</b> (6.84)	<b>0.018**</b> (2.26)	<b>-0.005</b> (-0.50)	<b>-0.045***</b> (-3.05)
<i>N</i>	2156	2463	2427	1270
<i>Adj. R</i> <sup>2</sup>	0.29	0.17	0.23	0.33
Panel C. Main sample with <i>TaxExpTaxAvoid</i> as a dependent variable				
<i>Post</i>	<b>0.059***</b> (9.77)	<b>0.015***</b> (3.23)	<b>-0.019***</b> (-2.92)	<b>-0.064***</b> (-4.89)
<i>N</i>	2306	2379	2178	1512
<i>Adj. R</i> <sup>2</sup>	0.25	0.09	0.18	0.21
Panel D. PSM sample (unbalanced) with <i>TaxExpTaxAvoid</i> as a dependent variable				
<i>Post</i>	-0.012 (-1.59)	-0.014* (-1.92)	-0.012 (-1.54)	-0.010 (-0.94)
<i>Mandatory</i>	0.011 (0.11)	-0.012 (-0.32)	0.082*** (2.72)	0.138* (1.91)
<i>Mandatory*Post</i>	<b>0.068***</b> (6.37)	<b>0.022**</b> (2.38)	<b>-0.000</b> (-0.05)	<b>-0.043**</b> (-2.56)
<i>N</i>	2156	2463	2427	1270
<i>Adj. R</i> <sup>2</sup>	0.24	0.14	0.20	0.30

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. All of the control variables are included. Country and industry fixed effects are included. Standard errors are clustered by firm. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.

Then we retest H1a and H1b with these two alternative tax avoidance measures by using the main and PSM samples. The empirical results are reported in Panels A to D of Table 8. Both coefficients on *Post* and *Mandatory\*Post* are significant with predicted signs, consistent with those reported in Tables 5 and 6. These results provide supplementary supporting evidence for H1a and H1b.

## 5.2. Additional test based on international GAAP differences

Previous studies demonstrate that the differences in accounting standards between the pre-adoption of local generally accepted accounting principles (GAAPs) and the IFRS are an important predictor of the IFRS effects (Ozkan et al., 2012; Wu & Zhang, 2019).

To capture such mixed effects, we use four international accounting standards (IAS) items that may impact tax planning based on Bae et al. (2008).<sup>16</sup> If the local GAAPs prior to the adoption of IFRS comply wholly with these four IAS items, firms that adopt the IFRS are included in the sub-sample labelled “*Low GAAPgap*”, otherwise they are labelled as “*High GAAPgap*”.

<sup>16</sup>Detailed description of GAAP differences of each IAS item is provided in Appendix C.

**Table 9.** Using accounting standard differences to measure effects of IFRS adoption.

	Dependent variable: <i>TaxAvoid</i>							
	Low level		Moderate level				High level	
	Group 1		Group 2		Group 3		Group 4	
	High GAAPgap (1)	Low GAAPgap (2)	High GAAPgap (3)	Low GAAPgap (4)	High GAAPgap (5)	Low GAAPgap (6)	High GAAPgap (7)	Low GAAPgap (8)
<i>Post</i>	<b>0.145***</b> <b>(11.50)</b>	<b>0.108***</b> <b>(7.85)</b>	0.029*** (3.41)	0.039** (2.43)	-0.041*** (-4.57)	-0.021 (-1.16)	<b>-0.233***</b> <b>(-12.76)</b>	<b>-0.154***</b> <b>(-11.19)</b>
<i>Difference</i> <i>(Prob &gt; chi2)</i>	<b>0.037**</b> <b>(0.040)</b>		-0.010 (0.586)		-0.020 (0.281)		<b>-0.079***</b> <b>(0.001)</b>	
<i>Fixed effects</i>	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Country, Industry	Yes
<i>S.E. cluster</i>	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
<i>N</i>	1534	1083	1668	886	1538	922	1214	937
<i>Adj. R<sup>2</sup></i>	0.30	0.37	0.06	0.12	0.08	0.07	0.33	0.34

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. All of the control variables are included. The international GAAP difference measure is described in Appendix C. If the local GAAPs prior to the adoption of IFRS comply wholly with these four IAS items, the firms are included in the sub-sample labelled “Low GAAPgap”, otherwise labelled as “High GAAPgap”. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.

**Table 10.** Excluding EU countries, financial crisis period and the US.

	Dependent variable: <i>TaxAvoid</i>			
	Low level Group 1 (1)	Moderate level		High level Group 4 (4)
		Group 2 (2)	Group 3 (3)	
<i>Panel A. Excluding EU</i>				
<i>Post</i>	<b>0.130***</b> <b>(4.76)</b>	<b>0.016</b> <b>(0.88)</b>	<b>-0.045***</b> <b>(-3.73)</b>	<b>-0.209***</b> <b>(-7.50)</b>
<i>N</i>	225	428	953	417
<i>Adj. R<sup>2</sup></i>	0.40	0.13	0.12	0.43
<i>Panel B. Excluding the global financial crisis</i>				
<i>Post</i>	<b>0.139***</b> <b>(10.83)</b>	<b>0.041***</b> <b>(4.43)</b>	<b>-0.035***</b> <b>(-3.43)</b>	<b>-0.192***</b> <b>(-13.48)</b>
<i>N</i>	1467	1399	1337	1248
<i>Adj. R<sup>2</sup></i>	0.32	0.13	0.14	0.34
<i>Panel C. Excluding the US</i>				
<i>Post</i>	0.001 (0.01)	-0.035** (-2.35)	-0.040*** (-2.69)	-0.046** (-2.40)
<i>Mandatory</i>	-0.097 (-1.55)	0.126** (2.38)	0.172** (2.33)	0.310*** (4.89)
<i>Mandatory*Post</i>	<b>0.118***</b> <b>(6.59)</b>	0.065*** (4.00)	0.010 (0.61)	<b>-0.123***</b> <b>(-5.17)</b>
<i>N</i>	1708	1937	1986	1043
<i>Adj. R<sup>2</sup></i>	0.28	0.22	0.28	0.47

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. All control variables are included. Country and industry fixed effects are included. Standard errors are clustered by firm. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.

Table 9 reports the related empirical results. As expected, the absolute values of coefficient on *Post* are significantly larger in *High GAAPgap* (in both Groups 1 and 4). These findings establish a more direct linkage between mandatory IFRS adoption and tax avoidance, and increase support for both H1a and H1b.

### 5.3. Exclusion of European countries

European countries constitute the majority of the testing sample and adopted the IFRS on a mandatory basis in 2005. However, some of the EU-wide directives were also enacted around the same period of time. For instance, there are the Market Abuse Directive (2003/6/EC), Prospectus Directive (2003/71/EC), the Takeover Directive (2004/25/EC), Markets in Financial Instruments Directive (2004/39/EC) and the Transparency Directive (2004/109/EC), to name a few. Apparently, the implementation of these directives might affect managerial incentives, financial reporting and economic decision making (Christensen et al., 2016).

To isolate the potential influence of the aforementioned concurrent institutional changes, H1a and H1b are tested again in countries outside of Europe (that is, retaining Australia, Hong Kong, the Philippines, and South Africa in the sample). Panel A of Table 10 shows similar results as those in Table 5, thus lending support to H1a and H1b.

### 5.4. Exclusion of potential influence of the global financial crisis

The global financial crisis originated in the US deeply impacted the European countries in about the fourth quarter of 2008. To isolate its potential influence, we only keep the

**Table 11.** Multivariate analysis of the effect of IFRS adoption on tax avoidance by excluding *BTaxC*.

	Dependent variable: <i>TaxAvoid</i>				
	Low level		Moderate level		High level
	Group 1 (1)	Group 2 (2)	Group 3 (3)	Group 4 (4)	
Panel A. Main sample					
<i>Post</i>	<b>0.134***</b> <b>(12.99)</b>	<b>0.033***</b> <b>(4.29)</b>	<b>-0.035***</b> <b>(-4.38)</b>	<b>-0.203***</b> <b>(-16.75)</b>	
<i>N</i>	2617	2554	2460	2151	
<i>Adj. R</i> <sup>2</sup>	0.29	0.09	0.10	0.34	
Panel B. PSM sample (unbalanced)					
<i>Post</i>	0.049*** (4.20)	0.014 (1.32)	-0.020* (-1.91)	-0.149*** (-15.73)	
<i>Mandatory</i>	-0.147 (-1.54)	0.135* (1.71)	0.118*** (2.82)	0.113 (1.08)	
<i>Mandatory*Post</i>	<b>0.084***</b> <b>(4.94)</b>	<b>0.027**</b> <b>(2.04)</b>	<b>-0.019</b> <b>(-1.38)</b>	<b>-0.027**</b> <b>(-1.99)</b>	
<i>N</i>	2489	2605	3053	1771	
<i>Adj. R</i> <sup>2</sup>	0.19	0.14	0.16	0.27	

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. All of the control variables are included. Country and industry fixed effects are included. Standard errors are clustered by firm. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.

firm-year observations of 2004 and 2008 (one year before and after IFRS adoption) in the sample and retest H1a and H1b. The results reported in Panel B of Table 10 are consistent with those in Table 5.

In addition, because the US firms comprise a large share of the benchmark and were most affected by the global financial crisis, we exclude all US firms in the PSM matched sample (unbalanced). The results presented in Panel C of Table 10 are consistent with those in Table 6.

**Table 12.** Alternative measure of tax enforcement.

	Dependent variable: <i>TaxAvoid</i>							
	Low level		Moderate level				High level	
	Group 1		Group 2		Group 3		Group 4	
	<i>High TaxEnf</i> (1)	<i>Low TaxEnf</i> (2)	<i>High TaxEnf</i> (3)	<i>Low TaxEnf</i> (4)	<i>High TaxEnf</i> (5)	<i>Low TaxEnf</i> (6)	<i>High TaxEnf</i> (7)	<i>Low TaxEnf</i> (8)
<i>Post</i>	<b>0.087***</b> <b>(3.26)</b>	<b>0.148***</b> <b>(11.87)</b>	0.044** (2.41)	0.026** (2.65)	-0.037* (-1.71)	-0.022** (-2.19)	<b>-0.224***</b> <b>(-9.02)</b>	<b>-0.179***</b> <b>(-15.98)</b>
<i>Difference (Prob &gt; chi2)</i>	<b>0.061**</b> <b>(0.034)</b>		-0.018 (0.364)		-0.015 (0.529)		<b>-0.045*</b> <b>(0.087)</b>	
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Country fixed effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>S.E. cluster</i>	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
<i>N</i>	927	1551	877	1497	704	1617	977	1078
<i>Adj. R</i> <sup>2</sup>	0.33	0.32	0.20	0.11	0.15	0.13	0.42	0.45

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. All of the control variables are included. Country and industry fixed effects are included. Standard errors are clustered by firm. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.



### 5.5. Exclusion of book-tax conformity as country-level control variable

In our earlier tests, we follow the cross-country studies on corporate tax avoidance and include *BTaxC* as a country-level control variable (Atwood et al., 2012; Kanagaretnam et al., 2018). Given the potential impact of IFRS adoption on *BTaxC*, we exclude *BTaxC* as a control variable and retest H1a and H1b. The results reported in Panels A and B of Table 11 are consistent.

### 5.6. Alternative measure of tax enforcement

Following De Simone et al. (2018), we use tax enforcement expenditures (divided by the gross domestic product (GDP)) of 2005 based on the *OECD's Tax Administration Comparative Information Series* as an alternative measure of country-level tax enforcement and conduct robustness test for H3a and H3b. Table 12 shows that the results are consistent with those in Panel B of Table 7.

### 5.7. Controlling for TaxAvoid in the matching process of PSM sample

In the earlier PSM-DID analysis, we do not control *TaxAvoid* in the matching process. This approach may raise a concern that the change in *TaxAvoid* following the adoption might be caused by the difference in *TaxAvoid* prior to the adoption. To alleviate this concern, we include *TaxAvoid* in the matching process.

The covariate balance test in Panel A of Table 13 shows that there is no difference in *TaxAvoid* between the treatment and control sample across all the four groups. In Panel B, the coefficients on *Mandatory* are all insignificant. The coefficients on *Mandatory\*Post* are significant in Columns (1) and (4), consistent with the earlier PSM-DID analysis.

## 6. Conclusion

This study investigates how IFRS adoption affects corporate tax avoidance conditional on the distribution of tax avoidance prior to the adoption. We hypothesise and find that firms with a lower (higher) initial level of tax avoidance tend to be more (less) tax aggressive after IFRS adoption. Further analyses suggest that the impact of IFRS adoption varies with country-level institutions. We find that the positive (negative) effect of IFRS adoption on corporate tax avoidance for firms with a lower (higher) initial level of tax avoidance is more pronounced in countries with stronger investor protection institutions. This is in agreement with Armstrong et al. (2015) who find strong corporate governance encourages lower levels of tax avoidance but also reduces higher level of tax avoidance.

Meanwhile, we also find that the strength of tax enforcement at the country-level acts as a monitoring mechanism and erodes (bolsters) the positive (negative) effects of IFRS adoption which would reduce the level of tax avoidance.

Our findings are generally robust after using alternative measures of tax avoidance, controlling for the potential influence of institutional changes in the EU and the global financial crisis, and using an alternative measure of tax enforcement. Overall, our study documents a conditional effect from IFRS adoption on corporate tax avoidance. We also provide evidence on the critical role of country-level institutional

**Table 13.** Controlling for *TaxAvoid* in the matching process of PSM-DID analysis.

Panel A. Covariate balance metrics of the PSM sample (controlling for <i>TaxAvoid</i> )												
Groups	Group 1: Bottom 25%			Group 2: 25–50 percentiles			Group 3: 50–75 percentiles			Group 4: Top 25%		
	Treatment N = 345	Benchmark N = 331	Differences t-stat	Treatment N = 361	Benchmark N = 364	Differences t-stat	Treatment N = 391	Benchmark N = 403	Differences t-stat	Treatment N = 434	Benchmark N = 413	Differences t-stat
<i>TaxAvoid</i>	−0.084	−0.073	−0.982	0.026	0.023	0.525	0.123	0.120	0.183	0.336	0.339	−0.177
<i>ROA</i>	0.097	0.107	−1.575	0.126	0.136	−1.001	0.123	0.131	−0.981	0.109	0.115	−0.340
<i>Size</i>	13.392	13.547	−1.021	13.551	13.436	0.461	13.904	13.915	−0.079	13.835	13.736	0.579
<i>R&amp;D</i>	0.010	0.012	−0.801	0.008	0.009	−0.434	0.013	0.012	0.326	0.015	0.017	−0.420
<i>Leverage</i>	0.114	0.112	0.207	0.130	0.123	0.570	0.122	0.110	1.281	0.178	0.160	1.439
<i>PPE</i>	0.326	0.329	−0.206	0.367	0.345	1.286	0.389	0.405	−0.819	0.456	0.428	1.184
<i>SalesGrow</i>	0.156	0.186	−1.277	0.262	0.340	−0.827	0.395	0.392	0.071	0.648	0.474	0.508

Panel B. PSM-DID analysis				
<i>Dependent variable: TaxAvoid</i>				
	Low level	Moderate level		High level
	Group 1 (1)	Group 2 (2)	Group 3 (3)	Group 4 (4)
<i>Post</i>	0.067*** (5.08)	0.028** (2.41)	−0.051*** (−4.71)	−0.149*** (−12.01)
<i>Mandatory</i>	0.010 (0.09)	−0.060 (−1.38)	0.067 (1.34)	−0.063 (−1.63)
<i>Mandatory*Post</i>	<b>0.057*** (3.11)</b>	−0.001 (−0.08)	0.020 (1.35)	<b>−0.033** (−2.06)</b>
<i>Fixed effects</i>	Country, Industry	Country, Industry	Country, Industry	Country, Industry
<i>S.E. cluster</i>	Firm	Firm	Firm	Firm
<i>N</i>	1376	1426	1570	1648
<i>Adj. R<sup>2</sup></i>	0.19	0.10	0.13	0.40

Note: All variables are defined in Appendix A. All firms are categorised into 4 groups – Groups 1–4, by 25th, 50th and 75th percentiles of the initial tax avoidance level before IFRS adoption. All of the control variables are included. Country and industry fixed effects are included. Standard errors are clustered by firm. \*, \*\* and \*\*\* indicate significance at the 10%, 5%, and 1% levels respectively and robust *t* statistics are reported in parentheses.

environments in shaping the consequences of changes in accounting standards in a tax planning context.

Our study responds to the recent calls for book-tax conformity and proposals to increase the links between financial accounting and taxable incomes in order to reduce opportunities for tax avoidance (Hanlon, 2021). Hanlon (2021) has expressed concerns over these calls and proposals, indicating that book-tax conformity may not constrain tax avoidance, but reduce the information content of accounting numbers. For example, Joos and Lang (1994) examine the effects of accounting diversity across the European Union and conclude the required conformity between financial and tax reporting provides incentives to reduce taxes by reporting lower profits. Our study finds that the adoption of fair value accounting, which is likely to weaken the book-tax link, narrows down the strength of tax planning. Our evidence indicates that book-tax conformity might not serve as a tool to reduce tax avoidance, consistent with Hanlon (2021).

In addition, since the adoption of IFRS reduces the variation in tax avoidance, an interesting question for future research is whether the harmonisation of tax strategies would affect the informativeness of tax avoidance. The investigation in this area would help to better understand the impacts of IFRS and the consequences of tax avoidance.

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## Appendices

### Appendix A. Variable definitions and data sources

	<p style="text-align: center;"><i>Dependent variable</i></p> <p>Measured with the following equation (Atwood et al., 2012):</p> $TaxAvoid_{it} = \frac{\left[ \sum_{t-2}^t (PTEBX \times TaxRate)_{it} - \sum_{t-2}^t CTP_{it} \right]}{\sum_{t-2}^t PTEBX_{it}} \times 100$ <p>where <i>PTEBX</i> are the pre-tax earnings before extraordinary items (Item #01401); <i>TaxRate</i> is the statutory corporate income tax rate; and <i>CTP</i> denotes the current taxes paid (Item #04150).</p>
<i>TaxAvoid</i>	<p>Based on Atwood et al. (2012) and constructed by using cash flow statement</p> $data:CashTaxAvoid_{it} = \frac{\left[ \sum_{t-2}^t (OCF \times TaxRate)_{it} - \sum_{t-2}^t CTP_{it} \right]}{\sum_{t-2}^t OCF_{it}} \times 100$ <p>where <i>TaxRate</i> is the statutory corporate income tax rate; <i>CTP</i> are current income taxes paid in cash (Item #04150) and <i>OCF</i> is the cash flow from operating activities (Item #04860).</p>
<i>CashTaxAvoid</i>	<p>Based on Atwood et al. (2012) and constructed by using tax expense reporting:</p> $TaxExpAvoid_{it} = \frac{\left[ \sum_{t-2}^t (PTEBX \times TaxRate)_{it} - \sum_{t-2}^t TaxExp_{it} \right]}{\sum_{t-2}^t PTEBX_{it}} \times 100$ <p>where <i>PTEBX</i> denotes the pre-tax earnings before extraordinary items (Item #01401); <i>TaxRate</i> is the statutory corporate income tax rate; and <i>TaxExp</i> is the reported tax expense in the current year.</p>
<i>TaxExpAvoid</i>	
<i>Independent variable</i>	
<i>Mandatory</i>	Dummy variable to identify those who adopted IFRS on a mandatory basis, equal to 1 when mandatory since 2005, and 0 otherwise
<i>Post</i>	Dummy variable to identify the period of pre- and post-IFRS adoption, equals 1 for post-IFRS period and 0 for pre-IFRS adoption.
<i>BTaxC</i>	Measured as the scaled ranking of the root mean squared errors (RMSEs) from the following country-year regression (Atwood et al., 2010): $CTE = \theta_0 + \theta_1 PTBI + \theta_2 ForPTBI + \theta_3 DIV + \varepsilon$ <p>where <i>CTE</i> is current tax expense (Items #01451 - #04199); <i>PTBI</i> is pre-tax book income (Item #01401); <i>ForPTBI</i> is foreign pre-tax book income (Item #07126); <i>DIV</i> denotes total dividends (Item #05376); and <math>\varepsilon</math> is an error term. To control for cross-sectional scale differences, <i>CTE</i>, <i>PTBI</i>, <i>ForPTBI</i> and <i>DIV</i> are all divided by average total assets (Item #02999).</p>
<i>Taxrate</i>	Statutory corporate income tax rate, manually collected from official website of Organisation for Economic Co-operation and Development ( <a href="https://data.oecd.org/">https://data.oecd.org/</a> ), Ernst & Young Worldwide corporate tax guide and KPMG LLP online summary. In countries where the statutory corporate income tax rate is progressive, defined as the median of tax rate at all levels.
<i>EarnVol</i>	Scaled descending decile rank of cross-sectional pre-tax earnings volatility by country-year from Atwood et al. (2012).
<i>ROA</i>	Return on assets, measured as earnings before extraordinary items (#01401) divided by total assets (#02999).
<i>Size</i>	Firm size, measured as natural logarithm of total assets (#02999).
<i>R&amp;D</i>	Research and development expenditures, measured as research and development expenditures (#01201) divided by total assets (#02999).
<i>Leverage</i>	Measured as long-term debt (#03251) divided by total assets (#02999).
<i>PPE</i>	Property, plant and equipment, measured as total fixed assets (#02501) divided by total assets (#02999).
<i>SalesGrow</i>	Growth of sales, measured as 3-year average change in sales (#01001).
<i>OwnerCon</i>	Closely held share (#08021), which represents the sum of shareholdings by all block holders who hold 5% or more of outstanding shares.
<i>Multi</i>	Dummy variable, equals to 0 when foreign income taxes (#07126) are missing or 0, and 1 otherwise.
<i>ADRI</i>	Modified antidirector rights index from Spamann (2010).
<i>TaxEnf</i>	Tax evasion index from the 1996 World Competitiveness Report.

## Appendix B. Classification of accounting standards adoption

The classification of accounting standards for each firm-year is based on the code listed in the definition of item "Accounting Standards Followed" (#07536) in the Worldscope Database.

### B1. Identification of IFRS firms

Code	Description in datastream
02	International standards
06	International standards and some EU guidelines
08	Local standards with EU and IASC guidelines
12	International standards-inconsistency problems
16	International standards and some EU guidelines-inconsistency problem
18	Local standards with some IASC guidelines
19	Local standards with OECD and IASC guidelines
23	IFRS

### B2. Identification of non-IFRS firms

Code	Description in datastream
01	Local standards
05	EU standards
07	Specific standards set by the group
09	Not disclosure
10	Local standards with some EU guidelines
11	Local standard-inconsistency problem
14	Commonwealth standards- inconsistency problems
15	EEC standards-inconsistency problems
17	Local standards with some OECD guidelines
21	Local standards with a certain reclassification for foreign companies
22	Other

## Appendix C. Measure of international GAAP difference

### C1. Four IAS items that comprise GAAP difference measure

Item	IAS Rule	Description – countries coded 1
1	IAS No.12	Does not generally require deferred tax accounting
2	IAS No.24	Has no or very limited disclosure requirements for related-party transactions
3	IAS No. 32.18/ .23	Does not require companies to account for their financial instruments based on substance over form
4	IAS No. 32.77	Does not require disclosure of the fair value of financial assets and liabilities

### C2. Difference from IAS by country

Country/item	1	2	3	4
Australia	0	0	0	0
Austria	0	1	0	1
Belgium	0	1	1	1
Czech Rep	0	1	1	0
Denmark	0	0	1	0
Finland	0	1	1	1
France	0	1	1	0
Germany	0	1	1	1
Greece	1	1	1	1

(Continued)

Continued.

Country/item	1	2	3	4
Hong Kong	0	0	1	1
Hungary	1	1	1	1
Ireland	0	0	1	0
Luxembourg	1	0	1	1
Netherlands	0	0	0	0
Norway	0	0	1	0
The Philippines	0	0	1	1
Poland	0	0	1	1
Portugal	1	1	1	1
South Africa	0	0	0	0
Spain	0	1	1	1
Sweden	0	0	1	1
Switzerland	0	0	1	1
UK	0	0	1	0

Note: For each accounting item listed in C1, country will receive a score of 1 for that accounting item if its local GAAP that do not conform to IAS before IFRS adoption; otherwise a score of 0 for that item.