

Languages and corporate tax avoidance*

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Abstract

This paper examines the effect of languages on corporate tax avoidance. We hypothesize and find that managers of firms in countries with languages that grammatically distinguish the future from the present (languages with a strong future time reference or FTR) perceive the potential future tax repayments and penalties to be more distant and therefore engage in more tax avoidance. Further tests exploiting the variation in language FTR within Switzerland and Belgium, which have *different* official languages in different regions but a *single* tax system, suggest that our findings are not driven by country-level differences in the tax system. We also provide evidence that U.S. firms with CEOs born in countries with strong FTR languages avoid more taxes than those with CEOs born in weak FTR countries, indicating that it is the CEO's native tongue that affects tax avoidance. Collectively, our findings highlight the importance of social norms in understanding corporate tax strategies.

Keywords: Social Norms; Languages; Corporate Tax Avoidance

1. Introduction

There are substantial variations in tax avoidance across U.S. firms and firms in different countries (Dyreng, Hanlon, and Maydew 2008; Hanlon and Heitzman 2010; Atwood, Drake, Myers, and Myers 2012). The literature on the determinants of corporate tax avoidance has focused on institutional environments and governance mechanisms, such as ownership structure (e.g., Chen, Chen, Cheng, and Shevlin 2010; Chen, Huang, Li, and Shevlin 2019), compensation contracts (e.g., Crocker and Slemrod 2005; Armstrong, Blouin, and Larcker 2012; Rego and Wilson 2012), audit and board committees (Robinson, Xue, and Zhang 2012; Armstrong, Blouin, Jagonlizer, and Larcker 2015), and tax system and enforcement (Atwood et al., 2012), leaving the role of social norms relatively underexplored. In this paper, we examine the impact of languages—an important social norm that defines the incentive structure of the society (North 1994) and shapes the way people think and act (Boroditsky 2001)—on corporate tax avoidance.

Languages differ widely in how they require speakers to mark the timing of events. For example, English and French (i.e., languages with strong future time reference, hereafter FTR) require speakers to grammatically separate the future and the present, while German and Chinese (i.e., languages with weak future time reference) do not. As suggested by Thieroff (2000) and Dahl (2000), the obligatory marking of future events (strong FTR) reduces the psychological salience of the future and can make future events seem more distant. Consistent with this argument, Chen (2013) finds that speakers required to speak about future events in a distinct way (strong FTR) disassociate the future from the present and are less likely to make intertemporal choices that involve current costs for future rewards, such as savings.

Corporate managers also make intertemporal choices when determining their firms' tax strategies (Slemrod 2004; Hanlon and Heitzman 2010). Tax avoidance is usually associated with

tax savings at the expense of potential future costs, such as tax repayments, interests, penalties, and reputational costs. Firms with a large difference between book and tax income are likely to face greater scrutiny by tax authorities (Mills 1998; Rego and Wilson 2012). Tax shelters challenged by tax authorities are associated with significant tax savings lost, penalties, and interest (Wilson 2009). Investors also react negatively to news about aggressive tax avoidance (Hanlon and Slemrod 2009; Shevlin et al. 2013), consistent with the existence of reputational penalties.

To study the effect of languages on corporate tax avoidance, we first develop a two-period model of tax avoidance that features tax benefits and costs of designing and implementing a tax strategy in the first period and potential penalties by the tax authority and investors in the second period. In our model, managers with different language FTR have different rates of discounting the potential penalties in the second period. This model is a special extension of Chen's (2013) model in the sense that we focus on the impact of language FTR on corporate tax avoidance only through the discounting channel without considering the differences in beliefs in distribution regarding the timing of future costs and benefits for managers with a different future time reference. Using this model, we show that, because managers with strong FTR languages perceive the expected future costs of tax repayments, interest, penalties, and reputational losses to be smaller, they are likely to avoid taxes.

After then, we use 197,298 firm-year observations from 36 countries and provide evidence consistent with this prediction. Following Atwood et al. (2012), we measure tax avoidance as the difference between the taxes on pre-tax earnings calculated at the home-country statutory corporate tax rate and the actual tax payments, divided by pre-tax earnings. This measure accounts for the fact that firms in different countries face different statutory tax rates, and the measure resembles the cash effective tax rates that are commonly used in studying U.S. firm tax avoidance.

Firms with higher values of the measure have more unpaid taxes and are therefore likely to avoid taxes more. After controlling for various firm and country characteristics, we find that firms in countries with strong FTR languages avoid more taxes than those in countries with weak FTR languages. This result provides evidence consistent with CEOs whose languages grammatically mark future events engaging in more tax avoidance.

One concern about these results is that they are based on a measure of language FTR that does not have within-country variation. Therefore it is likely that cross-country differences in tax systems, such as book-tax conformity and tax enforcement correlated with language FTR, drive the results. In our main regression, we control for measures of book-tax conformity and tax enforcement. To further mitigate this concern, we examine the impact of language FTR on the tax avoidance of firms in Switzerland, which has *different* official languages in different regions of the country but a *single* tax system. We search the official language of each canton of Switzerland and identify the language FTR of each firm by its headquarters city. We find that firms headquartered in cities with strong FTR languages engage in more tax avoidance than those headquartered in cities with weak FTR languages. We also conduct a similar test for firms in Belgium, which also has different official languages but a single tax system, and find consistent results. These findings suggest that our results are not driven by cross-country differences in tax system and provide further evidence on the effects of languages on corporate tax avoidance.

The results so far are consistent with two different interpretations. First, the CEO's *native tongue* shapes that person's perceptions about the future and consequently affects ways of thinking and acting. Second, the *working language* of the firm influences the CEO's preferences. To disentangle these two hypotheses, we focus on U.S. firms and examine the effect of the languages of CEOs' countries of origin on their firms' tax strategies. Because the working language of U.S.

firms is uniform, results from this test provide evidence on the impact of the CEO's native tongue on corporate tax avoidance. Boroditsky (2001) finds that one's native language helps shape the way that he thinks about *time*. Boroditsky shows that bilinguals' native tongue has a dominant impact on their thinking habits, even if the second language is acquired early in life, and this impact is not affected by the amount of exposure (length of time) to the second language. Fernandez (2011) suggests that, after emigrating to a new country, individuals retain their culture and values but leave political and economic conditions behind. Therefore we expect that linguistic traits brought by foreign-born CEOs to the United States affect their firms' tax avoidance. We search CEO names of S&P 1500 firms in the United States from the Marquis Who's Who database and code the language FTR of foreign-born CEOs as that of their countries of origin. After controlling for economic determinants of tax avoidance, time-invariant industry fixed effects, and year fixed effects, we find that firms with CEOs born in countries with strong FTR languages pursue more tax avoidance. In particular, these firms have lower GAAP and cash effective tax rates (ETR), higher discretionary permanent book-tax differences, and a higher probability of engaging in tax sheltering than firms with CEOs born in countries with weak FTR languages. In terms of economic significance, firms headed by CEOs born in countries with strong FTR languages have 3% lower cash ETRs, which is equivalent to \$4.389 million less cash taxes paid per year. Collectively, the finding from U.S. firms not only shows that CEOs' native tongue affects corporate tax avoidance but also suggests that our results are not confounded by unobserved country-level heterogeneity in tax systems and institutional environment.

To mitigate the concern that our U.S. results are driven by unobserved firm-level heterogeneity, we further examine whether changes in the language FTR following CEO turnover are associated with predicted changes in corporate tax avoidance. This is essentially a difference-

in-differences test in which we compare the tax avoidance changes in firms that experience changes in CEO language FTR to firms that do not. The staggered changes in CEO language FTR in different firms and years enable us to identify the impact of languages on corporate tax avoidance. We find evidence suggesting that changes from strong (weak) FTR CEOs to weak (strong) FTR CEOs are associated with decreases (increases) in tax avoidance, consistent with CEOs with strong FTR language avoiding more taxes.

We also provide some indirect evidence that firm tax avoidance in countries with strong FTR languages is associated with current cash tax savings. In particular, we examine the impact of language FTR on corporate investment, changes in cash holdings, and changes in debt and equity positions. We find that firms in countries with strong FTR languages have higher investment, greater changes in cash holdings, and lower changes in debt than firms in weak-FTR language countries. Moreover, firm tax avoidance in strong-FTR language countries is positively associated with investment. The findings are consistent with such firms using cash tax savings from tax avoidance to fund investment.

We further show that our results hold after controlling for different measures of earnings management, such as accrual components, discretionary accruals, and abnormal cash flows from operations. We also employ a measure of conforming tax avoidance developed by Badertscher, Katz, Rego, and Wilson (2016) and find that firms in countries with strong FTR languages are more likely to engage in conforming tax avoidance, strategies that reduce both taxable income and accounting earnings (Hanlon and Heitzman 2010). In addition, following Cen, Maydew, Zhang, and Zuo (2017), we use pre-tax cash flows, which are less subject to earnings management than pre-tax earnings, as an alternative scalar in our measure of tax avoidance. We find that this measure is also higher for firms in countries with strong FTR languages. Collectively, evidence from these

tests rules out the alternative explanation that the impact of language FTR on tax avoidance is a manifestation of incentives to manage financial reporting outcomes.

This paper makes three contributions to the literature. First, we identify effects of languages on corporate tax avoidance. North (1990) and Williamson (2000) suggest that a great many constraints are behavioral norms that influence economic activities. Guiso, Sapienza, and Zingales (2006) and Acemoglu and Robinson (2015) share this view and emphasize the importance of incorporating social norms in understanding economic phenomena. Alesina and Giuliano (2015) further document the interplay between social norms and institutional environments and suggest that both factors jointly determine economic outcomes. Studies that examine the role of social norms focus on corruption (DeBacker, Heim, and Tran 2015), social capital (Hasan, Hoi, Wu, Zhang 2017), and religion (Dyreng, Maydew, Williams 2012) in U.S. firms. Our consideration of the role of languages complements this line of research and advances understanding of the determinants of corporate tax avoidance.

Second, our study also relates to the line of research identifying fixed managerial leadership styles and the determinants and evolution of these styles (e.g., Bertrand and Schoar 2003; Dyreng, Hanlon, and Maydew 2010; Malmendier, Tate, and Yan 2011; Dittmar and Duchin 2016; Schoar and Zuo 2017; Law and Mills 2017; Law and Zuo 2020). This literature suggests that managerial traits and early life experiences, such as growing up during the Great Depression, serving in the military, or working in troubled firms, have significantly affect corporate policies. We extend this literature by showing that a CEO's native tongue, a trait acquired from parents during the first years after birth, manifests in corporate tax avoidance. Understanding the role of managerial characteristics in tax avoidance has implications on CEO selection and compensation design. Because managerial traits are associated with tax avoidance, hiring managers with such

traits could be a way for firms to promote particular tax planning strategies. More importantly, managerial preferences associated with personal traits could substitute for incentives arising from compensation contracts. Thus managers with certain traits may help firms pursue aggressive tax strategies without incurring additional contracting costs, such as a premium demanded by managers for bearing the risk of stock options and bonuses linked to after-tax performance measures (Rego and Wilson 2012; Gaertner 2014). Our finding also adds to the economics literature on the parental transmission of preferences in early childhood (e.g., Bisin and Verdier 2001; Hauk and Saez Marti 2002; Tabellini 2008; Heckman and Mosso 2014; Doepke and Zilibotti 2017) by showing that preferences can be transmitted intergenerationally through languages.

Last, our study contributes to the research on the influence of languages on corporate policies. These studies find that firms in countries with strong FTR languages exhibit less corporate social responsibility (Liang, Marquis, Renneboog, and Sun 2018), use more variable executive pay (Ellahie, Tahoun, and Tuna 2017), and have a greater propensity to manage earnings (Kim, Kim, and Zhou 2017) than firms in countries with weak FTR languages. Our paper adds to these studies by showing that languages also affect corporate tax avoidance.

The remainder of this paper is organized as follows. Section 2 reviews the literature and develops our hypothesis. Section 3 describes the data and discusses the research design. Section 4 presents the empirical results, and Section 5 concludes.

2. Literature review and hypothesis development

2.1 Languages and individual preferences

Languages impose an informal constraint on human interactions in the society (North 1994). Hall and Jones (1999) find that a large amount of cross-country variation in output per

worker can be explained by the countries' primary languages. Languages differ in *how* and *when* they require speakers to signal future events. For example, a German speaker uses the present tense when to mark the future, while an English speaker uses either "will" or "going to." In English, marking of future events is obligatory, which is explained by Jakobson and Halle (1956) as follows: "Languages differ essentially in what they *must* convey and not in what they *may* convey." The principle of linguistic relativity, which is also referred to as the Sapir-Whorf hypothesis (SWH), argues that the structure of a language affects its speakers' thoughts and nonlinguistic behavior (Whorf 1956). Slobin (1987) suggests that languages affect people's thought by grammatically requiring them to encode different scenarios when speaking, for example, future time referencing, gender referencing, and so forth. Thieroff (2000) further suggests that the difference in obligatory marking of the future is the major characteristic classifying strong FTR languages and weak FTR languages. In languages with strong FTR (e.g., English, French, and Kalaallisut), speakers must grammatically separate the future from the present, while in weak FTR languages (e.g., German, Finnish, and Mandarin), it is common for speakers to omit the future marker.

Chen (2013) suggests that the impact of languages on individual choices stems from two different mechanisms, namely, the difference in the discounting of future rewards and the difference in the precision of beliefs about the timing of future rewards. He demonstrates that speakers required to mark future events in a distinct way (strong FTR languages) are more likely to engage in activities that involve current rewards for future costs, for example, saving and exercising less, and spending and smoking more than speakers not required to do so. Sutter et al. (2015), in a controlled experiment in a northern Italian city in which half of the inhabitants spoke Italian and the rest spoke German, find that children in Italian-speaking primary schools (strong FTR language) were 46% less likely to delay gratification than children in German-speaking

primary schools (weak FTR language), consistent with the difference in the way languages encode time affecting speakers' intertemporal choices. Using the Global Preference Survey that includes samples of representative populations from 76 countries, Falk, Becker, Dohmen, Enke, Huffman, and Sunde (2018) find that the structures of languages significantly affects individual time preferences. They show that, when given a choice between receiving a payment today or payment in 12 months, speakers of strong FTR languages require a larger future payment to forego a given amount of current payment than speakers of weak FTR languages.

2.2 Corporate tax avoidance

There are considerable differences in tax avoidance across U.S. and international firms (Dyreng et al. 2008; Atwood et al. 2012). Firms can avoid taxes by adopting specific accounting methods, structuring transactions to accelerate tax deductions or delaying taxable income recognition, or engaging in activities that provide favorable tax treatments and lower taxable income. Tax avoidance increases current cash flow at the expense of potential future tax payments and may also carry substantial future costs, such as penalties, interest, greater scrutiny from tax authorities, and reputation losses. Wilson (2009) shows that in, 14 tax shelters successfully challenged by tax authorities, the average interest charges are around 40% of the tax liability originally reduced by the transactions. Moreover, tax avoidance is also associated with political and reputational costs (Zimmerman 1983; Bankman 2004; Desai and Dharmapala 2006; Hanlon, Shevlin, and Shroff 2014). Consistent with these arguments, studies find that investors react negatively to news about aggressive tax avoidance (Hanlon and Slemrod 2009; Shevlin et al. 2013) and the costs of bank loans are positively associated with tax aggressiveness (Hasan et al. 2014).

Many studies provide evidence that institutional environments and governance arrangements have a significant impact on corporate tax avoidance. In particular, these studies show that tax system characteristics (Atwood et al. 2012) and ownership structure (Chen et al. 2010; McGuire et al. 2014; Badertscher et al. 2013) have a significant impact on tax avoidance. The studies also show that the incentive compensation of managers and tax directors also affects tax avoidance (Armstrong et al. 2012; Rego and Wilson 2012; Chi et al. 2017). In addition, characteristics of audit committee and board of directors are also associated with tax avoidance (Robinson et al. 2012; Armstrong et al. 2015). Using Russell Index reconstitutions, researchers also find that shocks that increase institutional ownership are associated with an accompanying increase in tax avoidance (Khan et al. 2017; Chen et al. 2019).

2.3 The effect of languages on tax avoidance

Previous studies suggest that corporate managers have a significant impact on their firms' tax avoidance. Although managers are unlikely to have expertise in developing and implementing tax avoidance strategies, they can affect these activities by setting the "tone at the top" (Dyreng et al. 2010). Consistent with this argument, Dyreng et al. (2010) document that, after controlling for various firm characteristics, managers have incremental effects on GAAP and cash effective tax rates (ETRs). However, they do not find that measures of tax avoidance relate to such managerial characteristics as education, age, and gender. Chyz (2013) finds a positive association between the probability of executives evading taxes through manipulating stock-option exercise dates and the propensity of firms engaging in tax sheltering. Koester, Shevlin, and Wangerin (2016) show that executives with greater ability to allocate corporate resources avoid taxes more. Law and Mills (2017) find that managers with military experience undertake less aggressive tax strategies,

consistent with military managers sharing common values related to government legitimacy and allegiance.

Corporate managers make intertemporal choices when determining their firms' tax strategies (Slemrod 2004; Hanlon and Heitzman 2010). Tax avoidance is usually associated with current tax savings at the expense of potential future costs, such as tax repayments, interest, penalties, and reputational costs. Language FTR is likely to affect managers' perceived costs and benefits of implementing tax avoidance. To study the effect of language FTR on corporate tax avoidance, we adopt an "accept-first, audit-later" approach and develop a two-period model of tax avoidance. In such a model, all the benefits of tax avoidance materialize in the first period, and the potential costs associated with the audit by the IRS are incurred in the second period. Specifically, the expected net benefits of avoiding taxes and reducing the effective tax rates to $\hat{r}$ can be represented as follows.

$$V = D(1 - c_0)(r - \hat{r}) - \frac{1}{1+\delta} p(1 + c_1)D(r - \hat{r}). \quad (1)$$

In this model, a manager with a discount rate δ engages in tax avoidance by reducing corporate income taxes paid in year $t = 0$, which leads to a reported effective tax rate of $\hat{r}$. If the firm's real effective tax rate *without* any tax avoidance activity is r , the benefit from engaging in tax avoidance can be represented as $D(r - \hat{r})$, where D is the firm's pre-tax earnings. Designing and implementing this tax avoidance strategy has a cost, for example, a fee to accounting firms that is proportional to the tax benefit, regardless of whether the avoidance succeeds. We define this proportion cost as c_0 ($0 < c_0 < 1$). Thus, in year $t = 0$, the net benefit is $D(1 - c_0)(r - \hat{r})$. In year $t=1$, the firm is audited by the tax authority with the probability p that the tax authority disagrees with the firm's interpretation of the tax laws and challenges the firm's tax positions.

Under such a scenario, the firm has to repay the taxes avoided along with interest, penalties, and reputation damage at a rate c_1 ($0 < c_1 < 1$).

We assume that there are two types of managers: managers with strong FTR languages and managers with weak FTR languages. Chen (2013) suggests that the impact of languages on individual choices stems from both the difference in the discounting of future rewards and the difference in the precision of beliefs about the timing of future rewards. Following Chen (2013), we expect managers with strong FTR languages to discount the future more than managers with weak FTR languages ($\delta_{Strong-FTR} > \delta_{Weak-FTR}$). In this regard, our model is a special extension of Chen's (2013) model in the sense that we focus on the impact of language FTR on corporate tax avoidance only through the discounting channel without considering the differences in the beliefs in distribution about the timing of future costs and benefits for managers with different FTR.¹

We further assume that the probability of detection, p , follows a uniform distribution:

$$p = \begin{cases} \frac{r_{Ind} - \hat{r}}{r_{Ind}}, & \text{if } 0 \leq \hat{r} \leq r_{Ind} \\ 0, & \text{if } r_{Ind} < \hat{r} \end{cases}, \quad (2)$$

where r_{Ind} is an industry level effective tax rate benchmark that the IRS uses when conducting the audit. If we incorporate this probability of IRS detection into Equation (1) and take the first order derivative with respect to $\hat{r}$, the optimal tax avoidance can be represented as follows.

$$\hat{r}^* = \frac{1}{2}(r + r_{Ind}) - \frac{1}{2}r_{Ind}(1 + \delta) \frac{(1 - c_0)}{(1 + c_1)}. \quad (3)$$

¹ In our model, we assume that corporate managers do not have biases regarding the timing of future rewards and thus language FTR does not affect tax avoidance through the belief channel discussed in the model of Chen (2013). This is one limitation of our model.

Equation (3) suggests that the firm engages in more tax avoidance (lower $\hat{r}^*$) when the cost of designing and implementing an avoidance strategy in year $t = 0$, c_0 , is smaller and when the penalty by the tax authority in year $t = 1$, c_1 , is smaller. Regarding the effect of the discount rate δ on $\hat{r}^*$, the first order derivative of $\hat{r}^*$ with respect to the discount rate δ can be represented as follows.

$$\hat{r}^{*'}(\delta) = -\frac{1}{2}r_{Ind}\frac{(1-c_0)}{(1+c_1)}. \quad (4)$$

Because c_0 is the proportional cost of implementing a tax avoidance strategy and is smaller than 1, and c_1 is the proportional cost of penalty associated with tax avoidance and is positive, $\hat{r}^{*'}(\delta)$ is significantly negative. That is, the optimal effective tax rate (tax avoidance) is a decreasing (increasing) function of the discount rate δ . As managers with strong FTR languages have higher discount rates than managers with weak FTR languages ($\delta_{Strong-FTR} > \delta_{Weak-FTR}$), this prediction suggests that strong FTR managers avoid taxes more than weak FTR managers. In the online appendix, we detail the model and proof. We test the following hypothesis in an alternative form.

H1: Managers with strong FTR languages engage in more tax avoidance than managers with weak FTR languages.

3. Sample and research design

3.1 Sample

To empirically test the hypothesis developed in Section 2, we first obtain financial data from Compustat North America and Compustat Global. Following Chen (2013), we then obtain the FTR of each language from the European Science Foundation's Typology of Languages in

Europe (EUROTYP) project,² the most extensive study of typological distribution of FTR grammaticalization (Chen 2013). Strong FTR languages are those that require speakers to grammatically separate the future from the present in almost all circumstances, while weak FTR languages do not require speakers to do so. After dropping observations from countries without FTR information, we are left with 466,876 observations. We merge the sample with country-level control variables and exclude 26,946 firm-year observations with missing country-level controls. We further drop 164,421 observations with missing financial information to calculate tax avoidance measure (*TaxAvoidance*) and other firm-level controls. Finally, we drop 78,211 observations from financial and utility industries (i.e., firms with two-digit SIC codes 44–49 or 60–69). Our final sample includes 197,298 firm-year observations from 36 countries from 2003 to 2017.³ Table 1 reports the FTR of each country’s official language and the number of observations in each country. There is considerable variation in the number of observations, ranging from 32,075 firm-year observations in the United States to 278 firm-year observations in Colombia.⁴

3.2 Research design

To test the effect of languages on corporate tax avoidance, we estimate the following regression model.

$$TaxAvoidance_{ijt} = \alpha + \beta_1 * Strong\ FTR_{ijt} + \beta_2 * Control_{ijt} + \beta_3 * Industry_{ijt} + \beta_4 * Year_t + \varepsilon_{ijt}, \quad (5)$$

² Future-time reference was a focal area of the EUROTYP Theme Group on Tense and Aspect, which studied the typological and areal distribution of grammaticalized future-time reference. The resulting working group summarized their findings in an 846-page volume on Tense and Aspect, edited by Osten Dahl (2000). We follow Chen (2013) and adopt a future-time criterion from typological linguistics to separate languages into weak and strong FTR.

³ Our sample spans from 2003 to 2017 because statutory tax rates in different countries are available in this period from the KPMG Global Tax Rate Survey.

⁴ Firms in South Africa are excluded from the sample because the culture control variables are available only for white people, and there are at least 35 languages spoken in South Africa of which 10 are official languages.

where $TaxAvoidance_{ijt}$ represents our measure of tax avoidance of firm i in country j in year t . Following Atwood et al. (2012), we measure tax avoidance as the difference between the taxes on pre-tax earnings before exceptional items ($PTEBX$) calculated at the home-country statutory corporate tax rate ($Tax Rate$) and the current taxes paid (CTP), divided by pre-tax earnings. In particular, we calculate $TaxAvoidance_{ijt}$ as:

$$TaxAvoidance_{ijt} = \frac{\sum_{t-2}^t (PTEBX \times Tax Rate)_{ijt} - \sum_{t-2}^t CTP_{ijt}}{\sum_{t-2}^t PTEBX_{ijt}}, \quad (6)$$

where $Tax Rate$ refers to the home-country statutory corporate income tax rate from the KPMG website. We hand-collected these statutory tax rates from the 2003 to 2017 KPMG Global Tax Rate Survey. $PTEBX$ is pre-tax earnings before exceptional items. CTP is current taxes paid. $TaxAvoidance$ is a modification of the cash effective tax rate from Dyreng et al. (2008) and captures the amount of taxes unpaid expressed as the percentage of pre-tax earnings. This measure is especially useful in an international setting, because it is less sensitive to home-country accounting standards (Li, Maydew, Willis, and Xu 2017). A higher value of $TaxAvoidance$ suggests that the firm avoids taxes more. Observations with negative pre-tax income before exceptional items and missing current taxes paid are excluded from analyses.

Strong FTR is an indicator variable equal to one for firms in countries with languages grammatically separating the present and the future (strong FTR) and zero otherwise. We expect that firms in countries with strong FTR languages avoid more taxes and consequently have a higher $TaxAvoidance$. $Control_{ijt}$ represents firm and country characteristics that affect tax avoidance. In particular, we use the natural logarithm of total assets to proxy for firm size (*Size*). We use leverage (*Leverage*) to proxy for tax shields from debt financing. We also include in the regression sales growth (*SaleGrowth*). In addition, we also control for firm performance by including pre-tax return

on assets (*ROA*) and earnings volatility (*Earnings Volatility*). Hanlon and Heitzman (2010) suggest that book-tax differences capture some elements of tax avoidance. Atwood et al. (2012) show that firms in countries with higher required book-tax conformity avoid taxes less, because they have fewer opportunities to do so without decreasing reported income. To control for book-tax conformity, we follow Atwood et al. (2010) and use the following regression approach to calculate the conditional variance of current tax expense.

$$CTE_t = \theta_0 + \theta_1 * PTI_t + \theta_2 * FPTI_t + \theta_3 * DIV_t + e_t, \quad (7)$$

where *CTE* is current tax expense scaled by total assets. *PTI* is pre-tax book income scaled by total assets. *FPTI* is the estimated foreign pre-tax book income (foreign tax expense divided by the product of total tax expense and pre-tax book income) scaled by total assets. *DIV* is total dividends scaled by total assets. We estimate this regression by country-year and use the scaled descending ranking of the root mean squared errors to measure *BTAXC*. This measure of book-tax conformity captures the conditional variance of current tax expense for a given amount of pre-tax income. Countries with a higher *BTAXC* in a given year allow less flexibility for strategies that create book-tax differences to avoid taxes and thus have higher required book-tax conformity.

Atwood et al. (2012) also suggest that firms in countries with worldwide tax systems avoid taxes less, because the profits repatriated via dividend payments from foreign subsidiaries are likely subject to additional taxes in the home country. Therefore we control for *Worldwide Tax*, an indicator variable equal to one for firms in home countries with worldwide tax systems and zero otherwise. Atwood et al. (2012) and Hoopes, Mescall, and Pittman (2012) suggest that tax enforcement affects tax avoidance. We control for tax enforcement by including in the regression a tax audit risk dummy (*Tax Enforce*), which equals one for firms in countries defined by E&Y Global Transfer Pricing Reference Guides as medium or high tax-audit risk and zero otherwise.

We also include English legal origin (*English Origin*) and enforcement of contracts (*Contract Enforce*) to control for country-level differences in legal enforcements. We also control for country-level inflation (*Inflation*). Studies find that national culture explains variations in corporate policies across countries (e.g., Han, Kang, and Salter 2010). We use power distance (*Power Distance*), individualism (*Individualism*), masculinity (*Masculinity*), and uncertainty avoidance (*Uncertainty Avoidance*) to control for the effect of national culture on corporate tax avoidance. We further include a country's GDP growth rate (*GDP Growth*) in the regression to control for the effect of macroeconomic conditions. We obtain country-level data from Hofstede (2001) and the Economic Freedom website and report variables definitions in the appendix.⁵ To rule out the possibility that currency changes within a given country drive our results, we convert financial variables of non-U.S. firms into U.S. dollars, using the average currency rate in the year before computing the measures. $Industry_{i,j}$ is an indicator variable equal to one if firm i is in industry j and zero otherwise and is used to control for industry fixed effects on corporate tax avoidance. We use the three-digit Standard Industrial Classification (SIC) code to measure industry fixed effects. $Year_t$ is an indicator variable equal to one for year t and zero otherwise and is used to control for year fixed effects. Following Atwood et al. (2012), we cluster standard errors at the firm level to account for the correlation of the residuals of a given firm across years.⁶

3.3 Summary statistics

⁵ Data of Hofstede (2001) are based on surveys of IBM employees in over 70 countries designed to understand differences in corporate culture. Hofstede uses factor analysis to identify four dimensions of cultural variation: individualism, power distance, masculinity, and uncertainty avoidance. The Economic Freedom Index is from a survey published by the Fraser Institute (www.fraserinstitute.org).

⁶ Bertrand, Duflo, and Mullainathan (2004) show that clustered standard errors have a downward-biased component when the number of clusters is less than 50 and that this downward bias asymptotically disappears when the number of groups is larger than 50. Because our sample contains observations from 36 countries, we expect our results to be less subject to the downward bias concern documented by Bertrand et al. (2004) when the standard errors are clustered at the firm level.

We present descriptive statistics of our international sample in Panel A of Table 2. The mean and median of *TaxAvoidance* are 0.083 and 0.088, respectively, similar to those reported by Atwood et al. (2012). The mean value of *Strong FTR* is 0.530, suggesting that 53% of our observations are from countries with strong FTR languages. The mean *Worldwide Tax* is 0.567, suggesting that 56.7% of the observations are from countries with a worldwide tax system. We also note that 71.1% of observations are from countries with medium or high tax audit risk. *English Origin* is an indicator variable equal to one for firms in countries with an English common law system and zero otherwise. The mean of *English Origin* is 0.493, suggesting that 49.3% of our observations are from English common law countries. Overall, country-specific variables exhibit considerable variation across our sample. In terms of performance, sample firms have a mean return on assets (ROA) of 9%. The mean leverage ratio is 11.9%. All other firm-specific variables are generally comparable to those of prior studies (e.g., Atwood et al. 2012).

4. Results

4.1 Languages and tax avoidance

We report the estimation results of Model (1) in Table 3. In column (1), we include only *Strong FTR* and control for industry and year fixed effects. We find that the coefficient on *FTR* is 0.073 and significant at the 1% level, consistent with firms in countries with strong FTR languages avoiding more taxes. We include firm-level control variables in column (2) and still find a positive association between *Strong FTR* and *TaxAvoidance*. In column (3), we further control for country characteristics likely to affect corporate tax avoidance. The coefficient on *Strong FTR* is 0.028 and significant at the 1% level. In terms of economic significance, ceteris paribus, taxes unpaid, expressed as a percentage of pre-tax earnings, are 2.8 percentage point higher for firms in countries

with strong FTR languages. These findings are consistent with CEOs whose languages have strong FTR avoiding more taxes than CEOs whose languages have weak FTR.

With respect to control variables, we find a negative relation between firm size (*Size*) and *TaxAvoidance*, consistent with firms with higher potential political costs avoiding less taxes (Zimmerman 1983). We also find that *TaxAvoidance* increases with *leverage*, consistent with Dyreng et al. (2008). Moreover, firms with higher sales growth (*SaleGrowth*) avoid taxes more. This result is consistent with the finding of Badertscher, Burks, and Easton (2011), who show that firms with higher sales growth have lower annual cash effective tax rates. In addition, *TaxAvoidance* is negatively associated with earnings volatility (*Earnings Volatility*). Firms in countries with lower tax rates, greater required book-tax conformity, higher tax enforcement, and worldwide tax systems avoid taxes less, consistent with the findings of Atwood et al. (2012). We also find a negative relation between *TaxAvoidance* and *ROA*. This association is likely to be driven by the sample concentration of our international sample.⁷

As significant cross-country variation exists in the number of observations (e.g., 278 observations from Colombia and 32,075 observations from the United States), it is likely that our results are affected by the sample concentration. Following Atwood et al. (2012), we next calculate the median of each variable in the regression by country-industry-year and regress the median *TaxAvoidance* on *Strong FTR* and the median of control variables. Since each country has one variable per industry year in this regression, the concern that a particular country drives our results is largely mitigated. Atwood et al. (2012) suggest that this procedure represents a very conservative robustness test, because it removes a significant proportion of the variation in the measure of tax avoidance. We present the estimation results in Table 4. Consistent with the results in Table 3, we

⁷ We show in Table 4 that the relation between *TaxAvoidance* and *ROA* is positive when we control for the cross-country variation in the number of observations using the country-industry-year regression.

find that *Strong FTR* is positively associated with the country-industry-year median of *TaxAvoidance*, suggesting that our results are not affected by the sample concentration concern.

4.2 Evidence from firms in Switzerland and Belgium

Although the results in Section 4.1 provide evidence consistent with languages having a significant impact on corporate tax avoidance, one concern is that these results are based on a measure of language FTR that does not have within-country variation. Therefore it is likely that cross-country differences in tax system, such as book-tax conformity and enforcement that are correlated with language FTR, drive the results. In Section 4.1, we control for the cross-country differences in the tax system by including measures of book-tax conformity and enforcement in the regression. To further mitigate this concern, we examine the impact of language FTR on firms' tax avoidance in Switzerland, a country with *different* official languages in different cantons of the country, but a *single* tax system. Switzerland has four official languages: German (weak FTR, 63% of the population), French (strong FTR, 22.7% of the population), Italian (strong FTR, 8.4% of the population), and Romansh (strong FTR, 0.6% of the population). Moreover, because different cantons of Switzerland have different official languages, there is a significant within-country variation in language FTR. Figure 1A shows the distribution of official languages in Switzerland.

To implement this test, we first identify the headquarters city of each Swiss firm from the Compustat Global database and then search the official language of each city by cantons in Google and Wikipedia.⁸ *Strong FTR* is set to one if the official language of the city in which the firm is

⁸ The Compustat Global database reports firms' current headquarters. Thus it is likely that some firms in our sample changed the headquarters location during the sample period, and the location changes are associated with changes in the official language. To mitigate this concern, we manually checked the headquarters locations of each firm in our Swiss sample and Belgian sample in Google and Wikipedia. If firms do not change the headquarters locations during the sample period, we keep the location as reported by the Compustat Global database. If firms changed the headquarters location during the sample period, we replaced the headquarters location before the change reported by the Compustat Global database with the one that we collected from Google and Wikipedia.

headquartered has strong FTR and zero otherwise. We then regress our measures of tax avoidance on *Strong FTR* and firm-level control variables. The mean of *Strong FTR* for the Swiss sample is 0.173, suggesting that 17.3 percent of observations are from cantons with strong FTR languages. This variation of official languages within Switzerland enables us to identify the effects of languages on tax avoidance and rule out the possibility that our findings capture country-level differences in tax system.

We present the regression results of firms in Switzerland in Panel A of Table 5. Following prior studies (e.g., Dyreng et al. 2008; Hanlon and Heitzman 2010; Law and Mills 2017), we use cash effective tax rate (*Cash ETR*) and GAAP effective tax rate (*GAAP ETR*) to measure tax avoidance.⁹ *Cash ETR* captures the consequences of a firm's overall tax avoidance and is measured as cash taxes paid divided by pre-tax income adjusted for special items. *GAAP ETR* captures tax avoidance strategies that reduce total tax expense and is measured as total tax expense divided by pre-tax income adjusted for special items. We expect firms that avoid more taxes to have lower *Cash ETR* and *GAAP ETR*. We exclude firms with negative pre-tax income adjusted for special items from the sample, because loss firms have different tax reporting incentives, and their *Cash ETR* and *GAAP ETR* do not have an economic interpretation.

We find negative associations between *Strong FTR* and *Cash ETR* and *GAAP ETR*. The coefficient on *Strong FTR* is -0.041 (-0.029) when we use *Cash ETR* (*GAAP ETR*) to measure tax avoidance, suggesting *Cash ETR* (*GAAP ETR*) of Swiss firms headquartered in cantons with a

⁹ We use cash effective tax rate (*Cash ETR*) and GAAP effective tax rate (*GAAP ETR*) to compare tax avoidance for firms in the same country. The results for Swiss firms also hold if we use *TaxAvoidance* to measure tax avoidance (untabulated).

strong FTR language is 4.1 (2.9) percentage points lower than those headquartered in cantons with a weak FTR language.¹⁰

Similar to Switzerland, Belgium also has multiple official languages, including Dutch (weak FTR, 59% of the population), French (strong FTR, 40% of the population), and German (weak FTR, 1% of the population). Figure 1B shows the distribution of official languages in Belgium. Unlike Switzerland, in which major cities have a single official language, Belgium has a bilingual area in the Brussels capital region, in which many Belgian firms are located, and both Dutch and French are official languages. To measure the language FTR of Belgian firms, we first identify the headquarters city of each Belgian firm and then search the official language or the language spoken by the majority of the residents. In particular, for firms in cities with a single official language, *Strong FTR* is set to one if the official language of the city has strong FTR and zero otherwise. For firms in the Brussels capital region, *Strong FTR* is set to one because French is the language spoken by the majority of city residents in this region. Measuring *Strong FTR* in this way introduces bias and reduces the power of the test, especially because the number of Belgian firms is relatively small. The mean of *Strong FTR* for the Belgium sample is 0.455, suggesting that 45.5 percent of observations are from regions with strong FTR languages. We regress our measures of tax avoidance on *Strong FTR* and control variables and report the estimation results in Panel B of Table 5. We find that *Cash ETR* is negatively associated with *Strong FTR*, suggesting that the cash effective tax rates of firms in cities with strong FTR languages are significantly lower. We do not find a significant relation between *GAAP ETR* and *Strong FTR* for Belgian firms. Collectively, the findings of the Swiss and Belgium tests are consistent with the results in Section 4.1 and mitigate the concern that our results are driven by cross-country differences in tax system.

¹⁰ As the sample size is relatively small, our tests do not have enough power to detect significant relations between tax avoidance and firm characteristics other than ROA.

4.3 Evidence from CEOs of U.S. firms

The findings in Sections 4.1 and 4.2 are consistent with two different interpretations. First, the *native tongue* of the CEO shapes that person's perceptions of the future and consequently the ways that person thinks and acts. Second, the *working language* of the firm influences CEOs' preferences. In this section, we attempt to disentangle these two hypotheses by focusing on U.S. firms and examining the effect of the languages of CEOs' countries of origin on their firms' tax avoidance. Because the working language of U.S. firms is the same, results from this test provide evidence on the impact of CEOs' native tongue on corporate tax avoidance. Using three laboratory experiments, Boroditsky (2001) shows that the native tongue plays a more important role than the second language in bilinguals' thinking habits toward time, even if they acquire that language in early life (e.g., between three and 13 years old). Boroditsky also finds that the amount of exposure to the second language does not affect bilinguals' acquisition of the thinking habits of that language. Fernandez (2011) suggests that immigrants usually retain the culture and values of the country they were born. Therefore we expect foreign-born CEOs to bring the linguistic traits of their mother tongue to the United States, which affects their firms' tax avoidance. To test this prediction, we obtain the countries of origin of CEOs in the U.S. S&P 1500 Index firms from the Marquis Who's Who database. The language FTR of these CEOs is coded as that of their countries of origin. After merging CEO language FTR with financial data, our U.S. sample contains 6,147 observations, with 932 unique firms and 1,240 CEOs from 42 different countries. Panel A of Table 6 presents the distribution of CEOs' countries of origin and their native tongues.

In addition to *Cash ETR* and *GAAP ETR*, we employ three more measures of tax avoidance, namely, discretionary permanent book-tax differences (*DTAX*), which are a modified form of

book-tax differences, the probability of firms engaging in tax sheltering (*SHELTER*), and unrecognized tax benefits (*UTB*). *DTAX* is measured as the residual from the regression of permanent book-tax differences on nondiscretionary items (e.g., intangible assets and property, plant, and equipment) that are not driven by intentional tax avoidance. In particular, we follow Frank, Lynch, and Rego (2009) and estimate the following regression.

$$\begin{aligned} PERMDIFF_{it} = & \gamma_0 + \gamma_1 * INTANG_{it} + \gamma_2 * UNCON_{it} + \gamma_3 * MI_{it} + \gamma_4 * CSTE_{it} + \gamma_5 * \Delta NOL_{it} \\ & + \gamma_6 * PERMDIFF_{i,t-1} + \varepsilon_{it}, \end{aligned} \quad (8)$$

where *PERMDIFF* is the difference between total book-tax differences and temporary book-tax differences scaled by total assets. It is calculated as $\{BI - [(CFTE + CFOR) / STR]\} - (DTE / STR)$. *BI* is pre-tax book income. *CFTE* is current federal tax expense. *CFOR* is current foreign tax expense. *STR* is statutory tax rate. *DTE* is deferred tax expense. *INTANG* is goodwill and intangible assets scaled by total assets. *UNCON* is income (loss) reported under the equity method scaled by total assets. *MI* is income (loss) attributable to minority interest scaled by total assets. *CSTE* is current state income tax expense scaled by total assets. ΔNOL is the change in net operating loss carryforward scaled by total assets. We use the residual (ε) of this regression as our estimate of *DTAX*.

Unlike *Cash ETR*, which captures activities that reduce a firm's cash taxes paid, *DTAX* controls for the effects of nondiscretionary activities. Therefore *DTAX* reflects managers' discretionary decisions in tax avoidance and proxies for tax reporting aggressiveness. A higher *DTAX* indicates more aggressive tax avoidance.

We follow Wilson (2009) to construct our measure of the probability of tax sheltering (*SHELTER*). Based on a sample of firms identified as having participated in tax sheltering, Wilson (2009) develops a model that predicts the likelihood of firms engaging this practice. This model

has been used in many studies (e.g., Kim, Li, and Zhang 2011; Hoi, Wu, and Zhang 2013; Guenther, Matsunaga, and Williams 2016) to study tax sheltering. In particular, *SHELTER* is calculated as follows.

$$\begin{aligned} SHELTER = & -4.86 + 5.20*BT D + 4.08*|DA| - 1.41*LEV + 0.76*LAT + 3.51*ROA \\ & + 1.72*FINCOME + 2.43*R\&D, \end{aligned} \quad (9)$$

where *BT D* is the difference between book income and taxable income scaled by total assets. $|DA|$ is the absolute value of discretionary accruals estimated from the modified Jones model. *LEV* is long-term debt scaled by total assets. *LAT* is the logarithm of total assets. *ROA* is pre-tax income scaled by total assets. *FINCOME* is an indicator variable equal to one for observations reporting foreign income and zero otherwise. *R&D* is research and development expenditures scaled by total assets. A higher *SHELTER* indicates that firms are more likely to engage in tax sheltering.

We also use unrecognized tax benefits (*UTB*) as an alternative measure of tax avoidance. *UTB* is a liability recognized pursuant to FIN 48, which represents the amount of tax benefits related to aggressive tax positions that may be ultimately disallowed by the tax authority. Following Law and Mills (2015), we measure *UTB* as the balance of unrecognized tax benefits at the end of the year scaled by total assets.

In addition to the firm level variables that we control for in our international tests, we further include various CEO characteristics in the regression. We control for CEO gender, tenure, and age that may affect managers' preferences and incentives to pursue tax avoidance strategies. In addition, the ability of foreign-born CEOs may differ from that of domestic born ones. Thus we also control for managerial ability using the measure developed in Demerjian, Lev, and McVay (2012). Standard errors are clustered at the CEO level to account for the correlation of the residuals of a given CEO across years.

We present the descriptive statistics for our U.S. sample in Panel B of Table 2. The average firm in our sample has a *Cash ETR* and *GAAP ETR* of 0.261 and 0.308, respectively. It also has a permanent book tax difference of 1.5% of total assets and a balance of unrecognized tax benefits of 1% of total assets. Moreover, the likelihood of the average firm engaging in tax sheltering is 51.7%. Around 95% of the observations in our U.S. sample have strong FTR managers. In addition, the average firm is moderately leveraged at 18.7% and has a return on assets of 10.7%.

We report the estimation results for the U.S. sample in Panel B of Table 6.¹¹ In column (1), we use *Cash ETR* to measure tax avoidance. The coefficient on *Strong FTR* is -0.030 and significant at the 5% level, suggesting that firms with CEOs who speak strong FTR languages have a cash effective tax rate that is 3 percentage points lower than those with CEOs speaking weak FTR languages. In column (2), we replace *Cash ETR* with *GAAP ETR* and find consistent results. The GAAP effective tax rate of firms with CEOs speaking strong FTR languages is 2.3 percentage points lower than that of firms with CEOs speaking weak FTR languages. Column (3) reports the estimation results of using *DTAX* to measure tax avoidance. The coefficient on *Strong FTR* is 0.011 and significant at the 5% level, suggesting that CEOs with strong FTR languages engage in more discretionary activities to reduce taxes. Column (4) presents the results of using *SHELTER* as the dependent variable. The coefficient on *Strong FTR* is 0.042, consistent with firms with CEOs speaking strong FTR languages being 4.2 percentage points more likely to participate in tax sheltering. In column (5), we do not find a significant association between *Strong FTR* and *UTB*. Collectively, these results for the U.S. sample not only provide evidence that it is the native tongue of the CEO that affects firms' tax avoidance but also further mitigate the concern that other country-level characteristics and institutional environments confound our international results.

¹¹ To save space, we report the coefficients on control variables in Table OA1 of the online appendix.

It is likely that the results in Panel B of Table 6 capture the impact of unobserved firm-level heterogeneity on corporate tax avoidance. To mitigate this concern, we further examine whether changes in the language FTR following CEO turnover lead to changes in corporate tax avoidance. In particular, we first identify all CEO turnovers of which we can observe the countries of origin of both the departing and the newly appointed CEO. There are a total of 271 such CEO turnover events, with 15 associated with a change in CEO language FTR. We then match each event with a control firm without CEO turnover based on industry and size. For these 542 observations, we measure the change in tax avoidance associated with CEO turnover, $\Delta Tax Avoidance$, as the difference between the three-year average of our tax avoidance measures before and after CEO turnover, as follows.

$$\Delta Tax Avoidance_i = \frac{\sum_{t+1}^{t+3} Tax Avoidance_{i,t} - \sum_{t-3}^{t-1} Tax Avoidance_{i,t}}{3}, \quad (9)$$

where *Tax Avoidance* is our measures of tax avoidance and *t* is the first year the newly appointed CEO took office and is treated as the transition year. We construct ΔFTR by coding “from a weak FTR CEO to a strong FTR CEO” as 1 and “from a strong FTR CEO to a weak FTR CEO” as -1. Other changes, such as “from a strong FTR CEO to a strong FTR CEO,” “from a weak FTR CEO to a weak FTR CEO,” no change in the CEO country of origin, and no CEO turnover (control firms) are coded as 0. Out of the 15 observations that experienced a change in CEO language FTR, ΔFTR is equal to 1 for 4 observations and equal to -1 for 11 observations. We list the 15 CEO turnover events with changes in CEO language FTR in Table OA10 of the online appendix.

We then regress $\Delta Tax Avoidance$ on ΔFTR and changes in control variables. This test is essentially a difference-in-differences estimation in which we compare changes in tax avoidance of firms that experience changes in CEO language FTR to changes in tax avoidance of firms that

do not. The staggered changes in CEO language FTR in different firms and years enable us to identify the impact of language FTR on corporate tax avoidance. To illustrate this difference-in-differences estimate, suppose there is a change in CEO language FTR (from strong to weak or from weak to strong) for firm X in year t but no such change for firm Y . Firm X experiences a change in managers' perceptions of the costs and benefits of tax avoidance, while firm Y does not. Our hypothesis suggests that the change from a strong (weak) FTR CEO to a weak (strong) FTR CEO should lead firm X to decrease (increase) tax avoidance relative to firm Y . This is what the coefficient on ΔFTR captures. We expect ΔFTR to be negatively associated with $\Delta GAAP\ ETR$ and $\Delta Cash\ ETR$ and positively associated with $\Delta DTAX$, $\Delta SHELTER$, and ΔUTB .

In the first two columns of Panel C of Table 6, we find that the coefficients on $\Delta Cash\ ETR$ and $\Delta GAAP\ ETR$ are -0.051 and -0.045 and statistically significant at the 10% level, respectively, suggesting that *Cash ETR* and *GAAP ETR* decrease (increase) after a change from a weak (strong) FTR CEO to a strong (weak) FTR CEO. These suggest that strong (weak) FTR CEOs avoid taxes more (less). In columns (3) to (5), we regress $\Delta DTAX$, $\Delta SHELTER$, and ΔUTB on ΔFTR , respectively. When estimating $\Delta DTAX$, $\Delta SHELTER$, and ΔUTB , we lose a significant number of observations with changes in CEO language FTR ($\Delta FTR = 1$ or -1), due to the data requirements. Consistent with our expectations, the coefficient on $\Delta DTAX$ is 0.001 and statistically significant at the 5% level. We do not find significantly relations between ΔFTR and $\Delta SHELTER$ and ΔUTB . Taken together, the results of the turnover test provide further supporting evidence that strong FTR CEOs engage in more tax avoidance than weak FTR CEOs.

4.4 Financial reporting incentives

Kim et al. (2017) find that firms in strong FTR countries are more likely to manage earnings to increase income. Because our measure of tax avoidance, *TaxAvoidance*, uses pre-tax book income as the denominator, one may interpret our findings as evidence of income-increasing earnings management rather than tax avoidance. To rule out this alternative explanation, we perform the following four tests. First, we follow Atwood et al. (2012) and add different components of accruals in the regression. They are the change in net noncash working capital (ΔWC), the change in net noncurrent operating assets (ΔNCO), and the change in net financial assets (ΔFIN). *WC* is the difference between current operating assets and current operating liabilities. *NCO* is the difference between noncurrent operating assets and noncurrent operating liabilities. And *FIN* is the difference between financial assets and financial liabilities.

We report the estimation results of controlling for accrual components in column (1) of Table 7.¹² Consistent with Atwood et al. (2012), we find positive associations between our measure of tax avoidance and different components of accruals. Moreover, the coefficient on *Strong FTR* is still positively significant at the 1% level, with the magnitude largely unchanged, suggesting that the main results in Table 3 are not confounded by earnings management.

In column (2) of Table 7, we replace the accrual components with the absolute value of discretionary accruals (*AbsDA*) from the modified Jones model, developed by Dechow, Sloan, and Sweeney (1995), and the absolute value of abnormal cash flows from operations (*AbsCFO*), estimated following Roychowdhury (2006), as follows.

$$ACCR_t/AT_t = \mu_1*(1/AT_t) + \mu_2*(\Delta SALES_t - \Delta REC)/AT_t + \mu_3*PPE_t/AT_t + e_t$$

$$CFO_t/AT_t = \mu_1*(1/AT_t) + \mu_2*SALES_t/AT_t + \mu_3*\Delta SALES_t/AT_t + e_t, \quad (10)$$

¹² To save space, we report the coefficients on control variables in Table OA2 of the online appendix.

where *ACCR* and *CFO* are total accruals (income before extraordinary items less cash flow from operating activities) and cash flow from operating activities, respectively. *AT* is total assets. Δ *SALES* is change in sales. Δ *REC* is change in account receivables. *PPE* is property, plant, and equipment. We estimate these two regressions cross-sectionally for each industry with at least 20 observations in a given year. The residuals of these regressions are used to proxy for discretionary accruals and abnormal cash flows from operations, respectively. We find that *Strong FTR* is still positively associated with *TaxAvoidance*.

We also examine whether language FTR affects conforming tax avoidance, which refers to tax strategies that reduce both taxable income and accounting earnings (Hanlon and Heitzman 2010). Because this type of tax avoidance is associated with lower pre-tax financial reporting income, evidence from this test further mitigates the concern that our results are driven by the greater importance placed by strong FTR managers on accounting earnings. We follow Badertscher et al. (2016) and use the regression model below to construct the measure of conforming tax avoidance, as follows.

$$CTP_t = \eta_0 + \eta_1 * BTD_t + \eta_2 * NEG_t + \eta_3 * BTD_t * NEG_t + \eta_4 * SALE_t + \eta_5 * Industry_{i,t} + \eta_6 * Year_t + e_t, \quad (11)$$

where *CTP* is the ratio of cash taxes paid to lagged total assets. *BTD* is pre-tax income less income tax expense divided by statutory tax rate, scaled by lagged total assets. *NEG* is an indicator variable equal to one if *BTD* is negative and zero otherwise. *SALE* is net sales divided by net operating assets. We estimate this regression by country and use the negative residual of this regression as the measure of conforming tax avoidance (*ConformTaxAvoidance*). A larger *ConformTaxAvoidance* indicates more conforming tax avoidance. We report the estimation results of regressing *ConformTaxAvoidance* on *Strong FTR* and other control variables in column (3) of

Table 7. The coefficient on *Strong FTR* is significantly positive at the 1% level, suggesting that firms in strong FTR countries engage in more conforming tax avoidance.

Following Cen et al. (2017), we also use the difference between home-country statutory corporate tax rate and cash taxes paid divided by pre-tax cash flows, *SPREAD_CF*, as an alternative measure of tax avoidance. Because pre-tax cash flows are less likely to be manipulated than pre-tax income, using pre-tax cash flows as the scalar is less subject to the concern that our results are driven by managers' incentives to manipulate earnings. In column (4) of Table 7, we find that *SPREAD_CF* is positively associated with *Strong FTR*, suggesting that our findings are robust to using pre-tax cash flows as the scalar. Collectively, results in Table 7 mitigate the concern that our findings are driven by managers' incentives to achieve financial reporting outcomes.

4.5 Alternative measures of language FTR

Our results so far are based on an indicator variable of language FTR, *Strong FTR*, which equals one for firms in countries with strong FTR languages and zero otherwise. In Table 8, we replace this indicator variable with two alternative measures of FTR. Chen (2013), using online texts of weather forecasts for different countries, calculates the *Sentence Ratio (Verb Ratio)* as the number of sentences (verbs) that are grammatically future-marked, divided by the total number of sentences (verbs). *Sentence Ratio (Verb Ratio)* measures the percentage of sentences (verbs) regarding future weather that contain a grammatical future marker. A higher *Sentence Ratio* or *Verb Ratio* suggests that the language used in the country has a stronger language FTR. We present the estimation results of using *Sentence Ratio* and *Verb Ratio* to proxy for language FTR in Table 8.¹³ Consistent with the results of using *Strong FTR* to measure future time reference, we find that

¹³ To save space, we report the coefficients on control variables in Table OA3 of the online appendix.

Sentence Ratio and *Verb Ratio* are positively associated with *TaxAvoidance*, suggesting that firms in countries with a stronger language FTR avoid taxes more. A one percentage point increase in the percentage of sentences or verbs regarding future weather that contain a grammatical future marker is associated with an increase in the taxes unpaid, expressed as a percentage of pre-tax earnings, by 0.2 percentage points. Collectively, these findings suggest that our results are robust to alternative measures of language FTR.

4.6 Robustness checks

We provide a battery of additional tests in the online appendix. Recent studies suggest that cash generated from tax avoidance could be an alternative source of corporate financing (Law and Mills 2015; Edwards, Schwab, and Shevlin 2016). Thus, if firms in countries with strong language FTR avoid taxes, they should have more cash tax savings, which could be used to invest, distribute to creditors (pay down debt or issue less debt), or distribute to equity holders (repurchase shares, pay dividends, or issue less equity) (Chang, Dasgupta, Wong, and Yao 2014; Guenther, Njoroge, and Williams 2020).¹⁴

In Panel A of Table OA4, we find that firms in countries with strong language FTR have higher capital investment. Moreover, the investment is unlikely to be financed by external sources of cash, because firms in these countries have lower changes in debt and their changes in equity are not significantly different from those of firms in weak FTR countries.¹⁵ In addition, firms in

¹⁴ Debt and equity financing could be also used as tax avoidance strategies, e.g., stock options and deferred compensation that generate tax savings, and debt as tax shield. Therefore theoretical relations between tax avoidance and changes in debt and equity are ambiguous.

¹⁵ We use changes in debt and equity positions, because individual components of debt and equity financing, such as debt issuances, debt repayment, equity issuances, and share repurchases are missing for a substantial proportion (50% to 80%) for the observations in our main sample.

strong FTR countries have greater changes in cash holdings. These findings are consistent with cash savings from tax avoidance being used to fund investment.

If language FTR affects investment through cash tax savings, we expect that firms in strong FTR countries invest more when they avoid taxes more. In Panel B of Table OA4, we test this prediction by including the interaction between *Strong FTR* and *TaxAvoidance* in the regression. We find that investment is positively associated with *Strong FTR*TaxAvoidance*, consistent with firms investing more when they have more cash tax savings. We do not find significant relations between *Strong FTR*TaxAvoidance* and changes in cash holdings, changes in debt, and changes in equity, suggesting that the increase in investment for firms that avoid more taxes is unlikely to be driven by financing from other sources. Collectively, these findings provide some indirect evidence that tax avoidance of firms in strong FTR countries is associated with current cash tax savings that are used to fund investment.

Following Atwood et al. (2012), we further include *Factor*, which controls for cross-country institutional factors using the results of a factor analysis of the country's legal traditions (common law versus code law), the strength of investor rights, and ownership concentration as developed by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998), in the regression in column (1) of Table OA6 and find consistent results. In our main analyses, we include all firm-year observations from countries with language FTR information available. In column (2) of Table OA6, we drop U.S. firms that comprise 32,075 observations and account for 16% of our sample and re-estimate our Model (4). We find that the coefficient on *Strong FTR* is still positive and significant at the 1% level, suggesting that U.S. firms do not drive our main results in Table 3. Some countries and territories in our sample have multiple official languages. For example, Hong Kong has three—Cantonese (weak FTR), Mandarin (weak FTR), and English (strong FTR)—and

Singapore has four—Malay (weak FTR), Chinese (weak FTR), Tamil (strong FTR), and English (strong FTR). In our main analysis, we code Hong Kong and Singapore as weak FTR countries. In column (3) of Table OA6, we exclude from the sample firms in Hong Kong and Singapore and estimate the regression model again. Consistent with the main results in Table 3, we find a negative association between *Strong FTR* and *TaxAvoidance*. In addition, some countries, such as Hong Kong, Singapore, and the Netherlands, are considered tax havens. In column (4) of Table OA6, we exclude firms in these countries and find consistent results. These results suggest that the impact of tax havens on corporate tax avoidance does not drive our findings. In the main analysis, we exclude firms in Switzerland and Belgium, because these two countries have multiple official languages. In column (5) of Table OA6, we follow Chen (2013) and code the language FTR of these two countries as weak (German and Dutch, respectively). We find that our results are robust to including observations in the two countries in the sample. In column (6) of Table OA6, we include firms in South Africa by using the cultural variables for white people and defining the language of South Africa as English (Strong FTR), following Kim et al. (2017), and find consistent results.

In our main analyses, we control for industry fixed effects and year fixed effects separately and use three-digit SIC code to control for industry fixed effects. In column (1) of Table OA7, we include industry and year joint fixed effects in the regression and find consistent results. In columns (2) and (3) of Table OA7, we show that our results are not sensitive to using two-digit SIC code and Fama-French 48 industries to control for industry fixed effects. In addition, we use a one-year tax avoidance measure in column (4) of Table OA7 and find consistent results. In column (5) of Table OA7, we further include two indicator variables, *French Origin* and *German Origin*, which equal to one if the country has a French or German legal origin and zero otherwise, respectively.

We still find a significantly positive coefficient on *Strong FTR*, with the magnitude largely unchanged.

In Table OA8, we provide some weak evidence that the impact of the language FTR of foreign-born CEOs on U.S. firm tax avoidance is weakened by the CEOs' college education in an English-speaking country. Because the majority of CEOs in U.S. firms were born in the United States, many of the observations in our tests of U.S. firms have strong language FTR. In Table OA9, we use a weighted least-squares approach and find consistent, albeit weaker, results.

5. Conclusion

Languages differ in how they require speakers to mark the timing of events. Weak future time reference (FTR) languages do not make a clear distinction between the present and future, while strong FTR languages do. Obligatory marking of future events may make the future seem more psychologically distant to speakers of strong FTR languages and thus affect their behavior (Thieroff 2000; Dahl 2000). Our study extends the tax avoidance literature by showing that languages, a social norm that shapes individual preferences and explains a large amount of variation in economic development, have a significant impact on firms' tax avoidance.

Using the measure of tax avoidance developed by Atwood et al. (2012), we find that firms in countries with strong FTR languages are more likely to avoid taxes. This finding is robust to an alternative research design that uses the country-industry-year median of each variable, subsample analyses excluding observations of U.S. firms and observations in countries with multiple official languages that have different future time references (Hong Kong and Singapore), and alternative measures of language FTR and holds after controlling for earnings management. We employ the conforming tax avoidance measure developed by Badertscher et al. (2016) and find that strong

FTR CEOs avoid taxes more, reducing both taxable income and accounting earnings. This suggests that our findings are not driven by CEOs' incentives to achieve better financial reporting outcomes. We also use pre-tax cash flows as an alternative scalar in our measure of tax avoidance and find consistent results. To isolate the impact of languages from country-level confounds, such as tax system and institutional environments, we conduct within-country analyses by examining the tax avoidance of firms in Switzerland and Belgium. We find that Swiss and Belgian firms headquartered in cities with strong FTR languages avoid taxes more than those headquartered in cities with weak FTR languages. We further provide evidence that CEOs' native tongue affects tax avoidance by exploiting the country of origin of U.S. firms' CEOs. We find that U.S. firms with CEOs born in countries with strong FTR languages have lower cash and GAAP effective tax rates, engage in more discretionary activities to reduce taxes, and are more likely to participate in tax sheltering than U.S. firms with CEOs born in countries with weak FTR languages. Using changes in the language FTR following CEO turnover, we show that firms decrease (increase) tax avoidance after they experience changes from a strong (weak) FTR CEO to a weak (strong) FTR CEO.

In addition to contributing to the literature on the determinants of corporate tax avoidance, our study adds to the literature studying managerial leadership styles and the determinants and evolution of these styles as well as to the literature on the influence of languages on corporate policies.

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Appendix

<i>TaxAvoidance</i>	measure of tax avoidance following Atwood et al. (2012).
<i>ConformTaxAvoidance</i>	measure of conforming tax avoidance following Badertscher et al. (2016).
<i>SPREAD_CF</i>	the home-country statutory corporate income tax rate less cash taxes paid divided by pre-tax cash flows for firm, where pre-tax cash flows are defined as cash flow from operations plus cash taxes paid.
<i>GAAP ETR</i>	total tax expenses (Compustat TXT) divided by the difference between pre-tax book income (PI) and special items (SPI).
<i>Cash ETR</i>	cash taxes paid (TXPD) divided by the difference between pre-tax book income (PI) and special items (SPI).
<i>DTAX</i>	discretionary permanent book-tax differences following Frank et al. (2009).
<i>SHELTER</i>	the predicted probability of engaging in tax sheltering, following Wilson (2009).
<i>UTB</i>	uncertain tax benefits measured as the balance of unrecognized tax benefits (TXTUBEND) scaled by total assets (AT). We set <i>UTB</i> to zero for observations with missing <i>UTB</i> in fiscal years starting after 2006.
<i>Strong FTR</i>	an indicator variable equal to one for languages grammatically separating the present from the future and zero otherwise.
<i>Tax Rate</i>	the home-country statutory corporate income tax rate from the KPMG Global Tax Rate Survey.
<i>BTAXC</i>	measure of book-tax conformity, following Atwood et al. (2010).
<i>Worldwide Tax</i>	an indicator variable equal to one for firms in home countries with a worldwide tax approach and zero otherwise, from PWC Worldwide Tax Summaries and E&Y Worldwide Corporate Tax Guides.
<i>Tax Enforce</i>	an indicator variable equal to one for firms in countries with medium or high tax audit risk and zero otherwise, from E&Y Global Transfer Pricing Reference Guides.
<i>Power Distance</i>	power distance index, from Hofstede (2011).
<i>Individualism</i>	individualism, from Hofstede (2011).
<i>Masculinity</i>	masculinity, from Hofstede (2011).
<i>Uncertainty Avoidance</i>	uncertainty avoidance index, from Hofstede (2011).
<i>English Origin</i>	an indicator variable equal to one if the country has an English common law system and zero otherwise, from La Porta et al. (2008).
<i>French Origin</i>	an indicator variable equal to one if the country has a French civil law system and zero otherwise, from La Porta et al. (2008).
<i>German Origin</i>	an indicator variable equal to one if the country has a German civil law system and zero otherwise, from La Porta et al. (2008).
<i>Inflation</i>	country-level rate of inflation, from the Economic Freedom website (https://www.fraserinstitute.org/).
<i>Contract Enforce</i>	country-level legal enforcement of contracts, from Economic Freedom website (https://www.fraserinstitute.org/).
<i>Earnings Volatility</i>	the measure of country-level earnings volatility following Atwood et al. (2012).
<i>Size</i>	the natural logarithm of total assets (AT).
<i>Leverage</i>	long-term debt (DLTT) scaled by total assets (AT).
<i>ROA</i>	pre-tax income (PI) scaled by total assets (AT).
<i>Earnings Volatility</i>	measure of country-level earnings volatility, following Atwood et al. (2012).
<i>R&D</i>	research and development expense (XRD) scaled by total assets (AT).
<i>Intangible Assets</i>	intangible assets (INTAN) divided by total assets (AT).

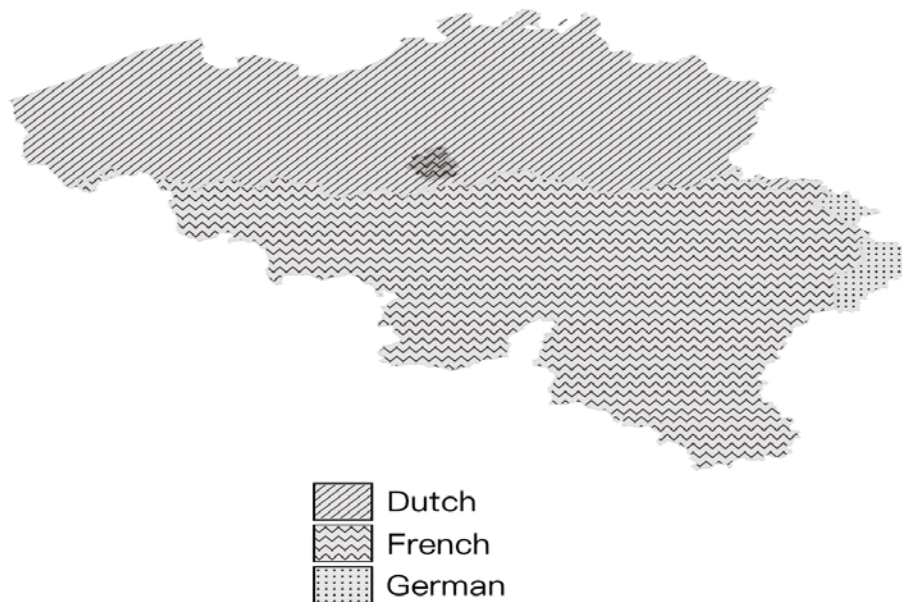
<i>GDP Growth</i>	GDP growth rate, from World Bank website.
<i>Capital Intensity</i>	net property, plant, and equipment (PPENT) scaled by total assets (AT).
<i>Equity Income</i>	equity income (ESUB) divided by total assets (AT).
<i>Foreign Income</i>	pre-tax foreign income (PIFO) divided by total assets (AT).
<i>SaleGrowth</i>	percentage change in sales (SALE) from year t-1 to t.
<i>Tenure</i>	the natural logarithm of 1 plus the number of years the CEO took office.
<i>Age</i>	the natural logarithm of CEO age.
<i>Female</i>	an indicator variable equal to one if the CEO is female and zero otherwise.
<i>Managerial Ability</i>	measure of managerial ability following Demerjian et al. (2012).
<i>Investment</i>	capital investment (CAPX) scaled by lagged total assets (AT).
$\Delta Cash$	change in cash and cash equivalent (CHE) scaled by lagged total assets (AT).
$\Delta Debt$	change in long-term debt (DLTT) and debt in current liabilities (DLC) scaled by lagged total assets (AT).
$\Delta Equity$	change in shareholder equity (SEQ) scaled by lagged total assets (AT).
<i>Sentence Ratio</i>	the number of sentences that are grammatically future-marked divided by the total number of sentences in online texts of weather forecasts for each country.
<i>Verb Ratio</i>	the number of verbs that are grammatically future-marked divided by the total number of verbs in online texts of weather forecasts for each country.
ΔWC	change in net noncash working capital, net noncash working capital is current operating assets minus current operating liabilities.
ΔNCO	change in net noncurrent operating assets, net noncurrent operating asset is noncurrent operating assets minus noncurrent operating liabilities.
ΔFIN	change in net financial assets, net financial asset is financial assets minus financial liabilities.
<i>AbsDA</i>	absolute value of discretionary accruals, following Dechow et al. (1995).
<i>AbsCFO</i>	absolute value of abnormal operating cash flows, following Roychowdhury (2006).
ΔFTR	an indicator variable for equal to 1 for firms with changes from a weak FTR CEO to a strong FTR CEO, equal to -1 for firms with changes from a strong FTR CEO to a weak FTR CEO, and 0 otherwise.
$\Delta GAAP ETR$	three-year average <i>GAAP ETR</i> in the post-CEO turnover period minus three-year average <i>GAAP ETR</i> in the pre-CEO turnover period.
$\Delta Cash ETR$	three-year average <i>Cash ETR</i> in the post-CEO turnover period minus three-year average <i>Cash ETR</i> in the pre-CEO turnover period.
$\Delta DTAX$	three-year average <i>DTAX</i> in the post-CEO turnover period minus three-year average <i>DTAX</i> in the pre-CEO turnover period.
$\Delta SHELTER$	three-year average <i>SHELTER</i> in the post-CEO turnover period minus three-year average <i>SHELTER</i> in the pre-CEO turnover period.
ΔUTB	three-year average <i>UTB</i> in the post-CEO turnover period minus three-year average <i>UTB</i> in the pre-CEO turnover period.

Figure 1A Distribution of Official Languages in Switzerland



The figure of language distribution in Switzerland is from Wikipedia:
https://en.wikipedia.org/wiki/Languages_of_Switzerland.

Figure 1B Distribution of Official Languages in Belgium



The figure of language distribution in Belgium is from Wikipedia:
https://en.wikipedia.org/wiki/Languages_of_Belgium.

Table 1 Sample Distribution by Country

Country	N	Language	FTR
Argentina	525	Spanish	Strong
Australia	4,724	English	Strong
Austria	602	German	Weak
Brazil	1,905	Portuguese	Weak
Canada	4,340	English	Strong
Chile	1,081	Spanish	Strong
China	26,620	Mandarin	Weak
Colombia	278	Spanish	Strong
Denmark	973	Danish	Weak
Finland	1,097	Finnish	Weak
France	5,141	French	Strong
Germany	4,569	German	Weak
Greece	1,342	Greek	Strong
Hong Kong	6,029	Cantonese	Weak
India	25,798	Hindi	Strong
Indonesia	2,823	Indonesian	Weak
Ireland	642	English	Strong
Israel	2,269	Hebrew	Strong
Italy	1,758	Italian	Strong
Japan	27,792	Japanese	Weak
Malaysia	6,990	Malaysian	Weak
Mexico	977	Spanish	Strong
Netherlands	1,270	Dutch	Weak
New Zealand	784	English	Strong
Norway	992	Norwegian	Weak
Pakistan	2,397	Urdu	Strong
Peru	785	Spanish	Strong
Philippines	990	Tagalog	Strong
Portugal	382	Portuguese	Strong
Singapore	4,026	Mandarin	Weak
South Korea	7,036	Korean	Strong
Sweden	2,806	Swedish	Weak
Thailand	3,959	Thai	Strong
Turkey	1,772	Turkish	Strong
United Kingdom	9,749	English	Strong
United States	32,075	English	Strong
Total	197,298		

Table 2 Descriptive Statistics

Panel A: International Sample						
Variable	N	Mean	Std. Dev	25%	50%	75%
<i>TaxAvoidance</i>	197,298	0.083	0.163	-0.008	0.088	0.164
<i>Strong FTR</i>	197,298	0.530	0.499	0.000	1.000	1.000
<i>Size</i>	197,298	5.603	1.962	4.330	5.546	6.854
<i>Leverage</i>	197,298	0.119	0.142	0.001	0.067	0.187
<i>ROA</i>	197,298	0.090	0.068	0.042	0.074	0.118
<i>R&D</i>	197,298	0.012	0.156	0.000	0.000	0.008
<i>SaleGrowth</i>	197,298	0.131	0.281	-0.007	0.079	0.205
<i>Tax Rate</i>	197,298	0.312	0.070	0.250	0.324	0.368
<i>Worldwide Tax</i>	197,298	0.567	0.496	0.000	1.000	1.000
<i>BTAXC</i>	197,298	0.311	0.234	0.170	0.213	0.447
<i>Tax Enforce</i>	197,298	0.711	0.453	0.000	1.000	1.000
<i>Power Distance</i>	197,298	59.243	19.643	40.000	55.000	77.000
<i>Individualism</i>	197,298	50.716	26.594	25.000	46.000	76.000
<i>Masculinity</i>	197,298	61.580	18.934	52.000	62.000	66.000
<i>Uncertainty Avoidance</i>	197,298	54.459	24.416	35.000	46.000	85.000
<i>English Origin</i>	197,298	0.493	0.500	0.000	0.000	1.000
<i>Inflation</i>	197,298	9.169	0.565	8.918	9.318	9.418
<i>Contract Enforce</i>	197,298	6.911	1.357	5.778	7.581	7.818
<i>Earnings Volatility</i>	197,298	0.514	0.258	0.316	0.500	0.737
<i>GDP Growth</i>	197,298	0.060	0.091	0.007	0.053	0.116
<i>AbsDA</i>	165,656	0.061	0.057	0.021	0.045	0.082
<i>AbsCFO</i>	169,119	0.061	0.057	0.020	0.045	0.084
<i>Verb Ratio</i>	133,574	0.356	0.410	0.000	0.000	0.769
<i>Sentence Ratio</i>	133,574	0.394	0.450	0.000	0.000	0.875

Panel B: U.S. Sample						
Variable	N	Mean	Std. Dev	25%	50%	75%
<i>Cash ETR</i>	6,147	0.261	0.139	0.162	0.261	0.344
<i>GAAP ETR</i>	6,147	0.308	0.113	0.252	0.328	0.375
<i>DTAX</i>	2,847	0.015	0.035	-0.002	0.010	0.028
<i>SHELTER</i>	4,712	0.517	0.291	0.241	0.493	0.754
<i>UTB</i>	2,072	0.010	0.013	0.002	0.006	0.014
<i>Strong FTR</i>	6,147	0.947	0.225	1.000	1.000	1.000
<i>Size</i>	6,147	7.803	1.647	6.569	7.675	8.965
<i>Leverage</i>	6,147	0.187	0.147	0.067	0.175	0.280
<i>ROA</i>	6,147	0.107	0.077	0.056	0.095	0.147
<i>Intangible Assets</i>	6,147	0.174	0.172	0.030	0.123	0.269
<i>R&D</i>	6,147	0.024	0.040	0.000	0.005	0.031
<i>Capital Intensity</i>	6,147	0.290	0.211	0.124	0.233	0.410
<i>Equity Income</i>	6,147	0.001	0.004	0.000	0.000	0.000
<i>Foreign Income</i>	6,147	0.024	0.037	0.000	0.007	0.037
<i>Managerial Ability</i>	6,147	0.033	0.158	-0.068	-0.010	0.096
<i>Female</i>	6,147	0.028	0.165	0.000	0.000	0.000
<i>Age</i>	6,147	1.882	0.834	1.099	1.946	2.485

Table 3 The Impact of Languages on Corporate Tax Avoidance: International Sample

	(1)	(2)	(3)
<i>Dependent variable =</i>	<i>TaxAvoidance</i>		
<i>Strong FTR</i>	0.073*** (0.002)	0.050*** (0.002)	0.028*** (0.004)
<i>Size</i>		-0.015*** (0.000)	-0.006*** (0.001)
<i>Leverage</i>		0.147*** (0.006)	0.146*** (0.005)
<i>ROA</i>		0.002 (0.012)	-0.037*** (0.012)
<i>R&D</i>		-0.008 (0.008)	-0.001 (0.001)
<i>SaleGrowth</i>		0.041*** (0.002)	0.007*** (0.002)
<i>Tax Rate</i>			0.049** (0.023)
<i>Worldwide Tax</i>			-0.011*** (0.003)
<i>BTAXC</i>			-0.016** (0.008)
<i>Tax Enforce</i>			-0.007** (0.003)
<i>Power Distance</i>			0.001*** (0.000)
<i>Individualism</i>			0.001*** (0.000)
<i>Masculinity</i>			-0.001*** (0.000)
<i>Uncertainty Avoidance</i>			-0.001*** (0.000)
<i>English Origin</i>			-0.026*** (0.003)
<i>Inflation</i>			-0.019*** (0.003)
<i>Contract Enforce</i>			-0.011*** (0.001)
<i>Earnings Volatility</i>			-0.043*** (0.004)
<i>GDP Growth</i>			0.078*** (0.006)
Industry fixed effects	Yes	Yes	Yes

Year fixed effects	Yes	Yes	Yes
Sample size	197,298	197,298	197,298
R-squared	0.096	0.131	0.234

This table examines the impact of language FTR on tax avoidance using the international sample. The dependent variable is the measure of tax avoidance, following Atwood et al. (2012). *Strong FTR* is an indicator variable equal to one for firms in countries with languages grammatically separating the present and the future and zero otherwise. All other variables are defined in the appendix. All tests are two-tailed with robust standard errors clustered at the firm level shown underneath the coefficient estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4 The Impact of Languages on Corporate Tax Avoidance: Country-Industry-Year Regression

	(1)	(2)
<i>Dependent variable =</i>	<i>TaxAvoidance</i>	
<i>Strong FTR</i>	0.034***	0.021***
	(0.003)	(0.005)
<i>Size</i>	-0.021***	-0.013***
	(0.001)	(0.001)
<i>Leverage</i>	0.088***	0.090***
	(0.011)	(0.011)
<i>ROA</i>	0.063**	0.004
	(0.026)	(0.026)
<i>R&D</i>	-0.002	-0.002***
	(0.001)	(0.001)
<i>SaleGrowth</i>	0.039***	0.017***
	(0.004)	(0.004)
<i>Tax Rate</i>		0.130***
		(0.032)
<i>Worldwide Tax</i>		0.014
		(0.032)
<i>BTAXC</i>		-0.008
		(0.008)
<i>Tax Enforce</i>		-0.010
		(0.012)
<i>Power Distance</i>		0.001***
		(0.000)
<i>Individualism</i>		0.000***
		(0.000)
<i>Masculinity</i>		-0.001***
		(0.000)
<i>Uncertainty Avoidance</i>		-0.001***
		(0.000)
<i>English Origin</i>		-0.008*
		(0.004)
<i>Inflation</i>		-0.014***
		(0.003)
<i>Contract Enforce</i>		-0.014***
		(0.002)
<i>Earnings Volatility</i>		-0.020***
		(0.005)
<i>GDP Growth</i>		0.110***
		(0.011)

Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Sample size	44,793	44,793
R-squared	0.162	0.225

This table examines the impact of language FTR on tax avoidance using the international country-industry-year median sample. The dependent variable is the country-industry-year median of the tax avoidance measure, following Atwood et al. (2012). *Strong FTR* is an indicator variable equal to one for countries with languages grammatically separating the present and the future and zero otherwise. All other variables are defined in the appendix. All tests are two-tailed with robust standard errors clustered at the firm level shown underneath the coefficient estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5 The Impact of Languages on Corporate Tax Avoidance

Panel A: Swiss Firms		
	(1)	(2)
<i>Dependent variable =</i>	<i>Cash ETR</i>	<i>GAAP ETR</i>
<i>Strong FTR</i>	-0.041*	-0.029**
	(0.021)	(0.015)
<i>Size</i>	0.008	0.009**
	(0.008)	(0.004)
<i>Leverage</i>	0.102	0.013
	(0.065)	(0.038)
<i>ROA</i>	0.274***	0.221***
	(0.102)	(0.029)
<i>Intangible Assets</i>	0.085	0.042
	(0.070)	(0.035)
<i>R&D</i>	0.005	0.000
	(0.035)	(0.000)
<i>Capital Intensity</i>	-0.044	-0.001
	(0.033)	(0.016)
<i>SaleGrowth</i>	-0.015	-0.013*
	(0.019)	(0.007)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Sample size	823	2,342
R-squared	0.101	0.113

Panel A examines the impact of language FTR on tax avoidance of Swiss firms. *Cash ETR* is measured as cash taxes paid divided by the difference between pre-tax book income and special items. *GAAP ETR* is measured as total tax expenses divided by the difference between pre-tax book income and special items. *Strong FTR* is an indicator variable equal to one for firms headquartered in cantons with strong FTR languages and zero otherwise. All other variables are defined in the appendix. All tests are two-tailed with robust standard errors clustered at the firm level shown underneath the coefficient estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 5 The Impact of Languages on Corporate Tax Avoidance

Panel B: Belgian Firms		
	(1)	(2)
<i>Dependent variable =</i>	<i>Cash ETR</i>	<i>GAAP ETR</i>
<i>Strong FTR</i>	-0.087*	0.007
	(0.051)	(0.048)
<i>Size</i>	0.008	-0.003
	(0.011)	(0.014)
<i>Leverage</i>	-0.034	-0.022
	(0.021)	(0.014)
<i>ROA</i>	0.598***	0.228***
	(0.132)	(0.074)
<i>Intangible Assets</i>	0.079	0.005
	(0.106)	(0.020)
<i>R&D</i>	-0.050	-0.067
	(0.070)	(0.099)
<i>Capital Intensity</i>	-0.057	-0.063
	(0.055)	(0.186)
<i>SaleGrowth</i>	-0.166***	-0.028*
	(0.030)	(0.015)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Sample size	368	647
R-squared	0.370	0.267

Panel B examines the impact of language FTR on tax avoidance of Belgian firms. *Cash ETR* is measured as cash taxes paid divided by the difference between pre-tax book income and special items. *GAAP ETR* is measured as total tax expenses divided by the difference between pre-tax book income and special items. *Strong FTR* is an indicator variable equal to one for firms headquartered in cantons with strong FTR languages and zero otherwise. All other variables are defined in the appendix. All tests are two-tailed with robust standard errors clustered at the firm level shown underneath the coefficient estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6 The Impact of Languages on Corporate Tax Avoidance: U.S. Sample

Panel A: Distribution of the Countries of Origin and Language FTR of U.S. CEOs							
Country of Origin	N	Language	FTR	Country of Origin	N	Language	FTR
Argentina	2	Spanish	Strong	Latvia	1	Latvian	Strong
Australia	10	English	Strong	Macedonia	1	Macedonian	Strong
Austria	1	German	Weak	Malaysia	2	Malaysian	Weak
Bulgaria	1	Bulgarian	Strong	Mexico	1	Spanish	Strong
Canada	28	English	Strong	Morocco	3	Arabic	Strong
Chile	1	Spanish	Strong	Netherlands	4	Dutch	Weak
China	3	Mandarin	Weak	New Zealand	1	English	Strong
Cuba	3	Spanish	Strong	Pakistan	3	Urdu	Strong
Czech Republic	1	Czech	Strong	Poland	1	Polish	Strong
Denmark	1	Danish	Weak	Russia	1	Russian	Strong
Egypt	2	Arabic	Strong	Serbia	2	Serbo-Croatian	Strong
France	7	French	Strong	South Africa	4	English	Strong
Germany	7	German	Weak	Spain	3	Spanish	Strong
Greece	3	Greek	Strong	Sweden	4	Swedish	Weak
Hong Kong	2	Cantonese	Weak	Taiwan	6	Mandarin	Weak
Hungary	1	Hungarian	Strong	Turkey	1	Turkish	Strong
India	20	Hindi	Strong	United Kingdom	21	English	Strong
Iran	4	Arabic	Strong	United States	1,071	English	Strong
Ireland	3	English	Strong	Zambia	1	English	Strong
Israel	1	Hebrew	Strong	Total	1,240		
Italy	4	Italian	Strong				
Japan	2	Japanese	Weak				
Lebanon	2	Arabic	Strong				

Table 6 The Impact of Languages on Corporate Tax Avoidance: U.S. Sample

Panel B: The Impact of the Language FTR of CEOs' Country of Origin on Corporate Tax Avoidance					
	(1)	(2)	(3)	(4)	(5)
<i>Dependent variable =</i>	<i>Cash ETR</i>	<i>GAAP ETR</i>	<i>DTAX</i>	<i>SHELTER</i>	<i>UTB</i>
<i>Strong FTR</i>	-0.030** (0.012)	-0.023** (0.011)	0.011** (0.005)	0.042* (0.023)	-0.002 (0.003)
<i>Controls</i>	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Sample size	6,147	6,147	2,847	4,712	2,072
R-squared	0.178	0.274	0.254	0.355	0.289

Panel B reports the regression results of tax avoidance on the language FTR of the CEO's country of origin using the U.S. sample. *Cash ETR* is measured as cash taxes paid divided by the difference between pre-tax book income and special items. *GAAP ETR* is measured as total tax expenses divided by the difference between pre-tax book income and special items. *DTAX* is discretionary permanent book-tax differences, following Frank et al. (2006). *SHELTER* is the predicted probability of a firm engaging in tax sheltering, following Wilson (2009). *UTB* is measured as the balance of unrecognized tax benefits scaled by total assets. *Strong FTR* is an indicator variable equal to one for CEOs from countries with languages grammatically separating the present and the future and zero otherwise. All other variables are defined in the appendix. All tests are two-tailed with robust standard errors clustered at the CEO level shown underneath the coefficient estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 6 The Impact of Languages on Corporate Tax Avoidance: U.S. Sample

Panel C: The Impact of Changes in CEO Language FTR on Changes in Corporate Tax Avoidance					
Dependent variable =	(1)	(2)	(3)	(4)	(5)
	$\Delta \text{Cash ETR}$	$\Delta \text{GAAP ETR}$	ΔDTAX	$\Delta \text{SHELTER}$	ΔUTB
ΔFTR	-0.051*	-0.045*	0.001**	0.021	-0.005
	(0.030)	(0.026)	(0.000)	(0.087)	(0.006)
$\Delta \text{Controls}$	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Sample size	540	542	264	442	220
R-squared	0.282	0.161	0.481	0.404	0.360

Panel C reports the regression results of changes in corporate tax avoidance on changes in CEO language FTR using the matched U.S. sample. $\Delta \text{Cash ETR}$ is the three-year average Cash ETR in the post-CEO turnover period minus the three-year average Cash ETR in the pre-CEO turnover period. $\Delta \text{GAAP ETR}$ is the three-year average GAAP ETR in the post-CEO turnover period minus the three-year average GAAP ETR in the pre-CEO turnover period. ΔDTAX is the three-year average discretionary permanent book-tax differences in the post-CEO turnover period minus the three-year average discretionary permanent book-tax differences in the pre-CEO turnover period. $\Delta \text{SHELTER}$ is the three-year average predicted probability of a firm engaging in tax sheltering in the post-CEO turnover period minus the three-year average predicted probability of a firm engaging in tax sheltering in the pre-CEO turnover period. ΔUTB is three-year average *UTB* in the post-CEO turnover period minus the three-year average *UTB* in the pre-CEO turnover period. ΔFTR is an indicator variable equal to 1 for firms that experience a change in CEO language FTR from “weak” to “strong,” equal to -1 for firms that experience a change in CEO language FTR from “strong” to “weak,” and 0 otherwise. All other variables are defined in the appendix. All tests are two-tailed with robust standard errors clustered at the CEO level shown underneath the coefficient estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 7 The Impact of Languages on Corporate Tax Avoidance: Controlling for Financial Reporting Incentives

	(1)	(2)	(3)	(4)
<i>Dependent variable =</i>	<i>TaxAvoidance</i>	<i>ConformTaxAvoidance</i>	<i>SPREAD_CF</i>	
<i>Strong FTR</i>	0.027***	0.024***	0.008***	0.021***
	(0.004)	(0.005)	(0.000)	(0.007)
<i>Controls</i>	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Sample size	197,298	165,656	196,245	159,709
R-squared	0.235	0.262	0.161	0.062

This table examines the impact of language FTR on tax avoidance after controlling for financial reporting incentives. The dependent variable in columns (1) and (2) is the measure of tax avoidance, following Atwood et al. (2012). The dependent variable in column (3) is the measure of conforming tax avoidance, developed by Badertscher et al. (2016). The dependent variable in column (4) is the measure of tax avoidance using pre-tax cash flows as the scalar, following Cen et al. (2017). *Strong FTR* is an indicator variable equal to one for firms in countries with languages grammatically separating the present and the future and zero otherwise. All other variables are defined in the appendix. All tests are two-tailed with robust standard errors clustered at the firm level shown underneath the coefficient estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 8 The Impact of Languages on Corporate Tax Avoidance: Alternative Measures of Language FTR

	(1)	(2)
<i>Dependent variable =</i>	<i>TaxAvoidance</i>	
<i>Verb Ratio</i>	0.213*** (0.006)	
<i>Sentence Ratio</i>		0.200*** (0.006)
<i>Controls</i>	Yes	Yes
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Sample size	133,574	133,574
R-squared	0.274	0.274

This table examines the impact of alternative measures of language FTR on tax avoidance using the international sample. The dependent variable is the measure of tax avoidance, following Atwood et al. (2012). *Sentence Ratio* is the number of sentences that are grammatically future-marked divided by the total number of sentences in online texts of weather forecasts for each country. *Verb Ratio* is the number of verbs that are grammatically future-marked divided by the total number of verbs in online texts of weather forecasts for each country. All other variables are defined in the appendix. All tests are two-tailed with robust standard errors clustered at the firm level shown underneath the coefficient estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.