Stock Price Informativeness and Corporate Tax Avoidance

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Abstract

We demonstrate that private information incorporated into stock prices has a significant impact on the sensitivity of corporate tax avoidance to stock prices. To establish causality, we use the decimalization of quoted prices as an exogenous shock to stock liquidity and NYSE's Autoquote implementation as a source of exogenous variation in algorithmic trading. Our findings provide strong support for the managerial learning effect, where stock prices convey useful new information to managers in guiding their decisions on tax avoidance. This effect remains robust after accounting for managerial private information, financial constraints, and different sources of public information. Furthermore, in cross-sectional tests we find that the effect is more pronounced in firms with foreign operations and lower capital intensity.

JEL classification: G14; G31; G32

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1. Introduction

Do managers learn from stock markets when avoiding corporate taxes? While there is ample evidence that corporate income tax structure influence investment decisions and that managers learn from their stock prices, the connection between managerial learning from prices and corporate tax avoidance decisions remains relatively underexplored. Hall and Jorgenson (1967) were the first to show that firms alter their investment behavior depending on tax policies. Firms may invest in a tax-preferred asset that provides a higher after-tax return even if the pre-tax return of this asset is lower than that of a fully taxed asset of identical risk (Scholes and Wolfson 1992).[1] Firms also avoid taxes to generate cash savings, which are particularly valuable when firms face financial constraints and future financing is costly or limited (Gamba and Triantis 2008; Riddick and Whited 2009; Graham et al. 2017).

We posit that a firm's corporate tax avoidance strategies are implemented alongside its policies on corporate investment and cash holdings. Previous studies show that managers learn external information embedded in their stock prices and incorporate it into their decisions on corporate investments and cash savings (Chen et al. 2007; Fresard 2012).[2] Stock prices aggregate diverse pieces of private and public information through the trading activity of a wide range of investors. Market prices may, for example, contain specific information about firm fundamentals, including investors' perception of growth prospects and future external financing costs, the firm's reputation in capital and product markets, and other strategic issues related to the firm's

[1] Hanlon and Heitzman (2010) provide an excellent review of tax research. For a more recent review of this literature, see Wang et al. (2020). Several studies examine the effect of taxes on investment location decision, foreign direct investment, and corporate mergers and acquisition decisions (Maydew 2001; Cloyd et al. 2003; Shackelford et al. 2011; Djankov et al. 2010; and Graham et al. 2014).

[2] Durnev, Morck, and Yeung (2004) find that firms' capital investments are more efficient and value-enhancing when stock price is more informative. Luo (2005) shows that that merging firms extract information from stock prices. Bakke and Whited (2010) confirm that managers incorporate private investor information when making investment decisions. Mathers et al (2017) find that firms' innovation outcomes improve with price informativeness.

relationship with various stakeholders.[3] To the extent that stock prices convey useful new information to managers, this information will also guide managers' decisions on tax avoidance and therefore, affect the sensitivity of firms' tax avoidance to the stock price.

Tax-avoiding firms engage in a broad spectrum of tax planning strategies that range from investing in projects that offer tax credits to sheltering taxes through operating in international tax havens (Hanlon and Heitzman 2010). These firms often hire external auditors or tax directors with specialized technical skills and expertise in tax planning to reduce the level of corporate tax expenses (Armstrong et al. 2012; Huseynov and Klamm 2012). Outside the firm, institutional investors such as hedge funds can provide such expertise to firm managers, enhancing the value-efficiency of tax avoidance (Cheng et al. 2012). Institutional investors may also introduce incentive mechanisms for managers to pursue greater tax savings to increase firm value. For example, Khan et al. (2017) find that institutional investors are unlikely to "explicitly" promote tax avoidance, but managers "deliver" tax avoidance following increases in institutional ownership. While these efforts may be sufficient to equip managers with all the necessary techniques to avoid taxes, stock prices may reflect new information that can help managers assess the efficiency of their corporate tax avoidance behavior. According to the learning hypothesis, managers are more likely to learn from stock prices when prices contain a greater amount of private information that is new to managers. Therefore, tax avoidance behavior of managers should be more sensitive to stock prices when outside investors incorporate more private information that is new to managers into the stock price. The nature of this incremental new information may be diverse and relevant to corporate tax avoidance for several reasons.

[3] Dow and Gorton (1997) and Subrahmanyam and Titman (1999) theoretically show that managers can use the information they infer from their stock prices to improve the efficiency of their corporate decisions and thus enhance the value of their firm. See also Dye and Sridhar (2002) and Goldstein and Guembel (2008).

First, corporate tax avoidance entails making specific investment decisions. Under to the "economic substance doctrine" in tax law, a tax strategy must have a valid business purpose and economic substance other than financial accounting benefits derived solely from tax savings (Scholes et al. 2014). In a survey of corporate tax executives by Graham et al. (2014), 86 percent of respondents identified the lack of business purpose or economic substance as the primary reason for not pursuing a tax strategy. Stock prices may contain specific information that may help managers to assess the economic substance of their tax-preferred investment decisions. By learning this information, managers can reduce the likelihood of facing challenges and potential denial of future tax benefits by the IRS.

Second, engaging in tax avoidance might be potentially harmful to firm reputation and may lead to negative publicity and backlash by stakeholders (Huseynov and Klamm 2012; Graham et al. 2014). While Gallemore et al. (2014) find no significant evidence that reputation concerns affect the likelihood of tax shelter usage, Khurana and Moser (2013) show that firms with long-term institutional shareholders engage in less tax avoidance, especially if such activities encourage managerial opportunism and reduce transparency. Given the stakeholders' ambiguous reaction to tax avoidance, managers may obtain some relevant information from the markets prior to making tax-related decisions and limit some tax avoidance practices to avoid exacerbating agency costs or harming the firm's reputation.

Third, firms engage in tax avoidance to enhance financial flexibility through cash savings. Prior research finds that firms hoard cash to finance future investments, especially when capital markets are imperfect (Almeida et al. 2004; Acharya et al. 2007). The value of cash holdings increases especially when firms are financially constrained and future external financing is uncertain (Gamba and Triantis 2008; Denis and Sibilkov 2010; Fresard 2012). Therefore, if prices

are more informative about the productivity of future investments under future financing frictions, managers may adjust their propensity to obtain cash savings through corporate tax avoidance based on the information they learn from market prices.

In summary, we argue that a firm's decision to avoid corporate taxes is intertwined with the firm's investment policies, motivations to save cash, and managers' assessment of potential direct and indirect costs of tax avoidance. To the extent that managers can learn new relevant information about future strategic issues from stock prices, including the outside stakeholders' perception of tax avoidance, managerial learning from stock prices should also determine the manager's propensity to engage in corporate tax avoidance.

We follow the methodology of Chen et al. (2007) and Fresard (2012) and examine how the informativeness of stock prices affects the sensitivity of tax avoidance to stock prices. We begin our analysis of the empirical relationship between price informativeness and corporate tax avoidance using a large sample of U.S. firms over the period 1970-2018. Following the prior literature, we use stock price nonsynchronicity as the measure of price informativeness (Roll 1988). Several studies have used this measure and related stock price informativeness to corporate investment decisions (Durnev et al 2003, 2004; Chen et al. 2007; Mathers et al. 2017). We construct a firm's tax sheltering propensity to measure the firm's inclination to avoid corporate taxes (Wilson, 2009). As noted by Wilson (2009), tax sheltering reflects more aggressive tax avoidance strategies. However, these strategies could also be associated with wealth creation for shareholders if coupled with proper governance.

In our first set of results, we find that corporate tax avoidance is positively and significantly associated with stock prices, as measured by Tobin's Q. This finding suggests that firms actively incorporate information from stock prices into their tax avoidance strategies. Firms tend to avoid

taxes more when the stock price contains a greater amount of private information reflected by outside investors. We show that the price informativeness measure has a significantly positive effect on the price sensitivity of tax avoidance. This result supports the managerial learning hypothesis and suggests that stock prices which reflect greater private information transmit useful new information to managers and affect their tax avoidance behavior. Managers learn from this private information and choose to engage in greater tax avoidance.

We acknowledge that in our empirical analysis, unobservable, time-varying omitted factors may affect both stock price informativeness and corporate tax avoidance decisions. Including firm fixed effects addresses potential endogeneity concerns stemming from unobservable time-invariant firm characteristics (omitted variables) that could influence both stock price informativeness and tax avoidance behavior. A firm's tax avoidance behavior could also affect the information content of its stock price by altering the level of private information incorporated into prices, which would suggest reverse causality. We address these endogeneity concerns using two approaches. First, we utilize an exogenous liquidity-increasing shock, the 2001 decimalization for NYSE and Nasdaq firms, as a quasi-experiment to conduct a difference-in-differences analysis. Firms' tax avoidance activity is unlikely to predict the introduction of this market-wide reform in stock exchanges. We find that firms that saw the largest change in stock price informativeness exhibit a more pronounced increase in their tax avoidance-to-price sensitivity after the event.

Second, we address endogeneity concerns by conducting an instrumental variable (IV) analysis using the two-stage least squares (2SLS) method. Our instrument for stock price informativeness is the Autoquote introduction to NYSE listed firms (following Hendershott et al. 2011). The introduction of Autoquote, which exogenously increases algorithmic trading, should directly affect the informativeness in stock prices (Hendershott et al. 2011). In addition, we use

another liquidity-enhancing event that is unrelated to firm fundamentals, i.e., the firm's stock split decisions, as an alternative instrument (Muscarella and Vetsuypens, 1996; Bali et al., 2014). The results of the first-stage IV analyses indicate that the instruments are unlikely to be weak. Furthermore, there is strong economic reason to believe that our instruments satisfy the exclusion restriction of IV analysis as they should not affect a firm's tax avoidance incentives directly or through other unobservable confounders. The second-stage results of our IV analyses are consistent with the hypothesis that managers use the private information reflected in the stock price when they make decisions to avoid taxes.

We conduct several tests to confirm the robustness of the managerial learning channel by accounting for factors that might confound the extent of private information reflected by outside investors in the stock price. One potential concern is that the information embedded in stock prices about the future benefits and costs of tax avoidance may not be new to managers. Because the information available to managers is unobservable, we use several variables to disentangle managerial information from the new information embedded in stock prices. First, we investigate the role of managers with greater ability to allocate resources.[4] We find that the impact of prices on corporate tax avoidance is lower in firms with higher managerial ability. Managers who are better at allocating corporate resources possess more information and rely less on the information in stock prices for their tax avoidance decisions. However, we find that the positive effect of stock price informativeness on the sensitivity of corporate tax avoidance persists even after controlling for managerial ability.

Next, we control for the stock's overall liquidity and the degree of public information reflected in the stock price by the equity market. We use the bid-ask spread and analyst coverage

[4] Koester et al. (2017) show that managers with superior ability avoid corporate taxes more. We use the managerial ability measure developed by Demerjian et al. (2012) in our analysis.

as measures of market liquidity of the stock and the extent of public information reflected in stock price. Financial analysts mostly serve as information conduits between firms and investors. Their presence may reduce the amount of new information conveyed through stock price to managers. We find that, after controlling for bid-ask spread and analyst coverage, private information in stock price that is new to managers is still positively associated with the sensitivity of tax avoidance to price.

Third, financially constrained firms may engage in tax planning to increase their internally generated funds. Thus, tax avoidance-to-price sensitivity may depend on the extent of financial constraints firms face. We test how financial constraints affect the tax avoidance-to-price sensitivity using two measures of financial constraints, the Altman Z score and the WW score. Our findings suggest that current financial constraints weaken the effect of private information on the sensitivity of tax avoidance to price. We interpret this as evidence that current financial constraints may limit the managerial propensity to avoid taxes and supersede the effect of managerial learning from stock prices. This is consistent with the evidence of Bayar et al. (2018) that greater tax avoidance may further exacerbate financial constraints.

In the last part of our empirical analysis, we conduct several subsample tests to solidify the robustness of the managerial learning effect we propose.[5] First, by sorting the sample into quartiles based on the level of private information and conducting empirical tests for each quartile-based subsample separately, we find that the sensitivity of tax avoidance to price is stronger with higher

[5] Following the existing literature (Dyreng et al. 2008; Koester et al. 2017), we also use the long-term cash effective tax rate (Cash ETR) as an alternative measure for corporate tax avoidance. Compared to tax sheltering, ETR is an aggregate measure of a firm's actual amount of taxes paid, and a lower value in ETR indicates greater corporate tax avoidance. The findings for Cash ETR are qualitatively similar to the findings we report for tax sheltering. We report these findings in the Online Appendix.

levels of private information. These results suggest that managers learn more regarding their tax avoidance activities when there is more private information contained in the market price.

Next, we conduct two cross-sectional tests. First, we find that the positive sensitivity of corporate tax avoidance to price informativeness is greater in magnitude for firms with foreign operations. These findings are consistent with the observation that firms with global operations have a larger number of tax avoidance tools available to them. In addition, learning private information from stock prices may be more valuable for these firms given their need to guide themselves when making global capital investment decisions. Second, we document that managers of less capital-intensive firms learn more from stock prices when making their tax planning decisions. In firms with higher capital intensity, avoidance of taxes through depreciation of investments may be perceived more natural due to the availability of various tax shields and other tax planning tools. In contrast, firms with lower capital intensity have a smaller set of tax avoidance tools at their disposal in contrast to more capital-intensive firms. Therefore, managers of firms with lower capital intensity are more likely to learn from stock prices to increase the efficiency of their tax avoidance decisions.

Our paper contributes to the literature in three important ways. First, we document that managers learn from stock prices when making decisions related to corporate taxes. This identifies is a new channel through which stock prices affect managerial actions, and to our knowledge, ours is the first study to link corporate tax avoidance to price informativeness. Our findings also suggest that managers may improve the value efficiency of their tax avoidance decisions based on the feedback they receive from stock market investors through the stock price.

Second, while prior literature on corporate tax avoidance links managerial decisions regarding taxes to various factors, such as managerial incentives, ownership structure, financial

constraints, and firm-specific factors, we focus on the informational role played of stock prices. We show that one of the driving factors behind corporate tax avoidance is managerial learning from the information embedded in stock prices. In addition, there is a longstanding debate on why firms "under-avoid" taxes (Weisbach 2001; Desai and Dharmapala 2006; Hanlon and Heitzman 2010; Gallemore et al. 2014). Our results suggest that managerial decisions to avoid taxes are related to information managers glean from stock markets. It is possible that the information that is received by the managers of under-avoiding firms does not clearly convey the value efficiency of tax avoidance, hence curbing their propensity to avoid taxes.

We also contribute to the literature that analyzes how stock prices affect corporate decisions (e.g., Barro 1990; Morck et al. 1990). The paper is related to the growing empirical literature on managerial learning channels: the role of private information in stock prices (e.g., Chen et al. 2007), the informativeness of peers' stock prices (e.g., Foucault and Fresard 2014; Dessaint et al. 2019), firms' capital constraints (e.g., Baker et al. 2003) in driving the investment-to-price sensitivity of firms. We contribute to these studies by showing that stock prices convey new information to managers and increase the efficiency of corporate tax avoidance decisions.

The rest of the paper is organized as follows. Section 2 presents the empirical methodology and describes the sample and the variables. Section 3 discusses the empirical findings of the baseline results as well as the channel tests. Section 4 reports the additional analyses. Finally, Section 5 concludes.

2. Data and Variables

The data used in this study are aggregated from several sources. We draw firms' financial characteristics from Compustat and stock price information from CRSP. The analyst coverage data

is available from I/B/E/S. Following the prior tax planning literature, firm-year observations with missing total assets and those with missing or non-positive pretax income are dropped. We also eliminate financial firms and utility firms (SIC codes 4000-4999 and 6000-6999). Our sample consists of 39,425 firm-year observations for US publicly listed firms from 1970 to 2018.

2.1 Tax Avoidance Measure

Our measure of corporate tax avoidance is tax sheltering propensity. Following Wilson (2009), we estimate the propensity of firms to engage in tax sheltering based on the shelter probability computed by using the estimates from the following logit regression model:

$$Shelter\ Prob. = -4.30 + 6.63 \times BTD - 1.72 \times Lev + 0.66 \times Size + 2.26 \times ROA + 1.62 \times FI + 1.56 \times RD, \quad (1)$$

where *BTD* is the book tax difference, *Lev* is the long-term debt scaled by total assets; *Size* is the log of total assets; *ROA* is the net-income scaled by total assets; *FI* is a dummy variable, coded one for firms with foreign income and zero otherwise; and *RD* is the research and development expenses scaled by total assets. We follow Rego and Wilson (2012), Hoi, Wu, and Zhang (2013), and Khurana and Moser (2013) and construct a dummy variable, *Tax Sheltering*, that equals one if a firm's estimated shelter probability belongs to the top quartile and zero otherwise.

2.2 Price Informativeness Measures

Our empirical analysis is focused on managers learning from private information in stock prices in tax management. We use price nonsynchronicity to determine the extent of private information contained in stock prices. Roll (1988) introduced this measure as an indication of private information and empirically demonstrated that price nonsynchronicity has only a very small correlation with public news. Subsequent studies find additional evidence that price

nonsynchronicity measures more private information than just noises (Durnev et al. 2003; Durnev et al. 2004). Therefore, many empirical studies use price nonsynchronicity to measure private information in stock prices (Chen, et al. 2007; Ferreira and Laux 2007; Ferreira et al. 2011; Fresard 2012; Mathers et al. 2017). We compute this measure by estimating 1-R^2, where R^2 is the R-square from the following regression:

$$r_{i,j,t} = \beta_{i,0} + \beta_{i,m} \times r_{m,t} + \beta_{i,j} \times r_{j,t} + \varepsilon_{i,t}, \quad (2)$$

where $r_{i,j,t}$ is the return of firm *i* in industry *j* at time *t*, $r_{m,t}$ is the market return at time *t*, and $r_{j,t}$ is the return of industry *j* at time *t*. The idea is that if a firm's stock return is less correlated with the market and industry returns, then the firm's stock price is more likely to convey firm-specific information, which is useful for managerial tax planning decisions. Thus, a higher value in 1-R^2 should indicate more private information impounded in stock prices (Roll 1988; Chen et al. 2007).

2.3 Managerial Ability Measures

We measure *Managerial Ability* by the MA-Score developed in Demerjian et al. (2012). The measure is constructed using a two-stage approach as the first stage uses data envelopment analysis (DEA) to capture how efficiently firm resources are managed to generate revenues relative to a firm's industry competitors. This is achieved by optimizing total sales using a vector of several inputs, including the cost of goods sold, SG&A, net PP&E, operating leases, R&D, purchased goodwill and intangibles.

$$max\ \theta_t = (Sales_t) \quad (3)$$
$$\cdot (v_1 COGS_t + v_2 SG\&A_t + v_3 PPE_t + v_4 OpsLease_t + v_5 R\&D_t$$
$$+ v_6 Goodwill_t + v_7 OtherIntan_t)^{-1}$$

The DEA optimization determines a firm-specific vector of optimal weights on the seven input variables by comparing the inputs of firm *i* to the inputs of all other firms within the same industry-year and computes a firm efficiency score θ that takes a value between 0 (least efficient firms) and 1 (most efficient firms). The second stage isolates the portion of the efficiency score attributable to managerial ability by estimating the following cross-sectional regression on firm-year level:

$$\theta_{i,t} = \alpha_0 + \beta_1 \cdot \ln(Total\ Assets_{i,t}) + \beta_2 \cdot Market\ Share_{i,t} + \beta_3 \cdot Positive\ Free\ CF_{i,t} + \beta_4 \cdot \ln(Age_{i,t}) + \beta_5 \cdot Business\ Segment\ Concentration_{i,t} + \beta_6 \cdot Foreign\ Currency\ Indicator_{i,t} + Year\ FEs + \varepsilon_{i,t} \quad (4)$$

Managerial Ability is constructed using the unexplained portion of θ, e.g., the residual of this regression, ranked with its industry peers. Unlike other measures of managerial ability used in prior literature (e.g., longer CEO tenure, higher CEO pay, higher historical stock and accounting performance, more CEO media mentions, etc.), this measure directly captures executives' capability to manage resources efficiently.

2.4 Other Variables

We control for several firm level characteristics. *Firm Size* is the natural logarithm of total book assets. *ROA* is net income divided by firm's book assets. *EBIT/Sale* is the firm's EBIT scaled by total sales revenue. *Leverage* is the sum of long-term and short-term debt scaled by firm's book assets. *Cash Holdings* is the balance of cash scaled by the firm's book assets. We measure the firm's capital intensity by *Capital Expenditure*, which is the firm's capital expenditure scaled by book assets. We measure the firm's earnings quality by *Discretionary Accruals*. Following Hong et al. (2014), we estimate the absolute value of discretionary accruals using the performance-

controlled cross sectional modified Jones (1991) model to control for aggressive financial reporting practices (Kothari et al. 2005). Larger values in *Discretionary Accruals* indicate higher earnings management and lower earnings quality. We also construct an *Earnings Volatility* measure as the standard deviation of its operating income over the last five years scaled by book assets. We additionally control for firm's operating cash flow (*Net Operating Loss*), cash dividend (*Dividend Payer*), and tangible asset ratio (*Tangibility*). Definitions of all the variables are provided in Appendix I.

In our extended tests, we control for public information using *Analyst Coverage*, which is the number of analysts covering the firm *i* in year *t*. We measure market liquidity using the bid-ask spread.[6] We use two measures of financial constraints suggested by the prior literature. The first is Altman Z score based on Altman (1968).[7] The second measure is WW score based on White and Wu (2006).[8] Lastly, firms with tax avoidance incentives may intentionally allocate portions of assets overseas to exploit jurisdictional variance in tax rates. We create a dummy variable, *Foreign Income* indicating if the firm has foreign earnings in year t.

2.5 Summary Statistics

The summary statistics of all variables are reported in Table 1. The mean value in *Tax Sheltering* is 0.327, comparable with descriptive statistics reported in prior studies (Khurana and Moser, 2013; Bayar et al. 2018). The mean value in $1\text{-}R^2$ is 0.814, indicating that on average, the

[6] Bid-ask spread is calculated as (Ask-Bid)/(midpoint of ask and bid price) from CRSP.

[7] Altman Z-Score is modeled as 1.2*(working capital / total assets) + 1.4*(retained earnings / total assets) + 3.3*(earnings before interest and tax / total assets) + 0.6*(market value of equity / total liabilities) + 1.0*(sales / total assets).

[8] WW score is modeled as -0.091*(cash flow/total assets) - 0.062*positive dividend + 0.021*(long-term debt/total assets) - 0.044 * (log of total assets) + 0.102*industry sales growth-0.035 * firm sales growth. Positive dividend is an indicator that equals 1 if the firm pays cash dividends.

market and industry returns can explain only about 20 percent of firms' return variations, consistent with Chen et al. (2007). The average Q in our sample is 2.24. The mean value in *Managerial Ability* is about 0.02, which is comparable with the MASCORE in Koester et al. (2017).

[Insert Table 1 about here]

Table 2 presents the Pearson correlations between variables. We find a significant negative relation between tax sheltering and $1\text{-}R^2$, implying that greater price informativeness is associated with lower corporate tax avoidance. We do not observe a strong univariate correlation between tax sheltering and Q. Most of the firm characteristics exhibit significant correlations with our tax avoidance measures, highlighting the importance of controlling for these variables in our multivariate analysis.

[Insert Table 2 about here]

3. Empirical Design and Results

3.1 Baseline Results

In this section, we empirically test whether managers incorporate private information from stock prices into their tax planning decisions. Using firm-year panel regressions, we examine how price informativeness influences the sensitivity of corporate tax avoidance to prices. Our baseline specification is as follows:

$$Tax\ Sheltering_{i,t} = \alpha_0 + \beta_1 \cdot Q_{i,t} + \beta_2 \cdot (1 - R^2)_{i,t} + \beta_3 \cdot (1 - R^2) \cdot Q_{i,t} + \gamma \cdot X'_{i,t} + Firm\ FEs + Industry * Year\ FEs + \varepsilon_{i,t} \quad (5)$$

The dependent variable is *Tax Sheltering*. Q represents the firm's stock price. $1\text{-}R^2$ measures price informativeness, capturing the private information embedded in prices. The

interaction term $(1\text{-}R^2)*Q$ is our key independent variable. $X'_{i,t}$ denotes the vector of firm-level controls listed in Table 1. We include firm fixed effects and industry × year fixed effects to account for unobserved heterogeneity. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate outliers, and standard errors are clustered at the firm level to address within-firm correlation.

Table 3 presents our baseline regression results. We begin by testing whether managers incorporate information from stock prices into tax avoidance decisions by estimating Equation (5) without interaction terms. Columns (1) and (2) show a statistically significant positive association (at the 1% level) between stock price (Q) and tax avoidance, supporting our hypothesis that managers learn from stock prices when allocating resources to tax-efficient assets. Our key variable of interest, $(1\text{-}R^2)*Q$, captures how firm-specific private information in stock prices that is new to managers affects the sensitivity of tax avoidance to stock price. In columns (3) and (4), the coefficients for $(1\text{-}R^2)*Q$ are significantly positive at the 1% level. The findings suggest that tax avoidance is more sensitive to stock price when the stock price contains a larger amount of private information that is new to managers. For instance, the tax avoidance-to-price sensitivity will increase by 48 percent if a firm's $1\text{-}R^2$ increases from a 25th percentile value (0.713) to a 75th percentile value (0.962). In other words, managers obtain larger corporate tax savings following a positive shock to Tobin's Q (stock price) when this signal contains a larger amount of investors' private information.[9]

[Insert Table 3 about here]

[9] Our findings are qualitatively similar when we use the probability of informed trading (PIN) measure developed in by Easley, Hvidkjaer, O'Hara (2002) and estimated by Brown and Hillegeist (2007). Their updated PIN estimate covers our sample period from 1993 to 2010. The results are available upon request.

3.2 Difference-in-Differences Analysis

Several endogeneity concerns could affect the relationship between price informativeness and tax avoidance sensitivity to stock prices. We note that the potential endogeneity problem where price informativeness and tax avoidance-to-price sensitivity are jointly determined could be mitigated by using the fixed effects regression method. Firm fixed effects address endogeneity concerns in which unobserved time-invariant firm-specific variables simultaneously determine both price informativeness and tax avoidance-to-price sensitivity. This is also equivalent to looking only at within-firm changes in price informativeness $1\text{-}R^2$.[10] Additionally, industry × year fixed effects help address omitted variable bias by accounting for time-varying industry-specific factors that could concurrently affect stock price informativeness and corporate tax strategies.

To further mitigate endogeneity concerns, we employ an exogenous liquidity-improving shock – the decimalization of quoted prices in the U.S. stock exchanges in 2001. The 2001 decimalization of quoted stock prices enables trading at minimum price increments of $0.01 compared to $1/16, or $0.0625 before the reform. Decimalization started on January 29, 2001, for NYSE stocks and on April 9, 2001, for Nasdaq stocks. Bessembinder (2003) documents a substantial decline in quoted and effective bid-ask spreads after decimalization, and this decline was greater for stocks that had narrower spreads for which decimalization relaxed the lowest bound constraint. Given the established relationship between price informativeness and stock illiquidity (Duarte and Young, 2009; Bakke and Whited, 2010; Ferreira, et al., 2011; Balakrishnan et al., 2014), we expect that stocks with the largest change in their price informativeness should experience a greater increase in their price sensitivity of tax avoidance. Therefore, we use this

[10] Another approach to alleviate endogeneity concerns is to use lagged price informativeness and explanatory variables. In unreported tests, our findings confirm a positive enhanced relation between price informativeness and tax avoidance-to-price sensitivity.

reform as a quasi-experiment in a difference-in-differences (DiD) analysis, estimating the following specification:

$$Tax\ Sheltering_{i,t} \tag{6}$$
$$= \alpha_0 + \beta_1 \cdot Post\ 2001 + \beta_2 \cdot Post\ 2001 \cdot Treatment + \beta_3 \cdot Post\ 2001$$
$$\cdot Treatment \cdot Q + \beta_4 \cdot Q + \beta_5 Post\ 2001 \cdot Q + \beta_6 Treatment \cdot Q + \gamma \cdot X'_{i,t}$$
$$+ Firm\ FEs + Industry * Year\ FEs + \varepsilon_{i,t}$$

The sample window for this study is 1991-2011. We select the treatment group as the firms that saw the above-median change in stock price informativeness ($1\text{-}R^2$) pre-2001 and the control group is vice versa. Alternatively, we designate the treatment group as the firms that saw the largest change (top quartile) in stock price informativeness ($1\text{-}R^2$) pre-2001 and the control group as the firms that saw the least change (bottom quartile) in stock price informativeness ($1\text{-}R^2$) pre-2001. We match the control variables of the treatment group and control group using propensity score matching to ensure they are comparable prior to the shock. We are interested in the coefficient β_3 of the triple interaction term $Post\ 2001 \cdot Treatment \cdot Q$, which is expected to be positive if the tax avoidance-to-price sensitivity is greater for the most informative firms post the reform.

Table 4 reports the results of the difference-in-differences regressions. After propensity score matching, both models show positive coefficients for $Post\ 2001 \cdot Treatment \cdot Q$, significant at the 5% level (t = 2.416 and 2.089). This is also economically significant. Compared to firms below the median level (in the bottom quartile) of stock price informativeness before the reform, firms above the median level (in the top quartile) of stock price informativeness witnessed a 15.9 (17) percent increase in their tax avoidance-to-price sensitivity after the reform. These results support our hypothesis that more informative stock prices enable managers to gain more private information for tax avoidance decisions.

[Insert Table 4 about here]

3.3 Instrumental Variable Analysis

To further address potential endogeneity concerns, we implement an instrumental variable (IV) approach using two-stage least squares (2SLS) estimation. The instrumental variable analysis helps mitigate both time-varying omitted variable bias and potential reverse causality between tax avoidance and price informativeness. A valid instrument for stock price informativeness must satisfy two conditions. First, the instrument must be sufficiently correlated with price informativeness (the relevance condition). Second, it must affect tax avoidance only through its impact on price informativeness, with no direct effect or correlation with unobservable determinants of tax avoidance (exclusion restriction).

We employ two instruments in this analysis. The first is the introduction of Autoquote to NYSE stocks in 2003.[11] Autoquote is a structural change in the NYSE market, and according to Hendershott et al. (2011), it exogenously causes an increase in algorithm trading, which improves market liquidity and has a positive impact on informativeness in stock quotes. We create an indicator variable *Event* that equals zero for the years before the Autoquote introduction and one afterwards, and another indicator variable *Treatment* that equals one for NYSE-listed firms and zero for Nasdaq-listed firms. The instrument is *Event*Treatment*. The second instrument we use is the company's stock split event. Stock splits are liquidity-enhancing events that are not directly related to firm values or firm fundamentals (Muscarella and Vetsuypens, 1996; Bali et al., 2014). We create an indicator variable *Split* that equals 0 for a firm in the period before the split and 1

[11] The NYSE began to phase in the Autoquote software on January 29, 2003, starting with six active, large-cap stocks. During the next two months, over 200 additional stocks were phased in at various dates, and all remaining NYSE stocks were phased in on May 27, 2003.

afterwards.[12] While the introduction of Autoquote and stock splits are external liquidity-enhancing events and strongly influence stock price informativeness, there is no theory or evidence suggesting that they directly affect firms' tax avoidance levels (or through other unobserved channels). Hence, we believe that our instruments meet both the relevance and exclusion restrictions.

The results of our 2SLS regressions are presented in Table 5. Models (1) and (2) present the 2SLS regression results using Autoquote as the instrument. In the first stage, we regress the endogenous variable ($1\text{-}R^2$) and its interaction $(1\text{-}R^2)*Q$ on the instrumental variables *Event*Treatment* and *Event*Treatment*Q*, together with other control variables. Consistent with the relevance condition, we document a significant relation between our instruments and the endogenous variables. In the second stage regression, we find a significantly positive relation between private information in prices and tax avoidance-to-price sensitivity. Models (3) and (4) present the 2SLS regression results using the stock split event as an alternative instrument. The results of first-stage regressions show a significant relation between stock splits and price informativeness. The second stage findings remain similar after using the alternative instrument. The first-stage F-statistics in both specifications are significantly large, rejecting the null hypothesis that the instruments are weak. Our findings suggest that the change in private information in stock prices causes a change in the sensitivity of tax avoidance to stock prices. Moreover, we note that Sargan-Hansen statistic for overidentifying test is 3.62, which indicates we cannot reject the joint null hypothesis that the instruments are valid instruments (uncorrelated with the error term). The results are also robust when we include additional firm characteristics, firm fixed effects and industry-by-year fixed effects. Taken together, our baseline results and

[12] For firms that have multiple stock split events over the sample period, we only consider the first split event.

endogeneity tests support the hypothesis that managers use part of the private information embedded in stock prices when they make tax avoidance decisions.

[Insert Table 5 about here]

3.4 Alternative Channels

To lend further support for the findings in our baseline results above, in this section, we extend the empirical analysis by also controlling for alternative channels that might also affect the tax avoidance-to-price sensitivity.

3.4.1 Controlling for Managerial Ability

Koester et al. (2017) argue that executives with greater ability to manage resources efficiently engage in greater corporate tax avoidance. High-ability managers have a superior understanding of their firms' operating environment, enabling them to better align business decisions with tax strategies and identify tax saving opportunities. Therefore, we test whether the previous results are robust to the insertion of the managerial ability proxy in the baseline specification (Eq. 5) and estimate its effect on the estimated tax avoidance-to-price sensitivity.

The results are reported in Table 6. We use the *Managerial Ability* variable following the methodology of Demerjian et al. (2012) as described in Section 3.3. We find that *Managerial Ability* is significantly positively related to tax sheltering. This is consistent with the finding of Koester et al. (2017) that managers with superior ability engage in more tax planning activities. Notably, the coefficients of *Managerial Ability*Q* are significantly negative in the models. This negative effect of *Managerial Ability* on tax avoidance-to-price sensitivity is consistent with the notion that when managers possess superior ability, they rely less on the information in stock price

in their tax planning decisions and the marginal learning effect is smaller. We conclude that our main results are robust to the inclusion of managerial ability.

[Insert Table 6 about here]

3.4.2 Controlling for Public Information

So far, our results are consistent with the prediction that managers learn some private information from prices and use this information in their tax planning activities. However, the significant association we document would only be reflective of managerial learning to the extent that the private information in price is *new* to managers (they have not learned it elsewhere). Testing this hypothesis is difficult because we do not directly observe the information set used by managers for their tax management decisions. However, to overcome this potential problem of identification, we gauge whether other competing sources of information affect the tax avoidance-to-price sensitivity. We expect that the extent of available public information attenuates the sensitivity of tax avoidance to stock price because managers already know this information through other channels. To test this conjecture, we first measure the public information contained in market liquidity captured by bid-ask spread. *BA Spread* is calculated by the spread between the bid and ask price scaled by the midpoint and reflects the market liquidity of the stock.

We report this result in Table 7, Panel A. We find that *BA Spread* is significantly positively associated with tax sheltering. This indicates lower market liquidity is associated with greater corporate tax avoidance (higher values in *BA Spread* indicates lower market liquidity). Furthermore, the coefficients for *BA Spread*Q* are significantly positive in all specifications. This finding implies that the price sensitivity of tax avoidance is attenuated when managers learn from other (public) information channels, specifically the observed liquidity reflected by order flows

(when investors have more information, the order flows tend to increase, and this consequently increases the stock's market liquidity and lowers the bid-ask spread).

Our second measure to quantify public information is the number of analysts covering a firm, which constitutes an important source of information in financial markets. The effects of analyst coverage may arise in two opposite ways. If the information produced by analysts and impounded in the stock price is new to managers, we should expect a positive relation between analyst coverage and tax avoidance-to-price sensitivity. A more commonly held view is that if analysts mainly transfer information from managers to investors, the content of information they release is unlikely to be new to managers (Chen et al. 2007; Fresard 2012) and thus suggesting a negative relation between analyst coverage and tax avoidance-to-price sensitivity.

We report this result in Table 7, Panel B. Although we find a significant positive association between analyst coverage and tax avoidance, we do not observe any significant coefficient for *Analyst Coverage*Q*. Therefore, we cannot draw conclusions on whether the information released by analysts is new to managers or not and whether it affects managerial learning from private information in stock prices. However, we can confirm that the main results are not affected by the inclusion of measures of alternative sources of information.

[Insert Table 7 about here]

3.4.3 Controlling for Financial Constraints

Several empirical studies document that financial constraints are associated with more aggressive tax planning strategies (Law and Mills 2015; Edwards et al. 2016; Bayar et al. 2018). Financially constrained firms may employ tax planning as a source of funds and in our setting, the tax avoidance-to-price sensitivity may depend on the extent of financial constraints they face.

Therefore, we test how financial constraints affect the tax avoidance-to-price sensitivity using two commonly used constraint measures, Altman Z score and WW score, as described in Section 3.4.

Panel A of Table 8 reports the results using Altman Z score. We find a significant negative relation between Altman Z score and tax sheltering. Since higher values in Altman Z score indicate lower financial constraints, this result is consistent with prior literature on the view that more financially constrained firms intend to accrue more cash savings from tax avoidance. On the other hand, we observe that higher financial constraints reduce tax avoidance-to-price sensitivity, as the coefficients of *Altman Z*Q* are significantly positive for *Tax Sheltering*.

When we use an alternative proxy for financial constraints, *WW score*, the results are consistent with those reported above. In Panel B of Table 8, we find that the coefficient for *WW score*Q* is significantly negative. Hence, we confirm that financial constraints decrease the tax avoidance-to-price sensitivity. A plausible explanation is that when managers face strong financial constraints, the pressure to conduct tax avoidance activities and save for internal funds dominates the marginal learning effect from private information obtained in the stock market.

[Insert Table 8 about here]

4. Extended Robustness Tests

4.1 Do Managers Learn More When There is More to Learn?

If private information contained in stock price can affect the tax avoidance-to-price sensitivity, it is likely that managers learn more from stock price when there is more new information to learn. To test this conjecture, we sort the full sample into quartiles based on $(1\text{-}R^2)$. We repeat the regressions in the specification of Eq.5 for each quartile-based subsample. As shown in Table 9, we find that the coefficients of $(1\text{-}R^2)*Q$ are more statistically significant in subsamples

with higher quartiles of private information.[13] This finding further supports the managerial learning effect and indicates that managers learn more about their tax avoidance decisions when there is more private information embedded in stock prices.

[Insert Table 9 about here]

4.2 Cross Sectional Tests

4.2.1 Foreign Operations

Lastly, we conduct two cross-sectional tests. First, we test if the effects we documented are stronger in firms with multinational operations. Firms using more tax shelters are documented to have larger book-tax differences, more foreign operations, subsidiaries in tax havens, and higher pre-tax income (Rego 2003; Wilson 2009; Lisowsky 2010). Firms can delay financial statement recognition of U.S. taxes on repatriations by designating foreign earnings as "permanently reinvested" (Krull 2004). Furthermore, some estimates suggest that little U.S. tax is collected on foreign earnings (Hines and Rice 1994; Dyreng and Lindsey 2009). Therefore, it is possible that managerial learning from private information in prices when making tax strategies may be reinforced if the firm has foreign operations.

To test this conjecture, we perform our baseline regressions in the subsamples split by *Foreign Income*, which indicates if a firm has foreign earnings in a given year t. We report this result in Table 10. We find that the coefficients for $(1\text{-}R^2)*Q$ are larger in statistical significance and economic magnitude in the firms with foreign income. The Chow-test statistics are at least above 20.0 rejecting the null hypothesis that the estimates across the two subsamples are equal.

[13] Our results remain qualitatively unchanged when we run quartile regressions based on *(1-R2)*.

This finding provides some support for the conjecture that for the firms with foreign earnings, tax avoidance-to-price sensitivity is stronger when stock prices contain more private information.

[Insert Table 10 about here]

4.2.2 Capital Intensity

We also test if the effects we documented in baseline models vary by the capital intensity of firms. Firms with higher capital intensity generally have a greater availability of tax avoidance tools, such as investment tax credits and accelerated depreciation methods that are inherent to their business model. The marginal value of stock price informativeness may be limited for the managers of more capital-intensive firms. In contrast, because tax avoidance tools are not readily available for managers of less capital-intensive firms, they may learn more from stock prices to assess the efficiency of their tax avoidance decisions.

To test this conjecture, we perform our baseline regressions in the subsamples split by the median value of capital expenditures scaled by total assets. We report this result in Table 11. We find that the relation between $(1\text{-}R^2)*Q$ and tax sheltering is more pronounced in firms with lower capital intensity. The Chow tests show that the two samples render statistically and economically divergent impacts. This finding indicates that managerial learning from private information in stock prices is more pronounced in the tax avoidance decisions of managers in less capital-intensive firms.

[Insert Table 11 about here]

4.3 Other Robustness Tests

We conduct several robustness tests, which are reported in the Internet appendices of this paper. First, we test if our results are robust to alternative measures of tax avoidance. We use the cash effective tax rate (*Cash ETR*) and long-term cash effective tax rate (*Long-tern Cash ETR*) as

alternative measures. Firms that engage in more tax avoidance activities should have lower ETRs. As reported in the Internet Appendix I, our findings also hold when we use the cash effective tax rate as an alternative measure for tax avoidance.

Second, since it may take some time for managers to learn from the stock price and incorporate the new private information into their tax planning strategies, we test the model in Eq.5 using tax avoidance lagged by one year as a control variable. This result is reported in the Internet Appendix II. Using the lagged dependent variable as a control variable does not qualitatively change our findings.

Third, during our long sample period, the wide spread of the Internet may have had a pivotal impact on electronic trading efficiency and the informativeness of stock prices. Therefore, we perform a subperiod test splitting our sample period into pre- and post-digitalization era. As reported in the Internet Appendix III, we run our analysis in the subperiod before and after 1990. We confirm that there is no managerial learning effect from stock prices regarding tax avoidance in the earlier periods when electronic trading was not prevalent. The effects we documented above were prominent only in more recent periods when the Internet and World Wide Web have been established phenomena.

5. Conclusion

In this paper, we investigate whether managers learn information from the stock market and use this information when forming corporate tax avoidance strategies. Our first important finding is that tax avoidance is positively associated with stock price information, confirming managerial learning from stock prices in tax planning activities. Using price nonsynchronicity as

the measure for price informativeness, we document that corporate tax avoidance is more sensitive to stock prices when the price contains a larger amount of private information.

To address the potential endogeneity issue in the relation between a firm's stock price informativeness and tax avoidance, we use an exogenous liquidity-improving policy shock as a quasi-experiment and an instrumental two-stage least squares approach. Our results still hold after accounting for endogeneity. We further validate that the relation is robust to the inclusion of alternative channels that might affect tax avoidance-to-price sensitivity including managerial ability, other sources of public information, and financial constraints. Managers learn more from private information in stock prices when prices are more informative. The effect we document is stronger in the firms with higher foreign operations and lower capital intensity. Overall, our results are consistent with the hypothesis that managers extract valuable private information from stock prices to use in their tax-related decisions. This outcome supports the prior literature indicating that financial markets affect the real economy. Our findings also imply that the private information contained in the stock price may reflect investors' assessment of the cost-benefit tradeoff of corporate tax avoidance.

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Table 1: Summary Statistics

This table presents the summary statistics for tax avoidance, managerial ability measure, financial constraint measures, information asymmetry measures, corporate governance measures, as well as the control variables in the firm-year data that covers the period of 1970-2018. All continuous variables are winsorized at the 1% and 99% levels. Descriptions of each variable are provided in Appendix I.

	N	Mean	SD	p25	Median	p75
Tax Sheltering	39425	0.327	0.469	0.000	0.000	1.000
(1-R2)	39425	0.814	0.189	0.713	0.888	0.962
Q	39425	2.235	2.580	1.142	1.568	2.433
Firm size	39425	5.744	2.425	3.847	5.604	7.450
ROA	39425	-0.043	0.270	-0.043	0.036	0.081
EBIT/Sale	39425	-0.303	1.612	-0.009	0.062	0.120
Discretionary Accruals	39425	0.020	0.349	-0.074	0.005	0.092
Leverage	39425	0.200	0.193	0.024	0.164	0.310
Capital Expenditure	39425	0.052	0.050	0.020	0.038	0.068
Cash Holdings	39425	0.201	0.214	0.038	0.119	0.296
Earnings Volatility	39425	0.074	0.096	0.025	0.043	0.080
Net Operating Loss	39425	0.245	0.430	0.000	0.000	0.000
Dividend Payer	39425	0.356	0.479	0.000	0.000	1.000
Tangibility	39425	0.238	0.185	0.096	0.192	0.332
Managerial Ability	38570	0.017	0.132	-0.060	-0.007	0.055
Altman Z	38971	4.942	7.152	1.993	3.445	5.766
WW score	39297	-0.273	0.131	-0.367	-0.268	-0.173
Analyst Coverage	39425	2.424	4.329	0.000	0.000	3.000
BA Spread	32439	0.024	0.038	0.002	0.011	0.031
Foreign Income	39425	0.488	0.500	0.000	0.000	1.000

Table 2: Pairwise Correlations

This table reports Pearson pairwise correlations. Two-tailed p-values are reported under the coefficients. All continuous variables are winsorized at the 1% and 99% levels. Descriptions of each variable are provided in Appendix I.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
[1] Tax Sheltering	1.000											
[2] 1-R^2	-0.492	1.000										
	0.000											
[3] Q	0.004	0.010	1.000									
	0.216	0.055										
[4] Firm Size	0.718	-0.588	-0.152	1.000								
	0.000	0.000	0.000									
[5] ROA	0.290	-0.191	-0.230	0.373	1.000							
	0.000	0.000	0.000	0.000								
[6] EBIT/Sale	0.184	-0.122	-0.263	0.261	0.590	1.000						
	0.000	0.000	0.000	0.000	0.000							
[7] Discretionary Accruals	0.049	0.001	0.001	0.006	0.202	0.092	1.000					
	0.000	0.797	0.784	0.239	0.000	0.000						
[8] Leverage	0.033	-0.043	-0.115	0.214	-0.068	0.060	-0.056	1.000				
	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
[9] Capital Expenditure	0.014	-0.003	0.032	0.060	0.060	0.059	0.007	0.042	1.000			
	0.007	0.521	0.000	0.000	0.000	0.000	0.187	0.000				
[10] Cash Holdings	-0.160	0.054	0.297	-0.263	-0.262	-0.411	-0.017	-0.374	-0.178	1.000		
	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000			
[11] Earnings Volatility	-0.254	0.204	0.277	-0.440	-0.586	-0.363	-0.043	-0.087	-0.048	0.278	1.000	
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
[12] Net Operating Loss	-0.343	0.250	0.159	-0.433	-0.553	-0.415	-0.004	-0.019	-0.118	0.287	0.394	1.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.411	0.000	0.000	0.000	0.000	

Table 3: The Impact of Price Informativeness on Tax Avoidance-to-Price Sensitivity

This table presents estimates of panel regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity. The dependent variable is *Tax Sheltering*. The effect of price informativeness on the tax avoidance-to-price sensitivity is measured by *(1-R2)×Q*. The t-statistics are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	Dependent Variable: Tax Sheltering			
	(1)	(2)	(3)	(4)
Q	0.006***	0.006***	0.002*	0.002**
	(9.314)	(8.610)	(1.754)	(1.969)
(1-R2) × Q			0.012***	0.010***
			(6.284)	(5.175)
(1-R2)			-0.167***	-0.157***
			(-15.840)	(-12.896)
Firm size	0.145***	0.128***	0.134***	0.123***
	(68.220)	(44.838)	(58.776)	(41.864)
ROA	0.137***	0.123***	0.139***	0.121***
	(15.227)	(12.946)	(15.459)	(12.773)
EBIT/Sale	-0.004***	-0.004***	-0.004***	-0.004***
	(-2.612)	(-2.622)	(-2.646)	(-2.595)
Discretionary Accruals	0.031***	0.057***	0.031***	0.057***
	(7.809)	(9.679)	(7.769)	(9.589)
Leverage	-0.253***	-0.237***	-0.244***	-0.234***
	(-21.975)	(-19.997)	(-21.202)	(-19.724)
Capital Expenditure	-0.003	0.029	-0.023	-0.000
	(-0.065)	(0.698)	(-0.566)	(-0.002)
Cash Holdings	-0.059***	-0.057***	-0.070***	-0.065***
	(-4.474)	(-4.325)	(-5.357)	(-4.880)
Earnings Volatility	0.444***	0.404***	0.412***	0.391***
	(19.015)	(16.722)	(17.669)	(16.187)
Net Operating Loss	-0.030***	-0.038***	-0.029***	-0.037***
	(-6.785)	(-8.282)	(-6.603)	(-8.078)
Dividend Payer	0.039***	0.032***	0.039***	0.032***
	(6.608)	(5.350)	(6.627)	(5.276)
Tangibility	-0.031	0.008	-0.007	0.018
	(-1.449)	(0.358)	(-0.313)	(0.813)
Constant	-0.483***	-0.355***	-0.297***	-0.210***
	(-30.840)	(-10.958)	(-14.800)	(-6.070)
Observations	39425	39425	39425	39425
R^2	0.763	0.777	0.765	0.778
Adjusted R^2	0.731	0.737	0.733	0.739
Firm FE	Yes	Yes	Yes	Yes
Industry*Year FE	No	Yes	No	Yes

Table 4: Difference-in-Differences Analysis using an Exogenous Shock and Propensity Score Matching

This table presents estimates of difference-in-differences specifications using the 2001 decimalization as an exogenous shock. The sample window is 1991-2011. *Post 2001* is an indicator variable for the years after 2001. In Model (1), *Treatment* is a dummy variable that equals 1 for firms that saw the above-median change in stock price informativeness (1-R2) pre-2001. In Model (2), the *Treatment* group is the firms that saw the largest change (top quartile) in stock price informativeness (1-R2) pre-2001 and the control group is the firms that saw the least change (bottom quartile) in stock price informativeness (1-R2) pre-2001. *Year 2001* is an indicator variable for the event year. The dependent variable is *Tax Sheltering*. The control variables are ensured comparative between the treatment group and control group during the pre-2001 periods using propensity score matching. The t-stats are reported in parentheses. All specifications include firm fixed effects and industry*year fixed effects. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	Dependent Variable: Tax Sheltering	
	(1)	(2)
Post 2001	0.182***	0.223**
	(3.515)	(2.189)
Post 2001 × Treatment	-0.032***	-0.066***
	(-3.217)	(-4.191)
Post 2001 × Treatment × Q	0.009**	0.014**
	(2.416)	(2.089)
Q	0.004***	0.004**
	(2.961)	(2.055)
Post 2001 × Q	0.004*	0.003
	(1.767)	(1.020)
Treatment × Q	0.005**	0.006*
	(2.353)	(1.755)
Year 2001	0.027	0.070
	(0.645)	(0.918)
Constant	0.297***	0.354***
	(5.785)	(3.524)
Observations	37624	22162
R^2	0.728	0.760
Adjusted R^2	0.681	0.728
Firm FE	Yes	Yes
Industry × Year FE	Yes	Yes
Controls	Yes	Yes

Table 5: Instrumental Variable Analysis

This table presents estimates of 2SLS instrumental variable regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity. Columns (1) and (2) present the 2SLS regressions using Autoquote introduction as the instrument. *Event* is an indicator equal 1 for years after the Autoquote introduction and *Treatment* is an indicator equal 1 for firms listed on NYSE and zero for Nasdaq firms. *Event*Treatment* is the instrument for (1-R2). Columns (3) and (4) present the 2SLS regressions using stock split as the instrument. *Split* is an indicator equal 1 for years after a firm has a stock split. Panel A presents the first stage estimations where the dependent variables are *(1-R2)* and *(1-R2)*Q* (endogenous variables). Panel B presents the second stage estimations where the dependent variable is *Tax Sheltering*. The t-stats are reported in parentheses. All specifications include firm fixed effects and industry*year fixed effects. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

Panel A	*First Stage Estimations*			
	(1)	(2)	(3)	(4)
	1-R2	(1-R2) × Q	1-R2	(1-R2) × Q
Event × Treatment	-0.225***	-0.394***		
	(-22.53)	(-8.08))		
Event × Treatment × Q	0.051***	0.109***		
	(10.63)	(4.62)		
Split			0.013***	-0.535***
			(4.06)	(-29.96)
Split × Q			-0.002	0.251***
			(-1.09)	(42.92)
Q	-0.001***	0.453***	-0.001***	0.344***
	(-1.62)	(126.32)	(-3.89)	(164.28)
Constant	1.377***	2.643***	1.272***	2.367***
	(73.33)	(28.74)	(150.46)	(50.82)
F-statistics	296.22	1533.23	488.06	3136.56

Panel B	*Second Stage Estimations*	
	Dependent Variable: Tax Sheltering	
Instrumented (1-R2)	-0.691***	-1.502***
	(-4.009)	(-3.365)
Instrumented (1-R2) × Q	0.128**	0.029***
	(2.259)	(3.081)
Q	-0.047**	-0.007**
	(-2.051)	(-1.933)
Constant	0.068	1.365**
	(0.409)	(2.384)
Observations	32549	39425
Firm FE	Yes	Yes
Industry × Year FE	Yes	Yes
Other controls	Yes	Yes

Table 6: Managerial Ability, Price Informativeness, and Tax Avoidance-to-Price Sensitivity

This table presents estimates of panel regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity after controlling for managerial ability. The dependent variable is *Tax Sheltering*. Managerial Ability is the MA score from Demerjian et al. (2012), computed using data envelopment analysis (DEA) where total sales is optimized using the vector of inputs including net PP&E, operating leases, R&D, purchased goodwill and intangibles, cost of goods sold, and SG&A. The DEA is optimized at the industry and year levels, and a firm efficiency score is computed. The firm efficiency score is then regressed on firm characteristics (size, market share, positive free cash flow, age, business segment concentration, a foreign currency indicator, and year indicators), and the residual from this regression is the managerial ability score. See Demerjian et al. (2012) for additional details. The t-statistics are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	Dependent Variable: Tax Sheltering			
	(1)	(2)	(3)	(4)
Q	0.007***	0.007***	0.002*	0.002**
	(8.699)	(7.966)	(1.660)	(2.035)
(1-R2)			-0.163***	-0.153***
			(-15.048)	(-12.179)
(1-R2) × Q			0.012***	0.009***
			(5.496)	(4.170)
Managerial Ability	0.147***	0.156***	0.152***	0.156***
	(5.457)	(5.593)	(5.631)	(5.612)
Managerial Ability × Q	-0.029***	-0.027***	-0.034***	-0.032***
	(-3.025)	(-2.781)	(-3.552)	(-3.235)
Constant	-0.500***	-0.372***	-0.316***	-0.228***
	(-30.969)	(-10.701)	(-15.314)	(-6.167)
Observations	38577	38577	38570	38570
R^2	0.763	0.776	0.765	0.777
Adjusted R^2	0.731	0.736	0.732	0.737
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes

Table 7: Public Information, Price Informativeness, and Tax Avoidance-to-Price Sensitivity

This table presents estimates of panel regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity after controlling for market information. Panel A presents the regression results after controlling for *BA spread,* which is calculated as (Ask-Bid)/(midpoint of ask and bid price). Panel B presents the regression results after controlling for *Analyst Coverage,* which is the natural logarithm of the number of analysts covering the firm each year. The dependent variable is *Tax Sheltering*. The t-statistics are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

Panel A	Dependent Variable: Tax Sheltering			
	(1)	(2)	(3)	(4)
Q	0.006***	0.007***	0.002	0.002*
	(6.380)	(6.654)	(1.333)	(1.726)
(1-R2)			-0.153***	-0.140***
			(-12.966)	(-10.265)
(1-R2) × Q			0.011***	0.010***
			(4.934)	(4.375)
BA Spread	0.480***	0.775***	0.590***	0.823***
	(6.019)	(9.248)	(7.299)	(9.684)
BA Spread × Q	0.112***	0.085***	0.086***	0.066**
	(3.853)	(2.874)	(2.927)	(2.204)
Constant	-0.580***	-0.428***	-0.412***	-0.299***
	(-30.103)	(-12.082)	(-17.281)	(-7.854)
Observations	32439	32439	32439	32439
R^2	0.767	0.781	0.768	0.782
Adjusted R^2	0.735	0.740	0.737	0.742
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes

Panel B	Dependent Variable: Tax Sheltering			
	(1)	(2)	(3)	(4)
Q	0.006***	0.005***	0.002*	0.002*
	(7.934)	(6.947)	(1.711)	(1.864)
(1-R2)			-0.161***	-0.151***
			(-15.157)	(-12.299)
(1-R2) × Q			0.011***	0.009***
			(5.713)	(4.400)
Analyst Coverage	0.018***	0.012***	0.017***	0.013***
	(4.886)	(2.903)	(4.435)	(3.113)
Analyst Coverage × Q	0.001	0.003**	-0.000	0.001
	(0.587)	(2.305)	(-0.321)	(0.936)
Constant	-0.450***	-0.337***	-0.278***	-0.199***
	(-27.796)	(-10.369)	(-13.659)	(-5.752)
Observations	39432	39432	39425	39425
R^2	0.764	0.777	0.765	0.778
Adjusted R^2	0.732	0.738	0.734	0.739
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes

Table 8: Financial Constraints, Price Informativeness, and Tax Avoidance-to-Price Sensitivity

This table presents estimates of panel regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity after controlling for financial constraints. Panel A presents the regression results after controlling for *Altman Z,* which is modeled as 1.2*(working capital / total assets) + 1.4*(retained earnings / total assets) + 3.3*(earnings before interest and tax / total assets) + 0.6*(market value of equity / total liabilities) + 1.0*(sales / total assets), following Altman (1968). Panel B presents the regression results after controlling for *WW score,* which is modeled as -0.091*(cash flow/total assets) - 0.062 * positive dividend + 0.021 * (long-term debt/total assets) - 0.044 * (log of total assets) + 0.102 * industry sales growth-0.035 * firm sales growth, following White and Wu (2006). The dependent variable is *Tax Sheltering*. The t-statistics are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

Panel A	Dependent Variable: Tax Sheltering			
	(1)	(2)	(3)	(4)
Q	0.007***	0.006***	0.003***	0.003***
	(8.332)	(6.890)	(2.906)	(2.826)
(1-R2)			-0.172***	-0.160***
			(-15.801)	(-12.664)
(1-R2) × Q			0.014***	0.010***
			(6.100)	(4.408)
Altman Z	-0.003***	-0.002***	-0.003***	-0.002***
	(-6.687)	(-4.934)	(-6.562)	(-5.018)
Altman Z × Q	0.001***	0.001***	0.001**	0.001***
	(5.911)	(5.829)	(2.496)	(2.852)
Constant	-0.484***	-0.365***	-0.290***	-0.216***
	(-30.631)	(-11.184)	(-14.300)	(-6.185)
Observations	38978	38978	38971	38971
R^2	0.775	0.546	0.776	0.546
Adjusted R^2	0.735	0.458	0.736	0.458
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes

Panel B	Dependent Variable: Tax Sheltering			
	(1)	(2)	(3)	(4)
Q	0.003***	0.003***	0.001	0.002*
	(3.706)	(3.357)	(1.431)	(1.730)
(1-R2)			-0.158***	-0.145***
			(-14.515)	(-11.402)
(1-R2) × Q			0.007***	0.005**
			(3.030)	(2.061)
WW score	0.489***	0.343***	0.454***	0.291***
	(7.316)	(4.709)	(6.672)	(3.913)
WW score × Q	-0.046***	-0.049***	-0.031***	-0.032***
	(-6.755)	(-6.817)	(-3.654)	(-3.668)
Constant	-0.479***	-0.361***	-0.295***	-0.219***
	(-30.431)	(-11.114)	(-14.642)	(-6.292)
Observations	39304	39304	39297	39297
R^2	0.764	0.777	0.765	0.778
Adjusted R^2	0.732	0.737	0.734	0.738
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes

Table 9: Quartile Regressions of the Effect of Price Informativeness on Tax Avoidance-to-Price Sensitivity

This table presents estimates of quintile regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity. The sample is split into four groups based on the quartiles of (1-R2). The dependent variable is *Tax Sheltering*. The t-statistics are reported in parentheses. All specifications include firm fixed effects and industry*year fixed effects. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	Lowest Quartile of (1-R2)			Highest Quartile of (1-R2)
	(1)	(2)	(3)	(4)
(1-R2) × Q	0.007	0.009	0.010**	0.005***
	(1.138)	(1.405)	(2.438)	(2.588)
(1-R2)	-0.037	-0.177*	-0.069	0.088
	(-1.517)	(-1.913)	(-0.468)	(0.436)
Q	0.004	0.002	-0.000	-0.000
	(1.472)	(0.626)	(-0.139)	(-0.069)
Constant	-0.593***	-0.383***	-0.155	-0.178
	(-11.795)	(-4.114)	(-1.082)	(-0.893)
Observations	12376	9403	8861	8785
R^2	0.783	0.820	0.847	0.859
Adjusted R^2	0.705	0.675	0.717	0.748
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes

Table 10: Heterogeneity Tests with Foreign Income

This table presents estimates of panel regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity by firms with foreign income versus without foreign income. The sample is split by *Foreign Income* which is a dummy variable that equals 1 if the firm has foreign income in year t and zero otherwise. The dependent variable is *Tax Sheltering*. The t-statistics are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	Firms with Foreign Income		Firms without Foreign Income	
	(1)	(2)	(3)	(4)
(1-R2) × Q	0.013***	0.011**	0.001	0.001
	(2.639)	(2.202)	(0.999)	(0.563)
(1-R2)	-0.111***	-0.119***	-0.025***	-0.011
	(-6.590)	(-5.998)	(-2.701)	(-1.041)
Q	0.004	0.005*	0.001	0.001
	(1.397)	(1.825)	(0.856)	(0.771)
Constant	-0.451***	-0.441***	-0.063***	-0.060**
	(-11.958)	(-7.166)	(-4.295)	(-2.394)
Observations	19241	19241	20184	20184
R^2	0.741	0.761	0.827	0.844
Adjusted R^2	0.705	0.707	0.792	0.798
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes
Chow test statistic	Model (1)&(3)	Model (2)&(4)		
	49.02	20.22		

Table 11: Heterogeneity Tests with Capital Intensity

This table presents estimates of panel regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity by firms with high versus low capital intensity. The sample is split by the median level of capital investment. The dependent variable is *Tax Sheltering*. The t-statistics are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	High Capital Intensity		Low Capital Intensity	
	(1)	(2)	(3)	(4)
(1-R2) × Q	0.006*	0.004	0.010***	0.008***
	(1.721)	(1.118)	(4.442)	(3.453)
(1-R2)	-0.117***	-0.137***	-0.162***	-0.135***
	(-6.608)	(-6.408)	(-11.416)	(-8.290)
Q	0.006***	0.006***	0.001	0.001
	(2.638)	(2.680)	(0.576)	(0.803)
Constant	-0.418***	-0.365***	-0.257***	-0.178***
	(-11.904)	(-5.796)	(-9.474)	(-4.004)
Observations	16866	16866	22559	22559
R^2	0.792	0.813	0.782	0.800
Adjusted R^2	0.741	0.747	0.738	0.743
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes
Chow test statistic	Model (1)&(3)	Model (2)&(4)		
	4.54	6.42		

Appendix I: Variable Definitions

Variables	Definitions
Tax Sheltering	A dummy variable that equals one if a firm's estimated shelter probability (estimated propensity of using tax shelters following Wilson [2009]) belongs to the top quartile, and zero otherwise. Shelter Prob. = -4.30 + 6.63 * book tax difference - 1.72 * (long-term debt scaled by total assets) + 0.66 * (log of total assets) + 2.26 * ROA + 1.62 * foreign income + 1.56 * (R&D expenditure/total assets).
(1-R2)	One minus R2 from regressing firm daily return on market and industry index over year t.
Q	Market value of equity plus book value of assets minus book value of equity, scaled by book value of assets.
Firm size	The natural logarithm of total book assets (at).
ROA	Firms' net income scaled by total book assets.
EBIT/Sale	Firms' EBIT scaled by total sales revenue.
Discretionary Accruals	The absolute value of discretionary accruals following Jones (1991).
Leverage	Firms' long-term and short-term debts scaled by total book assets.
Capital Expenditure	Firm's capital expenditure scaled by total book assets.
Cash Holdings	Firm's balance of cash scaled by total book assets.
Earnings Volatility	Firm's standard deviation of its operating income before depreciation (oibdp) over the last five years scaled by total book assets.
Net Operating Loss	A dummy variable that equals one if the firm's net operating cash flow (oancf) is negative and zero otherwise.
Dividend Payer	A dummy variable that equals one if the firm pays cash dividend in that fiscal year and zero otherwise.
Tangibility	Firm's property, plant, and equipment (ppent) scaled by total book assets.
Managerial Ability	Managerial ability score from Demerjian et al. (2012), computed using data envelopment analysis (DEA) where total sales is optimized using the vector of inputs including net PP&E, operating leases, R&D, purchased goodwill and intangibles, cost of goods sold, and SG&A. The DEA is optimized at the industry and year levels, and a firm efficiency score is computed. The firm efficiency score is then regressed on firm characteristics (size, market share, positive free cash flow, age, business segment concentration, a foreign currency indicator, and year indicators), and the residual from this regression is the managerial ability score. See Demerjian et al. (2012) for additional details.
BA Spread	Bid-ask spread calculated as (Ask-Bid)/(midpoint of ask and bid price) from CRSP.
Analyst Coverage	The number of analysts covering the firm in a given year t from I/B/E/S.
Altman Z	A financial constraint measure based on Altman (1968). Altman Z-Score is modeled as 1.2*(working capital / total assets) + 1.4*(retained earnings / total assets) + 3.3*(earnings before interest and tax / total assets) + 0.6*(market value of equity / total liabilities) + 1.0*(sales / total assets).
WW score	A financial constraint measure based on White and Wu (2006). WW score is modeled as -0.091*(cash flow/total assets) - 0.062 * positive dividend + 0.021 * (long-term debt/total assets) - 0.044 * (log of total assets) + 0.102 * industry sales growth-0.035 * firm sales growth. Positive dividend is an indicator that equals 1 if the firm pays cash dividends.
Foreign Income	A dummy variable that equals 1 if the firm has foreign income in year t.

Internet Appendix I: Alternative Measures of Tax Avoidance

This table presents estimates of panel regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity. The dependent variables are tax avoidance measures *Cash ETR* and *Long-term Cash ETR*. *Cash ETR* is the cash effective tax rate, calculated by cash paid for income taxes scaled by the sum of pretax income (net of special items) over one year. *Long-term Cash ETR* is estimated as the five-year-centered moving sum of cash paid for income taxes over five years scaled by the sum of pretax income (net of special items) over the sample period. The effect of price informativeness on the tax avoidance-to-price sensitivity is measured by *(1-R2)×Q*. The t-statistics are reported in parentheses. All specifications include firm fixed effects and industry*year fixed effects. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	(1) Cash ETR	(2) Long-term Cash ETR	(3) Cash ETR	(4) Long-term Cash ETR
Q	-0.005***	-0.006***	-0.002	-0.002
	(-6.367)	(-9.251)	(-1.439)	(-1.543)
(1-R2) × Q			-0.005**	-0.007***
			(-2.184)	(-3.813)
(1-R2)			0.022***	0.029***
			(2.771)	(4.173)
Firm size	0.016***	0.013***	0.016***	0.013***
	(8.927)	(7.676)	(9.032)	(7.812)
ROA	-0.194***	-0.096***	-0.186***	-0.093***
	(-9.356)	(-11.075)	(-8.915)	(-10.673)
EBIT/Sale	-0.009	0.004**	-0.009	0.005**
	(-1.273)	(2.119)	(-1.197)	(2.190)
Discretionary Accruals	0.015***	-0.001	0.015***	-0.001
	(3.635)	(-0.294)	(3.654)	(-0.314)
Leverage	-0.055***	-0.032***	-0.056***	-0.034***
	(-6.723)	(-4.471)	(-6.814)	(-4.674)
Capital Expenditure	0.170***	0.027	0.172***	0.033
	(7.175)	(1.310)	(7.277)	(1.575)
Cash Holdings	-0.008	-0.016*	-0.007	-0.014
	(-0.807)	(-1.856)	(-0.682)	(-1.630)
Earnings Volatility	-0.122***	-0.101***	-0.118***	-0.094***
	(-4.564)	(-4.831)	(-4.425)	(-4.474)
Net Operating Loss	0.023***	0.023***	0.023***	0.023***
	(6.169)	(8.048)	(6.171)	(7.995)
Dividend Payer	0.028***	0.010***	0.028***	0.010***
	(8.735)	(3.400)	(8.711)	(3.400)
Tangibility	0.005	0.020*	0.004	0.019
	(0.359)	(1.691)	(0.329)	(1.598)
Constant	0.116***	0.157***	0.098***	0.135***
	(5.498)	(8.072)	(4.392)	(6.592)
Observations	39769	36815	39763	36813
R^2	0.450	0.546	0.450	0.546
Adjusted R^2	0.342	0.459	0.342	0.459
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes

Internet Appendix II: Lagged Dependent Variable

This table presents estimates of panel regressions to examine the impact of price informativeness on tax avoidance-to-price sensitivity. The dependent variable is lagged *Tax Sheltering*. The effect of price informativeness on the tax avoidance-to-price sensitivity is measured by *(1-R2)×Q*. The t-statistics are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	Dependent Variable: Lagged Tax Sheltering			
	(1)	(2)	(3)	(4)
Q	0.007***	0.007***	0.000	0.001
	(10.085)	(9.813)	(0.113)	(0.801)
(1-R2) × Q			0.019***	0.017***
			(9.408)	(8.210)
(1-R2)			-0.212***	-0.174***
			(-18.752)	(-13.401)
Firm size	0.131***	0.106***	0.119***	0.101***
	(57.835)	(34.526)	(48.670)	(32.143)
ROA	0.001	0.010	0.002	0.007
	(0.106)	(0.995)	(0.202)	(0.647)
EBIT/Sale	0.003*	0.002	0.003*	0.003
	(1.940)	(1.482)	(1.904)	(1.531)
Discretionary Accruals	0.011**	0.007	0.010**	0.006
	(2.521)	(1.073)	(2.412)	(0.957)
Leverage	-0.178***	-0.143***	-0.166***	-0.139***
	(-14.191)	(-11.168)	(-13.259)	(-10.849)
Capital Expenditure	-0.130***	-0.000	-0.159***	-0.038
	(-3.053)	(-0.008)	(-3.744)	(-0.856)
Cash Holdings	-0.046***	-0.052***	-0.063***	-0.063***
	(-3.275)	(-3.639)	(-4.487)	(-4.410)
Earnings Volatility	0.317***	0.241***	0.273***	0.221***
	(12.260)	(9.055)	(10.580)	(8.316)
Net Operating Loss	-0.041***	-0.042***	-0.040***	-0.040***
	(-8.533)	(-8.561)	(-8.328)	(-8.313)
Dividend Payer	0.020***	0.015**	0.020***	0.014**
	(3.195)	(2.323)	(3.184)	(2.234)
Tangibility	-0.032	0.005	-0.001	0.017
	(-1.379)	(0.194)	(-0.064)	(0.704)
Constant	-0.389***	-0.208***	-0.162***	-0.049
	(-22.983)	(-6.757)	(-7.479)	(-1.441)
Observations	38084	38084	38078	38078
R^2	0.743	0.760	0.746	0.762
Adjusted R^2	0.709	0.718	0.712	0.720
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes

Internet Appendix III: Subperiod Analysis

This table presents estimates of the baseline regressions by subperiods. Columns (1) and (2) examine the baseline regressions in the period of 1970-1990. Columns (3) and (4) examine the baseline regressions in the period of post-1990. The dependent variable is *Tax Sheltering*. The effect of price informativeness on the tax avoidance-to-price sensitivity is measured by *(1-R2)×Q*. The t-statistics are reported in parentheses. Standard errors are clustered at the firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. Descriptions of all the variables are provided in Appendix I.

	Dependent Variable: Tax Sheltering			
	Pre-1990		Post-1990	
	(1)	(2)	(3)	(4)
Q	-0.000	-0.000	0.002*	0.002*
	(-0.000)	(-0.102)	(1.698)	(1.921)
(1-R2) × Q	0.011	0.011	0.011***	0.009***
	(1.540)	(1.567)	(5.722)	(4.601)
(1-R2)	-0.018	-0.011	-0.155***	-0.145***
	(-0.582)	(-0.302)	(-13.866)	(-11.189)
Firm size	0.065***	0.065***	0.134***	0.120***
	(3.832)	(3.471)	(52.072)	(37.454)
ROA	0.100***	0.078**	0.153***	0.133***
	(3.448)	(2.530)	(15.925)	(13.244)
EBIT/Sale	0.000	0.002	-0.005***	-0.005***
	(0.064)	(0.352)	(-2.899)	(-2.802)
Discretionary Accruals	0.063**	0.089***	0.030***	0.055***
	(2.472)	(2.931)	(7.339)	(9.132)
Leverage	-0.060	-0.057	-0.263***	-0.251***
	(-1.509)	(-1.400)	(-21.072)	(-19.575)
Capital Expenditure	0.074	0.042	-0.035	-0.014
	(0.660)	(0.360)	(-0.821)	(-0.314)
Cash Holdings	-0.045	-0.020	-0.080***	-0.075***
	(-0.890)	(-0.386)	(-5.739)	(-5.276)
Earnings Volatility	0.262***	0.225**	0.415***	0.386***
	(2.976)	(2.450)	(16.532)	(14.807)
Net Operating Loss	-0.015	-0.017	-0.033***	-0.040***
	(-1.364)	(-1.480)	(-6.783)	(-8.148)
Dividend Payer	0.027	0.029	0.042***	0.033***
	(1.282)	(1.300)	(6.719)	(5.028)
Tangibility	0.005	0.045	0.001	0.026
	(0.064)	(0.549)	(0.033)	(1.054)
Constant	-0.125	-0.143	-0.307***	-0.198***
	(-1.435)	(-1.435)	(-13.695)	(-5.449)
Observations	4038	4038	35387	35387
R^2	0.906	0.911	0.767	0.780
Adjusted R^2	0.843	0.845	0.734	0.739
Firm FE	Yes	Yes	Yes	Yes
Industry × Year FE	No	Yes	No	Yes

From: Onur Bayar
To: Anirudh Tippani
Cc: Yini Liu (yliu4287@uwo.ca)
Subject: Updating the EFMA paper
Date: Thursday, June 5, 2025 2:42:00 PM
Attachments: Manuscript - 05272025 Final.pdf

Dear Anirudh,

Could you please update our paper at the EFMA 2025 website? Please see attached the latest version of our paper.

Paper Title: Stock Price Informativeness and Corporate Tax Avoidance
Authors: Onur Bayar (Presenting), Fariz Huseynov, Yini Liu, Sabuhi Sardarli

Best,
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