UNIVERSIDADE DE SÃO PAULO
FACULDADE DE ECONOMIA, ADMINISTRAÇÃO, CONTABILIDADE E ATUÁRIA
DEPARTAMENTO DE CONTABILIDADE E ATUÁRIA
PROGRAMA DE PÓS-GRADUAÇÃO EM CONTROLADORIA E CONTABILIDADE

Analysts' Earnings Forecasts and Tax Avoidance Strategies

Previsões de Lucro dos Analistas e Estratégias para Evitar Tributos

Renata Nogueira Braga

Orientador: Prof. Dr. Gerlando Augusto Sampaio Franco de Lima

SÃO PAULO
2023

Prof. Dr. Carlos Gilberto Carlotti Júnior
Reitor da Universidade de São Paulo

Profa. Dra. Maria Dolores Montoya Diaz
Diretora da Faculdade de Economia, Administração, Contabilidade e Atuária

Profa. Dra. Mara Jane Contrera Malacrida
Chefe do Departamento de Contabilidade e Atuária

Prof. Dr. Renê Coppe Pimentel
Coordenador do Programa de Pós-Graduação em Controladoria e Contabilidade

Renata Nogueira Braga

Analysts' Earnings Forecasts and Tax Avoidance Strategies

Previsões de Lucro dos Analistas e Estratégias para Evitar Tributos

Doctoral Dissertation presented to the Graduate Program in Controllership and Accounting at the School of Economics, Business and Accounting, University of Sao Paulo, as a partial requirement to obtain the degree of Doctor of Science.

Advisor: Prof. Dr. Gerlando Augusto Sampaio Franco de Lima

Reviewed Version

São Paulo
2023

Catalogação na Publicação (CIP)
Ficha Catalográfica com dados inseridos pelo autor

Braga, Renata Nogueira.
Analysts' Earnings Forecasts and Tax Avoidance Strategies / Renata Nogueira Braga. - São Paulo, 2023.
136 p.

Tese (Doutorado) - Universidade de São Paulo, 2023.
Orientador: Gerlando Augusto Sampaio Franco de Lima.

1. Analysts' earnings forecasts. 2. Tax avoidance. 3. Conforming tax avoidance. 4. Non-conforming tax avoidance. I. Universidade de São Paulo. Faculdade de Economia, Administração, Contabilidade e Atuária. II. Título.

To my daughter, my husband and my parents.

ACKNOWLEDGMENTS

Comecei a escrever este agradecimento e lembrei de toda expectativa e ansiedade que eu senti quando decidi que cursaria o doutorado na FEA-USP. Mudar para outro estado e viver essa experiência só foi possível porque tive o apoio de diversas pessoas.

Agradeço ao Alan (*in memoriam*) pelas informações fornecidas sobre o programa que foram essenciais para minha decisão de cursar o doutorado na FEA, à amiga Simone que fez a minha matrícula no doutorado, aos meus tios Simone e Álvaro que foram avaliar de perto a minha futura moradia, à minha mãe e tia Rosa que me ajudaram com a mudança e ao meu marido que esteve presente e atuante em todos esses momentos. Esses foram apenas os primeiros passos da experiência vivida no doutorado.

Estar em São Paulo, longe das pessoas que eu mais amava, foi mais leve por causa da atenção e carinho que recebi de várias pessoas que cruzaram o meu caminho durante essa jornada. Agradeço imensamente à Priscila, quem eu considero que foi um anjo em minha vida. Ela me abraçou como parte da sua família. Foi cuidadosa comigo até o último minuto que eu estive em São Paulo. Serei sempre grata por isso. Agradeço aos amigos Douglas e Marcus pela amizade, que se fortaleceu depois de um memorável grupo de trabalho. Obrigada por estarem sempre disponíveis para conversar e por me compreenderem tão bem. Agradeço à Martha pela amizade, pela disponibilidade para me ajudar e por me ouvir falar do longo andamento da minha tese. Agradeço aos demais amigos que fizeram parte dessa trajetória, em especial ao Vitor, Carlos e Arnaldo. Agradeço aos amigos Laura e Kevin por nossas inúmeras conversas e por terem tornado os meus dias na Philadelphia mais felizes durante o meu período de doutorado sanduíche. Agradeço também aos amigos que já me apoiavam antes mesmo de eu iniciar o doutorado, em especial as minhas primas-irmãs Janielle e Marla e a amiga Simone.

Gostaria de agradecer ao meu orientador, Gerlando Lima, por toda disposição para me ajudar, instrução, suporte e compreensão neste período de doutorado. Obrigada por ter sido empático quando te falei da minha gravidez e por ter respeitado o meu momento de vida, mesmo sabendo que isso atrasaria a conclusão da minha tese.

Agradeço a Elizabeth Gordon por ter me dado a oportunidade de fazer o doutorado sanduíche na Temple University. Agradeço por ter me recebido de forma tão respeitosa, gentil e atenciosa e por ter me proporcionado uma experiência que foi tão enriquecedora para minha vida. Agradeço ao Sudipta Basu, que foi com certeza o professor mais extraordinário que eu tive a oportunidade de ter. Foi um curso de muito aprendizado e o projeto inicial desta tese nasceu enquanto eu cursava a sua disciplina.

Agradeço ao amigo Paul Demeré pelas contribuições feitas a este trabalho quando esse ainda era um projeto. Agradeço imensamente também por você ser sempre tão atencioso e prestativo comigo e com a minha família.

Agradeço ao professor Antônio Lopo Martinez pela atenção e pelas valiosas contribuições a este trabalho. Agradeço também aos professores Tiago Slavov, Fernando Murcia e Marcia De Luca pelas contribuições dadas durante a defesa desta tese.

Gostaria de agradecer a todos os professores da FEA que compartilharam seus conhecimentos, em especial ao professor Andson Braga de Aguiar. Com certeza os seus ensinamentos contribuíram muito para a minha formação profissional.

Gostaria de agradecer aos funcionários da FEA que sempre foram tempestivos e dispostos a ajudar, em especial ao Andres que sempre me recebeu com muita alegria e atenção.

Agradeço a Capes pelo apoio financeiro durante parte do período do doutorado.

O meu mais profundo agradecimento aos meus pais por tudo que já fizeram e continuam fazendo por mim. Vocês sempre apoiaram as minhas escolhas de vida e me deram todo o suporte que puderam. O amor e o apoio de vocês foram essenciais para que eu traçasse e alcançasse metas pessoais e profissionais. O aleatório da vida (que talvez não seja tão aleatório) me presenteou quando escolheu vocês para serem os meus pais. Agradeço também a toda minha família, em especial ao meu padrinho por ter plantado a semente da carreira acadêmica em minha mente e por ter sido sempre tão amoroso e atencioso comigo.

Agradeço ao meu marido que me apoiou nesta escolha que implicava em ficarmos distantes fisicamente durante 1 ano e meio. Você foi fundamental na minha primeira decisão na área acadêmica, cursar o mestrado. Desde então você tem me apoiado e participado de cada uma das minhas escolhas. Obrigada por todo apoio, companheirismo e amor.

Por fim, gostaria de agradecer a minha filha, Melissa, por ter me apresentado ao amor mais puro e profundo que um ser humano pode sentir. Filha, você trouxe um novo significado para a minha vida. Você me trouxe motivação para que eu tente me tornar um indivíduo e uma mãe melhor a cada dia. Sou grata por ter você em minha vida.

ABSTRACT

Braga, Renata Nogueira (2023). **Analysts' Earnings Forecasts and Tax Avoidance Strategies**. Doctoral Dissertation, School of Economics, Business and Accounting. University of Sao Paulo.

I examine the effects of analysts' earnings forecasts on firms' tax avoidance strategies. The firms' engagement in conforming or non-conforming tax avoidance impacts their net income in opposing directions. While engagement in conforming tax avoidance reduces firms' net income, engagement in non-conforming tax avoidance increases it. Therefore, engagement in different tax avoidance strategies brings the reported earnings closer to or further from the analysts' forecasted earnings. I hypothesize and find that firms engage in more conforming tax avoidance activities as the reported earnings per share are further from the analysts' consensus earnings forecast. I also test the effects of analysts' earnings forecasts on conforming tax avoidance separately for firms with positive and negative earnings surprises and find that my main result persists in both groups of firms. My main result also persists in firms with lower or higher analyst coverage. I hypothesize that firms engage in more non-conforming tax avoidance activities as the reported earnings per share are closer to the analysts' consensus earnings forecast. I find that for firms with negative earnings surprises, firms that report earnings per share closer to the analysts' consensus earnings forecast engage in more non-conforming tax avoidance, consistent with my hypothesis. For firms with positive earnings surprises, I find that firms that report earnings per share closer to the analysts' consensus earnings forecast engage in less non-conforming tax avoidance, inconsistent with my hypothesis. These findings indicate that firms that easily meet the analysts' earnings forecasts engage complementarily in both conforming and non-conforming tax avoidance. The association between non-conforming tax avoidance and absolute earnings surprise persists in firms with lower analyst coverage but not in firms with higher analyst coverage. My main result persists in firms with lower analyst coverage but not in firms with higher analyst coverage. To test my hypotheses, I use a sample of profitable U.S. public firms with analysts' coverage from 1994 through 2016, a period between two corporate tax reforms. My study contributes to broadening the understanding of the "under-sheltering puzzle" by knowing the extent to which analysts' consensus earnings forecasts impact the constraint of non-conforming tax avoidance and/or the adoption of conforming tax avoidance.

Keywords: Analysts' earnings forecasts; Tax avoidance; Conforming tax avoidance; Non-conforming tax avoidance.

RESUMO

Braga, Renata Nogueira (2023). **Previsões de Lucro dos Analistas e Estratégias para Evitar Tributos**. Tese de Doutorado. Faculdade de Economia, Administração, Contabilidade e Atuária da Universidade de São Paulo.

Eu examino os efeitos das previsões de lucro dos analistas sobre as estratégias das empresas para evitar tributos. A decisão de uma empresa de evitar tributos de forma conforme (*conforming tax avoidance*) ou não conforme (*non-conforming tax avoidance*) impacta seu lucro líquido em direções opostas. Enquanto a decisão de evitar tributos de forma conforme gera a redução do lucro líquido das empresas, a decisão de evitar tributos de forma não conforme gera o seu aumento. Portanto, o envolvimento em diferentes estratégias para evitar tributos pode aproximar ou afastar os lucros reportados pelas empresas dos lucros previstos pelos analistas. Eu levanto a hipótese e encontro que quanto mais distante o lucro por ação reportado está do consenso das previsões de lucro dos analistas, mais as empresas se engajam em atividades para evitar tributos de forma conforme. Eu também testo os efeitos das previsões de lucros dos analistas sobre a decisão de evitar tributos de forma conforme, separadamente para empresas com surpresas de lucros positivas e negativas. Eu verifico que o resultado persiste em ambos os grupos de empresas. O resultado encontrado também persiste em firmas com baixa ou alta cobertura de analistas. Eu levanto a hipótese que quanto mais próximo o lucro por ação reportado está do consenso das previsões de lucro dos analistas, mais as empresas se engajam em atividades para evitar tributos de forma não conforme. No grupo de empresas com surpresas de lucros negativas, eu encontro que as empresas com o lucro por ação reportado mais próximo do consenso das previsões de lucro dos analistas se engajam mais em atividades para evitar tributos de forma não conforme, consistente com minha hipótese. No grupo de empresas com surpresas de lucros positivas, eu encontro que as empresas com o lucro por ação reportado mais próximo do consenso das previsões de lucro dos analistas se engajam menos em atividades para evitar tributos de forma não conforme, inconsistente com minha hipótese. Esses resultados indicam que as empresas que batem com folga as previsões de lucro dos analistas se envolvem complementarmente em práticas conforme e não conforme para evitar tributos. A associação entre as práticas para evitar tributos de forma não conforme e a surpresa absoluta do lucro persiste em firmas com baixa cobertura de analistas, mas não persiste em firmas com alta cobertura de analista. Para testar minhas hipóteses, eu utilizo uma amostra de empresas americanas de capital aberto e com cobertura de analistas no período de 1994 a 2016. Esse período está entre duas reformas tributárias corporativas significativas ocorridas nos Estados Unidos. Este estudo contribui para ampliar a compreensão do "under-sheltering puzzle" ao identificar até que ponto o consenso das previsões de lucro dos analistas pode restringir as práticas para evitar tributos de forma não conforme e/ou incentivar a adoção de práticas para evitar tributos de forma conforme.

Palavras-chave: Previsões de lucro de analistas; Evitação de tributos; Evitação de tributos conforme; Evitação de tributos não conforme.

LIST OF TABLES

LIST OF FIGURES

CONTENTS

1. INTRODUCTION

1.1. Objectives and Motivation

I examine the effects of analysts' earnings forecasts on firms' tax avoidance strategies. The firm's decision to engage in conforming or non-conforming tax avoidance impacts its book income. While engagement in conforming tax avoidance reduces financial accounting income (Hanlon & Heitzman, 2010), engagement in non-conforming tax avoidance does not (Badertscher, Katz, Rego, & Wilson, 2019). In fact, engagement in non-conforming tax avoidance increases the net income because it decreases the tax expense. Thus, engagement in different tax avoidance strategies brings the reported earnings closer to or further from the forecasted earnings. Prior research suggests that firms engage in non-conforming tax avoidance activities to meet the analysts' consensus forecast (Dhaliwal, Gleason, & Mills, 2004). The relevance of analysts' earnings forecasts as an earnings benchmark to be met by firms may also drive the firms' engagement in conforming tax avoidance activities or in conforming and non-conforming tax avoidance complementarily. Understanding the extent to which analysts' consensus earnings forecasts impact the constraint of non-conforming tax avoidance and the adoption of conforming tax avoidance should help to broaden the understanding of the "under-sheltering puzzle[1]."

Prior research that contributes to understanding the "under-sheltering puzzle" focuses almost exclusively on non-conforming tax avoidance strategies. However, some firms that apparently are under-sheltering may be engaging in conforming tax avoidance (Badertscher et al., 2019). The decision to engage in tax avoidance activities poses non-tax costs for firms. These costs explain why more firms do not take advantage of tax planning opportunities. Further, the chosen strategy to engage in tax avoidance (conforming or non-conforming) poses distinct non-tax costs. Firms that would have negative earnings surprises (firms that would miss the target) have incentives and non-tax costs to engage in conforming or non-conforming tax avoidance that differ from those of firms that would have positive earnings surprises (firms that would meet or beat the target). Moreover, within the group of firms with positive or negative earnings surprises, firms that would be closer to or further from the target also have different incentives and non-tax costs to engage in conforming or non-conforming tax avoidance. Thus,

[1] The term "under-sheltering puzzle" refers to Weisbach's (2002) question on why firms do not engage in tax sheltering more extensively.

I argue that engagement in different tax avoidance strategies varies, depending on the analysts' earnings forecasts.

The following four scenarios may occur based on the distance between the book earnings and the analysts' earnings forecasts. First, firms would not be able to meet the analysts' earnings forecasts without manipulating earnings upward through tax expenses. These firms would have high non-tax costs associated with conforming tax avoidance. If these firms engage in conforming tax avoidance, they will reduce their reported income and likely would not be able to achieve the analysts' earnings target. On the other hand, these firms have incentives to engage in non-conforming tax avoidance to increase their net income and meet the analysts' target. If these firms engage in non-conforming tax avoidance, they will benefit from reducing their effective tax rate (ETR) and meeting analysts' earnings forecasts. For these firms, the tax benefits and the benefits associated with meeting the analysts' earnings target may outweigh the costs of presenting higher book-tax differences (e.g., providing a red flag for Internal Revenue Service [IRS] scrutiny). Focusing on firms that would not meet the analysts' earnings forecasts, prior studies show that firms engage in non-conforming tax avoidance to reduce their tax expense to meet or beat analysts' consensus forecasts (Dhaliwal et al., 2004; Gleason & Mills, 2008). On the other hand, to my knowledge, no prior studies test these firms' engagement in conforming tax avoidance.

Second, firms would slightly meet the analysts' earnings forecasts without having to manipulate earnings upward through tax expenses. Like firms in the first scenario, these firms have high non-tax costs associated with the engagement in conforming tax avoidance. If these firms engage in conforming tax avoidance, they will reduce their reported income and might miss the analysts' earnings target. These firms may have incentives to engage in non-conforming tax avoidance (increasing their net income) to easily meet the analysts' earnings forecasts or to ensure earlier that they will meet them. If these firms engage in non-conforming tax avoidance, they will have the benefits of reducing their ETR and the assurance that they will at least meet analysts' earnings forecasts. For these firms, the tax benefits and the benefits associated with the assurance of at least meeting the analysts' earnings target may outweigh the costs of presenting higher book-tax differences.

Third, firms would not meet the analysts' earnings forecasts or at least would not be close to them even after using all their discretion to manipulate earnings upward through tax expenses. These firms have incentives to engage in conforming tax avoidance. These firms would already have the costs associated with missing the analysts' earnings forecasts. Thus, engaging in conforming tax avoidance would reduce the reported income already penalized by

missing the target. Lopez and Rees (2002) document that a market penalty for missing analysts' expectations is an average negative price reaction of around 3.5%. The non-tax costs of engaging in conforming tax avoidance and consequently reporting a smaller income are lower for these firms than for firms reporting income around the analysts' target.

Fourth, firms would easily meet the analysts' earnings forecasts without having to manipulate earnings upward through tax expenses. Like firms in the third scenario, these firms have incentives to engage in conforming tax avoidance. The non-tax costs of engaging in conforming tax avoidance and consequently reporting a smaller income (up to where the reported income meets the forecasted earnings) are lower for these firms that would easily meet the analysts' earnings target than for firms that would slightly meet it. Given the higher non-tax costs of engaging in non-conforming tax avoidance and presenting high book-tax differences, and the lower non-tax costs of conforming tax avoidance, firms in the third and fourth scenarios have incentives to use mainly conforming tax avoidance to have the benefits of reducing their tax liabilities. To my knowledge, no prior studies test these firms' engagement in conforming or non-conforming tax avoidance.

Firms that would easily beat the analysts' earnings forecasts without having to use their discretion may also have incentives to engage in non-conforming tax avoidance to report income that is even greater than the earnings forecasted. These firms may be engaging only in conforming tax avoidance (upping the book earnings to meet the forecasted earnings), only in non-conforming tax avoidance to report an even higher book income to the market, or they may be engaging in and taking advantage of both strategies. Ex ante, it is not clear whether conforming and non-conforming tax avoidance strategies are substitutes or complements.

To set my expectations, I assume that firms have two broad incentives: meeting the analysts' earnings forecasts and reducing their tax liabilities. Anecdotal evidence[2] and prior studies show that analysts' earnings forecasts are a target firms want to achieve. Managers manage earnings and analysts' forecasts to meet the analysts' earnings forecasts (Burgstahler & Eames, 2006; Brown, 1997). The positive market reaction when firms reach this target can explain managers' behavior. Bartov, Givoly, and Hayn (2002) find that firms that meet or beat current analysts' earnings expectations have a higher return than firms that fail to meet these expectations. Anecdotal evidence[3] and prior studies also show that firms want to minimize tax

[2] An average of 72% of companies in the Standard & Poor's (S&P) 500 beat analysts' earnings forecasts for each quarter over the past five years (Daks, 2019).

[3] "At least 55 of the largest corporations in America paid no federal corporate income taxes in their most recent fiscal year despite enjoying substantial pretax profits in the United States" (Gardner & Wamhoff, 2021).

liabilities. Dyreng, Hanlon, Maydew, and Thornock (2017) show that corporate effective tax rates have decreased significantly over the past 25 years.

1.2. Hypotheses and Results

Based on the above arguments, I expect that firms that would have reported income further from the analysts' earnings forecasts, positively or negatively, have lower non-tax costs of engaging in conforming tax avoidance and then engage more in conforming tax avoidance than other firms. I also expect that firms that would have reported income closer to the analysts' earnings forecasts, positively or negatively, have higher non-tax costs of engaging in conforming tax avoidance, have non-tax benefits of engaging in non-conforming tax avoidance, and then engage more in non-conforming tax avoidance than other firms.

I do not know what the book income would be if the firms had not engaged in tax avoidance activities. Thus, I cannot know how far pre-managed earnings (book income before the firms' engagement in tax avoidance) would be below or above the analysts' forecasted earnings. I use in my analysis the reported earnings that are already managed for tax purposes. Accordingly, I draw my hypotheses in reference to reported earnings, as formally stated: (1) firms engage in more conforming tax avoidance activities when the reported earnings per share are further from the analysts' consensus earnings forecast, and (2) firms engage in more non-conforming tax avoidance activities when the reported earnings per share are closer to the analysts' consensus earnings forecast. Using reported earnings to test my hypotheses can underestimate my results for firms with positive earnings surprises.

Although I expect a positive relation between conforming tax avoidance and earnings surprise and a negative relation between non-conforming tax avoidance and earnings surprise, an increase (decrease) in earnings surprise might not impact conforming (non-conforming) tax avoidance. Some reasons could work against finding evidence for my Hypothesis 1. First, firms that would easily meet the analysts' forecasts may not engage in conforming tax avoidance activities to avoid presenting to the market a net income that just meets the analysts' expectations, or that beats it by just a few cents. Second, firms that would easily miss the analysts' forecasts may not engage in conforming tax avoidance activities to avoid presenting an even lower net income to the market. Moreover, some reasons could work against finding evidence for my Hypothesis 2. First, firms that would easily meet analysts' earnings forecasts may engage in more non-conforming tax avoidance to report even higher book earnings to the market. Second, firms that would slightly miss the analysts' forecasts may not engage in non-

conforming tax avoidance, considering that they have already missed the target and all of the non-tax costs of presenting higher book-tax differences. Additionally, the analysts may be able to anticipate the firms' tendency to engage in conforming and non-conforming tax avoidance in their earnings forecasts.

To test my hypotheses, I use a sample of profitable U.S. public firms with analysts' coverage from 1994 through 2016, a period between two corporate tax reforms. I collect the accounting data on Compustat North America and the analyst forecast data on I/B/E/S. To measure conforming tax avoidance, I use the metric developed in Badertscher, Katz, Rego, and Wilson (2019) (CTA). To measure non-conforming tax avoidance, I use industry- and size-adjusted ETR measures (NCTA_ETR and NCTA_CETR). Thus, to investigate the effects of analysts' earnings forecasts on firms' tax avoidance strategy, I regress conforming and non-conforming tax avoidance on earnings surprise. I include earnings surprise in the regressions in three ways: absolute values, signed values, and clustered signed values (four groups).

Consistent with my Hypotheses 1 and 2, I find that firms with reported earnings per share further from the analysts' consensus earnings forecast engage in more conforming tax avoidance, and firms with reported earnings per share closer to the analysts' consensus earnings forecast engage in more non-conforming tax avoidance (captured by NCTA_CETR). Inconsistent with my Hypothesis 2, I find that firms with reported earnings per share closer to the analysts' consensus earnings forecast engage in less non-conforming tax avoidance (captured by NCTA_ETR). These results indicate that firms that report annual earnings around the analysts' expectations use mainly temporary differences to engage in non-conforming tax avoidance activities.

Economically, I find that for the average firm, an increase of 16 cents of absolute earnings surprise (i.e., firms' reported earnings getting further from analysts' earnings forecasts) would result in (i) a decrease of $2.9 million in cash tax paid through the engagement in conforming tax avoidance for an average firm, and (ii) a decrease of $0.8 million in tax expenses through the engagement in non-conforming tax avoidance for an average firm (captured by NCTA_ETR). Also, I find that for the average firm, a decrease of 16 cents of absolute earnings surprise (i.e., firms' reported earnings getting closer to analysts' earnings forecasts) would result in a decrease of $2 million in cash tax paid through the engagement in non-conforming tax avoidance for an average firm (captured by NCTA_CETR).

Considering the asymmetric incentives and the non-tax costs for firms with positive and negative earnings surprises, I test the effects of analysts' earnings forecasts on firms' tax avoidance strategy separately for firms with positive and negative earnings surprises. For firms

with positive earnings surprises, I find that firms with reported earnings per share further from the analysts' consensus earnings forecast engage in more conforming tax avoidance, consistent with my Hypothesis 1, and also in more non-conforming tax avoidance, inconsistent with my Hypothesis 2. These results indicate that firms that easily meet analysts' expectations engage complementarily in both conforming and non-conforming tax avoidance. For firms with negative earnings surprises, I find that firms with reported earnings per share further from the analysts' consensus earnings forecast engage in more (less) conforming (non-conforming) tax avoidance, consistent with my Hypotheses 1 and 2.

Considering that the level of analyst coverage may put different pressure on firms to engage in conforming or non-conforming tax avoidance, I test the effects of analysts' earnings forecasts on firms' tax avoidance strategy separately for firms with higher and lower analyst coverage. I find that the number of analysts covering the firm is not changing the association between CTA and absolute earnings surprise. As my main result, I find a positive (negative) and significant association between NCTA_ETR (NCTA_CETR) and absolute earnings surprise in firms with lower analyst coverage. In firms with higher analyst coverage, on the other hand, the association between non-conforming tax avoidance and absolute earnings surprise becomes insignificant.

I run additional tests to evaluate the extent to which my results are sensitive to the choices of (i) the date of analysts' consensus forecast, (ii) the measure of analysts' consensus forecast, (iii) the boundary to segregate big and small missers (beaters), and (iv) the adjusted effective tax rates as non-conforming tax avoidance measures. As the main results, the results of sensitive tests, in general, are consistent with Hypothesis 1, inconsistent with Hypothesis 2 for firms with a positive earnings surprise, and consistent with Hypothesis 2 for firms with a negative earnings surprise. These results indicate that, in general, my findings are not sensitive to my empirical choices.

It is possible that simultaneity can arise in the corporate tax avoidance and earnings surprise relationship. I expect that the earnings surprise affects the firms' engagement in conforming or non-conforming tax avoidance. However, firms' decisions to engage in more conforming or non-conforming tax avoidance may affect analysts' forecast errors. I attempt to control for some of this endogeneity by estimating the relation between tax avoidance and earnings surprise using Arellano and Bover (1995) and Blundell and Bond's (1998) dynamic panel estimator (System GMM). As the results from ordinary least squares (OLS) estimation, the results from GMM estimation are consistent with Hypothesis 1 and inconsistent with Hypothesis 2 when non-conforming tax avoidance is captured by NCTA_ETR. Unlike the

result from OLS estimation, I find no significant coefficient on earnings surprise when non-conforming tax avoidance is captured by NCTA_CETR.

1.3. Contributions

My findings make several contributions to the literature. First, I contribute to the research on the determinants of corporate conforming and non-conforming tax avoidance. Prior studies that focused on conforming tax avoidance use small-sample evidence and analyze specific transactions instead of analyzing the firms' general engagement in conforming tax avoidance (Penno & Simon, 1986; Scholes, Wilson, & Wolfson, 1992; Guenther, 1994; Cloyd, Pratt, & Stock, 1996; Maydew, 1997). Moreover, early studies focus on the non-tax costs of conforming or non-conforming tax avoidance faced by public and private firms. Expanding prior studies, Badertscher et al. (2019) use large-sample evidence and assert that the non-tax costs of engaging in conforming or non-conforming tax avoidance vary within public firms, depending on whether they are subject to lower or higher capital market pressures. I further claim that the non-tax costs of conforming and/or non-conforming tax avoidance vary even within public firms with higher capital market pressure, depending on firms' earnings surprises. Thus, my study expands on Badertscher et al. (2019) by testing the firms' earnings surprise as a determinant of conforming and non-conforming tax avoidance and by providing evidence of the usage of conforming and non-conforming tax avoidance strategies as complements by firms with larger positive earnings surprise.

Second, I also extend research on the management of tax expenses around the analysts' earnings forecasts. Prior research suggests that firms engage in non-conforming tax avoidance (reducing tax expense) to meet or beat analysts' consensus forecast (Dhaliwal et al., 2004; Gleason & Mills, 2008). However, prior research does not document firms' decisions to engage in non-conforming tax avoidance when firms' reported income would easily meet or miss the analysts' consensus forecast before any engagement in tax avoidance. Previous studies also do not present evidence of firms' engagements in conforming tax avoidance by firms with different earnings surprises. In sum, prior research focuses on non-conforming tax avoidance activities and on firms that report income around analysts' earnings forecasts. I extend these studies by finding that firms that easily miss analysts' earnings forecasts engage in more (less) conforming (non-conforming) tax avoidance than firms that slightly miss it. I also extend these studies by finding that firms that easily meet analysts' earnings forecasts engage in both conforming and non-conforming tax avoidance strategies as complements.

Third, I contribute to research on earnings management by presenting a tax perspective to justify the high frequency of large negative and the small frequency of large positive earnings surprises. Brown (1997) mentions that managers manipulate earnings in a way that firms have a considerable number of small positive compared to small negative surprises and have large negative compared to large positive surprises. As the literature has already pointed out, the decision to manage earnings in a way to have large negative and to have no large positive surprises can be used by firms as a strategy to present a better performance in future years. But also, firms can present a higher frequency of large negative compared to large positive earnings surprises as a strategy to reduce their tax liability. My findings provide evidence that firms that easily meet or easily miss the analysts' earnings forecasts reduce their current tax liability and their book income by engaging in conforming tax avoidance. Thus, my study shows that tax plays a role in firms' choice of manipulating earnings.

Finally, financial analysts and investors could be interested in the evidence that firms change their earnings through engagement in conforming and/or non-conforming tax avoidance in response to forecasted earnings. Even sophisticated users like financial analysts struggle to incorporate tax-related information into their forecasts (Plumlee, 2003; Shane & Stock, 2006; Weber, 2009; Kim, Schmidt, & Wentland, 2020). Thus, knowing the likelihood of firms engaging not only in non-conforming tax avoidance but also in conforming tax avoidance as the earnings surprises change could help analysts and investors improve their earnings expectations.

2. LITERATURE REVIEW

2.1. Tax avoidance

There are no largely accepted definitions for tax avoidance (Hanlon & Heitzman, 2010). Slemrod (2004) defines corporate tax avoidance as tax liability reduction through legal actions. More broadly, tax avoidance is defined by Dyreng, Hanlon, and Maydew (2010) as anything that reduces the firm's taxes relative to its pretax accounting income. Using the same perspective, Hanlon and Heitzman (2010) define tax avoidance as the reduction of explicit taxes. These broad definitions do not take into account the technical differences between legal avoidance and illegal evasion. They do not segregate tax-reducing activities that comply with the law from those in a gray area of the law. Hanlon and Heitzman (2010) argue that this distinction is not taken into account because the transactions to reduce taxes are frequently technically legal, and the legality of these transactions is generally determined after the fact. Law is unclear in many areas; thus, firms can be involved in transactions with uncertain tax outcomes (Dyreng, Hanlon, & Maydew, 2008).

As previous studies (e.g., Cheng, Huang, Li, & Stanfield, 2012; Atwood, Drake, Myers, & Myers, 2012; (Kubick, Lynch, Mayberry, & Omer, 2016), I follow Hanlon and Heitzman (2010) and define tax avoidance as the reduction of explicit taxes. So, this definition includes (i) tax reduction strategies that are clearly legal; (ii) tax reduction strategies for which tax authorities would judge minimal penalties; (iii) tax reduction strategies for which tax authorities would judge substantial penalties; and (iv) tax reduction strategies that are clearly illegal and could result in criminal penalties to taxpayers (Atwood et al., 2012). Considering that the focus of this study is to imply if the firm is able to avoid taxes through any means rather than tell how aggressive the activity of reducing taxes is, I follow Dyreng et al. (2008) and Hanlon and Heitzman (2010) and I use the term tax avoidance rather than the terms tax aggressiveness, tax sheltering, tax evasion, or tax noncompliance. The literature uses these terms to refer to different aspects of tax avoidance (Atwood et al., 2012). I do not intend to distinguish between strategies that would be considered cautious tax avoidance from those that would be regarded as aggressive tax avoidance.

2.1.1. Tax avoidance strategies: conforming and non-conforming

Badertscher et al. (2019) define non-conforming tax avoidance as "tax strategies that reduce income tax liabilities but not financial statement (i.e., book) income" and conforming tax avoidance as "all book-tax conforming transactions that reduce a firm's explicit tax liability." Book-tax conforming transactions are transactions that reduce both book and taxable incomes with the purpose of reducing firms' tax liabilities (Badertscher et al., 2019). (Badertscher et al., 2019) developed a proxy to measure firms' level of conforming tax avoidance. Before the development of Badertscher et al.'s (2019) metric, previous studies focused almost exclusively on non-conforming tax avoidance. Prior studies that focused on conforming tax avoidance analyzed specific transactions instead of analyzing the firms' general engagement in conforming tax avoidance. Badertscher et al. (2019) sort this previous literature into two groups: (i) tax avoidance at public and private firms and (ii) tax-induced earnings management.

Prior studies have documented that public and private firms may adopt different tax strategies. While public firms are more likely to adopt non-conforming tax strategies, private firms are more likely to adopt conforming tax strategies (Penno & Simon, 1986; Cloyd et al., 1996; Mills & Newberry, 2001; Badertscher et al., 2019). The firms' non-tax costs can explain the propensity to engage more in conforming or non-conforming tax strategies. Two broad characteristics explain some of the non-tax costs faced more by public firms than by private firms if they engage in conforming tax avoidance. First, public firms rely on capital markets for funding while private firms do not; second, public firms are generally more manager-controlled than private firms (Penno & Simon, 1986). Since the market may be influenced by reported income numbers, public firms have incentives to report higher book income (Penno & Simon, 1986). They could face a reduction in their market value if they report lower book income (Cloyd et al., 1996). Also, since the accounting numbers are used to measure management performance in manager-controlled firms (Penno & Simon, 1986), managers could face reduced compensation tied to reported income if the firm reports lower book income (Cloyd et al., 1996).

Consistent with the above reasoning, Penno and Simon (1986) find that public firms are more likely to choose income-increasing accounting methods for financial reporting purposes than private firms. More specifically, they find that public firms are more likely to use FIFO accounting and straight-line depreciation, and private firms are more likely to use LIFO accounting and accelerated depreciation. These results indicate that private firms are more

likely to engage in conforming tax strategies than public firms since private firms may adopt income-decreasing accounting methods to pay less income taxes (i.e., conforming tax avoidance) without facing some of the non-tax costs faced by public firms.

In line with the findings in Penno and Simon (1986), Cloyd et al. (1996) documented through a survey that private-firm managers were more likely to conform than public-firm managers. In their survey, the authors used ambiguous situations, with unclear appropriate tax and financial accounting methods that should not necessarily be equivalent, to evaluate managers' decisions aiming to increase tax savings. These findings are similar to those in Mills and Newberry (2001), who, using archival data for a large sample of public and private firms, show that managers of public firms report higher book-tax income differences (i.e., public firms are less likely to conform) than do managers of private firms, among income firms. Mills and Newberry (2001) use firms' book-tax differences to identify if firms conform book income to taxable income. However, they show the constraints of using this measure. Book-tax differences not only capture the difference resulting from firms reporting low taxable income in response to tax incentives and not conforming book income. They also capture the difference resulting from firms reporting high book income in response to financial incentives and not increasing taxable income together. More recently, Badertscher et al. (2019) developed a broad measure of book-tax conforming tax avoidance that captures the firms' engagement in transactions that reduce both book and taxable income. They confirm previous studies' findings that private firms engage in more conforming tax avoidance than public firms.

In a scenario of only public firms, Badertscher et al. (2019) examine if the subjection to capital market pressure affects the firms' decision to engage in conforming tax avoidance. They find that public firms subject to lower capital market pressure engage in more conforming tax avoidance and less non-conforming tax avoidance than other public firms. The capital market pressure is proxied by stock issuance in the current year and in the following two years, analyst coverage, sales growth, and discretionary accruals. Badertscher et al. (2019) confirm their expectation that conforming tax avoidance strategies are more appealing when the benefits of non-conforming tax avoidance strategies are small, considering how costly non-conforming tax avoidance is. The benefits of reporting higher book income are smaller for public firms subject to lower capital market pressure than for public firms subject to higher capital market pressure, then public firms subject to lower capital market pressure have smaller benefits of non-conforming tax avoidance strategies. The results of Badertscher et al.'s (2019) study are parallel to the findings of Mills and Newberry (2001), who identify manager bonus plans and income-increasing behavior as capital market pressures. Mills and Newberry (2001) also find that public

firms subject to higher capital market pressure engage in more non-conforming tax avoidance (present higher book-tax difference) than other public firms. Mills and Newberry (2001) do not test the firms' engagement in conforming tax avoidance.

Besides Badertscher et al. (2019), previous studies have already focused on public firms and conforming tax avoidances strategy; however, these studies have analyzed specific transactions in the context of the 1986 Tax Reform Act (Scholes et al., 1992; Guenther, 1994; Maydew, 1997). The Tax Reform Act of 1986 reduced corporate tax rates from a maximum of 46% to 34%. Scholes et al. (1992) verify if firms shifted gross margin and selling, general and administrative expenses from one period to another in anticipation of these declining tax rates. They find that firms accelerated selling, general and administrative deductions, or/and deferred sales in anticipation of lower tax rates. Guenther (1994) assesses if some firms manage earnings through accruals expected to affect taxable income in the year before the effective date of the Tax Reform Act. He finds that large firms and firms with low levels of long-term debt report significantly lower current accruals for the year prior to the tax reduction. Extending previous studies, Maydew (1997) examines if firms with net operating loss (NOL) carrybacks tax-induced intertemporal income shifting. He provides evidence that firms shifted recurring and nonrecurring revenue and expense. More specifically, Maydew (1997) documented that firms with NOL carrybacks during a period immediately after TRA 86 was enacted deferred gross margin and accelerated selling, general and administrative expenses. These firms also sale assets or liabilities at a loss. These three previous studies focus on specific transactions to conform book income to taxable income in response to tax incentives[4].

2.1.2. Costs and benefits of different tax avoidance strategies

Engaging in conforming tax avoidance strategies results in lower reported income. Lower reported income can lead to debt covenant violations, reduce manager compensation tied to reported income, and lead to negative capital market consequences, for example, a reduction of the firm's market value (Cloyd et al., 1996). Corroborating that reduced book income increases the probability of debt covenants violation, Maydew (1997) finds that firms with high levels of leverage were less prone to accelerate expenses for tax purposes than other firms in the context of TRA 86. Lowering the reported income in response to tax incentives also may affect the maintenance of a pattern of positive and increasing earnings (Mills &

[4] Maydew (1997) refers to these transactions as tax-induced earnings management, and Badertscher et al. (2019) refer to them as conforming tax avoidance.

Newberry, 2001). Mills and Newberry (2001) find that firms that report increasing book earnings from the prior year are more likely to present high book-tax income differences. This result indicates that these firms engage less in conforming tax avoidance and/or manage book earnings in ways that do not impact taxable income. Additionally, engaging in conforming tax avoidance through income shifting may reduce operating efficiency, deteriorate customer relations, and add inventory holding costs, depending on the revenue that would have recognition postponed and expense that would have recognition accelerated (Scholes et al., 1992). For example, firms may lose revenue by delaying the performance of services in response to tax incentives (Maydew, 1997).

Cloyd et al. (1996) highlight some benefits of conforming tax avoidance. First, the firm does not need to report to IRS a book-tax difference and does not have to explain book-tax differences in the annual report footnotes. Second, conforming the financial accounting choice to an aggressive tax position (i.e., engaging in conforming tax avoidance activity) may reduce the probability of being challenged by the IRS and increase the probability of favorability defending this aggressive position in case of being challenged. Third, conformity generally indicates conservative financial accounting practices (related to expenses acceleration and revenue deferment) that can signal higher-quality earnings.

Engaging in non-conforming tax avoidance strategies results in higher book-tax differences. Higher book-tax differences are positively associated with IRS audit adjustments (Mills, 1998; Mills & Sansing, 2000) and with the incidence of tax sheltering (Wilson, 2009). The book-tax difference can serve as a red flag for IRS scrutiny (Cloyd et al., 1996). Although Mills and Sansing (2000) find evidence that high book-tax differences are positively correlated to the probability that a transaction be audited (proxied by proposed audit adjustments), they do not find a significant correlation between book-tax differences and additional tax collected. Thus, book-tax differences correlate with audit selection but not with detected tax avoidance (Mills & Sansing, 2000). Wilson (2009), on the other hand, documented that firms that engaged in tax sheltering present larger book-tax differences. Wilson (2009) uses a set of firms that confirmedly participated in corporate tax shelters to reach this conclusion. Wilson's (2009) findings suggest that large positive book-tax differences can be used as a signal of tax aggressiveness. Further, higher book-tax differences are negatively associated with earnings persistence (Hanlon, 2005). In sum, higher book-tax differences are interpreted as potential red flags to IRS and investors.

2.2. Earnings thresholds

During the last decades, researchers have shown that there is a large (small) number of firms with earnings above (below) three benchmarks: (i) last year's earnings, with the purpose of reporting small increases in earnings; (ii) non-negative earnings, in order to avoid reporting losses; and (iii) analysts' forecasts, with the purpose of meeting or beating the forecast (Burgstahler & Dichev, 1997; Degeorge, Patel, & Zeckhauser, 1999; Brown, 2001; Dechow, Richardson, & Tuna, 2003; Burgstahler & Eames, 2006; Donelson, Mcinnis, & Mergenthaler, 2013). The high costs for stakeholders to process information about the firms' earnings are stated as one of the reasons for some stakeholders to base the terms of transactions on cutoffs at zero changes in earnings or zero earnings (Burgstahler & Dichev, 1997). In addition to the psychological effect of using a reference point to evaluate outcomes, Degeorge et al. (1999) mention two other psychological effects that explain the importance given to the thresholds: human thought processes about positive and non-positive numbers; and people's dependence on rules of thumb to reduce transactions costs.

The firms' earnings behavior can indicate that managers are manipulating earnings to achieve some benchmarks. Degeorge et al. (1999) find evidence of earnings management as a response to rewards for exceeding the three thresholds: report positive profits, improve last year's performance, and meet analysts' earnings projections. They document that earnings will be managed upward if they fall slightly less than thresholds, and earnings will be controlled to meet the thresholds in the future if they fall far from thresholds. Consistent with this finding, Das and Zhang (2003) conclude that managers manipulate earnings upwards to round-up earnings per share in such a way that they can meet the three thresholds. They conjecture that, at the end of the fiscal period, managers would know the earnings per share and check if the firm could report one more cent of earnings per share by manipulating a small amount of earnings. Das and Zhang (2003) provide evidence that firms are more likely to manipulate earnings if managers believe rounding-up earnings per share will help them to meet analysts' forecasts, report profits, and sustain previous performance.

In line with prior studies, Donelson et al. (2013) find that earnings management drives discontinuities in the earnings distributions near benchmarks: analysts' consensus forecast, prior year earnings, and the zero-profit benchmark. To detect whether earnings management plays a significant role in the discontinuities, Donelson et al. (2013) use a sample of firms that restated earnings after settled class-action lawsuits that alleged fraudulent GAAP violations. Thus, they plot distributions of originally reported earnings (managed) and restated earnings

(unmanaged) to examine whether there are discontinuities in both distributions near earnings benchmarks. For the analyst forecast, prior-year earnings, and zero-profit benchmarks, when earnings are scaled by the contemporaneous market value of equity, they find no discontinuity in the distribution of restated earnings and a significant discontinuity in the distribution of originally reported earnings. For the zero-profit benchmark, when earnings are scaled by total assets or the post-class period market value of equity, they find discontinuities in both managed and unmanaged earnings distributions. Though, the discontinuity is smaller in the distribution of unmanaged earnings. Based on this evidence, Donelson et al. (2013) conclude that earnings management drives the discontinuities observed in the earnings distributions of their sample.

Focused on two of the three cited thresholds – last year's earnings and non-negative earnings, Burgstahler and Dichev (1997) show unusually low frequencies of small decreases in earnings and small losses and high frequencies of small increases in earnings and positive income. They present graphical evidence of scaled earnings changes and levels of earnings, identifying histograms with single-peaked and bell-shaped distributions with an irregularity near zero. This lack of smoothness in the area of zero is consistent with earnings management to avoid earnings decreases and losses. Burgstahler and Dichev (1997) estimate that 8% to 12% of the firms with small pre-managed earnings decreases manipulate earnings to report earnings increases, and 30% to 44% of the firms with small negative pre-managed earnings manipulate earnings to report positive earnings. They provide evidence that firms manipulate cash flow from operations and changes in working capital to increase earnings.

Using a different research design, Jacob and Jorgensen (2007) corroborate the results in Burgstahler and Dichev's (1997) finding evidence that earnings management is responsible for discontinuities near zero in the histograms. Considering that managers have more incentives to manipulate earnings in the fourth quarter of the fiscal year than at the end of interim quarters, Jacob and Jorgensen (2007) use annual periods terminating at the end of the first, second, and third quarters of the fiscal year as alternate measures of annual earnings. Doing this, they are able to identify that the pattern observed by Burgstahler and Dichev (1997) arises only in the earnings of the fiscal year-end but not in the other three annual periods. That indicates that discontinuities around zero in the histograms should not be attributable to a mechanical effect but to earnings management at fiscal year-end (Jacob & Jorgensen, 2007).

On the other hand, Dechow et al. (2003) find that earnings management is not a complete explanation for the kink in the earnings distributions. They examine whether small profit firms have high discretionary accruals compared to all other firms and small loss firms. They provide evidence that not only a set of small profit firms but also a set of small loss firms

have high discretionary accruals and have a similar proportion of positive discretionary accrual firms. They also provide evidence that small profit firms have high discretionary accruals relative to all other firms. Even though this finding is consistent with small profit firms engaging in earnings management, it is not sufficient evidence to explain the kink in the earnings distributions. Dechow et al. (2003) consider alternative explanations for the kink, finding evidence that selection bias towards profitable firms and scaling earnings by market value provide a partial explanation for the kink and its magnitude.

Consistent with these alternative explanations, Durtschi and Easton (2005) find that the frequency distributions of earnings can be explained by deflation, sample selection criteria, characteristics of observations to the left of zero and observations to the right of zero, or a combination of these factors. So, the frequency distributions of earnings should not be used as evidence of earnings management. According to these authors, if the deflator in observations to the left of zero differs considerably from the deflator in observations to the right of zero, the deflator will affect the distribution of earnings. That is the case of price, the most common deflator. The market appears to price differently firms reporting a profit and firms reporting a loss (Durtschi & Easton, 2005). The authors also argue that the sample selection criteria that require beginning-of-year prices intensify the discontinuity in the frequency distribution of deflated earnings. They show that more observations with small losses than observations with small profits are deleted because of the availability of the beginning-of-year prices on the Compustat files. This last alternative explanation is reinforced by Durtschi and Easton (2009). They analyze Jacob and Jorgensen's (2007) paper and conclude that their sample selection criteria provoked a break in the distribution at zero, and the earnings distribution is not likely explained by earnings management.

Burgstahler and Chuk (2015) debate the alternative explanations presented by Durtschi and Easton (2009, 2005) and show that there is no evidence that scaling and selection cause discontinuities. Burgstahler and Chuk (2015) demonstrate that the research design choices of Durtschi and Easton (2009, 2005) reduce power and point out that their research design neglects the effect of firm size as a covariate, places weight on results for small firms and ignores that the cost-benefit relation of the amount of managed earnings is different for firms of different sizes. Considering these research design flaws identified by Durtschi and Easton (2009, 2005), their results should not be used as evidence to contradict the hypothesis that earnings are managed to meet thresholds (Burgstahler & Chuk, 2015).

Beaver, McNichols, and Nelson (2007) present another alternative explanation for discontinuity in earnings reports. They show that income taxes and special items contribute to

a discontinuity at zero in the earnings distribution, even if there is no discretion. Firms with pretax profit have a higher effective tax rate than firms with pretax loss. So, the volume of income taxes is pushing observations of firms with pretax profit to the region just above zero in the net income distribution. In addition, the authors find that firms with negative earnings before special items have a greater magnitude and frequency of negative special items. So, the volume of negative special items pushes observations of loss firms away from zero. Beaver et al. (2007) conclude that the asymmetric nature of income taxes and special items contributes to the discontinuity at zero in the distribution of net income, independently of firms' discretionary behavior.

The market puts different pressures on meeting some of the three earnings thresholds, and consequently, the managers show preferences among them. These preferences have changed over time (Brown & Caylor, 2005). Analyzing data from 1974-1986, Degeorge et al. (1999) infer a hierarchy among the thresholds. The authors identify the thresholds' hierarchy in the following order: (i) positive profits; (ii) previous periods' earnings; and (iii) analysts' earnings forecasts. Dechow et al. (2003) analyze more recent data from 1989-2001 and compare the proportion of firms slightly after the threshold and right before it. Over the years, they find a recurrent reduction in the ratios of positive earnings and last year's earnings and a recurrent increase in the ratio of analyst forecast. These findings indicate that firms placed more weight on analysts' earnings forecasts in the last years of the analyzed period. Consistent with Dechow et al. (2003), Brown and Caylor (2005) analyzed data from 1985-2002, showing a shift in the threshold relevance. They document that after 1996 the managers start to focus mainly on the analysts' forecast threshold (instead of last year's earnings and non-negative earnings threshold).

When 400 executives were directly listened to, they pointed out last year's quarter as the most important threshold to beat, followed by analyst consensus estimates (Graham, Harvey, & Rajgopal, 2005). The authors, however, identify that the relevance of analyst consensus increases when the number of analysts covering the firm increases. In line with this finding, Brown and Caylor (2005) point out the increase in analyst following (more analysts following firms and more firms being followed by analysts) as one of the reasons managers put their focus on avoiding negative earnings surprises. Other reasons the authors mention to explain these focuses changing toward analyst forecasts are (i) an increase in media attention paid to analysts' forecasts and (ii) an increase in both the accuracy and precision of analysts' forecasts.

2.2.1. Meeting or beating analysts' forecasts

"The market-research company FactSet reports that for each quarter over the past five years, an average of 72 percent of companies in the S&P 500 beat earnings estimates" (Daks, 2019). On the one hand, analysts attempt to predict the earnings that firms report. On the other hand, executives try to exceed analysts' earnings forecasts. Degeorge et al. (1999) call it a game in which analysts predict an earning, and the firm manipulates the earning in response to analysts' predictions. In this game, the analyst's costs for their forecast magnitude error are symmetric for both sides. In contrast, the manager's costs for missing or beating the analyst's forecast by the same amount are different (Beyer, 2008).

Degeorge et al. (1999) document that the amount of forecast error[5] on the left of zero is much smaller than the amount on the right, indicating that managers try to meet or exceed analysts' earnings forecasts. Brown (2001) finds evidence that median earnings surprise[6] moves from slightly negative to slightly positive over time, showing a tendency of managers moving to meet and beat analyst estimates. Additionally, Brown (2001) sorts earnings into profits and losses and documents that median earnings surprise moves from zero to one cent per share, for profits, and from −33 cents per share to zero, for losses. This evidence reinforces the trend of firms exactly meeting and slightly beating analysts' estimates. Considering temporal changes, Brown (2001) analyzes and finds that his results are not driven by alternative explanations, changes in (i) forecast accuracy; (ii) forecast timeliness; (iii) the mix of earnings of one sign preceded by earnings of another sign; and (iv) the I/B/E/S definition of actual earnings.

Consistent with Degeorge et al. (1999) and Brown (2001), Burgstahler and Eames (2006) also identify a large amount of zero and small positive earnings surprises[7] and a small amount of small negative earnings surprises. They attribute this unusual frequency in the distributions of annual earnings surprises to (i) earnings management and (ii) analysts' forecast management. These findings are similar to those in Matsumoto (2002), who also identifies that these two factors help to explain the decrease in negative earnings surprises. However, while Matsumoto (2002) documents that firms use discretionary accruals to manage earnings upward

[5] Degeorge et al. (1999) defines forecast error as "the reported earnings per share minus the mean of the analysts' forecasts".

[6] Brown (2001) defines earnings surprise as "actual reported quarterly earnings minus the analyst forecast closest to, but before, the quarter's earnings announcement".

[7] Burgstahler and Eames (2006) define earnings surprise as "realized earnings less the last forecast of earnings before the earnings release date".

and avoid negative earnings surprises, Burgstahler and Eames (2006) provide evidence that firms also use cash from operations to accomplish it.

In a related study, Payne and Robb (2000) find that managers use their discretion to avoid negative earnings surprises. Payne and Robb (2000) document that managers move earnings toward analysts' forecasts when premanaged earnings are below analysts' forecasts. On the other hand, when the premanaged earnings are above analysts' forecasts, managers save up discretionary accruals from the current period to future periods. Matsumoto (2002) attempts to identify some firms' characteristics that influence managers to avoid negative earnings surprises. She finds that firms with (i) higher transient institutional ownership and (ii) high-growth prospects are more likely to manage earnings upward through positive abnormal accruals.

The analysts' forecast dispersion (Payne & Robb, 2000) and the analysts' coverage (Huang, Pereira, & Wang, 2017) also influence the likelihood of firms meeting or beating analysts' forecasts. Payne and Robb (2000) analyze the effect of analysts' forecast dispersion on the management of reported earnings and conclude that managers make a greater effort to meet or beat analysts' forecasts when the dispersion in analysts' forecasts is low. Huang et al. (2017) conclude that analyst coverage is positively associated with the likelihood of firms meeting or beating consensus analyst earnings forecasts. This finding is aligned with the greater market pressure on managers to meet analysts' forecasts when the firm has higher analyst coverage (Huang et al., 2017).

The evidence that meeting or beating analyst forecasts represents earnings management is more compelling than the evidence that small profits and small loss avoidance represent earnings management (Dechow, Ge, & Schrand, 2010). Dechow et al. (2010) point out that earnings management is the only supported explanation for the discontinuity around the consensus analyst forecast in their studies database. To verify whether earnings that meet or beat the consensus analyst forecast are managed, Dechow et al. (2010) analyze the literature segregating it into three major groups: (i) mechanism/ tools that firms use to achieve earnings that just meet or beat a target; (ii) firms' equity market incentives to meet or beat a target; and (iii) firms' opportunities to meet or beat a target. For the first group, Dechow et al. (2010) point out research examining the management of some accounts, the management of classification of income statement items, and the use of accruals and real decisions to meet analyst forecasts. For the second group, Dechow et al. (2010) mention research exploring the incentives from firms' ownership structure and managers' compensation. For the third group, Dechow et al.

(2010) indicate research investigating the opportunities from lower audit quality and unaudited interim quarters.

More recently, Bissessur and Veenman (2016) present the strategic analyst forecast pessimism as an alternative explanation for the discontinuity in the frequency distribution of earnings surprises. The authors argue that analysts face uncertainty, and their precision depends on both the precision of public information and the precision of analysts' private information. Being precise gives more chances for the analyst to be strategically pessimistic and induces more positive earnings surprises. Bissessur and Veenman (2016) document a positive association between firms with low forecast uncertainty and firms reporting earnings that just beat expectations. The authors point out that the benefits that come out of a good relationship between analysts and managers play a role as the motivation for analysts to help firms to meet or just beat their earnings forecasts.

There is plenty of evidence of managers guiding analysts' forecasts downward. Influencing the analysts' expectations downward will help firms easily beat analyst forecasts. However, it can be costly for the firm. According to Matsumoto (2002), if managers guide analysts' expectations downward early, the firm would face lower stock prices for an extended interval. On the other hand, if managers make it later, the firm would face a negative stock price reaction when the forecast is revised. However, the negative stock price reaction is a temporary cost to most firms (Kross, Ro, & Suk, 2011), and the benefits of meeting or beating the analysts' forecasts outweigh the cost of lowering the analysts' expectations (Bartov et al., 2002). Furthermore, the premium for meeting or beating the analysts' forecasts does not revert subsequently over a short and long window (up to three years following the earnings announcement) (Bartov et al., 2002).

Based on anecdotal evidence, Degeorge et al. (1999) point out that executives try to guide analysts' expectations downward, particularly around the earnings announcement date. Empirically testing, Burgstahler and Eames (2006) find evidence of firms managing analysts' forecasts to have zero or a small positive surprise. Huang et al. (2017) document that firms with more analyst coverage are more likely to use downward management guidance, especially firms that meet analyst forecasts. Being more specific, Matsumoto (2002) relates firm characteristics and the likelihood of downward forecast management. Matsumoto (2002) uses a metric that captures management's public and private disclosures (through informal private conversations) and finds that firms with (i) greater transient institutional ownership, (ii) greater reliance on implicit claims with stakeholders, and (iii) higher value-relevance of earnings are more likely

to guide forecasts downward; while firms with (i) a consistent pattern of prior losses are less likely to guide forecasts downward.

Cotter, Tuna, and Wysocki (2006) investigate the determinants of public management guidance and the outcomes of this guidance: (i) analysts' reaction, and (ii) likelihood of issuance of a meetable or beatable forecast. Concerning the determinants of public management guidance, the authors identify optimistic initial consensus analyst forecasts and low forecast dispersion as determinants. Public management would be the most efficient channel to deflate the optimism of all analysts. On the other hand, private communications would be the most efficient channel to deflate the optimism of specific analysts when there is a high forecast dispersion (Cotter et al., 2006). Concerning the outcomes of public management guidance, the authors document that analysts immediately review their expectations after public management guidance. They also conclude that analysts will likely issue final meetable or beatable earnings targets after public management guidance. Koh, Matsumoto, and Rajgopal (2008) find that after the accounting scandals and the passage of the Sarbanes-Oxley Act (SOX) in 2002, firms relied more on downward expectations management to meet or beat analyst earnings forecasts and less on earnings management to beat it.

Firms that persistently beat or meet analysts' earnings forecasts have more incentives to guide analysts' expectations downward since these firms would experience a more significant decline in stock price if they break the string (Kross et al., 2011). The authors argue that managers, focusing on consistently beating or meeting analysts' forecasts, issue more bad news earnings forecasts to guide analysts' expectations downward. Kross et al. (2011) confirm their hypothesis and find a positive association between the length of persistent beating or meeting analysts' earnings forecasts and the issuance of bad news. They also find that analysts suspect that, in this case, the bad news has been issued opportunistically and made fewer adjustments in their forecast review when the bad news is issued.

Trying to explain the interaction between analysts' and managers' strategies to forecast and report earnings, respectively, Beyer (2008) develops a model to provide an economic rationale in this setting. Her model predicts that "analyst's forecast exceeds median reported earnings" and "the analyst is more likely to revise his forecast downward than upward." The first prediction is explained by the analyst incentive derived from the manager incentive. The manager has incentives to manipulate earnings upwards if they slightly miss analysts' expectations. Taking into account this manager's incentive, analysts have incentives to forecast earnings that exceed median reported earnings. The second prediction is explained by the reduction of these analysts' incentives since, in their forecast review, they have more

information to predict with small errors and do not need to rely on managers' manipulation of earnings upwards. Based on the reason for these two predictions, Beyer (2008) calls attention to the fact that the downward forecast revisions are not necessarily due to managers guiding analysts' forecasts downward.

2.2.2. Analysts' forecasts and market reaction

The relevance of analysts' earnings forecasts as a benchmark to be achieved or exceeded can be explained by the benefits of meeting or beating the analysts' expectations and the costs of not meeting or beating them. The market rewards firms that meet or beat analysts' earnings forecasts and penalizes firms that stay below them (Bartov et al., 2002; Kasznik & McNichols, 2002; Lopez & Rees, 2002; Brown, 2003; Brown & Caylor, 2005; Beyer, 2008). The reward or penalty exists independently of firms' performance (Bartov et al., 2002). Meeting analysts' earnings forecasts explain abnormal returns more than the profit or loss status of the firm (Lopez & Rees, 2002). Over time (from 1984 to 1999), the negative abnormal return for firms that slightly miss the analyst forecast has severely increased (Brown, 2003).

Firms that meet or beat analysts' expectations have a fixed premium of quarterly returns that is 2.3% above the quarterly returns for firms that fail to meet them, regardless of the magnitude of the positive earnings surprise[8] (Bartov et al., 2002). Additionally to this fixed premium, the authors find an incremental return of about 0.5% for a 1% earnings surprise. Bartov et al. (2002) conclude that the quarter's abnormal returns are positively associated with the earnings surprise for the quarter. In line with the findings of the premium and incremental returns for firms that meet or beat analysts' forecast, Bartov et al. (2002) also documented that firms that ended the quarter with positive earnings surprise have an average return over quarters greater by about 3.2% than firms that ended with a negative earnings surprise, assuming all firms in general with the same quarterly earnings forecast error[9]. These findings are similar to those in Kasznik and McNichols (2002), who document that firms that meet or beat analysts' earnings forecasts are rewarded with a higher stock price than those that do not meet them.

[8] Earnings surprise is the difference between the actual earnings for the quarter and the latest forecast for the quarter.

[9] Bartov et al. (2002) measure earnings surprise and forecast error using analyst forecast issued in different moments. While the earnings surprise for the quarter is measured as the difference between the actual earnings for the quarter and the latest forecast for the quarter, the forecast error for the quarter is measure as the difference between the actual earnings and the earliest forecast for the quarter. In this test, they control for the forecast error to verify the effect of earnings surprise on abnormal return for the quarter.

Consistent with Bartov et al. (2002) and Kasznik and McNichols (2002), Lopez and Rees (2002) find that there is a market premium on positive earnings surprise. Lopez and Rees (2002) document a greater (more than three times) earnings response coefficient for firms that beat analysts' forecasts compared to firms that miss this threshold. Analyzing a short window nearby the earnings announcement, Lopez and Rees (2002) find a positive price reaction of around 0.7% to beating analysts' expectations and a negative price reaction of around 0.8% to missing analysts' expectations, independently of the magnitude of unexpected earnings. However, analyzing a long window nearby the earnings announcement, they find a penalty of around 3.5% for missing analysts' expectations and a reward of around 0.5% for beating analysts' forecast. Presenting these results, Lopez and Rees (2002) conclude that the penalty for missing the analysts' expectations is much higher than the reward for beating them. To find this result, Lopez and Rees (2002) use a broader interval of analysis because firms that expect to miss analysts' forecasts are likely to issue earnings preannouncements, and this information is reflected in the stock price before the earnings announcement date.

Lopez and Rees' (2002) findings are in line with Beyer's (2008) findings and are contrary to Bartov et al.'s. (2002) findings. Beyer (2008) finds a stronger market reaction to negative earnings surprises than to positive ones, considering the earnings surprises of the same magnitude, while Bartov et al. (2002) document that the reward for beating analysts' expectations is higher than the penalty for missing them. In contrast to previous studies, Payne and Thomas (2011) do not find convincing evidence of market penalization to firms slightly missing the analysts' earnings forecasts. Regarding the market reaction to firms that meet and firms that beat the analysts' forecasts, Bartov et al. (2002) find that firms that beat analysts' expectations have higher abnormal returns than firms that just meet them. Burgstahler and Eames (2006) mention two reasons for managers try to slightly exceed the analyst expectation than just meet them: (i) firms may target small positive surprises to reduce the risk of presenting negative earnings surprises, and (ii) firms that beat analysts' forecast may have more benefits than firms that just meet it. The last reasoning was confirmed by Bartov et al. (2002).

Bartov et al. (2002) draw attention to the relevance of expectations changes over the period to explain the return. To capture the expectations path, they use two analysts' forecast issuance for a quarter: (i) the first forecast for the quarter made after the earnings announcement of the previous quarter; and (ii) the last forecast for the quarter made before the earnings announcement for that quarter. To control for the magnitude of the forecast error, they create

portfolios of 5% forecast-errors[10] intervals. If the firm is into a portfolio of positive forecast error (i.e., the firm bet the first analysts' forecast) and beats the last forecast for the quarter made prior to earnings announcement (i.e., the firm has a positive earnings surprise), they have the highest average cumulative abnormal return (CAR) for the quarter (5.9%). However, if the firm is in the same portfolio of positive forecast error but does not beat the last forecast for the quarter, they present a lower average CAR for the quarter (2.7%) (Bartov et al., 2002). These findings indicate the relevance of beating the first and the last analysts' forecasts to have a higher CAR. For the cases that the firm is into a portfolio of negative forecast error (i.e., the firm missed the first analysts' forecast) and misses the last forecast for the quarter made prior to earnings announcement (i.e., the firm has a negative earnings surprise), they have an average CAR for the quarter of -6.6%. However, if the firm is in the same portfolio of negative forecast error but beats the last forecast for the quarter, they present a higher (yet negative) average CAR for the quarter of -2.9% (Bartov et al., 2002). Those findings indicate the relevance of beating the first analysts' forecast issued. Considering the scenario of two firms that beat the last analysts' forecast (i.e., they both have a positive earnings surprise), one of them did not beat the first forecast and had a negative average CAR of -2.9%, while the other one bet the first forecast and had a positive average CAR of 5.9%.

Bartov et al. (2002) also draw attention to the relevance of the magnitude of forecast error. The authors find that larger earnings forecast error is associated with a larger cumulative abnormal return (CAR). Their approach does not assume a linear relationship between the CAR and the earnings forecast error. Analyzing the observations with positive forecast errors, they find that for observations in the 0 to 5% and 30 to 35% groups, the weighted CAR is 2.3% and 8.1%, respectively. In parallel, analyzing the observations with negative forecast errors, they find that for observations in the 0 to -5% and -30 to -35% groups, the weighted CAR is 0.03% and -6.8%, respectively.

Bartov et al. (2002) find that even when the firms likely achieve the analysts' expectations through earnings or analysts' forecasts management, they are rewarded by investors. The results of the Bartov et al. (2002) study are only partially parallel to the findings of Bhojraj, Hribar, Picconi, and McInnis (2009), who point out that firms that just beat the analysts' forecasts through earnings management have higher stock returns than firms that barely miss them. However, they find that in the long run (three years), firms that use accruals

[10] To define the intervals, forecast errors is calculated as $(EPS - F_{earliest})/|\text{EPS}|$. EPS is the actual earnings per share for the quarter and $F_{earliest}$ is the analysts' earnings forecast made at the beginning of the quarter.

or reduce discretionary expenditures to beat expectations underperform those that slightly miss the analyst expectations but present high-quality earnings[11].

Kasznik and McNichols (2002) try to identify the determinants of a higher stock price for firms meeting the analysts' expectations. They conclude that higher stock price is explained by higher expected future profitability for firms meeting analysts' forecasts since they find a positive association between firms that meet earnings expectations and higher future earnings. Firms that meet or beat analysts' forecasts have significantly higher earnings in the current year and the three subsequent years than firms that do not meet earnings expectations (Kasznik & McNichols, 2002). The association between meeting expectations and the future profitability of the firm was also documented by Bartov et al. (2002), who identify this association as evidence of investors' rationality to reward firms that meet or beat analysts' forecasts.

Furthermore, Kasznik and McNichols (2002) document that the market reward is higher if the firm consistently meets or beats analysts' forecast in the last two years and even higher if the firm consistently meets it in the last three years. The higher returns for firms that consistently meet analysts' forecasts are incremental to their higher expected future earnings (Kasznik & McNichols, 2002). These higher returns do not reverse in the following years, and the authors interpret this persistence as the investors' perceptions of less risk and lower cost of equity capital associated with firms that consistently meet analysts' expectations. Lopez and Rees (2002) also analyze the effects of the persistence of earnings surprise on market reaction. Consistent with Kasznik and McNichols (2002), Lopez and Rees (2002) document a greater reward for firms that consistently beat analysts' forecasts. Moreover, they segregate the unexpected earnings into two components: systematic[12] and unsystematic, and they find that the market anticipates and discounts the systematic component of unexpected positive earnings.

Brown (2003) examines whether the negative market reaction to missing analysts' expectations has the same severity for growth and value firm. He finds that the negative abnormal return is higher for growth firms that slightly miss the analyst estimate than for value firms that slightly miss it. In a related study, Skinner and Sloan (2002) document that growth firms have an asymmetrical market response to negative earnings surprises. They show that the negative price response to negative earnings surprises is significantly larger than the positive price response to positive earnings surprises. Another disproportional negative market reaction

[11] The authors consider as firms that slightly miss the expectation but present high-quality earnings, "firms that just miss consensus forecasts (by one cent) but have large income-decreasing accruals and increases in discretionary expenditures".

[12] Measured as the median forecast error in the previous four quarters.

is documented by Huang et al. (2017). They find that a larger market reaction to earnings surprises is positively associated with greater analyst coverage, mainly if the earnings surprises are negative.

After the accounting scandals and the passage of the Sarbanes-Oxley Act (SOX) in 2002, the market became more skeptical about firms that just met or slightly beat analyst expectations (Koh et al., 2008). The authors find that firms that just meet or slightly beat (by less than one cent per share) analyst forecast do not receive a market premium after the last quarter of 2002, and firms that beat it easily (by more than one cent per share) receive a smaller market premium during the same period. Also documenting a negative change in the abnormal stock return of firms that just meet or narrowly beat analyst forecasts, Keung, Lin, and Shih (2010) find a lower abnormal stock return for firms with an earnings surprise of 0 and 1 cent than for firms with an earnings surprise of -1 cent and 2 cents, for the quarters from 2002 to 2006. They do not find this comparatively lower abnormal stock return pattern for firms that just meet or slightly beat analyst expectations in the quarters before 2002, indicating that the market skepticism on firms with an earnings surprise of 0 and 1 cent is a more recent event.

Concomitantly to the finding of the disappearance of the market premium for firms that just meet or slightly beat analyst forecasts during the interval from the last quarter of 2002 to the second quarter of 2006, Koh et al. (2008) find that the proportion of small beaters (by less than one cent per share) has declined during this period. Keung et al. (2010) also document a small drop in the average of firms reporting zero or small positive earnings surprises for the years 2002 to 2006. However, the authors draw attention to the fact that although this drop, there is still an increase in the average of firms reporting zero or small positive earnings surprises compared to the years from 1992 to 1996. In a more recent study, Griffin and Lont (2021) find that firms continue trying to eliminate small negative earnings surprises and meet analyst expectations. Despite the skepticism about firms meeting or slightly beating the analyst forecasts, an increasing trend of large positive earnings surprises is not observed in the last two decades (Griffin & Lont, 2021). These findings are in line with the executives' perspective. Graham et al. (2005) document that more than 80% of executives that answer their survey believe that “meeting benchmarks helps maintain or increase the firm’s stock price.”

In a different way from previous studies, Abarbanell and Park (2017) try to use a framework that takes into account a rational expectations equilibrium. In their framework, investors and managers act rationally and are able to anticipate the actions of the other. So, investors are able to anticipate bias in earnings surprises, and the prices reflect investors’ expectations of bias. Abarbanell and Park (2017) develop a metric of an ex-ante propensity for

a positive bias in firms' earnings surprises to operationalize empirical tests taking into account the rational expectations. Controlling for the predictable firm-specific propensity for a positive bias in earnings surprises, Abarbanell and Park (2017) find that firms that slightly miss and firms that barely exceed the analyst earnings forecasts do not have disproportional price responses to earnings surprises. Their analyses are for the period from 1993 to 2012.

2.3. Analyst forecasts and taxes

Dhaliwal et al. (2004) discuss that information asymmetry between managers and shareholders is an essential element for earnings management takes place. The complexity and substantial discretion that estimating tax expense involves making it difficult for financial statement users to evaluate the tax accrual, which cooperates with the persistence of information asymmetry (Dhaliwal et al., 2004). Estimating tax expense has its own complexity due to tax rules and their possible interpretations. Firms can still increase this complexity and the information asymmetry by practicing tax planning. Francis, Neuman, and Newton (2019) show that firms that use strategic choices to exploit tax laws increase firm complexity and make earnings and tax expenses more difficult to forecast. Analysts struggle to predict earnings accurately for complex firms (Haw, Jung, & Ruland, 1994; Hodder, Hopkins, & Wood, 2008; Chang, Donohoe, & Sougiannis, 2016). Tax-aggressive firms have lower corporate transparency, higher level of information asymmetry, larger analysts' forecast errors, and greater analysts' forecast dispersion (Balakrishnan, Blouin, & Guay, 2019).

More specifically, previous studies document analysts struggling to incorporate tax-related information into their forecasts (Amir & Sougiannis, 1999; Chen, Danielson, & Schoderbek, 2003; Plumlee, 2003; Shane & Stock, 2006; Weber, 2009; Kim, Schmidt, & Wentland, 2020). Plumlee (2003) uses six tax-law changes included in the Tax Reform Act (TRA) of 1986 to investigate how well analysts' forecasts of ETR incorporate information with different levels of complexity. He finds evidence that analysts capture the effects of less complex tax-law changes but not the effects of more complex tax-law changes in their forecast of ETR. Using the same event of TRA86, Shane and Stock (2006) document that analysts fail to take into account temporary components of reported earnings. Considering a reduction of the statutory corporate tax rate from 46% to 34% enacted by TRA86, firms had incentives and shifted income out of the period prior to tax rate reduction and into the period with a lower tax rate (Guenther, 1994; Maydew, 1997). Analysts were not able to fully anticipate the effects of

its tax incentives to shift income (Shane & Stock, 2006). Weber (2009) shows evidence consistent with analysts failing to use BTD information available at the time of their forecast to anticipate firms' future earnings. More broadly, Kim et al. (2020) document that analysts undervalue tax-based earnings information and react to tax-based earnings information differently from non-tax accounting information.

The studies described above present how hard it is for analysts to incorporate tax-related information into their earnings and ETR forecasts. Nevertheless, some of these studies suggest an analyst's learning effect. The diminished precision in analyst forecasts due to the adoption of a new and complex accounting rule for income taxes is almost completely corrected over time (Amir & Sougiannis, 1999). Errors in analysts' forecasts related to BTD information are less severe as analysts gain experience (Weber, 2009). Kim et al. (2020) call attention to the relevance of the information environment in the incorporation of tax-related information into analysts' forecasts. They find that in firms with a strong information environment, analysts fully incorporate tax-related earnings information into their forecasts. Contrary to prior studies that conclude that analysts struggle to incorporate tax-based information into their earnings forecasts, Bratten, Gleason, Larocque, and Mills (2017) show that analysts pay attention to taxes and are more accurate than management when complexities increase.

Considering that estimating tax expense involves complexity and discretion and that even sophisticated users like analysts struggle to fully anticipate it, firms can make use of tax accounts to manage earnings. Dhaliwal et al. (2004) examine whether firms opportunistically use tax expense to reach analysts' consensus forecasts. Their findings indicate that firms use tax expenses to manage earnings to achieve the target. Firms that would not have achieved the consensus forecast without tax expense management decrease their annual ETR from the third to the fourth quarter (Dhaliwal et al., 2004). Tax expense account offers a final opportunity for managers to manage earnings to achieve a target (Dhaliwal et al., 2004).

Gleason and Mills (2008) present three ways managers can opportunistically use their judgment on tax expense to discretionary report it. First, firms can use valuation allowance. Statement of Financial Accounting Standards n° 109: Accounting for Income Taxes (SFAS 109) requires that deferred tax assets be reduced by a valuation allowance if, based on the weight of available evidence, some amount or all of the deferred tax assets is not expected (likelihood of more than 50 percent) to be realized. Thus, managers should examine the available evidence to determine the likelihood that some amount of deferred tax assets will not be realized. "Judgement must be used in considering the relative impact of negative and positive evidence" (FASB, 1992). The manager's assessment of the future realization of deferred tax

assets is subjective. They can strategically overestimate the valuation allowance and write-off it when it is convenient to increase income (Schrand & Wong, 2003). For many firms, the valuation allowance provision is substantially large, permitting managers to make material changes in accounting earnings (Miller & Skinner, 1998).

Taking into account the manager's discretion, Frank and Rego (2006) and Schrand and Wong (2003) investigate if firms manage earnings through the deferred tax asset valuation allowance account. Schrand and Wong (2003) limit their sample to banks to strengthen their model of nondiscretionary adjustments and also because of the bank's volume of deferred tax assets and its potential for a high valuation allowance. In the sample banks that they analyze, the mean valuation allowance of banks that reported nonzero valuation allowances is $0.37 per share, relative to total reported earnings per share of $1.99 on average. Both studies find evidence that managers use valuation allowance accounts to smooth earnings toward the mean consensus analyst forecast. Though, Frank and Rego (2006) find no evidence that managers use valuation allowance accounts to smooth earnings around zero or earnings reported in the prior year. This result can be a piece of evidence consistent with Brown and Caylor's (2005) findings that, in more recent years, managers prioritize meeting earnings analysts' estimates more than avoiding losses or earnings decreases.

Contrary to research that finds that firms manage earnings through the deferred tax asset valuation allowance account, Miller and Skinner (1998) report that there is no strong evidence of managers using valuation allowance for earnings management purposes. However, they indicate that their tests may not be very powerful to test if managers exploit their discretion over the valuation allowance for earnings management purposes. Their main point is to test whether managers comply with the provisions of SFAS 109, so they sample 200 large firms based on their potentially large deferred tax assets. The managers of selected firms probably do not have similar incentives to manage earnings. Also, Miller and Skinner (1998) analyze only two years of SFAS 109 post-implementation. This period may not be enough for managers to use the valuation allowance as a reserve to smooth earnings. Considering the different motivations for firms to manage earnings, Bauman, Bauman, and Halsey (2001) identify evidence of prevailing firms' motive to engage in several forms of earnings management (to avoid losses, to avoid a decrease in year-to-year income, to invoke earnings "big bath," and to meet analysts' forecast) and investigate the effects of valuation allowance changes on earnings. They find that, on average, firms seem to comply with the provisions of SFAS 109; however, they document that individual firms seem to exploit valuation allowance changes for earnings management purposes.

Second, firms can use discretion in accruing and reversing the reserve for tax loss contingencies[13]. Statement of Financial Accounting Standards n° 5: Accounting for Contingencies (SFAS 5) requires that a loss contingency be recognized when it is probable (the future event or events are likely to occur) that an asset be impaired, or a liability be incurred, and it is possible to make a reasonable estimate of the loss amount. The manager has the discretion to judge the probability of a future event occurring and the amount of the loss. Also, managers have to exercise judgment about the materiality of expected loss (Gleason & Mills, 2002). Beyond the manager's discretion in accruing and reversing tax reserve, before June 2006, there was no specific guidance on how to address uncertainty in accounting for income tax assets and liabilities (FASB, 2006). That resulted in divergent accounting practices. In an attempt to achieve consistency in recognition, de-recognition, measurement, and disclosure of benefits related to income taxes, FASB issued a FASB Interpretation n° 48 (FIN 48), Accounting for Uncertainty in Income Taxes – An Interpretation of FASB Statement N°. 109, effective for fiscal years beginning after December 15, 2006 (FASB, 2006). "FIN 48 represents a fundamental change in the accounting for tax reserves in an attempt to provide greater transparency and consistency" (Gupta, Laux, & Lynch, 2016). The disclosure required by FIN 48 reveals that many firms have large tax reserves (Cazier, Rego, Tian, & Wilson, 2015). Thus, earnings management through income tax reserves could significantly impact firms' earnings per share.

Gupta et al. (2016) find that firms use their tax reserve to meet analysts' quarterly earnings forecasts. They documented a reduction in firms' tax reserves and a consequent income increase when earnings were below analysts' expectations before the manipulation of tax reserves. That result is just identified in the period prior to FIN 48. For the period after the implementation of FIN 48, the authors do not find evidence of manipulation of tax reserve to meet analysts' expectations. They find evidence that FIN 48 limited earnings management through tax reserve in the first years of its implementation. Gupta et al.'s (2016) finding are consistent with the findings of Cazier et al. (2015), which demonstrate that firms manage earnings through income tax reserves to meet/beat analysts' forecasts. The above research findings, however, differ from each other for the period after FIN 48. Cazier et al. (2015) do not find evidence that FIN 48 reduced earnings management through tax reserves to meet/beat analysts' forecasts. Comparatively, the findings of Cazier et al. (2015) for the post-FIN 48 periods are more long-term based since they evaluate the period from 2007 to 2011,

[13] Previous studies referred to reserve for tax loss contingencies as contingent liability for income taxes, reserve for income taxes, tax reserves or tax cushion.

while Gupta et al. (2016) analyze just two years (2007 and 2008) after the implementation of FIN 48.

Third, firms can change the amount of permanently reinvested earnings. The foreign profits that the firm does not expect to repatriate in the foreseeable future are termed permanently reinvested earnings (PRE) (Graham, Raedy, & Shackelford, 2012). The APB Opinion n° 23 (Accounting Principles Board, 1972) allows the parent company to designate foreign earnings as permanently reinvested, and no income taxes should be accrued by the U.S. parent company for the PRE. The APB Opinion n°23 just requires sufficient evidence that "the subsidiary has invested or will invest the undistributed earnings indefinitely or that the earnings will be remitted in a tax-free liquidation" (Accounting Principles Board, 1972). Krull (2004) provides evidence that firms increase the amount of PRE in low-tax countries to increase earnings and, thus, to meet or beat analysts' earnings forecasts.

3. HYPOTHESES DEVELOPMENT

Engaging in tax avoidance activities reduces a firm's tax liability, consequently increases its cash flow, and, in some cases, increases a firm's after-tax net income (Rego & Wilson, 2012). The benefits of tax avoidance are straightforward. However, it is known that the level of corporate tax avoidance significantly varies across firms. While some firms fully take advantage of tax planning opportunities, others do not; this is known as the "under-sheltering puzzle." The decision to avoid taxes or not may be explained by non-tax costs faced by firms and managers. The probability of detection and punishment, the penalty structure, and the risk aversion of the potential evader are determinants in the decision to engage in tax noncompliance (Slemrod, 2004). Also, the reputational and political costs of being labeled as tax aggressive are taken into account in the decision to be tax aggressive, at least by some firms (Hanlon & Slemrod, 2009). Additionally, the strategy of tax avoidance the firm uses can impose different and specific non-tax costs. Other non-tax costs arise from engaging in tax avoidance strategies that increase book-tax differences (non-conforming tax avoidance) and from engaging in tax avoidance strategies that reduce book income (conforming tax avoidance).

On the one hand, the choice of engaging in conforming tax avoidance strategies results in lower reported book income. Lower reported income can lead to debt covenant violations, reduce manager compensation, and lead to negative capital market consequences (Cloyd et al., 1996). Also, it may affect the maintenance of a pattern of positive and increasing earnings (Mills & Newberry, 2001). Additionally, engaging in conforming tax avoidance through income shifting may reduce operating efficiency, deteriorate customer relations, and add inventory holding costs, depending on the revenue that would have recognition postponed and the expense that would have recognition accelerated (Scholes et al., 1992). On the other hand, the choice of engaging in non-conforming tax avoidance strategies results in higher book-tax differences. Higher book-tax differences are positively associated with IRS audit adjustments (Mills, 1998) and with the incidence of tax sheltering (Wilson, 2009). Additionally, they are negatively associated with earnings persistence (Hanlon, 2005). In sum, higher book-tax differences are interpreted as potential red flags for IRS and investors.

While the engagement in non-conforming tax avoidance activities increases book-tax differences and provides a red flag to IRS, conforming the financial accounting choice to an aggressive tax position (i.e., engaging in conforming tax avoidance activity) may reduce the probability of being challenged by the IRS and increase the probability of favorability defending this aggressive position in case of being challenged (Cloyd et al., 1996). Considering

the costs of non-conforming tax avoidance and the benefits of conforming tax avoidance related to the probability of being challenged by the IRS and successfully defending the tax aggressive positions, it is expected that the firm will engage in more conforming tax avoidance the lower the firm's non-tax costs of engaging in conforming tax avoidance is. Otherwise, the firm will engage more in non-conforming tax avoidance; previous studies present evidence of these expectations. Badertscher et al. (2019) find that an increase in capital market pressure is associated with an increase in non-conforming tax avoidance and a decrease in conforming tax avoidance. Badertscher et al. (2019) findings are parallel to the results of prior studies, which document that private firms conform more financial accounting methods to tax choices than public firms (Cloyd et al., 1996; Mills & Newberry, 2001). Given that the main non-tax costs of engaging in conforming tax avoidance are related to the reporting of smaller book income, the decision to engage in conforming or non-conforming tax avoidance depends on the weight placed on book income, assuming other factors are held constant.

Firms that miss or beat the analysts' earnings forecasts by a few or many cents are expected to place different weigh on book income. Therefore, depending on how distant the firm's reported earnings are from the forecasted earnings, the firm could face different non-tax costs and engage in more conforming or non-conforming tax avoidance. Brown and Caylor (2005) document a tendency that after 1996, managers start to focus mainly on the analysts' forecast threshold. The identification of a large number of firms with zero and small positive earnings surprises and a small number of firms with small negative earnings surprises is used as evidence that managers try to meet or beat the analysts' forecast (Degeorge et al., 1999; Brown, 2001; Burgstahler & Eames, 2006). The firm's behavior toward the analysts' forecast threshold is explained by the benefits of meeting the target and the costs of missing it. While the market rewards firms that meet or beat analysts' forecasts, they penalize firms that miss them (Bartov et al., 2002; Kasznik & McNichols, 2002; Lopez & Rees, 2002; Brown, 2003; Brown & Caylor, 2005; Beyer, 2008). Firms that meet or beat analysts' forecasts have a fixed premium of quarterly returns that is 2.3% above the quarterly returns for firms that miss it, regardless of the magnitude of the positive earnings surprise (Bartov et al., 2002). Lopez and Rees (2002) document a reward of around 0.5% for firms that meet or beat analysts' forecasts and a penalty of around 3.5% for firms that miss it, analyzing a long window near the earnings announcement.

The negative capital market reaction to a lower book income is one of the main non-tax costs public firms face for engaging in conforming tax avoidance. Given that the market reaction is so affected by meeting the analysts' forecast benchmark, the negative capital market

response to a lower book income, driven by engagement in conforming tax avoidance, may be attenuated when the firm easily meets the analysts' forecasts or has already missed it. Firms that would easily meet the analysts' earnings per share forecasts without any tax management are able to engage in conforming tax avoidance activities and still be above that important benchmark for the market. These firms would still be rewarded for beating the analysts' expectations, even after decreasing their reported earnings. Thus, these firms would face lower non-tax costs for engaging in conforming tax avoidance. It is important to note that firms that would easily meet the analysts' forecasts and engage in conforming tax avoidance have the reduction of non-tax costs remaining up to the reported earnings meet the forecasted earnings.

Firms that would not meet the analysts' earnings forecasts, even after using all their discretion, will face a market penalization for missing the threshold (Lopez & Rees, 2002; Beyer, 2008). The market would already penalize these firms because they would not meet analysts' expectations. Thus, presenting a lower book income to the market due to the engagement in conforming tax avoidance would result in lower additional non-tax costs. Although Bartov et al. (2002) find that the cumulative abnormal return (CAR) is lower for firms with a higher negative earnings surprise, they also document that the relation between CAR and the forecast error is not linear. For example, the range of weighted CAR between firms with forecast error from 0% to -5% and firms with forecast error from -5% to -10% is -0.021, while the range of weighted CAR between firms with forecast error from -25% to -30% and firms with forecast error from -30% to -35% is -0.005 (Bartov et al., 2002). Therefore, the additional non-tax costs may be even lower if the book income is negatively further from the analysts' forecasts. It is important to note that firms that would miss the analysts' forecasts have a higher margin to lower their book income facing lower non-tax costs than firms that would easily meet the analysts' forecasts. Therefore, I expect that firms that would have reported earnings further from the analysts' forecasts, positively or negatively, have lower non-tax costs, and then engage more in conforming tax avoidance. My hypothesis is stated formally in alternative form:

H1: Firms engage in more conforming tax avoidance activities as the reported earnings per share are further from the analysts' consensus earnings forecast.

My expectation is based on the book income before any tax management. However, I do not know what the book income would be if the firms had not engaged in tax avoidance activities. Thus, to draw and test my hypotheses, I use the reported earnings already managed for tax purposes. The usage of the reported earnings can underestimate my results. In cases

where firms that would easily meet the analysts' forecasts decide to engage in a lot of conforming tax avoidance, their reported earnings could be very close to analysts' forecasts. Therefore, the effect of higher earnings surprise on conforming tax avoidance can be underestimated.

Although I expect a positive relation between conforming tax avoidance and earnings surprise, an increase in earnings surprise might have no impact on conforming tax avoidance. Some reasons could work against finding evidence for my hypothesis. First, firms that would easily meet the analysts' forecasts may not engage in conforming tax avoidance activities to not presenting to the market a net income that just meets or beats the analysts' expectations just by a few cents. From 2002, firms with earnings surprises of zero and one cent presented lower abnormal returns than firms with two cents of earnings surprises (Keung et al., 2010), showing some market skepticism on firms that just meet or beat the analysts' forecasts by one cent. Additionally, firms that beat the analysts' forecasts have higher abnormal returns than firms that just meet it (Bartov et al., 2002). Second, firms that would miss the analysts' forecasts may not engage in conforming tax avoidance activities so as not to present an even lower net income to the market. Firms with smaller negative earnings surprises have greater CAR than firms with higher negative earnings surprises (Bartov et al., 2002). Finally, the analysts may be able to anticipate the firm's probability of decreasing its net income and adjust their predictions to lower earnings. Prior studies show that analysts pay attention to taxes (e.g., Bratten et al., 2017), and the errors in analysts' forecasts due to income taxes complexities are corrected over time (e.g., Amir & Sougiannis, 1999; Weber, 2009).

Firms that would slightly miss or meet the analysts' earnings forecasts would have higher non-tax costs of engaging in conforming tax avoidance and consequently presenting a smaller book income. Firms could miss the analysts' earnings forecasts if they would slightly meet the analysts' forecasts and decide to engage in conforming tax avoidance. As mentioned above, the market penalizes firms that miss the analysts' forecast benchmark (Lopez & Rees, 2002; Beyer, 2008). Also, firms will report earnings that are negatively further from the forecasted earnings if they would slightly miss and decide to engage in conforming tax avoidance. Firms with lower negative earnings surprises have higher abnormal returns than firms with higher negative earnings surprises (Bartov et al., 2002). On the other hand, firms that engage in non-conforming tax avoidance strategies present smaller income tax expenses and, consequently, a higher net income. Therefore, engagement in non-conforming tax avoidance could increase the probability that firms report earnings around the analysts'

forecasted earnings. Given that non-conforming tax avoidance activities increase book-tax differences and provide a red flag to IRS (Mills, 1998; Wilson, 2009), the benefits of engaging in non-conforming tax avoidance should outweigh its costs. Firms that would slightly miss or meet the target and engage in non-conforming tax avoidance are more likely to have non-tax benefits outweighing non-tax costs. Therefore, I expect that firms that would have reported earnings closer to the analysts' forecasts, positively or negatively, have more non-tax benefits (offsetting non-tax costs) and then engage more in non-conforming tax avoidance. My hypothesis is stated formally in alternative form:

H2: Firms engage in more non-conforming tax avoidance activities as the reported earnings per share are closer to the analysts' consensus earnings forecast.

My results can be underestimated because my hypotheses are drawn and tested using the reported earnings already managed for tax purposes. If firms that would slightly meet the analysts' forecasts decide to engage in a lot of non-conforming tax avoidance, their reported earnings could be very far from analysts' forecasts. Therefore, the effect of lower earnings surprise on non-conforming tax avoidance can be underestimated.

Although I expect a negative relation between non-conforming tax avoidance and earnings surprise, a decrease in earnings surprise might have no impact on non-conforming tax avoidance. Some reasons could work against finding evidence for my hypothesis. First, firms that would easily meet analysts' earnings forecasts could engage in more non-conforming tax avoidance to report even higher book earnings to the market. Keung et al. (2010) demonstrate some market skepticism on firms that just meet or beat the analysts' forecasts by one cent. So, firms could engage in non-conforming tax avoidance to present book earnings that are positively further from analysts' forecasted earnings and avoid market skepticism. Second, firms that would slightly miss the analysts' forecasts could decide not to engage in non-conforming tax avoidance, considering that they have already missed the target and will be penalized by the market and also considering the non-tax costs of engaging in non-conforming tax avoidance. Finally, the analysts may be able to anticipate the firm's inclination to increase its net income through the reduction of tax expenses and adjust their predictions to higher earnings. Prior studies show that analysts pay attention to taxes (e.g., Bratten et al., 2017), and the errors in analysts' forecasts due to income taxes complexities are corrected over time (e.g., Amir & Sougiannis, 1999; Weber, 2009).

Considering the asymmetric incentives and the non-tax costs for firms with positive and negative earnings surprises, firms with positive and negative earnings surprises may have different reasons that could work against finding evidence for my hypotheses. Thus, I assess the effects of analysts' earnings forecasts on firms' tax avoidance strategies separately for firms with positive and negative earnings surprises. Consequently, I can identify whether the signal of earnings surprise plays a role in the results. Given that my hypotheses are tested using the reported earnings already managed for tax purposes, when they are tested separately, I may identify lower engagement in non-conforming tax avoidance by firms that slightly miss the analysts' earnings forecasts. Many firms that would slightly miss the analysts' targets may have engaged in non-conforming in tax avoidance and slightly met the analysts' targets. So, I also may identify higher engagement in non-conforming tax avoidance by firms that slightly meet the analysts' earnings forecasts.

Additionally, to achieve the purpose of assessing the firms' tax avoidance strategy when the reported earnings assume different distances from analyst forecasted earnings, I create four intervals for earnings surprise: (i) easily miss the analyst consensus forecast (EMS); (ii) slightly miss it (SMS); (iii) slightly meet it (SMT); and (iv) easily meet it (EMT). Suppose my expectations about the incentives and non-tax costs of the engagement in conforming and non-conforming tax avoidance are correct. In that case, I expect to find that firms that would slightly meet the analysts' earnings forecasts (SMT) would be the group of firms that engage less in conforming tax avoidance and more in non-conforming tax avoidance. Given that my hypotheses are tested using the reported earnings already managed for tax purposes, the conforming tax avoidance may be underestimated, and the non-conforming tax avoidance may be overestimated for firms that slightly meet the analysts' earnings forecasts. Firms that would easily meet the analysts' earnings forecasts and decide to engage in a lot of conforming tax avoidance could report earnings very close to analysts' forecasts (falling into the group of firms that slightly meet the forecast). Therefore, this could work against my expectation. Firms that would slightly meet the analysts' earnings forecasts and decide to engage in too much non-conforming tax avoidance could report earnings very far from analysts' forecasts (falling into the group of firms that easily meet the forecast). Therefore, this could work against my expectation.

4. DATA AND RESEARCH DESIGN

4.1. Measures of corporate tax avoidance

4.1.1. Conforming tax avoidance

Badertscher et al. (2019) developed a proxy to capture conforming tax avoidance. This proxy is based on the ratio of cash taxes paid to lagged total assets. Cash tax paid is used as the numerator, so any strategy to reduce income tax payments reduces the numerator of the ratio. Lagged total asset is used as the denominator, so the measure is not sensitive to transactions of the current period. The ratio is interpreted in the way that firms with similar asset sizes pay similar amounts of income taxes, all else being equal (Badertscher et al., 2019). However, it is known that firms with similar asset sizes do not always pay similar amounts of income tax since other variables could affect the ratio of cash taxes paid to lagged total assets–for example, industry membership, operational structure, and other non-tax operating decisions (Badertscher et al., 2019). These variables are controlled in the next steps of proxy measuring.

The ratio of cash taxes paid to lagged total assets reflects both conforming and non-conforming tax avoidance strategies. The ratio of cash taxes paid to lagged total assets would be reduced if the firm had a tax benefit from an expense that reduces both taxable and book income (conforming tax avoidance) or a tax benefit from an expense that reduces only taxable income but not book income (non-conforming tax avoidance)[14]. Thus, Badertscher et al. (2019) propose a way to eliminate non-conforming tax avoidance from the ratio of cash taxes paid to lagged total assets. They regress the ratio of cash taxes paid to lagged total assets on some variables that reflect non-conforming tax planning or that are not indicative of conforming tax avoidance and extract the residual from that equation as the measure of conforming tax avoidance. Precisely, they regress the ratio of cash taxes paid to lagged total assets on book-tax differences (BTD), an indicator variable for observations with negative book-tax differences (NEG), the interaction of BTD and NEG, the level of net operating loss carryforwards (NOL), and changes in NOL (ΔNOL).

[14] Badertscher et al. (2019) provide the following example: "Given a corporate tax rate of 35 percent, the tax benefit from selling an asset that generates a $100 loss and reduces both book and taxable incomes is equal to the tax benefit from claiming $100 of bonus depreciation that reduces taxable income, but not book income. Both tax benefits reduce the ratio of cash taxes paid to lagged total assets; however, while the former would be considered conforming tax avoidance, the latter would be considered non-conforming tax avoidance."

The authors include the interaction of BTD and NEG in the equation because positive and negative book-tax differences could have different effects on the ratio of cash taxes paid to lagged total assets. Positive book-tax differences (book income higher than taxable income) are probably an indication of non-conforming tax avoidance activities. On the other hand, negative book-tax differences (taxable income higher than book income) may be indicative of other factors (Badertscher et al., 2019)–for example, firms changing valuation allowance provision (Badertscher et al., 2019) or firms taking a "big bath" or using "cookie-jar" reserves (Hanlon & Heitzman, 2010). When the firms recognize a valuation allowance, there is an increase in income tax expense (through a reduction in the deferred tax expense) and a consequent decrease in net income. So, an increase in valuation allowance causes a decrease in book income and does not affect taxable income, generating negative book-tax differences. Also, when the firms take a "big bath" or use "cookie-jar" reserves, they decrease the book income with write-offs and expense accruals but often cannot use it to reduce the taxable income, generating negative book-tax differences (Hanlon & Heitzman, 2010).

Additionally, Badertscher et al. (2019) include the level of net operating loss carryforwards (NOL) and changes in NOL in the equation because the utilization of net operating loss carryforwards reduces the ratio of cash taxes paid to lagged total assets but does not reflect conforming tax avoidance. The equation is estimated by industry and fiscal year combinations to control for inter-temporal and cross-industry differences. The industry is defined based on the three-digit North America Industry Classification System (NAICS) code. Ultimately, the residual from the equation is extracted as the measure of conforming tax avoidance. Thus, they are using the average firm in the same industry and fiscal year as a benchmark for estimating the relative amount of conforming tax avoidance of individual firms. Their proxy reflects conforming tax avoidance strategies that reduce the ratio of cash taxes paid to lagged total assets below the average of the ratio of cash taxes paid to lagged total assets for a particular industry and fiscal year combination. Additionally, Badertscher et al. (2019) draw attention to the limitation of their conforming tax avoidance measure because the residual from the cited equation also captures measurement error to the extent that BTD does not appropriately reflect non-conforming tax avoidance and to the extent that non-tax factors affect the ratio of cash taxes paid to lagged total assets.

I follow Badertscher et al. (2019) and use the residual from the following equation as the measure of conforming tax avoidance, CONFORM_TAX.

$$TPAID\_TO\_AT_{it} = \beta_0 + \beta_1 BTD_{it} + \beta_2 NEG_{it} + \beta_3 BTD_{it}\, x\, NEG_{it} + \beta_4 NOL_{it} + \beta_5 \Delta NOL_{it} + \varepsilon_{it} \quad (1)$$

Where:

i and ***t*** = firm and year indicator, respectively;

TPAID_TO_AT = the ratio of taxes paid to lagged total assets;

BTD = book-tax differences;

NEG = an indicator variable equaling 1 for observations with negative book-tax differences and 0 otherwise;

BTD x NEG = the interaction of BTD and NEG;

NOL = an indicator variable equaling 1 if the firm has non-missing or non-zero net operating loss carryforward in year *t*-1, and 0 otherwise; and

ΔNOL = the change in net operating loss carryforward from period *t*-2 to period *t*-1, scaled by lagged total assets.

Following Badertscher et al. (2019), to estimate taxes paid to lagged total assets, TPAID_TO_AT, I require all firms to have non-negative cash taxes paid (TXPD[15]). BTD is the difference between book income and taxable income scaled by lagged total assets. Book income is pretax income (PI) in year *t*. Taxable income is calculated by adding current federal tax expense (TXFED) and current foreign tax expense (TXFO), dividing by the statutory tax rate, and subtracting the change in net operating loss carryforwards (TLCF) in year t. If the current federal tax expense is missing, then the total current tax expense (TXFED plus TXFO) is calculated by subtracting deferred taxes (TXDI), state income taxes (TXS), and other income taxes (TXO) from total income taxes (TXT) in year t.

Considering that Badertscher et al. (2019) do not present all their requirements to calculate some variables, I follow other studies using similar variables. Following Frank, Lynch, and Rego (2009), if current foreign tax expense (TXFO) and state income taxes (TXS) are missing on Compustat, I set them to zero. I apply the same procedure if other income taxes (TXO) are missing. Following Allen, Francis, Wu, and Zhao (2016), to measure book-tax differences (BTD), I require firm-year observation with positive current federal tax expense (TXFED), for which inferred taxable income is positive. Tax avoidance by firms with zero or negative taxable income is expected to differ from that of firms with positive taxable income.

[15] Compustat code

Firms with non-positive taxable income are assumed to have attenuated incentives, at the margin, to engage in tax avoidance activity (Desai & Dharmapala, 2006). Following Wilde (2017), if net operating loss carryforward (TLCF) is missing on Compustat, then I set it to zero.

I estimate the above equation using ordinary least squares regression by industry (three-digit NAICS) and fiscal year combination. Following Badertscher et al. (2019), I require at least 15 observations available for each industry and fiscal year combination. I multiply CONFORM_TAX by -1 and use the transformed variable, CTA, as the conforming tax avoidance measure. Thus, an increase in CTA indicates an increase in conforming tax avoidance.

4.1.2. Non-conforming tax avoidance

Considering that one of the main purposes of my study is to assess the firms' tax avoidance strategies when the firms' reported earnings are closer to or further from the forecasted earnings, I use proxies that capture both aggressive and more conservative types of tax avoidance activities: adjusted generally accepted accounting principles (GAAP) effective tax rate and adjusted cash effective tax rate. Effective tax rates (ETRs) measures capture risky and non-risky strategies of tax avoidance (Badertscher, Katz, & Rego, 2013) and are commonly used by both investors and executives as measures of firms' overall level of tax avoidance (McGuire, Wang, & Wilson, 2014).

GAAP effective tax rate, GAAP_ETR, captures tax avoidance resulting from permanent book-tax differences (Khan, Srinivasan, & Tan, 2017). Investments in tax-exempt assets, such as municipal bonds and foreign earnings permanently reinvested in a lower tax jurisdiction, are mentioned by Khan et al. (2017) as examples of tax avoidance activities reflected in the GAAP_ETR measure. Additionally, Badertscher et al. (2019) cite tax credits and structured transactions subject to different financial and tax treatment as examples of tax avoidance activities reflected in the GAAP_ETR measure. On the other hand, GAAP_ETR does not capture tax avoidance resulting from temporary book-tax differences by deferring cash taxes paid to later periods (Hanlon & Heitzman, 2010). Some tax avoidance activities are performed by accelerating deductions and deferring income for tax purposes without affecting book earnings (Dyreng et al., 2008). These practices reduce current taxes and increase deferred taxes without changing total tax expense. Given that total tax expense (current tax expense plus deferred tax expense) is the numerator of GAAP_ETR, GAAP_ETR does not reflect these tax avoidance practices. Moreover, GAAP_ETR has the limitation of reflecting strategies that do

not have tax planning purposes. GAAP_ETR is confounded by changes in tax contingency reserves and the valuation allowance (Badertscher et al., 2013).

The cash effective tax rate, Cash_ETR, captures some firms' engagement in tax avoidance activities not reflected in GAAP_ETR. Cash_ETR captures any tax avoidance practices that reduce actual cash taxes paid. Unlike the GAAP_ETR, Cash_ETR captures both temporary and permanent book-tax differences resulting from activities that defer cash tax paid. Furthermore, Cash_ETR is not affected by changes in estimates such as the valuation allowance or tax contingency reserves (Dyreng et al., 2008). On the other hand, Cash_ETR also has its own limitations. Cash_ETR is confounded by the timing of tax payments, settlements with tax authorities, and some types of earnings management (Badertscher et al., 2013).

Similar to the conforming tax avoidance proxy, I use non-conforming tax avoidance proxies that take cross-industry differences into account. I follow Balakrishnan et al. (2019) and use industry- and size-adjusted ETR measures. They are calculated as the difference between the average effective tax rate of the firm's size and industry peers over the year and the firm's effective tax rate over the same year. Thus, industry- and size-adjusted ETR measures capture tax avoidance of firms that is compared to tax avoidance of firms of similar size and in the same industry.

First, I compute the firm's effective tax rates as follows:

$$\boldsymbol{GAAP\_ETR_{i,t}} = \frac{\boldsymbol{TTE_{i,t}}}{\boldsymbol{PTEBX_{i,t}}}$$

$$\boldsymbol{Cash\_ETR_{i,t}} = \frac{\boldsymbol{CTP_{i,t}}}{\boldsymbol{PTEBX_{i,t}}}$$

Where:

i and ***t*** = firm and year indicator, respectively;

GAAP_ETR = generally accepted accounting principles effective tax rate;

Cash_ETR = cash effective tax rate;

TTE = total tax expense;

PTEBX = pre-tax earnings before exceptional items; and

CTP = cash taxes paid.

GAAP_ETR is the tax expense as a percent of pretax income. Cash_ETR is the cash taxes paid as a percent of pretax income. To estimate GAAP_ETR and Cash_ETR, I require positive PTEBX. PTEBX is pre-tax book income (PI) less special items (SPI) in year *t*. TTE is the total tax expense (TXT), and CTP is the cash taxes paid (TXPD). To estimate Cash_ETR, I required all firms to have non-negative cash taxes paid, CTP. The requirement to exclude firms with negative PTEBX and CTP follows previous studies (e.g., Dyreng et al., 2010; Guenther, Wilson, & Wu, 2019) because they are expected to be in a different tax position compared to profitable firms. To ensure a reasonable economic interpretation of tax rates (Guenther, Matsunaga, & Williams, 2017), I follow previous papers (e.g., Badertscher et al., 2013; Gallemore & Labro, 2015; Wilde, 2017), and I winsorize GAAP_ETR and Cash_ETR at zero and one [0,1]. After winsorization, values of 0 occur in less than one percent of firm-year observations.

Second, I compute the average effective tax rates of the firm's size and industry peers as follows:

$$\boldsymbol{industry\_size\ matched\ GAAP\_ETR_{i,t}} = \frac{\sum_{i=1}^{n} \boldsymbol{GAAP\_ETR_{i,t}}}{\boldsymbol{n}}$$

$$\boldsymbol{industry\_size\ matched\ Cash\_ETR_{i,t}} = \frac{\sum_{i=1}^{n} \boldsymbol{Cash\_ETR_{i,t}}}{\boldsymbol{n}}$$

Where:

i and ***t*** = firm and year indicator, respectively;

industry-size matched GAAP_ETR = generally accepted accounting principles effective tax rate computed within size and industry groupings; and

industry-size matched Cash_ETR = cash effective tax rate computed within size and industry groupings.

All other variables are as defined previously (in the first step).

Industry-size matched GAAP_ETR is the mean GAAP_ETR for firms of similar size and in the same industry. Industry-size matched Cash_ETR is the mean Cash_ETR for firms of similar size and in the same industry. Firms with similar sizes are firms within the same quintile of total assets. Firms in the same industry are firms within the same three-digit NAICS portfolios. I use three-digit NAICS instead of Fama-French 48 industry portfolios (used by

Balakrishnan et al., 2019) to be more aligned with the CTA measure, given that I also use three-digit NAICS to compute conforming tax avoidance proxy.

Lastly, I measure non-conforming tax avoidance as follows:

$$\boldsymbol{NCTA\_ETR_{i,t} = industry\_size\ matched\ GAAP\_ETR_{i,t} - GAAP\_ETR_{i,t}}$$

$$\boldsymbol{NCTA\_CETR_{i,t} = industry\_size\ matched\ Cash\_ETR_{i,t} - Cash\_ETR_{i,t}}$$

Where:

i and ***t*** = firm and year indicator, respectively;

NCTA_ETR = non-conforming tax avoidance captured by generally accepted accounting principles effective tax rate; and

NCTA_CETR = non-conforming tax avoidance captured by cash effective tax rate.

All other variables are as defined previously (in the first and second steps).

NCTA_ETR is the industry-size matched GAAP_ETR less the firm's GAAP_ETR. NCTA_CETR is the industry-size matched Cash_ETR less the firm's Cash_ETR. A positive NCTA_ETR indicates that the firm has lower tax expenses than the average firm's size and industry peers. A positive NCTA_CETR indicates that the firm pays less tax than the average firm's size and industry peers. Thus, an increase in NCTA_ETR or NCTA_CETR indicates an increase in non-conforming tax avoidance.

Unlike Armstrong, Blouin, Jagolinzer, and Larcker (2015) and Balakrishnan et al. (2019), I estimate the industry-size adjusted ETRs over a year. I use annual rates because I need to capture, in a specific year, the firm's engagement (or not) in conforming and/or non-conforming tax avoidance when the annual reported earnings assume different distances from analysts' forecasted earnings. If I estimate effective tax rates over more than one year, I will need to add the pretax earnings of these years. Thus, I would use an effective tax rate that takes into account actions of more than one year and annual earnings forecast for a single year. Consequently, I would not capture the firm's effort (engaging in conforming and/or non-conforming tax avoidance) applied exclusively in a specific year to report earnings closer to or further from the forecasted earnings for that year. Using annual rates, I intend to capture the year of the engagement and reversion of tax actions that create temporary differences. Also, I intend to capture the year of the engagement in tax actions that create permanent differences so

that I can assess the effects of analysts' earnings forecasts on the engagement in different tax avoidance strategies.

Because of this choice of using annual rates, my non-conforming tax avoidance proxies are more affected by accrual management activities than if I use effective tax rates estimated over three years. The long-run effective tax rates are less affected by accrual management activities because the accruals should reverse over the long run (Dyreng et al., 2008). Also, firms that manage earnings upward but still present constant taxes over the long run are avoiding taxes on the inflated book income (Hanlon & Heitzman, 2010). To assess the extent to which my results are sensitive to the choices of using annual rates, I run additional tests using NCTA_ETR and NCTA_CETR estimated over three years[16].

To assess the extent to which my results are sensitive to the choices of using industry- and size-adjusted ETR measures, I also run additional tests using raw GAAP_ETR and Cash_ETR. I multiply both GAAP_ETR and Cash_ETR by -1. Thus, an increase in GAAP_ETR or Cash_ETR indicates an increase in non-conforming tax avoidance[17].

4.2. Earnings surprise

Earnings surprise is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus forecast of EPS issued in the month prior to the month of the fiscal year-end. Scaled earnings surprise is the earnings surprise scaled by the stock price at the beginning of the fiscal year. Absolute scaled earnings surprise is the absolute value of scaled earnings surprise.

$$\boldsymbol{ES_{i,t} = AEPS_{i,t} - AF_{i,t}}$$

$$\boldsymbol{ES\_Scaled_{i,t} = \frac{ES_{i,t}}{PR_{i,t-1}}}$$

$$\boldsymbol{ES\_Abs\_Scaled_{i,t} = Abs\,(ES\_Scaled_{i,t})}$$

[16] In general, the results are not affected by this choice. The results of these sensitive tests draw attention to the loss of significance of coefficient on ES_Scaled (positive) (Table 20) and coefficient on EMT group (Table 21) when NCTA_CETR3 is the dependent variable. More details in section 6.4.

[17] The results are not affected by the decision of using raw or industry- and size-adjusted ETR measures as the dependent variables.

Where:

i and ***t*** = firm and year indicator, respectively;

ES = earnings surprise;

AEPS = actual earnings per share;

AF = analyst forecast;

ES_Scaled = scaled earnings surprise;

PR = stock price at the beginning of the fiscal year; and

ES_Abs_Scaled = absolute scaled earnings surprise.

AEPS is the actual earnings per share (I/B/E/S ACTUAL) of the fiscal year. AF is the mean (I/B/E/S[18] MEANEST) of analysts' consensus EPS forecast estimated in the second month of the firm's last fiscal quarter. I follow Bhojraj et al. (2009) in the choice of analyst forecast date. Bhojraj et al. (2009) use an analyst forecast date that gives enough time for managers to decide how to manage earnings and take myopic actions, such as cutting R&D and advertising expenditures. Similar to them, I use the analyst forecast date that gives enough time to managers to choose the tax avoidance strategy and employ it. For example, managers would need some time to accelerate certain expenditures and/or sales of assets with built-in losses. To address the concern about the choice of the analyst forecast date, I follow Bhojraj et al. (2009) and measure earnings surprise using the mean of analysts' consensus forecast issued on other dates. I use the consensus forecast calculated in (i) the first month of the firm's last fiscal quarter, (ii) the last month of the firm's fiscal quarter, (iii) the first month of the next fiscal year, and (iv) the month of the earnings announcement date.

Following previous studies (e.g., Gu & Wu, 2003; Bhojraj et al., 2009; Francis et al., 2019), I use the mean of analysts' forecasts instead of the median. However, as robustness tests, I perform all tests using the median of analysts' forecasts[19]. Consistent with previous studies (e.g., Francis et al., 2019; Balakrishnan et al., 2019), I perform tests using the earnings surprise scaled by the stock price at the beginning of the fiscal year (PRCC_F). As a robustness test, I

[18] According to Bhojraj et al. (2009), the consensus forecast provided by I/B/E/S is the number that managers focus on.

[19] In general, the results are not affected by this choice. Although the coefficient on ES_Abs_Scaled had lost the significance when NCTA_CETR is the dependent variable (Table 14), the coefficients on ES_Abs (positive and negative) are significant and positive (Table 15), similar to the coefficient of tests using the mean of analysts' forecasts (Table 7). More details in section 6.2.

also perform all tests using the earnings surprise without scaling by the stock price (ES)[20]. In some analyses, I use the absolute value of scaled earnings surprise (ES_Abs_Scaled).

To achieve the study's main purpose of assessing the firms' tax avoidance strategy when the reported earnings assume different distances from analyst forecasted earnings, I create four intervals for earnings surprise: (i) easily miss the analyst consensus forecast (EMS); (ii) slightly miss it (SMS); (iii) slightly meet it (SMT); and (iv) easily meet it (EMT). I require that the earnings reported be below or above analyst expectations by at most three cents to compose the SMS and the SMT groups, respectively. SMS ranges from (inclusive) -$0.03 to zero. SMT ranges from (inclusive) zero to $0.03 (inclusive). Earnings surprise smaller than -$0.03 is set in the EMS group. Earnings surprise greater than $0.03 is set in the EMT group. I follow Brown (2003), who considers three cents a small surprise.

Most previous research is interested only in the small missers or small beaters, focusing on finding some aspects of these groups of firms (the level of earnings management, for example). They usually use one or two cents as the boundary to define small missers (beaters). Differently from them, I am interested in all four groups, big and small missers (beaters). I try to use a boundary that would be small enough to be included in a group of small missers (beaters) and big enough to be the lower limit of big missers (beaters). Moreover, from 1 cent to 3 cents, there is a substantial difference between the number of firms with positive (beat the analyst expectations) and negative earnings surprises (miss the analyst expectations). This difference is substantially reduced after three cents. Another important aspect of using a three cents boundary is that the sample of firms that meet the analysts' forecast is almost perfectly divided in half. Adopting the criteria of three cents as a boundary, 30.7 percent of sample firms are in the group that slightly meets the analysts' forecast (SMT), and 30.1 percent of sample firms are in the group that easily meets it (EMT; see Appendix B). As sensitivity tests, I also perform all analyses using two cents of earnings surprise[21] (following Abarbanell & Park, 2017; and Keung et al., 2010) and earnings surprise within 10 percent of the value of the forecast[22] (following Brown, 2003) as the boundaries (inclusive) to compose SMS and SMT groups. Thus, I could evaluate the extent to which my results are sensitive to the choice of segregating big and small missers (beaters) based on the boundary of three cents earnings surprise.

[20] In general, the results are not affected by this choice (Tables 14 and 15). More details in section 6.2.

[21] The results are not affected by this choice (Table 18). More details in section 6.3.

[22] In general, the results are not affected by this choice (Table 18). More details in section 6.3.

4.3. Specification of regression model

I use the following equation to assess the effects of earnings surprise on conforming tax avoidance:

$$\boldsymbol{CTA_{it} = \beta_0 + \beta_1 ES\_Abs\_Scaled_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 EBIT_{it} + \beta_5 Mgr\_Ability_{it} + \beta_6 Leverage_{it} + \beta_7 PPE_{it} + IndFE + YearFE + \varepsilon_{it}} \quad (2)$$

Where:

i and ***t*** = firm and year indicator, respectively;

CTA = conforming tax avoidance;

ES_Abs_Scaled = absolute scaled earnings surprise;

Size = the log of the market value of equity;

MTB = the lagged market-to-book ratio;

EBIT = earnings before interest and taxes scaled by net operating assets;

Mgr_Ability = manager ability;

Leverage = the long term-debt scaled by lagged total assets;

PPE = the net amount of property, plant, and equipment scaled by lagged total assets;

IndFE = industry fixed effect; and

YearFE = year fixed effect.

CTA measures the firm's engagement in conforming tax avoidance and is estimated as the residual of Equation (1) times (-1) (more details in section *4.1.1*). Thus, an increase in CTA indicates an increase in conforming tax avoidance. ES_Abs_Scaled is the absolute value of the difference between the actual annual earnings per share and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end scaled by the stock price at the beginning of the fiscal year (more details in section *4.2*). The higher ES_Abs_Scaled is, the annual earnings reported are further from the analyst forecast. Consistent with firms with higher absolute earnings surprise engaging in more conforming tax avoidance strategies, I expect that my coefficient of interest, β_1, will be positive.

I include control variables for firm characteristics that could potentially be associated with conforming tax avoidance. I include *Size* because previous research has shown an association between firm size and conforming tax avoidance (Badertscher et al., 2019; Hoopes, Langetieg, Maydew, & Mullaney, 2020). I include *EBIT* to control for firm performance, and

Mgr_Ability to control for managerial ability because Badertscher et al. (2019) show a positive and significant association between those variables and conforming tax avoidance. *Mgr_Ability* is a managerial ability score developed by Demerjian, Lev, and McVay (2012)[23]. Badertscher et al. (2019) only include PPE as a control variable in the regression with cash ETR as the dependent variable. Because of their econometric model, they need one unique independent variable that is highly correlated with cash ETR and little correlated with CONFORM_TAX. Based on their citation of an existent correlation between *PPE* and conforming tax avoidance and the findings of Hoopes et al. (2020) that *PPE* is significantly and negatively associated with conforming tax avoidance, I include *PPE*. Following Hoopes et al. (2020), I also include *Leverage*. I include *MTB* as a proxy for firms' growth opportunities. To avoid a mechanical association with CTA, I do not use *NOL* and ***ΔNOL*** as control variables because they were used to construct CTA. I winsorize these continuous control variables at the 1st and 99th percentiles. All variables are defined in Appendix A. I also include year and industry (based on two-digit SIC code) fixed effects and employ robust standard errors. I estimate Equation (2) using ordinary least squares (OLS) regression with firm-level clustering.

I use the following equation to assess the effects of earnings surprise on non-conforming tax avoidance:

$$\boldsymbol{NCTA_{it} = \beta_0 + \beta_1 ES\_Abs\_Scaled_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 EBIT_{it} + \beta_5 Mgr\_Ability_{it} + \beta_6 Leverage_{it} + \beta_7 PPE_{it} + \beta_8 NOL_{it} + \beta_9 \Delta NOL_{it} + \beta_{10} Intangibles_{it} + \beta_{11} ROA_{it} + \beta_{12} EQINC_{it} + \beta_{13} FI_{it} + IndFE + YearFE + \varepsilon_{it}} \quad (3)$$

Where:

NCTA = non-conforming tax avoidance measures (NCTA_ETR and NCTA_CETR);

NOL = an indicator variable equal to one if the firms' tax loss carryforwards are non-negative in year t-1, and 0 otherwise;

ΔNOL = the change in tax loss carryforwards scaled by lagged assets;

Intangibles = the intangible assets scaled by lagged assets;

ROA = the operating income scaled by lagged assets;

EQINC = the equity income in earnings scaled by lagged assets; and

[23] The managerial ability measure was developed in Demerjian, Lev, and McVay (2012) and was updated with data through 2020. The dataset is available on Peter Demerjian's website: https://peterdemerjian.weebly.com/managerialability.html.

$\boldsymbol{FI}$ = the foreign pre-tax income scaled by lagged assets.

All other variables are as defined in Equation (2).

I estimate Equation (3) for both non-conforming tax avoidance measures. NCTA equals either NCTA_ETR or NCTA_CETR. NCTA_ETR equals the difference between the average GAAP effective tax rate of the firm's size and industry peers over the year and the firm's GAAP effective tax rate over the same year. NCTA_CETR equals the difference between the average cash effective tax rate of the firm's size and industry peers over the year and the firm's cash effective tax rate over the same year (more details in section *4.1.2*). Thus, an increase in NCTA indicates an increase in non-conforming tax avoidance. NCTA_ETR measures the firm's engagement in non-conforming tax avoidance that is captured by the GAAP effective tax rate. NCTA_CETR measures the firm's engagement in non-conforming tax avoidance that is captured by the cash effective tax rate. Consistent with firms with higher absolute earnings surprise engaging in less non-conforming tax avoidance strategies, I expect that my coefficient of interest, β_1, will be negative.

I include control variables for firm characteristics known to affect the effective tax rate. While just a few studies use conforming tax avoidance as the dependent variable, plenty of studies use non-conforming tax avoidance as the dependent variable. Many of them use GAAP ETR and Cash ETR as non-conforming tax avoidance proxies. I include *Size*, *MTB*, *Leverage*, and *PPE* (Chen, Chen, Cheng, & Shevlin, 2010; Boone, Khurana, & Raman, 2013; Kubick et al., 2016; Hasan, Hoi, Wu, & Zhang, 2017), *EBIT*, *Mgr_Ability* (Badertscher et al., 2019) as defined above (Equation [2]). I also include net operating loss carryforwards (*NOL* and *ΔNOL*), intangibles (*Intangibles*), profitability (*ROA*), equity method earnings (*EQINC*), and foreign operations (*FI*) (Chen et al., 2010; Boone et al., 2013; Kubick et al., 2016; Hasan et al., 2017). I winsorize these continuous control variables at the 1st and 99th percentiles. All variables are defined in Appendix A. I also include year and industry (based on two-digit SIC code) fixed effects and employ robust standard errors. I estimate Equation (3) using ordinary least squares (OLS) regression with firm-level clustering.

I use the following equations to assess the effects of positive and negative earnings surprise on conforming and non-conforming tax avoidance:

$$\boldsymbol{CTA_{it} = \beta_0 + \beta_1 ES\_Scaled_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 EBIT_{it} + \beta_5 Mgr\_Ability_{it} + \beta_6 Leverage_{it} + \beta_7 PPE_{it} + IndFE + YearFE + \varepsilon_{it}} \quad (4)$$

$$NCTA_{it} = \beta_0 + \beta_1 ES\_Scaled_{it} + \beta_2 Size_{it} + \beta_3 MTB_{it} + \beta_4 EBIT_{it} + \beta_5 Mgr\_Ability_{it} + \beta_6 Leverage_{it} + \beta_7 PPE_{it} + \beta_8 NOL_{it} + \beta_9 \Delta NOL_{it} + \beta_{10} Intangibles_{it} + \beta_{11} ROA_{it} + \beta_{12} EQINC_{it} + \beta_{13} FI_{it} + IndFE + YearFE + \varepsilon_{it} \quad (5)$$

Where:

ES_Scaled = scaled earnings surprise.

All other variables are as defined in Equations (2) and (3).

Given that firms with positive or negative earnings surprises may have different reasons that could work against finding evidence for my hypotheses, I run Equations (4) and (5) for firms with positive and negative earnings surprises separately. Consequently, I can identify whether the signal of earnings surprise plays a role in the results. I include year and industry (based on two-digit SIC code) fixed effects and employ robust standard errors. I estimate Equations (4) and (5) using ordinary least squares (OLS) regression with firm-level clustering.

Consistent with firms with higher earnings surprise engaging in more conforming tax avoidance strategies, I expect that my coefficient of interest, β_1, be positive in Equation (4) for firms with positive earnings surprise and negative in Equation (4) for firms with negative earnings surprise. Consistent with firms with higher earnings surprise engaging in less non-conforming tax avoidance strategies, I expect that my coefficient of interest, β_1, be negative in Equation (5) for firms with positive earnings surprises and positive in Equation (5) for firms with negative earnings surprises. Although I expect that firms that easily miss (negative ES) or that easily meet the analyst forecast (positive ES) present higher conforming tax avoidance, firms that easily miss the analyst forecast may not engage in conforming tax avoidance activities so as to not present an even lower net income to the market. As well, firms that easily meet the analyst's forecasts may not engage in conforming tax avoidance activities so as to not present to the market a net income closer to the analysts' expectations. Parallelly, although I expect that firms that slightly miss the analyst forecast (negative ES) present higher non-conforming tax avoidance, they may not engage in non-conforming tax avoidance, considering that they have already missed the target and will be penalized by the market. Also, although I expect that firms that easily meet the analyst forecast (positive ES) present lower non-conforming tax avoidance, they may engage in more non-conforming tax avoidance to present even higher book earnings to the market.

I use the following equations to compare the effect of different levels of earnings surprise on tax avoidance strategy:

$$\boldsymbol{CTA_{it} = \beta_0 + \beta_1 EMS_{it} + \beta_2 SMS_{it} + \beta_3 EMT_{it} + \beta_4 Size_{it} + \beta_5 MTB_{it} + \beta_6 EBIT_{it} + \beta_7 Mgr\_Ability_{it} + \beta_8 Leverage_{it} + \beta_9 PPE_{it} + IndFE + YearFE + \varepsilon_{it}} \quad (6)$$

$$\boldsymbol{NCTA_{it} = \beta_0 + \beta_1 EMS_{it} + \beta_2 SMS_{it} + \beta_3 EMT_{it} + \beta_4 Size_{it} + \beta_5 MTB_{it} + \beta_6 EBIT_{it} + \beta_7 Mgr\_Ability_{it} + \beta_8 Leverage_{it} + \beta_9 PPE_{it} + \beta_{10} NOL_{it} + \beta_{11} \Delta NOL_{it} + \beta_{12} Intangibles_{it} + \beta_{13} ROA_{it} + \beta_{14} EQINC_{it} + \beta_{15} FI_{it} + IndFE + YearFE + \varepsilon_{it}} \quad (7)$$

Where:

EMS = Easily miss the analyst forecast;

SMS = Slightly miss the analyst forecast; and

EMT = Easily meet the analyst forecast.

All other variables are as defined in Equations (2) and (3).

To estimate Equations (6) and (7), I set earnings surprise in four groups: (i) easily miss the analyst forecast (EMS), composed of earnings surprise smaller than -$0.03; (ii) slightly miss the analyst forecast (SMS), composed of earnings surprise ranging from (inclusive) -$0.03 to zero; (iii) slightly meet the analyst forecast (SMT), composed of earnings surprise ranging from (inclusive) zero to $0.03 (inclusive); and (iv) easily meet the analyst forecast (EMT), composed of earnings surprise greater than $0.03. I omitted the SMT group; thus, this group became the reference group. All other variables are as defined in Equations (2) and (3). I also include year and industry (based on two-digit SIC code) fixed effects and employ robust standard errors. I estimate Equations (6) and (7) using ordinary least squares (OLS) regression with firm-level clustering.

Consistent with firms with higher earnings surprise engaging in more conforming tax avoidance strategies, I expect that my coefficients of interest, β_1 and β_3, will be positive in Equation (6). Consistent with firms with higher earnings surprise engaging in less non-conforming tax avoidance strategies, I expect that my coefficients of interest, β_1 and β_3, will be negative in Equation (7).

4.4. Endogeneity

Although I hypothesize that the firms' engagement in tax avoidance is determined by earnings surprise, it is possible that simultaneity can arise in the corporate tax avoidance and earnings surprise relationship. I argue that firms may engage in more conforming or non-conforming tax avoidance, depending on how far their reported incomes are from analysts' earnings forecasts. However, analysts' forecast errors could be affected by firms' decisions to engage in more conforming or non-conforming tax avoidance. In this direction, Francis et al. (2019) show that as firms spend more on tax planning, the accuracy of analysts' forecasts of earnings per share declines. I attempt to control for some of this endogeneity by estimating the relation between tax avoidance and earnings surprise (Equations [2] and [3]) using Arellano and Bover (1995) and Blundell and Bond's (1998) dynamic panel estimator (system GMM [Generalized Method of Moments]). The system GMM estimator takes into account that some regressors may be endogenous and uses only "internal" available instruments based on lags of the instrumented variables because it does not assume the availability of good "external" instruments (Roodman, 2009).

I run my regressions using *xtabond2* in Stata. Regarding my specification choices, first, all explanatory variables except year dummies are treated as endogenous variables. Second, I employ two-step GMM estimation with Windmeijer corrected standard errors. Third, I use the forward orthogonal deviations to minimize data loss in my panel with gaps. "Instead of subtracting the previous observation from the contemporaneous one, it subtracts the average of all future available observations of a variable" (Roodman, 2009). Finally, I use the "collapse" option to limit instrument proliferation. More specifically, Wintoki, Linck, and Netter (2012) show that the collapse option "creates one instrument for each variable and lag distance, rather than one for each time period, variable, and lag distance. This option effectively constrains all of the yearly moment conditions to be the same."

Given that the system GMM relies on lags of dependent and independent variables as instruments, the number of lags of the dependent variable that will be used as independent variables and the number of lags of independent variables that will be used as instruments need to be defined. The lags of dependent variables included as independent variables should be sufficient to capture the influence of the firm's past tax avoidance on the firm's current tax avoidance. The lags of tax avoidance and the firm's characteristics used as instruments should be exogenous with respect to current tax avoidance. To ensure this exogeneity and the validity

of the instruments, I run two tests: the AR(2) second-order serial correlation test and the Hansen J test of over-identifying restrictions.

Previous studies have identified that firms that avoid tax in the prior year tend to avoid tax in the current year (Dyreng et al., 2008; Hoopes, Mescall, & Pittman, 2012). Although Dyreng et al. (2008) find persistence in the annual cash tax rate, the persistence is asymmetric. Low cash tax rates are more persistent than high cash tax rates. Dyreng et al. (2008) find that approximately 53 percent of firms with annual cash ETR between 0 and 10 percent in year 0 present annual cash ETR between 0 and 10 percent again in year 1. This percentage drops to 45 percent in years 2, 3, and 4. The tax rates are much less persistent in the group of firms with annual cash ETR above 40 percent; in year 1, only 37 percent of firms continue to present annual cash ETR above 40 percent. This percentage drops to 24 percent in year 4. In both groups of firms with high and low annual cash ETR, the persistence is higher in the first year. In a sensitivity test, Hoopes et al. (2012) add annual cash ETR lagged by one year to control for the persistence of tax avoidance. They find a positive and significant association between the lagged annual cash ETR and the current annual cash ETR. The authors also add annual cash ETR lagged by two years and their results remain the same.

I run a battery of tests with dependent variables lagged from one to four periods to assess the significance of the lags of the dependent variables. Only the first and the second lags are predominantly significant in the tests using CTA and NCTA_ETR as dependent variables. I also find that the first, second, and third lags are predominantly significant in the tests using NCTA_CETR as the dependent variable. Thus, considering these outcomes and prior studies, I decide to include two lags[24] of the dependent variable as independent variables. Regarding the

[24] In equation of CTA as dependent variable: (i) If I use one lag of the CTA as independent variable, even using different numbers of lags of independent variables as instruments, the equations do not attend the requirements of exogeneity and validity of the instruments captured by the AR(2) second-order serial correlation test and the Hansen J test of over-identifying restrictions; (ii) If I use three lags of CTA as independent variables and the third and fourth lags of all endogenous variables as instruments, the results are similar (coefficient of ES_Abs_Scaled positive and significant at five percent – untabulated).

In equation of NCTA_ETR as dependent variable: (i) If I use one lag of NCTA_ETR as independent variables and the second and third or the third and fourth lags of all endogenous variables as instruments, the results are similar (coefficient of ES_Abs_Scaled positive and significant at five percent – untabulated); (ii) If I use three lags of NCTA_ETR as independent variables, even using different numbers of lags of independent variables as instruments, the equations do not attend the requirements of exogeneity and validity of the instruments captured by the AR(2) second-order serial correlation test and the Hansen J test of over-identifying restrictions.

In equation of NCTA_CETR as dependent variable: (i) If I use one lag of NCTA_ETR as independent variables, even using different numbers of lags of independent variables as instruments, the equations do not attend the requirements of exogeneity and validity of the instruments captured by the AR(2) second-order serial correlation test and the Hansen J test of over-identifying restrictions; (ii) If I use three lags of NCTA_CETR as independent variables and the third and fourth lags of all endogenous variables as instruments, the results are similar (coefficient of ES_Abs_Scaled not significant – untabulated).

instruments, Wintoki et al. (2012) present that “increasing the instruments’ lag length makes them more exogenous, but may also make them weaker,” what they call an “empirical trade-off.” I use the third and fourth lags of all endogenous variables as instruments, which are the minimum number of lags that allow the instruments to meet the requirements of specification tests (AR[2] and Hansen J tests). My assumption in the GMM regression is that all the regressors except year dummies are endogenous.

I do not run the regressions in equations 4, 5, 6, and 7 using system GMM because, as previously said, the system GMM uses the lags of regressors as instruments. Equations (4) and (5) test the relation between tax avoidance and positive and negative earnings surprises. I run the regression in equations 4 and 5 separately for firm-years with positive and negative earnings surprises. Thus, if I use system GMM, the first lag of positive (or negative) earnings surprises could be, for example, seven years back, and the second lag of positive (or negative) earnings surprises would be even more years back. That long distance would make the instrument weaker. The same problem would happen with Equations (6) and (7).

4.5. Sample selection

I obtain data from Compustat North America and I/B/E/S Summary History database. First, I obtain all firm-year observations on Compustat for United States firms from fiscal years 1994 through 2016, resulting in 205,852 total observations. I begin the sample period in 1994 because of the statutory tax rate increase enacted by the Omnibus Budget Reconciliation Act of 1993. Additionally, I select 1994 as the beginning year of this study because of the relevance given to analysts’ forecasts in the middle of the 1990s. I finish the sample period in 2016 because of the statutory tax rate decrease enacted by the Tax Cuts and Jobs Act of 2017. The statutory tax rate changes can incentivize firms to shift income from one period to another. This specific incentive to tax-induced earnings management can affect the relation between analyst forecast accuracy and tax avoidance practices. While firms have a strong reason to shift income when the statutory tax rate is changed (Guenther, 1994; Maydew, 1997), analysts are not able to fully anticipate its tax incentives (Chen et al., 2003; Shane & Stock, 2006).

Second, I require that all firm-year observations satisfy the following criteria: (i) the firm is not a financial institution or in a regulated industry (SIC codes 6000–6999 and 4800–4900); (ii) data necessary to estimate conforming tax avoidance are available; (iii) at least 15 observations are available for each industry and fiscal year combination; and (iv) data necessary to estimate non-conforming tax avoidance proxies are available. Remember that I require

positive pre-tax book income less special items to estimate NCTA_ETR and NCTA_CETR. After I apply these requirements, the total observations are 44,089 (7,033 unique firms). Finally, to test the hypotheses, I require the following criteria: (i) firm-year observations with analyst coverage; and (ii) data available to estimate control variables, resulting in 23,571 firm-year observations (4,107 unique firms). I summarize my sample selection in Table 1.

In the I/B/E/S database, I restrict the sample to U.S. firms (USFIRM=1) and forecast currency to USD (CURCODE=USD). I eliminate observations with missing values for actual earnings (ACTUAL) and earnings announcement date (ANNDATS_ACT). I also remove observations with forecasts recorded (STATPERS) after the earnings announcement date. I use the Compustat criteria to identify the fiscal year that the company is in. I consider that firms with fiscal year-ends from June through December pertain to that fiscal year, and firms with fiscal year-ends from January through May pertain to the fiscal year before. To measure analyst forecast error, I use actual earnings and earnings announcement date from I/B/E/S database instead of Compustat. Finally, I require analysts' consensus forecast of EPS issued in the month prior to the month of the fiscal year-end. All of these requirements result in 101,804 firm-year (17,672 unique firms) forecasts before the merger with Compustat data.

TABLE 1 – Sample selection procedures

Firm-year observations from United States firms with information in the COMPUSTAT to fiscal years 1994-2016	205,852
Less:	
Utilities and financial services firms	(68,139)
Firm-years with data not available to estimate conforming tax avoidance	(82,548)
Firm-year observations in industries (three-digit NAICS) with less than 15 firm-years available	(7,208)
Firm-years with missing data necessary to estimate non-conforming tax avoidance proxies	(3,868)
Total of firm-year observations to estimate conforming (CTA) and non-conforming (NCTA_ETR and NCTA_CETR) tax avoidance (7,033 unique firms)	**44,089**
Less firm-years without analyst coverage	(18,039)
Less firm-years with missing data necessary to estimate control variables	(2,479)
Total of firm-year observations (4,107 unique firms)	**23,571**

5. RESULTS

5.1 Descriptive statistics

Table 2 provides descriptive statistics for conforming tax avoidance, non-conforming tax avoidance, earnings surprise, and the control variables used in the empirical analyses. The extent of conforming and non-conforming tax avoidance engagement is measured from a relative perspective. CTA measures the firm's ratio of cash taxes paid to lagged total assets relative to its industry peers. NCTA_ETR and NCTA_CETR measure the firm's effective tax rates relative to its size and industry peers. The mean of CTA is -0.2 percent, signaling that, on average, firms deviate -0.2 percent (paying 0.2 percent[25] more taxes) of the expected value of the ratio taxes paid to assets for a specific industry (three-digit NAICS) and fiscal year group. The median of CTA is 0.4 percent, indicating that most firms pay less tax than the average firm in the same industry and fiscal year. The standard deviation of CTA, measured for a specific industry and fiscal year combination, is 3.4 percent, indicating that there is no significant cross-sectional variation within industry and year grouping. The descriptive statistics of CTA are similar to those presented by Badertscher et al. (2019) for this metric. We present the same mean and median of CTA, even considering that I have a much smaller sample due to the requirement that all firms should have analyst coverage. It should be remembered, though, that differently from Badertscher et al. (2019), I multiplied CTA by (-1). Thus, larger values of CTA represent more engagement in conforming tax avoidance.

The mean of NCTA_ETR is 0.1 percent, signaling that, on average, firms deviate 0.1 percent (having 0.1 percent less tax expenses) of the average ETR for a specific industry (three-digit NAICS), size, and fiscal year group. The median of NCTA_ETR is -1.3 percent, indicating that most firms have higher tax expenses than the average firm in the same industry, size, and fiscal year. The mean of NCTA_CETR is 0.3 percent, signaling that, on average, firms deviate 0.3 percent (paying 0.3 percent less taxes) of the average CETR for a specific industry (three-digit NAICS), size, and fiscal year group. The median of NCTA_CETR is 1.5 percent, indicating that most firms pay less tax than the average firm in the same industry, size, and fiscal year. The standard deviation of NCTA_ETR and NCTA_CETR is 13.1 percent and 16.8

[25] Given that the lagged total asset is the denominator of the scaled cash taxes paid (what is not common for a tax avoidance measure), it is worth emphasizing that on average firms pay 0.2 percent of average total assets, not of average pre-tax earnings.

percent, respectively. Given that NCTA proxies are measured for a specific industry, size, and fiscal year combination, these standard deviations indicate a significant cross-sectional variation within industry, size, and year grouping. Compared with previous studies, the descriptive statistics of NCTA_ETR and NCTA_CETR present higher medians and lower standard deviations[26]. In addition to the difference in the period and the number of observations analyzed, while previous studies use Fama-French 48 industry to calculate the average effective tax rate for firms in the same industry, I use three-digit NAICS for this purpose. The decision to use three-digit NAICS is to apply the same criteria that I use to measure conforming tax avoidance and therefore align more conforming and non-conforming tax avoidance proxies. Larger values of NCTA represent more engagement in non-conforming tax avoidance.

The mean of GAAP_ETR and Cash_ETR is -30.7 percent and -27.2 percent, respectively, indicating a mean level of non-conforming tax avoidance of 4.3 percent and 7.8 percent of pre-tax earnings, respectively (given the US statutory corporate tax rate of 35 percent). The difference of -3.5 percent between the mean of non-conforming tax avoidance proxies is possibly explained by the fact that while GAAP_ETR[27] has total tax expense (current tax expense plus differed tax expense) in the numerator, Cash_ETR only has cash tax paid in the numerator. Thus, in addition to permanent book-tax differences, Cash_ETR also captures temporary book-tax differences derived from activities that defer cash tax paid. The standard deviations of GAAP_ETR and Cash_ETR are 14.3 percent and 18.1 percent, respectively, indicating a significant cross-sectional variation in non-conforming tax avoidance proxies. The mean and median statistics of GAAP_ETR and Cash_ETR are similar to those in prior studies (e.g., Balakrishnan et al., 2019; Hasan et al., 2017; Kubick et al., 2016).

The median of ES is 1 cent, indicating that most firms in the sample beat the consensus analysts' forecast. The median of ES is positive for each year of the sample (see Appendix B), showing that the number of firms beating analyst expectations exceeds, in every sample year, the number of firms that miss it. The mean of ES is positive for all years from 2002 to 2016, except for 2006 when the ES was negative although small – less than one cent (-0,005), and 2008 when the ES had the highest absolute mean (-0.032) (see Appendix B). The 2008

[26] Balakrishnan et al. (2019) present median NCTA_ETR of -3,7 percent (called *TA_GAAP* by the authors), and median NCTA_CETR of 0,9 percent (called *TA_CASH* by the authors). The standard deviation of NCTA_ETR and NCTA_CETR is, respectively, 18,4 percent and 21,4 percent. Their sample is 40,193 firm-year observations for the period from 1990–2013. Armstrong et al. (2015) present median NCTA_ETR (called *TAETR* by the authors) of -3,1 percent and standard deviation of 19,8 percent. Their sample is 3,137 firm-year observations for the period from 2007–2011.

[27] GAAP_ETR also captures strategies that do not necessarily have tax planning purpose, for example: changes in tax contingency reserves and the valuation allowance.

economic recession faced by the United States may have negatively and unexpectedly affected firms' reported earnings and, consequently, affected the mean of ES. The comparison of descriptive statistics of ES with this measure in previous research is restricted because of the date of analyst forecast issuance used to calculate ES. While previous studies generally use the latest forecast issued before earnings announcement or fiscal year-end, I follow Bhojraj et al. (2009) and use the forecast issued in the second month of the firm's last fiscal quarter. Bhojraj et al. (2009) do not present descriptive statistics for their total sample. Even considering the difference in the forecast used, the ES statistics are in the range of those presented in earlier studies (e.g., Gu && Wu, 2003; Balakrishnan et al., 2019; Francis et al., 2019).

TABLE 2 – Descriptive statistics

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
CTA	23,571	-0.002	0.034	-0.017	0.004	0.019
NCTA_ETR	23,571	0.001	0.131	-0.060	-0.013	0.049
NCTA_CETR	23,571	0.003	0.168	-0.070	0.015	0.108
GAAP_ETR	23,571	-0.307	0.143	-0.378	-0.333	-0.251
Cash_ETR	23,571	-0.272	0.181	-0.354	-0.262	-0.153
ES	23,571	0.000	0.129	-0.020	0.010	0.040
ES_Abs_Scaled	23,533	0.004	0.009	0.000	0.001	0.004
ES_Scaled	23,533	0.000	0.008	-0.001	0.000	0.002
Size	23,571	6.672	1.837	5.379	6.557	7.830
MTB	23,571	3.446	3.226	1.669	2.528	4.013
Leverage	23,571	0.188	0.210	0.003	0.136	0.290
NOL	23,571	0.371	0.483	0.000	0.000	1.000
DNOL	23,571	-0.001	0.045	0.000	0.000	0.000
ROA	23,571	0.134	0.106	0.066	0.114	0.180
EQINC	23,571	0.001	0.003	0.000	0.000	0.000
PPE	23,571	0.281	0.243	0.103	0.208	0.376
Intangible	23,571	0.193	0.231	0.007	0.108	0.299
FI	23,571	0.021	0.038	0.000	0.000	0.030
EBIT	23,571	0.259	0.313	0.117	0.188	0.304
Mgr_Ability	23,571	0.593	0.280	0.400	0.600	0.800

The table presents descriptive statistics for tax avoidance proxies, earnings surprises, and other variables used in the empirical analyses. CTA is a proxy for conforming tax avoidance. CTA is multiplied by negative one so that larger values represent more engagement in conforming tax avoidance. NCTA_ETR and NCTA_CETR are proxies for non-conforming tax avoidance. Larger values of NCTA represent more engagement in non-conforming tax avoidance. Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end. ES_Abs_Scaled is the absolute value of ES_Scaled. ES_Scaled is ES scaled by the stock price at the beginning of the fiscal year. GAAP_ETR and Cash_ETR are alternative proxies for non-conforming tax avoidance. GAAP_ETR and Cash_ETR are constrained to the range [0,1] and are multiplied by negative one so that larger values, i.e., values closer to zero, represent more engagement in non-conforming tax avoidance. All continuous variables are winsorized at the 1 percent and 99 percent levels. All other variables are defined in Appendix A.

The descriptive statistics of EBIT and Mgr_Ability are similar to those presented by Badertscher et al. (2019). The sample statistics for other control variables are in the range of those presented in earlier studies (e.g., Kubick et al., 2016; Hasan et al., 2017). Concerning the firm's characteristics, sample firms have an average market value of equity equal to $5.99 million (untabulated). The sample is composed basically of profitable firms; only 5.4 percent (untabulated) of firms report negative net income. This high number of profitable firms can be explained by the sample exclusion of firms with negative pre-tax income before special items and negative cash taxes paid from the sample. 93.5 percent (untabulated) of firm-year observations have coverage of at least two analysts. The median company is followed by six analysts (untabulated).

Table 3 reports Pearson (above the diagonal) and Spearman (below the diagonal) correlation coefficients between the variables. All reported correlations, except those in bold, are statistically significant at the 5 percent level or better. All measures of tax avoidance are significantly and positively correlated with one another, indicating that all three measures may be capturing some common aspects of tax avoidance. The correlation coefficients for the three tax avoidance measures suggest that they are also capturing different attributes of tax avoidance. Pearson (Spearman) correlation of 0.299 (0.298) between NCTA_ETR and NCTA_CETR indicates that the effective tax rate proxies capture some distinct aspects of non-conforming tax avoidance, as discussed in section 4.1.2. These correlation coefficients are consistent with prior research (e.g., Chen et al., 2010; Kubick, Lynch, Mayberry, & Omer, 2015).

The univariate correlations reveal a positive correlation between CTA and ES_Abs_Scaled, a positive correlation between NCTA_ETR and ES_Abs_Scaled, and a negative correlation between NCTA_CETR and ES_Abs_Scaled (not statistically significant by Spearman correlation test). These correlations suggest that depending on the non-conforming tax avoidance measure, there is an inverse correlation between non-conforming tax avoidance and absolute earnings surprise. Given that NCTA_ETR only captures permanent book-tax differences and NCTA_CETR captures both permanent and temporary book-tax differences, the engagement in tax avoidance that results in temporary book-tax differences may be driving the inverse correlation between non-conforming tax avoidance and absolute earnings surprise. A multivariate analysis is necessary to control other determinants of tax avoidance to determine whether earnings surprise affects firms' tax avoidance strategy.

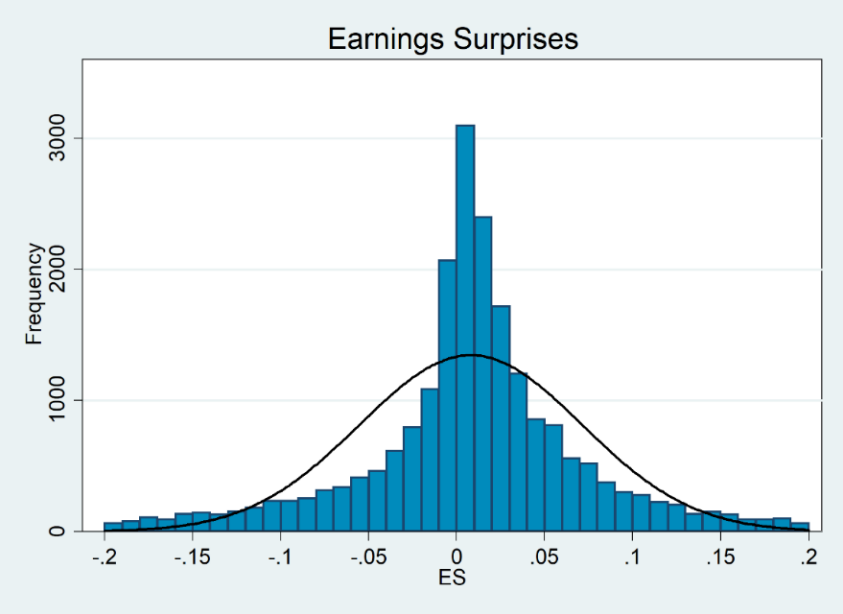
TABLE 3 – Pearson and Spearman correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) CTA		0.175	0.340	0.103	-0.069	-0.227	0.109	**0.007**	-0.019	-0.635	-0.016	-0.028	0.050	-0.060	-0.350	-0.204
(2) NCTA_ETR	0.225		0.299	0.062	**-0.012**	**0.009**	0.015	0.061	-0.043	-0.169	**0.006**	**0.006**	-0.021	0.046	-0.098	**0.010**
(3) NCTA_CETR	0.483	0.298		-0.067	0.021	0.081	0.024	0.085	-0.073	0.071	**-0.005**	0.033	**-0.002**	0.071	0.067	0.040
(4) ES_Abs_Scaled	0.162	0.070	**-0.005**		-0.333	-0.166	0.070	**0.004**	-0.032	-0.150	-0.014	0.043	-0.081	-0.114	-0.100	-0.043
(5) Size	-0.103	0.030	**-0.004**	-0.379		0.317	0.069	0.166	0.053	0.062	0.142	-0.019	0.167	0.373	0.100	0.136
(6) MTB	-0.273	-0.013	0.052	-0.369	0.403		**0.009**	**0.004**	0.017	0.358	0.023	-0.043	**0.004**	0.149	0.292	0.218
(7) Leverage	0.130	0.017	**0.004**	0.049	0.153	-0.087		0.030	0.053	-0.175	0.053	0.286	0.323	-0.035	-0.209	-0.126
(8) NOL	-0.040	0.079	0.116	0.018	0.183	**-0.004**	0.049		-0.145	-0.157	**-0.002**	-0.149	0.185	0.130	-0.061	-0.032
(9) DNOL	**0.001**	**-0.012**	-0.090	-0.032	0.055	**0.010**	0.044	-0.234		-0.052	**0.004**	0.034	0.064	0.026	-0.062	**-0.009**
(10) ROA	-0.561	-0.225	-0.020	-0.244	0.076	0.442	-0.238	-0.163	-0.032		0.018	0.060	-0.131	0.173	0.607	0.291
(11) EQINC	**0.003**	**0.009**	**-0.012**	-0.03	0.170	**-0.009**	0.117	0.029	0.014	-0.013		0.067	**-0.012**	0.065	0.018	-0.026
(12) PPE	-0.053	**0.002**	**-0.009**	0.029	**-0.005**	-0.033	0.269	-0.175	0.042	0.099	0.071		-0.277	-0.073	-0.105	-0.080
(13) Intangible	0.025	-0.019	-0.017	-0.111	0.239	0.022	0.260	0.218	0.029	-0.154	0.049	-0.318		0.028	-0.184	-0.131
(14) FI	-0.034	0.088	0.056	-0.155	0.401	0.141	0.029	0.179	**-0.004**	0.086	0.110	-0.083	0.155		0.174	0.106
(15) EBIT_	-0.440	-0.19	**0.000**	-0.216	0.159	0.438	-0.331	-0.086	-0.056	0.804	**0.003**	-0.054	-0.200	0.148		0.239
(16) Mgr_Ability	-0.180	**0.002**	0.025	-0.074	0.120	0.257	-0.171	-0.031	**-0.004**	0.277	-0.051	-0.118	-0.182	0.048	0.283	

The table presents Pearson correlations above the diagonal and Spearman correlations below the diagonal for the sample. All reported correlations are statistically significant at $p < 0.05$, with the exception of the correlations in bold.
The sample comprises 23,571 firm-year observations during the period 1994–2016. All variables are defined in Appendix A.

Figure 1 presents the distribution of earnings surprises measured in cents per share. I restricted the histogram from -0.20 to 0.20 cent window to better visualize the distribution. This interval comprises 91 percent of the full sample. The sample distribution of earnings surprises is consistent with earlier research (e.g., Bhojraj et al., 2009; Bird, Karolyi, & Ruchti, 2019). The number of observations that meet or beat the analysts' consensus forecast (60.8 percent of firm-years) exceeds those that fail to meet it (39.2 percent of firm-years). Additionally, the number of observations that just meet or slightly beat analyst expectations (30.7 percent of firm-years) up to three cents substantially exceed those that slightly miss it (16.8 percent of firm-years) up to three cents.

FIGURE 1 – Histogram of earnings surprises (in cents)

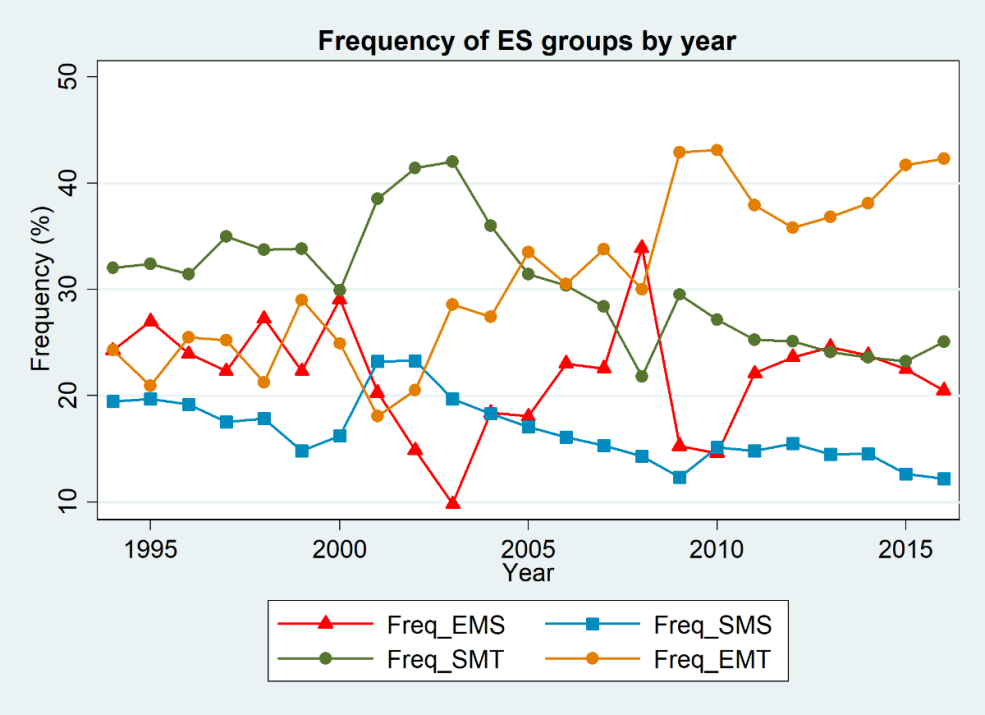


The Figure presents the histogram of earnings surprises distribution (in cents), focusing on the -0.20 to 0.20 cent window. The total number of firm-year observations comprehended in the histogram is 21,336 for the period from 1994 to 2016. The y-axis shows the frequency of firm-year observations for each interval of 1 cent of earning surprise (x-axis). Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end (see Appendix A).

I created four groups of earnings surprises (EMS, SMS, SMT, and EMT) to analyze the relationship between tax avoidance strategy and analysts' forecasts. I segregate big and small missers (beaters) using 3 cents as a boundary. Figure 2 presents the frequency of earnings surprise groups (EMS, SMS, SMT, and EMT) over time. The number of firms that slightly meet

the analyst expectation has been considerably greater than those that slightly miss it for all the sample years. The number of firms that slightly met the analyst expectation exceeded those that easily met it until 2005 when this relation was inverted. The positive difference between the number of firms that easily meet the analysts' forecast and those that slightly meet it has become more evident from 2008. The increase in the number of firms that easily meet the analyst forecast and the concomitant reduction in the number of firms that slightly meet it may be driven by the market skepticism on firms with an earnings surprise of 0 and 1 cent documented for the period from 2002 to 2006 by Keung et al. (2010).

FIGURE 2 – Frequency of earnings surprise groups by year (in percent)



The figure presents the frequency of earnings surprise groups by year. Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end (see Appendix A). Four groups are used to pool earnings surprises: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.03); (ii) slightly miss it (SMS) (-$0.03≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.03); and (iv) easily meet it (EMT) (ES>$0.03).

Changes in patterns of the frequency of earnings surprise groups in the years 2001 and 2008 can be noticed. In both years, the United States faced an economic recession that may have affected both firms' income and analysts' expectations. In 2001, the number of firms with larger earnings surprises reduced (fewer firms in the EMS and EMT groups), and the number of firms with smaller earnings surprises increased (more firms in the SMS and SMT groups).

In 2000, 46% of firms were in the slightly miss or meet group; in 2001, this number increased to 62%. In other words, more firms reported earnings closer to the analysts' expectations in 2001. In 2008, the number of firms that easily missed the analyst forecast increased (11.3 percentage points), while the number of firms that slightly met and easily met it decreased (6.6 percentage points and 3.8 percentage points, respectively). See Appendix B for more detailed information on the frequency of earnings surprise groups by year.

5.2 Univariate analysis

Table 4 presents the mean and median of conforming and non-conforming[28] tax avoidance measures by earnings surprise groups. The median CTA is positive in all ES groups, indicating that most firms in each ES group present scaled cash taxes paid smaller than the average firm in the same industry and fiscal year. The mean and median of CTA are higher for the groups that easily miss (EMS) and meet (EMT) the analysts' expectations, suggesting that firms that are further from the analysts' forecasts engage in more conforming tax avoidance activities. The mean and median of CTA have the lowest value in the slightly meet group (SMT), suggesting that firms that meet the analysts' forecasts by a few cents engage in less conforming tax avoidance activities.

The median of NCTA_ETR is negative in all ES groups, suggesting that most firms in each ES group engage less in non-conforming tax avoidance activities (captured by NCTA_ETR measure) than the average firm in the same industry, size, and fiscal year. The median of NCTA_CETR is positive in SMS, SMT, and EMT groups, suggesting that most firms in each of these ES groups engage more in non-conforming tax avoidance activities (captured by NCTA_CETR measure) than the average firm in the same industry, size, and fiscal year. The mean and median of NCTA_ETR and NCTA_CETR are higher for the group that easily meets (EMT) the analysts' expectations, suggesting that firms that are positively further from the analysts' forecast engage in more non-conforming tax avoidance activities captured by both GAAP and cash effective tax rate. The mean and median of NCTA_ETR have the lowest value in the slightly miss (SMS) and slightly meet (SMT) groups, suggesting that firms that are closer to the analysts' forecast by a few cents engage in less non-conforming tax avoidance activities (captured by NCTA_ETR measure). The mean and median of NCTA_CETR have the lowest value in the easily miss group (EMS), suggesting that firms that miss the analysts' forecast by

[28] See Appendix C for mean and median of alternative non-conforming tax avoidance proxies (GAAP_ETR and Cash_ETR) by earnings surprise groups.

more cents of earnings engage in less non-conforming tax avoidance activities (captured by NCTA_CETR measure).

The table also presents the mean and median of earnings surprises by earnings surprise groups. In the final sample, the median and mean of ES for both groups SMS and SMT are -0.01 and 0.01 cent, respectively[29]. These indicate that most (and the average) firms in the group that slightly fail to meet the analysts' expectations miss them because of a penny per share. Most (and the average) firms in the group that slightly meet the expectations beat them by 1 cent per share. The median for the EMS and EMT groups is -0.10 and 0.07 cents, respectively, suggesting that most firms in EMS miss the target by more cents than most firms in EMT meet the target.

TABLE 4 – Mean and median of tax avoidance proxies and earnings surprise by earnings surprise groups

ES		CTA		NCTA_ETR		NCTA_CETR		ES	
group	**N**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**	**Mean**	**Median**
EMS	5,279	0.001	0.007	0.000	-0.012	-0.034	-0.007	-0.154	-0.100
SMS	3,960	-0.004	0.003	-0.006	-0.016	0.004	0.012	-0.011	-0.010
SMT	7,227	-0.006	0.001	-0.006	-0.016	0.015	0.019	0.013	0.010
EMT	7,105	-0.001	0.005	0.012	-0.007	0.019	0.029	0.109	0.070
Total	**23,571**	**-0.002**	**0.004**	**0.001**	**-0.013**	**0.003**	**0.015**	**0.000**	**0.010**

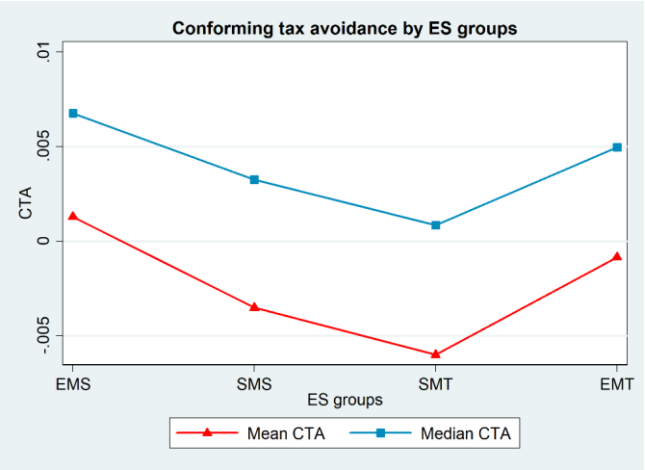
The table presents the mean and median of CTA, NCTA_ETR, NCTA_CETR, and ES by earning surprise groups. CTA is a proxy for conforming tax avoidance. NCTA_ETR and NCTA_CETR are proxies for non-conforming tax avoidance. Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end. Four groups are used to pool earnings surprises: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.03); (ii) slightly miss it (SMS) (-$0.03≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.03); and (iv) easily meet it (EMT) (ES>$0.03). All variables are defined in Appendix A.

Figure 3 presents the mean and median of conforming and non-conforming tax avoidance measures by earnings surprise groups. The means and medians of tax avoidance measures from Table 4 were used to create Figure 3. Figure 3 shows graphically the relation between tax avoidance strategies and earnings surprises.

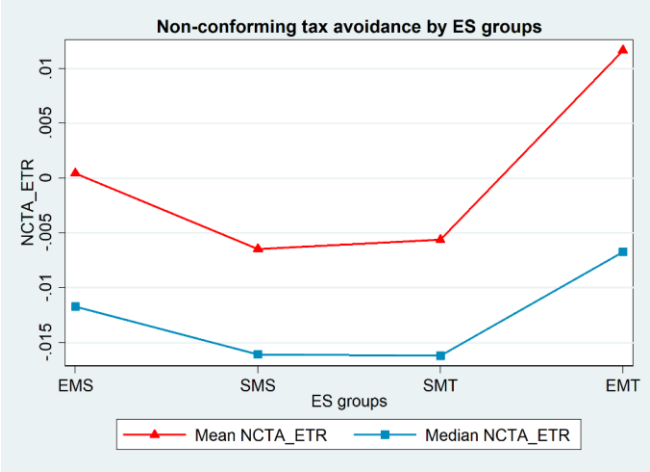
[29] Using 2 cents as a boundary to define slightly miss and meet groups, the median and mean of the earnings surprise for both groups SMS and SMT are -0.01 and 0.01 cent, respectively. Using earnings surprise within 10 percent of the value of the forecast as a boundary to define slightly miss and meet groups, the median (mean) of earnings surprise for the groups SMS and SMT is -0.02 (-0.05) and 0.02 (0.04) cents, respectively. Indicating that, regardless any of the three boundaries tested, most firms in SMS (SMT) group miss (meet) the analyst forecast by at most 2 cents.

FIGURE 3 – Mean and median of tax avoidance strategy by earnings surprise groups

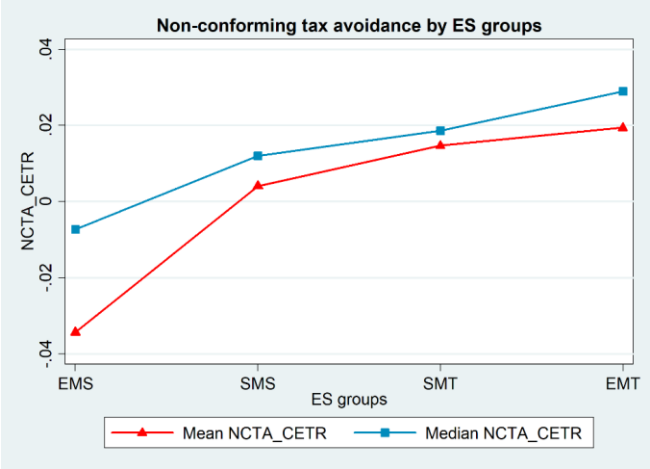
Panel A



Panel B



Panel C



(*continued on next page*)

FIGURE 3 (continued)

The figure presents the tax avoidance strategy by earnings surprise groups. Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end. Four groups are used to pool earnings surprises: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.03); (ii) slightly miss it (SMS) (-$0.03≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.03); and (iv) easily meet it (EMT) (ES>$0.03). CTA is a proxy for conforming tax avoidance. NCTA_ETR and NCTA_CETR are proxies for non-conforming tax avoidance. All variables are defined in Appendix A.

To examine whether the means of tax avoidance measures are statistically different for each earnings surprise group, I performed a parametric test. Table 5 presents mean differences in tax avoidance measures (CTA, NCTA_ETR, and NCTA_CETR) between the earnings surprise groups (EMS, SMS, SMT, and EMT). The table shows significant mean differences in CTA and NCTA_CETR for each earnings surprise group. However, as shown in Table 5, I find no statistically significant mean differences in NCTA_ETR between firms that slightly miss the analyst expectation (SMS) and slightly meet it (SMT). This indicates that the level of engagement in non-conforming tax avoidance captured by NCTA_ETR is not statistically different between the SMS and SMT groups.

TABLE 5 – T-test of difference of means in tax avoidance for earnings surprises groups

	EMS x SMS		EMS x SMT		EMS x EMT	
	Mean difference	T-statistic	Mean difference	T-statistic	Mean difference	T-statistic
CTA	0.005	6.692***	0.007	11.902***	0.002	3.564***
NCTA_ETR	0.007	2.401**	0.006	2.418**	-0.011	-4.303***
NCTA_CETR	-0.038	-10.237***	-0.049	-15.074***	-0.054	-16.105***

	SMS x SMT		SMS x EMT	
	Mean difference	T-statistic	Mean difference	T-statistic
CTA	0.002	3.586***	-0.003	-3.926***
NCTA_ETR	-0.001	-0.354	-0.018	-7.209***
NCTA_CETR	-0.011	-3.413***	-0.015	-4.800***

	SMT x EMT	
	Mean difference	T-statistic
CTA	-0.005	-9.075***
NCTA_ETR	-0.017	-8.309***
NCTA_CETR	-0.005	-1.833*

Significance at the 10%, 5%, and 1% levels are indicated by ∗, ∗∗, and ∗∗∗, respectively.
The table presents the results of t-test of mean differences in tax avoidance for each earnings surprise group. All variables are defined in Appendix A.

Based on my hypotheses, I expect firms in EMS and EMT groups to engage in more (less) conforming (non-conforming) tax avoidance than firms in SMS and SMT groups. Parallelly, I expect firms in SMS and SMT groups to engage in less (more) conforming (non-conforming) tax avoidance than firms in EMS and EMT groups.

On average, firms that easily miss (EMS group) the analyst expectations engage in (i) more conforming tax avoidance activities than firms in all other ES groups and (ii) less non-conforming tax avoidance activities (captured by NCTA_CETR) than firms in all other ES groups, mainly avoiding the engagement in tax avoidance strategies that generate temporary differences between book income and taxable income. The univariate results of the EMS group are consistent with Hypothesis 1 and consistent with Hypothesis 2 when non-conforming tax avoidance is captured by NCTA_CETR.

On average, firms that easily meet (EMT group) analyst expectations engage in (i) more conforming tax avoidance activities than firms in SMS and SMT groups and (ii) more non-conforming tax avoidance activities than firms in all other groups, using tax avoidance strategies that generate both permanent and temporary differences between book income and taxable income. These results are consistent with Hypothesis 1 and inconsistent with Hypothesis 2.

On average, firms that slightly miss (SMS group) the analyst expectation engage in (i) less conforming tax avoidance activities than firms in EMS and EMT groups and (ii) less non-conforming tax avoidance activities (captured by NCTA_ETR) than firms in EMS and EMT groups. These results are consistent with Hypothesis 1 and inconsistent with Hypothesis 2 when non-conforming tax avoidance is captured by NCTA_ETR.

On average, firms that slightly meet (SMT group) the analyst expectation engage in (i) less conforming tax avoidance activities than firms in all other ES groups and (ii) less non-conforming tax avoidance activities (captured by NCTA_ETR) than firms in EMS and EMT groups. Similar to the results for the SMS group, these results are consistent with Hypothesis 1 and inconsistent with Hypothesis 2 when non-conforming tax avoidance is captured by NCTA_ETR. A multivariate analysis is necessary to control other explanatory variables of tax avoidance to determine whether earnings surprise affects firms' tax avoidance strategy.

5.3 Multivariate results

Tables 6, 7, and 8 present the regression analysis of my hypotheses (H1 and H2). I estimate all regression models presented in these Tables using ordinary least squares regression.

I also include fixed effect controls for year and industry and estimate robust standard errors clustered by firm. Table 6 presents the results of estimating Equation (2) for the measure of conforming tax avoidance as the dependent variable and Equation (3) for each of the two measures of non-conforming tax avoidance as dependent variables. Consistent with H1, CTA is positively and significantly (at the 1 percent level) associated with absolute earnings surprise, indicating that firms engage in more conforming tax avoidance on average when their earnings are further from analysts' forecast (i.e., higher absolute earnings surprise). Economically, for the average firm, an increase of 0.004 of ES_Abs_Scaled[30] (from the 25th percentile to the 75th percentile) results in a 46.8 percent (from -0.2 percent to -0.11 percent) increase in conforming tax avoidance (CTA)[31]. Given my sample average total assets of $3.2 billion[32] (untabulated), this 46.8 percent increase in CTA would result in a decrease in cash taxes paid of $2.9 million[33] for an average firm.

Consistent with H2, NCTA_CETR is negatively and significantly (at the 1 percent level) associated with absolute earnings surprise, indicating that firms engage in more non-conforming tax avoidance on average when their earnings are closer to analysts' forecast (i.e., lower absolute earnings surprise). On the other hand, NCTA_ETR is positively and significantly (at the 1 percent level) associated with absolute earnings surprise. This result is inconsistent with H2. The divergent results conditional to the measure of non-conforming tax avoidance suggest that firms not only engage in conforming or non-conforming tax avoidance depending on their earnings surprise but also engage in different non-conforming tax avoidance activities depending on their earnings surprise.

[30] Equivalent to 16 cents of absolute earnings surprise that is found through the following steps: [0.004 (ES_Abs_Scaled at Q3 from Table 2) x 40.82 (stock price at the beginning of the fiscal year at Q3, untabulated)] – [0.000 (ES_Abs_Scaled at Q1 from Table 2) x 14 (stock price at the beginning of the fiscal year at Q1, untabulated)] = 16 cents.

[31] To calculate the effect from moving from the 25th percentile to the 75th percentile of absolute scaled earnings surprise on conforming tax avoidance, I perform the following steps: [0.004 (ES_Abs_Scaled at Q3 from Table 2) - 0.000 (ES_Abs_Scaled at Q1 from Table 2)] x 0.234 (the coefficient on ES_Abs_Scaled from Table 6, Column [1]) ÷ -0.002 (mean CTA from Table 2) = -46.8 percent.

[32] I winsorize the variable total asset (AT) at the 1st and 99th percentiles. Then, I calculate the mean of AT for the 23,533 firm-year observations included in Equation (2).

[33] The average total assets of $3,201 million multiplied by -0.09 percent (variation of -0.2 percent to -0.11 percent) equal a decrease in cash taxes paid of $2.9 million.

TABLE 6 – The effects of earnings surprise (absolute) on conforming and non-conforming tax avoidance

Variable	(1) CTA	(2) NCTA_ETR	(3) NCTA_CETR
Intercept	0.015***	0.011*	-0.028***
	(0.002)	(0.006)	(0.009)
ES_Abs_Scaled	0.234***	0.566***	-1.316***
	(0.031)	(0.181)	(0.226)
Size	0.001***	-0.003***	-0.005***
	(0.000)	(0.001)	(0.001)
MTB	-0.002***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)
EBIT	-0.031***	-0.008*	0.019***
	(0.002)	(0.005)	(0.006)
Mgr_Ability	-0.014***	0.028***	0.014***
	(0.001)	(0.004)	(0.005)
Leverage	0.013***	-0.007	0.028***
	(0.002)	(0.007)	(0.009)
PPE	-0.015***	0.033***	0.063***
	(0.002)	(0.007)	(0.010)
NOL		0.009***	0.031***
		(0.003)	(0.003)
DNOL		-0.148***	-0.233***
		(0.031)	(0.032)
Intangible		-0.015**	0.002
		(0.007)	(0.008)
ROA		-0.282***	0.033*
		(0.016)	(0.019)
EQINC		0.468	-0.299
		(0.316)	(0.418)
FI		0.315***	0.269***
		(0.041)	(0.046)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes
Observations	23,533	23,533	23,533
Adjusted R^2	0.180	0.054	0.034

The sample contains 23,533 firm-year observations during 1994–2016. Column (1) presents the results of estimating the effects of earnings surprise on conforming tax avoidance (Equation [2]). Columns (2) and (3) present results of estimating the effects of earnings surprise on non-conforming tax avoidance (Equation [3]). The absolute earnings surprise (ES_Abs_Scaled) is scaled by the stock price at the beginning of the fiscal year. A higher ES_Abs_Scaled implies a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

Economically, for the average firm, a decrease of 0.004 of ES_Abs_Scaled (from the 75th percentile to the 25th percentile) results in a 175.5 percent (from 0.3 percent to 0.8 percent)

increase in non-conforming tax avoidance (NCTA_CETR)[34]. Given my sample average pre-tax earnings before exceptional items of $378.4 million[35] (untabulated), this 175.5 percent decrease in NCTA_CETR would result in a decrease in cash taxes paid of $2 million[36] for an average firm. Economically, for the average firm, an increase of 0.004 of ES_Abs_Scaled (from the 25th percentile to the 75th percentile) results in a 226.4 percent (from 0.1 percent to 0.3 percent) increase in non-conforming tax avoidance (NCTA_ETR)[37]. Given my sample average pre-tax earnings before exceptional items of $378.4 million (untabulated), this 226.4 percent increase in NCTA_ETR would result in a decrease in tax expenses of $0.8 million[38] for an average firm.

In summary, firms that report annual earnings further from analysts' forecast: (i) engage in more conforming tax avoidance. I interpret this result as evidence that as further firms' reported earnings are from the analysts' expectation, lower is the non-tax cost to firms engage in conforming tax avoidance strategies; (ii) engage in more non-conforming tax avoidance (captured by NCTA_ETR measure); and (iii) engage in less non-conforming tax avoidance (captured by NCTA_CETR measure). I interpret these results as evidence that firms that report annual earnings further from the analysts' expectation use mainly permanent differences to engage in non-conforming tax avoidance activities. Additionally, firms that report annual earnings around the analysts' expectations use mainly temporary differences to engage in non-conforming tax avoidance activities. These results should be interpreted with caution since the earnings surprises are absolute. Given that firms can face different non-tax costs and benefits depending on whether they meet or fail to meet analysts' forecasts (whether earnings surprises are positive or negative), they can engage in different tax avoidance strategies.

---

[34] To calculate the effect from moving from the 75th percentile to the 25th percentile of absolute earnings surprise on non-conforming tax avoidance (NCTA_CETR), I perform the following steps: [0.000 (ES_Abs_Scaled at Q1 from Table 2) - 0.004 (ES_Abs_Scaled at Q3 from Table 2)] x -1.316 (the coefficient on ES_Abs_Scaled from Table 6, Column [3]) ÷ 0.003 (mean NCTA_CETR from Table 2) = 175.5 percent.

[35] I winsorize the variable pre-tax earnings before exceptional items (PTEBX) at the 1st and 99th percentiles. Then, I calculate the mean of PTEBX for the 23,533 firm-year observations included in Equation (3).

[36] The average PTEBX of $378.4 million multiplied by 0.5 percent (variation of 0.3 percent to 0.8 percent) equal a decrease in cash taxes paid of $2 million.

[37] To calculate the effect from moving from the 25th percentile to the 75th percentile of absolute earnings surprise on non-conforming tax avoidance (NCTA_ETR), I perform the following steps: [0.004 (ES_Abs_Scaled at Q3 from Table 2) - 0.000 (ES_Abs_Scaled at Q1 from Table 2)] x 0.566 (the coefficient on ES_Abs_Scaled from Table 6, Column [2]) ÷ 0.001 (mean NCTA_ETR from Table 2) = 226.4 percent.

[38] The average PTEBX of $378.4 million multiplied by 0.2 percent (variation of 0.1 percent to 0.3 percent) equal a decrease in tax expenses of $0.8 million.

The coefficients on the control variables are significant in the expected directions. In Column (1), the coefficient estimates for Size, MTB, EBIT, Mgr_Ability, Leverage, and PPE are statistically significant at the 1 percent level; Size coefficient is positive and significant, indicating that larger firms engage in more conforming tax avoidance. Size is negatively and significantly associated with non-conforming tax avoidance measures, indicating that larger firms engage in less non-conforming tax avoidance. In Column (2), the coefficient estimates for Size, MTB, Mgr_Ability, PPE, NOL, DNOL, ROA, and FI are statistically significant at the 1 percent level; Intangible is statistically significant at the 5 percent level; EBIT is statistically significant at the 10 percent level; and Leverage and EQINC are not statistically significant. In Column (3), the coefficient estimates for Size, MTB, EBIT Mgr_Ability, Leverage, PPE, NOL, DNOL, and FI are statistically significant at the 1 percent level; ROA is statistically significant at the 10 percent level; Intangible and EQINC are not statistically significant.

Table 7 presents the results of estimating Equations (4) and (5) for positive and negative earnings surprise separately. Consistent with H1, CTA is positively and significantly (at the 1 percent level) associated with positive earnings surprises and negatively and significantly (at the 1 percent level) associated with negative earnings surprises. This result indicates that firms that report earnings further (positively or negatively) from analysts' forecasts engage in more conforming tax avoidance on average. NCTA_CETR and NCTA_ETR are positively and significantly (at the 1 percent level) associated with positive and negative earnings surprises. This result indicates that firms that report earnings positively further from analysts' forecast (i.e., higher positive ES) engage in more non-conforming tax avoidance on average, inconsistent with H2. Moreover, firms that report earnings negatively closer to analysts' forecast (i.e., higher negative ES) engage in more non-conforming tax avoidance on average, consistent with H2.

The coefficients of ES_Scaled (positive and negative) are in the same direction for equations with NCTA_CETR or NCTA_ETR as dependent variables. The direction similarity of both non-conforming tax avoidance proxies indicates that (i) positive earnings surprises are driving the association between absolute earnings surprise and NCTA_ETR, and (ii) negative earnings surprises are driving the association between absolute earnings surprise and NCTA_CETR (presented in Table 6).

TABLE 7 – The effects of positive and negative earnings surprise on conforming and non-conforming tax avoidance

Variable	(1) CTA	(2) NCTA_ETR	(3) NCTA_CETR	(4) CTA	(5) NCTA_ETR	(6) NCTA_CETR
Intercept	0.013***	0.014*	-0.017*	0.017***	0.005	-0.037***
	(0.002)	(0.008)	(0.010)	(0.003)	(0.010)	(0.013)
ES_Scaled (positive)	0.493***	2.618***	1.521***			
	(0.066)	(0.285)	(0.329)			
ES_Scaled (negative)				-0.174***	0.680**	3.494***
				(0.044)	(0.288)	(0.361)
Size	0.001***	-0.003***	-0.006***	0.001*	-0.002	-0.005***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.002)
MTB	-0.001***	0.004***	0.005***	-0.002***	0.003***	0.002**
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)
EBIT	-0.029***	-0.007	0.016***	-0.037***	-0.015**	0.017*
	(0.002)	(0.006)	(0.006)	(0.003)	(0.008)	(0.009)
Mgr_Ability	-0.013***	0.024***	0.021***	-0.014***	0.033***	0.004
	(0.001)	(0.005)	(0.006)	(0.002)	(0.006)	(0.008)
Leverage	0.011***	-0.012	0.016	0.015***	-0.000	0.043***
	(0.002)	(0.008)	(0.010)	(0.003)	(0.010)	(0.013)
PPE	-0.016***	0.030***	0.073***	-0.015***	0.038***	0.056***
	(0.003)	(0.008)	(0.010)	(0.003)	(0.010)	(0.014)
NOL		0.010***	0.027***		0.006	0.032***
		(0.003)	(0.004)		(0.004)	(0.005)
DNOL		-0.142***	-0.188***		-0.146***	-0.300***
		(0.036)	(0.034)		(0.054)	(0.060)
Intangible		-0.010	0.002		-0.021**	0.007
		(0.008)	(0.009)		(0.010)	(0.013)
ROA		-0.274***	-0.045**		-0.321***	0.084***
		(0.018)	(0.021)		(0.025)	(0.030)
EQINC		0.295	-0.329		0.536	-0.356
		(0.365)	(0.456)		(0.450)	(0.621)
FI		0.330***	0.269***		0.279***	0.268***
		(0.046)	(0.048)		(0.054)	(0.066)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,309	14,309	14,309	9,224	9,224	9,224
Adjusted R^2	0.177	0.071	0.035	0.192	0.052	0.055

The sample contains 14,309 (9,224) firm-year observations with positive (negative) earnings surprises during 1994–2016. Columns (1) to (3) present results of estimating the effects of positive earnings surprise on tax avoidance. Columns (4) to (6) present results of estimating the effects of negative earnings surprise on tax avoidance (Equations [4] and [5]). Earnings surprise is scaled by the stock price at the beginning of the fiscal year. A higher ES_Scaled implies a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

In summary, firms with larger positive earnings surprises engage in more conforming and non-conforming tax avoidance. I interpret this result as evidence that as positively further firms' reported earnings are from the analysts' expectation, lower is the non-tax cost to firms engaging in conforming tax avoidance strategies. Additionally, I interpret this result as evidence that firms do not expect to report lower earnings to the market, so they engage in both conforming and non-conforming tax avoidance (generating permanent and temporary book-tax differences). Engagement in non-conforming tax avoidance activities reduces tax expenses and, consequently, increases net income. Therefore, firms with larger positive earnings surprise use conforming and non-conforming tax avoidance strategies as complements (not as substitutes).

In summary, firms with larger negative earnings surprise: (i) engage in more conforming tax avoidance and (ii) engage in less non-conforming tax avoidance. I interpret this result as evidence that as negatively further firms' reported earnings are from the analysts' expectation, lower is the non-tax cost to firms engaging in conforming tax avoidance strategies. Moreover, as negatively closer firms' reported earnings are from the analysts' expectation, higher is the non-tax benefit to firms engaging in non-conforming tax avoidance strategies and presenting higher book income to the market.

Table 8 presents the results from estimating Equations (6) and (7). Consistent with H1 and inconsistent with H2, Columns (1) – (3) show that EMT coefficients are positive and statistically significant. These results indicate that firms that easily meet the analysts' forecast engage in more conforming and non-conforming tax avoidance than firms that slightly meet it, reassuring the results presented in Table 7, Columns (1) – (3).

Economically, on average, firms that easily meet the analyst forecast engage in 0.4 percent more conforming tax avoidance than firms that slightly meet the analyst forecast. Given my sample average total assets of $3.2 billion (untabulated), the difference of 0.4 percent in conforming tax avoidance would result in lower cash taxes paid of $12.8 million[39] for an average firm in the EMT group. Additionally, on average, firms that easily meet the analyst forecast engage in 1.6 percent more non-conforming tax avoidance (captured by NCTA_ETR) than firms that slightly meet the analyst forecast. Given my sample average pre-tax earnings before exceptional items of $378.4 million (untabulated), the difference of 1.6 percent in NCTA_ETR would result in lower tax expenses of $6 million[40] for an average firm in the EMT group. On average, firms that easily meet the analyst forecast engage in 0.6 percent more non-

[39] The average total assets of $3,201 million multiplied by 0.4 percent equal a lower cash tax paid of $12.8 million.

[40] The average PTEBX of $378.4 million multiplied by 1.6 percent equal a lower tax expense of $6 million.

conforming tax avoidance (captured by NCTA_CETR) than firms that slightly meet the analyst forecast. Given my sample average pre-tax earnings before exceptional items of $378.4 million (untabulated), the difference of 0.6 percent in NCTA_CETR would result in lower cash taxes paid of $2.3 million[41] for an average firm in the EMT group.

Consistent with both H1 and H2, Column (1) demonstrates that the EMS coefficient is positive and statistically significant. At the same time, Column (3) shows that the EMS coefficient is negative and statistically significant (both at the 1 percent level). The EMS coefficient is not statistically significant in Column (2). These results indicate that firms that easily miss the analyst expectation engage in more (less) conforming (non-conforming) tax avoidance than firms that slightly meet it.

Economically, on average, firms that easily miss the analyst forecast engage in 0.3 percent more conforming tax avoidance than firms that slightly meet the analyst forecast. Given my sample average total assets of $3.2 billion (untabulated), the difference of 0.3 percent in conforming tax avoidance would result in lower cash taxes paid of $9.6 million[42] for an average firm in the EMS group. Additionally, on average, firms that easily miss the analyst forecast engage in 4.5 percent less non-conforming tax avoidance (captured by NCTA_CETR) than firms that slightly meet the analyst forecast. Given my sample average pre-tax earnings before exceptional items of $378.4 million (untabulated), the difference of 4.5 percent in NCTA_CETR would result in higher cash taxes paid of $17 million[43] for an average firm in the EMS group.

Regarding firms around the analyst forecast, I do not present a hypothesis differentiating corporate tax avoidance strategies for firms that meet the analyst forecast by a few cents and firms that miss it also by a few cents. Column (1) demonstrates that the SMS coefficient is positive and statistically significant (at the 10 percent level). Column (3) shows that the SMS coefficient is negative and statistically significant (at the 1 percent level). These results indicate that firms that slightly miss the analyst expectation engage in more (less) conforming (non-conforming) tax avoidance than firms that slightly meet it.

[41] The average PTEBX of $378.4 million multiplied by 0.6 percent equal a lower cash tax paid of $2.3 million.

[42] The average total assets of $3,201 million multiplied by 0.3 percent equal a lower cash tax paid of $9.6 million.

[43] The average PTEBX of $378.4 million multiplied by 4.5 percent equal a higher cash tax paid of $17 million.

TABLE 8 – The effects of earnings surprise groups on conforming and non-conforming tax avoidance

	(1)	(2)	(3)
Variable	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.017***	0.018***	-0.030***
	(0.002)	(0.006)	(0.009)
EMS	0.003***	-0.002	-0.045***
	(0.001)	(0.003)	(0.003)
SMS	0.001*	-0.004	-0.009***
	(0.001)	(0.002)	(0.003)
EMT	0.004***	0.016***	0.006**
	(0.001)	(0.002)	(0.003)
Size	0.000	-0.004***	-0.004***
	(0.000)	(0.001)	(0.001)
MTB	-0.002***	0.004***	0.003***
	(0.000)	(0.000)	(0.000)
EBIT	-0.031***	-0.009*	0.018***
	(0.002)	(0.005)	(0.006)
Mgr_Ability	-0.013***	0.028***	0.014**
	(0.001)	(0.004)	(0.005)
Leverage	0.013***	-0.007	0.025***
	(0.002)	(0.007)	(0.009)
PPE	-0.016***	0.034***	0.069***
	(0.002)	(0.007)	(0.009)
NOL		0.009***	0.030***
		(0.003)	(0.003)
DNOL		-0.152***	-0.230***
		(0.030)	(0.031)
Intangible		-0.015**	0.005
		(0.007)	(0.008)
ROA		-0.289***	0.022
		(0.016)	(0.019)
EQINC		0.480	-0.286
		(0.314)	(0.419)
FI		0.315***	0.251***
		(0.040)	(0.045)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes
Observations	23,571	23,571	23,571
Adjusted R^2	0.179	0.056	0.042

The sample contains 23,571 firm-year observations during 1994–2016. Column (1) presents the results of estimating the effects of earnings surprise groups on conforming tax avoidance (Equation [6]). Columns (2) and (3) present results of estimating the effects of earnings surprise groups on non-conforming tax avoidance (Equation [7]). A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance. Earnings surprises are pooled in four groups based on earnings surprise distribution: (i) easily miss the analyst consensus forecast (EMS) (ES<-\$0.03); (ii) slightly miss it (SMS) (-\$0.03≤ES<\$0); (iii) slightly meet it (SMT) (\$0≤ES≤\$0.03); and (iv) easily meet it (EMT) (ES>\$0.03). I omit the SMT group, so this group is the reference group.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

Economically, on average, firms that slightly miss the analyst forecast engage in 0.1 percent more conforming tax avoidance than firms that slightly meet the analyst forecast. Given my sample average total assets of $3.2 billion (untabulated), the difference of 0.1 percent in conforming tax avoidance would result in lower cash taxes paid of $3.2 million[44] for an average firm in the SMS group. Additionally, on average, firms that slightly miss the analyst forecast engage in 0.9 percent less non-conforming tax avoidance (captured by NCTA_CETR) than firms that slightly meet the analyst forecast. Given my sample average pre-tax earnings before exceptional items of $378.4 million (untabulated), the difference of 0.9 percent in NCTA_CETR would result in higher cash taxes paid of $3.4 million[45] for an average firm in the SMS group.

In summary, the results in Table 8 demonstrate that, on average: (i) firms that easily miss analysts' forecast, slightly miss it, and easily meet it engage in more conforming tax avoidance strategies than firms that slightly meet it. I interpret these findings as evidence that firms that meet the analysts' forecast by a few cents engage in less conforming tax avoidance activities because they would face higher non-tax costs[46] than firms in other ES groups if they decide to engage in conforming tax avoidance; (ii) firms that easily meet analysts' forecast also engage in more non-conforming tax avoidance strategies (captured by both NCTA_ETR and NCTA_CETR) than firms that slightly meet it. I interpret these results as evidence that firms that beat the analysts' expectations by more than 3 cents use income tax expenses reduction to handily beat the analysts' benchmark. Also, I interpret these results as evidence that firms that easily meet the analyst forecast use conforming and non-conforming tax avoidance strategies as complements; and (iii) firms that slightly and easily miss analysts' forecast engage in less non-conforming tax avoidance strategies (captured by NCTA_CETR) than firms that slightly meet it. Given that the coefficients of EMS and SMS on NCTA_ETR are not statistically significant, I interpret these findings as evidence that firms that fail to meet the analysts' expectations engage in non-conforming tax avoidance activities that result mainly in temporary book-tax differences.

[44] The average total assets of $3,201 million multiplied by 0.1 percent equal a lower cash tax paid of $3.2 million.

[45] The average PTEBX of $378.4 million multiplied by 0.9 percent equal a higher cash tax paid of $3.4 million.

[46] Given that conforming tax avoidance strategies reduce the book income, firms that meet the analysts' forecast just by a few cents could not meet the analyst target if they engage in conforming tax avoidance and, consequently, they would face the non-tax costs associated to missing the analysts' expectation.

Badertscher et al. (2019) use analyst coverage as a proxy for higher capital market pressure. They find that firms with analyst coverage (i.e., subject to higher capital market pressure) engage in less conforming tax avoidance and more non-conforming tax avoidance. In my sample, all firms have analyst coverage. Thus, they are all subject to higher capital market pressure. Expanding Badertscher's idea of capturing capital market pressure, I use higher analyst coverage as a proxy for higher capital market pressure. Higher analyst coverage puts greater pressure on management (Allen et al., 2016). Therefore, firms with a higher number of analysts covering them have more capital market pressure than firms with a lower number of analysts covering them.

Table 9 presents the results from estimating the relation between tax avoidance strategies and earnings surprise in firms with lower and higher analyst coverage. Higher analyst coverage refers to firms whose number of analysts covering them are in the top quartile of the sample, and lower analyst coverage refers to firms whose number of analysts covering them are in the bottom quartile of the sample. Columns (1) and (4) show a positive and significant association between CTA and absolute earnings surprise in firms with lower or higher analyst coverage. Thus, the number of analysts covering the firm is not changing the association between CTA and absolute earnings surprise[47].

Columns (2) and (3) show a positive (negative) and significant association between NCTA_ETR (NCTA_CETR) and absolute earnings surprise in firms with lower analyst coverage. In firms with higher analyst coverage (columns [5] and [6]), the association between non-conforming tax avoidance and absolute earnings surprise becomes insignificant. Thus, all firms, independently of their earnings surprise, may be engaging in less or more non-conforming tax avoidance when subject to higher analyst coverage. If firms, in general, are engaging in less non-conforming tax avoidance, these findings would be in line with the investor recognition and information demand views pointed out by Allen et al. (2016). If firms, in general, are engaging in more non-conforming tax avoidance, these findings would be in line with the market pressure view pointed out by Allen et al. (2016).

[47] I also test whether analyst coverage affects the association between CTA and signaled earnings surprise. In untabulated results, I find that the association between CTA and positive earnings surprise is kept in firms with lower or higher analyst coverage. However, the association between CTA and negative earnings surprise becomes insignificant, in firms with higher analyst coverage. The loss of significance may be explained by the fact that the decision to engage in conforming tax avoidance by firms that miss the analyst forecast may be more costly under higher capital market pressure.

TABLE 9 – The effects of earnings surprise (absolute) on conforming and non-conforming tax avoidance in firms with lower or higher analyst coverage

	Lower analyst coverage			Higher analyst coverage		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.034***	-0.026**	-0.004	0.014***	0.032*	0.007
	(0.003)	(0.013)	(0.017)	(0.005)	(0.017)	(0.023)
ES_Abs_Scaled	0.140***	0.689***	-1.216***	0.374***	0.820	-1.272
	(0.037)	(0.214)	(0.284)	(0.118)	(0.655)	(0.860)
Size	-0.002***	0.001	-0.015***	-0.000	-0.002	-0.005**
	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)
MTB	-0.002***	0.008***	0.004***	-0.001***	0.001*	0.002***
	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
EBIT	-0.035***	-0.030***	0.014	-0.021***	0.015*	0.030***
	(0.003)	(0.009)	(0.009)	(0.003)	(0.008)	(0.010)
Mgr_Ability	-0.022***	0.045***	0.002	-0.010***	0.002	-0.003
	(0.002)	(0.008)	(0.011)	(0.002)	(0.007)	(0.009)
Leverage	0.014***	-0.025*	-0.001	0.018***	-0.002	0.031**
	(0.003)	(0.013)	(0.017)	(0.003)	(0.012)	(0.016)
PPE	-0.019***	0.016	0.056***	-0.013***	0.039***	0.059***
	(0.003)	(0.012)	(0.016)	(0.004)	(0.013)	(0.019)
NOL		0.011**	0.047***		0.002	0.015***
		(0.005)	(0.006)		(0.004)	(0.006)
DNOL		-0.190***	-0.294***		-0.092	-0.100*
		(0.052)	(0.060)		(0.068)	(0.060)
Intangible		-0.012	0.017		0.006	-0.020
		(0.014)	(0.016)		(0.013)	(0.015)
ROA		-0.256***	0.104***		-0.324***	-0.045
		(0.028)	(0.033)		(0.034)	(0.037)
EQINC		0.789	1.316*		-0.193	-1.363**
		(0.619)	(0.686)		(0.419)	(0.657)
FI		0.203**	0.273***		0.434***	0.330***
		(0.091)	(0.095)		(0.064)	(0.073)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,000	7,000	7,000	5,915	5,915	5,915
Adjusted R^2	0.211	0.058	0.040	0.186	0.063	0.044

The sample contains 7,000 (5,915) firm-year observations with lower (higher) analyst coverage during 1994–2016. Column (1) presents the results of estimating the effects of earnings surprise on conforming tax avoidance (Equation [2]). Columns (2) and (3) present results of estimating the effects of earnings surprise on non-conforming tax avoidance (Equation [3]). The absolute earnings surprise (ES_Abs_Scaled) is scaled by the stock price at the beginning of the fiscal year. A higher ES_Abs_Scaled implies a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

5.3.1 Endogeneity

Table 10 presents the results of estimating Equations (2) and (3) using System GMM. I include two lags of dependent variables as independent variables, and I use the third and fourth lags of all endogenous variables as instruments. My assumption in the GMM regression is that all the regressors except year dummies are endogenous. In Column (1), similar to my previous result and consistent with H1, I find a positive and significant coefficient on ES_Abs_Scaled. In Column (2), similar to my previous result and inconsistent with H2, I find a positive and significant coefficient on ES_Abs_Scaled. In both Columns (1) and (2), the significance level is weaker, and the magnitude of coefficients is larger in this specification than in the OLS regression (Table 6). In Column (3), unlike my previous result, I find no significant coefficient on ES_Abs_Scaled. These results indicate that, even after I control for possible simultaneity between corporate tax avoidance and earnings surprises, firms engage on average in more conforming tax avoidance and non-conforming tax avoidance (captured by NCTA_ETR) when their earnings are further from analysts' forecast (i.e., higher absolute earnings surprise).

The results of the specification tests presented in Table 10 show that: (i) AR (1) test yields a p-value of 0.000 in Columns (1) and (3) and 0.006 in Column (2), indicating strong evidence against the null hypothesis of no autocorrelation in the first differenced errors at order 1; (ii) AR (2) test yields a p-value of 0.539 in Column (1), 0.667 in Column (2), and 0.311 in Column (3), indicating no significant evidence against the null hypothesis of no autocorrelation in the first differenced errors at order 2; (iii) Hansen test of over-identification yields a p-value of 0.656 in Column (1), 0.411 in Column (2), and 0.243 in Column (3), indicating no significant evidence against the null that all instruments are valid; (iv) Diff-in-Hansen tests of exogeneity yields a p-value of 0.656 in Column (1), 0.411 in Column (2), and 0.243 in Column (3), indicating no significant evidence against the null of joint validity of the full instrument set.

TABLE 10 – The effects of earnings surprise (absolute) on conforming and non-conforming tax avoidance estimated using System GMM

Variable	(1) CTA	(2) NCTA_ETR	(3) NCTA_CETR
Intercept	-0.005	-0.119	0.137
	(0.017)	(0.074)	(0.108)
ES_Abs_Scaled	1.044*	4.755*	-3.653
	(0.558)	(2.518)	(3.447)
Size	0.001	0.013	-0.020
	(0.003)	(0.013)	(0.019)
MTB	-0.000	0.001	-0.001
	(0.001)	(0.003)	(0.004)
EBIT	-0.025	0.037	0.038
	(0.017)	(0.051)	(0.089)
Mgr_Ability	0.003	0.060	0.035
	(0.010)	(0.050)	(0.066)
Leverage	0.005	0.082	-0.126*
	(0.013)	(0.058)	(0.072)
PPE	0.001	-0.030	-0.082
	(0.019)	(0.102)	(0.128)
NOL		-0.008	0.012
		(0.015)	(0.018)
DNOL		0.669	-0.312
		(0.670)	(0.789)
Intangible		0.031	0.014
		(0.071)	(0.093)
ROA		-0.254*	0.112
		(0.131)	(0.194)
EQINC		-3.274	-1.744
		(2.232)	(3.177)
FI		0.155	0.216
		(0.276)	(0.337)
L1.CTA	0.382**		
	(0.154)		
L2.CTA	0.051		
	(0.055)		
L1.NCTA_ETR		0.014	
		(0.176)	
L2.NCTA_ETR		0.057*	
		(0.032)	
L1.NCTA_CETR			0.353**
			(0.157)
L2.NCTA_CETR			0.046*
			(0.028)

(*continued on next page*)

TABLE 10 (continued)

Variable	(1) CTA	(2) NCTA_ETR	(3) NCTA_CETR
Observations	12,778	12,778	12,778
Number of gvkey	2,310	2,310	2,310
Number of Instruments	45	63	63
AR(1) test (*p*-value)	0.000	0.006	0.000
AR(2) test (p-value)	0.539	0.667	0.311
Hansen test of over-identification (p-value)	0.656	0.411	0.243
Diff-in-Hansen tests of exogeneity (p-value)	0.499	0.267	0.254

The sample contains 12,778 firm-year observations during 1994–2016. Column (1) presents the results of estimating the effects of earnings surprise on conforming tax avoidance (Equation [2]) using System GMM. Columns (2) and (3) present results of estimating the effects of earnings surprise on non-conforming tax avoidance (Equation [3]) using System GMM. The absolute earnings surprise is scaled by the stock price at the beginning of the fiscal year. A higher ES_Abs_Scaled implies a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance. AR(1) and AR(2) are tests for first- and second-order autocorrelation in the first-differenced errors under the null of no serial correlation. The Hansen test of over-identification is under the null that all instruments are valid. Diff-in-Hansen exogeneity tests are under the null of joint validity of the full instrument set.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year dummies. All variables are defined in Appendix A.

6. ROBUSTNESS ANALYSIS

To assess the extent to which my results are sensitive to the choices of (i) the date of analysts' consensus forecast, (ii) the measure of analysts' consensus forecast, (iii) the boundary to segregate big and small missers (beaters), and (iv) the adjusted effective tax rates as non-conforming tax avoidance measures, I run additional tests. To the choice of using analysts' consensus forecast estimated in the second month of the firm's last fiscal quarter, I run additional tests using the consensus forecast estimated in (i) the first month of the firm's last fiscal quarter, (ii) the last month of the firm's last fiscal quarter, (iii) the first month of the next fiscal year, and (iv) the month of the earnings announcement date. To the choice of using the price-scaled mean of analysts' consensus EPS forecast, I run additional tests using (i) the price-scaled median of analysts' consensus EPS forecast and (ii) the mean, without scaling by price, of analysts' consensus EPS forecast. To the choice of segregating big and small missers (beaters) based on the boundary of 3 cents earnings surprise, I run additional tests using (i) 2 cents as a boundary and (ii) 10 percent of the value of earnings forecast as a boundary. To the choice of using size-industry-adjusted ETR and CETR measured over one year, I ran additional tests using (i) the raw GAAP_ETR and Cash_ETR measured over one year and (ii) NCTA_ETR and NCTA_CETR measured over three years.

Similar to my main results, the results of sensitive tests, in general, are consistent with Hypothesis 1, inconsistent with Hypothesis 2 when the earnings surprise is positive and consistent with Hypothesis 2 when the earnings surprise is negative. These results indicate that, in general, my findings are not sensitive to my empirical choices. The results in the sensitive tests that draw attention to the change in the main results (statistical significance drop) are: (i) ES (negative) on NCTA_ETR is statistically significant when the earnings surprise is measured using the price-scaled mean of analysts' consensus forecast estimated at the second month of firm's last fiscal quarter (Table 7). The statistical significance drops when the date or measure of analysts' consensus forecast varies. This result indicates that my finding using NCTA_ETR as the dependent variable, in Equation (5) estimated separately for positive and negative earnings surprise, is sensitive to the choice of analysts' consensus forecast date and measure; and (ii) EMT on NCTA_CETR is statistically significant when the earnings surprise is measured using the price-scaled mean of analysts' consensus forecast estimated at the second month of firm's last fiscal quarter (Table 8). The statistical significance drops when analysts' consensus forecast date varies. This result indicates that my finding using NCTA_CETR as the

dependent variable in Equation (7) is sensitive to the choice of analysts' consensus forecast date.

6.1 Different analyst consensus forecast dates to measure earnings surprise

To assess the extent to which my results are sensitive to the choice of using analysts' consensus forecast estimated in the second month of the firm's last fiscal quarter, I run additional tests using different analyst consensus forecast dates. As sensitive tests, I use the consensus forecast calculated in (i) the first month of the firm's last fiscal quarter, (ii) the last month of the firm's last fiscal quarter, (iii) the first month of the next fiscal year, and (iv) the month of the earnings announcement date. The results in Tables 11, 12, and 13 are consistent with Hypothesis 1. Moreover, similar to my main results, they are inconsistent with Hypothesis 2 when the earnings surprise is positive and consistent with Hypothesis 2 when the earnings surprise is negative. These results indicate that, in general, my findings are not sensitive to the choice of analysts' consensus forecast date. It is important to note that no pattern is noticed when the analysts' consensus forecast estimation date gets closer to the earnings announcement date.

Table 11 presents the results from estimating Equations (2) and (3) using different dates for the analysts' consensus forecast. In Panel A, earnings surprise is measured using the mean of analysts' consensus forecast calculated at the first (Columns [1] – [3]) and last (Columns [4] – [6]) month of firms' last fiscal quarter. In Panel B, earnings surprise is measured using the mean of analysts' consensus forecast calculated at the first month of the next fiscal year (Columns [1] – [3]) and at the month of the earnings announcement date (Columns [4] – [6]).

Similar to the results in Table 6, the results in Table 11 are consistent with Hypothesis 1 and inconsistent with Hypothesis 2 when NCTA_ETR is the dependent variable. Unlike the results in Table 6, ES_Abs_Scaled is not statistically significant in Columns (3) and (6). This result indicates that my finding using NCTA_CETR as the dependent variable in Equation (3) is sensitive to the choice of analysts' consensus forecast date. ES_Abs_Scaled on NCTA_CETR is statistically significant only when the earnings surprise is measured using the mean of analysts' consensus forecast estimated at the second month of the firm's last fiscal quarter (Table 6). Using this date, the level of engagement in non-conforming tax avoidance for firms with positive and negative earnings surprises could be more symmetrically divergent. Hence, the absolute earnings surprise on NCTA_CETR is not statistically significant. For a better

understanding of whether positive or negative ES_Scaled is driving the association between absolute earnings surprise and NCTA measures, I analyze the results of signaled ES_Scaled.

TABLE 11 – The effects of earnings surprise (absolute) on conforming and non-conforming tax avoidance (alternative dates)

Panel A

	First month of the firm's last fiscal quarter			Last month of the firm's last fiscal quarter		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.012***	0.010	-0.027***	0.013***	0.006	-0.037***
	(0.002)	(0.007)	(0.009)	(0.002)	(0.007)	(0.009)
ES_Abs_Scaled	0.512***	0.844***	-0.019	0.584***	1.362***	0.325
	(0.051)	(0.253)	(0.330)	(0.059)	(0.285)	(0.353)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,791	19,791	19,791	21,636	21,636	21,636
Adjusted R^2	0.183	0.057	0.028	0.181	0.057	0.029

Panel B

	First month of the next fiscal year			Month of the earnings announcement date		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.014***	0.005	-0.039***	0.014***	0.005	-0.040***
	(0.002)	(0.007)	(0.009)	(0.002)	(0.007)	(0.009)
ES_Abs_Scaled	0.547***	1.387***	0.392	0.570***	1.370***	0.543
	(0.059)	(0.290)	(0.370)	(0.063)	(0.304)	(0.354)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,239	21,239	21,239	20,562	20,562	20,562
Adjusted R^2	0.186	0.055	0.029	0.184	0.054	0.029

The table presents the results of estimating the effects of earnings surprise on conforming and non-conforming tax avoidance. ES_Abs_Scaled is the absolute value of earnings surprise (ES) scaled by the stock price at the beginning of the fiscal year. In Panel A, ES is measured using the mean of analysts' consensus forecast calculated at the first (Columns [1] – [3]) and last (Columns [4] – [6]) month of the firms' last fiscal quarter. In Panel B, ES is measured using the mean of analysts' consensus forecast calculated at the first month of the next fiscal year (Columns [1] – [3]) and at the month of the earnings announcement date (Columns [4] – [6]). A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance. A higher ES_Abs_Scaled indicates a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

Table 12 presents the results from estimating Equations (4) and (5) for positive and negative earnings surprise separately, using different dates for the analysts' consensus forecast. In Panel A, earnings surprise is measured using the mean of analysts' consensus forecast estimated at the first month of the firms' last fiscal quarter. In Panel B, earnings surprise is measured using the mean of analysts' consensus forecast estimated at the last month of the firms' last fiscal quarter. In Panel C, earnings surprise is measured using the mean of analysts' consensus forecast estimated at the first month of the next fiscal year. In Panel D, earnings surprise is measured using the mean of analysts' consensus forecast estimated at the month of the earnings announcement date.

Similar to the results in Table 7, the results in Table 12 are consistent with Hypothesis 1 for positive and negative earnings surprise, inconsistent with Hypothesis 2 for positive earnings surprise, and consistent with Hypothesis 2 for negative earnings surprise. Unlike the results in Table 7, ES_Scaled (negative) is not statistically significant in Column (5) in all Panels A, B, C, and D. ES_Scaled (negative) on NCTA_ETR is statistically significant only when the earnings surprise is measured using the mean of analysts' consensus forecast estimated at the second month of firm's last fiscal quarter (Table 7). In other words, the statistical significance of ES_Scaled (negative) on NCTA_ETR drops when analysts' consensus forecast date varies. This result indicates that my finding using NCTA_ETR as the dependent variable in Equation (3), estimated separately for positive and negative earnings surprise, is sensitive to the choice of analysts' consensus forecast date.

Table 12 presents the results from estimating Equations (6) and (7) using different dates for the analysts' consensus forecast issued. In Panel A, earnings surprise is measured using the mean of analysts' consensus forecast issued in the first (Columns [1] – [3]) and last (Columns [4] – [6]) month of firms' last fiscal quarter. In Panel B, earnings surprise is measured using the mean of analysts' consensus forecast issued at the first month of the next fiscal year (Columns [1] – [3]) and the month of the earnings announcement date (Columns [4] – [6]).

Similar to the results in Table 8, the results in Table 13 are consistent with Hypothesis 1 for the EMS and EMT groups, inconsistent with Hypothesis 2 for EMT group, and consistent with Hypothesis 2 for EMS group. Unlike the results in Table 8, EMT is not statistically significant in Columns (3) and (6). EMT on NCTA_CETR is statistically significant only when the earnings surprise is measured using the mean of analysts' consensus forecast estimated in the second month of the firm's last fiscal quarter (Table 8). This result indicates that my finding using NCTA_CETR as the dependent variable in Equation (7) is sensitive to the choice of analysts' consensus forecast date.

TABLE 12 – The effects of positive and negative earnings surprise on conforming and non-conforming tax avoidance (alternative dates)

Panel A

	First month of the firm's last fiscal quarter					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.009***	0.013	-0.016	0.016***	0.011	-0.034**
	(0.003)	(0.008)	(0.011)	(0.003)	(0.010)	(0.014)
ES_Scaled (positive)	0.724***	2.172***	1.698***			
	(0.074)	(0.357)	(0.406)			
ES_Scaled (negative)				-0.401***	0.522	1.557***
				(0.071)	(0.373)	(0.545)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,762	11,762	11,762	8,029	8,029	8,029
Adjusted R^2	0.181	0.067	0.039	0.189	0.059	0.025

Panel B

	Last month of the firm's last fiscal quarter					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.011***	0.005	-0.024**	0.013***	0.008	-0.049***
	(0.003)	(0.008)	(0.010)	(0.003)	(0.010)	(0.014)
ES_Scaled (positive)	0.866***	3.079***	2.505***			
	(0.090)	(0.405)	(0.445)			
ES_Scaled (negative)				-0.475***	0.307	1.996***
				(0.081)	(0.427)	(0.597)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,962	13,962	13,962	7,674	7,674	7,674
Adjusted R^2	0.181	0.067	0.034	0.189	0.051	0.033

(*continued on next page*)

TABLE 12 (continued)

Panel C

	First month of the next fiscal year					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.012***	0.007	-0.026**	0.015***	-0.001	-0.054***
	(0.002)	(0.008)	(0.010)	(0.003)	(0.011)	(0.015)
ES_Scaled (positive)	0.890***	3.016***	2.517***			
	(0.089)	(0.436)	(0.476)			
ES_Scaled (negative)				-0.388***	-0.082	1.911***
				(0.083)	(0.411)	(0.618)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,106	14,106	14,106	7,133	7,133	7,133
Adjusted R^2	0.187	0.065	0.033	0.189	0.050	0.033

Panel D

	Month of the earnings announcement date					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.015***	0.010	-0.019*	0.017***	-0.003	-0.051***
	(0.002)	(0.008)	(0.010)	(0.003)	(0.011)	(0.015)
ES_Scaled (positive)	0.503***	2.962***	1.434***			
	(0.070)	(0.314)	(0.382)			
ES_Scaled (negative)				-0.165***	0.297	2.885***
				(0.057)	(0.370)	(0.444)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,632	14,632	14,632	7,470	7,470	7,470
Adjusted R^2	0.179	0.070	0.032	0.191	0.048	0.043

The table presents the results of estimating the effects of positive and negative earnings surprise on conforming and non-conforming tax avoidance. ES_Scaled is the earnings surprise (ES) scaled by the stock price at the beginning of the fiscal year. In Panel A, ES is measured using the mean of analysts' consensus forecast estimated at the first month of the firms' last fiscal quarter. In Panel B, ES is measured using the mean of analysts' consensus forecast estimated at the last month of the firms' last fiscal quarter. In Panel C, ES is measured using the mean of analysts' consensus forecast estimated at the first month of the next fiscal year. In Panel D, ES is measured using the mean of analysts' consensus forecast estimated at the month of the earnings announcement date. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance. A higher ES_Scaled indicates a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

TABLE 13 – The effects of earnings surprise groups on conforming and non-conforming tax avoidance (alternative dates)

Panel A

	First month of the firm's last fiscal quarter			Last month of the firm's last fiscal quarter		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.017***	0.022***	-0.014	0.016***	0.017**	-0.021**
	(0.002)	(0.007)	(0.009)	(0.002)	(0.006)	(0.009)
EMS	0.003***	-0.005**	-0.029***	0.003***	0.001	-0.034***
	(0.001)	(0.003)	(0.004)	(0.001)	(0.003)	(0.004)
SMS	0.001*	-0.004	-0.013***	0.000	-0.003	-0.012***
	(0.001)	(0.003)	(0.004)	(0.001)	(0.002)	(0.003)
EMT	0.003***	0.007***	0.003	0.003***	0.014***	0.004
	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,811	19,811	19,811	21,667	21,667	21,667
Adjusted R^2	0.177	0.058	0.034	0.177	0.057	0.036

Panel B

	First month of the next fiscal year			Month of the earnings announcement date		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.018***	0.015**	-0.022**	0.018***	0.016**	-0.022**
	(0.002)	(0.007)	(0.009)	(0.002)	(0.007)	(0.009)
EMS	0.002***	0.002	-0.035***	0.003***	-0.000	-0.035***
	(0.001)	(0.003)	(0.004)	(0.001)	(0.003)	(0.004)
SMS	0.000	-0.001	-0.011***	0.000	-0.002	-0.012***
	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)
EMT	0.003***	0.013***	0.002	0.003***	0.012***	0.001
	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,271	21,271	21,271	20,596	20,596	20,596
Adjusted R^2	0.182	0.055	0.035	0.180	0.054	0.034

The table presents the results of estimating the effects of earnings surprise groups on conforming and non-conforming tax avoidance. Earnings surprise is pooled in four groups based on earnings surprise distribution: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.03); (ii) slightly miss it (SMS) (-$0.03≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.03); and (iv) easily meet it (EMT) (ES>$0.03). I omit the SMT group, so this group is the reference group.

(*continued on next page*)

TABLE 13 (continued)

In Panel A, ES is measured using the mean of analysts' consensus forecast calculated at the first (Columns [1] – [3]) and last (Columns [4] – [6]) month of the firms' last fiscal quarter. In Panel B, ES is measured using the mean of analysts' consensus forecast calculated at the first month of the next fiscal year (Columns [1] – [3]) and at the month of the earnings announcement date (Columns [4] – [6]). A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance.
*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

6.2 Different analyst consensus forecast measures (median scaled and mean)

To assess the extent to which my results are sensitive to the choice of using the price-scaled mean of analysts' consensus EPS forecast, I run additional tests using different analyst consensus forecast measures. As sensitive tests, I use the price-scaled median of analysts' consensus EPS forecast and the mean, without scaling by price, of analysts' consensus EPS forecast. The results in Tables 14, 15, and 16 are consistent with Hypothesis 1. Moreover, similar to my main results, they are inconsistent with Hypothesis 2 when the earnings surprise is positive and consistent with Hypothesis 2 when the earnings surprise is negative. These results indicate that, in general, my findings are not sensitive to the choice of analysts' consensus forecast measure.

Table 14 presents the results from estimating Equations (2) and (3) using different analysts' consensus forecast measures. Columns (1) – (3) present earnings surprise measured using the price-scaled median of analysts' consensus forecast. Columns (4) – (6) present earnings surprise measured using the mean, without scaling by price, of analysts' consensus forecast. Similar to the results in Table 6, the results in Table 14 are consistent with Hypothesis 1 and inconsistent with Hypothesis 2. Unlike the results in Table 6, ES_Abs_Scaled is not statistically significant in Column (3) when the price-scaled median of analysts' consensus forecast is used instead of the price-scaled mean of analysts' consensus forecast. This result indicates that my finding using NCTA_CETR as the dependent variable in Equation (3) is sensitive to the choice of analysts' consensus forecast measure.

TABLE 14 – The effects of earnings surprise (absolute) on conforming and non-conforming tax avoidance (alternative analysts' consensus forecast measures)

	Median_Scaled			Mean		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.013***	0.011	-0.032***	0.019***	0.017***	-0.035***
	(0.002)	(0.007)	(0.009)	(0.002)	(0.006)	(0.009)
ES_Abs	0.578***	0.978***	0.088	0.005**	0.030***	-0.127***
	(0.058)	(0.304)	(0.364)	(0.002)	(0.011)	(0.014)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,341	21,341	21,341	23,571	23,571	23,571
Adjusted R^2	0.182	0.057	0.028	0.177	0.053	0.038

The table presents the results of estimating the effects of earnings surprise on conforming and non-conforming tax avoidance. ES_Abs is the absolute value of earnings surprise (ES). In Columns (1) – (3), ES is measured using the median of analysts' consensus forecast scaled by the stock price at the beginning of the fiscal year. In Columns (4) – (6), ES is measured using the mean, without scaling by price, of analysts' consensus forecast. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance. A higher ES_Abs indicates a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

Table 15 presents the results from estimating Equations (4) and (5) for positive and negative earnings surprise separately, using different analysts' consensus forecast measures. In Panel A, earnings surprise is measured using the price-scaled median of analysts' consensus forecast. In Panel B, earnings surprise is measured using the analysts' consensus forecast's mean without scaling by price.

Similar to the results in Table 7, the results in Table 15 are consistent with Hypothesis 1 for positive and negative earnings surprise, inconsistent with Hypothesis 2 for positive earnings surprise, and consistent with Hypothesis 2 for negative earnings surprise. Unlike the results in Table 7, ES (negative) is not statistically significant in Column (5) in both Panel A and B. In other words, the statistical significance of ES (negative) on NCTA_ETR drops when the measure of analysts' consensus forecast varies. This result indicates that my finding using NCTA_ETR as the dependent variable in Equation (5), estimated separately for positive and negative earnings surprise, is sensitive to the choice of analysts' consensus forecast measure.

TABLE 15 – The effects of positive and negative earnings surprise on conforming and non-conforming tax avoidance (alternative analysts' consensus forecast measures)

Panel A

	Median_Scaled					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.010***	0.007	-0.029***	0.015***	0.016*	-0.030**
	(0.003)	(0.008)	(0.011)	(0.003)	(0.010)	(0.014)
ES_Scaled (positive)	0.890***	2.907***	2.750***			
	(0.091)	(0.427)	(0.441)			
ES_Scaled (negative)				-0.438***	0.707	2.332***
				(0.078)	(0.450)	(0.601)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,447	13,447	13,447	7,894	7,894	7,894
Adjusted R^2	0.183	0.065	0.034	0.187	0.055	0.033

Panel B

	Mean					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.018***	0.035***	-0.002	0.020***	-0.004	-0.068***
	(0.002)	(0.008)	(0.010)	(0.003)	(0.009)	(0.013)
ES (positive)	0.013***	0.119***	0.015			
	(0.004)	(0.016)	(0.020)			
ES (negative)				-0.002	0.018	0.227***
				(0.003)	(0.016)	(0.020)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,332	14,332	14,332	9,239	9,239	9,239
Adjusted R^2	0.172	0.065	0.033	0.190	0.050	0.056

The table presents the results of estimating the effects of positive and negative earnings surprise on conforming and non-conforming tax avoidance. ES_Scaled is the earnings surprise (ES) scaled by the stock price at the beginning of the fiscal year. In Panel A, ES is measured using the price-scaled median of analysts' consensus forecast. In Panel B, ES is measured using the analysts' consensus forecast's mean without scaling by price. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance. A higher ES_Abs_Scaled indicates a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

Table 16 presents the results from estimating Equations (6) and (7) using different analysts' consensus forecast measures. Earnings surprise is measured using the price-scaled median of analysts' consensus forecast. Similar to the results in Table 8, the results in Table 16 are consistent with Hypothesis 1 for the EMS and EMT groups, inconsistent with Hypothesis 2 for EMT group, and consistent with Hypothesis 2 for EMS group. The coefficient signs of EMS, SMS, and EMT presented in Columns (1) – (3) are the same as in Table 8.

TABLE 16 – The effects of earnings surprise groups on conforming and non-conforming tax avoidance (alternative analysts' consensus forecast measures)

	Median		
	(1)	(2)	(3)
Variable	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.016***	0.018***	-0.020**
	(0.002)	(0.006)	(0.009)
EMS	0.003***	0.000	-0.032***
	(0.001)	(0.003)	(0.004)
SMS	0.001	-0.003	-0.009***
	(0.001)	(0.002)	(0.003)
EMT	0.004***	0.015***	0.007**
	(0.001)	(0.002)	(0.003)
Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes
Observations	21,370	21,370	21,370
Adjusted R^2	0.178	0.059	0.035

The table presents the results of estimating the effects of earnings surprise groups on conforming and non-conforming tax avoidance. Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the median of analysts' consensus EPS forecast. ES is pooled in four groups based on earnings surprise distribution: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.03); (ii) slightly miss it (SMS) (-$0.03≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.03); and (iv) easily meet it (EMT) (ES>$0.03). I omit the SMT group, so this group is the reference group. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance.
*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

6.3 Different boundaries to define easily and slightly missers (beaters)

To assess the extent to which my results are sensitive to the choice of segregating big and small missers (beaters) based on the boundary of three cents earnings surprise, I run additional tests using 2 cents and using 10 percent of the value of earnings forecast as

boundaries. Table 17 presents the mean and median of conforming and non-conforming tax avoidance measures by earnings surprise groups. In Panel A, the earnings surprise groups are defined using 2 cents boundary. SMS range from (inclusive) -2 cents to zero. SMT range from (inclusive) zero to 2 cents (inclusive). Earnings surprise smaller than -2 cents are set in the EMS group. Earnings surprise greater than 2 cents are set in the EMT group. In Panel B, the earnings surprise groups are defined using 10 percent of the value of earnings forecast as a boundary. SMS range from (inclusive) -10 percent of the value of earnings forecast to zero. SMT range from (inclusive) zero to 10 percent of the value of earnings forecast (inclusive). Earnings surprises smaller than -10 percent of the value of earnings forecast are set in the EMS group. Earnings surprise greater than 10 percent of the value of earnings forecast are set in the EMT group.

The findings are similar to the findings using 3 cents boundary to define earnings surprise groups. Like the statistics presented in Table 4, in Table 17, the mean and median of CTA are higher for the groups that easily miss (EMS) and meet (EMT) the analyst forecast and lower for the group that slightly meet it (SMT). The mean and median of NCTA_ETR and NCTA_CETR are higher for the group that easily meets (EMT) the analyst expectation. The mean and median of NCTA_ETR [NCTA_CETR] have the lowest value in the slightly miss group (SMS) [easily miss group (EMS)].

The mean and median of earnings surprises (ES) by earnings surprise groups, defined using 2 cents boundary (Panel A, Table 17), are similar to the mean and median of ES by earnings surprise groups, defined using 3 cents boundary (Table 4). The median and mean for both groups, SMS and SMT, are also -0.01 and 0.01 cent, respectively. These indicate that most firms in the SMS (SMT) group miss (meet) the analyst expectation because of a penny per share. The median for EMS and EMT groups is -0.08 and 0.06 cents, respectively, a little bit lower than the median for these groups when they are estimated using 3 cents boundary. These lower medians are expected since the median for the original EMS and EMT groups includes the values of earnings surprise between -2 and -3 cents and between 2 and 3 cents, respectively.

TABLE 17 – Mean and median of tax avoidance proxies and earnings surprises by earnings surprise groups (alternative boundaries to segregate ES groups)

Panel A – 2 cents boundary

ES group	N	CTA		NCTA_ETR		NCTA_CETR		ES	
		Mean	Median	Mean	Median	Mean	Median	Mean	Median
EMS	6,079	0.001	0.006	-0.001	-0.013	-0.030	-0.004	-0.137	-0.080
SMS	3,160	-0.004	0.003	-0.005	-0.016	0.005	0.013	-0.008	-0.010
SMT	5,505	-0.006	0.001	-0.006	-0.016	0.014	0.018	0.009	0.010
EMT	8,827	-0.002	0.004	0.009	-0.008	0.019	0.028	0.093	0.060
Total	**23,571**	**-0.002**	**0.004**	**0.001**	**-0.013**	**0.003**	**0.015**	**0.000**	**0.010**

Panel B – 10 percent of the value of earnings forecast boundary

ES group	N	CTA		NCTA_ETR		NCTA_CETR		ES	
		Mean	Median	Mean	Median	Mean	Median	Mean	Median
EMS	2,778	0.008	0.014	0.005	-0.003	-0.067	-0.023	-0.193	-0.150
SMS	6,499	-0.005	0.002	-0.005	-0.016	0.002	0.007	-0.046	-0.020
SMT	11,847	-0.006	0.001	-0.003	-0.015	0.016	0.019	0.041	0.020
EMT	2,435	0.007	0.013	0.030	0.008	0.024	0.061	0.147	0.110
Total	**23,559**	**-0.002**	**0.004**	**0.001**	**-0.013**	**0.003**	**0.015**	**0.001**	**0.010**

The table presents the mean and median of CTA, NCTA_ETR, NCTA_CETR, and ES by earning surprise groups. CTA is a proxy for conforming tax avoidance. NCTA_ETR and NCTA_CETR are proxies for non-conforming tax avoidance. Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end. Four groups are used to pool earnings surprises. In Panel A, the groups are defined as follows: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.02); (ii) slightly miss it (SMS) (-$0.02≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.02); and (iv) easily meet it (EMT) (ES>$0.02). In Panel B, the groups are defined as follows: (i) easily miss the analyst consensus forecast (EMS) (ES<-10% of the value of earnings forecast); (ii) slightly miss it (SMS) (10% of the value of earnings forecast ≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤10% of the value of earnings forecast); and (iv) easily meet it (EMT) (ES>10% of the value of earnings forecast). All variables are defined in Appendix A.

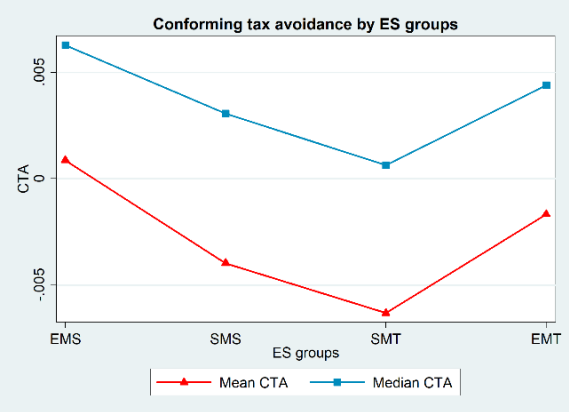
The mean and median of earnings surprises (ES) by earnings surprise groups, defined using 10 percent of the value of earnings forecast boundary (Panel B, Table 17), are some cents higher than the mean and median of ES by earnings surprise groups, defined using 3 cents boundary (Table 4). In Panel B, the mean of ES for all earnings surprise groups is higher than that for all earnings surprise groups defined using 2 or 3 cents as a boundary. While the mean for SMS and SMT groups defined using 2 or 3 cents as a boundary is around 1 cent, the mean for SMS and SMT groups defined using 10 percent of the value of earnings forecast as a boundary is around 4 cents. The median for SMS and SMT groups is -0.02 and 0.02 cents, respectively. These indicate that most firms in the SMS (SMT) group miss (meet) the analyst expectation because of 2 cents per share. The median for EMS and EMT groups is -0.15 and 0.11 cents, respectively, higher than the median for these groups when they are defined using

3 cents as a boundary. Additionally, it is important to note that the number of firm-year observations in each earnings surprise group considerably changes. The number of firm-year observations in SMS and SMT groups increased (corresponding to approximately 78 percent of the sample), and the number of firm-year observations in EMS and EMT groups decreased (corresponding to approximately 22 percent of the sample).

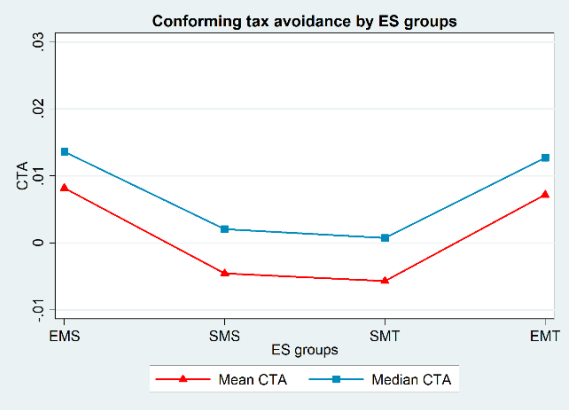
Figure 4 presents the mean and median of conforming and non-conforming tax avoidance measures by earnings surprise groups. The means and medians of tax avoidance measures from Table 17 were used to create Figure 4. Figure 4 shows graphically the relation between tax avoidance strategies and earnings surprises. In Panel A, the earnings surprise groups are defined using 2 cents boundary. In Panel B, the earnings surprise groups are defined using 10 percent of the value of earnings forecast as a boundary.

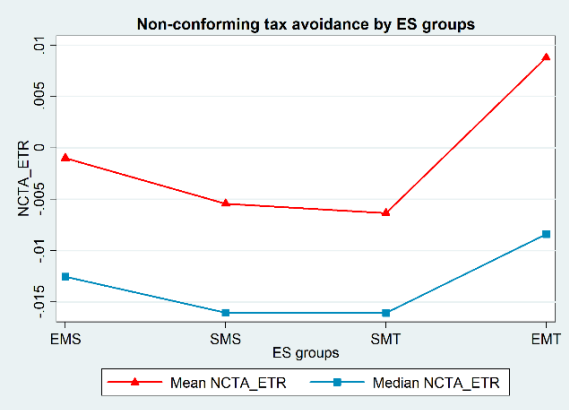
FIGURE 4 – Mean and median of tax avoidance strategy by earnings surprise groups (alternative boundaries to segregate ES groups)

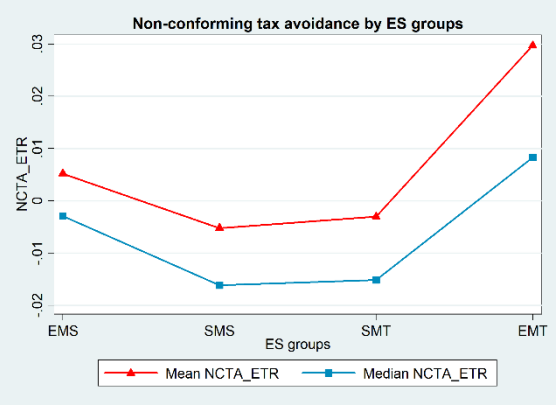
Panel A



Panel B

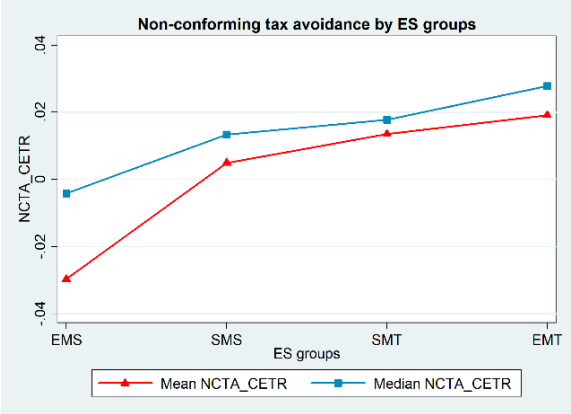


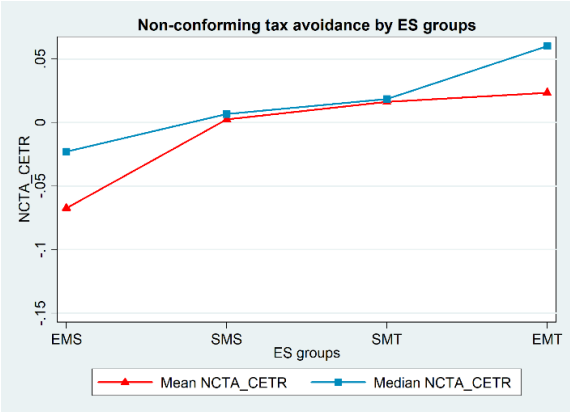




(*continued on next page*)

FIGURE 4 (continued)





The figure presents the tax avoidance strategy by earnings surprise groups. Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end. Four groups are used to pool earnings surprises. In Panel A, the groups are defined as follows: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.02); (ii) slightly miss it (SMS) (-$0.02≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.02); and (iv) easily meet it (EMT) (ES>$0.02). In Panel B, the groups are defined as follows: (i) easily miss the analyst consensus forecast (EMS) (ES<-10% of the value of earnings forecast); (ii) slightly miss it (SMS) (10% of the value of earnings forecast ≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤10% of the value of earnings forecast); and (iv) easily meet it (EMT) (ES>10% of the value of earnings forecast). All variables are defined in Appendix A.

Table 18 presents the results from estimating Equations (6) and (7), using alternative boundaries to segregate big and small missers (beaters). Columns (1) – (3) show results using 2 cents as a boundary, and Columns (4) – (6) show results using 10 percent of the value of earnings forecast as a boundary. Similar to the results in Table 8, the results in Table 18 are consistent with Hypothesis 1, consistent with Hypothesis 2 for the EMS group, and inconsistent with Hypothesis 2 for the EMT group. The coefficient signs of EMS, SMS, and EMT presented in Columns (1) – (3) are the same as in Table 8. However, the statistical significance at the 10 percent level of the SMS group drops in Column (1) Table 18, indicating that the level of conforming tax avoidance in firms that slightly miss the analyst expectation and firms that slightly meet it is not statistically different when 2 cents is used as a boundary to limit SMS and SMT groups. The statistical significance at the 10 percent level of the SMS group also drops in Column (4) Table 18. The difference in SMS coefficients when 3 cents and when 2 cents or 10 percent of the value of earnings forecast is used as a boundary to define earnings surprise groups does not affect my Hypotheses 1 and 2.

The coefficient signs of EMS, SMS, and EMT presented in Columns (4) – (6) are the same as in Table 8. However, the statistical significance of the EMT group drops in Column (6) Table 18, indicating that firms that easily meet the analyst forecast do not engage in more non-conforming tax avoidance (captured by NCTA_CETR) than firms that slightly meet it.

Also, unlike Table 8, the coefficients of EMS and SMS groups are statistically significant in Column (5) Table 18, indicating that firms that miss the analyst forecast engage in less non-conforming tax avoidance (captured by NCTA_ETR) than firms that slightly meet it. Given that the earnings surprise group composition considerably changes using 10 percent of the value of earnings forecast as a boundary, some results are expected to be sensitive to this choice. However, it is important to note that, in general, the consistency with hypotheses has not changed.

TABLE 18 – The effects of earnings surprise groups on conforming and non-conforming tax avoidance (alternative boundaries to segregate ES groups)

	2 cents			10% of forecast value		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CTA	NCTA_ETR	NCTA_CETR	CTA	NCTA_ETR	NCTA_CETR
Intercept	0.017***	0.018***	-0.032***	0.012***	0.018***	-0.011
	(0.002)	(0.007)	(0.009)	(0.002)	(0.006)	(0.009)
EMS	0.003***	-0.003	-0.039***	0.009***	-0.011***	-0.082***
	(0.001)	(0.003)	(0.003)	(0.001)	(0.004)	(0.005)
SMS	0.001	-0.001	-0.007**	0.000	-0.004**	-0.013***
	(0.001)	(0.003)	(0.003)	(0.001)	(0.002)	(0.002)
EMT	0.003***	0.014***	0.007**	0.011***	0.022***	0.006
	(0.001)	(0.002)	(0.003)	(0.001)	(0.004)	(0.005)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes
Observations	23,571	23,571	23,571	23,559	23,559	23,559
Adjusted R^2	0.178	0.055	0.041	0.189	0.056	0.052

The table presents the results of estimating the effects of earnings surprise groups on conforming and non-conforming tax avoidance (Equations [6] and [7]). In Columns (1) – (3), the earnings surprise groups are defined as follows: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.02); (ii) slightly miss it (SMS) (-$0.02≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.02); and (iv) easily meet it (EMT) (ES>$0.02). In Columns (4) – (6), the earnings surprise groups are defined as follows: (i) easily miss the analyst consensus forecast (EMS) (ES<-10% of the value of earnings forecast); (ii) slightly miss it (SMS) (10% of the value of earnings forecast ≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤10% of the value of earnings forecast); and (iv) easily meet it (EMT) (ES>10% of the value of earnings forecast). I omit the SMT group, so this group is the reference group. A higher CTA, NCTA_ETR, and NCTA_CETR indicate a greater firm engagement in corporate tax avoidance.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

6.4 Different non-conforming tax avoidance measures (ETR and CETR variations)

To assess the extent to which my results are sensitive to the choice of using size-industry-adjusted ETR and CETR, I run additional tests using different variations of ETR and CETR as non-conforming tax avoidance measures. As sensitive tests, I use the raw GAAP_ETR and Cash_ETR measured over one year, and also NCTA_ETR and NCTA_CETR measured over three years. The results in Tables 18, 19, and 20 are inconsistent with Hypothesis 2 when the earnings surprise is positive and consistent with Hypothesis 2 when the earnings surprise is negative. These results indicate that, in general, my findings are not sensitive to the choice of adjusted ETR and CETR.

Table 19 presents the results from estimating Equation (3) using different effective tax rate variations. Columns (1) – (2) present raw GAAP_ETR and Cash_ETR measured over one year as non-conforming tax avoidance proxies. Columns (3) – (4) present size-industry-adjusted ETR and CETR measured over three years as non-conforming tax avoidance proxies. Similar to the results in Table 6, the results in Table 19 are consistent with Hypothesis 2 when NCTA_CETR is the dependent variable and inconsistent with Hypothesis 2 when NCTA_ETR is the dependent variable. Unlike the results in Table 6, ES_Abs_Scaled is not statistically significant in Column (3) when NCTA_ETR is measured over three years. This result indicates that my finding using NCTA_ETR as the dependent variable in Equation (3) is sensitive to its estimation over one or three years.

Table 20 presents the results from estimating Equation (5) for positive and negative earnings surprise separately, using different effective tax rate variations. In Columns (1) – (4), raw GAAP_ETR and Cash_ETR measured over one year are used as non-conforming tax avoidance proxies. In Columns (5) – (8), size-industry-adjusted ETR and CETR measured over three years are used as non-conforming tax avoidance proxies.

Similar to the results in Table 7, the results in Table 20 are inconsistent with Hypothesis 2 for positive earnings surprise and consistent with Hypothesis 2 for negative earnings surprise. Unlike the results in Table 7, ES (positive) is not statistically significant in Column (6). This result indicates that my finding using NCTA_CETR as the dependent variable in Equation (5), estimated separately for positive and negative earnings surprise, is sensitive to the period length of CETR estimation.

TABLE 19 – The effects of earnings surprise (absolute) on non-conforming tax avoidance (alternative effective tax rate measures)

Variable	(1) GAAP_ETR	(2) Cash_ETR	(3) NCTA_ETR3	(4) NCTA_CETR3
Intercept	-0.335***	-0.358***	0.023***	-0.015*
	(0.007)	(0.009)	(0.007)	(0.009)
ES_Abs_Scaled	0.729***	-1.380***	0.016	-1.157***
	(0.197)	(0.244)	(0.182)	(0.195)
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes
Observations	23,533	23,533	22,973	22,973
Adjusted R^2	0.129	0.087	0.033	0.038

The table presents the results of estimating the effects of earnings surprise on non-conforming tax avoidance. Columns (1) and (2) present raw GAAP_ETR and Cash_ETR measured over one year as non-conforming tax avoidance proxies. Columns (3) and (4) present size-industry-adjusted ETR and CETR measured over three years as non-conforming tax avoidance proxies. A higher GAAP_ETR, Cash_ETR, NCTA_ETR3, and NCTA_CETR3 indicate a greater firm engagement in corporate tax avoidance. A higher ES_Abs_Scaled indicates a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

Table 21 presents the results from estimating Equations (6) and (7) using different variations of ETR and CETR as non-conforming tax avoidance measures. In Columns (1) and (2), raw GAAP_ETR and Cash_ETR measured over one year are used as non-conforming tax avoidance proxies. In Columns (3) and (4), size-industry-adjusted ETR and CETR measured over three years are used as non-conforming tax avoidance proxies.

Similar to the results in Table 8, the results in Table 21 are inconsistent with Hypothesis 2 for EMT group and consistent with Hypothesis 2 for EMS group. Unlike the results in Table 8, EMT is not statistically significant in Column (4). This result is in line with the lack of statistical significance of ES_Scaled (positive) on NCTA_CETR3 in Table 20, Column (6), indicating that firms with larger positive earnings surprise do not engage in more non-conforming tax avoidance (captured by NCTA_CETR3) than firms with smaller positive earnings surprise. The loss of statistical significance of ES_Scaled (positive) (Table 20) and EMT (Table 21) may indicate that firms with larger positive earnings surprise engage in non-conforming tax avoidance activities that are reversed within three years.

TABLE 20 – The effects of positive and negative earnings surprise on non-conforming tax avoidance (alternative effective tax rate measures)

Variable	(1) GAAP_ETR	(2) Cash_ETR	(3) GAAP_ETR	(4) Cash_ETR	(5) NCTA_ETR3	(6) NCTA_CETR3	(2) NCTA_ETR3	(3) NCTA_CETR3
Intercept	-0.336***	-0.342***	-0.337***	-0.373***	0.023***	-0.013	0.016	-0.020
	(0.008)	(0.011)	(0.011)	(0.015)	(0.008)	(0.010)	(0.010)	(0.012)
ES_Scaled (positive)	3.140***	1.911***			1.918***	0.215		
	(0.300)	(0.346)			(0.339)	(0.369)		
ES_Scaled (negative)			0.717**	3.801***			0.655***	1.936***
			(0.312)	(0.390)			(0.252)	(0.264)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,309	14,309	9,224	9,224	13,839	13,839	9,134	9,134
Adjusted R^2	0.165	0.089	0.103	0.105	0.042	0.035	0.033	0.044

The table presents the results of estimating the effects of positive and negative earnings surprises on non-conforming tax avoidance. In Columns (1) – (4), raw GAAP_ETR and Cash_ETR measured over one year are used as non-conforming tax avoidance proxies. In Columns (5) – (6), size-industry-adjusted ETR and CETR measured over three years are used as non-conforming tax avoidance proxies. A higher GAAP_ETR, Cash_ETR, NCTA_ETR3, and NCTA_CETR3 indicate a greater firm engagement in corporate tax avoidance. A higher ES_Abs_Scaled indicates a greater distance between actual annual earnings per share (EPS) and analysts' consensus EPS forecast.

*, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

TABLE 21 – The effects of earnings surprise groups on non-conforming tax avoidance (alternative effective tax rate measures)

	(1)	(2)	(3)	(4)
Variable	GAAP_ETR	Cash_ETR	NCTA_ETR3	NCTA_CETR3
Intercept	-0.326***	-0.356***	0.023***	-0.024***
	(0.007)	(0.009)	(0.007)	(0.009)
EMS	-0.004	-0.054***	-0.003	-0.020***
	(0.003)	(0.004)	(0.002)	(0.003)
SMS	-0.004	-0.012***	-0.004	-0.006**
	(0.002)	(0.003)	(0.002)	(0.003)
EMT	0.017***	0.006**	0.008***	-0.003
	(0.002)	(0.003)	(0.002)	(0.003)
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster Firm	Yes	Yes	Yes	Yes
Observations	23,571	23,571	22,997	22,997
Adjusted R^2	0.130	0.098	0.034	0.036

The table presents the results of estimating the effects of earnings surprise groups on non-conforming tax avoidance. In Columns (1) and (2), raw GAAP_ETR and Cash_ETR measured over one year are used as non-conforming tax avoidance proxies. In Columns (3) and (4), size-industry-adjusted ETR and CETR measured over three years are used as non-conforming tax avoidance proxies. Earnings surprise is pooled in four groups based on earnings surprise distribution: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.03); (ii) slightly miss it (SMS) (-$0.03≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.03); and (iv) easily meet it (EMT) (ES>$0.03). I omit the SMT group, so this group is the reference group. A higher GAAP_ETR, Cash_ETR, NCTA_ETR3, and NCTA_CETR3 indicate a greater firm engagement in corporate tax avoidance. *, **, *** Indicate significance at 10 percent, 5 percent, and 1 percent levels, respectively. For each variable, I report the robust standard errors clustered by firm in parentheses. All regressions include year and industry (based on 2-digit SIC code) fixed effects. All variables are defined in Appendix A.

7. CONCLUSION

Firms have two broad incentives: meeting the analysts' earnings forecasts and reducing income tax liabilities. Prior research shows that firms are pressured to meet the analysts' earnings forecasts (Huang et al., 2017) and that firms manage earnings to meet the analysts' expectations (e.g., Degeorge et al., 1999; Brown, 2001; Burgstahler & Eames, 2006). The pressure on firms to meet the analyst forecast is created by the negative market reaction in case firms miss the analyst earnings expectations (Huang et al., 2017). The market penalizes firms that fail to meet analysts' forecasts (Bartov et al., 2002; Kasznik & McNichols, 2002; Lopez & Rees, 2002). Prior research also shows that firms have significantly reduced their effective tax rate over the past 25 years (Dyreng et al., 2017). Many prior studies report an effective tax rates mean that is lower than the statutory tax rate (e.g., Kubick et al., 2016; Hasan et al., 2017). The benefits of tax avoidance are straightforward. Engaging in tax avoidance reduces firms' tax liabilities and therefore increases their cash flow (Rego & Wilson, 2012).

Firms may engage in conforming or non-conforming tax avoidance strategies. Conforming tax avoidance is a tax strategy that reduces both income tax liabilities and financial accounting income when it is employed (Hanlon & Heitzman, 2010). Non-conforming tax avoidance, on the other hand, is a tax strategy that reduces income tax liabilities but not financial accounting income when it is employed (Badertscher et al., 2019). Given the reduction in tax expenses without the simultaneous reduction in pre-tax book income, firms' engagement in non-conforming tax avoidance activities increases their after-tax net income. Thus, firms' engagement in tax avoidance impacts their net income in opposing directions, depending on whether they choose to engage in conforming or non-conforming tax avoidance. Consequently, the engagement in different tax avoidance strategies brings the reported earnings closer to or further from the analysts' forecasted earnings. The firm may deliberately engage in conforming or non-conforming tax avoidance strategies or may still engage complementarily in both strategies to change its earnings surprise. Therefore, firms' tax avoidance strategy may vary depending on whether firms' reported income would be closer to or further from analysts' consensus earnings forecast.

I examine the effects of analysts' earnings forecasts on tax avoidance strategies. More specifically, I assess whether firms engage in more conforming tax avoidance as the reported earnings per share are further (positively and negatively) from the analysts' earnings forecasts. I also assess whether firms engage in more non-conforming tax avoidance as the reported earnings per share are closer (positively and negatively) to the analysts' earnings forecasts.

Additionally, I examine whether firms that slightly meet the analysts' earnings forecasts engage in more non-conforming tax avoidance and less conforming tax avoidance than other firms.

The main costs of using conforming tax avoidance strategies to reduce taxable income are related to the concomitant reduction in the book income. Firms that engage in conforming tax avoidance would pay less income taxes but would have the costs of reporting lower book income to the market. Firms that would not achieve the analysts' earnings forecasts or that would easily meet them could engage in conforming tax avoidance and report a lower book income with a reduced cost. Firms that would not meet the analysts' earnings forecasts or would not be at least close to them, even after using all their discretion to increase their earnings, would already have the costs associated with missing the analysts' earnings forecasts. Thus, engaging in conforming tax avoidance would reduce the reported income, which is already penalized by missing the target. Also, firms that would easily beat the analysts' earnings forecasts without having to use their discretion have lower non-tax costs of engaging in conforming tax avoidance and reporting a smaller income (up to the point of the reported income meeting the analysts' forecasted earnings). Given the lower non-tax costs of conforming tax avoidance for these firms and the general high non-tax costs of engaging in non-conforming tax avoidance and presenting high book-tax differences, these firms have incentives to use mainly conforming tax avoidance to have the tax benefits of reducing their tax liabilities.

On the other hand, if firms that would report earnings around the analysts' earnings forecasts decide to engage in conforming tax avoidance, they would have increased non-tax costs of reporting lower book income. If firms that would not be able to meet the analysts' earnings forecasts without using their discretion decide to engage in conforming tax avoidance, they likely could not be able to achieve the analysts' earnings target. Also, if firms that would slightly meet the analysts' earnings forecasts without having to use their discretion decide to engage in conforming tax avoidance, they could miss the analysts' earnings target. However, these firms may have non-tax incentives to engage in non-conforming tax avoidance and increase their after-tax net income. For these firms, the tax benefits of engaging in non-conforming tax avoidance and the benefits associated with meeting the analysts' earnings target may outweigh the costs of presenting higher book-tax differences.

Based on the above arguments, I hypothesize and find that firms engage in more conforming tax avoidance activities as the reported earnings per share are further from the analysts' consensus earnings forecast. Considering the asymmetric incentives and the non-tax costs for firms with positive and negative earnings surprises, I test the effects of analysts' earnings forecasts on conforming tax avoidance separately for firms with positive and negative

earnings surprises. My main result persists in both groups of firms. My main result also persists in firms with lower or higher analyst coverage. I find that the number of analysts covering the firm is not changing the association between CTA and absolute earnings surprise.

I also hypothesize that firms engage in more non-conforming tax avoidance activities as the reported earnings per share are closer to the analysts' consensus earnings forecast. I confirm my hypothesis when non-conforming tax avoidance is captured by cash effective tax rate (NCTA_CETR). However, I do not confirm my hypothesis when non-conforming tax avoidance is captured by GAAP effective tax rate (NCTA_ETR). Testing firms with positive earnings surprises separately, I find that firms with reported earnings per share closer to the analysts' consensus earnings forecast engage in less non-conforming tax avoidance, inconsistent with my hypothesis. For firms with negative earnings surprises, I find that firms with reported earnings per share closer to the analysts' consensus earnings forecast engage in more non-conforming tax avoidance, consistent with my hypothesis. The association between non-conforming tax avoidance and absolute earnings surprise persists in firms with lower analyst coverage. On the other hand, in firms with higher analyst coverage, the association between non-conforming tax avoidance and absolute earnings surprise becomes insignificant.

I attempt to control for possible simultaneity that can arise in the corporate tax avoidance and earnings surprise relationship by using Arellano and Bover (1995) and Blundell and Bond's (1998) dynamic panel estimator (system GMM). As the results from ordinary least squares (OLS) estimation, the results from GMM estimation are consistent with Hypothesis 1 and inconsistent with Hypothesis 2 when non-conforming tax avoidance is captured by NCTA_ETR. Unlike the result from OLS estimation, I find no significant coefficient on earnings surprise when non-conforming tax avoidance is captured by NCTA_CETR.

My findings contribute to research on the determinants of corporate conforming and non-conforming tax avoidance. Understanding why some firms engage in conforming or non-conforming tax avoidance and the non-tax costs of both tax avoidance strategies provides a better comprehension of why some firms engage in more tax avoidance than others (thus, helping to decode the "under-sheltering puzzle"). I contribute to a wide understanding by using a scenario of public firms with higher capital market pressure, but with different incentives and the non-tax costs of engaging in conforming and/or non-conforming tax avoidance contingent on firms' earnings surprises.

My study also contributes to extending the research on the management of tax expenses around the analysts' earnings forecasts. Prior research focuses on the management of tax expenses through non-conforming tax avoidance strategies by firms that report income around

analysts' earnings forecasts. I extend these studies by analyzing both tax avoidance strategies, conforming and non-conforming, and by analyzing not only firms that reported income is around the analysts' consensus earnings forecast but also firms that would easily meet or miss it. Furthermore, I provide a tax perspective to justify the high frequency of large negative earnings surprises and the small frequency of large positive earnings surprises. My findings provide evidence that firms that easily meet or easily miss the analysts' earnings forecasts reduce their current tax liability and their book income through the engagement in conforming tax avoidance. Thus, my study shows that tax plays a role in firms' choices to manipulate earnings.

The main limitation of this study is the usage of reported earnings to test my hypotheses. I do not know what the book income would be if the firms had not engaged in tax avoidance activities. Thus, I use the reported earnings already managed for tax purposes in my analysis. The usage of the reported earnings can underestimate my results. In cases where firms that would easily meet the analysts' forecasts decide to engage in a lot of conforming tax avoidance, their reported earnings could be very close to analysts' forecasts. Therefore, the effect of higher earnings surprise on conforming tax avoidance can be underestimated. Furthermore, if firms that would slightly meet the analysts' forecasts decide to engage in too much non-conforming tax avoidance, their reported earnings could be very far from analysts' forecasts. Therefore, the effect of lower earnings surprise on non-conforming tax avoidance can be underestimated.

My findings demonstrate that analysts' earnings forecasts impact corporate tax avoidance strategies and, as a result, open opportunities for future research to examine whether the adopted tax avoidance strategy impacts firm value for firms with similar earnings surprises. Furthermore, future research could assess whether manager compensation tied to reported income affects the relationship between tax avoidance strategies and analysts' earnings forecasts. Finally, although my focus is on the relation between tax avoidance and analysts' consensus earnings forecast, I look forward to future research that explores possible relations between tax avoidance strategies and other thresholds, such as last year's earnings and non-negative earnings.

REFERENCES

Accounting Principles Board (APB). 1972. Accounting for Income Taxes—Special Areas. APB Opinion No. 23. New York, NY: APB.

Abarbanell, J., & Park, H. (2017). Do bright-line earnings surprises really affect stock price reactions? Management Science, 63(4), 1063–1084. https://doi.org/10.1287/mnsc.2015.2376

Allen, A., Francis, B. B., Wu, Q., & Zhao, Y. (2016). Analyst coverage and corporate tax aggressiveness. Journal of Banking & Finance, 73, 84–98. https://doi.org/10.1016/j.jbankfin.2016.09.004

Amir, E., & Sougiannis, T. (1999). Analysts' Interpretation and Investors' Valuation of Tax Carryforwards. Contemporary Accounting Research, 16(1), 1–33. https://doi.org/10.1111/j.1911-3846.1999.tb00572.x

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. Journal of Econometrics, 68(1), 29–51. https://doi.org/10.1016/0304-4076(94)01642-D

Armstrong, C. S., Blouin, J. L., Jagolinzer, A. D., & Larcker, D. F. (2015). Corporate governance, incentives, and tax avoidance. Journal of Accounting and Economics, 60(1), 1–17. https://doi.org/10.1016/j.jacceco.2015.02.003

Atwood, T. J., Drake, M. S., Myers, J. N., & Myers, L. a. (2012). Home Country Tax System Characteristics and Corporate Tax Avoidance: International Evidence. The Accounting Review, 87(6), 1831–1860. https://doi.org/10.2308/accr-50222

Badertscher, B. a., Katz, S. P., & Rego, S. O. (2013). The separation of ownership and control and corporate tax avoidance. Journal of Accounting and Economics, 56(2–3), 228–250. https://doi.org/10.1016/j.jacceco.2013.08.005

Badertscher, B., Katz, S., Rego, S. O., & Wilson, R. J. (2019). Conforming Tax Avoidance and Capital Market Pressure. The Accounting Review, 90(4), accr-52359. https://doi.org/10.2308/accr-52359

Balakrishnan, K., Blouin, J. L., & Guay, W. R. (2019). Tax aggressiveness and corporate transparency. Accounting Review, 94(1), 45–69. https://doi.org/10.2308/accr-52130

Bartov, E., Givoly, D., & Hayn, C. (2002). The rewards to meeting or beating earnings expectations. Journal of Accounting and Economics, 33, 173–204.

Bauman, C. C., Bauman, M. P., & Halsey, R. F. (2001). Do Firms Use the Deferred Tax Asset Valuation Allowance to Manage Earnings? The Journal of the American Taxation Association, 23(s-1), 27–48. https://doi.org/10.2308/jata.2001.23.s-1.49

Beaver, W. H., McNichols, M. F., & Nelson, K. K. (2007). An alternative interpretation of the discontinuity in earnings distributions. Review of Accounting Studies, 12(4), 525–556. https://doi.org/10.1007/s11142-007-9053-0

Beyer, A. (2008). Financial analysts' forecast revisions and managers' reporting behavior. Journal of Accounting and Economics, 46(2–3), 334–348. https://doi.org/10.1016/j.jacceco.2008.08.003

Bhojraj, S., Hribar, P., Picconi, M., & McInnis, J. (2009). Making sense of cents: An examination of firms that marginally miss or beat analyst forecasts. Journal of Finance, 64(5), 2361–2388. https://doi.org/10.1111/j.1540-6261.2009.01503.x

Bird, A., Karolyi, S. A., & Ruchti, T. G. (2019). Understanding the "numbers game." Journal of Accounting and Economics, 68(2–3), 101242. https://doi.org/10.1016/j.jacceco.2019.101242

Bissessur, S. W., & Veenman, D. (2016). Analyst information precision and small earnings surprises. Review of Accounting Studies (Vol. 21). Springer US. https://doi.org/10.1007/s11142-016-9370-2

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87(1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Boone, J. P., Khurana, I. K., & Raman, K. K. (2013). Religiosity and Tax Avoidance. The Journal of the American Taxation Association, 35(1), 53–84. https://doi.org/10.2308/atax-50341

Bratten, B., Gleason, C. A., Larocque, S. A., & Mills, L. F. (2017). Forecasting taxes: New evidence from analysts. The Accounting Review, 92(3), 1–29. https://doi.org/10.2308/accr-51557

Brown, L. D. (1997). Analyst Forecasting Errors: Additional Evidence. Financial Analysts Journal, 53(6), 77–80.

Brown, L. D. (2001). A temporal analysis of earnings surprises: Profits versus losses. Journal of Accounting Research, 39(2), 221–241. https://doi.org/10.1111/1475-679X.00010

Brown, L. D. (2003). Small Negative Surprises: Frequency and Consequence. International Journal of Forecasting, 19, 149–159. https://doi.org/10.2139/ssrn.281383

Brown, L. D., & Caylor, M. L. (2005). A Temporal Analysis of Quarterly Earnings Thresholds: Propensities and Valuation Consequences. The Accounting Review, 80(2), 423–440. https://doi.org/10.2308/accr.2005.80.2.423

Burgstahler, D., & Chuk, E. (2015). Do scaling and selection explain earnings discontinuities? Journal of Accounting and Economics, 60(1), 168–186. https://doi.org/10.1016/j.jacceco.2014.08.002

Burgstahler, D., & Dichev, I. (1997). Earnings Management to Avoid Earnings Decreases and Losses. Journal of Accounting and Economics, 24, 99–126. https://doi.org/10.2469/dig.v28.n3.302

Burgstahler, D., & Eames, M. (2006). Management of earnings and analysts' forecasts to achieve zero and small positive earnings surprises. Journal of Business Finance and Accounting, 33(5–6), 633–652. https://doi.org/10.1111/j.1468-5957.2006.00630.x

Cazier, R., Rego, S., Tian, X., & Wilson, R. (2015). The impact of increased disclosure requirements and the standardization of accounting practices on earnings management through the reserve for income taxes. Review of Accounting Studies, 20(1), 436–469. https://doi.org/10.1007/s11142-014-9302-y

Chang, H. S., Donohoe, M., & Sougiannis, T. (2016). Do analysts understand the economic and reporting complexities of derivatives? Journal of Accounting and Economics, 61(2–3), 584–604. https://doi.org/10.1016/j.jacceco.2015.07.005

Chen, K. C. W., Danielson, M. G., & Schoderbek, M. P. (2003). Analysts' Interpretation of Transitory Earnings Components: Evidence from Forecast Revisions after Disclosure of the 1993 Deferred Tax Adjustment. Journal of Accounting, Auditing & Finance, 18(3), 333–353. https://doi.org/10.1177/0148558X0301800303

Chen, S., Chen, X., Cheng, Q., & Shevlin, T. (2010). Are family firms more tax aggressive than non-family firms? Journal of Financial Economics, 95(1), 41–61. https://doi.org/10.1016/j.jfineco.2009.02.003

Cheng, C. S. A., Huang, H. H., Li, Y., & Stanfield, J. (2012). The Effect of Hedge Fund Activism on Corporate Tax Avoidance. The Accounting Review, 87(5), 1493–1526. https://doi.org/10.2308/accr-50195

Cloyd, C. B., Pratt, J., & Stock, T. (1996). The Use of Financial Accounting Choice to Support Aggressive Tax Positions: Public and Private Firms. Journal of Accounting Research, 34(1), 23. https://doi.org/10.2307/2491330

Cotter, J., Tuna, I., & Wysocki, P. D. (2006). Expectations Management and Beatable Targets: How Do Analysts React to Explicit Earnings Guidance?*. Contemporary Accounting Research, 23(3), 593–624. https://doi.org/10.1506/FJ4D-04UN-68T7-R8CA

Daks, Martin (2019). Why do analysts low-ball earnings forecasts? Chicago Booth Review. Retrieved from https://review.chicagobooth.edu/accounting/2019/article/why-do-analysts-low-ball-earnings-forecasts

Das, S., & Zhang, H. (2003). Rounding-up in reported EPS, behavioral thresholds, and earnings management. Journal of Accounting and Economics, 35(1), 31–50. https://doi.org/10.1016/S0165-4101(02)00096-4

Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. Journal of Accounting and Economics, 50(2–3), 344–401. https://doi.org/10.1016/j.jacceco.2010.09.001

Dechow, P., Richardson, S. A., & Tuna, I. (2003). Why are earnings kinky? An examination of the earnings management explanation. Review of Accounting Studies, 8(2–3), 335–384. https://doi.org/10.1023/A:1024481916719

Degeorge, F., Patel, J., & Zeckhauser, R. (1999). Earnings Management to Exceed Thresholds. In R. H. Thaler (Ed.), The Journal of Business (Vol. 72, pp. 1–33). Princeton: Princeton University Press. Retrieved from http://www.degruyter.com/view/books/9781400829125/9781400829125-021/9781400829125-021.xml

Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. Management Science, 58(7), 1229–1248. https://doi.org/10.1287/mnsc.1110.1487

Desai, M. A., & Dharmapala, D. (2006). Corporate tax avoidance and high-powered incentives. Journal of Financial Economics, 79(1), 145–179. https://doi.org/10.1016/j.jfineco.2005.02.002

Dhaliwal, D. S., Gleason, C. A., & Mills, L. F. (2004). Last-Chance Earnings Management: Using the Tax Expense to Meet Analysts' Forecasts. Contemporary Accounting Research, 21(2), 431–460. https://doi.org/10.1506/TFVV-UYT1-NNYT-1YFH

Donelson, D. C., Mcinnis, J. M., & Mergenthaler, R. D. (2013). Discontinuities and earnings management: Evidence from restatements related to securities litigation. Contemporary Accounting Research, 30(1), 242–268. https://doi.org/10.1111/j.1911-3846.2012.01150.x

Durtschi, C., & Easton, P. (2005). Earnings management? the shapes of the frequency distributions of earnings metrics are not evidence ipso facto. Journal of Accounting Research, 43(4), 557–592. https://doi.org/10.1111/j.1475-679X.2005.00182.x

Durtschi, C., & Easton, P. (2009). Earnings management? erroneous inferences based on earnings frequency distributions. Journal of Accounting Research, 47(5), 1249–1281. https://doi.org/10.1111/j.1475-679X.2009.00347.x

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2008). Long-Run Corporate Tax Avoidance. The Accounting Review, 83(1), 61–82. https://doi.org/10.2308/accr.2008.83.1.61

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2010). The Effects of Executives on Corporate Tax Avoidance. The Accounting Review, 85(4), 1163–1189. https://doi.org/10.2308/accr.2010.85.4.1163

Dyreng, S. D., Hanlon, M., Maydew, E. L., & Thornock, J. R. (2017). Changes in corporate effective tax rates over the past 25 years. Journal of Financial Economics, 124(3), 441–463. https://doi.org/10.1016/j.jfineco.2017.04.001

FASB. (1992). Statement of Financial Accounting Standards No. 109: Accounting for income taxes, (109), 1–116. Retrieved from http://www.fasb.org/cs/BlobServer?blobkey=id&blobnocache=true&blobwhere=1175820922121&blobheader=application/pdf&blobheadername2=Content-Length&blobheadername1=Content-Disposition&blobheadervalue2=715283&blobheadervalue1=filename=fas109.pdf&blobcol=urldat

Financial Accounting Standards Board (FASB). 1992. Accounting for Income Taxes. Statement of Financial Accounting Standards No. 109. Norwalk, CT: FASB.

Financial Accounting Standards Board (FASB). 2006. Accounting for Uncertainty in Income Taxes: An Interpretation of FASB Statement No. 109. FASB Interpretation No. 48. Norwalk, CT: FASB. Retrieved from https://www.fasb.org/resources/ccurl/86/12/aop_fin48.pdf

Francis, J. R., Neuman, S. S., & Newton, N. J. (2019). Does Tax Planning Affect Analysts' Forecast Accuracy? Contemporary Accounting Research, 36(4), 2663–2694. https://doi.org/10.1111/1911-3846.12515

Frank, M. M., Lynch, L. J., & Rego, S. O. (2009). Tax Reporting Aggressiveness and Its Relation to Aggressive Financial Reporting. The Accounting Review, 84(2), 467–496. https://doi.org/10.2308/accr.2009.84.2.467

Frank, M. M., & Rego, S. O. (2006). Do Managers Use the Valuation Allowance Account to Manage Earnings around Certain Earnings Targets? The Journal of the American Taxation Association, 28(1), 43–65. https://doi.org/10.2308/jata.2006.28.1.43

Gallemore, J., & Labro, E. (2015). The importance of the internal information environment for tax avoidance. Journal of Accounting and Economics, 60(1), 149–167. https://doi.org/10.1016/j.jacceco.2014.09.005

Gardner, M., & Wamhoff, S. (2021). 55 corporations paid $0 in federal taxes on 2020 profits. Institute on taxation and economic policy. Retrieved from https://itep.org/55-profitable-corporations-zero-corporate-tax/

Gleason, C. A., & Mills, L. F. (2002). Materiality and contingent tax liability reporting. The Accounting Review, 77(2), 317–342. https://doi.org/10.2308/accr.2002.77.2.317

Gleason, C. A., & Mills, L. F. (2008). Evidence of differing market responses to beating analysts' targets through tax expense decreases. Review of Accounting Studies, 13(2–3), 295–318. https://doi.org/10.1007/s11142-007-9066-8

Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. Journal of Accounting and Economics, 40(1–3), 3–73. https://doi.org/10.1016/j.jacceco.2005.01.002

Graham, J. R., Raedy, J. S., & Shackelford, D. a. (2012). Research in accounting for income taxes. Journal of Accounting and Economics, 53(1–2), 412–434. https://doi.org/10.1016/j.jacceco.2011.11.006

Griffin, P. A., & Lont, D. H. (2021). Evidence of an increasing trend in earnings surprises over the past two decades: The role of positive manager-initiated non-GAAP adjustments. Journal of Business Finance and Accounting, 48(9–10), 1525–1559. https://doi.org/10.1111/jbfa.12527

Gu, Z., & Wu, J. S. (2003). Earnings skewness and analyst forecast bias. Journal of Accounting and Economics, 35(1), 5–29. https://doi.org/10.1016/S0165-4101(02)00095-2

Guenther, D. A. (1994). Earnings management in response to corporate tax rate changes: Evidence from the 1986 Tax Reform Act. Accounting Review, 69(1), 230–243. Retrieved from http://www.jstor.org/stable/248269

Guenther, D. A., Matsunaga, S. R., & Williams, B. M. (2017). Is Tax Avoidance Related to Firm Risk? The Accounting Review, 92(1), 115–136. https://doi.org/10.2308/accr-51408

Guenther, D. A., Wilson, R. J., & Wu, K. (2019). Tax uncertainty and incremental tax avoidance. Accounting Review, 94(2), 229–247. https://doi.org/10.2308/accr-52194

Gupta, S., Laux, R. C., & Lynch, D. P. (2016). Do Firms Use Tax Reserves to Meet Analysts' Forecasts? Evidence from the Pre- and Post-FIN 48 Periods. Contemporary Accounting Research, 33(3), 1044–1074. https://doi.org/10.1111/1911-3846.12180

Hanlon, M. (2005). The Persistence and Pricing of Earnings, Accruals, and Cash Flows When Firms Have Large Book-Tax Differences. The Accounting Review, 80(1), 137–166. https://doi.org/10.2308/accr.2005.80.1.137

Hanlon, M., & Heitzman, S. (2010). A review of tax research. Journal of Accounting and Economics, 50(2–3), 127–178. https://doi.org/10.1016/j.jacceco.2010.09.002

Hanlon, M., & Slemrod, J. (2009). What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. Journal of Public Economics, 93(1–2), 126–141. https://doi.org/10.1016/j.jpubeco.2008.09.004

Hasan, I., Hoi, C.-K. S., Wu, Q., & Zhang, H. (2017). Does Social Capital Matter in Corporate Decisions? Evidence from Corporate Tax Avoidance. Journal of Accounting Research, 55(3), 629–668. https://doi.org/10.1111/1475-679X.12159

Haw, in mu, Jung, K., & Ruland, W. (1994). The Accuracy of Financial Analysts' Forecasts after Mergers. Journal of Accounting, Auditing & Finance, 9(3), 465–483. https://doi.org/10.1177/0148558X9400900306

Hodder, L., Hopkins, P. E., & Wood, D. A. (2008). The effects of financial statement and informational complexity on analysts cash flow forecasts. Accounting Review, 83(4), 915–956. https://doi.org/10.2308/accr.2008.83.4.915

Hoopes, J. L., Langetieg, P., Maydew, E. L., & Mullaney, M. (2020). Is Tax Planning Best Done In Private? SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3420362

Hoopes, J. L., Mescall, D., & Pittman, J. a. (2012). Do IRS Audits Deter Corporate Tax Avoidance? The Accounting Review, 87(5), 1603–1639. https://doi.org/10.2308/accr-50187

Huang, S. X., Pereira, R., & Wang, C. (2017). Analyst Coverage and the Likelihood of Meeting or Beating Analyst Earnings Forecasts. Contemporary Accounting Research, 34(2), 871–899. https://doi.org/10.1111/1911-3846.12289

Jacob, J., & Jorgensen, B. N. (2007). Earnings management and accounting income aggregation. Journal of Accounting and Economics, 43(2–3), 369–390. https://doi.org/10.1016/j.jacceco.2007.01.007

Kasznik, R., & McNichols, M. F. (2002). Does meeting earnings expectations matter? Evidence from analyst forecast revisions and share prices. Journal of Accounting Research, 40(3), 727–759. https://doi.org/10.1111/1475-679X.00069

Keung, E., Lin, Z. X., & Shih, M. (2010). Does the stock market see a zero or small positive earnings surprise as a red flag? Journal of Accounting Research, 48(1), 91–121. https://doi.org/10.1111/j.1475-679X.2009.00354.x

Khan, M., Srinivasan, S., & Tan, L. (2017). Institutional Ownership and Corporate Tax Avoidance: New Evidence. The Accounting Review, 92(2), 101–122. https://doi.org/10.2308/accr-51529

Kim, S., Schmidt, A. P., & Wentland, K. M. (2020). Analysts, Taxes, and the Information Environment. The Journal of the American Taxation Association, 42(1), 103–131. https://doi.org/10.2308/atax-52515

Koh, K., Matsumoto, D. A., & Rajgopal, S. (2008). Meeting or beating analyst expectations in the post-scandals world: Changes in stock market rewards and managerial actions. Contemporary Accounting Research, 25(4), 1067–1098. https://doi.org/10.1506/car.25.4.5

Kross, W. J., Ro, B. T., & Suk, I. (2011). Consistency in meeting or beating earnings expectations and management earnings forecasts. Journal of Accounting and Economics, 51(1–2), 37–57. https://doi.org/10.1016/j.jacceco.2010.06.004

Krull, L. K. (2004). Permanently Reinvested Foreign Earnings, Taxes, and Earnings Management. The Accounting Review, 79(3), 745–767.

Kubick, T. R., Lynch, D. P., Mayberry, M. A., & Omer, T. C. (2015). Product market power and tax avoidance: Market leaders, mimicking strategies, and stock returns. The Accounting Review, 90(2), 675–702. https://doi.org/10.2308/accr-50883

Kubick, T. R., Lynch, D. P., Mayberry, M. A., & Omer, T. C. (2016). The effects of regulatory scrutiny on tax avoidance: An examination of SEC comment letters. The Accounting Review, 91(6), 1751–1780. https://doi.org/10.2308/accr-51433

Lopez, T. J., & Rees, L. (2002). The Effect of Beating and Missing Analysts' Forecasts on the Information Content of Unexpected Earnings. Journal of Accounting, Auditing & Finance, 17(2), 155–184. https://doi.org/10.1177/0148558X0201700204

Matsumoto, D. A. (2002). Management's incentives to avoid negative earnings surprises. Accounting Review, 77(3), 483–514. https://doi.org/10.2308/accr.2002.77.3.483

Maydew, E. (1997). Tax-induced earnings management by firms with net operating losses. Journal of Accounting Research, 35(I), 83–96. Retrieved from

http://heinonlinebackup.com/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/tutain19&section=9

McGuire, S. T., Wang, D., & Wilson, R. J. (2014). Dual Class Ownership and Tax Avoidance. The Accounting Review, 89(4), 1487–1516. https://doi.org/10.2308/accr-50718

Miller, G. S., & Skinner, D. J. (1998). Determinants of the valuation allowance for deferred tax assets under SFAS no. 109. Accounting Review, 73(2), 213–233.

Mills, L. F. (1998). Book-Tax Differences and Internal Revenue Service Adjustments. Journal of Accounting Research, 36(2), 343–356. https://doi.org/10.2307/2491481

Mills, L. F., & Newberry, K. J. (2001). The Influence of Tax and Nontax Costs on Book-Tax Reporting Differences: Public and Private Firms. Journal of the American Taxation Association, 23(1), 1–19. https://doi.org/10.2308/jata.2001.23.1.1

Mills, L. F., & Sansing, R. C. (2000). Strategic Tax and Financial Reporting Decisions: Theory and Evidence. Contemporary Accounting Research, 17(1), 85–106. https://doi.org/10.1111/j.1911-3846.2000.tb00912.x

Payne, J. L., & Robb, S. W. G. (2000). Earnings Management: The Effect of Ex Ante Earnings Expectations. Journal of Accounting, Auditing & Finance, 15(4), 371–392. https://doi.org/10.1177/0148558X0001500401

Payne, J. L., & Thomas, W. B. (2011). The torpedo effect: Myth or reality? Journal of Accounting, Auditing and Finance, 26(2), 255–278. https://doi.org/10.1177/0148558X11401216

Penno, M., & Simon, D. (1986). Accounting Choices: Public Versus Private Firms. Journal of Business Finance & Accounting, 13(January).

Plumlee, M. A. (2003). The effect of information complexity on analysts' use of that information. Accounting Review, 78(1), 275–296. https://doi.org/10.2308/accr.2003.78.1.275

Rego, S. O., & Wilson, R. (2012). Equity Risk Incentives and Corporate Tax Aggressiveness. Journal of Accounting Research, 50(3), 775–810. https://doi.org/10.1111/j.1475-679X.2012.00438.x

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. Stata Journal, 9(1), 86–136. https://doi.org/10.1177/1536867x0900900106

Scholes, M., Wilson, G., & Wolfson, M. (1992). Firms' responses to anticipated reductions in tax rates: The Tax Reform Act of 1986. Journal of Accounting Research, 30(1), 161–186. Retrieved from http://www.nber.org/papers/w4171

Schrand, C. M., & Wong, M. H. F. (2003). Earnings Management Using the Valuation Allowance for Deferred Tax Assets under SFAS No. 109 *. Contemporary Accounting Research, 20(3), 579–611. https://doi.org/10.1506/480D-098U-607R-5D9W

Shane, P. B., & Stock, T. (2006). Security analyst and stock market efficiency in anticipating tax-motivated income shifting. Accounting Review, 81(1), 227–250. https://doi.org/10.2308/accr.2006.81.1.227

Skinner, D. J., & Sloan, R. G. (2002). Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. Review of Accounting Studies, 7(2–3), 289–312. https://doi.org/10.2139/ssrn.172060

Slemrod, J. (2004). The economics of cooperate tax selfishness. National Tax Journal, LVII(57), 877--899. https://doi.org/10.1017/CBO9781107415324.004

Weber, D. P. (2009). Do analysts and investors fully appreciate the implications of book-tax differences for future earnings? Contemporary Accounting Research, 26(4), 1175–1206. https://doi.org/10.1506/car.26.4.7

Weisbach, David, "Ten Truths about Tax Shelters," Tax Law Review 55 (2002), 215–253.

Wilde, J. H. (2017). The deterrent effect of employee whistleblowing on firms' financial misreporting and tax aggressiveness. The Accounting Review, 92(5), 247–280. https://doi.org/10.2308/accr-51661

Wilson, R. J. (2009). An Examination of Corporate Tax Shelter Participants. The Accounting Review, 84(3), 969–999. https://doi.org/10.2308/accr.2009.84.3.969

Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. Journal of Financial Economics, 105(3), 581–606. https://doi.org/10.1016/j.jfineco.2012.03.005

APPENDIX A – Variable definitions

Variable	Description
Conforming tax avoidance:	
CTA	The residual (ε) from Equation 1 in Badertscher et al. (2019): $$TPAID\_TO\_AT_{it} = \beta_0 + \beta_1 BTD_{it} + \beta_2 NEG_{it} + \beta_3 BTD_{it} \, x \, NEG_{it} + \beta_4 NOL_{it} + \beta_5 \Delta NOL_{it} + \varepsilon_{it}$$ The regression is estimated by three-digit NAICS and fiscal year combination. At least fifteen observations were required to be available for each industry and fiscal year combination. I multiply the residual (ε) by -1.
TPAID_TO_AT	Cash tax paid (TXPD) divided by lagged total assets (AT). All firms were required to have non-negative cash taxes paid.
BTD	The difference between book income and taxable income scaled by lagged total assets (AT). Book income is pretax income (PI). Taxable income is calculated by summing current federal tax expense (TXFED) and current foreign tax expense (TXFO), then dividing by the statutory tax rate, and after subtracting the change in net operating loss carryforwards (TLCF) in year t. If current federal tax expense is missing, then total current tax expense (TXFED plus TXFO) is calculated by subtracting deferred taxes (TXDI), state income taxes (TXS), and other income taxes (TXO) from total income taxes (TXT). I set TXFO, TXS, and TXO to 0 if the data are missing. All firms were required to have positive current federal tax expense (TXFED).
NEG	An indicator variable equal to 1 if book-tax differences (BTD) are negative, and 0 otherwise.
NOL	An indicator variable equal to 1 if the firm has non-missing or non-zero net operating loss carryforward in year t-1, and 0 otherwise
DNOL	The change in net operating loss carryforward from year t-2 to t-1, scaled by lagged total assets.
Non-conforming tax avoidance:	
NCTA_ETR	The firm's mean industry size GAAP_ETR less the firm's GAAP_ETR.
GAAP_ETR	Total tax expense divided by pre-tax earnings before exceptional items (TTE/PTEBX). All firms were required to have positive pre-tax earnings before exceptional items (PTEBX). I winsorize GAAP_ETR at zero and one [0,1].
PTEBX	Pre-tax book income (PI) less special items (SPI).
NCTA_CETR	The firm's mean industry size Cash_ETR less the firm's Cash_ETR.
Cash_ETR	Cash taxes paid divided by pre-tax earnings before exceptional items (CTP/PTEBX). All firms were required to have positive pre-tax earnings before exceptional items (PTEBX). I winsorize Cash_ETR at zero and one [0,1].
Analysts' earnings forecast:	
ES	Actual earnings per share (I/B/E/S ACTUAL) of the fiscal year less the mean (I/B/E/S MEANEST) of analysts' consensus EPS forecast estimated in the second month of the firm's last fiscal quarter.
ES_Scaled	Earnings surprise (ES) scaled by the stock price at the beginning of the fiscal year (PRCC_F).
ES_Abs_Scaled	Change in tax loss carryforward (TLCF), scaled by lagged total assets (AT).

(*continued on next page*)

APPENDIX A (continued)

Variable	Description
Control variables:	
Size	The log of the market value of equity (PRCC_F x CSHO).
MTB	The lagged market-to-book ratio [(PRCC_F x CSHO)/CEQ].
EBIT	Earnings before interest and taxes (PI + XINT) scaled by net operating assets (SEQ - CHE +XINT+DLC+DLTT). I set XINT, CHE, DLC, and DLTT to 0 if the data are missing.
Mgr_Ability	A managerial ability score developed by Demerjian, Lev, and McVay (2012).
Leverage	The long term-debt (DLTT) scaled by lagged total assets (AT). I set DLTT to 0 if the data are missing.
PPE	The net amount of property, plant, and equipment (PPENT) scaled by lagged total assets (AT). I set PPENT to 0 if the data are missing.
NOL	An indicator variable equal to one if the firms' tax loss carryforwards are non-negative in year t-1, and 0 otherwise.
DNOL	Change in tax loss carryforward (TLCF), scaled by lagged total assets (AT).
Intangibles	The intangible assets (INTAN) scaled by lagged assets (AT). I set INTAN to 0 if the data are missing.
ROA	The operating income (PI - XI) scaled by lagged assets (AT).
EQINC	The equity income in earnings (ESUB) scaled by lagged assets (AT). I set ESUB to 0 if the data are missing.
FI	The foreign pre-tax income (PIFO) scaled by lagged assets (AT). I set PIFO to 0 if the data are missing.

APPENDIX B – Frequency of earnings surprise groups by year

Year	N	Mean ES	Median ES	Frequency of EMS (%)	Frequency of SMS (%)	Frequency of SMT (%)	Frequency of EMT (%)
1994	1,264	-0.008	0.003	24.2	19.5	32.0	24.3
1995	1,304	-0.022	0.000	27.0	19.7	32.4	20.9
1996	1,366	-0.008	0.005	23.9	19.2	31.4	25.5
1997	1,456	-0.004	0.008	22.3	17.5	35.0	25.2
1998	1,324	-0.015	0.001	27.3	17.8	33.7	21.2
1999	1,241	-0.005	0.010	22.3	14.8	33.8	29.0
2000	1,125	-0.016	0.003	29.1	16.2	29.9	24.9
2001	814	-0.013	0.000	20.3	23.2	38.5	18.1
2002	727	0.003	0.005	14.9	23.2	41.4	20.5
2003	817	0.016	0.010	9.8	19.7	42.0	28.5
2004	1,029	0.005	0.010	18.4	18.3	36.0	27.4
2005	1,108	0.012	0.010	18.1	17.1	31.4	33.5
2006	1,130	-0.005	0.010	23.0	16.1	30.4	30.5
2007	1,037	0.006	0.010	22.6	15.3	28.4	33.8
2008	953	-0.032	0.000	33.9	14.3	21.8	30.0
2009	779	0.029	0.020	15.3	12.3	29.5	42.9
2010	877	0.032	0.020	14.6	15.2	27.1	43.1
2011	892	0.012	0.010	22.1	14.8	25.2	37.9
2012	931	0.012	0.010	23.6	15.5	25.1	35.8
2013	891	0.006	0.010	24.6	14.5	24.1	36.8
2014	937	0.010	0.020	23.8	14.5	23.6	38.1
2015	871	0.017	0.020	22.5	12.6	23.2	41.7
2016	698	0.023	0.020	20.5	12.2	25.1	42.3
All years	**23,571**	**0.000**	**0.010**	**22.4**	**16.8**	**30.7**	**30.1**

The table presents the frequency of earnings surprise groups by year. Furthermore, the table presents the mean and median of earnings surprise by year. Earnings surprise (ES) is defined as the difference between the actual annual earnings per share (EPS) and the analysts' consensus EPS forecast issued in the month prior to the month of the fiscal year-end (see Appendix A). Four groups are used to pool earnings surprises: (i) easily miss the analyst consensus forecast (EMS) (ES<-\$0.03); (ii) slightly miss it (SMS) (-\$0.03≤ES<\$0); (iii) slightly meet it (SMT) (\$0≤ES≤\$0.03); and (iv) easily meet it (EMT) (ES>\$0.03).

APPENDIX C – Mean and median of alternative non-conforming tax avoidance proxies by earnings surprise groups

ES group	N	GAAP_ETR		Cash_ETR	
		Mean	Median	Mean	Median
EMS	5,279	-0.312	-0.335	-0.320	-0.296
SMS	3,960	-0.318	-0.341	-0.273	-0.266
SMT	7,227	-0.316	-0.340	-0.259	-0.257
EMT	7,105	-0.290	-0.318	-0.250	-0.240
Total	**23,571**	**-0.307**	**-0.333**	**-0.272**	**-0.262**

The table presents the mean and median of GAAP_ETR and Cash_ETR by earning surprise groups. GAAP_ETR and Cash_ETR are alternative proxies for non-conforming tax avoidance. Four groups are used to pool earnings surprises: (i) easily miss the analyst consensus forecast (EMS) (ES<-$0.03); (ii) slightly miss it (SMS) (-$0.03≤ES<$0); (iii) slightly meet it (SMT) ($0≤ES≤$0.03); and (iv) easily meet it (EMT) (ES>$0.03). All variables are defined in Appendix A.