

UC Irvine

UC Irvine Electronic Theses and Dissertations

Title

Aggressive Book and Tax Reporting: An Uncertain Relationship

Permalink

<https://escholarship.org/uc/item/8vj2v4nd>

Author

Lyon, Sarah Catherine

Publication Date

2014

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA,
IRVINE

Aggressive Book and Tax Reporting: An Uncertain Relationship

DISSERTATION

submitted in partial satisfaction of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

in Management

by

Sarah Catherine Lyon

Dissertation Committee:

Professor Mort Pincus, Chair

Professor Terry Shevlin

Professor Alexander Nekrasov

2014

DEDICATION

To Reagan and Taylor
you make everything in life that much sweeter.

TABLE OF CONTENTS

	Page
List of Figures	iv
List of Tables	v
Acknowledgements	vi
Curriculum Vitae	vii
Abstract of the Dissertation	ix
Chapter 1 Introduction	1
Chapter 2 Aggressive Book and Tax Reporting: Part 1	2
Chapter 2 Appendices	27
Chapter 2 Figures	37
Chapter 2 Tables	39
Chapter 3 Aggressive Book and Tax Reporting: Part 2	47
Chapter 3 Appendices	76
Chapter 3 Figures	79
Chapter 3 Tables	84
Chapter 4 Conclusion	92
References	95

LIST OF FIGURES

		Page
Figure 1.1	Financial Reporting Aggressiveness Continuum and Proxies	37
Figure 1.2	Tax Reporting Aggressiveness Continuum and Proxies	38
Figure 2.1	The Basic Relationship Between Book and Tax Aggressiveness	79
Figure 2.2	Distribution of Firm-Years Across DFIN and ETR Quintiles	80
Figure 2.3	Division of firms for a Positive and Negative Relationship Test	81
Figure 2.4	Firms with a Positive Relationship between Aggressive Book and Tax Reporting can be classified as Aggressive or non-Aggressive for Reporting	82
Figure 2.5	The Likely Location of Fraud Firms in an Overall Distribution of Book and Tax Reporting Aggressiveness	83

LIST OF TABLES

	Page
Table 1.1	Descriptive Statistics for Sample Firms 39
Table 1.2	The Association Between Fraud and Tax Aggressiveness in Different Sample Periods 40
Table 1.3	The Association Between Aggressive Book and Tax Reporting in Different Sample Periods 42
Table 1.4	The Association Between Aggressive Book and Tax Reporting using Additional Book and Tax Aggressiveness Measures 43
Table 1.5	The Association Between Fraud and Tax Aggressiveness Using Additional Book and Tax Aggressiveness Measures 44
Table 1.6	LLP Regression Results Including Additional Control Variables 45
Table 1.7	FLR Regression Results Including Additional Control Variables 46
Table 2.1	A Positive and Negative Relationship between Aggressive Book And Tax Reporting 84
Table 2.2	Characteristics Associated with Aggressive Reporting 86
Table 2.3	Book and Tax Components Identified in Principal Component Analysis 87
Table 2.4	Differences in Factor Scores Across Reporting Strategies 88
Table 2.5	Summary of Table 2.4 Results 90
Table 2.6	Results of Using Total Factor Score 1 and Total Factor Score 2 to Identify the Firm's Reporting Strategy 91

ACKNOWLEDGEMENTS

I would like to thank my advisor and committee chair, Mort Pincus, for his unfaltering support, guidance, and patience over the last five years. He has managed to walk a fine line, giving me the freedom to pursue my research interests, while inspiring me to consider others. I will never forget his generosity, both in spirit and in time. I hope some of his character has rubbed off on me - I am undoubtedly better for it.

I cannot express enough thanks to my committee members for their continued encouragement and support. Terry Shevlin, Alex Nekrasov, Devin Shanthikumar, and David Brownstone, you have been tremendously helpful during the development and execution of this work. It has truly been an honor to work with each of you.

Completing this program would not have been possible without my husband Travis. He has been there for the good times and bad, and his love, support, and encouragement has made all the difference. And to my family and friends, who have helped me raise two little girls and listened patiently while I explained the intricacies of aggressive book and tax reporting, thank you from the bottom of my heart.

I would also like to thank the Merage School of Business and the CalCPA for their generous financial support.

CURRICULUM VITAE

Education

- June 2014* University of California, Irvine Irvine, CA
Doctoral Management Program, specialization in Accounting
Proposal accepted 10/2013; Completion 6/2014
- January 2008* University of San Diego San Diego, CA
Master of Accounting and Financial Management; GPA 4.00
- June 2004* University of California, Davis Davis, CA
Bachelor of Science in Managerial Economics; Emphasis in
Agricultural and Resource Economics; GPA 3.83
- August 2008* Certified Public Accountant License California

Experience

- Fall 2012* University of San Diego: Instructor Intermediate Accounting 1. Overall
Decile Rank (Institution and College) 7.3
- 2009-2014* UC Irvine Teaching Assistant for undergraduate and graduate classes
including Corporate and Partnership Taxation, Individual Taxation,
Managerial Accounting, Financial Accounting, and Auditing (including TA
sessions)
- 2004 – 2009* Public Accounting; Moss Adams LLP, San Diego CA
Worked with clients to gather necessary information for compliance
reporting, prepared tax returns, and consulted with non-profit clients on
proper entity structure and activities
- 2007* Graduate Assistant, University of San Diego, Accounting Department

Activities, Memberships and Awards

- 2013* CalCPA, Orange County/Long Beach Chapter – Doctoral Fellowship Award
- 2010 -2011* Member of UC Irvine Sustainability Science Team
- 2010-2011* Vice-president of the Student PhD Association
- 2009* CalCPA Accounting Doctoral Scholarship Recipient

2008-present Member of American Institute of Certified Public Accountants, California Society of Certified Public Accountants, and American Accounting Association

Working Papers

Hickman, Lyon, Richey, Turnoff. 2013. "Sustainability at a Crossroads: Informing Environmental Management in Western Riverside". In review *Local Environment*.

Research in Progress

Lyon, S. "Aggressive Book and Tax Reporting: An Uncertain Relationship". Dissertation Part 1 and 2.

Shanthikumar, D., and Lyon, S. "The Dow Jones Sustainability Index: Market Reaction and Investor Holdings".

Faurel, L., Haight, T., Lyon, S., and Pincus, M. "SFAS 141(R), Book-Tax Differences and Earnings Informativeness".

Wellmeyer, P., and Lyon, S. "Is Green Reporting Making Investors Blue?"

ABSTRACT OF THE DISSERTATION

Aggressive Book and Tax Reporting: An Uncertain Relationship

By

Sarah Catherine Lyon

Doctor of Philosophy in Management

University of California, Irvine, 2014

Professor Mort Pincus, Chair

Frank, Lynch, and Rego (2009) and Lennox, Lisowsky, and Pittman (2013) examine the relationship between aggressive book and tax reporting and report conflicting results. I identify differences in the methodology of these two studies that I predict account for their opposing conclusions. I find that the measure of aggressive book reporting is the most important determinate of the relationship documented, and I conclude that the relationship between aggressive book and tax reporting likely varies among firms.

I then show that the relationship between aggressive book and tax reporting is positive for some firms and negative for others. I review characteristics associated with aggressive book and tax reporting and use Principal Component Analysis to reduce these characteristics to their underlying components. I test for and find significant differences in the components of firms with different reporting strategies. Finally, I examine whether factor scores can be used to correctly identify a firm's reporting strategy, and find I can correctly identify the reporting strategy in up to 33% of firm-years. I conclude firms choose book and tax reporting strategies that result in both positive and negative

relationships between aggressive book and tax reporting, and that firm characteristics can provide assistance in the identification of the firm's reporting strategy.

Chapter 1: Introduction

I study the relationship between aggressive reporting in firm's financial statements and aggressive reporting in firm's tax returns. I am motivated in large part by conflicting results in two recent studies, one suggesting that aggressive book and tax reporting is positively related, and the other suggesting that it is negatively related (Frank, Lynch, and Rego 2009, and Lennox, Lisowsky, and Pittman 2013, respectively). Anecdotal and empirical evidence also motivates my study, as it suggests that firms are finding ways to manage their book income up and taxable income down in the same period. By further investigating the relationship between aggressive book and tax reporting I contribute to this relatively new stream of accounting literature.

In Chapter 2, I investigate differences in the research methodology of Frank et al. (2009) and Lennox et al. (2013) that likely account for their conflicting results. I conclude that the relationship between aggressive book and tax reporting is heavily dependent on the measure of aggressive book reporting, which can highlight the relationship between aggressive book and tax reporting in specific sets of firms or during certain periods of time.

In Chapter 3, I first provide evidence that the relationship between aggressive book and tax reporting varies among firms. Using Principal Component Analysis, I then examine whether the underlying characteristics of firms with different reporting strategies are different, and find that in the majority of cases, they are. Finally, I explore the extent to which firm characteristics can be used to identify the firm's relationship between aggressive book and tax reporting, and find that I can correctly identify the reporting strategy in up to 33% of firm-years.

In Chapter 4, I conclude and provide ideas for future research in this area.

Chapter 2: Aggressive Book and Tax Reporting: An Uncertain Relationship Part 1

Abstract: Prior research examining the relationship between aggressive book and tax reporting reports conflicting results. I reexamine the evidence in Frank, Lynch, and Rego (2009) and Lennox, Lisowsky, and Pittman (2013) by discussing and testing whether differences in their research methodologies, specifically differences in the selection of firms, the time period examined, the measures of book and tax aggressiveness used, and the model specifications, contribute to the inconsistent conclusions in the two studies.

I find that the measure of aggressive financial reporting used in the analysis greatly influences the relationship documented, as the results in Frank et al. (2009) and Lennox et al. (2013) are sensitive to modifications in this research design choice. The results in Lennox et al. (2013) also show some sensitivity to the sample time period examined. By increasing the comparability of these two studies, I conclude that the relationship between aggressive book and tax reporting is more complex than prior studies have allowed for, likely varying among firms.

1: Introduction

Firm managers often prefer to report high levels of income in their firms' financial statements while at the same time, report low levels of income in their firms' tax returns. Reporting in this way is similar to "having your cake and eating it too"; managers show greater profits to investors *and* lower the tax liabilities of the firm (Hanlon, Laplante, and Shevlin 2005; Badertscher, Phillips, Pincus, and Rego 2009).

Anecdotal evidence surrounding the accounting scandals of the late 1990's and early 2000's coupled with the discovery of a growing book-tax gap,¹ motivated two recent articles that examine the relationship between aggressive financial reporting and aggressive tax reporting.² The first study, Frank, Lynch, and Rego (2009), finds a positive relationship between aggressive book and tax reporting, and concludes that firms are able to manage book income up and taxable income down in the same period.³ The second study, Lennox, Lisowsky, and Pittman (2013), reports the opposite result - they conclude there is a negative relationship between aggressive book and tax reporting, as they find

¹ A book-tax gap is a divergence between income reported in the firm's audited financial statements and the taxable income reported on the firm's tax returns (Desai 2005; Boynton, De Filippes, and Legel 2005).

² In this paper I use the terms aggressive financial reporting and aggressive book reporting interchangeably to describe firms that (appear to) strategically use techniques to alter their financial statements to achieve certain goals. The techniques can be within or outside of GAAP. I also use the terms aggressive tax reporting and tax aggressive firms interchangeably to describe firms that (appear to) use planning techniques to alter their explicit tax liability (Hanlon and Heitzman 2010). Evidence suggests that firms may not always be maximizing their financial statement (book) income or minimizing their taxable income, thus firms could also use planning techniques to achieve certain book or tax goals. The planning techniques can range from legal to illegal strategies.

³ Frank et al. (2009) develop a proxy for aggressive tax reporting, DTAX, which captures unexplained (discretionary) permanent differences between book and tax income. Frank et al. (2009) find that DTAX is positively related to a proxy for aggressive financial reporting, specifically performance-matched discretionary accruals (DFIN), controlling for factors associated with tax planning and earnings management incentives, and they also find that DFIN is positively related to DTAX, controlling for the same factors. Frank et al. (2009) also use total book-tax differences as a measure of aggressive tax reporting and again find a positive relationship between book-tax differences and aggressive financial reporting.

that tax aggressive firms are less likely, or at least not more likely, to commit accounting fraud than non-tax aggressive firms.⁴

These two studies examine the same general research question, but I conjecture that differences in their approach to answering the research question are responsible for the conflicting results. Investigating whether differences in the research designs of these two studies affect their conclusions and gaining a deeper understanding of the relationship between aggressive book and tax reporting is important for several reasons. Accounting literature examining the relationship between aggressive book and tax reporting is a relatively new area of research. Better understanding the strength of this relationship, and identifying how research design choices can highlight or obscure the relationship, or even introduce biases into the conclusions, is important for future research in this area that builds upon research designs of these initial studies (e.g., Fan 2013).

This line of research is also closely related to studies examining book-tax conformity, book-tax trade-offs and the determinants, characteristics, and consequences of earnings management and aggressive tax reporting. These literature streams examine at least one form of aggressive reporting in firms (either aggressive book and/or tax reporting), hence, this study contributes to the accounting literature in these areas as well.

The relationship between aggressive book and tax reporting may also be of interest to regulatory agencies including the Internal Revenue Service (IRS) and Securities and Exchange Commission (SEC). These agencies seek to identify firms likely involved in tax

⁴ While Erickson, Hanlon, Maydew (2004) and Badertscher et al. (2009) examine different research questions, both studies provide evidence that is likely significant in resolving this research question. Both studies find that firms accused of fraud are more likely to engage in book-tax conforming earnings management, where book income is managed upward and tax income also increases - Badertscher et al. (2009) base their analysis on firms that restated almost certainly due to earnings management and Erickson et al. (2004) use firms accused of financial statement fraud in their analysis.

evasion and fraudulent financial reporting, respectively. A better understanding of whether firms involved in one aggressive reporting activity are more or less likely to be involved in another may help these agencies to identify firms that report very aggressively.

As a first step in examining this conflict in the literature, I replicate Frank et al. (2009) and Lennox et al. (2013). I find results consistent with both studies and the main results of the replications are presented in Appendix 1A and Appendix 1B. In Section 2, I examine differences in the methodologies of each paper that, *ex ante*, I believe contribute to their conflicting conclusions. I find that one research design choice in particular - the measure of aggressive book reporting - is an important factor in determining whether the documented relationship between aggressive book and tax reporting is positive or negative. I also find significant differences in the descriptive characteristics of firms in the two samples, suggesting these studies are examining firms that likely have different incentives and opportunities for aggressive book and tax reporting.

The results in Frank et al. (2009), which indicate there is a positive relationship between aggressive book and tax reporting, are generally robust to alterations in the time period examined, and are also robust to the inclusion of additional control variables, year dummies, and clustered standard errors in their main regression. However, the results are sensitive to a different measure of aggressive book reporting used in Lennox et al. (2013) - financial statement fraud.

I find that the results of Lennox et al. (2013), which indicate there is a negative relationship between aggressive book and tax reporting, are sensitive to both the time period examined and to the alternative measure of aggressive book reporting used in Frank et al. (2009) - discretionary accruals. The results in Lennox et al. (2013) are slightly

weaker, although not substantially different, with the addition of control variables to their main regression.

By modifying the research design choices of each study to increase the comparability, I reconcile the conflicting results. I conclude that the relationship between aggressive book and tax reporting is more complex than prior studies have allowed for, likely varying cross-sectionally and/or over time. For example, the relationship between aggressive book and tax reporting may be systematically different for firms engaged in financial statement fraud. In Section 3, I summarize my findings and provide ideas for future research in this area.

2: Significant differences in research methodology

I identify four significant differences in the research methodology of Lennox et al. (2013) (LLP hereinafter) and Frank et al. (2009) (FLR hereinafter) that likely contribute to the different conclusions reached. Ex ante, I argue that two differences, the sample time period and the measures of aggressive book and tax reporting, significantly affect the conclusions in each study. For completeness, I also examine differences in the characteristics of firms included in each sample and differences in the model specification and test to what extent, if any, these differences also contribute to the conflicting conclusions.

In order to fully understand the methodologies and empirical results of FLR and LLP I first replicate each study, and find results consistent with the conclusions in FLR and LLP.⁵

⁵ I purchased financial statement fraud data through the Center for Financial Reporting and Management (CRFM) compiled by Dechow, Ge, Larson and Sloan (2011) to replicate LLP. Using the CRFM data, my results were not consistent with the conclusions in LLP. LLP generously sent me their data, with which I very closely

Appendix 1A presents my replication of the main table in FLR, and Appendix 1B presents my replication of the main table in LLP.

2.1 Major Difference in LLP and FLR: Sample Selection Restrictions

The first major difference between the two studies relates to restrictions on the firms included in each sample. LLP identify “fraud firms” by collecting Accounting and Auditing Enforcement Releases (AAER’s), from January 1981 through October 2006 (when the study’s data collection ended) from the SEC website and Lexis-Nexus searches.

Following prior studies, LLP drop non-accounting frauds from their sample of AAER’s and code firm-years as fraud-years if an AAER indicates that fraud took place during any portion of the year, e.g., if a firm receives an AAER related to fiscal Q4 2002 and fiscal Q1 2003, both fiscal 2002 and 2003 are coded as fraud years.

LLP note that there is data attrition in the fraud sample beginning in 2001, which reflects the delay between a firm engaging in alleged fraudulent financial reporting, the initiation of an SEC investigation, and the SEC issuing an AAER. In other words, the SEC was still issuing AAER’s related to fraud that occurred, e.g., in fiscal 2000 and 2001 in 2006.

Because of the data attrition, LLP limit their fraud-sample to AAER’s associated with fraud firm-years between 1981-2001. LLP have a total fraud sample of 1,109 firm-years, roughly .6% of the Compustat population of US public firms, however, due to data limitations, the fraud samples range from 386 firm-years to 797 firm-years for each tax aggressiveness measure tested. LLP compare the fraud sample to a non-fraud sample of US public firms.

The non-fraud sample ranges from 61,668 firm-years to 125,476 firm-years for each tax

replicated their results. I reconciled the CRFM data and the LLP data and found significant differences in the identification of fraud-firm-years over the 1981-2001 period.

aggressiveness measure tested, roughly 33%-66% of the total Compustat population of US firm-years during the sample period.

FLR use an overall smaller subset of Compustat firms in their study. Beginning with the entire Compustat firm population from 1991-2005, FLR remove subsidiaries, foreign corporations, firms with non-positive book values of equity, utility and financial service firms, and firms with data not available to estimate DFIN and DTAX, respectively their book and tax aggressiveness variables. This yields a sample that is 45,235 firm-years, roughly 35% of the total Compustat population of firm-years during the period.

I find that data required to calculate DTAX and DFIN are available for larger firms on average, as the average firm in the FLR sample has approximately \$1,225 million in assets whereas the average firm in the LLP sample is much smaller, with approximately \$658 million in assets. Prior studies have shown firm size is associated with many factors that can reflect different incentives and opportunities to report aggressively for book and tax purposes. For example, Bhushan (1989) finds larger firms have greater analyst following, impacting financial reporting incentives, and Rego (2003) demonstrates that economies of scale exist for tax planning, suggesting larger firms with higher levels of pre-tax income and more extensive foreign operations are better able to reduce their tax burdens through tax-planning activities.

As a result of the aggressiveness proxies selected, and the data requirements to compute the aggressiveness proxies and control variables, I speculate these studies are examining samples with different firm characteristics that likely impact firm incentives and opportunities for aggressive book and/or tax reporting (such as the difference in firm size). In Table 1.1, Panel A (following Figure 1.2) I provide a summary of descriptive firm

characteristics for all firms in the FLR and LLP samples.⁶ I find statistically significant differences in all the descriptive firm characteristics I examine, including size, pre-tax income, leverage, the extent of foreign operations, the presence of foreign operations, the presence and magnitude of net operating losses (NOL's), analyst following, return on assets (ROA), and return on equity (ROE).^{7,8} For example, the FLR sample has significantly more firms with foreign operations, and these firms have a greater percentage of pre-tax income coming from their foreign operations. Prior literature suggests the presence and extent of foreign operations creates opportunities for aggressive book and tax reporting, so *ex ante*, the average FLR firm is expected to report more aggressively than the average LLP firm. Differences in the firm characteristics listed in Panel A of Table 1.1, suggest that the results of one study based on its sample of firm-years may not generalize to the results of the other study based on its sample of firm-years.

In Table 1.1, Panel B, I provide a summary of descriptive firm characteristics for the aggressive book reporting firms in both samples. For this test, I define aggressive book reporting firms as firms accused of financial statement fraud in the LLP sample and the firms in the highest decile of the DFIN each year in the FLR sample. I find statistically significant differences in the size, pre-tax income, leverage, presence of NOL's, analyst following, and ROA of the aggressive book reporting firms in each sample. FLR and LLP use

⁶ See Appendix 1C for variable definitions.

⁷ The inclusion/exclusion of utility and financial service firms could also be impacting the results of the studies. Regulated firms included in the LLP sample (excluded from the FLR sample) may have different incentives regarding earnings management than other businesses (Phillips, Pincus, and Rego 2003). According to my calculations, the utility and financial service firms account for about 15% of the total firms in the LLP sample. In footnote 20 (p.12) LLP state that their results are nearly identical if they remove financial firms from the sample, but do not mention the effect of removing utility firms as well. Including these regulated firms in the analysis makes it more difficult to directly compare the results of the two studies because the results may be based on firms with different financial reporting incentives.

⁸ Unfortunately it is not possible to fully reverse the sampling of FLR and LLP. I can apply the more restrictive sampling method of FRL to LLP and reduce the LLP sample size, but I would not be able to greatly increase the sample size of FLR because of data requirements for calculating DTAX and DFIN.

different measures of aggressive book reporting in their studies, and differences in the underlying characteristics of these firms suggest that firms engaged in financial statement fraud are likely different than firms that aggressively manage discretionary accruals. Again, this finding suggests that the results of one study may not generalize to the other.⁹

2.2 Major Difference in LLP and FLR: Sample Period Examined

A second major difference in the two studies is the sample period examined. In their main analysis, LLP examine the relationship between aggressive book and tax reporting from 1981-2001 (and report similar untabulated results for a second analysis from 1995-2001). AAER's were first issued in May 1982 (Larson 2008), so LLP use fraud years beginning in 1981 as the first year in their analysis and use a cut-off date of 2001 because of the data attrition issues previously mentioned. FLR examine the relationship between aggressive book and tax reporting from 1991-2005. Their sample period begins in 1991 because prior research shows the book-tax gap began to grow sometime in the early 1990's.

I believe there are two possible ways in which the time period examined could be impacting the conclusions of each study. First, the relationship between aggressive book and tax reporting could be changing over time. Prior studies document aggregate time-series trends indicating that aggressive tax reporting began to coincide with aggressive financial reporting in the 1990's (Plesko 2000; Desai 2005; Yin 2003). Over time the book-

⁹ In untabulated results, I rank firms in the FLR sample into 40 groups each year and define firms in the top group as the aggressive reporting firms in the FLR sample. This results in a sample of approximately 1,027 firm-years from the FLR sample, which is very similar to the number of fraud firm-years in the LLP sample, 1,108. I test for differences in the LLP fraud sample and these FLR firms and find significant differences in all of the characteristics listed in Table 1.1, except of the level of foreign operations and ROE.

tax trade-off may be decreasing, allowing firms to align their book and tax reporting strategies, i.e., more firms may be reporting aggressively for both book and tax purposes.¹⁰ If so, the FLR sample, which also includes years 2002-2005 and excludes years 1981-1990, would document the shifting relationship better than the LLP sample, which ends in 2001 and includes years prior to 1991.

Second, the unusual reporting environment of the early 2000's is captured in the FLR data and not in the LLP data. A recent article in Forbes (2012, p. 1) states, "The early 2000's were a veritable golden age for accounting fraud cases" and then notes that massive financial statement fraud cases now appear to be few and far between.¹¹ I speculate that widespread fraudulent financial reporting in the early 2000's influenced the financial reporting of all firms, creating an environment where the majority of firms were reporting more aggressively for book and/or tax purposes than usual. Beatty, Liao, and Yu (2013) find that fraudulent financial reporting creates a spillover effect on other firms' investment behavior. The fraudulent accounting distorts the investment opportunity signal and can lead to over-investment by other firms interested in showing greater returns to investors. If non-fraud firms over-invest in response to fraudulent financial reporting, it is also conceivable that non-fraud firms are willing to pursue more aggressive tax and financial reporting strategies in response to fraudulent financial reporting, to improve the appearance of their financial performance for investors.

¹⁰ Trade-off theory is based on the idea that there is sufficient conformity (the degree to which the rules for financial and tax reporting are similar) between book and tax reporting so that firms can primarily manage only one measure of income.

¹¹ <http://www.forbes.com/sites/insider/2012/11/14/accounting-fraud-cases-are-dead-long-live-accounting-fraud-cases/>.

To determine whether the time period examined impacts the conclusions of the two studies, I perform three tests. First, I estimate the FLR model from 1981-2001, matching the LLP time period. Second, I extend the LLP fraud sample to include the years 2002-2005 and estimate their model from 1991-2005, matching the FLR sample. Third, I run both studies' models in (approximate) 10-year increments beginning in 1981 and ending in 2008.¹² Examining the relationship between aggressive book and tax reporting during several time periods allows me to at least partially assess whether the relationship between aggressive book and tax reporting is consistent over time, while potentially maintaining power in my fraud sample.¹³ In addition, isolating the 1980's from the rest of the sample may be interesting as a meaningful book-tax gap was not documented until the early 1990's. This suggests that firms did not report aggressively for both book and tax purposes in the 1980's, and if so, then I expect both the LLP and FLR models to document an insignificant (or negative) relationship between aggressive book and tax reporting during this time.¹⁴

Isolating the early to mid-2000's from the rest of the sample may also be important as this time period contains several significant events (the burst of the dot-com bubble, multiple large corporate accounting scandals, 9/11, and the enactment of the Sarbanes Oxley Act (SOX)) that likely influence the reporting environment during the time. For

¹² The financial statement fraud data gathered in August 2012 by Dechow, Ge, Larson and Sloan (2011) and purchased through the Center for Financial Reporting and Management (CFRM) show data attrition in the fraud sample during the last 10-year period (2001-2010) as it is likely the SEC had not issued all AAER's related to firm-years from 2001 through 2010 by August 2012. Based on the data attrition in the Dechow et al. (2011) data, I limit the last time period in my analysis to firm-years from 2001-2008.

¹³ AAER's are issued to a small number of firms each year. Creating too many time periods may reduce the number of fraud firms in each time period to a level where there is little statistical power to detect the presence of a significant relationship between fraud and tax aggressiveness.

¹⁴ Post 1988, I calculate total accruals on a pre-tax basis following FLR. However, in the pre-1988 period I calculate total accruals on an after-tax basis, because variables needed to calculate total accruals on a pre-tax basis are taken from statement of cash flow, which is unavailable during this time. I follow the methodology of Xie (2001) to estimate performance-matched discretionary accruals pre-1988.

example, Frank, Lynch, Rego, and Zhao (2012) suggest the enactment of SOX eliminated the positive relationship between corporate risk-taking and aggressive reporting.

Table 1.2, Panels A, B, C and D present the results of estimating the LLP model over different time periods. In Panel A, I find similar results to those originally reported in LLP when I estimate the relationship between fraud and tax aggressiveness during the time period examined by FLR, 1991-2005. However, running the LLP model in 10-year periods in Panels B, C, and D, shows the sensitivity of the LLP results to the time period examined. In the first period, 1981-1990, I find no evidence of a significant positive or negative relationship between fraud and tax aggressiveness; however, I cannot rule out the possibility that this is due to the small fraud sample size. In the second period, 1991-2000, I find results consistent with LLP, suggesting either a negative or insignificant relationship between fraud and tax aggressiveness. During the final period, 2001-2008, I find mixed results; two effective tax rate (ETR) measures suggest a *positive* relationship between fraud and aggressive tax reporting, and two book-tax difference (BTD) measures suggest a *negative* relationship between fraud and tax aggressiveness. Based on this analysis, I conclude that the relationship between fraud and tax aggressiveness is not consistent over time as results from one time period do not necessarily generalize to other time periods.

Table 1.3, Panels A, B, C and D present the results of estimating the FLR model over various time periods. In Panel B, I find the FLR results are somewhat sensitive to the sample time period as the relationship between DFIN and BTD (a firm's book-tax difference, defined as book income less estimated taxable income) is insignificant in this period, 1981-1990. An insignificant relationship in this period is consistent with the LLP results from 1981-1990 and consistent with my prediction, as a meaningful book-tax gap

was not documented until the early 1990's. Otherwise, the results in Table 1.3, Panels A, C, and D consistently show a positive relationship between aggressive book and tax reporting, suggesting a relatively stable relationship between these measures of book and tax reporting aggressiveness over the last 30 years.

2.3 Major Difference in LLP and FLR: Book and Tax Aggressiveness Measures

The two studies also differ in the measures used for aggressive book and tax reporting. LLP use fraud as a proxy for aggressive book reporting. Fraud is the most extreme measure of aggressive book reporting, and identification of fraud firms is generally done through AAER searches resulting in relatively small sample sizes. LLP argue that using firms accused of fraud as a proxy for aggressive financial reporting may be desirable as there is a very high level of confidence these firms committed fraud, or at least engaged in egregious earnings management, whereas other measures of book reporting aggressiveness likely measure aggressive book reporting with greater error.

FLR use performance-matched discretionary accruals (DFIN) as a measure of aggressive book reporting. Discretionary (i.e., abnormal) accruals are a less definitive measure of aggressive financial reporting, as some discretionary accruals violate GAAP while others do not. Figure 1.1 (after Appendix 1D) shows my interpretation of how commonly used measures of aggressive book reporting are related to each other and, in principle, how the measures capture extreme or less extreme financial reporting aggressiveness.¹⁵

¹⁵ Figure 1.1 is not drawn to scale.

To measure tax aggressiveness, LLP use several proxies, including five ETR measures (ETR1-ETR5) and three book-tax difference measures (BTD1-BTD3).¹⁶ FLR use two measures of aggressive tax reporting, DTAX and BTD. In general, ETR and BTD proxies are closely related measures of tax aggressiveness and likely capture some overlapping elements of tax avoidance.

Figure 1.2 shows my interpretation of how commonly used measures of tax aggressiveness are related to each other and in principle, how the measures capture extreme or less extreme tax reporting aggressiveness. Figure 1.2 is adapted from Figure 3 in Lisowsky, Robinson, and Schmidt (2013) and discussion in Hanlon and Heitzman (2010).¹⁷

Figures 1.1 and 1.2 illustrate that there are many proxies available to measure aggressive book and tax reporting. LLP show that a discrete book aggressiveness measure (fraud) that captures the most extreme form of financial reporting aggressiveness is negatively related, or unrelated, to several continuous measures of tax avoidance and tax aggressiveness.¹⁸ FLR show that a continuous measure of book aggressiveness (DFIN) is positively related to two continuous measures of tax aggressiveness (DTAX, BTD).

I believe the book and tax aggressiveness proxies selected in LLP and FLR play an important role in the conclusions of each study. The proxies for book and tax

¹⁶ See Appendix 1C for detailed definitions of each measure. Two of the BTD measures used in LLP are the same as the two measures of tax aggressiveness used in FLR, with different names. BTD1 in LLP is the same proxy as BTD in FLR, and BTD3 in LLP is the same proxy as DTAX in FLR.

¹⁷ Figure 1.2 is not drawn to scale.

¹⁸ Erickson, Hanlon, and Maydew (2004) show that when some firms fraudulently increase their book income they also increase their taxable income, likely based on the conformity between book and tax reporting rules. As a result, these firms must pay taxes on the fraudulent earnings, resulting in a higher effective tax rate (ETR). LLP also find that fraud firms on average have higher ETR's (i.e., fraud firms are less tax aggressive). In untabulated results, I also find that firms accused of financial statement fraud have significantly higher (estimated) taxable income than non-fraud firms.

aggressiveness shape the data collection (hand-collected vs. information from a database), total sample size (small vs. large sample), years under analysis (due to data availability restrictions and/or time restrictions for hand collection), and model specification (OLS vs. other models, discussed below). The book aggressiveness proxies are also conceptually different; for example, does aggressive book reporting need to violate GAAP (i.e., financial statement fraud) or can it consist of artificially inflating or deflating accruals within GAAP?¹⁹

To test whether the aggressiveness measures impact the conclusions of each paper, I substitute the additional measures of aggressive book and tax reporting used in LLP (FLR) into FLR (LLP). The original FLR model of tax aggressiveness on book aggressiveness is listed below as Equation 1 and the original FLR model of book aggressiveness on tax aggressiveness is listed as Equation 2.

Equation 1: Original FLR model of tax on book aggressiveness using OLS

$$DFIN_{it} = \beta_0 + \beta_1 TAX_{it} + \beta_2 PTROA_{it} + \beta_3 NOL_D_{it} + \beta_4 FOR_D_{it} + \beta_5 LEV_{it} + \beta_6 MTB_{it} + \beta_7 AF_D_{it} + \beta_8 NUM_AN_{it} + \beta_9 EM1_{it} + \beta_{10} EM2_{it} + \beta_{11} EM3_{it} + \beta_{12} \Delta PTCFO_{it} + \beta_{13} SIZE_{it} + \varepsilon_{it}$$

where TAX=DTAX or BTD. (1)

Equation 2: Original FLR model of book on tax aggressiveness using OLS

$$TAX_{it} = \beta_0 + \beta_1 DFIN_{it} + \beta_2 PTROA_{it} + \beta_3 NOL_D_{it} + \beta_4 FOR_D_{it} + \beta_5 LEV_{it} + \beta_6 MTB_{it} + \beta_7 AF_D_{it} + \beta_8 NUM_AN_{it} + \beta_9 EM1_{it} + \beta_{10} EM2_{it} + \beta_{11} EM3_{it} + \beta_{12} \Delta PTCFO_{it} + \beta_{13} SIZE_{it} + \varepsilon_{it}$$

where TAX= DTAX or BTD. (2)

¹⁹ Later in this section, I expand the analysis and also examine whether aggressive tax reporting that violates the Internal Revenue Code (i.e., tax sheltering) is different from structuring transactions within the laws of the Internal Revenue Code to reduce the firm's explicit tax liability.

First, I substitute the additional measures of tax aggressiveness used by LLP into the FLR model and test the relationship between DFIN and the additional tax aggressiveness variables (in Equations 1 and 2, I use ETR1, ETR2, ETR3, ETR4, ETR5, or BTDD2 as the TAX variable). Second, I alter the book aggressiveness measure used in FLR, so that it is similar to the book aggressiveness measure used in LLP, an indicator for financial statement fraud. For all firms in the FLR sample, I calculate the scaled probability of fraud, the F-score developed in Dechow, Ge, Larson, and Sloan (2011, p. 61)²⁰ and test for a positive relationship between the estimated probability of fraud and tax aggressiveness (in Equations 1 and 2, I substitute F_SCORE for DFIN).²¹ See Appendix 1C for variable definitions.

The results of estimating the FLR model with the additional book and tax aggressiveness variables are presented in Table 1.4, Panels A and B. Panel A shows significantly negative coefficients on ETR1, ETR2, ETR4, and ETR5, suggesting a positive relationship between aggressive book and tax reporting (as the ETR increases the firm is considered *less* aggressive for tax reporting). Panel A also shows a positive and significant coefficient on BTDD2, also suggesting a positive relationship between aggressive book and tax reporting (as the BTDD increases the firm is considered to be *more* aggressive for tax reporting). With the exception of ETR3, all additional tax aggressiveness variables tested

²⁰ $F_score = -7.893 + 0.790 (RSST_ACC) + 2.518 (CH_REC) + 1.191 (CH_INV) + 1.979 (SOFT_ASSETS) + 0.171 (CH_CS) - 0.932 (CH_ROA) + 1.092 (ISSUE)$. In developing this model, Dechow et al. (2011) examine AAER's related to fraud that were issued to public companies from 1982-2005; their sample period includes all years examined in both LLP and FLR, with the exception of 1981, and therefore seems to be a suitable model for predicting fraudulent financial reporting in this setting.

²¹ By using a continuous variable for fraud as my dependent variable, I do not need alter the model (i.e., switch to a probit model) for this test. Using the same model allows me to isolate the impact of a different book aggressiveness proxy on the relationship between aggressive book and tax reporting.

support the original conclusion in FLR that book and tax aggressiveness is positively related.

Table 1.4, Panel B shows the relationship between the F-score developed in Dechow et al. (2011) and the original tax aggressiveness variables in FLR (DTAX and BTD). In both cases I document a significantly *negative* relationship between the estimated probability of fraud and tax aggressiveness. This finding conflicts with the original conclusion in FLR; the negative relationship between the F-score and tax aggressiveness proxies supports the conclusion firms that engaged in fraud are likely to be less tax aggressive than firms not engaged in fraud, consistent with the results in LLP.

The original LLP model is listed as Equation 3 (below). In Appendix 1D, I discuss why the random effects probit model used in LLP produces inconsistent parameter estimates with panel data, as panel data violate the assumptions of independence and homoscedasticity of errors required in the random effects probit model. As a result, I use an alternative model, the Linear Probability Model, to analyze modifications to LLP's research design and in my replication of LLP.

Equation 3: Original LLP model using a random effects probit model

$$FRAUD_{it} = \alpha_0 + \alpha_1 TAX_{it} + \alpha_2 BIG_FIVE_AUDIT_{it} + \alpha_3 AUDIT_TENURE_{it} + \alpha_4 SIZE_{it} \\ + \alpha_5 AGE_{it} + \alpha_6 NEGATIVE_EQUITY_{it} + \alpha_7 M\&A_{it} + \alpha_8 D\&E_ISSUED_{it} \\ + \alpha_9 ROA_{it} + \alpha_{10} TIME_TREND_{it} + u_i + \varepsilon_{it}$$

where TAX=ETR1, ETR2, ETR3, ETR4, ETR5, BTD1, BTD2 or BTD3. (3)

To test whether the book aggressiveness measure used in LLP impacts the conclusions in the study, I substitute discretionary accruals (DFIN) into the LLP model by creating an indicator variable for firms in the top quintile of discretionary accruals (both the probit model and the linear probability model require a discrete dependent variable)

and test the relationship between DFIN and the tax aggressiveness measures in the original study (I substitute HIGH_DFIN for FRAUD in Equation 3).

LLP state that they use several proxies for tax aggressiveness to triangulate their evidence; however, some of the tax aggressiveness proxies selected are very similar to each other while other proxies are infrequently used in the literature. Further, LLP omit some commonly used tax aggressiveness proxies that may have better triangulated the evidence on the relationship between aggressive tax reporting and alleged fraud. To extend their efforts in understanding the relationship between fraud and tax aggressiveness, I add the tax shelter prediction score (Wilson 2009)²² and the long-run cash ETR (Dyreng, Hanlon, and Maydew 2008) to the tax aggressiveness measures used in LLP to test the relationship between fraud and tax aggressiveness (in Equation 3, I use TAX SHELTER or LR CASH ETR as the TAX variable). Adding the tax shelter prediction score as a tax aggressiveness measure documents the relationship between the most extreme form of aggressive tax reporting and most extreme form of aggressive financial reporting in firms. Using the long-run cash ETR eliminates some of the volatility in annual ETR proxies, and likely provides a better estimate of a firm's tax avoidance than an annual ETR measure (Dyreng et al 2008).

The results of estimating Equation 3 with the additional book and tax variables are presented in Table 1.5, Panels A and B. In Panel A, I use an indicator for firms in the highest quintile of DFIN and find a significantly positive relationship in seven of the eight tax aggressiveness proxies used in LLP (the exception is ETR3). These results conflict with those of LLP and suggest that the negative relationship documented between fraud and tax

²² Wilson (2009) uses public corporations accused of tax sheltering between 1975 and 2007 in developing his model for tax shelter prediction. Wilson's sample period includes the time period examined in both LLP and FLR and therefore seems to be a suitable model for tax shelter prediction in this setting.

aggressiveness during this period does not extend to high levels of DFIN, another measure of aggressive book reporting.²³

Combining the results of Table 1.4, Panel B, and Table 1.5, Panel A, it appears that the proxy for aggressive book reporting, either fraud or discretionary accruals (DFIN), greatly influences the relationship between aggressive book and tax reporting. Using financial statement fraud, or an indicator for firms likely to be engaged in fraud, yields a negative relationship between aggressive book and tax reporting, while using DFIN, or an indicator for firms with high levels of DFIN, yields a positive relationship between aggressive book and tax reporting. I interpret this evidence to suggest that fraud firms have a systematically different relationship between aggressive book and tax reporting than the rest of the population of firms.

It is also interesting to note that in both the FLR and LLP revised models, the relationship between DFIN or HIGH_DFIN and ETR3 is negative (see Table 1.4 Panel A and Table 1.5 Panel A), while the other ETR measures, ETR1, ETR2, ETR4, and ETR5, are positively related to both DFIN and HIGH_DFIN. ETR3 is a measure of aggressive tax reporting based on Zimmerman (1983), calculated as total tax expense less the change in deferred tax, divided by operating cash flows. Earnings are composed of cash flows and accruals, so the denominator for ETR3, operating cash flows, is likely negatively related to the level of discretionary accruals in firms (all else equal, when operating cash flows are high, firms may use fewer discretionary accruals to meet earnings benchmarks, and when

²³ In untabulated results I also examine the relationship between firms in the highest 10%, 2% and 1% of DFIN, using indicators for firms in these groups. The results for all three tests are quantitatively similar to those presented in Table 1.5, Panel A, suggesting that the (generally) positive relationship between the DFIN indicator used to identify aggressive book reporting and the measures of tax aggressiveness is not sensitive to how the indicator is constructed.

operating cash flows are low, firms may use larger discretionary accruals meet earnings benchmarks), which explains the negative relationship between DFIN or HIGH_DFIN and ETR3.

In Table 1.5, Panel B, I find results consistent with LLP suggesting either a negative or insignificant relationship between fraud and tax aggressiveness. The relationship between fraud and the long-run cash ETR is not significant; however, the relationship between fraud and the tax shelter prediction score is significantly negative. The negative relationship between the tax shelter prediction score and financial statement fraud provides evidence that firms likely still face book-tax trade-offs at the extremes; firms find it very difficult to engage in both tax sheltering activities and financial statement fraud concurrently.

2.4 Major Difference in LLP and FLR: Models, control variables, and standard errors

There are also differences in the models, control variables, and standard error calculations used in the empirical analysis of the two studies. LLP use a random effects probit model for the main test (as discussed in Appendix 1D, the random effects probit model provides inconsistent estimates in this setting) and control for many firm level determinates of fraud identified in prior studies. LLP include a time trend variable (similar to a year fixed effect) and cluster standard errors by firm. FLR use two OLS regressions in their main analyses. Both of FLR's regressions control for incentives to tax plan and incentives to manage earnings, as well as firm size, and use robust standard errors to determine coefficient significance.

There is limited overlap in the control variables of both studies (see Equations 1, 2, and 3 above), as firm size and performance are the only control variables used in both regressions.²⁴ The limited similarity in control variables suggests that one or both models omit potentially important control variables, and/or one or both models potentially include additional variables that are unnecessary.

To determine whether the control variables included in the models affect the conclusions of the two studies, I add control variables to each model, creating an identical set of controls for both models. To the LLP model, I add controls for leverage, growth, change in pre-tax cash flow from operations, the number of analysts following the firm, and indicators for analyst coverage, earnings management, NOL's, and foreign operations.²⁵ These additional control variables are included in the FLR regressions.

To the FLR model I add controls for auditor type, auditor tenure, and firm age, and indicators for mergers and acquisitions and the issuance of new debt and equity.²⁶ These additional control variables are included in the LLP model. Similar to LLP, I am not able to find a corporate governance variable that is available for the majority of the firm-years in the FLR sample time period (see Appendix 1D), and therefore, I add a random effect to the FLR model to control for corporate governance. I also include year dummies and cluster the

²⁴ FLR use pre-tax return on assets whereas LLP use after-tax return on assets as a control variable.

²⁵ LLP, footnote 20 (p. 750), states that leverage is one of the firm-level controls. However, LLP do not include a variable consistent with the standard definition of financial leverage (debt divided by assets). The variable most similar to leverage in their regression is an indicator that equals 1 if *new* debt issued plus *new* equity issued is greater than 20% of assets. This variable does not take into account prior debt of the company and thus does not appear to fully control for firm leverage.

²⁶ One of the control variables used in LLP is an indicator for firms with negative book equity. FLR remove firms with negative book equity from their sample, so I do not add this control variable to the proposed FLR model in this section.

standard errors by firm.²⁷ To empirically address two sources of correlation (time-series and cross-sectional), a common approach is to include dummy variables for each time period and then cluster by firm (Peterson 2009). See the revised LLP and FLR models below in Equation 4, 5 and 6.

Equation 4: My revised LLP model using a linear probability model

$$\begin{aligned} Fraud_{it} = & \alpha_0 + \alpha_1 TAX_{it} + \alpha_2 BIG_FIVE_AUDIT_{it} + \alpha_3 AUDIT_TENURE_{it} + \alpha_4 SIZE_{it} \\ & + \alpha_5 AGE_{it} + \alpha_6 NEGATIVE_EQUITY_{it} + \alpha_7 M\&A_{it} + \alpha_8 D\&E_ISSUED_{it} \\ & + \alpha_9 ROA + \alpha_{10} NOL_D_{it} + \alpha_{11} FOR_D_{it} + \alpha_{12} LEV_{it} + \alpha_{13} MTB_{it} \\ & + \alpha_{14} AF_D_{it} + \alpha_{15} NUM_AN_{it} + \alpha_{16} \Delta PTCFO_{it} + \alpha_{17} EM1_{it} + \alpha_{18} EM2_{it} \\ & + \alpha_{19} EM3_{it} + \alpha_{20} TIME_TREND_{it} + u_i + \varepsilon_{it} \end{aligned}$$

where Tax=ETR1, ETR2, ETR3, ETR4, ETR5, BTD1, BTD2 or BTD3. (4)

Equation 5: My revised FLR model of tax on book aggressiveness

$$\begin{aligned} DFIN_{it} = & \beta_0 + \beta_1 TAX_{it} + \beta_2 PTROA_{it} + \beta_3 NOL_D_{it} + \beta_4 FOR_D_{it} + \beta_5 LEV_{it} + \\ & \beta_6 MTB_{it} + \beta_7 AF_D_{it} + \beta_8 NUM_AN_{it} + \beta_9 EM1_{it} + \beta_{10} EM2_{it} + \beta_{11} EM3_{it} + \\ & \beta_{12} \Delta PTCFO_{it} + \beta_{13} SIZE_{it} + \beta_{14} BIG_FIVE_AUDIT_{it} + \beta_{15} AUDIT_TENURE_{it} + \\ & \beta_{16} AGE_{it} + \beta_{17} M\&A_{it} + \beta_{18} D\&E_ISSUED_{it} + \beta_{19} YEAR_FIXED_EFFECTS_t + \\ & u_i + \varepsilon_{it} \end{aligned}$$

where TAX=DTAX or BTD. (5)

Equation 6: My revised FLR model of book on tax aggressiveness

$$\begin{aligned} TAX_{it} = & \beta_0 + \beta_1 DFIN_{it} + \beta_2 PTROA_{it} + \beta_3 NOL_D_{it} + \beta_4 FOR_D_{it} + \beta_5 LEV_{it} + \\ & \beta_6 MTB_{it} + \beta_7 AF_D_{it} + \beta_8 NUM_AN_{it} + \beta_9 EM1_{it} + \beta_{10} EM2_{it} + \beta_{11} EM3_{it} + \\ & \beta_{12} \Delta PTCFO_{it} + \beta_{13} SIZE_{it} + \beta_{14} BIG_FIVE_AUDIT_{it} + \beta_{15} AUDIT_TENURE_{it} + \\ & \beta_{16} AGE_{it} + \beta_{17} M\&A_{it} + \beta_{18} D\&E_ISSUED_{it} + \beta_{19} YEAR_FIXED_EFFECTS_t + \\ & u_i + \varepsilon_{it} \end{aligned}$$

where TAX= DTAX or BTD. (6)

The results of estimating Equation 4 are presented in Table 1.6. The additional control variables slightly weaken LLP's results suggesting that fraud is negatively related to

²⁷ In the original paper, FLR calculate robust standard errors. Robust standard errors control for heteroskedasticity but do not control for correlation in errors over time or across firms.

tax aggressiveness. I find statistical significance of a negative relationship in three of the eight measures of tax aggressiveness in the LLP model, while the other tax aggressiveness measures are insignificant.²⁸

The results of estimating Equations 5 and 6 are presented in Table 1.7. I find the sign and significance of the book and tax aggressiveness in the FLR regressions remain consistent with the addition of control variables, random firm effects, year dummies, and clustered standard errors.

As conflicting results remain after I increase the similarity of the models in the two studies, I conclude model specification is not the main driver of the results of either study.

3: Discussion

I examine two studies, FLR and LLP, which report conflicting results regarding the relationship between aggressive book and tax reporting. I highlight four research design choices in the studies, including the selection of firms, the sample time period, the aggressiveness proxies used, and the empirical modeling, that likely account for the opposing conclusions. I test whether modifications to these research design choices reduce or eliminate the conflicting results in these two papers.

In Section 2.1, I find that the sample of firm-years used in the two studies may not be directly comparable, as there are significant differences among the descriptive characteristics of the firms in each study, as well as significant differences in the firms I define as the aggressive book reporting firms in each study. The differences suggest the

²⁸ In my replication of LLP, I find evidence of a negative relationship between fraud and aggressive tax reporting in four of the eight tax aggressiveness measures (the other four tax aggressiveness measures are insignificant) using the linear probability model. The original LLP results show evidence of a negative relationship between fraud and aggressive tax reporting in six of the eight tax aggressiveness measures.

two studies examine firms that, on average, reflect different opportunities and incentives for aggressive book and tax reporting.

In Section 2.2, I alter the time period examined and find some evidence that conflicts with the original conclusions in both studies. The results in FLR are generally robust to alternations in the sample time period, with the exception of the period from 1981-1990, when one of the relationships between book and tax aggressiveness is insignificant. The conclusions in LLP, however, are sensitive to alternations in the time period examined; I find an insignificant relationship between fraud and tax aggressiveness in the 1980's, a negative relationship in the 1990's, and evidence of both a positive and negative relationship in the 2000's.

In Section 2.3, I find strong evidence that the measure of aggressive book reporting greatly influences the relationship between aggressive book and tax reporting. In the FLR model, using an alternative measure of book aggressiveness, the F-score, yields evidence that conflicts with the findings in FLR; I find the estimated probability of fraud is negatively related to tax aggressiveness. In the LLP model, using an alternative measure of book aggressiveness, an indicator for firms in the highest quintile of DFIN, I find evidence of a positive relationship between discretionary accruals and tax aggressiveness, which conflicts with the findings in LLP. Using alternative measures of aggressive tax reporting does not significantly change the original conclusions of either study.

In Section 2.4 I find both studies are generally unaffected by the addition of control variables, and other modifications to the original models. The results in FLR are robust alternations to their model, including the addition of control variables, year dummies, and

clustered standard errors. The results in LLP slightly weaken, but do not substantively change with the inclusion of additional control variables.

My analysis supports the idea that the relationship between aggressive book and tax reporting is more complex than prior studies have allowed for. I believe the relationship between aggressive book and tax reporting varies cross-sectionally and may also vary over time. For example, firms accused of fraud may have a consistently different relationship between aggressive book and tax reporting than the rest of the population of firms.

Future studies in this area may investigate the relationship between additional book and tax aggressiveness proxies, examine the persistence of the relationship between book and tax aggressiveness in firms, and investigate the relationship between book and tax aggressiveness in non-US firms.

Appendix 1A: My Replication of FLR

I replicate Table 1 and Tables 3-6 in FLR, which support the conclusion that aggressive tax reporting is positively related to aggressive book reporting. I limit the presentation of my replication results to Table 6, however I am happy to share the results of my entire replication upon request. Table 6 presents the results from estimating Equation 1 (2) above, where the independent (dependent) variables are DTAX and BTD and the dependent (independent) variable is DFIN. The results of my regression are consistent with FLR, showing a positive and significant coefficient on the variable representing aggressive book or tax reporting.

FLR, Table 6							
Original FLR Results and My Replication of FLR							
Multivariate Regression Analyses of the Relation between Financial and Tax Reporting Aggressiveness using Firm-Years from 1991-2005							
Original FLR Results				My Replication of FLR			
OLS Regressions of measures of Tax Reporting Aggressiveness on DFIN and Controls for Tax Planning and Earnings Management Incentives				OLS Regressions of measures of Tax Reporting Aggressiveness on DFIN and Controls for Tax Planning and Earnings Management Incentives			
	Predicted Signs [for a Positive Relationship]	Dependant variable			Predicted Signs [for a Positive Relationship]	Dependant variable	
		DTAX	BTD			DTAX	BTD
Intecept		0.017 ***	-0.059 ***	Intecept		-0.001	-0.010 ***
DFIN	+	0.101 ***	0.031 ***	DFIN	+	0.050 ***	0.029 ***
PTR0A		0.287 ***	0.449 ***	PTR0A		0.323 ***	0.164 ***
NOL_D		0.034 ***	0.089 ***	NOL_D		0.025 ***	0.054 ***
FOR_D		0.050	-0.160 ***	FOR_D		-0.002	-0.012 ***
LEV		0.049 ***	0.033 ***	LEV		0.035 ***	-0.009 ***
MTB		0.001	-0.003 ***	MTB		-0.001 ***	0.002 ***
AF_D		0.008 *	0.003 *	AF_D		-0.007 **	-0.004 **
NUM_AN		-0.634 ***	-0.194 ***	NUM_AN		-0.177 ***	-0.012
EM1		0.041 ***	0.018 ***	EM1		0.028 ***	-0.005 **
EM2		-0.011 **	0.000	EM2		-0.010 ***	0.001
EM3		-0.007	-0.002	EM3		-0.008 ***	-0.003
Δ PTCFO		0.027 *	-0.023 ***	Δ PTCFO		0.038 ***	0.021 ***
SIZE		-0.007 ***	0.002 ***	SIZE		-0.004 ***	0.000
Adj. R ²		0.037	0.261	Adj. R ²		0.267	0.139
n		45,235	45,235	n		42,845	42,845
OLS Regressions of DFIN on Measures of Tax Reporting Aggressiveness and Controls for Tax Planning and Earnings Management Incentives				OLS Regressions of DFIN on Measures of Tax Reporting Aggressiveness and Controls for Tax Planning and Earnings Management Incentives			
	Predicted Signs [for a Positive Relationship]	Independent variable			Predicted Signs [for a Positive Relationship]	Independent variable	
		TAX=DTAX	TAX=BTD			TAX=DTAX	TAX=BTD
Intecept		0.097 ***	0.103 ***	Intecept		0.072 ***	0.073 ***
TAX	+	0.063 ***	0.088 ***	TAX	+	0.208 ***	0.138 ***
PTR0A		0.194 ***	0.174 ***	PTR0A		0.154 ***	0.200 ***
NOL_D		0.017 ***	0.011 ***	NOL_D		0.011 ***	0.008 ***
FOR_D		0.001	0.003	FOR_D		-0.007 ***	-0.005 **
LEV		0.038 ***	0.038 ***	LEV		0.031 ***	0.040 ***
MTB		0.001	0.001 **	MTB		0.002 ***	0.001 ***
AF_D		-0.015 ***	-0.015 ***	AF_D		-0.016 ***	-0.017 ***
NUM_AN		-0.095 *	-0.118 **	NUM_AN		0.132 ***	0.097 **
EM1		0.001	0.002	EM1		-0.008	-0.002
EM2		0.005	0.005	EM2		0.003	0.000
EM3		0.001	0.001	EM3		-0.010 **	-0.011 ***
Δ PTCFO		-0.237 ***	-0.234 ***	Δ PTCFO		-0.420 ***	-0.418 ***
SIZE		-0.020 ***	-0.021 ***	SIZE		-0.013 ***	-0.014 ***
Adj. R ²		0.055	0.052	Adj. R ²		0.096	0.090
n		45,235	45,235	n		42,845	42,845
FLR estimate the OLS regressions with robust clustered errors. The time period under analysis includes firm-years from 1991-2005.				I estimate the OLS regressions with robust clustered errors. The time period under analysis includes firm-years from 1991-2005.			
*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).				*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).			

Appendix 1B: My replication of LLP

I replicate Tables 1-5 in LLP, which support the conclusion that tax aggressiveness is negatively related (or unrelated) to financial statement fraud. I limit the presentation of my replication results to Table 5, however I am happy to share the results of my entire replication upon request. Table 5 presents the results from estimating Equation 3 above, where the independent variables include eight measures of tax aggressiveness and the dependent variable is an indicator for fraud (each column uses a different proxy for tax aggressiveness).

I replicate the regression using a linear probability model instead of a random effects probit model as described in LLP (see Appendix 1D). LLP find a positive and significant coefficient on four of the five ETR tax aggressiveness proxies and a negative and significant coefficient on two of the three BTD tax aggressiveness proxies (the remaining coefficients are insignificant). Positive and significant coefficients on the ETR proxies suggest a negative relationship between fraud and aggressive tax reporting – as the ETR increases the firm is considered less aggressive for tax reporting. A negative and significant coefficient on the BTD proxies also suggests a negative relationship between fraud and aggressive tax reporting – as the BTD increases the firm is considered more aggressive for tax reporting.

I find a positive and significant relationship for two of the five ETR tax aggressiveness proxies (the other three coefficients are insignificant), and a negative and significant coefficient of two of the three BTD tax aggressiveness proxies (the other coefficient is insignificant) using the linear probability model (see LLP, Table 5 – My Replication below).

LLP, Table 5 - Original LLP Results										
The Association Between Accounting Fraud and the Tax Variables										
	Predicted Signs [for a Negative Relationship]	1	2	3	4	5	6	7	8	
ETR1	+	0.34 (1.96) *								
ETR2	+		0.64 (3.22) ***							
ETR3	+			0.26 (2.27) **						
ETR4	+				0.43 (3.05) ***					
ETR5	+					0.21 (1.40)				
BTD1	-						-0.001 (-2.52) **			
BTD2	-							-0.002 (-3.89) ***		
BTD3	-								-0.002 (-0.15)	
Big Five		-0.56 (-5.36) ***	-0.52 (-3.45) ***	-0.29 (-1.97) **	-0.33 (-2.10) **	-0.21 (-1.31)	-0.59 (-6.99) ***	-0.56 (-6.56) ***	-0.45 (-3.48) ***	
Company Size		0.13 (5.38) ***	0.16 (4.80) ***	0.16 (5.63) ***	0.11 (3.81) ***	0.1 (3.35) ***	0.21 (10.02) ***	0.2 (9.57) ***	0.2 (6.40) **	
Company Age		-0.1 (-1.90) *	-0.1 (-1.42)	-0.06 (-.90)	-0.12 (-1.78) *	-0.11 (-1.52)	-0.1 (-2.07) **	-0.08 (-1.75) *	-0.11 (-1.54)	
Audit Firm Tenure		0.18 (3.76) ***	0.16 (2.40) **	0.06 (1.15)	0.14 (2.35) **	0.15 (2.62) ***	0.09 (-2.13) **	0.08 (1.96) *	0.02 (-0.29)	
Negative Equity		-0.17 (-0.75)	-0.25 (-.79)	-0.15 (-0.78)	0.09 (0.33)	-0.09 (-.35)	-0.28 (-2.55) **	-0.26 (-2.40) **	-0.21 (-1.20)	
M&A Indicator		0.26 (3.24) ***	0.12 (1.02)	0.33 (3.50) ***	0.28 (2.87) ***	0.37 (4.06) ***	0.29 (3.93) ***	0.28 (3.86) ***	0.11 (1.01)	
Debt & Equity Issued		0.24 (3.74) ***	0.27 (3.10) ***	0.04 (0.44)	0.19 (2.36) **	0.18 (2.77) **	0.17 (3.10) ***	0.16 (2.97) ***	0.17 (2.05) **	
ROA		-0.92 (-2.28) **	-0.76 (-1.76) *	-0.46 (-2.98) ***	-1.18 (-2.47) **	-1.24 (-2.83) ***	-0.18 (-2.93) ***	-0.17 (-2.75) ***	0.29 (-2.95) ***	
Time Trend		0.05 (8.32) ***	0.06 (6.94) ***	0.05 (5.67) ***	0.09 (8.00) ***	0.09 (8.09) ***	0.04 (6.86)	0.04 (6.86) ***	0.04 (5.66) **	
Company Specific Effects? (Random Effects)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Fraud Obs.		646	386	484	461	481	797	776	394	
No-Fraud Obs.		102,320	65,749	68,928	63,204	62,988	125,476	122,478	61,668	
The dependent variable equals one if the company engaged in accounting fraud during the year, and zero otherwise. LLP control for company-specific effects by estimating random effects probit models. Z-statistics are reported in parentheses. Standard errors are adjusted for clustering by company. The analysis includes firm-years from 1981-2001.										
*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).										

LLP, Table 5 - My Replication										
The Association Between Accounting Fraud and the Tax Variables										
	Predicted Signs [for a Negative Relationship]	1	2	3	4	5	6	7	8	
ETR1	+	0.00291 1.63								
ETR2	+		0.00556 2.57 ***							
ETR3	+			0.00223 1.59						
ETR4	+				0.00400 2.23 **					
ETR5	+					0.00106 0.56				
BTD1	-						-0.00001 -1.74 *			
BTD2	-							-0.00003 -2.24 **		
BTD3	-								0.00008 0.04	
Big Five		-0.0060 (-3.35) ***	-0.0048 (-2.55) **	-0.0042 (-2.39) **	-0.0039 (-1.92) *	-0.0031 (-1.48)	-0.0064 (-4.78) ***	-0.0061 (-4.64) ***	-0.0044 (-2.16) **	
Company Size		0.0018 (5.59) ***	0.0017 (5.33) ***	0.0017 (5.25) ***	0.0016 (4.28) ***	0.0016 (4.19) ***	0.0021 (8.89) ***	0.0021 (8.68) ***	0.0020 (5.61) ***	
Company Age		0.0000 (-0.07)	0.0001 (0.14)	-0.0008 (-1.07)	-0.0004 (-0.52)	-0.0002 (-0.21)	-0.0003 (-0.77)	-0.0002 (-0.55)	-0.0005 (-0.57)	
Audit Firm Tenure		0.0001 (0.64)	0.0000 (-0.01)	0.0001 (0.8)	0.0000 (0.19)	0.0000 (0.24)	0.0000 (0.25)	0.0000 (0.13)	-0.0001 (-0.51)	
Negative Equity		-0.0015 (-0.7)	-0.0012 (-0.49)	-0.0016 (-0.82)	0.0014 (0.47)	-0.0004 (-0.13)	-0.0024 (-2.25) **	-0.0023 (-2.09) **	-0.0019 (-0.99)	
M&A Indicator		0.0027 (2.3) **	0.0009 (0.75)	0.0037 (2.6) ***	0.0031 (2.15) **	0.0047 (3.05) ***	0.0033 (3.19) ***	0.0033 (3.13) ***	0.0008 (0.58)	
Debt & Equity Issued		0.0018 (2.44) **	0.0018 (1.97) **	0.0000 (-0.05)	0.0015 (1.53)	0.0015 (1.47)	0.0011 (1.85) *	0.0010 (1.64)	0.0010 (1.13)	
ROA		-0.0053 (-1.59)	-0.0044 (-1.49)	-0.0054 (-2.19) **	-0.0089 (-1.98) **	-0.0112 (-2.43) **	-0.0019 (-2.85) ***	-0.0018 (-2.69) ***	-0.0031 (-2.3) **	
Time Trend		0.0004 (4.07) ***	0.0004 (4.22) ***	0.0005 (3.87) ***	0.0007 (5.29) ***	0.0008 (5.31) ***	0.0003 (4.75) ***	0.0003 (5.07) ***	0.0004 (3.8) ***	
Company Specific Effects? (Random Effects)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Fraud Obs.		646	386	481	460	480	796	775	392	
No-Fraud Obs.		102,284	65,733	68,898	63,168	62,949	125,443	122,445	61,690	
The dependent variable equals one if the company engaged in accounting fraud during the year, and zero otherwise. I control for company-specific effects by estimating random effects linear probability models. Z-statistics are reported in parentheses. Standard errors are adjusted for clustering by company. The analysis includes firm-years from 1981-2001.										
*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).										

Appendix 1C		
Variable Names and Definitions		
Panel A: Tax Aggressiveness Variables		Figure 1.1 and 1.2 reference
ABNORMAL TOTAL BTD	Residuals from the regression $BTD/TA = \beta_0 + \beta_1 M + e$. See Desai and Dharmapala (2006).	BTD proxy
BTD1 in LLP / BTD in FLR	Pre-tax income (#170) less ((Current federal tax expense (#63) plus foreign tax expense (#64)), divided by the statutory marginal tax rate).	BTD proxy
BTD2	BTD1 less (Total deferred tax expense (#50), divided by the statutory marginal tax rate).	BTD proxy
BTD3 in LLP / DTAX in FLR	Residuals from estimating the following equation by 2-digit SIC code and fiscal year, where all variables, including the intercept are scaled by beginning of year total assets (#6): $PERMDIFF_{it} = \alpha_0 + \alpha_1 INTANG_{it} + \alpha_2 UNCON_{it} + \alpha_3 MI_{it} + \alpha_4 CSTE_{it} + \alpha_5 \Delta NOL_{it} + \alpha_6 LAG_PERMDIFF_{it} + \epsilon$.	BTD proxy
CURRENT ETR	Current federal tax expense (#63), divided by pre-tax income (#170).	ETR proxy
ETR1	Total tax expense (#16), divided by Pre-tax income (#170).	ETR proxy
ETR2	Current federal tax expense (#63), divided by (Income before extraordinary items (#18) plus Current Federal tax Expense (#63) plus Minority Interest (#49) less Extraordinary Items (#48) less Equity in earnings (#55)).	ETR proxy
ETR3	Total tax expense (#16) less Change in deferred tax (#35), divided by Operating cash flows (#308).	ETR proxy
ETR4	Cash taxes paid (#317), divided by Pre-tax income (#170).	ETR proxy
ETR5	Cash taxes paid (#317), divided by (Pre-tax income (#170) less Special items (#17)).	ETR proxy
ETR DIFFERENTIAL	The statutory ETR less the firm's GAAP ETR.	ETR proxy
LR CASH ETR	The sum of cash taxes paid (#317) over 5 years, divided by pre-tax income (#170) over the 5 years.	ETR proxy
MARGINAL TAX RATE	Simulated marginal tax rate. For examples, see Shevlin (1990) and Graham (1996a, b).	Marginal tax rate
TAX SHELTER	Tax Shelter prediction score (Wilson 2009) = $-4.30 + (6.63*BTD) - (1.72*LEVERAGE) + (0.66*SIZE) + (2.26*ROA) + (1.62*FOREIGN_INCOME) + (1.56*R\&D)$	Tax Shelter proxy
TOTAL BTD	Pre-tax income (#170) less ((Current federal tax expense (#63) plus foreign tax expense (#64)), divided by the statutory marginal tax rate), less the change in NOL (#52).	BTD proxy
TEMPORARY BTD	Deferred tax expense (#50), divided by the statutory marginal tax rate.	BTD proxy
UNRECOGNIZED TAX BENEFITS	One variation is the natural log of 1 plus the total UTB balance at the end of the year $\ln(1 + \text{TXTUBEND})$.	Tax Shelter proxy
Panel B: Book Aggressiveness Variables		Figure 1.1 and 1.2 reference
DFIN	Performance-matched discretionary accruals. Firm specific normal accruals are calculated using coefficient estimates from the following equation, estimated by 2-digit SIC code and fiscal year, where all variables, including the intercept are scaled by beginning of year total assets (#6): $TACC = \alpha_0 + \alpha_1 (\Delta REV_{it}) - \alpha_2 \Delta AR_{it} + \alpha_3 PPE_{it} + \eta$ where $TACC = \text{total accruals} = (\text{Earnings before extraordinary items (\#123)} + \text{Total tax expense (\#16)}) - [(\text{Cash flow from operations (\#308)} + \text{Income taxes paid (\#317)}) - \text{Extraordinary items and discontinued operations (\#124)}]$. Discretionary accruals is the difference between total accruals and estimated normal accruals. Each firm year is matched based on industry and decile of pre tax-return on assets. Performance adjusted discretionary accruals is the difference between each observations discretionary accrual measure and the median discretionary accrual measure for its industry and PTROA decile.	Accruals model

Appendix 1C Continued		
Panel B: Book Aggressiveness Variables (continued)		Figure 1.1 and 1.2 reference
FRAUD	Indicator variable that equals 1 if the company is alleged by an Accounting and Auditing Enforcement Release (AAER) to have engaged in fraud during the year, 0 otherwise.	Fraud proxy
F-SCORE	The scaled probability of fraud from Dechow, Ge, Larson, and Sloan (2011, p. 61). Predicted value = $-7.9893 + 0.790 (\text{RSST ACC}) + 2.518 (\text{CH REC}) + 1.191 (\text{CH INV}) + 1.979 (\text{SOFT ASSETS}) + 0.171 (\text{CH CS}) - 0.932 (\text{CH ROA}) + 1.029 (\text{ISSUE})$.	Fraud proxy
HIGH_DFIN	Indicator variable that equals 1 if the firm is in the highest quintile of discretionary accruals (DFIN).	Accruals model
Panel C: Control Variables		Figure 1.1 and 1.2 reference
AF_D	Indicator variable that equals 1 if firm i has at least one analyst covering the firm on I/B/E/S in year t , 0 otherwise.	
AGE	Log of the number of years that the company is listed on Compustat.	
ASSETS	Total assets (#6).	
AUDIT TENURE	Log of the number of years that the company is audited by the same audit firm on Compustat.	
BIG FIVE AUDIT	Indicator variable that equals 1 if the company is audited by one of the Big 5 firms or one of their predecessors (AU=01-08), 0 otherwise.	
BTD (Wilson 2009)	Pre-tax income (#170) less ((Current federal tax expense (#63) plus foreign tax expense (#64)), divided by the statutory marginal tax rate) less the change in the NOL carryforward (#52). If current federal tax expense is missing, total tax expense is calculated by subtracting deferred taxes (#50), state income taxes (#173) and other income taxes (#211) from total income taxes (#16).	BTD proxy
CH CS (Dechow et al. 2011)	Percentage change in cash sales (Sales (#12) less change in Accounts Receivable (#2)).	
CH INV (Dechow et al. 2011)	Change in inventory (#3), divided by average total assets (#6).	
CH REC (Dechow et al. 2011)	Change in accounts receivable (#2), divided by average total assets (#6).	
CH ROA (Dechow et al. 2011)	(Earnings in year t (#18), divided by average total assets in year t (#6)), divided by (Earnings in year $t-1$, divided by average total assets in year $t-1$).	
D&E ISSUED	An indicator variable equal to 1 if the sum of new long-term debt (#111) plus new equity (#108) exceeds 20% of total assets (#6), 0 otherwise.	
EM1	Indicator variable that equals 1 if net income (#172) in year t , divided by the market value of common equity in year $t-1$ is greater than 0 and less than or equal to 0.01 for firm i , 0 otherwise.	Earnings management indicator
EM2	Indicator variable that equals 1 if the change in net income (#172) from year $t-1$ to t , divided by the market value of common equity at year $t-2$, is greater than 0 and less than or equal to 0.01 for firm i , 0 otherwise.	Earnings management indicator
EM3	Indicator that equals 1 if firm i 's actual earnings less the median analyst forecast for fiscal year t (as reported on I/B/E/S) is greater than 0 and less than or equal to 0.01, and 0 otherwise.	Earnings management indicator
FOR_D	Indicator variable that equals 1 if the absolute value of pre-tax foreign income (#273) > 0, 0 otherwise.	
FOREIGN INCOME (Wilson 2009)	An indicator variable set equal to 1 for firm observations reporting foreign income, and 0 otherwise.	
ISSUE (Dechow et al. 2011)	An indicator variable equal to 1 if the firm issued securities during year t (#108 > 0 or #111 > 0).	

Appendix 1C Continued		
Panel C: Control Variables (continued)		Figure 1.1 and 1.2 reference
LEV	Long-term debt (#9), plus debt in current liabilities (#34) divided by total assets (#6).	
LEVEL FOR OPS	Foreign pre-tax income (#273) divided by pre-tax income (#170).	
LEVERAGE (Wilson 2009)	Long-term debt (#9), divided by total assets (#6).	
M&A	Indicator variable that equals 1 if the company had an acquisition that contributed to sales (#249 > 0), 0 otherwise.	
MTB	Market value of common equity (#199 X #25) in year $t-1$, divided by the book value of common equity (#60) in year $t-1$.	
NEGATIVE EQUITY	Indicator variable that equals 1 if total liabilities (#181) > total assets (#6), 0 otherwise.	
NOL_D	Indicator variable that equals 1 if firm i has an NOL (#52 > 0) in the current year, 0 otherwise.	
NUM_AN	The number of analysts covering firm i in year t as reported by I/B/E/S, divided by total assets (#6) in year $t-1$.	
NUMEST	The number of analysts covering firm i in year t .	
ΔPTCFO	Change in pre-tax cash flows from operations (#308 - #124 + #317) divided by total assets at year $t-1$.	
R&D (Wilson 2009)	Research and Development Expense (#46), divided by total assets (#6) at year $t-1$.	
PRETAX INCOME	Pre-tax income (#170).	
PTROA	Pre-tax income (#170) divided by total assets (#6) at year $t-1$.	
ROA	Net income (#172), divided by total assets (#6).	
ROE	Net income (#172), divided by stockholders equity (#216).	
RSST ACC (Dechow et al. 2011)	RSST ACC = (change in WC + change in NCO + change in FIN) / Average total assets (#6), where WC = Current Assets (#4) - Cash and Short-term Investments (#1) - Current Liabilities (#5) - Debt in Current Liabilities (#34); NCO = Total Assets (#6) - Current Assets (#4) - Investments and Advances (#32) - Total Liabilities (#181) - Current liabilities (#5) - Long-term debt (#9); FIN = Short term investments (#193) + Long-term investments (#32) - long-term debt (#9) + Debt in Current Liabilities (#34) + Preferred Stock(#130); following Richardson et al. 2005.	
SIZE	Log of total assets (#6).	
SOFT ASSETS (Dechow et al. 2011)	(Total assets (#6), less PP&E (#8), less Cash and cash equivalents (#1)), divided by total assets (#6).	
TAX LOSS SCALED	Tax loss carryforward (#52), divided by total assets (#6).	
TIME_TREND	A variable that increases by 1 each year. 1 in 1981, 2 in 1982,...,20 in 2000, and 21 in 2001.	
Following LLP, each ETR variable is set as missing when the denominator is zero or negative and each ETR is winsorized to the range [0,1]. Continuous variables are winsorized at 1 and 99% to address problems associated with outliers.		

Appendix 1D: Empirical issues with the random effects probit model and panel data

LLP examine the relationship between fraud and tax aggressiveness. They use a random effect probit model as dependent variable, the incidence of fraud, is binary, and they include a random effect to capture corporate governance of the firm, as they are unable to find a proxy for corporate governance that does not dramatically reduce their fraud sample size due to data limitations. The primary assumptions of the random effects probit model are that the random effect and the probit model error are independent, identically distributed, and normal (Gu, Fiebig, Cripps, and Kohn 2009).²⁹

In panel data, there are many cases where the errors are expected to be correlated over time and/or across firms (Peterson 2009). LLP note the potential correlation in the errors of their panel data and include a time trend variable (similar to year fixed effects) and cluster standard errors by firm. However, the data used in LLP and the model selected by LLP are incompatible - the panel data on fraud violates the assumptions of independence and homoscedasticity of errors required in the random effects probit model.

Greene (2008 p. 517) notes that clustered standard errors only work well if the estimator is consistent. Green then states “The pseudo-MLE [maximum likelihood estimator that is cluster robust] is only consistent for random effects in a few special cases....It is **not** consistent in the probit and logit models in which this approach is often used” (emphasis added). Consistency is considered necessary for all reasonable estimators.

²⁹ LLP do not use fixed effects in their model, as doing so would drop all firms that lack variation in the dependent variable (i.e., all the firms that have Fraud=0 for all years or Fraud=1 for all years) because the fixed effects probit model does not use a within transformation by demeaning the variable. For example, in the fixed effects **linear model** $y_{it} = X_{it}\beta + \alpha_i + \varepsilon_{it}$, y is the dependent variable, X is the regressor matrix, α is the fixed effect, and ε is the error term. The fixed effect is unobservable and cannot be directly controlled for, so the fixed effect model eliminates the fixed effect by demeaning the variables using a within transformation; $y_{it} - \bar{y}_i = (X_{it} - \bar{X}_i)\beta + (\alpha_i - \bar{\alpha}_i) + (\varepsilon_{it} - \bar{\varepsilon}_i) = \dot{y}_{it} = \dot{X}_{it}\beta + \dot{\varepsilon}_{it}$.

The linear probability model is an alternative model that can be used to answer the research question in LLP. Coefficients from a linear probability model are interpreted as the average marginal effect of increasing X on the outcome represented by Y ; using this model, the coefficient on the tax aggressiveness variables can be interpreted as the increase in the probability that the firm will engage in (and be accused) of fraud, given a one unit increase in the tax aggressiveness of the firm. Angrist and Pischke (2009) show that the linear probability model is a consistent estimator of the average marginal effect in the related probit model.

Critics of the linear probability model point out that it is not a perfect model (e.g., Horrace and Oaxaca 2006), as the estimated coefficients can imply probabilities outside the unit interval $[0,1]$, which will be inconsistent with the probit index function parameters. However, this is not an issue in LLP's study, as they examine the relationship between fraud and aggressive tax reporting by interpreting the sign of the coefficient on the tax aggressiveness variables, and do not calculate probabilities.

I use the linear probability model to estimate the regression in LLP, including all control variables, a random firm effect, time trend variable, and clustered standard errors. In my replication of LLP, I find similar but slightly weaker results using the linear probability model (see Appendix 1B, Table 5, Panel B). I also use the linear probability model to analyze modifications to the original LLP research design in Sections 2.2-2.4.

Figure 1.1: Financial Reporting Aggressiveness Continuum and Proxies

[illegible]

Figure 1.2: Tax Reporting Aggressiveness Continuum and Proxies					
Less extreme aggressiveness			Extreme aggressiveness		
Following the Internal Revenue Code			Not following the Internal Revenue Code		
No intent to evade taxes		Intent to evade taxes	No intent to evade taxes		Intent to evade taxes
Normal operations resulting in low ETR's					
Tax Avoidance					
Proxies: Effective Tax Rate (ETR) measures - GAAP ETR, Current ETR, Cash ETR, Long-run ETR, and Marginal					
	Tax Aggressiveness				
	Proxies: Book-Tax Differences (BTD) - Total BTD, Temporary BTD, Abnormal BTD, and DTAX				
				Tax Sheltering	
				Proxies: Tax Shelter Activity, Unrecognized Tax Benefits	

Table 1.1							
Descriptive Statistics for Sample Firms							
Panel A: Descriptive statistics for all FLR and LLP sample firms							
	FLR Sample N	FLR Sample mean	LLP Sample N	LLP Sample mean	Difference in means	t stat	
ASSETS	42,845	1,224.60	162,624	657.90	566.70	30.19	***
PRE-TAX INCOME	42,845	87.62	162,624	57.89	29.73	17.66	***
LEV	42,845	0.20	162,624	0.51	(0.31)	(184.91)	***
LEVEL FOR OPS	42,845	0.09	162,624	0.04	0.05	18.71	***
FOR_D	42,845	0.33	162,624	0.16	0.17	69.21	***
TAX LOSS SCALED	42,845	0.14	162,624	0.57	(0.43)	(73.76)	***
NOL_D	42,845	0.30	162,624	0.37	(0.07)	(29.04)	***
NUMEST	42,845	4.73	162,624	2.74	1.99	58.32	***
ROA	42,845	(0.01)	162,624	(0.12)	0.11	68.70	***
ROE	42,845	(0.08)	162,624	(0.05)	(0.03)	(6.25)	***
Panel B: Descriptive statistics for aggressive book reporting firms, defined as fraud firms in the LLP sample and firms in the highest decile of DFIN each year in the FLR sample							
	FLR Sample N	FLR Sample mean	LLP Sample N	LLP Sample mean	Difference in means	t stat	
ASSETS	4,260	456.20	1,108	1,213.60	(757.40)	(6.90)	***
PRE-TAX INCOME	4,260	34.50	1,108	85.23	(50.73)	(4.80)	***
LEV	4,260	0.18	1,108	0.56	(0.38)	(23.58)	***
LEVEL FOR OPS	4,260	0.06	1,108	0.05	0.01	1.53	
FOR_D	4,260	0.21	1,108	0.20	0.01	0.62	
TAX LOSS SCALED	4,260	0.32	1,108	0.31	0.01	0.24	
NOL_D	4,260	0.36	1,108	0.43	(0.07)	(4.51)	***
NUMEST	4,260	2.56	1,108	4.75	(2.19)	(9.77)	***
ROA	4,260	(0.05)	1,108	(0.13)	0.09	5.73	***
ROE	4,260	(0.17)	1,108	(0.16)	(0.01)	(0.18)	
All continuous variables are winsorized at the 1st and 99th percentiles. See Appendix 1C for variable definitions.							

Table 1.2

The Association Between Accounting Fraud and Tax Aggressiveness in Different Sample Periods

I run the LLP model over several sample time periods, using the original measures of book and tax aggressiveness and the original control variables (Equation 3). This table presents the results from the regressions. For the sake of brevity, the results for the control variables are not reported. All variables are defined in Appendix 1C. Predicted signs in this table are based on the LLP results suggesting a negative relationship between aggressive book and tax reporting.

Panel A: LLP Results over the period 1991-2005 (FLR Sample Period)									
	Predicted Signs for a Negative Relationship	1	2	3	4	5	6	7	8
ETR1	+	0.00571 (2.25) **							
ETR2	+		0.00500 (1.51)						
ETR3	+			0.00275 (1.78) *					
ETR4	+				0.00156 (0.76)				
ETR5	+					-0.00163 (-0.77)			
BTD1	-						-0.00001 (-2.00) **		
BTD2	-							-0.00004 (-2.80) ***	
BTD3	-								-0.00099 (-0.39)
Control variables		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Random Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fraud Obs.		668	412	678	618	656	956	945	600
No-Fraud Obs.		66,903	45,546	72,147	62,383	63,384	98,385	96,812	46,043

Panel B: LLP Results over the period 1981-1990									
	Predicted Signs for a Negative Relationship	1	2	3	4	5	6	7	8
ETR1	+	-0.00205 (-0.97)							
ETR2	+		0.0013 (0.58)						
ETR3	+			0.00088 (0.46)					
ETR4	+				0.00315 (1.31)				
ETR5	+					0.00379 (1.47)			
BTD1	-						0.000002 (-0.37)		
BTD2	-							0.000006 (-0.57)	
BTD3	-								-0.00416 (-1.64)
Control variables		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Random Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fraud Obs.		184	114	58	51	47	216	206	106
No-Fraud Obs.		44,721	29,165	12,871	11,981	11,283	52,401	50,817	26,495

The dependent variable equals one if the company engaged in accounting fraud during the year, and zero otherwise. I control for company-specific effects by estimating random effects linear probability models. Z-statistics are reported in parentheses. Standard errors are adjusted for clustering by company.

*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).

Table 1.2 Continued									
Panel C: LLP Results over the period 1991-2000									
	Predicted Signs for a Negative Relationship	1	2	3	4	5	6	7	8
ETR1	+	0.00506 (1.99) **							
ETR2	+		0.00949 (2.53) **						
ETR3	+			0.00230 (1.36)					
ETR4	+				0.00465 (2.07) **				
ETR5	+					0.00148 (0.63)			
BTD1	-						-0.00001 (-1.32)		
BTD2	-							-0.00004 (-2.73) ***	
BTD3	-								0.00158 (0.63)
Control variables		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Random Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fraud Obs.		415	247	373	365	383	520	510	258
No-Fraud Obs.		53,560	34,168	50,947	47,628	47,905	66,992	65,655	32,362

Panel D: LLP Results over the period 2001-2008									
	Predicted Signs for a Negative Relationship	1	2	3	4	5	6	7	8
ETR1	+	0.00315 (0.84)							
ETR2	+		-0.00218 (-0.57)						
ETR3	+			0.00329 (1.37)					
ETR4	+				-0.00472 (-1.89) *				
ETR5	+					-0.00480 (-1.82) *			
BTD1	-						-0.00001 (-2.02) **		
BTD2	-							-0.00002 (-1.86) *	
BTD3	-								-0.00147 (-0.69)
Control variables		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Random Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fraud Obs.		328	209	381	315	339	447	441	333
No-Fraud Obs.		30,828	19,568	35,812	28,728	29,885	44,465	44,009	21,802

The dependent variable equals one if the company engaged in accounting fraud during the year, and zero otherwise. I control for company-specific effects by estimating random effects linear probability models. Z-statistics are reported in parentheses. Standard errors are adjusted for clustering by company.
 *** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).

Table 1.3**The Association Between Aggressive Book and Tax Reporting in Different Sample Periods**

I run the FLR models over several sample time periods, using the original measures of book and tax aggressiveness and the original control variables (Equations 1 and 2). This table presents the results from the regressions. For the sake of brevity, the results for the control variables are not reported. All variables are defined in Appendix 1C. Predicted signs in this table are based on the FLR results suggesting a positive relationship between aggressive book and tax reporting.

Panel A: FLR results over the period 1981-2001 (LLP Sample Period)

OLS Regressions of measures of Tax Reporting Aggressiveness on DFIN and Controls for Tax Planning and Earnings Management Incentives

	Predicted Signs for a Positive Relationship	Dependent variable	
		DTAX	BTD
Intercept		0.017 ***	-0.041 ***
DFIN	+	0.221 ***	0.050 ***
Controls		Yes	Yes
Adj. R ²		0.164	0.265
n		58,015	58,015

OLS Regressions of DFIN on Measures of Tax Reporting Aggressiveness and Controls for Tax Planning and Earnings Management Incentives

	Predicted Signs for a Positive Relationship	Dependent variable	
		DFIN	DFIN
Intercept		0.027 ***	0.035
DTAX	+	0.204 ***	
BTD	+		0.076 ***
Controls		Yes	Yes
Adj. R ²		0.190	0.155
n		58,015	58,015

Panel B: FLR Results over the period 1981-1990

OLS Regressions of measures of Tax Reporting Aggressiveness on DFIN and Controls for Tax Planning and Earnings Management Incentives

	Predicted Signs for a Positive Relationship	Dependent variable	
		DTAX	BTD
Intercept		-0.001 ***	-0.031 ***
DFIN	+	0.058 ***	0.016
Controls		Yes	Yes
Adj. R ²		0.175	0.209
n		22,558	22,558

OLS Regressions of DFIN on Measures of Tax Reporting Aggressiveness and Controls for Tax Planning and Earnings Management Incentives

	Predicted Signs for a Positive Relationship	Dependent variable	
		DFIN	DFIN
Intercept		-0.001 ***	-0.083
DTAX	+	0.080 ***	
BTD	+		0.025
Controls		Yes	Yes
Adj. R ²		0.328	0.325
n		22,558	22,558

Panel C: FLR results over the period 1991-2000

OLS Regressions of measures of Tax Reporting Aggressiveness on DFIN and Controls for Tax Planning and Earnings Management Incentives

	Predicted Signs for a Positive Relationship	Dependent variable	
		DTAX	BTD
Intercept		0.035 ***	-0.053 ***
DFIN	+	0.324 ***	0.072 ***
Controls		Yes	Yes
Adj. R ²		0.185	0.278
n		32,371	32,371

OLS Regressions of DFIN on Measures of Tax Reporting Aggressiveness and Controls for Tax Planning and Earnings Management Incentives

	Predicted Signs for a Positive Relationship	Dependent variable	
		DFIN	DFIN
Intercept		0.040 ***	0.059 ***
DTAX	+	0.252 ***	
BTD	+		0.112 ***
Controls		Yes	Yes
Adj. R ²		0.186	0.121
n		32,371	32,371

Panel D: FLR results over the period 2000-2010

OLS Regressions of measures of Tax Reporting Aggressiveness on DFIN and Controls for Tax Planning and Earnings Management Incentives

	Predicted Signs for a Positive Relationship	Dependent variable	
		DTAX	BTD
Intercept		0.071 ***	-0.053 ***
DFIN	+	0.125 ***	0.043 ***
Controls		Yes	Yes
Adj. R ²		0.124	0.291
n		26,989	26,989

OLS Regressions of DFIN on Measures of Tax Reporting Aggressiveness and Controls for Tax Planning and Earnings Management Incentives

	Predicted Signs for a Positive Relationship	Dependent variable	
		DFIN	DFIN
Intercept		0.124 ***	0.135 ***
DTAX	+	0.084 ***	
BTD	+		0.076 ***
Controls		Yes	Yes
Adj. R ²		0.072	0.065
n		26,989	26,989

OLS regressions are estimated with robust clustered errors (heteroscedasticity consistent).

*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).

Table 1.4									
The Association between Aggressive Book and Tax Reporting using Additional Aggressiveness Measures									
I run both of the FLR models substituting in measures of tax aggressiveness used in LLP in Panel A and a fraud prediction value in Panel B into the original FLR equation (Equations 1 and 2). I use the original sample time period and control variables. This table presents the results from the regressions. For the sake of brevity, the results for the control variables are not reported. All variables are defined in Appendix 1C. Predicted signs in this table are based on the FLR results suggesting a positive relationship between aggressive book and tax reporting.									
Panel A: OLS Regressions of additional measures of tax reporting aggressiveness on DFIN									
		Dependent variable							
	Predicted Signs for a Positive Relationship	ETR1	ETR2	ETR3	ETR4	ETR5	BTD2		
Intercept		0.251 ***	0.191 ***	0.283 ***	0.291 ***	0.297 ***	-23.394 ***		
DFIN	-	-0.046 ***	-0.077 ***	0.112 ***	-0.083 ***	-0.047 ***			
DFIN	+						12.036 ***		
Controls		Yes	Yes	Yes	Yes	Yes	Yes		
Adj. R ²		0.064	0.105	0.224	0.085	0.044	0.105		
n		30,535	21,776	31,857	30,535	32,087	39,244		
OLS Regressions of DFIN on additional measures of tax reporting aggressiveness									
		Dependent variable							
	Predicted Signs for a Positive Relationship	DFIN	DFIN	DFIN	DFIN	DFIN	DFIN		
Intercept		0.048 ***	0.054 ***	-0.003	0.048 ***	0.024 ***	0.076 ***		
ETR1	-	-0.065 ***							
ETR2	-		-0.084 ***						
ETR3	-			0.038 ***					
ETR4	-				-0.055 ***				
ETR5	-					-0.033 ***			
BTD2	+						0.0001 ***		
Controls		Yes	Yes	Yes	Yes	Yes	Yes		
Adj. R ²		0.092	0.101	0.073	0.093	0.099	0.088		
n		30,535	21,776	31,857	30,535	32,087	39,244		
Panel B: OLS Regressions of measures of tax reporting aggressiveness on F-score									
		Dependent variable							
	Predicted Signs for a Positive Relationship	DTAX	BTD						
Intercept		0.006 ***	-0.003 *						
F-score	+	-0.004 **	-0.009 ***						
Controls		Yes	Yes						
Adj. R ²		0.263	0.134						
n		38,644	38,644						
OLS Regressions of F-score on measures of tax reporting aggressiveness									
		Dependent variable							
	Predicted Signs for a Positive Relationship	F-score	F-score						
Intercept		0.519 ***	0.518 ***						
DTAX	+	-0.051 **							
BTD	+		-0.137 ***						
Controls		Yes	Yes						
Adj. R ²		0.049	0.050						
n		38,644	38,644						
OLS regressions are estimated with robust clustered errors.									
*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).									

Table 1.5**The Association Between Fraud and Tax Aggressiveness using Additional Book and Tax Aggressiveness Measures**

I substitute the indicator variable High_DFIN into the LLP model as the dependent variable and test the relationship with the original tax aggressiveness variables over the original LLP sample period and with the original control variables. Panel A presents the results from the regressions. In Panel B, I substitute two tax aggressiveness measures into the LLP model as independent variables and test the relationship between these measures and fraud, over the original LLP sample period and with the original control variables. For the sake of brevity, the results for the control variables are not reported. All variables are defined in Appendix 1C. Predicted signs in this table are based on the LLP results suggesting a negative relationship between aggressive book and tax reporting.

Panel A										
	Predicted Signs for a Negative Relationship	1	2	3	4	5	6	7	8	
ETR1	+	-0.0883 (-5.94) ***								
ETR2	+		-0.06028 (-4.37) ***							
ETR3	+			0.23453 (26.20) ***						
ETR4	+				-0.0602 (-5.78) ***					
ETR5	+					-0.0051 (-0.46)				
BTD1	-						0.00017 (8.27) ***			
BTD2	-							0.00015 (4.50) ***		
BTD3	-								0.09732 (5.05) ***	
Controls		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Random Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
High_DFIN =1 Obs.		7,741	5,789	3,481	5,439	5,245	9,333	9,294	5,818	
High_DFIN=0 Obs.		33,830	23,089	27,200	23,645	23,976	37,374	37,233	24,237	
The dependent variable equals one if the company is in the top quintile of DFIN, and zero otherwise.										
Panel B										
	Predicted Signs for a Negative Relationship	1	2							
LR CASH ETR	+	0.00092 (.91)								
TAX SHELTER	-		-0.00408 (-2.46) **							
Controls		Yes	Yes							
Random Effects		Yes	Yes							
Fraud Obs.		362	839							
No-Fraud Obs.		37,983	118,327							
The dependent variable equals one if the company is engaged in accounting fraud during the year, and zero otherwise.										
I control for company-specific effects by estimating random effects linear probability models. Z-statistics are reported in parentheses. Standard errors are adjusted for clustering by company. The analysis includes firm-years from 1981-2001.										
*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).										

Table 1.6

LLP Regression Results including additional control variables

I run the LLP model using the original measures of book and tax aggressiveness over the original LLP sample period and include additional control variables (Equation 4). This table presents the results from the regressions. All variables are defined in Appendix 1C. Variables in *italic* are not in the original LLP model. Predicted signs in this table are based on the LLP results suggesting a negative relationship between aggressive book and tax reporting.

The Association Between Accounting Fraud and the Tax Variables with additional control variables										
	Predicted Signs for a Negative Relationship	1	2	3	4	5	6	7	8	
ETR1	+	0.00374 (1.40)								
ETR2	+		0.00678 (2.17) **							
ETR3	+			0.00277 (1.52)						
ETR4	+				0.00555 (2.39) **					
ETR5	+					0.00112 (0.47)				
BTD1	-						-0.000003 (-0.43)			
BTD2	-							-0.00004 (-2.16) **		
BTD3	-								0.00088 (0.24)	
BIG FIVE AUDIT		-0.0053 *	-0.0046 *	-0.0007	-0.0034	-0.0026	-0.0069 ***	-0.0063 ***	-0.0047	
SIZE		0.0025 ***	0.0020 ***	0.0020 ***	0.0019 ***	0.0018 ***	0.0029 ***	0.0028 ***	0.0025 ***	
AGE		-0.0021 *	-0.0016	-0.0008	-0.0011	-0.0012	-0.0035 ***	-0.0033 ***	-0.0022	
AUDIT TENURE		0.0001	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	-0.0001	
NEGATIVE EQUITY		0.0025	0.0026	0.0026	0.0069	0.0050	0.0013	0.0014	0.0006	
M&A		0.0008	-0.0004	0.0026	0.0013	0.0025	0.0006	0.0007	-0.0018	
D&E ISSUED		0.0015	0.0017	-0.0003	0.0018	0.0019	0.0006	0.0006	0.0006	
ROA		-0.0068	-0.0026	-0.0040 *	-0.0117 *	-0.0114 **	-0.0031 ***	-0.0026 **	-0.0039	
TIME TREND		0.0005 ***	0.0005 ***	0.0007 ***	0.0010 ***	0.0010 ***	0.0004 ***	0.0004 ***	0.0005 ***	
<i>EM1</i>		0.0036	0.0034	0.0058 **	0.0028	0.0045	0.0017	0.0017	0.0078 **	
<i>EM2</i>		0.0003	0.0007	0.0003	0.0007	0.0012	-0.0009	-0.0007	0.0005	
<i>EM3</i>		-0.0004	0.0001	-0.0018	0.0001	-0.0015	-0.0003	-0.0011	-0.0024	
<i>NUM_AN</i>		0.0037	0.0075	0.0005	0.0138	0.0146	0.0008	-0.0009	0.0020	
<i>AF_D</i>		0.0003	0.0005	0.0008	0.0016	0.0025	0.0013	0.0013	0.0010	
<i>LEV</i>		0.0035	0.0014	0.0041	0.0036	0.0039	-0.0003	-0.0005	0.0018	
<i>MTB</i>		0.0006 ***	0.0005 ***	0.0007 ***	0.0008 ***	0.0008 ***	0.0004 ***	0.0004 ***	0.0004 ***	
<i>NOL_D</i>		0.0007	0.0000	0.0011	0.0013	0.0007	-0.0003	-0.0004	-0.0011	
<i>FOR_D</i>		-0.0046 ***	-0.0019	-0.0033 *	-0.0046 *	-0.0050 **	-0.0037 **	-0.0032 *	-0.0053 ***	
<i>C_PTCFOP</i>		-0.0062 ***	-0.0075 ***	0.0021	-0.0055	-0.0070 *	-0.0089 ***	-0.0088 ***	-0.0055 **	
Random Effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Fraud Obs.		479	289	376	392	411	528	517	298	
No-Fraud Obs.		65,435	41,941	47,142	44,385	44,490	71,504	69,875	40,687	

The dependent variable equals one if the company engaged in accounting fraud during the year, and zero otherwise. I control for company-specific effects by estimating random effects linear probability models. Standard errors are adjusted for clustering by company. The analysis includes firm-years from 1981-2001.

*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).

Table 1.7

FLR Regression Results including additional control variables

I run the original FLR models using the original measures of book and tax aggressiveness over the original FLR sample period and include additional control variables, year dummies, and cluster standard errors by firm (Equations 5 and 6). This table presents the results from the regressions. All variables are defined in Appendix 1C. Variables in italic are not in the original FLR model. Predicted signs in this table are based on the FLR results suggesting a positive relationship between aggressive book and tax reporting.

Panel A					Panel B				
OLS Regressions of measures of Tax Reporting Aggressiveness on DFIN and Controls for Tax Planning and Earnings Management Incentives					OLS Regressions of DFIN on Measures of Tax Reporting Aggressiveness and Controls for Tax Planning and Earnings Management Incentives				
	Predicted Signs for a Positive Relationship	Dependent variable				Predicted Signs for a Positive Relationship	Independent variable		
		DTAX		BTD			TAX=DTAX		TAX=BTD
DFIN	+	0.041 ***		0.022 ***	TAX	+	0.183 ***		0.136 ***
PTROA		0.353 ***		0.198 ***	PTROA		0.236 ***		0.272 ***
NOL_D		0.024 ***		0.059 ***	NOL_D		0.007 **		0.011
FOR_D		-0.002		-0.010 ***	FOR_D		-0.004		-0.003
LEV		0.043 ***		-0.011 ***	LEV		0.046 ***		0.042 ***
MTB		0.000		0.001 ***	MTB		0.001 **		0.001
AF_D		-0.005 ***		-0.002	AF_D		-0.002		-0.015
NUM_AN		-0.132 ***		0.008	NUM_AN		0.202 ***		0.292 **
EM1		0.023 ***		-0.004	EM1		-0.007		-0.017
EM2		-0.007 ***		0.002 *	EM2		0.005		0.007
EM3		-0.005 ***		-0.001	EM3		-0.001		-0.007
Δ PTCFO		0.029 ***		0.012 **	Δ PTCFO		-0.434 ***		-0.362 ***
SIZE		-0.005 ***		-0.003 ***	SIZE		-0.020 ***		-0.023 ***
AGE		0.000		0.000	AGE		0.001 ***		0.000 ***
<i>BIG FIVE AUDIT</i>		-0.009 ***		0.000	<i>BIG FIVE AUDIT</i>		-0.015 ***		-0.018 ***
<i>AUDIT TENURE</i>		0.000 ***		0.000	<i>AUDIT TENURE</i>		-0.001		0.000 *
<i>M&A</i>		-0.003		0.001	<i>M&A</i>		-0.019 ***		-0.012 ***
<i>D&E ISSUED</i>		-0.004 **		0.009 ***	<i>DE_ISSUED</i>		0.018 ***		0.024 ***
<i>YEAR DUMMIES</i>		Yes		Yes	<i>YEAR DUMMIES</i>		Yes		Yes
<i>RANDOM EFFECT</i>		Yes		Yes	<i>RANDOM EFFECT</i>		Yes		Yes
CLUSTER ERRORS BY FIRM		Yes		Yes	CLUSTER ERRORS BY FIRM		Yes		Yes
Adj. R ²		0.220		0.147	Adj. R ²		0.116		0.113
n		42,793		42,793	n		42,793		42,793

*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).

Chapter 3: Aggressive Book and Tax Reporting: An Uncertain Relationship Part 2

Abstract: Prior research examining the relationship between aggressive book and tax reporting reports conflicting results. Based on the results in the first section of my dissertation, I examine whether the relationship between aggressive book and tax reporting is positive for some firms and negative for others. I sort firms into quintiles based on their level of aggressive book and tax reporting and show a significantly positive relationship between aggressive book and tax reporting in one group of firms and a significantly negative relationship in the other group. I then use Principal Component Analysis to reduce a large set of characteristics associated with aggressive book and tax reporting to four book and four tax components and use the components to investigate differences in the underlying characteristics of firms with different reporting strategies. I find significant differences in nearly every component I examine across all reporting strategies I test. Finally, based on the components predicted relationship with aggressive book or tax reporting, I combine the components and examine the extent to which I can predict the firm's reporting strategy. I correctly identify the reporting strategy in 25%-33% of firm-years, an improvement of 1%-7% over the probability of correctly assigning firm-years to the reporting strategy by chance. I conclude that firms choose reporting strategies that reflect both a positive and negative relationship between aggressive book and tax reporting, and firm characteristics can be used to aid in the identification of the firm's reporting strategy with some success, suggesting other factors also contribute to the level of aggressiveness in book and tax reporting decisions.

1: Introduction

Anecdotal evidence surrounding the accounting scandals of the late 1990's and early 2000's coupled with the discovery of a growing book-tax gap,³⁰ motivated three recent studies that examine the relationship between aggressive financial reporting and aggressive tax reporting.³¹ The first study, Frank, Lynch, and Rego (2009), finds a positive relationship between aggressive book and tax reporting and concludes that firms are able to manage book income up and taxable income down in the same period.³² The second study, Lennox, Lisowsky, and Pittman (2013), concludes there is a negative relationship between aggressive book and tax reporting, as they find that tax aggressive firms are less likely, or at least not more likely, to commit accounting fraud than non-tax aggressive firms.³³ The third study is the first section of my dissertation, in which I reconcile the conclusions Frank et al. (2009) and Lennox et al. (2013), by showing that the measure of aggressive financial reporting greatly influences the relationship between aggressive book and tax reporting documented.

³⁰ A book-tax gap is a divergence between income reported in the firm's audited financial statements and the taxable income reported on the firm's tax returns (Desai 2005; Boynton, De Filippes, and Legel 2005).

³¹ In this paper I use the terms aggressive tax reporting and tax aggressive firms interchangeably to describe firms that (appear to) use planning techniques to reduce their explicit tax liability (Hanlon and Heitzman 2010). The planning techniques can range from legal avoidance of taxes to illegal evasion of taxes. I also use the terms aggressive financial reporting and aggressive book reporting interchangeably to describe firms that (appear to) strategically use techniques to alter their financial statements to achieve certain goals. The techniques can be within or outside of GAAP.

³² Frank et al. (2009) develop a proxy for aggressive tax reporting, DTAX, which captures unexplained (discretionary) permanent differences between book and tax income, and find that DTAX is positively related to a proxy for aggressive financial reporting, specifically performance-matched discretionary accruals (DFIN), controlling for factors associated with tax planning and earnings management incentives. Frank et al. (2009) also find that DFIN is positively related to DTAX, controlling for the same factors. Frank et al. (2009) also use total book-tax differences as a measure of aggressive tax reporting and again find a positive relationship between book-tax differences and aggressive financial reporting.

³³ While Erickson, Hanlon, Maydew (2004) and Badertscher et al. (2009) examine different research questions, both studies provide evidence that is likely significant in resolving this research question. Both studies find that firms accused of fraud are more likely to engage in book-tax conforming earnings management, where book income is managed upward and tax income also increases - Badertscher et al. (2009) base their analysis on firms that restated almost certainly due to earnings management and Erickson et al. (2004) use firms accused of financial statement fraud in their analysis.

Further investigation of the relationship between aggressive book and tax reporting is important for several reasons. In this study, I allow the relationship between aggressive book and tax reporting to differ among firms, likely mirroring the actual reporting environment more accurately. To my knowledge such an investigation would be the first to document the presence of both significantly positive and significantly negative relationships between aggressive book and tax reporting in a sample of firms.

In this study, I also examine whether there are differences in the characteristics of firms with a positive or negative relationship between aggressive book and tax reporting. Prior research (e.g., Matsunaga, Shevlin, and Shores, 1992) has largely focused on specific firm events (i.e., the issuance of disqualifying dispositions of incentive stock options) to identify firms likely to be more or less aggressive for book or tax reporting (i.e., firms likely to forgo some tax benefits because of the related financial statement effects). However, in this paper I approach the question differently; based on the level of book and tax reporting aggressiveness, I test for differences in the underlying characteristics of firms.

Identifying whether there are differences in the characteristics of firms with different reporting strategies has the potential for enabling *ex ante* identification of the firms' reporting strategies. In this study, I examine the extent to which I can identify the reporting strategy of the firm using only firm characteristics. Numerous studies and anecdotal evidence suggest firms may not be able to report aggressively for both book and tax purposes. Identifying firms that are likely to be aggressive in both book and tax reporting (a positive relationship) may help future research to identify whether and/or why these firms face different reporting constraints, trade-offs, or costs than other firms that report less aggressively. Similarly, identifying firms likely to be non-aggressive in book

and tax reporting (also a positive relationship) is an initial step in identifying the determinants of non-aggressive reporting and may help future researchers identify why these firms face different reporting constraints, trade-offs and/or costs than other firms that report more aggressively.

This line of research also builds upon numerous studies examining book-tax trade-offs and the determinants, characteristics, and consequences of earnings management and aggressive tax reporting. Hence, this study contributes to the accounting literature in these areas as well.

In Section 2, I discuss the possibility that the relationship between aggressive book and tax reporting can be positive for some firms and negative for others, and show both a significantly positive relationship and a significantly negative relationship within my sample of Compustat firms. In Section 3, I review characteristics that prior literature finds to be associated with aggressive book and tax reporting and use Principal Component Analysis to reduce these characteristics to the most important factors. In Section 4, I test for differences in the characteristics of firms across reporting strategies using their book and tax factor scores and test the extent to which I can identify the firm's reporting strategy using the factor scores. I conclude in Section 5.

2: The relationship between aggressive book and tax reporting

In this section, I first discuss the possibility that some firms have a positive relationship between aggressive book and tax reporting, while others have a negative relationship. I then document the presence of a positive and negative relationship by separating a sample of Compustat firms into two groups based on their quintile

combination of aggressive book and tax reporting, and show that one group has a positive relationship between aggressive book and tax reporting and the other group has a negative relationship between aggressive book and tax reporting.

Figure 2.1 (following Appendix 2B) illustrates how firms may differ in their extent of aggressive book and tax reporting, and the positive or negative relationship that would be assigned to the firm as a result. Firms with a positive relationship between book and tax aggressiveness are in the dark area of the figure, and firms with a negative relationship are in the light area of the figure. Prior literature suggests the majority of firms either report aggressively for both book and tax purposes (firms are likely to locate in the dark area of Figure 2.1) or that the majority of firms make trade-offs between aggressive book and tax reporting (firms are likely to locate in the light area of Figure 2.1).

Those arguing that book and tax reporting are strategic complements (Desai 2005; Desai and Dharmapala 2006) believe that tax avoidance strategies can increase agency conflicts between managers and shareholders. Managers can use tax strategies that obscure financial reporting making it easier for them to extract rents, which is not in the shareholders' best interest, i.e., non-conforming earnings management should predominate and firms are likely to report aggressively for book and tax purposes.

Those arguing that aggressive book and tax reporting are substitutes believe that managers face trade-offs when making financial and tax reporting decisions.³⁴ The manager may incur tax costs (e.g., larger tax liabilities) in order to report higher book income, or incur financial reporting costs (e.g., a reduced share price associated with lower

³⁴ The trade-off theory is based on the idea that there is sufficient conformity (the degree to which the rules for financial and tax reporting are similar) between book and tax reporting so that firms can primarily manage only one measure of income.

book income) in order to reduce taxable income reported to the tax authorities, i.e., conforming earnings management should predominate and firms are likely to report aggressively for book or tax purposes, but not both.

In practice, however, the relationship between aggressive book and tax reporting likely has more variation. Each firm is expected to assess the costs and benefits associated with aggressive book and tax reporting and each firm has different opportunities and incentives for aggressive reporting as well. Therefore, it seems possible, even likely, that firms will choose different combinations of reporting aggressiveness for book and tax purposes. Some firms will choose levels of book and tax aggressiveness with a positive relationship and others will choose levels with a negative relationship.

There is some univariate evidence to support this idea. In Table 5, Panel C, of Frank et al. (2009) (reproduced here in Figure 2.2, Panel A), firms are assigned to quintiles based on their level of book and tax aggressiveness (DFIN and DTAX, see Appendix 2A for variable definitions). Frank et al. (2009) record the resulting frequencies of all firm-years that fall into each quintile combination of DFIN and DTAX. Frank et al. (2009) focus on the higher than expected frequencies along the main diagonal of their table (i.e., from the upper left to the lower right), and argue this provides support for their conclusion that aggressiveness in book and tax reporting is positively related. However, this table also shows a greater number of firm-years than expected in the diagonal going in the opposite direction (from the upper right to the lower left), where the relationship between aggressive book and tax reporting is negative.^{35,36} I interpret Figure 2.2 Panel A, as

³⁵ If firm-years were randomly distributed across all quintiles of aggressive book and tax reporting then the expected number of firm-years in each cell would be the total number of firm-years, divided by the number of

preliminary evidence that a positive relationship between aggressive book and tax reporting is likely to be present in some firms, while a negative relationship is likely to be present in others.

I document the presence of a positive relationship and negative relationship between aggressive book and tax reporting within a sample of firms with the following process. I rank all U.S. Compustat firms from 1991-2012 based on their level of book and tax reporting aggressiveness into quintiles by year, using DFIN as a measure of book aggressiveness, and ETR as a measure of tax aggressiveness.^{37,38} I require these firms to have with non-missing DFIN and ETR values and non-missing control variable information, resulting in a final sample of 51,806 firm-years over the 22 year period. Depending on the quintile combination of the firm's book and tax aggressiveness, I classify the firm into Group 1, Group 2, or Group 3. Group 1 firms have a combination of DFIN and ETR quintiles that suggest a positive relationship between aggressive book and tax reporting. Group 2 firms have a combination of DFIN and ETR quintiles that suggest a negative relationship between aggressive book and tax reporting. Group 3 contains firms with quintile combinations of DFIN and ETR that could suggest a positive or a negative relationship; as a result of the ambiguity, these firms are excluded from the analysis. I present the

cells ($49,886/25 = 1,995$). The cells in both diagonals in Figure 2.2 indicate a larger than expected number of firm-years.

³⁶ A chi-squared test of independence indicates that the observed frequency of firm-years in FLR's Table 5, Panel C differs from the expected frequency with probability $<.0001$.

³⁷ See Appendix 2A for variable definitions. DFIN and ETR are commonly used measures of book and tax aggressiveness that result in less data attrition than other aggressiveness measures due to data item availability on Compustat. Although DFIN likely captures aggressive book reporting with error, I use a continuous measure of aggressive book reporting to avoid creating distinct groups of firms within my relationship classification. See Appendix 2B for a discussion of limitations associated using financial statement fraud, a discrete measure of aggressive book reporting, in this setting.

³⁸ I exclude utility and financial service firms (with 2-digit SIC of 49, or 60-69).

distribution of firm-years in my sample across DFIN and ETR quintiles in Figure 2.2, Panel B.³⁹ Figure 2.3 illustrates how firms are assigned to groups.

I regress ETR on DFIN, and DFIN on ETR, using the combined list of control variables from Lennox et al. (2013) and Frank et al. (2009) listed below in Equation 1 and 2. I use this comprehensive set of variables to make my results comparable to those two studies and to the first chapter of my dissertation. I run the regression separately for Groups 1 and 2. All variables are defined in Appendix 2A.

$$\begin{aligned} \text{Equation 1: } \mathbf{DFIN}_{it} = & \beta_0 + \beta_1 \mathbf{ETR}_{it} + \beta_2 \mathbf{PTROA}_{it} + \beta_3 \mathbf{NOL_D}_{it} + \beta_4 \mathbf{FOR_D}_{it} + \\ & \beta_5 \mathbf{LEVERAGE}_{it} + \beta_6 \mathbf{MTB}_{it} + \beta_7 \mathbf{AF_D}_{it} + \beta_8 \mathbf{NUM}_{ANit} + \beta_9 \mathbf{EM1}_{it} + \beta_{10} \mathbf{EM2}_{it} + \\ & \beta_{11} \mathbf{EM3}_{it} + \beta_{12} \mathbf{\Delta PTCFO}_{it} + \beta_{13} \mathbf{SIZE}_{it} + \beta_{14} \mathbf{BIG\ FIVE\ AUDIT}_{it} + \beta_{15} \mathbf{AUDIT\ TENURE}_{it} + \\ & \beta_{16} \mathbf{AGE}_{it} + \beta_{17} \mathbf{NEGATIVE\ EQUITY}_{it} + \beta_{18} \mathbf{M\&A}_{it} + \\ & \beta_{19} \mathbf{D\&E_ISSUED}_{it} + \beta_{20} \mathbf{TIME\ TREND}_t + u_i + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} \text{Equation 2: } \mathbf{ETR}_{it} = & \beta_0 + \beta_1 \mathbf{DFIN}_{it} + \beta_2 \mathbf{PTROA}_{it} + \beta_3 \mathbf{NOL_D}_{it} + \beta_4 \mathbf{FOR_D}_{it} + \\ & \beta_5 \mathbf{LEVERAGE}_{it} + \beta_6 \mathbf{MTB}_{it} + \beta_7 \mathbf{AF_D}_{it} + \beta_8 \mathbf{NUM}_{ANit} + \beta_9 \mathbf{EM1}_{it} + \beta_{10} \mathbf{EM2}_{it} + \\ & \beta_{11} \mathbf{EM3}_{it} + \beta_{12} \mathbf{\Delta PTCFO}_{it} + \beta_{13} \mathbf{SIZE}_{it} + \beta_{14} \mathbf{BIG\ FIVE\ AUDIT}_{it} + \beta_{15} \mathbf{AUDIT\ TENURE}_{it} + \\ & \beta_{16} \mathbf{AGE}_{it} + \beta_{17} \mathbf{NEGATIVE\ EQUITY}_{it} + \beta_{18} \mathbf{M\&A}_{it} + \\ & \beta_{19} \mathbf{D\&E_ISSUED}_{it} + \beta_{20} \mathbf{TIME\ TREND}_t + u_i + \varepsilon_{it} \end{aligned} \quad (2)$$

The results of the regressions are presented in Table 2.1. In Panel A, I find significant negative coefficients on the independent variables (either DFIN or ETR) for Group 1 firms, which implies a positive relationship between aggressive book and tax reporting in Group 1 (i.e., as the firm's ETR increases, the firm is considered less tax aggressive). In Panel B, I find the opposite result for Group 2 firms. I find a significantly

³⁹ The cells in Figure 2.2, Panel B indicate a larger than expected number of firm-years along the main diagonal only, indicating more firm-years in my sample are likely to have a positive relationship between aggressive book and tax reporting (if firm-years were randomly distributed across all quintiles of DFIN and ETR then the expected number of firm-years in each cell would be $51,806/25 = 2,072$). Hence, the distribution of firms in my sample may bias against my finding evidence of a negative relationship between aggressive book and tax reporting in a subset of my sample firms. A chi-squared test of independence indicates that the observed frequency of firm-years in my sample differs from the expected frequency of firm-years with probability $<.0001$.

positive coefficient on the independent variable (either DFIN or ETR), which implies a negative relationship between aggressive book and tax reporting in Group 2 firms.

By separating firms into two groups based on the quintile combination of their book and tax aggressiveness, I show that there are firms with a significantly positive relationship between aggressive book and tax reporting and other firms with a significantly negative relationship between aggressive book and tax reporting within my sample of firms, while controlling for characteristics associated with aggressive book and tax reporting. In other words, I document that some firms act as if they view aggressive book and tax reporting as strategic complements, while other firms act as they view aggressive book and tax reporting as substitutes.

3: Firm-level characteristics associated with aggressive book and tax reporting

I am interested in identifying whether firms with different reporting strategies have different underlying characteristics. Prior research has identified many firm characteristics associated with aggressive book and/or tax reporting (Dechow, Sloan, and Sweeney 1996; Burns and Kedia 2006; Zimmerman 1983; Gutpa and Newberry 1997), and suggests that industry, size, growth, financial performance, leverage, foreign operations, family ownership, information asymmetry, and book-tax differences can each be significantly related to both aggressive book and tax reporting. Table 2.2, Panel A, summarizes these characteristics and also lists additional characteristics associated with either aggressive book or tax reporting in Panels B and C, respectively. Below I briefly

review the literature on the firm characteristics common to both aggressive book and tax reporting.⁴⁰

Firm Characteristic: Industry

Prior studies show that while the incidence of accounting fraud is not isolated to any particular industry, there is some clustering of fraud in certain industries. For example, Erickson, Hanlon, and Maydew (2006) find that business services firms (SIC 73) are more than twice as likely as the average firm to be accused of fraud, and miscellaneous retail (SIC 59) firms are approximately five times more likely than the average firm to be accused of fraud.

Zimmerman (1983) examines the relationship between size, industry classification, and effective tax rates and finds that certain industries have stronger relationships between firm size and effective tax rates. For example, Zimmerman (1983) finds the strongest relationship between firm size and tax rates in the oil and gas industry.

Firm Characteristic: Size

Firm size is likely an important determinant of aggressive financial reporting, although the predictions for the relationship are inconsistent. Beneish (1999) finds firm size is positively correlated with SEC scrutiny, suggesting larger firms will receive more regulatory attention and are likely to be accused of fraud more often. Doyle, Ge, and McVay (2007) and Ashbaugh-Skaife, Collins, and Kinney (2007) find size is correlated with firm resources to control fraud, suggesting that larger firms with more resources should engage in fraud less frequently.

⁴⁰ Table 2.2 is a more comprehensive list of control variables than I use in Equations 1 and 2. In Equations 1 and 2 I use only the control variables from Frank et al. (2009) and Lennox et al. (2013).

Size is also related to tax reporting aggressiveness. Given the scale and complexity of tax shelters, it appears that firms must be sufficiently large to engage in most tax shelters (Wilson 2009) and size is likely also a factor in various tax planning techniques as Dyreng, Hanlon, and Maydew (2008) find that long-run tax avoidance is positively associated with firm size. Firm size is also positively correlated with IRS scrutiny (e.g., Coordinated Industry Case (CIC) taxpayers) suggesting larger firms are likely to be accused of tax sheltering more often than smaller firms.⁴¹

Firm Characteristic: Growth

Firm growth is commonly measured as the growth in assets, sales, or the market to book ratio. High-growth firms may commit accounting fraud in order to increase or sustain their sales growth (Loebbecke, Eining, Willingham 1989; Bell, Szykowny, and Willingham 1991). Skinner and Sloan (2002) show that the common stock of growth firms exhibits an asymmetrically large price response to negative earnings surprises, which may further increase managements incentives for aggressive book and/or tax reporting to avoid missing an earnings target. Growth firms also have greater external financing needs (Schrand and Zechman 2012), which may create aggressive reporting incentives to obtain financing at a lower cost.

Growing firms are likely to make investments in tax-favored assets that generate timing differences in the recognition of expenses for book and tax purposes. For example, growing firms are likely to invest in property, plant and equipment, and will likely have larger book-tax differences due to depreciation deductions as a result (Chen, Chen, Cheng, and Shevlin 2010).

⁴¹ <http://www.irs.gov/Businesses/Case-Classification>.

Firm Characteristic: Performance

Poorly performing firms may resort to accounting fraud in order to cover up their deficient performance. A commonly used performance metric is return on total assets (ROA). ROA is often used as a measure to assess the performance of managers and thus potentially affects bonuses, wage increases, etc. Summers and Sweeney (1998) report that ROA differs significantly between fraud and non-fraud firms.

Performance metrics are related to tax aggressiveness, as more profitable firms tend to have higher effective tax rates. Wilson (2009) also finds that profitable firms are more likely to engage in tax sheltering.

Firm Characteristic: Leverage

The ability to meet exchange-listing requirements, repay debt, or meet debt covenants gives highly leveraged firms greater incentives to commit accounting fraud than firms that are not highly leveraged (Altman 1968; Begley, Ming, and Watts 1997). The extent of leverage has also been associated with income-increasing discretionary accruals (DeAngelo, DeAngelo, and Skinner 1994; DeFond and Jiambalvo 1991).

The literature documents a negative relationship between leverage and tax shelters. At first, this may seem counter intuitive as greater leverage (i.e., debt) provides interest deductions, reducing taxable income. However, Graham and Tucker (2006) find tax shelter participants use less leverage than a size and industry matched set of control firms, and conclude that tax shelter firms use tax shelter deductions as a substitute for interest deductions. Tax sheltering itself can also act to remove debt from financial statements, lowering leverage and creating a negative relationship between sheltering and leverage (Mills and Newberry 2005).

Firm Characteristic: Foreign operations

Statement on Auditing Standards No. 99: Consideration of Fraud in a Financial Statement Audit, and Albrecht (2002) indicate that when a firm has significant operations located in different international jurisdictions the opportunities for financial reporting fraud increase.

Rego (2003) finds that multinational corporations in general, and multinational corporations with more extensive foreign operations in particular, have lower worldwide ETRs than other firms. Hanlon, Mills, and Slemrod (2007) find that multinational firms have more deficiencies in tax compliance relative to non-multinational firms, consistent with the idea that multinational firms have more opportunities to develop tax shelter strategies associated with foreign activities. Lisowsky (2010) finds a similar result; tax shelter likelihood is positively related to the extent of foreign operations.

Firm Characteristic: Family ownership

Wang (2006) finds evidence that founding family ownership of public companies is positively associated with lower abnormal accruals, greater earnings informativeness, and less persistence of transitory loss components in earnings. Higher earnings quality in family firms may result from better alignment of interests between family members and other shareholders, or may be attributed to greater demand for earnings quality by non-family users of financial statements.

Chen et al. (2010) find that family firms are less tax aggressive than their non-family counterparts. This result suggests that family owners are willing to forgo some tax benefits to avoid a potential penalty and reputation damage from an IRS audit and/or a price

discount if minority (i.e., noncontrolling) shareholders believe the family firm is using tax avoidance activities to mask rent-seeking (Desai and Dharmapala 2006.)

Firm Characteristic: Information asymmetry

When information asymmetry is high, shareholders do not have access to relevant information to monitor managers' actions, which may give rise to the practice of earnings management (Schipper, 1989; Warfield, Wild, and Wild 1995). Richardson (2000) finds a positive relationship between measures of information asymmetry and earnings management.

Balakrishnan, Blouin, and Guay (2012) find that aggressive tax planning increases information asymmetry and analyst forecast errors, and reduces earnings quality. In addition to providing expected tax savings, tax planning can also increase the complexity of the organization, and if not communicated to outside parties (i.e., investors and analysts) the complexity can create transparency problems for the firm. Ayers, Jiang, and LaPlante (2009) report a similar result; they find the relative information content of estimated taxable income for high tax-planning firms is lower than that of other firms.

Firm Characteristic: Book-tax differences

Book-tax differences can arise from normal temporary differences, like depreciation, and normal permanent differences, like interest on tax-exempt municipal bonds. Prior research suggests that positive temporary book-tax differences are associated with aggressive financial reporting (Phillips, Pincus, and Rego 2003). Hanlon (2005) finds that firms with large temporary book-tax differences have less persistent GAAP earnings, and concludes that investors likely view the book-tax differences as a "red flag" indicating low earnings quality. Lev and Nissim (2004) also find a relationship between the ratio of

taxable income (TI) to book income (BI) and aggressive financial reporting. They show that the ratio of tax-to-book income is useful in predicting future earnings growth (also see Chi, Pincus, and Teoh 2014).

Several studies find a positive relationship between tax aggressiveness and book-tax differences. Desai and Dharmapala (2007) and Wilson (2009) find a positive association between tax sheltering and book-tax differences. Heltzer (2008) finds that book-tax differences provide insight into a firm's relative level of tax reporting aggressiveness, (however, not a firm's relative level of financial reporting aggressiveness), and Frischmann, Shevlin, and Wilson (2008) find book-tax differences are positively associated with a firm's contingency for uncertain tax benefits.

To summarize, prior research identifies many firm characteristics associated with both aggressive book and tax reporting. Although this is likely an incomplete list, testing for differences in each of these characteristics may be redundant as there may be characteristics included in the list that capture similar firm constructs. Therefore, I subject the characteristics in Panels A, B, and C of Table 2.2 to Principal Component Analysis (PCA) to reduce the set of observed variables into a smaller set of artificial variables (principal components) that will account for a maximal amount of variance in the observed variables.⁴² As I do not have private data, some of the variables listed in Table 2.2 are not possible for me to include in my analysis. I use the following characteristics associated with

⁴² To determine the number of meaningful components to retain, I use a combination of the eigenvalue-one criterion and the scree test. Using the eigenvalue-one criterion, I retain any component with an eigenvalue greater than 1. Components with an eigenvalue greater than 1 account for a meaningful amount of variance; each observed variable accounts for one unit of variance, so a component with an eigenvalue greater than 1 is accounting for more variance than has been contributed by the variable. Using the scree test, I then look for a "break" between the components with relatively large and small eigenvalues. Components before the break are retained and are assumed to be meaningful, components after the break are assumed to be unimportant and are not retained.

aggressive book and tax reporting in the PCA: Aggressive Book Reporting – size, growth, performance, foreign operations, book-tax differences, leverage, mergers and acquisitions, desire for external financing, issuance of debt and equity, balance sheet bloat, firm age, and audit firm quality; Aggressive Tax Reporting – size, growth, performance, foreign operations, book-tax differences, leverage, intangible assets, equity income in earnings, capital intensity, and net loss carryforwards.⁴³

I separately subject the characteristics associated with aggressive book reporting and aggressive tax reporting to PCA. I use ones as prior communality estimates and the principal axis method to extract components, followed by an orthogonal rotation in both cases. The results are reported in Table 2.3.

I reduce twelve book characteristics to four principal components (components), and list the significant factor loadings, which I define as those with absolute values equal or greater than 0.40, and the variance explained by each factor in Table 2.3, Panel A.⁴⁴ After each significant factor loading, I include the significant factor's predicted relation with aggressive book reporting taken from Table 2.2. For example, prior studies find both growth and ROA are positively related to aggressive book reporting, therefore, I list a "+" after each of these significant factors for Book Performance component. I then determine a predicted relation between each component and aggressive book reporting, based on the predicted relations of the significant factor loadings. For example, as both growth and ROA

⁴³ Firms missing any of the above listed characteristics associated with aggressive book or tax reporting are excluded from the analysis.

⁴⁴ With the exception of book-tax-difference, all book characteristics I use in the PCA appear at least once as a significant factor.

are expected to be positively related to aggressive book reporting, I predict the Book Performance component will be positively related to aggressive book reporting.⁴⁵

Based on the significant factor loadings, I give each book component a name; “Opportunity”, with significant loadings including big 4/5 auditor, firm age, size, and extent of foreign operations; “Performance”, with significant factor loadings including growth and return on assets (ROA); “External Pressure”, with significant loadings including debt and equity issuance, acquisitions, and age; and “Liability”, with significant factor loadings including balance sheet bloat, external financing, and leverage.

I follow the same procedure for the tax principal components in Table 2.3, Panel B. I reduce the ten tax characteristics to four components, and list these components including the significant factor loadings and the variance explained by each factor.⁴⁶ After each significant factor loading, I include the significant factor’s predicted relationship with aggressive tax reporting from Table 2.2, and the components predicted relationship with aggressive tax reporting.⁴⁷

Based on the significant factor loadings, I name each tax component; “Prior Activities”, with significant factor loadings including change in net operating loss (NOL) and book-tax difference; “Performance”, with significant factor loadings including growth, ROA and leverage; “Opportunity”, with significant factor loadings including firm size and extent

⁴⁵ The expected relationship between some of the components and aggressive book or tax reporting is unclear. For example, the Book Opportunity component has significant factor loadings that are expected to be both positively and negatively associated with aggressive book reporting. The expected relationship for these components is based on whether there is a larger number of significant factor loadings with a positive or negative expected relationship.

⁴⁶ With the exception of equity income in earnings, all tax characteristics I use in the PCA appear at least once as a significant factor.

⁴⁷ I assign a predicted positive relation to the Tax Prior Activities factor, because the weight on the BTD factor is greater than the weight on the change in NOL factor.

of foreign operations; and “Asset” with significant factor loadings including intangibles and capital intensity.

In both the book PCA and tax PCA I identify an Opportunity component and a Performance component, based on very similar significant factor loadings in the PCA for book and tax characteristics. In addition, in both the book and tax PCA I identify one component with significant factor loadings associated with balance sheet items. I anticipate that in Section 4, any differences in these components across reporting strategies (i.e., positive vs. negative relationship) will be similar.

Factor scores are created for each book and tax component, resulting in eight factor scores for each firm-year (associated with book components 1-4 and tax components 1-4).⁴⁸

4: Defining the relationship between book and tax reporting

A somewhat subtle, but important concept to discuss is how prior studies define the positive and negative relationship between aggressive book and tax reporting. For example, Frank et al. (2009) conclude there is a positive relationship between book and tax reporting aggressiveness. They run two regressions, first using performance matched discretionary accruals (DFIN) as the dependent variable and two proxies for tax reporting aggressiveness (DTAX and BTD) as their independent variables, and then reversing the independent and dependent variables in a second regression, while controlling for

⁴⁸ A Factor Score is computed on the components created in a principal component analysis. The Factor Score follows a general formula: $C_1 = \beta_{11}x_1 + \beta_{12}x_2 + \dots + \beta_{1p}x_p$, where C_1 =the firm's score on the principal component; β_{1p} =the regression coefficient (weight) for observed variable, identified by principal component analysis; x_p =the observed value of the variable.

characteristics associated with aggressive book and tax reporting.⁴⁹ In both regressions, they find a significant coefficient on the right hand variables (DTAX, BTD or DFIN). In their abstract, Frank et al. (2009) state (p. 467) “Our results suggest that insufficient costs exist to offset the financial and tax reporting incentives, such that nonconformity between financial accounting standards and tax laws allows firms to manage book income upwards and taxable income downward in the same reporting period.”

However, what Frank et al. (2009) have documented is the general positive relationship in the *entire* dark area of Figure 2.1. Firms in the upper right hand portion of the diagonal are, as Frank et al. (2009) claim, managing book income upwards and taxable income downward in the same reporting period. However, firms in the lower left hand portion of the main diagonal reflect the opposite situation - they have relatively higher taxable income and lower book income; that is, these firms have low aggressiveness in both book and tax reporting, however, the relationship between book and tax reporting is still positive. Figure 2.4 shows how firms with a positive relationship between book and tax reporting can be generally classified into two subsets, as aggressive or unaggressive (i.e., high book and tax aggressiveness or low book and tax aggressiveness).

Firms with a negative relationship between book and tax reporting can also be separated into two distinct groups. These groups of firms have very different reporting strategies; one set is highly aggressive in book reporting and less aggressive in tax reporting, while the other group is highly aggressive in tax reporting and less aggressive in book reporting. I am not aware of any research that distinguishes between these two groups of firms when discussing a negative relationship between aggressive book and tax

⁴⁹ See Appendix 2A for variable definitions.

reporting. Lennox et al. (2013) find evidence of a negative (or insignificant) relationship between financial statement fraud and aggressive tax reporting and conclude in their abstract (p. 1) “...fraud firms are less tax aggressive.” Lennox et al. (2013) document half of the picture; that book aggressive firms are likely to be less tax aggressive (i.e., fraud firms are more likely to locate in the upper left corner of Figure 2.1). They do not provide evidence that the most tax aggressive firms are likely to be less book aggressive.

I raise these points for several reasons; first, to highlight the complexities in documenting and describing a positive or negative relationship between aggressive book and tax reporting. The second reason I discuss these points relates to prior literature and the reasonable predictions that can be drawn from the conclusions in the literature. Many studies in the accounting literature focus on the determinants of more aggressive reporting, for example, firms that aggressively avoid taxes or firms that are likely to manage earnings in certain contexts. As a result, we know relatively little about the determinants of “unaggressive” reporting (e.g., firms with unusually high effective tax rates or unusually low abnormal accruals). It seems important for future research on the relationship between (all levels of) book and tax reporting to consider the extent to which determinates associated primarily with aggressive reporting should be used.

The final and most important reason I raise these points is because they guide my analysis in this section. I initially set out to determine whether the firms with a positive relationship between aggressive book and tax reporting have different underlying characteristics than firms with a negative relationship between aggressive book and tax reporting. However, splitting the sample into these two groups may be overly simplifying the classification of reporting strategies, based on the idea that not all firms with a positive

relationship between aggressive book and tax reporting have similar reporting strategies (some are very aggressive for book and tax, while others are less aggressive) and not all firms with a negative relationship between aggressive book and tax reporting have similar reporting strategies (some are very aggressive for book reporting and less aggressive for tax reporting, and vice versa).

As a preliminary step, I investigate whether there are differences in the underlying characteristics of firms with a positive and negative relationship between aggressive book and tax reporting. I examine differences in the average factor scores associated with the book and tax components for firms in each group (i.e., positive relation group and negative relation group). My results are presented in Table 2.4, Panel A. I find significant differences in three of the four book factor scores and two of the four tax factor scores. Even using these broad classifications, I document differences in the factor scores of firms with a positive and negative relationship between aggressive book and tax reporting.

Next I look for differences in the underlying characteristics of firms that are aggressive in both book and tax reporting and firms that are unaggressive in both book and tax reporting (i.e., firms with high book/tax aggressiveness and low book/tax aggressiveness in Figure 2.4), building on the results of Frank et al. (2009). The results are presented in Table 2.4, Panel B. I find that there are statistically significant differences in all eight of the average factor scores, suggesting that although these two subsets of firms both have a positive relationship between aggressive book and tax reporting, they likely have very different underlying firm characteristics.

The third test I perform looks for differences in the underlying characteristics of firms with a negative relationship between aggressive book and tax reporting, building on

the results of Lennox et al. (2013), (i.e., whether book aggressive firms in the upper left and tax aggressive lower right sections of Figure 2.1 have different underlying characteristics). I find significant differences in the mean factor scores of all four book factors and two tax factors in Panel C. Again, this finding supports the idea that the two subsets of firms with a negative relationship between aggressive book and tax reporting are likely to have very different underlying firm characteristics.

Next, I test whether the two subsets of firms with a positive relationship between aggressive book and tax reporting and the two subsets of firms with a negative relationship have different underlying characteristics than the rest of the firms in my sample.

In Panel D of Table 2.4, I compare the factor scores of aggressive reporting firms with the rest of the sample and find statistically significant differences in all book and tax factors scores. In Panel E, I find similar results – the unaggressive reporting firms also have significantly different book and tax factor scores than the other firms in the sample.

Panels F and G show the results from a similar analysis on the two sections of firms with a negative relationship between aggressive book and tax reporting. I examine whether there are differences in book and tax factor scores for “aggressive book” reporters (firms in the top quintiles of book reporting aggressiveness and bottom quintiles of tax reporting aggressiveness) and the factor scores for firms in the rest of the sample. The results are reported in Panel F. I find significant differences in all four of the book factor scores and two of the tax factor scores. In Panel G, I examine the opposite situation – whether there are differences in the factor scores for “aggressive tax” reporters (firms in the top quintiles of tax reporting aggressiveness and bottom quintiles of book reporting aggressiveness) and

the factor scores for firms in rest of the sample. I find significant differences in all but one of the book and tax factor scores.

In my final analysis, I determine whether there are differences in the underlying characteristics of firms that report aggressively for both book and tax, and firms that are aggressive for only book or tax reporting. These results may be of interest to regulatory agencies such as the IRS and SEC; when the IRS (SEC) identifies an aggressive tax (book) reporting firm, the SEC (IRS) may be able to determine whether the firm is likely to also report aggressively report for book (tax) purposes.

In Panel H, I test for differences in the factor scores of firms that are book aggressive and the factor scores of firms that are aggressive for both book and tax reporting. I find differences in all eight factors. In Panel I, I also find significant differences in all four book factor scores and three of the four tax factor scores when I compare firms that are tax aggressive with firms that are aggressive for book and tax reporting.

Based on the results presented in Table 2.4, I conclude that the aggressive reporting firms (firms that are aggressive in both book and tax reporting) have significantly different underlying firm characteristics than the non-aggressive reporting firms (firms that are less aggressive in book and tax reporting). The aggressive and non-aggressive reporting firms also have significantly different underlying firm characteristics than the rest of the sample firms.

I also conclude that there are significant differences in the underlying characteristics of the two subsets of firms with a negative relationship between aggressive book and tax reporting. The “aggressive book” reporters are significantly different from

the “aggressive tax” reporters and both subsets of firms have significantly different underlying firm characteristics than the rest of the sample.

I summarize the results from Table 2.4, Panels A-I in Table 2.5. In Panel A, I focus on identifying differences in the average factor scores of aggressive and non-aggressive reporting firms. Based on the results in Table 2.4, I conclude that aggressive reporting firms have smaller Book Opportunity and Tax Opportunity factor scores than firms that report non-aggressively for both book and tax. I also find that the aggressive reporting firms have larger Book and Tax Performance factor scores and larger External Pressure, Book Liability, Prior Activities, and Asset factor scores than firms that report less aggressively. I compare my results with the predicted relation of the components to aggressive book or tax reporting from Table 2.3. I find that the predicted relation of the component is consistent with the relation that I document for six of the eight components. The exceptions are the Book External Pressure factor and the Tax Opportunity factor, both of which are predicted to be positively associated with aggressive book and tax reporting respectively - I find these factors to be negatively associated with firms that report aggressively for both book and tax purposes.

In Table 2.5, Panel B, I focus on identifying differences in the average factor scores of firms that are aggressive for book reporting only and the average factor scores of firms that are aggressive for tax reporting only. Based on the results in Table 2.4, I conclude that firms reporting aggressively for book purposes only have smaller Book and Tax Opportunity factor scores and smaller Book and Tax Performance factor scores than firms reporting aggressively for tax purposes only. Aggressive book reporters also have larger External Pressure and Liability factor scores than firms reporting aggressively for tax

purposes only. I compare these results with the predicted relation of the components to aggressive book or tax reporting from Table 2.3. I find that the predicted relation of the component is consistent with the relation that I document for five of the eight components. The first exception is the Book Performance factor which is predicted to be positively related to aggressive book reporting and I find to be negatively associated with aggressive book reporting. The Prior Activities factor is the second exception. I find no significant difference between the Prior Activities factor of aggressive tax reporting firms and other firms. The final exception is the Tax Asset factor, which I find to be smaller for tax aggressive firms and is predicted to be larger for tax aggressive firms.

The highly significant differences in the average factor scores from Table 2.4 suggest that it may be possible to identify the firms' reporting strategy using only the factor scores. I test whether I can identify four firm reporting strategies; aggressive reporting, non-aggressive reporting, aggressive book reporting, and aggressive tax reporting (i.e., the location of firms in Table 2.4, Panels D, E, F, and G).

I first determine the extent to which I can identify aggressive reporting firms and non-aggressive reporting firms. I sum the eight factor scores for each firm-year to create Total Factor Score 1 defined below. I base Total Factor Score 1 on the factor's predicted relationship with aggressive reporting. For all factors except the Book Opportunity factor, the predicted relation between the factor and aggressive book or tax reporting is positive, so I add these factors in Total factor Score 1 without modification. The predicted relation between the Book Opportunity factor and aggressive reporting is negative, therefore, I multiply this factor by -1 before adding it to the other factors.

Total Factor Score 1 = $(-1 \times \text{Book Opportunity Score}) + \text{Book Performance Score} + \text{External Pressure Score} + \text{Liability Score} + \text{Prior Activity Score} + \text{Tax Performance Score} + \text{Tax Opportunity Score} + \text{Tax Asset Score}$.

Based on the predicted relationship between the factors and aggressive book and tax reporting, Total Factor Score 1 should be largest for aggressive reporting firms and smallest for non-aggressive reporting firms. Therefore, I rank firms into quintiles by year based on Total Factor Score 1. I predict firms in the top quintile are more likely to be classified as aggressive, i.e., in the dark section of Table 2.4, Panel D, and firms in the bottom quintile of Total Factor Score 1 are more likely to be classified as non-aggressive, i.e., in the dark section of Table 2.4, Panel E. I compare my classification strategy based on Total Factor Score 1, to my previous reporting strategy classification based on the firm's quintile combination of DFIN and ETR.

I previously classify firms in six of the DFIN-ETR quintile combinations as "aggressive reporters", therefore, the probability of correctly assigning firm-years to this reporting strategy by chance is 24%.⁵⁰ In Table 2.6, Panel A, I show that I correctly identify 31% of aggressive reporting firm-years using Total Factor Score 1, an improvement of 7% over the probability of correctly assigning firm-years to this reporting strategy by chance.

In Panel B, I report the results from identifying non-aggressive reporting firm-years using Total Factor Score 1. I previously classify firms in seven of the DFIN-ETR quintile combinations as "non-aggressive reporters", therefore, the probability of correctly choosing this reporting strategy by chance is 28%. I correctly identify 33% of non-

⁵⁰ If firms are randomly assigned to one of the twenty-five DFIN-ETR quintile combinations, the probability of correctly assigning the firm to the correct DFIN-ETR quintile combination is 4%.

aggressive reporting firm-years – an improvement of 5% over the probability of correctly assigning firm-years to this reporting strategy by change.

Next I determine the extent to which I can identify firms that are only aggressive in book reporting and firms that are only aggressive in tax reporting. I base Total Factor Score 2 on the factor's predicted relationship with aggressive book and tax reporting and construct Total Factor Score 2 so that it should be largest for aggressive tax reporting firms and smallest for aggressive book reporting firms. Firms only aggressive in tax reporting are by definition not aggressive for book reporting, so I multiply all components predicted to be positively related to aggressive book reporting by -1 before adding them to the other factors, and do not modify the book factor predicted to be negatively related to aggressive book reporting. All four tax components are predicted to be positively associated with aggressive tax reporting, so I add these factors in Total Factor Score 2 without modification.

Total Factor Score 2=Book Opportunity Score + (-1*Book Performance Score) + (-1*External Pressure Score) + (-1*Liability Score) + Prior Activity Score + Tax Performance Score + Tax Opportunity Score+ Tax Asset Score.

I rank firms into quintiles by year based on Total Factor Score 2. I predict firms in the bottom quintile are more likely to be classified as book aggressive only, i.e. in the dark section of Table 2.4, Panel F, and firms in the top quintile of Total Factor Score 2 are more likely to be classified as tax aggressive only, i.e., in the dark section of Table 2.4, Panel G.

I test my identification of book aggressive firm-years using Total Factor Score 2 against my previous classification based on the firm's quintile combination of DFIN and ETR and report results in Table 2.6, Panel C. I previously classify firms in six of the DFIN-

ETR quintile combinations as “aggressive book reporters”, therefore, the probability of correctly choosing this reporting strategy by chance is 24%. I correctly identify aggressive book reporting in 28% of firm-years, a 4% improvement over the probability of correctly assigning firm-years to this reporting strategy by chance.

In Panel D of Table 2.6, I report results for my identification of tax aggressive firm-years. I previously classify firms in six of the DFIN-ETR quintile combinations as “aggressive tax reporters”, therefore, the probability of correctly assigning firm-years to this reporting strategy by chance is again 24%. I correctly identify aggressive tax reporting in 25% of firms, just a 1% improvement over the probability of correctly assigning firm-years to this reporting strategy by chance.

The method I develop to predict reporting strategies provides some improvement over correctly choosing the reporting strategy by chance, however, the improvement varies depending on the reporting strategy tested. While this suggests that firm characteristics provide some information that is useful in predicting reporting aggressiveness, it also suggests that there are many other factors that likely influence the firm’s book and tax reporting decisions.

4: Conclusion

The conflicting results of prior studies support the idea that the relationship between aggressive book and tax reporting is complex, likely varying among firms. I extend the examination of the relationship between aggressive book and tax reporting to allow for the relationship to be positive in some firms and negative in others and document a

significantly positive and a significantly negative relationship between aggressive book and tax reporting within a sample of Compustat firms.

I then review firm characteristics that prior literature finds to be associated with aggressive book and/or tax reporting. I use Principal Component Analysis to reduce these variables to their underlying constructs and find many significant differences in the book and tax factor scores of firms with different reporting strategies. I explore the ability of using these factor scores to identify the firm's relationship between aggressive book and tax reporting. I find that I can correctly identify the reporting strategy in 25%-33% of firm-years, an improvement of 1%-7% over the probability of correctly assigning firm-years to the reporting strategy by chance. I conclude that firms select reporting strategies that reflect both a positive and negative relationship between aggressive book and tax reporting. Firm characteristics can also be used to aid in the *ex-ante* identification of the firm's reporting strategy, however, many other factors likely contribute to level of aggressiveness in firm's book and tax reporting decisions.

Appendix 2A	
Variable Names and Definitions	
Panel A: Book and Tax Aggressiveness Variables	
BTD	Pre-tax income (#170) less ((Current federal tax expense (#63) plus foreign tax expense (#64)), divided by the statutory marginal tax rate).
DFIN	Performance-matched discretionary accruals. Firm specific normal accruals are calculated using coefficient estimates from the following equation, estimated by 2-digit SIC code and fiscal year, where all variables, including the intercept are scaled by beginning of year total assets (#6): $TACC = \alpha_0 + \alpha_1 (\Delta REV \text{ (\#12)} - \Delta AR \text{ (\#302)}) + \alpha_1 PPE \text{ (\#7)} + \eta$ where $TACC = \text{total accruals} = (\text{Earnings before extraordinary items (\#123)} + \text{Total tax expense (\#16)}) - [(\text{Cash flow from operations (\#308)} + \text{Income taxes paid (\#317)}) - \text{Extraordinary items and discontinued operations (\#124)}]$. Discretionary accruals is the difference between total accruals and estimated normal accruals. Each firm year is matched based on industry and decile of pre tax-return on assets. Performance adjusted discretionary accruals is the difference between each observations discretionary accrual measure and the median discretionary accrual measure for its industry and PTROA decile.
DTAX	Residuals from estimating the following equation by 2-digit SIC code and fiscal year, where all variables, including the intercept are scaled by beginning of year total assets (#6): $PERMDIFF_{it} = \alpha_0 + \alpha_1 INTANG \text{ (\#33)} + \alpha_2 UNCON \text{ (\#55)} + \alpha_3 MI \text{ (\#49)} + \alpha_4 CSTE \text{ (\#173)} + \alpha_5 \Delta NOL \text{ (\#52)} + \alpha_6 LAG_PERMDIFF + \varepsilon$.
ETR	Total tax expense (#16), divided by pre-tax income (#170).
Panel B: Control Variables	
AF_D	Indicator variable that equals 1 if firm i has at least one analyst covering the firm on I/B/E/S in year t , 0
AGE	Log of the number of years that the company is listed on Compustat.
AUDIT TENURE	Log of the number of years that the company is audited by the same audit firm on Compustat.
BALANCE SHEET BLOAT	Shareholders' equity (#216) minus cash and short-term investments (#1), plus total debt (#9 + #34) in year $t-1$, scaled by net sales (#12) at the end of year $t-2$.
BIG FIVE AUDIT	Indicator variable that equals 1 if the company is audited by one of the Big 5 firms or one of their predecessors (AU=01-08), 0 otherwise.
BOOK TAX DIFFERENCE	Book income less taxable income scaled by lagged total assets; book income is pre-tax income (Compustat #170) in year t ; taxable income is calculated by grossing-up the sum of current federal tax expense (#63) and current foreign tax expense (#64) and subtracting the change in NOL carryforwards (#52) in year t . If current federal tax expense is missing, then total current tax expense is calculated by subtracting deferred taxes (#50), state income taxes (#173) and other income taxes (#211) from total income taxes (#16) in year t .
CAPITAL	Net property, plant and equipment (#8) divided by total assets (#6) at year $t-1$.
CHANGE IN NOL	Change in net operating loss carryforward (#52) divided by total assets at year $t-1$.
D&E ISSUED	An indicator variable equal to 1 if the sum of new long-term debt (#111) plus new equity (#108) exceeds 20% of total assets (#6), 0 otherwise.
EM1	Indicator variable that equals 1 if net income (#172) in year t , divided by the market value of common equity in year $t-1$ is greater than 0 and less than or equal to 0.01 for firm i , 0 otherwise.
EM2	Indicator variable that equals 1 if the change in net income (#172) from year $t-1$ to t , divided by the market value of common equity at year $t-2$, is greater than 0 and less than or equal to 0.01 for firm i , 0 otherwise.
EM3	Indicator that equals 1 if firm i 's actual earnings less the median analyst forecast for fiscal year t (as reported on I/B/E/S) is greater than 0 and less than or equal to 0.01, and 0 otherwise.
EQUITY INCOME IN EARNINGS	Equity in earnings (#55) divided by total assets (#6) at year $t-1$.
EXTERNAL FINANCING	Indicator variable that equals 1 if the firm will want external financing in the next 2 years; if cash from operations in year t (#308) less average capital expenditures from year $t-3$ to $t-1$ (#128) divided by current assets in year $t-1$ (#4) is less than or equal to -.5, 0 otherwise.
FOR_D	Indicator variable that equals 1 if the absolute value of pre-tax foreign income (#273) >0, 0 otherwise.
FOREIGN OPERATIONS	Pre tax foreign income (#273) divided by total assets (#6) at year $t-1$.
GROWTH	Share price at close of the fiscal year (#199) times common shares outstanding (#25) divided by common
INTANGIBLES	Intangibles (#33) divided by lag assets.
LEVERAGE	Long-term debt (#9), plus debt in current liabilities (#34) divided by total assets (#6).

Appendix 2A Continued

Panel B: Control Variables (continued)

M&A	Indicator variable that equals 1 if the company had an acquisition that contributed to sales (#249 > 0), 0 otherwise.
MTB	Market value of common equity (#199 X #25) in year $t-1$, divided by the book value of common equity (#60)
NEGATIVE EQUITY	Indicator variable that equals 1 if total liabilities (#181) > total assets (#6), 0 otherwise.
NUM_AN	The number of analysts covering firm i in year t as reported by I/B/E/S, divided by total assets (#6) in year t .
NOL_D	Indicator variable that equals 1 if firm i has an NOL (#52 > 0) in the current year, 0 otherwise.
Δ PTCFO	Change in pre-tax cash flows from operations (#308 - #124 + #317) divided by total assets in year $t-1$.
PTROA	Pre-tax income (#170) divided by total assets (#6) at year $t-1$.
ROA	Net income (#172) divided by total assets (#6).
SIZE	Log of total assets (#6).
TIME_TREND	A variable that increases by 1 each year. 1 in 1991, 2 in 1992,...,20 in 2010, and 22 in 2012.
TOTAL FACTOR SCORE 1	A combination of the four book and four tax components identified in Principal Component Analysis. Based on each components predicted relationship with aggressive book or tax reporting, Total Factor Score 1 should be largest for aggressive book and tax reporting firms, and smallest for non-aggressive book and tax reporting firms. Total Factor Score 1 is calculated as: $(-1 \times \text{Book Opportunity Score}) + \text{Book Performance Score} + \text{External Pressure Score} + \text{Liability Score} + \text{Prior Activity Score} + \text{Tax Performance Score} + \text{Tax Opportunity Score} + \text{Tax Asset Score}$.
TOTAL FACTOR SCORE 2	A combination of the four book and four tax components identified in Principal Component Analysis. Based on each components predicted relationship with aggressive book or tax reporting, Total Factor Score 2 should be largest for aggressive tax reporting firms, and smallest for aggressive book reporting firms. Total Factor Score 2 is calculated as: $\text{Book Opportunity Score} + (-1 \times \text{Book Performance Score}) + (-1 \times \text{External Pressure Score}) + (-1 \times \text{Liability Score}) + \text{Prior Activity Score} + \text{Tax Performance Score} + \text{Tax Opportunity Score} + \text{Tax Asset Score}$.

Following Lennox et al. (2013), the ETR variable is set as missing when the denominator is zero or negative and winsorized to the range [0,1]. Continuous variables are winsorized at 1 and 99% to address problems associated with outliers.

Appendix 2B: Using Fraud to examine the relationship between aggressive book and tax reporting

Lennox et al. (2013) examine financial statement fraud and aggressive tax reporting, and find either a negative or insignificant relationship. Using firms accused of fraud as a proxy for aggressive financial reporting may be desirable as there is a very high level of confidence these firms committed fraud, or at least engaged in egregious earnings management, whereas other measures of book reporting aggressiveness likely measure aggressive book reporting with greater error. However, using fraud limits the conclusions Lennox et al. (2013) can draw on the general positive or negative relationship between book and tax aggressiveness, as it creates distinct groups of firms (those that engaged in fraud and those that did not) about which the authors can draw conclusions.

In Figure 2.5, I have combined my interpretation of the results in Lennox et al. (2013) with Figure 2.1. Fraudulent reporting is the most extreme form of aggressive book reporting, as less than 1% of Compustat firms are accused of fraud (Figure 2.5 is not drawn to scale). The results in Lennox et al. (2013) suggest fraud firms are likely to be located in the upper left corner of an overall distribution of firm's book and tax aggressiveness - these firms have high financial reporting aggressiveness and relatively low tax reporting aggressiveness. The results also suggest that fraud firms are unlikely to locate in the upper right corner, where firms have both high book and tax aggressiveness. However, the results in LLP do not provide information on the general relationship between aggressive book and tax reporting for the other >99% of firms not accused of fraud.

Figure 2.1: The basic relationship between book and tax aggressiveness

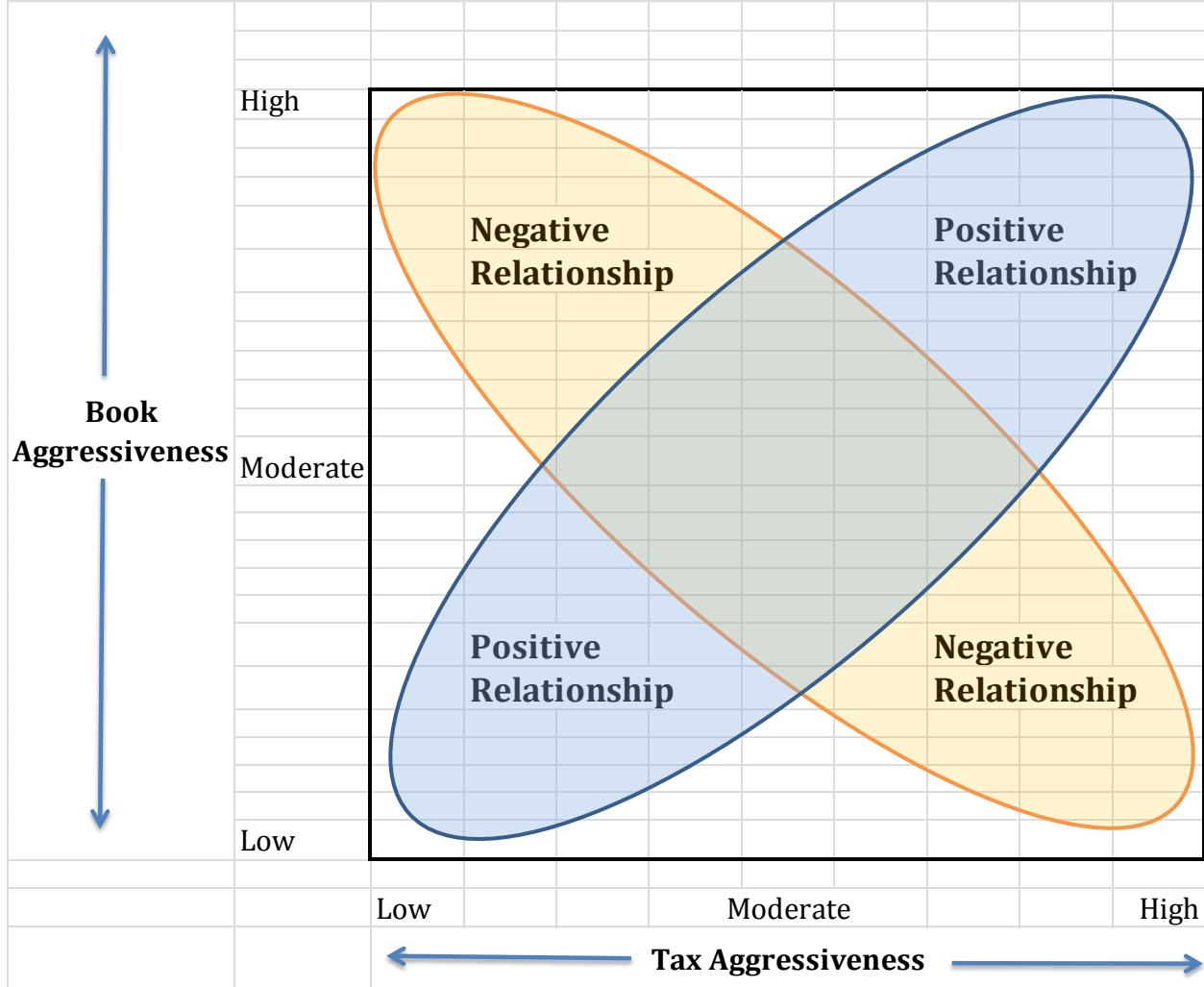


Figure 2.2: Distribution of firm-years across DFIN and ETR quintiles							
Panel A: Reproduction of Table 5, Panel C in Frank et al. (2009)							
Distribution of firm-years across each DTAX and DFIN quintile combination, 1991-2005							
		DTAX Quintiles					
		Q1	Q2	Q3	Q4	Q5	Total
DFIN Quintiles:	Q1	3,125	1,677	1,380	1,621	2,171	9,974
	Q2	1,570	2,270	2,228	2,196	1,715	9,979
	Q3	1,371	2,303	2,481	2,234	1,589	9,978
	Q4	1,509	2,122	2,422	2,183	1,743	9,979
	Q5	2,399	1,607	1,467	1,745	2,758	9,976
	Total	9,974	9,979	9,978	9,979	9,976	49,886
Panel B: Distribution of my sample firms							
Distribution of firm-years across each DFIN and ETR Quintile, 1991-2012							
		ETR Quintiles					
		Q1	Q2	Q3	Q4	Q5	Total
DFIN Quintiles:	Q1	2,391	1,966	1,952	1,998	2,043	10,350
	Q2	2,142	2,243	2,149	2,166	1,668	10,368
	Q3	2,062	2,231	2,300	2,054	1,718	10,365
	Q4	1,985	2,086	2,083	2,210	2,004	10,368
	Q5	1,775	1,842	1,881	1,940	2,917	10,355
	Total	10,355	10,368	10,365	10,368	10,350	51,806

Figure 2.3: Division of firms for a positive and negative relationship test

	Q5	2	2	2	1	1		
DFIN	Q4	2	3	3	1	1		
Quintiles:	Q3	2	3	3	3	2		
	Q2	1	1	3	3	2		
	Q1	1	1	2	2	2		
		Q1	Q2	Q3	Q4	Q5		
	ETR Quintiles							
1= Group 1; 8 quintile combinations								
2= Group 2; 10 quintile combinations								
3= Group 3; Firms excluded from the analysis								
ETR quintiles have been reversed so a low ETR quintile corresponds with low tax aggressiveness								

Figure 2.4: Firms with a positive relationship between book and tax reporting aggressiveness can be classified as aggressive or non-aggressive for reporting

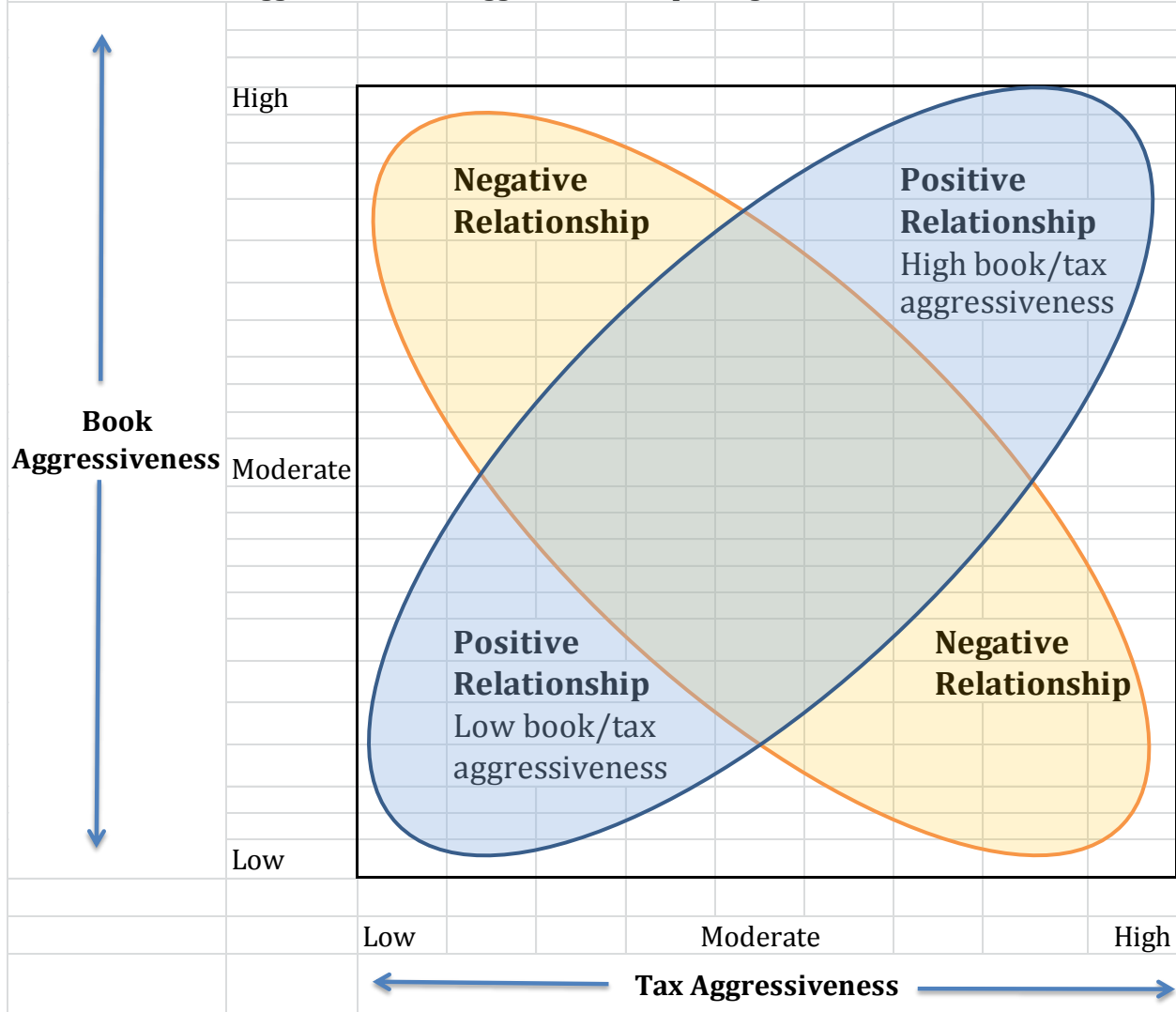


Figure 2.5: The likely location of fraud firms in an overall distribution of book and tax reporting aggressiveness

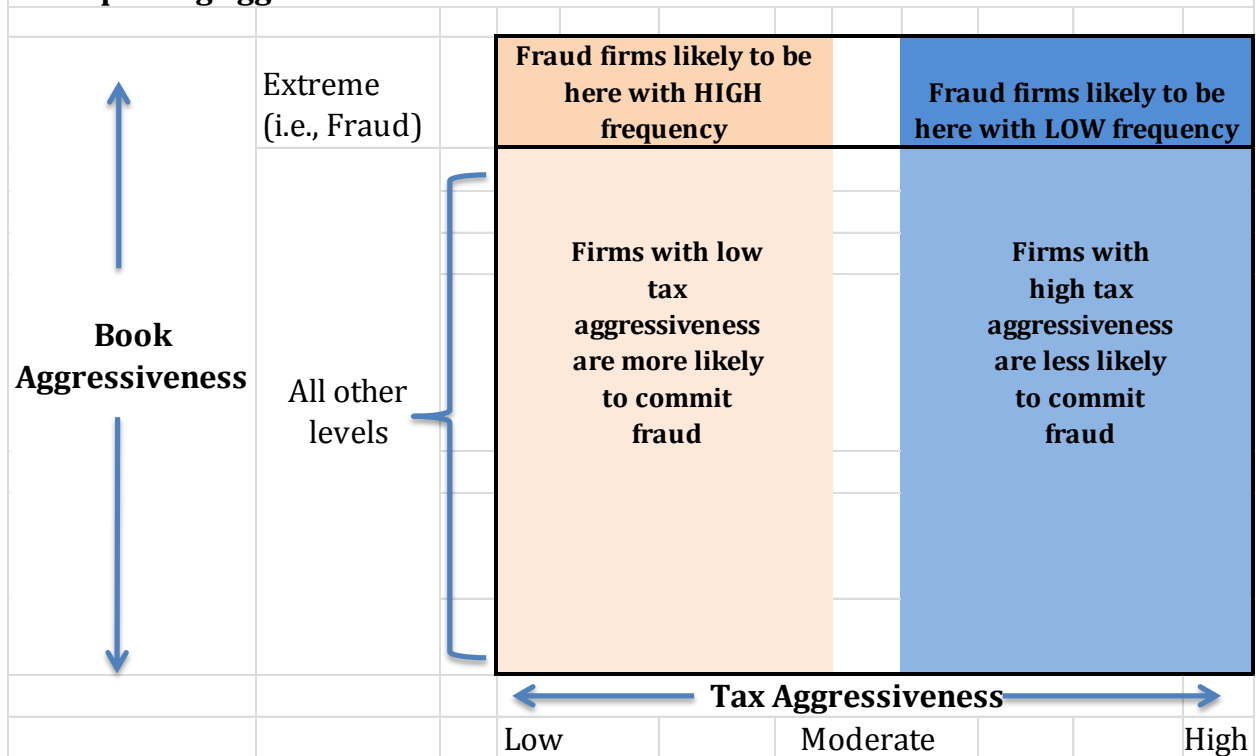


Table 2.1

A positive and negative relationship between aggressive book and tax reporting

I separate firms with non-missing DFIN, ETR, and control variable information into two groups based on the quintile combination of the firms book and tax aggressiveness as defined in Figure 2.3. I estimate equation 1 and 2 separately for Group 1 and Group 2 over the period 1991-2012. This table represents the results from the regressions. All variables are defined in Appendix 2A.

Panel A: OLS Regressions of ETR on DFIN and DFIN on ETR for Group 1							
	Predicted	Dependent variable			Predicted	Dependent variable	
	Sign	DFIN			Sign	ETR	
INTERCEPT		0.6717 ***			INTERCEPT	0.2516 ***	
ETR	-	-1.8177 ***			DFIN	-0.0394 ***	
PTROA		0.3581 **			PTROA	-0.1693 ***	
NOL_D		0.1281 ***			NOL_D	-0.0309 ***	
FOR_D		0.1783 ***			FOR_D	0.0142 ***	
LEV		-0.2188 ***			LEV	-0.0441 ***	
MTB		0.0035			MTB	-0.0011 **	
AF_D		-0.0023			AF_D	0.0473 ***	
NUM_AN		-0.5417			NUM_AN	-0.1690 **	
EM1		0.1047 ***			EM1	0.0877 ***	
EM2		0.0164			EM2	0.0112 ***	
EM3		0.0308			EM3	0.0105 **	
ΔPTCFO		0.5794 ***			ΔPTCFO	0.2082 ***	
SIZE		-0.0213 ***			SIZE	0.0135 ***	
AGE		-0.0022 **			AGE	-0.0005 ***	
BIG5_AUDIT		-0.0450			BIG5_AUDIT	0.0171 ***	
AUDIT_TENURE		-0.0023			AUDIT_TENURE	0.0002	
NEGATIVE_EQUITY		0.4242 ***			NEGATIVE_EQUITY	-0.0118	
M&A		0.0369			M&A	0.0284 ***	
DE_ISSUED		0.0017			DE_ISSUED	-0.0085 **	
TIME_TREND		0.0217 ***			TIME_TREND	-0.0027 ***	
Adj. R ²		0.121			Adj. R ²	0.189	
n		22,528			n	22,528	

Table 2.1 Continued							
Panel B: OLS Regressions of ETR on DFIN and DFIN on ETR for Group 2							
	Predicted	Dependent variable			Predicted	Dependent variable	
	Sign	DFIN			Sign	ETR	
INTERCEPT		-0.3256 ***			INTERCEPT	0.2773 ***	
ETR	+	1.1124 ***			DFIN	0.0277 ***	
PTROA		0.8177 ***			PTROA	0.1463 ***	
NOL_D		0.0396 *			NOL_D	-0.0119 ***	
FOR_D		0.0364			FOR_D	0.0134 ***	
LEV		-0.1148 **			LEV	0.0298 **	
MTB		0.0025			MTB	-0.0028 ***	
AF_D		0.1426 ***			AF_D	0.0104 *	
NUM_AN		-1.8864 ***			NUM_AN	0.2400 ***	
EM1		-0.0743 *			EM1	0.1111 ***	
EM2		0.0938 ***			EM2	0.0014	
EM3		-0.0625			EM3	0.0135 ***	
ΔPTCFO		-0.2234 ***			ΔPTCFO	-0.2699 ***	
SIZE		-0.0304 ***			SIZE	0.0060 ***	
AGE		-0.0019 **			AGE	0.0005 ***	
BIG5_AUDIT		-0.0382			BIG5_AUDIT	-0.0168 ***	
AUDIT_TENURE		-0.0019			AUDIT_TENURE	0.0005 *	
NEGATIVE_EQUITY		-0.0045			NEGATIVE_EQUITY	-0.0378 **	
M&A		0.1091 ***			M&A	0.0320 ***	
DE_ISSUED		0.0103			DE_ISSUED	0.0109 ***	
TIME_TREND		0.0273 ***			TIME_TREND	-0.0034 ***	
Adj. R ²		0.057			Adj. R ²	0.093	
n		24,014			n	24,014	
Standard errors are clustered by firm. The time period under analysis includes firm-years from 1991-2012. Continuous variables are winsorized at 1% and 99%. Following Chen et al. (2010) ETR is set as missing when the denominator is zero or negative and is truncated to the [0,1] range. The results are consistent when I add a random effect to the regression.							
*** Significance at the 1% level (two-tailed). **Significance at the 5% level (two-tailed). *Significance at the 10% level (two-tailed).							

Table 2.2

Characteristics associated with aggressive reporting

Below are firm-specific characteristics that prior literature has shown to be associated (positively or negatively) with aggressive book and/or tax reporting. Listed next to each characteristic is an example of a study that has shown the characteristic is related to aggressive book or tax reporting.

Panel A: Firm characteristics associated with book and tax aggressiveness

Predicted sign	Characteristic	Example Citations for Book Reporting	Example Citations for Tax Reporting
+/- book, +/- tax	Industry	Burns, Kedia (2006)	Zimmerman (1983)
+/- book, + tax	Size	Burns, Kedia (2006)	Zimmerman (1983)
+ book, + tax	Firm growth	Beasley (1996)	Chen, Chen, Chang, Shevlin (2010)
+ book, + tax	Performance metrics	Summers, Sweeney (1998)	Gutpa, Newberry (1997)
+ book, + tax	Foreign Operations	Albrecht (2002)	Rego (2003)
+ book, + tax	Information Asymmetry	Richardson (2000)	Balakrishnan et al. (2012)
+ book, + tax	Book-tax differences	Hanlon (2005)	Wilson (2009)
+ book, - tax	Leverage	Vermeer (2003)	Gutpa, Newberry (1997)
- book, - tax	Family firm ownership	Wang 2006	Chen, Chen, Chang, Shevlin (2010)

Panel B: Firm characteristics associated with book aggressiveness

Predicted sign	Characteristic	Example Citations for Book Reporting
+/-	Board of Directors composition	Beasley (1996)
+	Mergers and Acquisitions	Erickson, Wang (1999)
+	Desire for external financing	Dechow, Sloan, Sweeney (1996)
+	Debt and Equity issuance	Dechow, Sloan, Sweeney (1996)
+	CEO on Board of Directors	Erickson, Hanlon, Maydew (2006)
-	Balance sheet bloat	Barton, Simko (2002)
-	Firm Age	Beasley (1996)
-	Audit firm quality	Stice (1991)
-	Board monitoring	Erickson, Hanlon, Maydew (2006)

Panel C: Firm characteristics associated with tax aggressiveness

Predicted sign	Characteristic	Example Citations for Tax Reporting
+/-	Intangible assets	Chen, Chen, Chang, Shevlin (2010)
+/-	Executive Incentive structures	Phillips (2003)
+/-	Equity Income in earnings	Chen, Chen, Chang, Shevlin (2010)
+	Capital intensity	Stickney, McGee (1982)
-	Net loss/net loss carryforwards	Wang (1991)

Table 2.3

Book and tax components identified in Principal Component Analysis

I subject firm characteristics associated with aggressive book or tax reporting to Principal Component Analysis. I identify four components related to aggressive book reporting and four components related to aggressive tax reporting and list each below. For each component I include the significant factor loadings of the component with the predicted sign of the factor loading from Table 2.2, the Principal Component's predicted relation with aggressive book or tax reporting based on the predicted signs of the factor loadings, the name of the component, and the variance explained by each component.

Panel A - Book Principal Components				
n=51,806	Significant Factor Loadings	Predicted relation	Name	Variance explained
Factor 1	Big 5 Auditor (-), age (-), size (+/-), foreign operations (+)	-	Opportunity	1.793
Factor 2	Growth (+), ROA (+)	+	Performance	1.366
Factor 3	D&E issued (+), acquisitions (+), age (-)	+	External Pressure	1.324
Factor 4	Bloat (-), external financing (+), leverage (+)	+	Liability	1.273
Panel B -Tax Principal Components				
n=51,806	Significant Factor Loadings	Predicted relation	Name	Variance explained
Factor 1	Change in NOL (-), BTD (+)	+	Prior Activities	1.763
Factor 2	Growth (+), ROA (+), leverage (-)	+	Performance	1.537
Factor 3	Size (+/-), foreign operations (+)	+	Opportunity	1.422
Factor 4	Intangibles (+/-), capital intensity (+)	+	Asset	1.182

Table 2.4

Differences in factor scores across reporting strategies

I calculate differences in mean factor scores for each book and tax component identified in Principal Component Analysis for firms with different reporting strategies. I report the number of firms in each strategy group, the mean factor score for each group, the difference between the mean factors scores, and the t-value associated with the difference. T-values in bold are considered significant at the 10% level or lower.

Panel A: Difference in positive and negative relation firms							
Book Factors	n	Negative relation firms mean	n	Positive relation firms mean	Difference	t value	Book aggressiveness quintiles are shown on the vertical axis and tax aggressiveness quintiles are shown on the horizontal axis.
Opportunity	23,176	-0.0344	28,630	0.0279	-0.0623	-7.06	5
Performance	23,176	0.0031	28,630	-0.0025	0.0056	0.63	4
External Pressure	23,176	0.0333	28,630	-0.0270	0.0603	6.81	3
Liability	23,176	0.0125	28,630	-0.0101	0.0226	2.55	2
Tax Factors							1
Prior Activities	23,176	0.0001	28,630	-0.0001	0.0002	0.02	1 2 3 4 5
Performance	23,176	-0.0044	28,630	0.0036	-0.0080	-0.90	
Opportunity	23,176	-0.0166	28,630	0.0134	-0.0300	-3.39	
Asset	23,176	-0.0194	28,630	0.0157	-0.0352	-3.96	
Black=positive relation firms Gray=negative relation firms							
Panel B: Difference in aggressive and non-aggressive positive relation firms							
Book Factors	n	Non-aggressive firms mean	n	Aggressive firms mean	Difference	t value	
Opportunity	15,422	0.1081	13,208	-0.0658	0.1740	14.34	5
Performance	15,422	-0.1186	13,208	0.1331	-0.2517	-21.40	4
External Pressure	15,422	0.0932	13,208	-0.1672	0.2604	22.37	3
Liability	15,422	-0.1055	13,208	0.1013	-0.2068	17.07	2
Tax Factors							1
Prior Activities	15,422	-0.0234	13,208	0.0272	-0.0506	-3.77	1 2 3 4 5
Performance	15,422	-0.1328	13,208	0.1628	-0.2956	-25.49	
Opportunity	15,422	0.0504	13,208	-0.0298	0.0802	6.69	
Asset	15,422	-0.0720	13,208	0.1181	-0.1901	-16.48	
Black=positive relation "aggressive" firms Gray=positive relation "non-aggressive" firms White=firms excluded from the analysis							
Panel C: Difference in book aggressive and tax aggressive negative relation firms							
Book Factors	n	Only book aggressive firms	n	Only tax aggressive firms	Difference	t value	
Opportunity	11,631	-0.1089	11,545	0.0406	-0.1495	-11.52	5
Performance	11,631	-0.1561	11,545	0.1635	-0.3196	-24.02	4
External Pressure	11,631	0.1138	11,545	-0.0478	0.1617	12.27	3
Liability	11,631	0.0448	11,545	-0.0201	0.0649	4.90	2
Tax Factors							1
Prior Activities	11,631	-0.0072	11,545	0.0075	-0.0147	-1.22	1 2 3 4 5
Performance	11,631	-0.1745	11,545	0.1670	-0.3415	-25.68	
Opportunity	11,631	-0.1004	11,545	0.0679	-0.1684	-12.76	
Asset	11,631	-0.0101	11,545	-0.0288	0.0187	1.40	
Black=negative relation "tax aggressive" firms Gray=negative relation "book aggressive" firms White=firms excluded from the analysis							
Panel D: Difference in aggressive firms (positive relation) and all other firms							
Book Factors	n	All other firms	n	aggressive firms	Difference	t value	
Opportunity	38,598	0.0225	13,208	-0.0658	0.0884	8.05	5
Performance	38,598	-0.0455	13,208	0.1331	-0.1786	-16.54	4
External Pressure	38,598	0.0572	13,208	-0.1672	0.2245	22.92	3
Liability	38,598	-0.0347	13,208	0.1013	-0.1360	-11.86	2
Tax Factors							1
Prior Activities	38,598	-0.0093	13,208	0.0272	-0.0365	-2.72	1 2 3 4 5
Performance	38,598	-0.0557	13,208	0.1628	-0.2185	-21.16	
Opportunity	38,598	0.0102	13,208	-0.0298	0.0400	3.69	
Asset	38,598	-0.0404	13,208	0.1181	-0.1586	-16.36	
Black= positive relation "aggressive" firms Gray=all other firms							

Table 2.4 Continued										
Panel E: Difference in non-aggressive firms and all other firms										
Book Factors	n	All other firms	n	non-aggressive firms	Difference	t value				
Opportunity	36,384	-0.0458	15,422	0.1081	-0.1539	-17.21	5			
Performance	36,384	0.0503	15,422	-0.1186	0.1689	19.36	4			
External Pressure	36,384	-0.0395	15,422	0.0932	-0.1327	-13.76	3			
Liability	36,384	0.0447	15,422	-0.1055	0.1502	18.04	2			
Tax Factors							1			
Prior Activities	36,384	0.0099	15,422	-0.0234	0.0333	4.64		1	2	3
Performance	36,384	0.0563	15,422	-0.1328	0.1891	20.87			4	5
Opportunity	36,384	-0.0214	15,422	0.0504	-0.0718	-8.01				
Asset	36,384	0.0305	15,422	-0.0720	0.1025	10.62				
Panel F: Difference in book aggressive and all other firms										
Book Factors	n	all other firms	n	only book aggressive firms	Difference	t value				
Opportunity	40,175	0.0315	11,631	-0.1089	0.1404	14.32	5			
Performance	40,175	0.0452	11,631	-0.1561	0.2013	20.10	4			
External Pressure	40,175	-0.0330	11,631	0.1138	-0.1468	-13.43	3			
Liability	40,175	-0.0130	11,631	0.0448	-0.0578	-5.41	2			
Tax Factors							1			
Prior Activities	40,175	0.0021	11,631	-0.0072	0.0093	1.15		1	2	3
Performance	40,175	0.0505	11,631	-0.1745	0.2250	21.80			4	5
Opportunity	40,175	0.0291	11,631	-0.1004	0.1295	13.30				
Asset	40,175	0.0029	11,631	-0.0101	0.0130	1.21				
Panel G: Difference in tax aggressive and all other firms										
Book Factors	n	all other firms	n	only tax aggressive firms	Difference	t value				
Opportunity	40,261	-0.0116	11,545	0.0406	-0.0523	-4.73	5			
Performance	40,261	-0.0469	11,545	0.1635	-0.2104	-18.76	4			
External Pressure	40,261	0.0137	11,545	-0.0478	0.0616	6.05	3			
Liability	40,261	0.0058	11,545	-0.0201	0.0259	2.46	2			
Tax Factors							1			
Prior Activities	40,261	-0.0021	11,545	0.0075	-0.0096	-0.84		1	2	3
Performance	40,261	-0.0479	11,545	0.1670	-0.2148	-19.69			4	5
Opportunity	40,261	-0.0195	11,545	0.0679	-0.0874	-7.71				
Asset	40,261	0.0083	11,545	-0.0288	0.0371	3.51				
Panel H: Difference in book aggressive and book and tax aggressive firms										
Book Factors	n	only book aggressive firms	n	Book and tax aggressive	Difference	t value				
Opportunity	11,652	-0.1156	9,071	-0.2235	0.1079	7.36	5			
Performance	11,652	-0.0739	9,071	0.1828	-0.2567	-16.91	4			
External Pressure	11,652	0.0705	9,071	-0.1606	0.2310	16.26	3			
Liability	11,652	0.0273	9,071	0.1747	-0.1474	-8.63	2			
Tax Factors							1			
Prior Activities	11,652	-0.0012	9,071	0.0337	-0.0349	-1.80		1	2	3
Performance	11,652	-0.0747	9,071	0.2133	-0.2880	-19.80			4	5
Opportunity	11,652	-0.1014	9,071	-0.1355	0.0341	2.35				
Asset	11,652	0.0392	9,071	0.1017	-0.0626	-4.57				
Panel I: Difference in tax aggressive and book and tax aggressive firms										
Book Factors	n	only tax aggressive firms	n	Book and tax aggressive	Difference	t value				
Opportunity	11,647	0.1135	9,071	-0.2235	0.3370	21.41	5			
Performance	11,647	0.1296	9,071	0.1828	-0.0531	-3.31	4			
External Pressure	11,647	-0.0958	9,071	-0.1606	0.0648	4.80	3			
Liability	11,647	0.0039	9,071	0.1747	-0.1709	-10.08	2			
Tax Factors							1			
Prior Activities	11,647	0.0124	9,071	0.0337	-0.0214	-1.01		1	2	3
Performance	11,647	0.1312	9,071	0.2133	-0.0821	-5.47			4	5
Opportunity	11,647	0.1181	9,071	-0.1355	0.2537	16.04				
Asset	11,647	0.0060	9,071	0.1017	-0.0957	-7.06				
Black=tax aggressive firms Gray=book and tax aggressive firms White=firms excluded from the analysis										

Table 2.5			
Summary of Table 2.4 results			
I summarize the results of Table 2.4 by identifying patterns in the relative sizes of the factor scores associated with each component for firms with different reporting strategies. I classify the factor scores as either smaller (indicating a negative relation between the component and aggressive reporting), larger (indicating a positive relation between the component and aggressive book or tax reporting), or not significantly different (indicating no significant relation between the component and aggressive book or tax reporting) than other sets of firms as identified below. I include the components predicted relationship with aggressive book or tax reporting from Table 2.3.			
Panel A: Summary of Table 2.4, Panels B, D, E, H, I	Predicted relation with Aggressive reporting	Aggressive reporting firms	Non-aggressive reporting firms
Book Opportunity Factor	-	Smaller	Larger
Book Performance Factor	+	Larger	Smaller
External Pressure Factor	+	Smaller	Larger
Liability Factor	+	Larger	Smaller
Prior Activities Factor	+	Larger	Smaller
Tax Performance Factor	+	Larger	Smaller
Tax Opportunity Factor	+	Smaller	Larger
Asset Factor	+	Larger	Smaller
Panel B: Summary of Table 2.4, Panels C, F, G	Predicted relation with Aggressive reporting	Aggressive book reporting only	Aggressive tax reporting only
Book Opportunity Factor	-	Smaller	Larger
Book Performance Factor	+	Smaller	Larger
External Pressure Factor	+	Larger	Smaller
Liability Factor	+	Larger	Smaller
Prior Activities Factor	+	Not significantly different	Not significantly different
Tax Performance Factor	+	Smaller	Larger
Tax Opportunity Factor	+	Smaller	Larger
Asset Factor	+	Not significantly different	Smaller

Table 2.6	
Results of using Total Factor Score 1 and Total Factor Score 2 to identify the firm's reporting strategy.	
I rank firms into quintiles by year, based on the value of Total Factor Score 1 or Total Factor Score 2. I predict the firm's reporting strategy based on the Total Factor Score quintile, and check my predicted reporting strategy against my previous classification of the firm's reporting strategy, which is based on the firm's quintile combination of DFIN and ETR.	
Panel A: Identifying Aggressive Reporting Firms	
Firm-years in the top quintile of Total Factor Score1 (potential aggressive reporting firm)	10,355
Firm-years in the top quintile of Total Factor Score 1 that I classify as aggressive, based on the firm's quintile combination of DFIN and ETR	3,232
Percent correct	31%
Probability of correctly assigning firm-years to the reporting strategy by chance	24%
Improvement in prediction	7%
Panel B: Identifying Non-Aggressive Reporting Firms	
Firm-years in the bottom quintile of Total Factor Score 1 (potential non-aggressive reporting firm)	10,350
Firm-years in the bottom quintile of Total Factor Score I classify as non-aggressive, based on the firm's quintile combination of DFIN and ETR	3,444
Percent correct	33%
Probability of correctly assigning firm-years to the reporting strategy by chance	28%
Improvement in prediction	5%
Panel C: Identifying Book-Aggressive Reporting Firms	
Firm-years in the bottom quintile of Total Factor Score 2 (potential book aggressive reporting firm)	10,350
Firm-years in the bottom quintile of Total Factor Score 2 that I classify as book aggressive, based on the firm's quintile combination of DFIN and ETR	2,857
Percent correct	28%
Probability of correctly assigning firm-years to the reporting strategy by chance	24%
Improvement in prediction	4%
Panel D: Identifying Tax-Aggressive Reporting Firms	
Firm-years in the top quintile of Total Factor Score 2 (potential tax aggressive reporting firm)	10,355
Firm-years in the top quintile of Total Factor Score 2 that I classify as tax aggressive, based on the firm's quintile combination of DFIN and ETR	2,558
Percent correct	25%
Probability of correctly assigning firm-years to the reporting strategy by chance	24%
Improvement in prediction	1%

Chapter 4: Conclusion

I investigate the relationship between aggressive book and tax reporting by examining the conflicting results of Frank et al. (2009) and Lennox et al. (2013) in the first section of my dissertation. I identify four differences in the research methodology of these two studies that likely contribute to the inconsistent conclusions, and find that one difference, the measure of aggressive financial reporting used in the analysis, plays a large role in determining the relationship documented; using financial statement fraud as a proxy for aggressive book reporting yields a negative relationship between book and tax aggressiveness and using discretionary accruals (DFIN) yields a positive relationship between aggressive book and tax reporting. I also find some sensitivity to the sample period examined, and conclude that the relationship between aggressive book and tax reporting likely varies among firms and may also vary over time.

I then document that the relationship between aggressive book and tax reporting varies among firms in the second section of my dissertation, by separating a sample of firms to show that in one group there is a positive relationship between aggressive book and tax reporting and in the other group there is a negative relationship. I use Principal Component Analysis to reduce a large set of firm characteristics associated with aggressive book and/or tax reporting to their underlying components and test for differences in the components of firms with different reporting strategies. I find significant differences in almost all components in every set of firms I examine. I then use the components to predict the firm's reporting strategy and find I can correctly classify the reporting strategy in up to 33% of firm-years. I conclude that firms choose reporting strategies that reflect both a

positive and negative relationship between aggressive book and tax reporting and that firm characteristics can be used to aid in the identification of the firms reporting strategy.

In the future, I anticipate continuing to investigate research questions in this area. First, I would like to examine the relationship between real earnings management (REM), accrual based earnings management, and aggressive tax reporting. There are two methods managers can use to report aggressively in their financial statements, accrual based earnings management and REM, and managers can use the two techniques as substitutes based on their relative costs (Pincus and Rajgopal 2002; Yang 2012). Research to this point has examined the relationship between only one method, accrual based earnings management, and tax aggressiveness, which likely provides an incomplete picture of the relationship between aggressive book and tax reporting.

However, the relationship between REM and tax aggressiveness is complex, as REM is likely to be conforming earnings management - for example, reducing advertising expense would increase book as well as taxable income. This suggests that REM is likely to be negatively related to tax aggressiveness. Therefore I would like to investigate three research questions. First, is there a negative relationship between aggressive REM (i.e., high levels of REM) and aggressive tax reporting? Second, if REM increased after the Sarbanes Oxley Act (SOX) in 2002 (Cohen et al. 2008), does the proportion of firms with a negative relationship between aggressive REM and tax reporting change pre- and post-SOX? And third, focusing firms that report aggressively for book purposes using REM, when are these firms also aggressive for tax purposes?

The second project I would like to pursue relates to the identification of firms engaged in financial statement fraud. As I state a few times in my dissertation, using firms

accused of fraud as a measure of aggressive financial reporting may be desirable as there is a very high level of confidence these firms committed fraud, or at least engaged in egregious earnings management, whereas other measures of book reporting aggressiveness likely measure aggressive book reporting with greater error. However, this commonly accepted statement assumes that all researchers agree on the definition of financial statement fraud, on which firms committed fraud, when the fraud occurred, and the researchers make no mistakes when manually collecting and categorizing the data on fraud (or make identical mistakes).

I have financial statement fraud data from two sets of well know researchers, in which each identifies fraud firm-years over a similar period. The differences in these data sets are amazing. In preliminary analysis, I find that approximately 50% of their samples differ, either in the identification of fraud firm-years (i.e., research group 1 finds that fraud occurred in fiscal year 2000, and research group 2 finds that fraud occurred in fiscal year 2001), or in the firms themselves (i.e., research group 1 classifies at least one fiscal year of firm X as a fraud-year while research group 2 classifies all-fiscal years for firm X as non-fraud).

My research questions related to the identification of financial statement fraud are the following: What are the commonly used definitions of fraud in the accounting literature? Do the definitions account for any of the differences in fraud samples? If researchers identify financial statement fraud with such large discrepancies, what are the implications for accounting research using financial statement fraud?

I find aggressive book and tax reporting to be fascinating areas of research and I am excited about the possibilities for future research in this area.

References

- Albrecht, W. Fraud Examination. Ohio: Thomson-SouthWestern 2002.
- Altman, E., 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance* 35, 1001-1016.
- Angrist, J., Pischke, J-S. Mostly Harmless Econometrics. Princeton and Oxford: Princeton University Press 2009.
- Ashbaugh-Skaife, H., Collins, D., Kinney, W., 2007. The discovery and reporting of internal control deficiencies prior to sox-mandated audits. *Journal of Accounting and Economics* 44, 166–192.
- Ayers, B., Jiang, X., Laplante, S., 2009. Taxable income as a performance measure: the effects of tax planning and earnings quality. *Contemporary Accounting Research* 26,15–54.
- Badertscher, B., Phillips, J., Pincus, M., Rego, S., 2009. Earnings Management Strategies and the Trade-Off Between Tax Benefits and Detection Risk: To Conform or Not to Conform? *The Accounting Review* 84, 63–97.
- Balakrishnan, K., Blouin, J., Guay, W. Does Tax Aggressiveness Reduce Financial Reporting Transparency? Working paper, University of Pennsylvania, 2012.
- Barton, J., Simko, P., 2002. The balance sheet as an earnings management constraint. *The Accounting Review* 77, 1–27.
- Begley, J., Ming, J., Watts, S., 1997. Bankruptcy classification errors in the 1980s: An empirical analysis of Altman's and Ohlson's Models. *Review of Accounting Studies* 1, 267-284.
- Beasley, M., 1996. An empirical analysis of the relation between the board of director composition and financial statement fraud. *The Accounting Review* 71, 443–465.
- Beatty, A., Liao, S., Yu, J., 2013. The spillover effect of fraudulent financial reporting on peer firms' investment efficiency. *Journal of Accounting and Economics* 55, 183-205.
- Bell, T., Szykowny, S., Willingham, J., 1991. Assessing the likelihood of fraudulent financial reporting: A cascaded logit approach. Working Paper, KPMG Peat Marwick, Montvale, NJ.
- Beneish, M., 1999. Incentives and Penalties Related to Earnings Overstatements that Violate GAAP. *The Accounting Review* 74, 425-57.
- Boynton, C., De Filippes, P., Legel, E., 2005. Prelude to Schedule M-3: Schedule M-1 corporate book-tax difference data 1990–2003. *Proceedings of the Annual Conference on Taxation*, 131–137. Washington, D.C.: National Tax Association–Tax Institute of America.

- Burns, N., Kedia, S., 2006. The impact of performance-based compensation on misreporting. *Journal of Financial Economics* 79, 35–67.
- Bhushan, R., 1989. Firm characteristics and analyst following. *Journal of Accounting and Economics* 11, 255-274.
- Chen, S., Chen X., Cheng, Q., Shevlin, T., 2010. Are Family Firms More Tax Aggressive than Non-Family Firms? *Journal of Financial Economics* 95, 41–61.
- Chi, Pincus, and Teoh, 2014. Mispricing of Book-Tax Differences and the Trading Behavior of Short Sellers and Insiders. *The Accounting Review* 89 (2): 511-543.
- Cohen, D., Zarowin, P., 2010. Accrual based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics* 50, 2-19.
- DeAngelo, H., DeAngelo, L., 1990. Dividend policy and financial distress: An empirical investigation of troubled NYSE firms. *The Journal of Finance* XLV (December), 1415-1431.
- DeAngelo, H., DeAngelo, L., Skinner, D., 1994. Accounting choice in troubled companies. *Journal of Accounting and Economics* 17 (1): 113-143.
- Dechow, P., Sloan, R., Sweeney, A., 1996. Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* 13, 1–36.
- Dechow, P., Ge, W., Larson, C., Sloan, R., 2011. Predicting Material Accounting Misstatements. *Contemporary Accounting Research* 28, 17–82.
- DeFond, M., Jiambalvo J., 1991. Incidence and circumstances of accounting errors. *The Accounting Review* 66 (3), 643-655.
- Desai, M., 2005. The Degradation of Reported Corporate Profits. *Journal of Economic Perspectives* 19, 171–92.
- Desai, M., Dharmapala, D., 2006. Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics* 79, 145–179.
- Desai, M., Dharmapala, D., 2007. Corporate tax avoidance and firm value. Working paper, Harvard University and University of Connecticut.
- Doyle, J., Ge, W., McVay, S., 2007. Accruals Quality and Internal Control over Financial Reporting. *The Accounting Review* 82(5), 1141-1170.
- Dyreng, S., Hanlon, M., Maydew, E., 2008. Long-run corporate tax avoidance. *The Accounting Review* 83, 61–82.

- Dyreng, S., Hanlon, M., Maydew, E., 2010. The Effects of Executives on Corporate Tax Avoidance. *The Accounting Review* 85, 1163-1189.
- Erickson, M., Hanlon, M., Maydew, E., 2004. How much will firms pay for earnings that do not exist? Evidence of taxes paid on allegedly fraudulent earnings. *The Accounting Review* 79 (2), 387-408.
- Erickson, M., Hanlon, M., Maydew, E., 2006. Is There a Link Between Executive Equity Incentives and Accounting Fraud? *Journal of Accounting Research* 44, 1-31.
- Erickson, M., Wang, S., 1999. Earnings management by acquiring firms in stock for stock mergers. *Journal of Accounting and Economics* 27, 149-176.
- Fan, H., 2013. Tax Aggressive and Closely-held Firms: Evidence from Canadian Firms. Working paper, Schulich School of Business.
- Frank, M., Lynch, L., Rego, S., 2009. Tax reporting aggressiveness and its relation to aggressive financial reporting. *The Accounting Review* 84, 467-496.
- Frank, M., Lynch, L., Rego, S., Zhao, R., 2012. Are Aggressive Reporting Practices Indicative of Risk-Taking Corporate Environments? Working paper, Indiana University.
- Frankel, R., Johnson, M., Nelson, K., 2002. The relation between auditors' fees for nonaudit services and earnings management. *The Accounting Review* 77, 71-105.
- Frischmann, P., Shevlin, T., Wilson, R., 2008. Economic consequences of increasing the conformity in accounting for uncertain tax benefits. *Journal of Accounting and Economics* 46, 261-278.
- Goh, B., Lee, J., Lim, C., Shevlin, T., 2013. The Effect of Corporate Tax Avoidance on the Cost of Equity. Working paper.
- Graham, J., 1996a. Debt and the marginal tax rate. *Journal of Financial Economics* 41, 41-74.
- Graham, J., 1996b. Proxies for the corporate marginal tax rate. *Journal of Financial Economics* 42, 187-221.
- Graham, J., Tucker, A., 2006. Tax shelters and corporate debt policy. *Journal of Financial Economics* 81, 563-594.
- Greene, W., 2008. *Econometric Analysis*. New Jersey: Prentice-Hall.
- Gu, Y., Fiebig, D., Cripps, E., Kohn, R., 2009. Bayesian estimation of a random effects heteroskedastic probit model. *Econometrics Journal* 12, 324-339.

- Guenther, D., Maydew, E., Nutter, S., 1997. Financial reporting, tax costs, and book-tax conformity. *Journal of Accounting and Economics* 23, 225–248.
- Gupta, S., Newberry, K., 1997. Determinants of the variability in corporate effective tax rates: evidence from longitudinal study. *Journal of Accounting and Public Policy*, 1–34.
- Hanlon, M., 2005. The persistence and pricing of earnings, accruals, and cash flows when firms have large book-tax differences. *The Accounting Review* 80, 137–166.
- Hanlon, M., Heitzman, S., 2010. A review of tax research. *Journal of Accounting and Economics* 50, 127–178.
- Hanlon, M., Laplante, S., Shevlin, T., 2005. Evidence on the possible information loss of conforming book income and taxable income. *The Journal of Law & Economics* 48, 407–442.
- Hanlon, M., Mills, L., Slemrod, J., 2007. An empirical examination of corporate tax noncompliance. In *Taxing Corporate Income in the 21st Century*, edited by A. Auerbach, J. R. Hines, Jr., and J. Slemrod. Cambridge, U.K.: Cambridge University Press
- Hanlon, M., Krishnan, G., Mills, L., 2012. Audit fees and book-tax differences. *Journal of the American Taxation Association* 34 (1), 55-86.
- Harford, J., Mansi, S., Maxwell, W., 2008. Corporate governance and firm cash holdings in the US. *Journal of Financial Economics* 87, 535–555.
- Heltzer, W., 2009. Conservatism and book-tax differences. *Journal of Accounting, Auditing & Finance*, 24 (3), 469-504.
- Hermalin, B., Wisbach, M., 1998. Endogenously Chosen Boards of Directors and Their Monitoring of the CEO. *American Economic Review* 88, 96-118.
- Horrace, W., Oaxaca, R., 2006. Results on the bias and inconsistency of ordinary least squares for the linear probability model. *Econometrics Letters* 90, 321-327.
- Juris, Stephen. "Accounting Fraud Cases Are Dead. Long Live Accounting Fraud Cases". *Forbes*. Forbes.com LLC, 14 November, 2012. Web. 15 August 2013.
- Kasznik, R., 1999. On the association between voluntary disclosure and earnings management. *Journal of Accounting Research* 37, 57–81.
- LaFond, R., Roychowdhury, S., 2008. Managerial ownership and accounting conservatism. *Journal of Accounting Research* 46, 101–135.
- Larson, C. *Accounting Fraud and Institutional Investors*. ProQuest 2008.

- Lennox, C., Lisowsky, P., Pittman, J., 2013. Tax Aggressiveness and Accounting Fraud. *Journal of Accounting Research* 51 (4), 739-778.
- Lev, B., Nissim, D., 2004. Taxable income, future earnings, and equity values. *The Accounting Review* 79, 1039-1074.
- Lisowsky, P., 2010. Seeking shelter: Empirically modeling tax shelters using Financial Statement Information. *The Accounting Review* 85 (5), 1693-1720.
- Lisowsky, P., Robinson, L., Schmidt, A., 2013. Do Publicly Disclosed Tax Reserves Tell Us About Privately Disclosed Tax Shelter Activity? *Journal of Accounting Research* 51 (3), 583-629.
- Loebbecke, J., Eining, M., Willingham, J., 1989. Auditors' experience with material irregularities: Frequency, nature, and detestability. *Auditing: A Journal of Practice & Theory* 9 (Fall): 1-28.
- Long, S. Regression Models for Categorical and Limited Dependent Variables. California: Sage Publications 1997.
- Matsunaga, S., Shevlin, T., Shores, D., 1992. Disqualifying dispositions of incentive stock options: Tax benefits versus financial reporting costs. *Journal of Accounting Research*: 37-68.
- Mills, L., Newberry, K., 2005. Firms' off-balance sheet and hybrid debt-financing: Evidence from their book-tax reporting differences. *Journal of Accounting Research* 43 (2): 251-282.
- Phillips, J., 2003. Corporate tax-planning effectiveness: the role of compensation-based incentives. *The Accounting Review* 78, 847-874.
- Phillips, J., Pincus, M., Rego, S., 2003. Earnings management: new evidence based on deferred tax expense. *The Accounting Review* 78, 491-521.
- Pincus, M., & Rajgopal, S., 2002. The interaction between accrual management and hedging: Evidence from oil and gas firms. *The Accounting Review* 77(1), 127-160.
- Plesko, G., 2000. Evidence and Theory on Corporate Tax Shelters. National Tax Association Proceedings from the 92nd Annual Conference on Taxation, 367-71.
- Rego, S., 2003. Tax avoidance activities of U.S. multinational corporations. *Contemporary Accounting Research* 20, 805-833.
- Richardson, V., 2000. Information Asymmetry and Earnings Management: Some Evidence. *Review of Quantitative Finance and Accounting* 15 (4), 325-347.
- Schipper, K., 1989. Commentary on earnings management. *Accounting Horizons* 3, 91-102.

Schrand, C., Zechman, S., 2012. Executive overconfidence and the slippery slope to financial misreporting. *Journal of Accounting and Economics* 53, 311-329.

Shackelford, D., Shevlin, T., 2001. Empirical tax research in accounting. *Journal of Accounting and Economics* 31, 321-387.

Shevlin, T., 1990. Estimating corporate marginal tax rates with asymmetric tax treatment of gains and losses. *Journal of the American Tax Association* 11, 51-67.

Skinner, D., Sloan, R., 2002. Earnings Surprises, Growth Expectations, and Stock Returns or Don't Let an Earnings Torpedo Sink Your Portfolio. *Review of Accounting Studies* 7, 289-312.

Skousen, C., Wright, C., 2008. Contemporaneous risk factors and the prediction of financial statement fraud. *Journal of Forensic Accounting* IX (1), 37-61.

Stice, J., 1991. Using financial and market information to identify pre-engagement factors associated with lawsuits against auditors. *The Accounting Review* 66 (3), 516-533.

Stickney, C., McGee, V., 1982. Effective corporate tax rates: the effect of size, capital intensity, leverage and other factors. *Journal of Accounting and Public Policy* 1, 23-45.

Summers, S., Sweeney, J., 1998. Fraudulently misstated financial statements and insider trading: An empirical analysis. *The Accounting Review* 73, 131-146.

Tashman, L., 2000. Out-of-sample tests of forecasting accuracy: an analysis and review. *International Journal of Forecasting* 16, 437-450.

Uzun, H., Szewczky, S., Varma, R., 2004. Board Composition and Corporate Fraud, *Financial Analysts Journal* 60, 33-43.

Vermeer, T., 2003. The impact of SAS No. 82 on an auditor's tolerance of earnings management. *Journal of Forensic Accounting* 5, 21-34.

Wang, S., 1991. The relation between firm size and effective tax rates: A test of firms' political success. *The Accounting Review* 66 (1), 158-169.

Wang, D., 2006. Founding Family Ownership and Earnings Quality. *Journal of Accounting Research* 44(3), 619-656.

Warfield, T., Wild, J., Wild, K., 1995. Managerial ownership, accounting choices, and informativeness of earnings, *Journal of Accounting and Economics* 20, 61-92.

Wilson, R., 2009. An examination of corporate tax shelter participants. *The Accounting Review* 84, 969–1000.

Xie, H., 2001. The Mispricing of Abnormal Accruals. *The Accounting Review* 76 (3), 357-373.

Yin, G., 2003. How Much Tax Do Large Public Corporations Pay? Estimating the Effective Tax Rates of the S&P 500. *Virginia Law Review* 89, 793–845.

Zimmerman, J., 1983. Taxes and firm size. *Journal of Accounting and Economics* 5, 119–149.