WHAT DO MEASURES OF TAX AGGRESSIVENESS MEASURE?

Amy Dunbar, Danielle M. Higgins, John D. Phillips, and *George A. Plesko*
University of Connecticut

INTRODUCTION

Measuring tax aggressiveness is an important issue facing empirical tax researchers. We conduct a comprehensive review and analysis of various proposed measures of this construct. We examine nine tax aggressiveness measures and explore whether these measures capture the same, or at least similar, underlying constructs, yielding similar inferences regarding firms' levels of tax aggressiveness. Our work, in conjunction with Hanlon and Heitzman (2010), is designed to provide guidance to future tax aggressiveness research.

The conceptual challenge in this stream of research is the lack of a universal definition of tax aggressiveness. Chen et al. (2010, p. 1) define tax aggressiveness as "downward management of taxable income through tax planning activities." Alternatively, Frischmann et al. (2008, p. 265) more narrowly define tax aggressiveness as the act of "engaging in significant tax positions with relatively weak supporting facts." Lisowsky et al. (2010) view tax aggressiveness as actions close to the end of a continuum of tax avoidance activities that range from legitimate tax planning to investments in abusive tax shelters.

The tax aggressiveness measures we examine are as follows.[1] Four are variants of effective tax rate (ETR) ratios in which the numerator contains a measure of tax burden and the denominator represents the ability to pay tax. Two measures are based solely on book-tax differences. The three remaining measures are based on the estimates of econometric models designed to capture "abnormal" tax planning behavior that may be more reflective of aggressiveness. We first define the measures and discuss how each has been used in prior studies. Then, we examine how these measures relate to both one another and to firm characteristics.

TAX AGGRESSIVENESS MEASURES

In this section, we identify and define nine commonly used tax aggressiveness proxies, present summary statistics for each measure, and provide correlations among these proxies.

Tax Aggressiveness Measures

Table 1 Panel A provides detailed definitions of the tax aggressiveness measures we examine. The firms' effective tax rate (ETR), defined as some measure of tax liability divided by income, has long been used in the literature as a measure of active tax planning. The book effective tax rate (BETR) is calculated as total book tax expense divided by pretax income. Similarly, the current book effective tax rate (CETR) uses the current book tax expense in the numerator.

The ETR-based measures have two important limitations. First, because total tax expense is comprised of current and deferred taxes, the BETR fails to account for tax aggressiveness associated with temporary book-tax differences because decreases in current tax expense are offset by corresponding increases in deferred tax expense. Second, both the BETR and CETR may understate a firm's level of tax aggressiveness if the firm records contingencies associated with uncertain tax benefits that arise from taking aggressive tax positions (De Waegenaere et al., 2010).

Dyreng et al. (2008) introduce an alternative measure of tax aggressiveness, the long-run cash effective tax rate (LRCashETR). Dyreng et al. calculate the LRCashETR as the ratio of the 10-year sum of cash taxes paid to the 10-year sum of pretax financial income.[2] Dyreng et al. (2008) argue that their measure remedies the two shortcomings of the ETR-based tax aggressiveness measures. Although Dyreng et al. (2008) examine long-run tax avoidance (rather than aggressiveness), several subsequent studies of tax aggressiveness have employed their measure as a proxy for tax aggressiveness (i.e. Frischmann et al., 2008).

Other studies use the total difference between book and taxable income (BTD) as a proxy for tax aggressiveness. Computing BTD requires estimating taxable income, which is typically done by grossing up current tax expense by the

Table 1
Variable Definitions

Panel A: Tax Aggressiveness Variable Definitions

Variable Name	*Definition*
BETR	The book effective tax rate calculated as total expense (*TXT*) in year *t* divided by pre-tax book income (*PI*) in year *t*;
CETR	The current book effective tax rate calculated as current tax expense (*TXC*) in year *t* divided by pre-tax book income (*PI*) in year *t*;
CashETR	The cash effective tax rate calculated as cash taxes paid (*TXPD*) in year *t* divided by pre-tax book income in year *t* (*PI*) less special items (*SPI*);
LRCashETR	The five year average cash effective tax rate calculated as the five year sum of cash taxes paid (*TXPD*) divided by the five-year sum of pre-tax book income (*PI*) less special items (*SPI*);
BTD	Total book tax differences computed as the difference between book income (*PI*) less minority interest (*MII*) and an estimate of taxable income. Taxable income is estimated by grossing up the sum of federal tax expense (*TXFED*) and foreign tax expense (*TXFO)* by the statutory rate and then subtracting the change in the net operating loss (*TCLF*) from year *t-1* to year *1*. *BTD* is scaled by beginning of the year total assets (*AT*);
PBTD	Permanent book tax differences computed as the difference between total book tax differences (*BTD*) and temporary book tax differences [Computed by grossing up deferred tax expense (*DTE*) by the statutory rate];
DTAX	Discretionary permanent differences, which is the residual obtained from estimating the following equation by GICS code and fiscal year, where all variables, including the intercept, are scaled by beginning of the year total assets (*AT*):

$$PERMDIFF_{it} = \alpha_0 + \alpha_1 INTANG_{it} + \alpha_2 UNCON_{it} + \alpha_3 MI_{it} + \alpha_4 CSTE_{it} + \alpha_5 \Delta NOL_{it} + \alpha_6 LAGPERM_{it} + \varepsilon_{it}$$

Where:

$PERMDIFF_{it}$	=	Pre-tax book income (*PI*) less minority interest (*MII*) less an estimate of taxable income, where taxable income is computed as the sum of federal tax expense (*TXFD*) and foreign tax expense (*TXFO*) grossed up by the statutory rate;
$INTAN_{it}$	=	Goodwill and other intangibles (*INTAN*);
$UNCON_{it}$	=	Income (loss) reported under the equity method (*UNCON*);
$CSTE_{it}$	=	Income (loss) attributable to minority interest (*MII*);
MI_{it}	=	Current state income tax expense (*TXS*);
ΔNOL_{it}	=	Change in net operating loss carryforwards (*TLCF*);
$LAGPERM_{it}$	=	One-year lagged PERMDIFF.

Table 1 (cont'd)
Variable Definitions

Panel A: Tax Aggressiveness Variable Definitions (cont'd)

Variable Name	*Definition*
AbBTD	Abnormal book tax differences, calculated as the residual obtained from estimating the following pooled-cross sectional regression: $BTD_{it} = \beta_i TACC_{it} + \mu_i + \varepsilon_{it}$ Where: BTD_{it} = Total book tax differences (see *BTD*); $TACC_{it}$ = Total accruals, computed using data from the statement of cash flows (Hribar and Collins 2002) and computed on a pre-tax basis (Frank et al. 2009). Specifically total accruals are calculated as income before extraordinary items (*IBC*) plus total tax expense (*TXT*) less the sum of cash flows from operating activities (*OANCF*) and cash taxes paid (*TXPD*) adjusted for extraordinary items and discontinued operations (*XIDOC*); μ_i = firm fixed effects.
SHELTER	The predicted probability the firm is engaged in tax sheltering, computed as follows: SHELTER = -4.30 + (6.63*TotalBTD) + (-1.72*LEV) + (0.66*SIZE) + (2.26*ROA) + (1.56**MNC*) + (1.56**RD*) Where: $TotalBTD_{it}$ = Pre-tax income (*PI*) less an estimate of taxable income, where taxable income is computed by grossing up the sum of federal tax expense (*TXFED*) and foreign tax expense (*TXFO*) by the statutory rate and subtracting the change in the net operating loss carryforward (*TLCF*). *TotalBTD* is scaled by beginning of the year total assets (*AT*); LEV_{it} = Long term debt (*DLTT*) scaled by total assets (*AT*) in year *t*; $SIZE_{it}$ = Log of total assets (*AT*) in year *t*; ROA_{it} = Pre-tax income (*PI*) in year *t* divided by total assets (*AT*) in year *t*; MNC_{it} = An indicator variable equal to 1 if pre-tax foreign income (*PIFO*) is greater than zero, and 0 otherwise; RD_{it} = Total research and development expense (*XRD*) in year *t* scaled by total assets (*AT*) at the beginning of the year.

Compustat variable names are reported in parentheses.

Table 1 (cont'd)
Variable Definitions

Panel B: Firm Characteristics Variable Definitions

Variable Name	*Definition*
SIZE	Log of total assets in year t (AT);
FOREIGN	Ratio of foreign pretax income (PIFO) to total worldwide pretax income in year t (PI);
CFO	Operating cash flows in year t (OANCF) scaled by total assets in year t (AT);
ROA	Pretax income in year t (PI) divided by total assets in year t (AT)
NOL	An indicator variable equal to 1 if the firm has a tax loss carryfoward in year t (TLCF) and 0 otherwise;
Leverage	Long term debt (DLTT) scaled by total assets in year t (AT);
MTB	Ratio of market value of common equity (PRCC_F*CSHO) to book value of common equity in year t (CEQ);
RD	Total research and development expense in year t (XRD) scaled by total assets at the beginning of the year (AT);
CAPINT	Total gross property, plant and equipment in year t (PPEGT) scaled by total assets;
INTAN	Goodwill and other intangibles in year t (INTAN) scaled by total assets at the beginning of the year (AT);
DACC	Performance matched discretionary accruals (Kothari et al. 2005) are computed as follows. First, a measure of discretionary accruals is obtained by estimating the following model by GICS group and fiscal year, where all variables, including the intercept are scaled by total assets at the beginning of the year (AT):

$$TACC_{it} = \alpha_0 + \alpha_1(\Delta REV_{it} - \Delta AR_{it}) + \alpha_2 PPE_{it} + \eta_{it}$$

Where:

$TACC_{it}$	=	Total accruals, computed using data from the statement of cash flows (Hribar and Collins 2002) and computed on a pre-tax basis (Frank et al. 2009). Specifically total accruals are calculated as income before extraordinary items (IBC) plus total tax expense (TXT) less the sum of cash flows from operating activities (OANCF) and cash taxes paid (TXPD) adjusted for extraordinary items and discontinued operations (XIDOC);
ΔREV_{it}	=	Change in sales (SALE) from year t-1 to year t;
ΔAR_{it}	=	Change in accounts receivable (RECCH) from year t-1 to year t;
PPE_{it}	=	Gross property, plant and equipment (PPEGT) in year t;
η_{it}	=	Discretionary accruals in year t before adjusting for performance;

Each firm-year is matched on industry and decile of pre-tax return on assets. Performance-matched discretionary accruals are computed as the difference between each observation's discretionary accrual and the median discretionary accrual for the industry-ROA decile, where the median excludes the observation.

Compustat variable names are reported in parentheses.

statutory tax rate. Empirically, Wilson (2009) finds that BTD is positively associated with a measure of tax sheltering.

Several other studies employ variants of book-tax differences as the proxy for tax aggressiveness. Rego and Wilson (2010) use permanent book-tax differences as their proxy, based on the assumption that managers prefer tax strategies that reduce income tax expense. While tax strategies that generate temporary book-tax differences could lead to lower current tax expense, such differences also lead to a corresponding income in deferred tax expense, resulting in no change to total tax expense. They compute PBTD as total book-tax differences minus deferred tax expense grossed by the applicable federal statutory rate.

Frank et al. (2009) develop and use a measure of discretionary permanent differences, which they calculate from a model (variable definition in table 1 Panel A), in which total permanent book-tax differences are regressed on nondiscretionary items unrelated to tax planning known to cause permanent differences. The residuals from this annual cross-sectional regression is their proxy for tax aggressiveness, DTAX.

Desai and Dharmapala (2006) compute abnormal BTDs (AbBTD) using the residuals from estimating book-tax differences on total accruals. This measure attempts to separate total BTDs into those that are not attributable to tax planning (normal BTDs) and those that are attributable to tax planning (abnormal BTDs).

Finally, Wilson (2009) introduces a tax shelter prediction model. The tax aggressiveness measure is the predicted probability of a firm engaging in a tax shelter, SHELTER, and, from his results, is computed as follows (see Table 1 for definitions):

$$\text{Prob (Shelter)} = -4.30 + (6.63*\text{TotalBTD}) + (-1.72*\text{LEV}) + (0.66*\text{SIZE}) + (2.26*\text{ROA}) + (1.56*\text{MNC}) + (1.56*\text{RD})$$

Data

We begin with all firms in Compustat for 1990 through 2009 (227,609 firm-years; 24,506 firms).[3] We eliminate observations associated with a subsidiary (5,149 firm-years; 500 firms years) or a foreign incorporated unit (41,649 firm-years; 4,834 firms), observations with book value of equity less than or equal to zero (41,649 firm-years; 4,834 firms), observations with missing or zero total assets (24,697 firm-years; 1,937 firms), observations that changed fiscal year ends or had missing fiscal year ends (19,350 firm-years; 1,552 firms), and observations with insufficient data to compute lag variables (6,044 firm-years; 450 firms). We also delete observations in regulated industries (GICS group 40 and 55), as these firms likely face different reporting incentives and regulatory scrutiny. With this sample, we compute the various tax aggressiveness measures; however, we lose additional observations because we lack the data necessary to compute DTAX (50,520 firm-years; 5,092 firms), 5-year LRCashETR (16,896 firm-years; 2,795 firms), BTD, PBTD or AbBTD (4,767 firm-years; 180 firms) and BETR, CETR or CashETR (1,068 firm-years; 211 firms). Our final sample consists of 12,675 firm-years, corresponding to 2,661 unique firms.

Tax Aggressiveness Measures

Table 2 Panel A reports summary statistics for the nine tax aggressiveness measures. The mean BETR of 0.3502 is greater than the mean CETR of 0.3322, consistent with the mean PBTD of .0253. The CashETR mean (0.2921) is lower than both of these, implying that firms pay less tax than the amount recorded as current tax expense, and is consistent with firms recording tax contingency reserves for the difference. DTAX has a negative mean but a slightly positive median. Taken together with the standard deviation of 0.2172, these results suggest DTAX is skewed and highly variable. The difference between BTD and PBTD of approximately 0.005 is an estimate of the average temporary book-tax differences.

Correlations between the nine tax aggressiveness measures are reported in Table 2 Panel B. Because higher tax aggressiveness is consistent with a lower ETR-based measure and a higher non-ETR-based measure, we expect correlations between the ETR-based-measures and correlations between the non-ETR-based measures to be positive, though correlations between the ETR-based and non-ETR-based measures should be negative. While the Pearson correlations are mostly consistent with these expectations, their magnitudes suggest that they do not measure the same constructs. For example, the correlations between the CETR and BETR (0.466) and the CashETR (0.280) are surprisingly low given that pre-tax income is the denominator in all three measures. Moreover, the 0.466 correlation between the CETR and BETR is

Table 2
Descriptive Statistics and Correlations for Tax Aggressiveness Measures

Panel A: Descriptive Statistics

	mean	*sd*	*p25*	*p50*	*p75*
BETR	0.3502	0.1180	0.3207	0.3656	0.3907
CETR	0.3322	0.1775	0.2458	0.3388	0.4018
CashETR	0.2921	0.1802	0.1830	0.2901	0.3739
LRCashETR	0.2806	0.1214	0.2121	0.2945	0.3554
BTD	0.0253	0.0640	-0.0012	0.0173	0.0410
PBTD	0.0199	0.0605	0.0004	0.0099	0.0261
DTAX	-0.0504	0.2172	-0.0401	0.0006	0.0217
AbBTD	0.0301	0.0576	0.0029	0.0234	0.0481
SHELTER	0.4859	0.4653	0.0000	0.4244	1.0000
Observations	12675				

See Table 1 Panel A for tax aggressive variable definitions.

Panel B: Correlations

	BETR	*CETR*	*CashETR*	*LRCashETR*	*BTD*	*PBTD*	*DTAX*	*AbBTD*	*SHELTER*
BETR	1	0.441	0.321	0.369	-0.313	-0.545	-0.096	-0.305	-0.238
CETR	0.466	1	0.547	0.493	-0.754	-0.076	0.039	-0.723	-0.168
CashETR	0.280	0.483	1	0.680	-0.407	-0.072	-0.028	-0.390	-0.184
LRCashETR	0.337	0.446	0.616	1	-0.347	-0.103	-0.035	-0.340	-0.207
BTD	-0.310	-0.528	-0.312	-0.321	1	0.379	0.142	0.942	0.176
PBTD	-0.420	-0.168	-0.144	-0.188	0.726	1	0.340	0.353	0.117
DTAX	0.033	0.055	-0.005	0.044	0.018	0.058	1	0.150	0.545
AbBTD	-0.304	-0.548	-0.322	-0.329	0.956	0.644	0.051	1	0.186
SHELTER	-0.137	-0.123	-0.160	-0.157	0.184	0.139	0.309	0.195	1

Pearson (Spearman) correlation coefficients are reported below (above) the diagonal. See Table 1 for variable definitions.

Table 2 (cont'd)

Descriptive Statistics and Correlations for Tax Aggressiveness Measures

Panel C: Pearson Correlations: Tax Aggressiveness Measures with Firm Characteristics

	BETR	*CETR*	*CashETR*	*LRCashETR*	*BTD*	*PBTD*	*DTAX*	*AbBTD*	*SHELTER*
Size	0.004	-0.033	-0.110	-0.096	-0.048	-0.093	0.548	-0.009	0.672
Foreign	-0.036	0.107	0.044	0.002	-0.036	-0.026	-0.005	-0.029	0.071
CFO	-0.119	-0.084	-0.137	-0.124	0.328	0.375	-0.048	0.365	0.103
ROA	-0.094	-0.061	-0.036	-0.014	0.348	0.403	-0.080	0.259	0.075
NOL	-0.044	-0.063	-0.091	-0.161	0.059	0.050	0.088	0.069	0.238
Leverage	0.049	-0.110	-0.080	-0.091	-0.012	-0.114	0.140	0.005	0.023
MTB	-0.014	-0.022	-0.042	-0.045	0.063	0.081	-0.005	0.046	0.036
RD	-0.091	0.087	-0.075	-0.140	-0.026	0.121	-0.052	-0.032	0.088
CAPINT	-0.088	-0.162	-0.079	-0.093	0.134	0.039	-0.014	0.205	-0.033
INTAN	0.099	0.034	-0.017	-0.010	0.004	-0.031	0.146	0.011	0.145
DACC	-0.023	-0.017	-0.010	-0.016	0.069	0.063	0.001	0.062	0.007

See Table 1 Panel B for firm characteristic variable definitions.

the highest correlation involving BETR. The highest Pearson correlation is between BTD and PBTD (0.722). As expected, the correlations between BETR and CETR and the two book-tax difference measures, BTD and PBTD, are consistent with permanent book-tax differences being relatively more important in explaining variation in the BETR whereas total book-tax differences are more important in explaining the variation in the CETR. Finally, the correlations involving DTAX are all relatively low, with the exception of the correlation between DTAX and SHELTER.

FIRM CHARACTERISTICS ASSOCIATED WITH TAX AGGRESSIVENESS

Firm Characteristics

Table 1 Panel B provides detailed definitions of the firm characteristic measures we examine. We discuss each characteristic, beginning with SIZE. The relation between size and aggressive tax planning, though studied extensively, is unclear. Larger firms may have greater resources and opportunities to engage in aggressive tax planning; however, larger firms may also face greater political costs (Zimmerman, 1983). Rego (2003) finds that larger firms have higher worldwide book effective taxes, consistent with the political cost argument. Wilson (2009), however, finds a positive association between tax shelter participation and firm size, suggesting that larger firms are more tax aggressive. To explore this relation, we construct a measure SIZE as the natural log of total assets.

Rego (2003) finds that multinational firms with more extensive foreign operations have lower ETRs and concludes that these results are consistent with economies of scope for tax planning. Wilson (2009) and Lisowsky (2010) also provide evidence that the presence of foreign operations is associated with their measures of tax aggressiveness. To capture these effects, we measure Foreign as the ratio of total pre-tax foreign income to total worldwide pre-tax income.

Profitable firms arguably have a greater incentive to reduce taxes relative to firms that are not profitable. We thus investigate the relation between the tax aggressive measures and two measures of profitability: cash flow from operations (CFO) and return on assets (ROA). Conversely, firms with net operating losses have less incentive to be tax aggressive. We investigate the correlation between

each of the tax aggressive measures and tax status, NOL, which is a binary variable equal to one if the firm has a net operating loss carry forward at the end of the year and zero otherwise.

Mills et al. (1998) argue that leverage proxies for the complexity of firms' financial transactions, so firms with higher leverage could have the ability to minimize taxes through financing transactions. Alternatively, firms with higher leverage may have less need for other non-debt tax shields and thus engage in less tax aggressive behavior (Graham and Tucker, 1996). We measure *Leverage* as the ratio of long-term debt to total assets.

Phillips (2003) concludes that firms with growth opportunities also have more tax planning opportunities. We include two measures that proxy for a firm's growth opportunities: the market-to-book ratio, MTB, and research and development expense, RD.

Similar to capital structure, capital intensity also leads to an increase in overall tax planning opportunities. We thus include a measure of a firm's investment in fixed assets, CAPINT. Similarly, because investments in intangible assets present additional opportunities for tax planning through transfer pricing, we include INTAN as a measure of a firm's intangibles.

Finally, we include a measure of managerial discretion – performance matched discretionary accruals (DACC) based on Kothari et al. (2005) because evidence suggests that tax aggressive firms are also more likely to be aggressive with financial reporting (Frank et al., 2009).

Correlations

The correlations of the firm characteristics with the nine tax aggressiveness measures are reported in Table 2 Panel C. The only substantial correlations involving firm size (SIZE) is with DTAX and SHELTER, 0.548 and 0.672, respectively, which is consistent with larger firms having the largest discretionary permanent differences and is indicative of greater tax planning, if discretionary permanent differences capture these activities. All correlations involving *Foreign* are less than 0.100, consistent with foreign operations not presenting tax planning opportunities.

The two measures of performance, cash flow from operations (CFO) and return on assets (ROA), are highly correlated with total book-tax differences (0.328 and 0.348), permanent book-tax differences (0.375 and 0.403), and abnormal book-tax differences (0.365 and 0.259). This result suggests profitable firms have greater book-tax differences. Given that CFO does not involve accrual-based earnings management, these book-tax differences are likely to be the result of tax planning. All correlations involving the NOL indicator variables are less than 0.100 except for the correlation with SHELTER (0.238), suggesting that tax shelter losses generate net operating losses. The only correlation involving *Leverage* that is greater than 0.100 is with DTAX (0.140), consistent with levered firms having more discretionary permanent book-tax differences.

The market-to-book ratio (MTB) and research and development expense (RD) both proxy for growth opportunities. Surprisingly, none of the correlations involving MTB are greater than 0.100. Only two tax aggressiveness measures have correlations with RD in excess of 0.100; LRCashETR at –0.140 is consistent with the tax-reducing role of the credit. The correlation between PBTD and RD, 0.121, is likely due to the measurement error inherent in using current tax expense to measure taxable income. Assume, for example, a firm has pre-tax income of $100, no book-tax differences, a 35 percent tax rate and a research and development credit of five dollars. Tax is $30 and, when inflated by the statutory rate, taxable income is estimated at $86, inducing an erroneous measurement of total book-tax difference of $14, all of which is deemed permanent because deferred tax expense is zero.

Capital intensity (CAPINT) is highly correlated with several variables consistent with accelerated tax depreciation creating large book-tax differences. The variable INTAN is positively correlated with PBTD by construction, as well as AbBTD. Finally, none of the correlations involving abnormal accruals from estimating the modified Jones model are greater than 0.100.

CONCLUSION

In this study, we demonstrate that the basic properties of the most commonly used measures of tax aggressiveness are not only different from each other, but that each possesses a distinct, and varied, pattern of behavior. These differences have implications about the way in which tax aggressiveness may affect financial and tax reporting and for the types of tax aggressiveness they may be able to capture, with some measures more sensitive to

year-to-year changes than others. As work continues in this area, researchers need to incorporate a broader group of economic and financial variables into models of tax planning and understand the particular characteristics of any measure they employ. Doing so will allow for better identification and control for non-tax characteristics that may inappropriately influence measures of tax aggressiveness.

Notes

[1] Hanlon and Heitzman (2010) identify twelve measures of tax aggressiveness (avoidance). We do not analyze unrecognized tax positions because this measure requires extensive hand collection of data. We do not analyze marginal tax rates or temporary book tax differences because these are not really measures of tax aggressiveness. While Mills (1998) finds that temporary book-tax differences are positively associated with proposed IRS adjustments, and thus could be reflective of aggressive tax planning, other studies (e.g., Phillips et al., 2003) show that temporary BTDs are reflective of earnings management.

[2] Some later studies use the five-year sum of cash taxes paid to the five-year sum of pretax financial income. See Rego and Wilson (2010) and Frischmann et al. (2008). We also use a five-year ratio to avoid losing observations.

[3] Our sample begins in 1990 because we require five years' worth of data to compute the long-run cash ETR, and one additional year to compute lag variables. Therefore, the first year of our analysis is 1994, one year after SFAS 109, *Accounting for Income Taxes*, was effective.

References

Chen, Shuping, Xia Chen, Qiang Cheng, and Terry Shevlin. Are Family Firms More Tax Aggressive Than Non-Family Firms? *Journal of Financial Economics* 95 (January 2010): 41-61.

Desai, Mihir A. and Dhammika Dharmapala. Corporate Tax Avoidance and High-Powered Incentives. *Journal of Financial Economics* 79 (January 2006): 145-179.

De Waegenaere, Anja, Richard Sansing, and Jacco Wielhouwer. Financial Accounting Measures of Tax Reporting Aggressiveness. 2010. Available at SSRN: http://ssrn.com/abstract=1697536

Dyreng, Scott, Michelle Hanlon, and Edward Maydew. Long-run Corporate Tax Avoidance. *The Accounting Review* 83 (January 2008): 61-82.

Frank, Mary Margaret, Luann J. Lynch, and Sonja O. Rego. Tax Reporting Aggressiveness and its Relation to Aggressive Financial Reporting. *The Accounting Review* 84 (March 2009).

Frischmann, Peter J., Terry Shevlin, and Ryan Wilson. Economic Consequences of Increasing the Conformity in Accounting for Uncertain Tax Benefits. *Journal of Accounting & Economics* 46 (December 2008): 261-278.

Graham, John and Alan Tucker. 2006. Tax Shelters and Corporate Debt Policy. *Journal of Financial Economics* 81(September 2006): 563-594.

Hanlon, Michelle, and Shane Heitzman. A Review of Tax Research. *Journal of Accounting and Economics* 50 (December 2010): 127-178.

Hribar, Paul and Daniel W. Collins. Errors in Estimating Accruals: Implications for Empirical Research. *Journal of Accounting Research* 40 (March 2002): 105-134.

Kothari, S.P., Andrew J. Leone, and Charles E. Wasley. Performance Matched Discretionary Accrual Measures. *Journal of Accounting and Economics* 39 (February 2005): 163-197.

Lisowsky, Petro. Seeking Shelter: Empirically Modeling Tax Shelters Using Financial Statement Information. *The Accounting Review* 85 (September 2010): 1693-1720.

Lisowsky, Petro, Leslie Robinson, and Andrew Schmidt. An Examination of FIN 48: Tax Shelters, Auditor Independence, and Corporate governance. Working paper, University of Illinois at Urbana–Champaign, Tuck School of Business at Dartmouth, and Columbia University, 2010.

Mills, Lillian, Book-tax Differences and Internal Revenue Service Adjustments. *Journal of Accounting Research* 36 (Autumn 1998): 343-356.

Mills, Lillan, Merle E. Erickson, and Edward L. Maydew. Investments in Tax Planning. *The Journal of the American Taxation Association* 20 (Spring 1998): 1-20.

Phillips, John. Corporate Tax Planning Effectiveness: The Role of Compensation-Based Incentives. *The Accounting Review* 78 (July 2003): 847-874.

Phillips, John, M. Pincus, and Sonja Rego. Earnings Management: New Evidence Based on Deferred Tax Expense. *The Accounting Review* 78 (April 2003): 491-521.

Rego, Sonja. Tax-avoidance Activities of U.S. Multinational Corporations. *Contemporary Accounting Research* 20 (January 2003): 805-833.

Rego, Sonja and Ryan Wilson. Executive Compensation, Equity Risk Incentives, and Corporate Tax Aggressiveness. 2010. Available at SSRN: http://ssrn.com/abstract=1337207.

Wilson, Ryan. An Examination of Corporate Tax Shelter Participants. *The Accounting Review* 84 (May 2009): 969-999.

Zimmerman, Jerold. Taxes and Firm Size. *Journal of Accounting and Economics* 5 (April 1983): 119-149.