Evidence on firms' use of subjective evidence when estimating the deferred tax asset valuation allowance.

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Abstract: We examine how objective and subjective evidence determine the deferred tax asset valuation allowance (DTAVA). Our results suggest that managers primarily use objective evidence to assess the realizability of deferred tax assets, which is consistent with accounting standards and practitioner guides. However, we find evidence that managers over-weight more subjective factors such as estimated future taxable income when determining the DTAVA, especially when observations have cumulative losses. Second, we document a positive association between the use of subjective evidence to determine the DTAVA and adverse tax-related financial reporting outcomes. This association varies in the cross-section when managers have greater opportunities to use discretion and judgement. Our study enhances researchers' understanding of the DTAVA by providing large sample evidence on the extent to which firms use subjective evidence to determine the DTAVA and by providing evidence that greater subjectivity in estimating the DTAVA can have negative financial reporting consequences.

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1. Introduction

Recent research suggests that deferred tax asset valuation allowance (DTAVA) adjustments account for a significant portion of the cross-sectional and time-series variation in corporate effective tax rates (ETRs) (Drake, Hamilton, and Lusch [2020]; Schwab, Stomberg, and Xia [2022]). However, little research examines the determinants of the DTAVA, particularly in large samples or in recent years (Behn, Eaton, and Williams [1998]; Miller and Skinner [1998]). Corporate tax planning and the financial reporting of income taxes are dynamic and have changed drastically since the onset of Statement of Financial Accounting Standards No. 109 (SFAS 109, now Accounting Standards Codification (ASC) 740) in 1992. In this study, we provide new evidence about the relative and incremental importance of the economic determinants of the DTAVA. Specifically, we examine the extent to which managers rely on objective versus subjective evidence when assessing the DTAVA and test the firm-specific financial reporting consequences of using objective versus subjective evidence when determining the DTAVA.

We hand collect data on deferred taxes for S&P 500 and S&P 600 firm-years between 2008-2017 and extend Behn et al. [1998] and Miller and Skinner [1998] to examine the relative objectivity of DTAVA determinants. Given the inherent discretionary nature of the DTAVA and the significant judgement needed to determine the DTAVA, managers must carefully balance the use of objective versus subjective evidence when determining the size of the DTAVA. In general, practitioner guidance (Deloitte [2020]) suggests that cumulative losses are the most objectively verifiable form of evidence, whether positive or negative.[1] Eaton and Williams [1998], as well as all the ASC 740 guidance produced by the Big 4 firms (Deloitte [2020], EY

[1] Positive evidence signals that the firm will have future taxable income sufficient in amount and character to realize currently accrued DTAs. Negative evidence signals that the firm may not realize currently accrued DTAs in the future.

[2019], KPMG [2019], PwC [2019]), suggest that the potential for a tax loss carryback is the most objectively verifiable source of positive evidence listed in ASC 740-10-30-18, followed by future reversals of taxable temporary differences, tax planning strategies, and estimates of future taxable income.

We use tests of information content and explanatory power to examine the extent to which managers rely on objective versus subjective evidence when assessing the realizability of DTAs (Paton and Littleton [1940], Eaton and Williams [1998]).[2] Regressions of DTAVA determinants indicate that: (1) the coefficient estimates on cumulative losses are significantly greater than the coefficient estimates on any of the four sources of positive evidence (tax loss carrybacks, future reversals of taxable temporary differences, tax planning strategies, and future estimated taxable income), (2) cumulative losses explain more of the variation in the DTAVA than any of the four sources of positive evidence, and (3) in general, the association between the DTAVA and the positive evidence variables identified by practitioners as relatively more objective (tax loss carrybacks and future reversals of taxable temporary differences) is larger than the association between the DTAVA and the positive evidence variables identified by practitioners as relatively less objective (tax planning strategies and estimates of future taxable income). These results are consistent with characterizing cumulative losses as the most important source of evidence when evaluating the realizability of DTAs. Furthermore, these results suggest that managers can generally discriminate between objective and subjective positive evidence when determining the DTAVA.

However, we also find that managers can over-weight subjective sources of positive evidence relative to more objective sources of positive evidence. For example, ASC 740 and practitioner guidance suggest that estimates of future taxable income are the most subjective

[2] We do not tabulate the results of the explanatory power tests. These results are available upon request.

source of positive evidence that managers can use when assessing the realizability of DTAs. Nevertheless, we fail to document a difference in the predicted direction in the relative and incremental information content of future reversals of taxable temporary differences, tax planning strategies, and estimates of future taxable income in determining the DTAVA. These results exemplify managers using judgement and discretion in GAAP to take actions inconsistent with the stated objectives of ASC 740-10-30-23.

Next, we examine the association between the quality of tax-based information in the financial statements and the reliance on subjective evidence in assessing the realizability of DTAs. We use three measures of tax-based financial reporting quality: tax-related restatements, tax-related internal control weaknesses, and DTAVA-related SEC comment letters. We document a positive association between the use of subjectivity in assessing the DTAVA and the probability of having a tax-related restatement, a tax-related internal control weakness, and a DTAVA-related SEC comment letter. Additional tests indicate that firms with income-decreasing adjustments (i.e., positive values of subjectivity) largely account for the positive association between financial reporting quality and the use of subjectivity in assessing the DTAVA. Collectively, these results suggest that using more subjective evidence to assess the realizability of DTAs weakens the quality of the financial reporting for income taxes by allowing managers to over-estimate the DTAVA, which creates hidden reserves.

In supplemental tests, we examine the association between unrecognized tax benefits (UTBs) and the DTAVA. The standards and practitioner guidance suggest two roles for UTBs when assessing the DTAVA. First, UTBs could represent negative evidence to the extent that they represent unsettled circumstances that could adversely affect future profitability if settled. Second, practitioner guidance suggests that managers could consider UTBs as an additional

source of positive evidence. Since prior research finds that there is considerable subjectivity in the determination of UTBs (e.g., De Simone, Robinson, and Stomberg [2014]), including UTBs as a source of evidence could increase subjectivity in setting the DTAVA.[3] We document a positive association between the UTB and the DTAVA, suggesting that managers view UTBs as negative evidence. The size of the UTB coefficient suggests that the UTB represents more subjective evidence.

We also examine the effects of positive evidence on the DTAVA in observations with and without cumulative losses. Cumulative losses are a substantial source of objective negative evidence that should increase the DTAVA. Therefore, it is useful to understand the nature of the positive evidence that managers use to overcome cumulative losses, as practitioners suggest that managers should only use objective positive evidence to offset objective negative evidence (Deloitte [2020]; EY [2019]). Our results suggest that managers of firms with cumulative losses substitute future reversals of temporary taxable differences for tax loss carrybacks and increase the weights placed on tax planning strategies and estimates of future taxable income, which are more subjective. This finding suggests that managers rely on more subjective positive evidence to overcome more objective negative evidence, leaving room for poorer quality estimates of the DTAVA.

Our final tests examine whether the scope of operations (multinational versus domestic firms) or the extent of external monitoring (high versus low analyst coverage) moderates the association between subjectivity and tax-based financial reporting quality. We only document a

[3] Lee and Menon [2019] characterize accounting estimates as subjective when different people with the same information set can arrive at different conclusions regarding its value. Lee and Menon [2019] consider an estimate as subjective if there is greater uncertainty about how a financial statement user will interpret a given signal. Consistent with this notion of subjectivity, De Simone et al. [2014] document considerable variation in whether 14 of 19 public paper companies accrue a UTB for refundable alternative fuel credits, despite holding the economics of the transaction and the relevant legal authorities constant.

positive association between subjectivity and tax-based financial reporting quality in multinational observations and observations with low analyst coverage. These results are consistent with the idea that subjectivity is more detrimental when managers have more opportunities to use discretion and judgement in the accrual-setting process.

Our findings contribute to the literature examining the determinants of the DTAVA by providing new evidence on the positive and negative evidence variables that managers use to determine the magnitude of this economically important account. Our findings speak to the relative and incremental information content of the objective and subjective determinants of the DTAVA, which provides evidence of the reliability of the DTAVA. This is important because over-reliance on subjective information could give rise to estimation error or provide opportunities for managers to use subjectivity opportunistically. We also extend the literature examining the financial reporting consequences of income taxes. Several studies document links between the DTAVA and poor financial reporting quality through earnings management (e.g., Bauman, Bauman, and Halsey [2001]; Frank and Rego [2006]; Schrand and Wong [2003]). Our finding that managers over-rely on subjective evidence when assessing the DTAVA, especially in observations with cumulative losses, suggests a specific mechanism managers may use to manage earnings via the tax accounts.

2. Background – Deferred Tax Asset Valuation Allowance

Under ASC 740-10-25-29, managers recognize a deferred tax asset (DTA) for deductible temporary differences and operating loss and tax credit carryforwards. Managers measure DTAs using the applicable enacted tax rate and provisions of the enacted tax law. Generally, managers record DTAs when they recognize an event giving rise to a future tax benefit in the company's financial statements. Managers must recognize a DTAVA if, based on the weight of available

evidence, it is more likely than not that the company will not realize all or some portion of the DTA (ASC 740-10-30-5(e)).[4] For example, in our sample period, the tax law permitted firm managers to carry back a current tax loss to receive a refund of taxes paid in the previous two years and carry any remaining tax loss forward for up to 20 years to offset future profits. A firm with tax losses in the current and two prior years could not utilize a tax loss carryback, but could offset 100% of its future taxable income in year $t+n$ up to the amount of the loss in year t. However, if it is not certain whether the firm will have sufficient future taxable income over the subsequent 20 years to absorb the tax loss in year t, then the firm should record a DTAVA for the taxable income that they do not expect to realize.[5]

Managers must assess all available positive and negative evidence to determine the amount of any required DTAVA (ASC 740-10-30-17). Positive evidence signals that the firm will have future taxable income sufficient in amount and character to realize currently accrued DTAs. Negative evidence signals that the firm may not realize currently accrued DTAs in the future. As negative evidence accumulates, managers must provide additional positive evidence to conclude that a firm will not need a DTAVA for all or some portion of the DTA (ASC 740-10-30-23).

ASC 740-10-30-21 states that "cumulative losses in recent years" are a type of negative evidence for entities to consider in evaluating the need for a DTAVA. Discussions with tax partners suggest that cumulative losses are the *prima facie* source of negative evidence used to assess the realizability of DTAs. Cumulative losses are such a significant form of negative evidence that, during the SFAS 109 deliberations, the FASB considered establishing more

[4] All companies with significant deductible temporary differences and operating loss and tax credit carryforwards must evaluate the realizability of their DTAs, not only those companies in a net DTA (DTA – DTL > 0) position.

[5] Tax loss carryback and carryforward rules are jurisdiction-specific and vary across jurisdictions. Many jurisdictions do not allow carrybacks and have much shorter carryforward periods.

stringent criteria for recognizing DTAs (such as "probable" or "assured beyond a reasonable doubt") when there is a cumulative pretax loss for financial reporting for the current year and the two preceding years (EY [2019]). The FASB concluded that more restrictive criteria were not necessary because a cumulative loss in recent years is a significant piece of negative evidence that would be difficult to overcome on a more-likely-than-not (or any other) basis. However, the FASB did expressly incorporate language in ASC 740 that highlights the importance of cumulative losses. Specifically:

> "Forming a conclusion that a valuation allowance is not needed is difficult when there is significant negative evidence such as cumulative losses in recent years" (ASC 740-10-30-21).
>
> "The more negative evidence that exists, the more positive evidence is necessary and the more difficult it is to support a conclusion that a valuation allowance is not needed for some portion or all of the deferred tax asset. A cumulative loss in recent years is a significant piece of negative evidence that is difficult to overcome" (ASC 740-10-30-23).

Managers must also assess positive evidence that can reduce the DTAVA. Positive evidence typically derives from expectations of future taxable income since the realization of DTAs depends on generating sufficient future taxable income. Managers must consider four sources of positive evidence to determine the necessity of a DTAVA (ASC 740-10-30-18).

1. Taxable income in prior carryback years, if carryback is permitted under the tax law.
2. Future reversals of existing taxable temporary differences.
3. Tax-planning strategies.
4. Future taxable income exclusive of reversing temporary differences and carryforwards.

ASC 740-10-30-23 also indicates that firms must consider the extent to which managers can objectively verify positive and negative evidence and give less weight to more subjective estimates. Managers must use objectively verifiable positive evidence to offset any objectively verifiable negative evidence in assessing whether to apply a DTAVA (Deloitte [2020], EY [2019]).

Objectivity (later verifiability), as originally defined in the era of Paton and Littleton [1940], implied unbiasedness and supported by documentation. This evidence-based notion of objectivity evolved into a consensus-based notion; Ijiri and Jaedicke [1966] define objectivity as consensus among a given group of observers or measurers (Erb and Pelger [2015]). The FASB's use (and practitioner interpretation) of the phrase "objectively verifiable" in ASC 740-10-30-23 is more consistent with the evidence-based notion of verifiability rather than the consensus notion. For example, Deloitte [2020, 163-164] and KPMG [2019, 148] propose that users can objectively verify sources (1) and (2) above by viewing supporting documentation (e.g., prior tax returns), while future events largely determine items (3) and (4), which require more subjectivity. We list the four sources of positive evidence above from most objective to least objective, consistent with Eaton and Williams [1998], PwC [2019, 5-15], and EY [2019, 128].[6] We summarize the primary sources of DTAVA evidence in Figure 1.

3. Hypotheses

3.1. Hypothesis 1

Accounting standards for estimating the DTAVA suggest that managers should use judgement in considering the relative effect of positive and negative evidence and weigh the evidence to the extent they can objectively verify the evidence. Verifiability is an enhancing characteristic of accounting information (Healy and Palepu [2001]; Statement of Financial Accounting Concepts (SFAC) No. 8, FASB [2010]). Verifiability helps to assure users that information faithfully represents what it purports to represent; limited verifiability produces accounting numbers that are less reliable and useful (Glover, Ijiri, Levine, and Liang [2006]).

[6] Miller and Skinner [1998, 216] suggest that items (2) and (4) are likely the most important sources of taxable income; however, they do not discuss which items are more verifiable.

Current and historical information is inherently more verifiable than projections of future information. Managers can objectively verify cumulative losses by examining prior financial statements. Therefore, cumulative losses are one of the most objectively verifiable forms of negative evidence (Deloitte [2020]). Eaton and Williams [1998], as well as all the ASC 740 guidance produced by the Big 4 firms (Deloitte [2020], EY [2019], KPMG [2019], PwC [2019]), largely suggest that taxable income in carryback years and future reversals of existing temporary differences are objective sources of positive evidence, while tax-planning strategies and future taxable income are subjective sources of positive evidence. This discussion suggests that the association between the DTAVA and sources of evidence should increase in the extent to which the evidence is objectively verifiable. Therefore, we state our first hypothesis as follows:

> H_1: The association between the valuation allowance and objectively verifiable sources of taxable income is stronger than the association between the valuation allowance and subjectively verifiable sources of taxable income.

3.2. Hypothesis 2

ASC 740 and practitioner guidance emphasize the importance of using objectively verifiable evidence when assessing and determining the DTAVA, as there are inherent benefits for external financial statement users when managers rely more (less) on objectively (subjectively) verifiable evidence. For example, subjective evidence requires more estimation, which can lead to less reliable accruals, more discretionary accruals, and greater capital market distortions (Sloan [1996]; Richardson, Sloan, Soliman, and Tuna [2005]; Subramanyam [1996]). Subjective evidence is often difficult to audit (Hirst [1994]), which can lower the reliability of financial statements and lead to restatements (Plumlee and Yohn [2010]). The concern over using subjective evidence is particularly relevant for tax expense; managers must apply tax statutes, regulations, and administrative practices in every jurisdiction in which they operate, as

well as understand the related financial reporting implications. The intentional and unintentional estimation errors related to the tax expense decrease the quality of the tax accrual and leads to increases in adverse tax-related financial reporting outcomes; Choudhary et al. [2016] report that tax accrual quality improves the predictive ability to observe a future tax-related restatement (internal control weakness) by 32 (72) percent relative to the unconditional probability. External entities, such as the SEC and PCAOB, also scrutinize management's use of subjectivity in the tax accounts; income tax issues are frequently addressed in comment letters (McKeon and Usvyatsky [2018]) and critical audit matter disclosures (Drake et al. [2022a]).

Bauman et al. [2001], Schrand and Wong [2003], and Frank and Rego [2006] provide evidence that managers use the DTAVA to manage earnings, which is consistent with early criticism of SFAS 109 that managers could use subjectivity in determining the DTAVA as an earnings management tool. Thus, to the extent that managers rely more on subjective evidence when determining the DTAVA, we expect their firms to have weaker financial reporting quality. Specifically, we posit a positive association between the reliance on subjective evidence and tax-related financial statement misstatements, tax-related internal control weaknesses, and DTAVA-related SEC comment letters. We state our second hypothesis in the alternative form as follows:

> H_2: There is a positive association between the firm's use of subjective evidence in determining the DTAVA and the likelihood that the firm has a tax-related financial statement misstatement, tax-related internal control weaknesses, and DTAVA-related SEC comment letters.

4. Research Methods

4.1. Sample Selection and Variable Definitions

Our sample consists of S&P 500 and S&P 600 firms for the years 2008-2017. We exclude observations with a 2017 fiscal year that ends after December 22, 2017 (the date President Trump signed the Tax Cuts and Jobs Act of 2017 [TCJA 2017] into law) from our

sample; these observations had to revalue their DTAs and DTLs based on the new federal statutory tax rate of 21 percent. We collect DTAVA-related data of S&P 500 and S&P 600 firms from Audit Analytics, XBRL filings, and SEC Form 10-K and merge this with data from Compustat, CRSP, and FRB.[7] Our final data set includes 6,899 observations. We winsorize all continuous variables annually at the 1st and 99th percentile to reduce the effect of outliers.

Prior research on the determinants and information content of the DTAVA used small, narrow samples and data from earlier time periods near the onset of SFAS 109 (e.g., Behn et al. [1998]; Miller and Skinner [1998]; Bauman et al. [2001]; Schrand and Wong [2003]; Kumar and Visvanathan [2003]). In the 20 years since these studies, accounting firms have evolved to the extent that there is across-firm consensus concerning the measurement of positive and negative evidence of the realizability of DTAs, despite the lack of authoritative guidance. Therefore, we extensively reviewed ASC 740 guidance produced by tax specialists at Big-4 accounting firms (Deloitte [2020]; EY [2019]; KPMG [2019]; PwC [2019]) and interviewed tax practitioners to develop proxies consistent with the real-world information used to evaluate the realizability of DTAs. This practitioner guidance likely enhances our construct and internal validity relative to the aforementioned studies.

4.1.1. Positive Evidence Variables

ASC 740-10-30 describes four sources of taxable income (TI) that managers can use as positive evidence to substantiate reducing the DTAVA. More positive evidence should lead to DTAVA decreases; therefore, we expect a negative association between our positive evidence proxies and the DTAVA. ASC 740-10-30-23 specifies that managers should examine and use the most objective sources of TI first when evaluating a DTAVA. We describe our proxies for

[7] All of the deferred tax data that we use in the study originate from the DTA/DTL disclosure of firm-specific tax footnotes found in SEC Form 10-K. Further, all of the deferred tax data articulate according to the following two formulas: (1) Gross DTA – DTA Valuation Allowance = Net DTA; (2) Net DTA – Gross DTL = Net DTA/(DTL).

potential sources of TI in order of most to least objective (Deloitte [2020]; Eaton and Williams [1998]; EY [2019]; KPMG [2019]; PwC [2019]).[8]

The first and most objective source of TI is the TI permitted in prior carryback years. We proxy for this construct using estimated TI over the previous two years (*t*–1 and *t*–2) scaled by assets and create an indicator variable (*CBACK*) equal to one (zero otherwise) if the two-year average estimated TI is positive. The second most objective TI source is future reversals of existing temporary differences.[9] We proxy for this variable using an indicator variable (*REVERSE*) equal to one (zero otherwise) if the ratio of gross deferred tax liabilities to gross deferred tax assets is greater than one, which indicates that the firm has adequate deferred tax liabilities to absorb all year *t* DTAs.

The third most objective source of TI is tax planning strategies. The guidance in ASC 740 explains that viable tax planning strategies are those that managers could implement if needed to accelerate taxable amounts to utilize existing carryforwards, change the character of income or deductions from ordinary to capital, or switch from tax-exempt to taxable investments. Managers can use tax planning strategies to create the type and character of income to utilize DTAs. Not all tax-planning actions a company may utilize in the normal course of business qualify as a tax planning strategy under ASC 740. A qualified tax planning strategy is an action that is prudent

[8] In addition to the four sources of taxable income discussed in ASC 740-10-30-18, ASC 740-10-30-22 outlines three ***examples*** of positive evidence that, when present, may overcome negative evidence when assessing the realizability of DTAs: (1) Existing contracts or firm sales backlog that will produce more than enough taxable income to realize the DTA based on existing sales prices and cost structures, (2) An excess of appreciated asset value over the tax basis of the entity's net assets in an amount sufficient to realize the DTA, and (3) A strong earnings history exclusive of the loss that created the future deductible amount coupled with evidence indicating that the loss is an aberration rather than a continuing condition. Our goal in creating the proxies for positive evidence variables is not to create a proxy for every possible source of TI. Rather, our goal is to create a parsimonious, aggregate proxy for each of the four positive sources of TI described in ASC 740-10-30-18; these aggregate proxies should reflect the information from various examples (e.g., order backlog) outlined in ASC 740 and the associated practitioner guidance. See footnote 12 for a similar discussion of our treatment of the additional negative evidence described in ASC 740-10-30-21.

[9] We measure estimated TI as the sum of current federal and foreign tax expense divided by the top statutory federal tax rate applicable that year, less the change in tax loss carryforwards, consistent with prior literature (e.g., Hanlon, LaPlante, and Shevlin [2005]).

and feasible, would result in the realization of DTAs, and does not occur in the normal course of business (ASC 740-10-30-19). We proxy for tax planning strategies using *TAXPLAN*, which is the industry-year adjusted difference between the market value of equity and the estimated tax basis of the net assets. This measure reflects opportunities to generate TI by selling appreciated assets outside the normal or ordinary course of business.[10]

The least objective source of TI is estimates of future taxable income, excluding reversals of temporary differences and carryforwards (*FUTURE_TI*). We calculate *FUTURE_TI* as the predicted value from regressing year *t* estimated taxable income excluding temporary differences and carryforwards (*SCTI_EX*) on the same variable from year *t*–1. [11, 12]

4.1.2. Primary Negative Evidence Variable

We also examine negative evidence. More negative evidence should lead to DTAVA increases; therefore, we expect a positive association between our negative evidence proxy and the DTAVA. Cumulative losses in recent years represent negative evidence for entities to consider in assessing the need for a DTAVA (ASC 740-10-30-21). ASC 740 does not define "cumulative losses in recent years." Still, practitioners and non-authoritative guidance issued by

[10] Practitioner interviews and guidance significantly affected our measurement of *TAXPLAN*. Consistent with Behn et al. [1998], we initially used an ETR-based variable (the difference between the federal statutory rate and the cash ETR) as our measure of tax planning strategies. However, in ASC 740-10-55-39, the FASB states that it does not consider tax minimization actions that managers undertake in the normal course of business as tax planning strategies pursuant to ASC 740-10-30. Thus, an ETR-based variable, which largely reflects normal tax minimization activities taken in the ordinary course of business, is not an appropriate measure of tax planning strategies pursuant to ASC 740-10-30. The FASB suggests that selling appreciated assets is a potential tax planning strategy pursuant to ASC 740-10-30. We industry-adjust our measure of appreciated assets to capture the opportunity to sell appreciated assets outside the normal course of business.

[11] We measure estimated TI excluding temporary differences and carryforwards as the sum of current federal and foreign tax expense divided by the top statutory federal tax rate applicable that year.

[12] Prior literature (e.g., Behn et al. [1998]; Miller and Skinner [1998]) often uses prior realizations of pretax book income or ROA to proxy for future TI. We use a forecast instead of past realizations to avoid introducing excess objectivity into the measurement of an otherwise subjective source of evidence. In unreported robustness tests, we use three-year averages (*t*–1 – *t*–3) of scaled pretax income and ROA as alternative proxies for estimated future TI in the regressions reported in Panel A of Table 3. The coefficient estimates on average scaled pretax income and average ROA are significantly larger (all $p < 0.01$) than the coefficient estimates on *FUTURE_TI*, which is consistent with past realizations adding objectivity into the measurement of estimated TI.

the FASB (e.g., Statement 109.100) overwhelmingly agree that managers should measure cumulative losses using aggregate pretax income adjusted for permanent differences for the most recent three years (the current year and previous two years).[13] Accordingly, we proxy for this construct using *CUMLOSS*, an indicator variable equal to one (zero otherwise) if the sum of comprehensive income plus pretax income multiplied by the statutory tax rate for the years $t - t–2$ is negative.[14]

4.2. H_1 Research Design – Relative Verifiability of Sources of DTAVA Evidence

To test H_1, we estimate the following regression:

$$VA_{it} = \varphi_0 + \varphi_1 CUMLOSS_{it} + \varphi_2 CBACK_{it} + \varphi_3 REVERSE_{it} + \varphi_4 TAXPLAN_{it} + \varphi_5 FUTURE\_TI_{it} + \varphi_6 SIZE_{it} + \sum_j \varphi_z AUDITOR_t + \sum_j \varphi_j IND_t + \sum_j \varphi_k YEAR_t + \varepsilon_t \quad (1)$$

VA is the DTA valuation allowance scaled by the gross DTA. We control for firm size (*SIZE*) using the log of total assets in all regressions to ensure that size does not confound our inferences. We define the sources of negative and positive evidence (*CUMLOSS*, *CBACK*, *REVERSE*, *TAXPLAN*, *FUTURE_TI*) previously and in Appendix A. We include auditor, industry (using the Fama-French 17 industry classification scheme), and year fixed-effects, as well as heteroskedasticity-consistent clustered (by firm) standard errors in all models. To ease interpretations and comparisons among our variables of interest, we standardize the continuous

[13] Aggregate pretax income should include one-time items (restructuring charges and asset impairments), discontinued operations, and other comprehensive income adjustments.

[14] ASC 740-10-30-21 lists four additional sources of negative evidence including: (1) A history of operating loss or tax credit carryforwards expiring unused, (2) Losses expected in early future years (by a presently profitable entity), (3) Unsettled circumstances that, if unfavorably resolved, would adversely affect future operations and profit levels on a continuing basis in future years, and (4) A carryback or carryforward period that is so brief it would limit realization of tax benefits if a significant deductible temporary difference is expected to reverse in a single year or the entity operates in a traditionally cyclical business. We examine the effects of item (3) in section 5 of the paper; we do not separately examine the other three items because the aggregate determinants in equation (1) likely capture the effects of these items.

regression inputs using a procedure developed by Gelman [2008]. Specifically, for each continuous variable, we subtract its mean and then divide by two standard deviations.[15]

H_1 focuses on the relative objectivity of each source of DTAVA evidence t. ASC 740-10-30-23 indicates that firms must consider the extent to which managers can objectively verify positive and negative evidence and give less weight to more subjective estimates. The discussion in sections 4.1.1 and 4.1.2 suggests the following classification of DTAVA determinants:

OBJECTIVE_VA_EVIDENCE = *CUMLOSS*, *CBACK*, and *REVERSE*
SUBJECTIVE_VA_EVIDENCE = *TAXPLAN* and *FUTURE_TI*.

We perform two procedures to assess whether firms rely more on objective versus subjective evidence when determining the valuation allowance. First, we use F-tests to test for differences in the coefficients in equation (1). Formally, we test the following:

- |*CUMLOSS*| > |*CBACK*|, |*REVERSE*|, |*TAXPLAN*|, |*FUTURE_TI*|
- [*CBACK* + *REVERSE*] > [*TAXPLAN* + *FUTURE_TI*]
- *CBACK* > *REVERSE* > *TAXPLAN* > *FUTURE_TI*

While we combine the positive and negative evidence variables in equation (1), the standards do not mandate that managers consider *all* evidence collectively when setting the DTAVA. If only one source of evidence is sufficient to substantiate the necessity of a DTAVA, managers do not have to consider other sources of evidence (ASC 740-10-30-18). For this reason, we simultaneously estimate five individual equations by regressing *VA* on each positive or negative evidence variable, *SIZE*, and auditor, industry, and year fixed effects. We use a Wald

[15] Researchers typically standardize each continuous variable by subtracting its mean and dividing by **one** standard deviation. Gelman [2008] shows that dividing each continuous variable by two standard deviations allows a generic comparison with inputs equal to the mean +/- one standard deviation, which allows the researcher to directly compare the transformed continuous predictors and untransformed binary predictors.

test to evaluate the equality of each positive and negative evidence coefficient across the five equations.[16] Formally, we test the following:

- $|CUMLOSS| > |CBACK|, |REVERSE|, |TAXPLAN|, |FUTURE\_TI|$
- $[CBACK + REVERSE] > [TAXPLAN + FUTURE\_TI]$
- $CBACK > REVERSE > TAXPLAN > FUTURE\_TI$

4.3. H_2 Research Design – Consequences of Using Subjective Evidence

Our second hypothesis examines the financial-reporting consequences of managers using subjective evidence when assessing the realizability of DTAs. To test H_2, we first determine the extent to which firms rely on subjective evidence. To do so, we estimate the following regressions by industry (using the Fama-French 17 industry classification scheme) and year:

$$VA_{it} = \vartheta_0 + \sum \vartheta_O OBJECTIVE\_VA\_EVIDENCE_{it} + \sum \vartheta_S SUBJECTIVE\_VA\_EVIDENCE_{it} + \vartheta_6 VA_{it-1} + \vartheta_7 SIZE_{it} + \psi_t \quad (2)$$

$$VA_{it} = \kappa_0 + \sum \kappa_O OBJECTIVE\_VA\_EVIDENCE_{it} + \kappa_6 VA_{it-1} + \kappa_7 SIZE_{it} + \zeta_t \quad (3)$$

where *OBJECTIVE_VA_EVIDENCE* = *CUMLOSS*, *CBACK*, and *REVERSE*, while *SUBJECTIVE_VA_EVIDENCE* = *TAXPLAN* and *FUTURE_TI*. We define each variable in equations (2) and (3) previously.

We subtract the residual of equation (2) from the residual of equation (3) (i.e., $\hat{\zeta}_{it} - \hat{\psi}_{it}$) to generate our measure of subjective evidence. A differenced residual approaching (far from) zero suggests that more objective (subjective) evidence determines the DTAVA. Thus, we create an indicator variable to capture the firm-specific reliance on using subjective evidence to assess the DTAVA. *SUBJECTIVE* equals one (zero otherwise) if the industry-year decile rank of the differenced residual of each observation equals zero, one, eight, or nine.

We use *SUBJECTIVE* to examine the association between the quality of tax-based

[16] In the H_1 cross-equation and F-tests, we use the absolute value of each coefficient because we are interested in the coefficient magnitudes, not the coefficient signs (and we predict opposing coefficient signs for the positive and negative evidence DTAVA determinants).

information in the financial statements and the reliance on subjective evidence in assessing the DTAVA. We use three measures of the quality of tax-based financial statement information: (1) tax-related misstatements, (2) tax-related internal control weaknesses (ICWs), and (3) DTAVA-related SEC comment letters. We measure tax-related misstatements using tax restatements obtained from Audit Analytics (Seetharaman et al. [2011]; Goldman et al. [2022]). We create an indicator variable equal to one (zero otherwise) if the observation has a tax-related restatement in year *t* (*TX_RES*). We measure tax-related ICWs using tax ICWs obtained from Audit Analytics (De Simone et al. [2015]; Bauer [2016]). We create an indicator variable equal to one (zero otherwise) if the observation has a tax-related ICW in year *t* (*TX_ICW*). We measure DTAVA-related SEC comment letters using DTAVA comment letters obtained from Audit Analytics (Cassell et al. [2013]; Johnston and Petacchi [2017]). We create an indicator variable equal to one (zero otherwise) if the observation has a DTAVA-related comment letter in year *t* (*VA_CMLTR*).

We separately regress each measure of tax-based financial reporting quality (*TX_FRQ* = *TX_RES*, *TX_ICW*, or *VA_CMLTR*) on *SUBJECTIVE* and several control variables using the following model:

$$\begin{aligned} TX\_FRQ_{it} = {} & \Gamma_0 + \Gamma_1 SUBJECTIVE_{it} + \Gamma_2 LNMVE_{it} + \Gamma_3 SHUMWAY_{it} + \Gamma_4 LNSEG_{it} + \\ & \Gamma_5 FCT\_DUM_{it} + \Gamma_6 MERGE\_DUM_{it} + \Gamma_7 FOR\_SALES_{it} + \\ & \Gamma_8 SALES\_GROW_{it} + \Gamma_9 TLCF_{it} + \Gamma_{10} TENURE_{it} + \Gamma_{11} PRETAX\_ROA_{it} + \\ & \Gamma_{12} SD\_PI3_{it} + \sum \vartheta_O OBJECTIVE\_VA\_EVIDENCE_{it} + \\ & \sum \vartheta_S SUBJECTIVE\_VA\_EVIDENCE_{it} + \vartheta_6 VA_{it-1} + \sum_j \Gamma_z AUDITOR_t + \\ & \sum_j \Gamma_j IND_t + \sum_j \Gamma_k YEAR_t + \zeta_t \end{aligned} \quad (4)$$

We define *TX_RES*, *TX_ICW*, *VA_CMLTR*, and *SUBJECTIVE* above. We follow Seetharaman et al. [2011], Cassell et al. [2013], De Simone et al. [2015], and Johnson and Petacchi [2017] and include controls that likely affect tax-related financial reporting quality. These variables primarily control for complexity, such as firm size (*LNMVE*), the number of business and

geographic segments (*LNSEG*), the presence of foreign transactions (*FCT_DUM*), whether the firm has M&A activity (*MERGE_DUM*), the extent of foreign operations (*FOR_SALES*), and the volatility of pretax operating income (*SD_PI*3). We also include control variables that capture the decile rank of the percentage probability of bankruptcy in year *t* (*SHUMWAY*), sales growth (*SALES_GROW*), tax loss carryforwards (*TLCF*), auditor tenure (*TENURE*), and pretax profitability (*PRETAX_ROA*). Last, consistent with the recommendations of Chen, Hribar, and Melessa [2018], we include the independent variables from the first-stage estimation as control variables.[17] We include the same set of determinants for each measure of tax financial reporting quality for parsimony and consistency. Similar to Seetharaman et al. [2011], we cluster standard errors by firm and include auditor, industry, and year fixed effects in each regression. *TX_RES*, *TX_ICW*, and *VA_CMLTR* are indicator variables; therefore, we estimate the models for these variables using logit and report odds ratios instead of coefficients.

5. Results

5.1. Descriptive Statistics and Baseline Results

We present our sample descriptive statistics in Table 1, Panel A. The mean *VA* is 0.169; our sample observations have a valuation allowance of 16.9 percent of the gross DTA, on average. The DTAVAs appear relatively small; at least ten percent of the sample has zero *VA* and the median *VA* is 7.3 percent of the gross DTA. Over 90 percent of the sample expect to realize the majority of their DTAs; the 90th percentile of *VA* equals 51.6 percent. The mean *GROSS_DTA* is 7.0 percent of assets, while the mean *GROSS_DTL* is 6.4 percent of assets. Most

[17] We include the first-step regressors in the second-step equation even though we transform the residuals from the first-step regression. Chen et al. [2018] indicate that using transformed residuals as a dependent variable in a second-step regression could still lead to Type I and Type II errors. Our inferences are quantitatively and qualitatively similar if we do not include the first-step regressors in the second-step equation.

of our sample observations have net DTL positions (the median *NET_DTX* equals -0.001). Our mean (median) sized firm is 8.680 (8.667), which corresponds to $5.88B ($5.81B) in total assets.

Panel B presents a comparison of our primary negative and positive evidence variables for firms with an above-median ("high") DTAVA versus a below-median ("low") DTAVA. The mean of *CUMLOSS* is significantly larger for observations with a high *VA* relative to observations with as low *VA* (Mean Difference = 0.109, $p < 0.01$). The means of the positive evidence variables for high DTAVA firms are significantly lower than the means of the positive evidence variables for low DTAVA firms. Specifically, the mean difference between the high and low valuation allowance groups of *CBACK, REVERSE, TAXPLAN,* and *FUTURE_TI* total -0.083, -0.103, -0.290, and -0.014 (all $p < 0.01$ except for *TAXPLAN*), respectively. The evidence provided in Panel B is consistent with the discussion in ASC 740-10-30 and the results of Behn et al. [1998]; there is a positive (negative) association between the valuation allowance and measures that reflect negative evidence (positive evidence) of future taxable income.

We present additional statistics for various financial reporting quality-related characteristics of high and low DTAVA observations in Panel C of Table 1. High DTAVA observations are significantly more complex; these firms have more segments (*LNSEG*), more volatile income (*SD_PI*3), and have a larger foreign sales percentage (*FOR_SALES*) relative to low DTAVA observations. Additionally, the performance of high DTAVA observations is significantly worse than the performance of low DTAVA observations; these observations have more tax loss carryforwards (*TLCF*), lower sales growth (*SALES_GROW*), and lower profitability (*PRETAX_ROA*).

We present the correlation matrix in Table 2. The correlation between *CUMLOSS* and *VA* is 0.428, which is larger than any of the correlations between *VA* and the positive evidence

variables (*CBACK*, *REVERSE*, *TAXPLAN*, *FUTURE_TI*). The correlations between the positive evidence variables and *VA* are negative and significant, consistent with expectations. However, the correlation between *FUTURE_TI* and *VA* is larger than the correlation between *VA* and *REVERSE* and *VA* and *TAXPLAN*, which is initial evidence suggesting that the association between this subjective TI source and the DTAVA is greater than that of purportedly more objective TI sources and the DTAVA.

5.2. Primary Analyses

5.2.1. Results – Hypothesis 1

Before we discuss the results of our tests of H_1, we present some baseline multivariate results in Panel A of Table 3. We find a positive (negative) association between the valuation allowance and measures that reflect negative evidence (positive evidence) of future taxable income. These results are consistent with the early determinants studies (Behn et al. [1998] and Miller and Skinner [1998]) and suggest that each variable captures unique positive and negative evidence about the realizability of DTAs.

We present the results of our analysis of H_1 in Panels A-C of Table 3; we examine the information content of objective and subjective evidence in determining the DTAVA by comparing the magnitudes of the standardized coefficients of the different evidence variables from Panel A. We present cross-equation tests in Panel B; the test results in column [1] indicate whether *CUMLOSS* is the most objective source of evidence (positive or negative) that managers use to assess the realizability of DTAs. The results we present in columns [1]-[5] of Panel A indicate that the absolute value of the coefficient on *CUMLOSS* is statistically greater than the absolute value of the coefficients on *CBACK, REVERSE, TAXPLAN,* and *FUTURE_TI* (all $p < 0.01$).

We next examine the relative objectivity of each positive evidence variable and present the results of cross-equation Wald tests in columns [2]-[4] of Panel B. In general, we expect *CBACK* > *REVERSE* > *TAXPLAN* > *FUTURE_TI*. Consistent with H_1, the sum of the coefficients on the two objective measures of taxable income (*CBACK* and *REVERSE*) is significantly greater than the sum of the coefficients on the two subjective measures of taxable income (*TAXPLAN* and *FUTURE_TI*). In addition, the tests in column [2] reveal that the coefficient on *CBACK* is statistically greater than the coefficient on *REVERSE, TAXPLAN,* and *FUTURE_TI,* while the tests in column [3] indicate that the coefficient on *REVERSE* is statistically greater than the coefficient on *TAXPLAN* (all $p < 0.01$). However, the tests in columns [3] and [4] indicate that the coefficient on *FUTURE_TI* is larger than the coefficients on *REVERSE* and *TAXPLAN*. The relative strength of the weight that managers place on estimates of future taxable income compared to future reversals of taxable temporary differences and tax planning strategies is inconsistent with H_1.[18]

We next estimate equation (1) and use the coefficients in column [6] of Panel A to perform F-tests to evaluate the incremental information content of each positive and negative evidence variable for the DTAVA. We present these results in Panel C, which are largely consistent with those from Panel B. However, we do not document a difference between the coefficients on *CBACK* and *REVERSE* in column [2]. In column [4], the coefficient on *TAXPLAN* is statistically smaller than the coefficient on *FUTURE_TI*, both of which are opposite of our expectations.

To summarize, the results in Table 3 largely support H_1. We find that the association between *CUMLOSS* and the DTAVA is significantly larger than the association between any of

[18] As a robustness test, we also examine the relative explanatory power of each source of evidence using Vuong [1989] tests. The results of and inferences from the Vuong [1989] tests largely mirror the results of the cross-equation tests that we discussed in the previous paragraph.

the other positive evidence variables (*CBACK, REVERSE, TAXPLAN,* and *FUTURE_TI*) and the DTAVA. Practitioners view the presence of a cumulative loss as the most objective source of evidence in assessing the realizability of DTAs; therefore, these results support H_1. Moreover, additional tests indicate that the association between the DTAVA and the positive evidence variables identified by practitioners as relatively more objective (*CBACK* and *REVERSE*) is larger than the association between the DTAVA and the positive evidence variables identified by practitioners as relatively less objective (*TAXPLAN* and *FUTURE_TI*). Lastly, while ASC 740 and practitioner guidance suggest that estimates of future taxable income (*FUTURE_TI*) are the most subjective source of positive evidence that managers can use when assessing the realizability of DTAs, our tests find evidence that the information content of *FUTURE_TI* is greater than that of some of the more objective sources of positive evidence (e.g., *REVERSE* and *TAXPLAN*). The apparent "over-reliance" on subjective estimates of future taxable income relative to more objective sources of positive evidence is an example of managers using discretion in GAAP that is inconsistent with the stated objectives of the standard.

5.2.2. Results – Hypothesis 2

We present the results relevant to the tests of H_2, which examines the association between the quality of the financial reporting of taxes and the use of subjective information when assessing the realizability of DTAs, in Table 4. In Panel A, we present descriptive statistics from estimating equations (2) and (3) by industry (Fama-French 17) and year. Each model explains a substantial portion of the variation in *VA*; the mean adjusted R^2 in equations (2) and (3), respectively, is 0.868 and 0.851.

In Panel B, we present the results of estimating equation (4), which tests whether the relative subjectivity imposed by firms in determining their DTAVA affects the properties of the

financial reporting of taxes (H_2). We report the results of estimating equation (4) with *TX_RES*, *TX_ICW*, and *VA_CMLTR* as the dependent variable in columns [1]-[3], respectively. Consistent with H_2, we document a positive and significant association between *SUBJECTIVE* and each of the three tax-related financial reporting outcomes. Collectively, these results suggest that using more subjective evidence to assess the realizability of DTAs impairs the quality of the accounting for income taxes.

To gain a better understanding of how managers' use of subjectivity in their valuation allowance estimates affects tax-based financial reporting quality outcomes, we re-estimate equation (4) after partitioning *SUBJECTIVE* into positive and negative values and report the results in Panel C, columns [1]-[3] and [4]-[6], respectively. We continue to document a positive association between financial reporting quality outcomes and *SUBJECTIVE*; however, the results are significant primarily when *SUBJECTIVE* is positive. Positive (negative) values of *SUBJECTIVE* decrease (increase) income; therefore, these results are consistent with managers using subjectivity to over-estimate the DTAVA, perhaps to create hidden reserves.[19]

5.3. Additional Analyses

5.3.1. UTBs and the DTAVA

In 2007, the FASB updated SFAS 109 by issuing ASC 740-10-25 (FIN 48). FIN 48 standardized the disclosure and measurement of unrecognized tax benefits (UTB), a liability that arises from managers engaging in uncertain tax positions. There are two potential ways in which the UTB could affect the DTAVA. First, in addition to the four sources of taxable income listed in ASC 740-10-30-18, EY [2019], PwC [2019], and Deloitte [2020] indicate that managers

[19] In Tables 3 and 5, the results indicate that managers over-weight subjective evidence of future taxable income when determining the DTAVA, especially in observations with cumulative losses. These results suggest that the over-weighting of estimates of future taxable income is a plausible mechanism that managers could use to create hidden reserves that could lead to a restatement, ICW, or comment letter.

should consider UTBs as an additional source of TI. When the tax authority settles a UTB, TI may increase, potentially allowing managers to use deferred tax benefits such as NOL carryforwards. Prior research documents significant within-industry variation in tax accruals meant to represent uncertain tax positions (De Simone, Robinson, and Stomberg [2014]). Thus, if managers use UTBs as a source of positive evidence, they likely introduce additional subjectivity into assessing the DTAVA. Second, UTBs also represent a risk factor managers might use as negative evidence supporting a higher DTAVA. Specifically, ASC-740-10-30-21(c) indicates that unsettled circumstances that could affect profitability if settled unfavorably are an additional source of negative evidence. The UTB is a contingent liability; thus, it represents an unsettled circumstance that could affect firm-specific profitability and the DTAVA. On average, whether managers view the UTB as objective or subjective positive or negative evidence is an empirical question. We estimate the following regressions to test the association between the DTAVA and the UTB:

$$VA_{it} = \Lambda_0 + \Lambda_1 EUTBBE_{it} + \Lambda_2 SIZE_{it} + \sum_j \Lambda_z AUDITOR_t + \sum_j \Lambda_j IND_t + \sum_j \Lambda_k YEAR_t + \varepsilon_t \quad (5)$$

$$VA_{it} = \varsigma_0 + \varsigma_1 CUMLOSS_{it} + \varsigma_2 CBACK_{it} + \varsigma_3 REVERSE_{it} + \varsigma_4 TAXPLAN_{it} + \varsigma_5 FUTURE\_TI_{it} + \varsigma_6 EUTBBE_{it} + \varsigma_7 SIZE_{it} + \sum_j \varsigma_z AUDITOR_t + \sum_j \varsigma_j IND_t + \sum_j \varsigma_k YEAR_t + \varepsilon_t \quad (6)$$

We measure the UTB as the ending balance of unrecognized tax benefits divided by lagged common stockholders' equity (*EUTBBE*). We define all other variables previously. We present the results of estimating equations (5) and (6) in Table 5. We document a positive and significant association between *EUTBBE* and *VA* in both equations. The absolute value of the coefficient on *EUTBBE* in the multivariable regression presented in column [2] is 0.072, while the absolute values of the coefficients on the other subjective determinants in the multivariable regression, *TAXPLAN* and *FUTURE_TI*, are 0.021 and 0.096, respectively. F-tests indicate that the coefficient on *EUTBBE* is significantly different from the coefficients on the objective

determinants and *TAXPLAN*. However, we cannot detect a difference between the coefficients on *EUTBBE* and *FUTURE_TI*.[20] Overall, these results suggest that, on average, managers view the UTB as subjective, negative evidence.

5.3.2. Positive Evidence and Cumulative Losses

Our analysis indicates that the presence of a cumulative loss is the most significant determinant of the valuation allowance and explains more of the variation in the valuation allowance than any of the other sources of evidence. These results are consistent with practitioners viewing cumulative losses as the *prima facie* source of negative evidence to assess the realizability of DTAs. When an entity is in a cumulative loss position and does not have objectively verifiable positive evidence, its managers must record a valuation allowance. There is no evidence on the extent to which managers use positive evidence to offset the effects of cumulative losses when assessing the realizability of DTAs. We estimate three additional regressions to evaluate the effects of positive evidence in observations with and without cumulative losses.

$$VA_{it} = \beta_0 + \beta_1 CBACK_{it} + \beta_2 REVERSE_{it} + \beta_3 SIZE_{it} + \sum_j \beta_z AUDITOR_t + \sum_j \beta_j IND_t + \sum_j \beta_k YEAR_t + \sigma_t \quad (7)$$

$$VA_{it} = \delta_0 + \delta_1 TAXPLAN_{it} + \delta_2 FUTURE\_TI_{it} + \delta_3 SIZE_{it} + \sum_j \delta_z AUDITOR_t + \sum_j \delta_j IND_t + \sum_j \varphi_k YEAR_t + \tau_t \quad (8)$$

$$VA_{it} = \gamma_0 + \gamma_1 CBACK_{it} + \gamma_2 REVERSE_{it} + \gamma_3 TAXPLAN_{it} + \gamma_4 FUTURE\_TI_{it} + \gamma_5 SIZE_{it} + \sum_j \gamma_z AUDITOR_t + \sum_j \gamma_j IND_t + \sum_j \gamma_k YEAR_t + \upsilon_t \quad (9)$$

We define all variables previously and include objective positive evidence variables (i.e., *CBACK* and *REVERSE*) in equation (7), subjective positive evidence variables (i.e., *TAXPLAN* and *FUTURE_TI*) in equation (8), and both objective and subjective positive evidence variables

[20] The results of cross equation Wald tests show that the coefficient on *EUTBBE* is significantly different from the coefficients on each individual DTAVA determinant reported in Panel A of Table 3 (all $p < 0.01$). Additionally, the results of Vuong [1989] tests indicate that the adjusted R^2 of the individual UTB regression (equation (5)) is significantly less than the adjusted R^2 of the individual objective evidence regressions that we report in columns [1]-[3] of Panel A in Table 3. These results all support classifying the effects of the UTB as subjective evidence.

in equation (9). We use these equations to answer two general conjectures. First, when evaluating objective positive evidence, managers of firms with cumulative losses should rely more on future reversals of taxable temporary differences (a less objective source of TI) relative to tax loss carrybacks when assessing the realizability of DTAs because the value of tax loss carrybacks should decline when observations have cumulative losses. Second, practitioner guidance states that managers must use objectively verifiable positive evidence to offset any objectively verifiable negative evidence in assessing whether to apply a valuation allowance (Deloitte [2020], EY [2019]). Therefore, when evaluating the necessity of a DTAVA, managers of firms with cumulative losses should rely less, if at all, on tax planning strategies and estimates of future taxable income relative to firms without cumulative losses.

We present the results of estimating equations (7)-(9) in panel B of Table 5. To test our conjectures about managers' use of positive evidence in the observations with and without cumulative losses, we simultaneously estimate each equation pair (e.g., equation (7) in observations with and without cumulative losses) and use a Wald test to test the equality of each positive evidence coefficient across each equation pair. We present the results of estimating each cross-equation Wald test in Panel C of Table 5.

We first examine the objective evidence variables. The results in columns [1], [2], [5], and [6] indicate that the coefficient on *CBACK* is slightly smaller in observations with cumulative losses compared to those without cumulative losses; however, the difference is significant only in equation (9) (χ^2 = 1.86, p = 0.086). The coefficient on *REVERSE* is significantly larger in observations with cumulative losses than those without cumulative losses (χ^2 = 79.82, p = 0.000).[21] These results suggest that as managers assess the need for a DTAVA,

[21] Additionally, unreported F-tests of the coefficients in equation (9) for observations with cumulative losses indicate that the coefficient on *REVERSE* is significantly larger than the coefficient on *CBACK* (F = 21.15, p =

they place less weight on tax loss carrybacks and more weight on reversals of taxable temporary differences when firms have cumulative losses relative to firms without cumulative losses. However, practitioners consider reversals of taxable temporary differences as objective evidence, so substituting reversals for tax loss carrybacks is consistent with practitioner guidelines.

We next evaluate the effects of subjective evidence. The results of equation (8), presented in columns [3]-[4] of Panel B, indicate that the coefficients on both *TAXPLAN* and *FUTURE_TI* for observations with cumulative losses are negative and significant and significantly larger than the corresponding coefficients for observations without cumulative losses (χ^2 = 6.86, p = 0.009 and χ^2 = 10.97, p = 0.000, respectively). In equation (9), the coefficient on *FUTURE_TI* for observations with cumulative losses is significantly larger than the coefficient on *FUTURE_TI* for observations without cumulative losses (χ^2 = 3.20, p = 0.037); however, we are unable to detect a difference between the coefficients on *TAXPLAN* for observations with and without cumulative losses (χ^2 = 1.38, p = 0.120). These results suggest that, counter to practitioner guidance, managers not only use subjective evidence to reduce the DTAVA in the presence of cumulative losses, but they also place more weight on tax planning strategies and estimates of future taxable income in firms with cumulative losses relative to firms without cumulative losses. Overall, the results in Panel B suggest that managers use relatively less objective evidence to offset the effects of cumulative losses.

5.3.3. Subjective Evidence Cross-sectional Tests

We extend our analysis of H_2 to examine whether the scope of operations (multinational versus domestic firms) or the extent of external monitoring (high versus low analyst following) moderates the association between subjectivity and tax-based financial reporting quality. The

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0.000), while the coefficient on *REVERSE* is significantly smaller than the coefficient on *CBACK* for observations without cumulative losses (F = 4.21, p = 0.021).

size and complexity of multinational firms provide managers with increased opportunity to use subjective estimates (e.g., managers of multinational firms must determine the DTAVA by jurisdiction (Deloitte [2020]; EY [2019]; KPMG [2019]; PwC [2019])). Consequently, operating in multiple jurisdictions enhances the judgmental uncertainty associated with using subjectivity to estimate the DTAVA.

To test if the scope of operations moderates the association between subjectivity and tax-related financial reporting quality, we estimate equation (4) using multinational and domestic observation samples. We classify observations that report non-zero (no) foreign pretax income as multinational (domestic) and present the results from estimating equation (4) for multinational (domestic) observations in the odd (even) numbered columns of Panel A in Table 6. For multinational observations, we find a positive and significant association between *SUBJECTIVE* and two of the three ex-post tax financial reporting outcomes (*TX_ICW* and *VA_CMLTR*). The respective associations for domestic observations are almost all insignificant. In Panel B, the cross-equation tests fail to detect a difference between the coefficients on *SUBJECTIVE* for multinational versus domestic observations.

Second, we examine if the extent of external monitoring by financial analysts moderates the association between using subjectivity in estimating the valuation allowance and tax financial reporting outcomes. Prior research documents a negative association between analyst coverage and discretionary accruals (Yu [2008]), which suggests that external monitoring reduces the accounting distortions that result from managerial discretion to use subjectivity when estimating accruals. We expect that greater analyst coverage lowers the information asymmetry between management and external stakeholders, reducing the incentives to use subjectivity in estimating the valuation allowance.

To test if external monitoring moderates the association between subjectivity and tax-related financial reporting quality, we estimate equation (4) using a sample of observations with high versus low analyst coverage. We classify observations above (below) the median of the number of sell-side equity analysts who provide firm-specific annual EPS forecasts to *I/B/E/S* for fiscal year *t* as having high (low) analyst coverage. We present the results of observations with high (low) analyst coverage in the odd (even) numbered columns of Panel C. We find a positive and significant association between *SUBJECTIVE* and *TX_RES*, *TX_ICW*, and *VA_CMLTR* only when analyst coverage is low; however, the results of cross-equation tests in Panel D show that the coefficients on *SUBJECTIVE* are different for observations with low versus high analyst coverage only when *VA_CMLR* is the dependent variable.

6. Conclusion

We examine the extent to which managers use objective and subjective evidence to assess the realizability of deferred tax assets in S&P 500 and S&P 600 firms. Our results suggest that managers primarily use objective evidence to assess the realizability of deferred tax assets, which is consistent with accounting standards and practitioner guides. However, we find evidence that managers over-weight more subjective factors such as estimated future taxable income when determining the DTAVA, especially when firms have cumulative losses. We also document a positive association between the use of subjective evidence to determine the DTAVA and adverse tax-related financial reporting outcomes; income-decreasing adjustments (i.e., positive values of subjectivity) largely account for the positive association between financial reporting quality and the use of subjectivity in assessing the DTAVA. In supplemental tests, we document a positive association between the UTB and the DTAVA, which suggests that managers view UTBs as negative evidence, on average. The size of the coefficient on the UTB

suggests that the UTB represents more subjective evidence. Lastly, we show that the positive association between the use of subjective evidence to determine the DTAVA and adverse tax-related financial reporting outcomes varies in the cross-section. In general, we only document a positive association between subjectivity and tax-based financial reporting quality in multinational observations and observations with low analyst coverage. These results are consistent with the idea that subjectivity is more detrimental when managers have greater opportunity to use discretion and judgement in the accrual setting process. Our study enhances researchers' understanding of the DTAVA by providing large sample evidence on the extent to which firms use subjective evidence to determine the DTAVA and by providing evidence that greater subjectivity in estimating the DTAVA can have negative financial reporting consequences.

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Figure 1
Sources of DTAVA Evidence

	Negative Evidence [Increase to DTAVA]	Positive Evidence [Decrease to DTAVA]
Objective Evidence	Cumulative Losses	Potential for Tax Loss Carrybacks Temporary Tax Difference Reversals
Subjective Evidence		Tax Planning Strategies Future Taxable Income

[1] This figure outlines the primary sources of evidence used to determine the realizability of deferred tax assets. Positive evidence signals that the firm will have future taxable income sufficient in amount and character to realize currently accrued DTAs. Negative evidence signals that the firm may not realize currently accrued DTAs in the future.

Appendix A
Variable Definitions[1]

Variable		Definition
Panel A: Deferred Taxes[2]		
GROSS_DTA	=	**Gross Deferred Tax Assets.** Gross deferred tax assets divided by lagged total assets (AT).
VA	=	**Valuation Allowance**. The gross DTA valuation allowance, divided by *GROSS_DTA*.
NET_DTA	=	**Net Deferred Tax Assets.** Net deferred tax assets divided by lagged total assets (AT). *NET_DTA = GROSS_DTA – VA*.
GROSS_DTL	=	**Gross Deferred Tax Liabilities.** Gross deferred tax liabilities divided by lagged total assets (AT).
NET_DTX	=	**Net Deferred Taxes.** Net deferred taxes divided by lagged total assets (AT). *NET_DTX = NET_DTA – GROSS_DTL*.
Panel B: Negative and Positive Evidence Variables		
CUMLOSS	=	**Cumulative Losses.** An indicator variable equal to one (zero otherwise) if the sum of pretax comprehensive income (CI, if missing CI then net income (NI) minus preferred dividends (DPA) plus the change in marketable securities adjustment (MSA) plus the change in cumulative translation adjustment (RECTA)) plus pretax income (PI) multiplied by the statutory tax rate, for the years t–2 to year t, is less than zero.
CBACK	=	**Potential for a Tax Loss Carryback.** An indicator variable equal to one (zero otherwise) if the average estimated taxable income (*TI* = Current federal tax expense (TXFED) plus current foreign tax expense (TXFO) divided by the statutory federal tax rate (0.35) minus the change in tax loss carryforwards (TLCF)) for years t–1 − t–2 is greater than zero.
REVERSE	=	**Future Reversals of Taxable Temporary Differences**. An indicator variable equal to one (zero otherwise) if the ratio of gross deferred tax liabilities to gross deferred tax assets is greater than one.
TAXPLAN	=	**Tax Planning Strategies.** The market value of equity (PRCC_F*CSHO) less the tax basis of net assets, measured as stockholders' equity (SEQ) less taxable temporary differences (Gross DTL/0.35) plus deductible temporary differences (Gross DTA/0.35). We industry-adjust each observation and subtract the (Fama-French 17) industry/year median from each observation.
FUTURE_TI	=	**Future Taxable Income Exclusive of Reversing Temporary Differences and Tax Loss Carryforwards.** We calculate *FUTURE_TI* as the predicted values of the following regressions, estimated by industry (Fama-French 17) and year (each industry/year pair must have at least 10 observations): $SCTI\_EX_{it} = \delta_0 + \delta_1 SCTI\_EX_{it-1} + \varepsilon_{it}$ where *SCTI_EX* = Estimated taxable income exclusive of reversing temporary differences and tax loss carryforwards (Current federal tax expense (TXFED) plus current foreign tax expense (TXFO) divided by the statutory federal tax rate) divided by lagged total assets (AT).
EUTBBE	=	**Ending UTB**. The ending balance of unrecognized tax benefits (TXTUBEND) divided by lagged common stockholders' equity (CEQ).
Panel C: Financial Reporting Quality		
TX_RES	=	**Tax Restatements.** An indicator variable equal to one (zero otherwise) if a firm-year observation reports a financial statement restatement due to tax reasons (Audit Analytics, RES_ACC_RES_FKEY_LIST = 18)
TX_ICW	=	**Tax Internal Control Weaknesses.** An indicator variable equal to one (zero otherwise) if a firm-year observation reports an auditor-identified financial statement internal control weakness due to tax reasons (Audit Analytics, NOTEFF_ACC_REAS_KEYS = 41 and IC_OP_TYPE = A).
VA_CMLTR	=	**Valuation Allowance Comment Letters.** An indicator variable equal to one (zero otherwise) if a firm-year observation reports a SEC comment letter due to issues related to the deferred tax asset valuation allowance (Audit Analytics, FASB_CODE = 740-10).
SIZE	=	**Size.** The natural log of total assets (AT).

(*continued on next page*)

Variable Definitions (continued)

Variable		Definition
Panel C: Financial Reporting Quality (Continued)		
SUBJECTIVE	=	**Subjective Valuation Allowance Evidence.** An indicator variable equal to one (zero otherwise) if the industry (Fama-French 17) and year decile rank of the difference in the residuals of the following regressions, estimated by industry (Fama-French 17) and year on sample observations (each industry/year pair must have at least 10 observations), equals zero, one, eight or nine: $VA_{it} = \delta_0 + \sum\delta_1 OBJECTIVE\_VA\_EVIDENCE_{it} + \sum\delta_2 SUBJECTIVE\_VA\_EVIDENCE_{it} + \delta_3 VA_{it-1} + \delta_4 SIZE_{it} + \varepsilon_{it}$ $VA_{it} = \delta_0 + \sum\delta_1 OBJECTIVE\_VA\_EVIDENCE_{it} + \delta_2 VA_{it-1} + \delta_3 SIZE_{it} + \varepsilon_{it}$ where *VA* = The DTA valuation allowance, divided by *GROSS_DTA*, *OBJECTIVE_VA_EVIDENCE* = *CUMLOSS*, *CBACK*, and *REVERSE*, defined in Panels B and C, *SUBJECTIVE_VA_EVIDENCE* = *TAXPLAN* and *FUTURE_TI*, defined in Panel B, and *SIZE* = The natural log of total assets (AT).
MTB	=	**Market-to-Book Ratio.** The market value of equity (PRCC_F * CSHO).
LNMVE	=	**Size.** The natural log of the market value of equity (PRCC_F * CSHO) divided by the common book value of equity (CEQ).
SHUMWAY	=	**Bankruptcy Rank.** The decile rank of the percentage probability of bankruptcy in year *t* from the default hazard prediction model based on Shumway [2001]. Higher scores indicate a higher probability of bankruptcy.
LNSEG	=	**Number of Segments.** The natural log of the number of firm-specific business and geographic segments.
FCT_DUM	=	**Foreign Transactions.** An indicator variable equal to one (zero otherwise) if the company reports a non-zero foreign currency translation adjustment (FCA) in year *t*.
MERGE_DUM	=	**Merger Indicator.** An indicator variable equal to one (zero otherwise) if the pretax acquisition/merger (AQP) amount is not equal to zero.
FOR_SALES	=	**Foreign Sales Percentage.** Foreign sales (FSALE – Compustat geographic segments) divided by total sales (SALE).
SALES_GROW	=	**Sales Growth.** (Annual sales (SALE) divided by lagged annual sales) – 1.
TLCF	=	**Tax Loss Carryforwards.** Tax loss carryforwards (TLCF) divided by lagged total assets (AT).
TENURE	=	**Auditor Tenure.** The natural log of auditor tenure.
PRETAX_ROA	=	**Pretax ROA.** Pretax income (PI) divided by lagged total assets (AT).
*SD_PI*3	=	**Pretax Income Volatility.** The three-year standard deviation of pretax income (PI), measured contemporaneously (*t*–2 to *t*).
MNC (*DOMESTIC*)	=	**Multinational (Domestic) Firm-Year.** An indicator variable equal to one (zero otherwise) if a firm has non-zero foreign pretax income (PIFO).
H_AFOL (*L_AFOL*)	=	**High (Low) Analyst Following.** An indicator variable equal to one (zero otherwise) if the number of sell-side equity analysts who provide firm-specific annual earnings per share forecasts to *I/B/E/S* for fiscal year *t* is above (below) the corresponding industry-year median. [from *I/B/E/S*]

[1] This Appendix provides detailed definitions for variables used in this study. The data in Panel A comes from Audit Analytics, XBRL filings, and SEC Form 10-K. The data in Panels B-C comes from CRSP and Compustat North American Fundamentals annual data, unless otherwise noted; we report *Compustat* and CRSP mnemonics in parentheses where applicable.

[2.] All of the deferred tax data that we use to define the variables in Panel A originate from the DTA/DTL disclosure of firm-specific tax footnotes found in SEC Form 10-K.

Table 1
Descriptive Statistics: 2008-2017[1]

Variables	Mean [1]	SD [2]	Min [3]	P5 [4]	P10 [5]	P25 [6]	P50 [7]	P75 [8]	P90 [9]	P95 [10]	Max [11]
Panel A: Deferred Taxes											
GROSS_DTA	0.070	0.071	0.001	0.008	0.013	0.028	0.052	0.086	0.136	0.192	0.559
VA	0.169	0.237	0.000	0.000	0.000	0.007	0.073	0.217	0.516	0.778	1.000
NET_DTA	0.050	0.042	0.000	0.006	0.009	0.021	0.041	0.067	0.100	0.129	0.288
GROSS_DTL	0.064	0.063	0.000	0.002	0.005	0.018	0.044	0.086	0.152	0.197	0.390
NET_DTX	-0.014	0.067	-0.360	-0.146	-0.103	-0.040	-0.001	0.020	0.054	0.080	0.193
SIZE	8.680	1.813	4.978	5.854	6.299	7.256	8.667	9.953	11.028	11.772	13.693

	Above Median Valuation Allowance					Below Median Valuation Allowance					Mean
Variables	Mean [1]	SD [2]	Q1 [3]	Median [4]	Q3 [5]	Mean [6]	SD [7]	Q1 [8]	Median [9]	Q3 [10]	Difference [11]
Panel B: Negative and Positive Evidence Variables											
CUMLOSS	0.162	0.369	0.000	0.000	0.000	0.054	0.225	0.000	0.000	0.000	0.109***
CBACK	0.812	0.390	1.000	1.000	1.000	0.896	0.305	1.000	1.000	1.000	-0.083***
REVERSE	0.374	0.484	0.000	0.000	1.000	0.476	0.500	0.000	0.000	1.000	-0.103***
TAXPLAN	0.695	6.365	-1.056	-0.103	1.231	0.985	7.510	-0.634	0.090	1.530	-0.290*
FUTURE_TI	0.062	0.060	0.018	0.049	0.086	0.076	0.072	0.021	0.059	0.106	-0.014***
EUTBBE	0.036	0.057	0.006	0.018	0.044	0.025	0.043	0.003	0.011	0.029	0.011***
Panel C: Financial Reporting Quality											
TX_RES	0.019	0.135	0.000	0.000	0.000	0.009	0.097	0.000	0.000	0.000	0.009***
TX_ICW	0.007	0.083	0.000	0.000	0.000	0.005	0.073	0.000	0.000	0.000	0.002
VA_CMLTR	0.016	0.127	0.000	0.000	0.000	0.012	0.109	0.000	0.000	0.000	0.004*
SUBJECTIVE	0.365	0.481	0.000	0.000	1.000	0.401	0.490	0.000	0.000	1.000	-0.036***
MTB	3.533	4.542	1.460	2.282	3.842	3.568	4.312	1.542	2.371	3.883	-0.035
LNMVE	8.636	1.665	7.249	8.813	9.822	8.426	1.657	7.013	8.417	9.600	0.210***
SHUMWAY	4.426	2.862	2.000	4.000	7.000	4.598	2.776	2.000	5.000	7.000	-0.172**
LNSEG	1.810	0.825	1.609	1.946	2.303	1.444	0.887	0.693	1.609	2.079	0.366***
FCT_DUM	0.420	0.494	0.000	0.000	1.000	0.284	0.451	0.000	0.000	1.000	0.136***
MERGE_DUM	0.504	0.500	0.000	1.000	1.000	0.442	0.497	0.000	0.000	1.000	0.062***
FOR_SALES	0.181	0.296	0.000	0.000	0.299	0.117	0.249	0.000	0.000	0.060	0.064***
SALES_GROW	0.061	0.183	-0.025	0.044	0.125	0.077	0.173	-0.007	0.058	0.136	-0.016***
TLCF	0.090	0.190	0.000	0.020	0.086	0.034	0.096	0.000	0.000	0.024	0.057***
TENURE	10.266	4.271	8.000	11.000	14.000	10.289	4.262	8.000	11.000	14.000	0.022
PRETAX_ROA	0.071	0.097	0.020	0.061	0.118	0.098	0.096	0.032	0.083	0.146	-0.027***
SD_PI3	0.041	0.049	0.010	0.023	0.051	0.034	0.043	0.008	0.020	0.041	0.008***

[1] This table presents descriptive statistics for S&P 500 and S&P 600 sample firms from 2008-2017. In Panel A, we present summary statistics for information related to deferred taxes. In Panel B (Panel C), we present summary statistics for positive and negative evidence DTAVA determinants (firm-specific financial reporting quality measures and characteristics) for firms with high/low valuation allowance balances. We classify a firm as having a high (low) valuation allowance balance if *VA* is above (below) the industry-year *VA* median (we use the Fama and French [1997] 17 industry classification scheme). In column [11] of Panels B and C, we present the result of a high/low *VA* mean difference (column [1]-column [6]) *t*-test. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 (two-tailed) levels, respectively. We define *VA* as the deferred tax asset valuation allowance divided by the gross deferred tax asset. We define all other variables in Appendix A.

Table 2
Correlations

Variables	[1]	[2]	[3]	[4]	[5]	[6]
[1] *VA*						
[2] *CUMLOSS*	**0.428**					
[3] *CBACK*	**-0.296**	**-0.336**				
[4] *REVERSE*	**-0.213**	**-0.122**	**0.086**			
[5] *TAXPLAN*	**-0.098**	**-0.088**	**0.088**	0.103		
[6] *FUTURE_TI*	**-0.265**	**-0.274**	**0.253**	**0.019**	**0.192**	
[7] *SIZE*	**-0.071**	**-0.142**	**0.124**	**0.212**	**0.054**	**0.219**

[1] This table presents correlations for S&P 500 and S&P 600 sample firms from 2008-2017. We define *VA* as the deferred tax asset valuation allowance divided by the gross deferred tax asset. **BOLD** correlations are significant at the 5% level or better (two-tailed). We define all other variables in Appendix A.

Table 3
Deferred Tax Asset Valuation Allowance Account Determinants[1]

Panel A: Positive and Negative Evidence Regressions

Variables	***VA*** **[1]**	***VA*** **[2]**	***VA*** **[3]**	***VA*** **[4]**	***VA*** **[5]**	***VA*** **[6]**
CUMLOSS	0.647***					0.510***
	(13.83)					(11.45)
CBACK		-0.396***				-0.206***
		(-10.87)				(-6.45)
REVERSE			-0.218***			-0.163***
			(-9.85)			(-8.48)
TAXPLAN				-0.058***		-0.013
				(-4.25)		(-1.06)
FUTURE_TI					-0.247***	-0.096***
					(-9.60)	(-5.24)
SIZE	-0.038	-0.071***	-0.065**	-0.094***	-0.113***	-0.022
	(-1.44)	(-2.62)	(-2.25)	(-3.18)	(-3.88)	(-0.88)
Auditor FE	Y	Y	Y	Y	Y	Y
Ind/Year FE	Y	Y	Y	Y	Y	Y
N	6899	6899	6899	6899	6899	6899
Adj R^2	0.2396	0.1625	0.1244	0.0895	0.1289	0.2926

Panel B: Tests of Objective and Subjective Evidence – Cross Equation Coefficient Tests for Individual Regressions in Panel A, Columns [1[- [5[

Variables	*CUMLOSS* **[1]**	*CBACK* **[2]**	*REVERSE* **[3]**	*TAXPLAN* **[4]**
[*CBACK* + *REVERSE*] - [*TAXPLAN* + *FUTURE_TI*]				142.08***
CBACK	75.29***			
REVERSE	250.44***	63.93***		
TAXPLAN	431.51***	206.37***	146.40***	
FUTURE_TI	238.87***	49.18***	3.85†	156.04†

Panel C: Tests of Objective and Subjective Evidence – Coefficient F-Tests for the Regression in Panel A, Column [6]

Variables	*CUMLOSS* **[1]**	*CBACK* **[2]**	*REVERSE* **[3]**	*TAXPLAN* **[4]**
[*CBACK* + *REVERSE*] - [*TAXPLAN* + *FUTURE_TI*]				34.77***
CBACK	24.38***			
REVERSE	48.39***	1.52		
TAXPLAN	117.62***	31.64***	43.10***	
FUTURE_TI	70.55***	8.56***	7.72***	13.00†

[1] This table presents regressions of the determinants of DTAVAs for S&P 500 and S&P 600 firms from 2008-2017. In Panel A, we present the results of estimating OLS regressions of the current scaled DTAVA on current positive and negative evidence DTAVA determinants and size. We present coefficient estimates first, followed by robust, clustered (by firm) t-statistics. To compare coefficient estimates of continuous and dichotomous regression inputs across and within equations, we standardize the continuous regression inputs using a procedure developed by Gelman [2008]; for each continuous variable, we subtract its mean and divide by two standard deviations. We adjust the OLS standard errors for heteroscedasticity and firm-level serial correlation in the residuals and include auditor, industry (using the Fama and French [1997] 17 industry classification scheme), and year fixed effects in each regression. The symbols ***, **, and * denote statistical significance at the 1%, 5% and 10% levels (two-tailed), respectively. In Panels B and C, we present the results of tests of the incremental and relative information content of objective and subjective evidence. See page 12 for a summary of the tests underlying each contrast. We have directional predictions for these tests; therefore, the symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (one-tailed), respectively. The symbol † indicates that the test is significant, but in the wrong direction. We define the variables in Appendix A.

Table 4
Financial Reporting Quality and Subjective Evidence

Panel A: Descriptive Statistics for First Stage Estimation

	Equation (2)					Equation (3)				
Variables	**Mean** [1]	**SD** [2]	**Q1** [3]	**Median** [4]	**Q3** [5]	**Mean** [6]	**SD** [7]	**Q1** [8]	**Median** [9]	**Q3** [10]
INTERCEPT	0.065*	0.400	-0.055	0.050**	0.178	0.076**	0.304	-0.060	0.041***	0.158
CUMLOSS	0.059***	0.169	0.000	0.000***	0.047	0.060***	0.172	0.000	0.000***	0.047
CBACK	-0.002	0.187	-0.019	0.000	0.016	-0.007	0.171	-0.026	0.000	0.017
REVERSE	-0.014***	0.047	-0.028	-0.008**	0.009	-0.021***	0.061	-0.028	-0.006***	0.005
TAXPLAN	-0.001	0.015	-0.002	0.000	0.001					
FUTURE_TI	0.014	2.764	-0.394	-0.089**	0.107					
VA_{t-1}	0.856***	0.317	0.791	0.901***	1.000	0.869***	0.303	0.787	0.899***	1.016
SIZE	-0.002	0.032	-0.011	-0.001	0.007	-0.003	0.025	-0.007	-0.001	0.006
Adj R^2	0.868***	0.140	0.813	0.918***	0.971	0.851***	0.154	0.783	0.899***	0.967
N	124					131				

Panel B: Second Stage Estimation – The Association Between Tax Financial Reporting Quality and *SUBJECTIVE*

Variables	TX_RES_t [1]	TX_ICW_t [2]	VA_CMLTR_t [3]
SUBJECTIVE	1.439*	3.040***	1.500**
	(1.51)	(2.96)	(2.02)
LNMVE	0.876	0.674**	1.296***
	(-1.23)	(-2.29)	(2.80)
SHUMWAY	1.076	0.952	1.008
	(1.25)	(-0.62)	(0.17)
LNSEG	1.041	1.331	1.093
	(0.21)	(0.84)	(0.58)
FCT_DUM	1.117	0.891	1.133
	(0.42)	(-0.22)	(0.56)
MERGE_DUM	1.322	1.915*	1.100
	(1.17)	(1.60)	(0.47)
FOR_SALES	1.628	8.716***	0.843
	(1.04)	(3.01)	(-0.39)
SALES_GROW	0.735	0.549	2.260
	(-0.36)	(-0.43)	(1.17)
TLCF	1.395	0.899	0.525
	(0.46)	(-0.07)	(-0.97)
TENURE	1.003	0.986	0.947**
	(0.10)	(-0.30)	(-2.19)
PRETAX_ROA	0.007***	0.000***	0.714
	(-2.59)	(-2.72)	(-0.20)
SD_PI3	0.010**	8.994	0.033
	(-1.84)	(0.52)	(-1.06)
First Stage Regressors			
CUMLOSS	1.040	0.996	2.219**
	(0.10)	(-0.01)	(1.86)
CBACK	1.858*	1.789	1.505
	(1.58)	(0.83)	(1.18)
REVERSE	0.669*	0.635	0.735
	(-1.62)	(-1.19)	(-1.24)
TAXPLAN	0.994	0.998	0.986
	(-0.31)	(-0.07)	(-0.70)
FUTURE_TI	0.190	0.056	0.004*
	(-0.43)	(-0.80)	(-1.56)
VA_{t-1}	0.810	0.312	1.086
	(-0.36)	(-0.89)	(0.15)

(*continued on next page*)

Table 4 (Continued)

Panel B (Continued)

	TX_RES$_t$ [1]	*TX_ICW*$_t$ [2]	*VA_CMLTR*$_t$ [3]
Auditor FE	Y	Y	Y
Ind/Year FE	Y	Y	Y
N	5150	4300	5524
Pseudo R^2	0.126	0.243	0.069
χ^2	210.075	327.770	3160.534

Panel C: Positive and Negative Subjectivity

Variables	*TX_RES*$_t$	*TX_ICW*$_t$	*VA_CMLTR*$_t$	*TX_RES*$_t$	*TX_ICW*$_t$	*VA_CMLTR*$_t$
	SUBJECTIVE >= 0			*SUBJECTIVE* < 0		
	[1]	[2]	[3]	[4]	[5]	[6]
SUBJECTIVE	1.572*	4.034***	1.694**	1.156	2.898*	1.436
	(1.43)	(2.69)	(1.97)	(0.38)	(1.61)	(1.10)
Controls	Y	Y	Y	Y	Y	Y
Auditor FE	Y	Y	Y	Y	Y	Y
Ind/Year FE	Y	Y	Y	Y	Y	Y
N	2555	1713	2572	2245	1364	2319
Pseudo R^2	0.163	0.288	0.082	0.186	0.314	0.143
χ^2	178.286	191.224	2240.567	201.525	309.333	959.649

[1] This table presents results about financial reporting quality and using subjective evidence to determine the DTAVA for S&P 500 and S&P 600 firms from 2008-2017. In Panel A, we present descriptive statistics from estimating equation (2) and equation (3) by industry (Fama and French [1997] 17 industry classification scheme) and year using OLS regressions of the current scaled DTAVA on current positive and negative evidence DTAVA determinants, the lagged, scaled DTAVA, and size. The symbols ***, **, and * denote statistical significance at the 1%, 5% and 10% levels (two-tailed), respectively. In Panel B, we present the results of estimating logit regressions of tax-based financial reporting quality measures on *SUBJECTIVE*, tax- and nontax-related financial reporting quality control variables, and the control variables from the first-stage regression. In Panel C, we present the results of estimating logit regressions of tax-based financial reporting quality measures on positive (columns [1]-[3]) and negative (columns [4]-[6]) values of *SUBJECTIVE*, tax- and nontax-related financial reporting quality control variables, and the control variables from the first-stage regression. We present odds ratios first, followed by robust, clustered by firm, z-statistics. We adjust the standard errors for heteroscedasticity and firm-level serial correlation in the residuals and include auditor, industry (using the Fama and French [1997] 17 industry classification scheme), and year fixed effects in each regression. We have a directional prediction for the association between financial reporting quality and *SUBJECTIVE*; therefore, the symbols ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels (one-tailed), respectively. We define the variables in Appendix A.

Table 5
UTBs as an Additional Source of Positive Evidence[1]

Panel A: UTBs as an Additional Source of Positive Evidence

Variables	*VA* [1]	*VA* [2]
CUMLOSS		0.524***
		(11.07)
CBACK		-0.223***
		(-6.38)
REVERSE		-0.157***
		(-7.73)
TAXPLAN		-0.021
		(-1.45)
FUTURE_TI		-0.096***
		(-5.11)
EUTBBE	0.133***	0.072***
	(5.05)	(3.56)
SIZE	-0.115***	-0.023
	(-3.55)	(-0.82)
Auditor FE	Y	Y
Ind/Year FE	Y	Y
N	5641	5641
Adj R^2	0.0918	0.3114

Panel B: Positive Evidence Regressions for Observations with and without Cumulative Losses

Variables	*VA* *CUMLOSS* = 1 [1]	*VA* *CUMLOSS* = 0 [2]	*VA* *CUMLOSS* = 1 [3]	*VA* *CUMLOSS* = 0 [4]	*VA* *CUMLOSS* = 1 [5]	*VA* *CUMLOSS* = 0 [6]
CBACK	-0.170***	-0.224***			-0.119*	-0.198***
	(-2.81)	(-6.11)			(-1.86)	(-5.43)
REVERSE	-0.639***	-0.118***			-0.622***	-0.122***
	(-7.17)	(-6.50)			(-6.85)	(-6.64)
TAXPLAN			-0.157***	-0.012	-0.050	-0.002
			(-2.78)	(-1.01)	(-1.17)	(-0.18)
FUTURE_TI			-0.519***	-0.107***	-0.307*	-0.080***
			(-3.24)	(-5.73)	(-1.84)	(-4.60)
SIZE	-0.136	0.010	-0.215**	-0.024	-0.124	-0.001
	(-1.36)	(0.40)	(-2.01)	(-0.94)	(-1.25)	(-0.04)
Auditor FE	Y	Y	Y	Y	Y	Y
Ind/Year FE	Y	Y	Y	Y	Y	Y
N	751	6148	751	6148	751	6148
Adj R^2	0.2771	0.1358	0.1786	0.0989	0.2824	0.1423

Panel C: Cross-Equation Positive Evidence Coefficient Tests for Observations with and without Cumulative Losses

Variables	**Objective Evidence** **Panel B, Column [1]-Column [2]** [1]	**Subjective Evidence** **Panel B, Column [3]-Column [4]** [2]	**Both** **Panel B, Column [5]-Column [6]** [3]
CBACK	$\chi^2 = 0.95$		$\chi^2 = 1.86^*$
REVERSE	$\chi^2 = 88.74^{***}$		$\chi^2 = 79.82^{***}$
TAXPLAN		$\chi^2 = 6.86^{***}$	$\chi^2 = 1.38$
FUTURE_TI		$\chi^2 = 10.97^{***}$	$\chi^2 = 3.20^{**}$

(*continued on next page*)

Table 5 (Continued)

[1] This table presents the results of additional tests about positive evidence DTAVA determinants for S&P 500 and S&P 600 firms from 2008-2017. In Panel A, we present the results of estimating OLS regressions of the current scaled DTAVA on current positive and negative evidence DTAVA determinants and size. In Panel B, we present the results of estimating OLS regressions of the current scaled DTAVA on current positive evidence DTAVA determinants and size for observations with and without cumulative losses. In Panel A and Panel B, we present coefficient estimates first, followed by robust, clustered (by firm) t-statistics. To compare coefficient estimates of continuous and dichotomous regression inputs across and within equations, we standardize the continuous regression inputs using a procedure developed by Gelman [2008]; for each continuous variable, we subtract its mean and divide by two standard deviations. We adjust the OLS standard errors for heteroscedasticity and firm-level serial correlation in the residuals and include auditor, industry (using the Fama and French [1997] 17 industry classification scheme), and year fixed effects in each regression. The symbols ***, **, and * denote statistical significance at the 1%, 5% and 10% levels (two-tailed), respectively. In Panel C, we present the results of cross-equation tests of the differences in positive evidence DTAVA determinants for observations with and without cumulative losses. We have directional predictions for these tests; therefore, the symbols ***, **, and * denote statistical significance at the 1%, 5% and 10% levels (one-tailed), respectively. We define the variables in Appendix A.

Table 6
Subjective Evidence Cross-sectional Tests

Panel A: Multinational and Domestic Firm-Years

	TX_RES_t		TX_ICW_t		VA_CMLTR_t	
Variables	**MNC**	**Domestic**	**MNC**	**Domestic**	**MNC**	**Domestic**
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**
SUBJECTIVE	1.328	1.505	3.232***	2.786	1.562**	1.319
	(1.01)	(0.84)	(2.37)	(1.07)	(1.91)	(0.64)
Controls	Y	Y	Y	Y	Y	Y
Auditor FE	Y	Y	Y	Y	Y	Y
Ind/Year FE	Y	Y	Y	Y	Y	Y
N	3351	1607	2535	1013	3347	1770
Pseudo R^2	0.176	0.238	0.284	0.430	0.071	0.133
χ^2	207.68	235.06	291.995	481.635	1905.143	952.474

Panel B: Cross Equation Coefficient Tests | Multinational and Domestic Firm-Years

	TX_RES_t	TX_ICW_t	VA_CMLTR_t
SUBJECTIVE	$\chi^2 = 0.05$	$\chi^2 = 0.02$	$\chi^2 = 0.12$

Panel C: Firm-Years with Above and Below Median Analyst Following

	TX_RES_t		TX_ICW_t		VA_CMLTR_t	
Variables	**H_AFOL**	**L_AFOL**	**H_AFOL**	**L_AFOL**	**H_AFOL**	**L_AFOL**
	[1]	**[2]**	**[3]**	**[4]**	**[5]**	**[6]**
SUBJECTIVE	1.339	1.842**	2.352	2.887***	1.135	2.191***
	(0.81)	(1.77)	(1.22)	(2.44)	(0.47)	(2.47)
Controls	Y	Y	Y	Y	Y	Y
Auditor FE	Y	Y	Y	Y	Y	Y
Ind/Year FE	Y	Y	Y	Y	Y	Y
N	2478	2436	1086	1898	2709	2265
Pseudo R^2	0.180	0.154	0.485	0.254	0.098	0.108
χ^2	282.563	1562.540	140.534	1119.243	2441.262	2123.461

Panel D: Cross Equation Coefficient Tests | Above and Below Median Analyst Following

	TX_RES_t	TX_ICW_t	VA_CMLTR_t
SUBJECTIVE	$\chi^2 = 0.41$	$\chi^2 = 0.06$	$\chi^2 = 2.48^*$

[1] This table presents results of cross-sectional tests of the association between financial reporting quality and using subjective evidence to determine the DTAVA for S&P 500 and S&P 600 firms from 2008-2017. In Panel A (Panel C), we present the results of estimating logit regressions of tax-based financial reporting quality measures on *SUBJECTIVE*, tax- and nontax-related financial reporting quality control variables, and the control variables from the first-stage regression for multinational and domestic observations (observations with high and low analyst following). We present odds ratios first, followed by robust, clustered by firm, z-statistics. We adjust the standard errors for heteroscedasticity and firm-level serial correlation in the residuals and include auditor, industry (using the Fama and French [1997] 17 industry classification scheme), and year fixed effects in each regression. We have a directional prediction for the association between financial reporting quality and *SUBJECTIVE*; therefore, the symbols ***, **, and * denote statistical significance at the 1%, 5% and 10% levels (one-tailed), respectively. In Panel B (Panel D), we present the results of cross-equation tests of the differences in *SUBJECTIVE* for multinational and domestic observations (observations with high and low analyst following). We have directional predictions for these tests; therefore, the symbols ***, **, and * denote statistical significance at the 1%, 5% and 10% levels (one-tailed), respectively. We define the variables in Appendix A.