# Does the deferred tax asset valuation allowance signal firm creditworthiness?

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**Abstract**
In this study, I provide evidence that the valuation allowance for deferred tax assets helps predict the future creditworthiness of a firm. Under the provisions of SFAS No. 109, a firm records a deferred tax asset provided it expects to generate sufficient taxable income to realize the asset in the form of tax savings in the future. If a firm does not expect to generate sufficient taxable income to realize the asset, a valuation allowance is created to reduce the balance. As a result, the valuation allowance indicates management's expectation of future taxable income, which could be informative in predicting the ability of the firm to make future interest and principal payments on debt. Alternatively, the valuation allowance may not be informative regarding creditworthiness if it is a result of overly conservative accounting practices or if it is used as an earnings management tool. I document a negative association between material increases in the valuation allowance and contemporaneous and future changes in credit ratings, evidence that is consistent with the valuation allowance providing a signal of a decline in firms' creditworthiness.

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## 1. Introduction

In this study I use material increases in the valuation allowance as an implicit forecast by management of poor future performance and examine changes in the valuation allowance as a signal of firm creditworthiness. Specifically, I examine whether the information conveyed by material increases in the valuation allowance are associated with changes in credit ratings issued by Standard & Poor's (S&P); and the timing of the decreases in credit ratings.[1] I document a negative association between increases in the valuation allowance and contemporaneous and future changes in credit ratings, evidence that is consistent with increases in the valuation allowance signaling a decline in firms' creditworthiness.

Prior research has found that the information in tax accounts, particularly the difference between estimated pretax income (taxable income) and financial accounting income (book income), is informative in several settings. While a large stream of research examines the role of differences in book income and taxable income and earnings persistence and equity valuation (see for example Lev and Nissim, 2004; Hanlon, 2005; Weber 2009; Blaylock et al., 2012; Dhaliwal et al. 2013), less is known about the role the financial reporting of tax information plays in debt markets.

Statement of Financial Accounting Standards No. 109 (SFAS No. 109), now part of Accounting Standards Codification section 740 (ASC 740), requires the creation of a deferred tax asset to recognize the expected future tax savings realized when there are temporary differences between book income and taxable income. After deferred tax assets have been recognized, they must then be reduced through the use of a valuation allowance (a contra-asset)

[1] I focus on increases, as opposed to decreases, in the valuation allowance account for two reasons. First, increases are more common than decreases and, as a result, are observable for a greater number of firms. Second, in order to include a broad sample of firms in my tests, I utilize an algorithm to identify significant increases in the valuation allowance account. Because of the mechanics of SFAS No. 109, a similar algorithm is not feasible for decreases in the valuation allowance account.

if it is more likely than not that the deferred tax asset will not be realized. Managers make a determination about the magnitude of the allowance (subject to external audit) based on expectations about future taxable income.

To the extent that a positive relation exists between future taxable income and future accounting earnings, the SFAS No. 109 provisions create a unique setting where management provides a public assessment of low (or negative) earnings persisting into the future. This assessment could be informative in assessing firms' future performance and firm value. Dhaliwal et al. (2013) examine the differential persistence of accounting losses based on firms' tax attributes. They document evidence consistent with losses being most persistent for firms in which a full valuation allowance is established against the current period net operating loss (NOL) and document equity market pricing of this information. Because persistent losses are a negative signal of creditworthiness, I predict a negative association between increases in the valuation allowance and proxies for firm creditworthiness.

Despite the evidence in Dhaliwal et al., (2013) in the equity market, there are reasons to believe the relation could be different in debt markets. Unlike equity markets, in debt markets regardless of firm performance, a firm will never pay creditors more than the promised interest and principal payments. Further, if a firm experiences financial difficulties they could default and pay creditors less than the promised cash flows. As a result, in contrast to the more symmetric potential outcomes for equity investors, creditors are primarily concerned with the downside risk of a firm. This greater concern with negative outcomes should make the information in the valuation allowance about poor future taxable income particularly informative to debt market participants.

Prominent examples of firms recording large increases in the valuation allowance include Bethlehem Steel's 2001 increase of $1.2 billion and General Motor's 2007 increase of almost $40 billion. Both of these examples occurred prior to poor future performance at the respective firms, eventually leading to large-scale corporate bankruptcies. These anecdotes are consistent with increases in the valuation allowance indicating a decrease in firm creditworthiness.

The assessment related to future taxable income based on management's evaluation of the overall expected performance of the firm makes the valuation allowance unlike most other accounting write-downs and/or allowances, such as the allowance for doubtful accounts, inventory valuation allowances, fixed assets impairments, etc., which focus on the expected future benefit related to a particular asset and not the overall prospects of the firm.

The change in the valuation allowance is a potentially appealing signal to use in assessing creditworthiness for the following reasons. Unlike other management issued guidance about future performance such as earnings forecasts, or third party assessments of future prospects such as analyst forecasts, the valuation allowance is a required disclosure under U.S. GAAP that all firms (that do not meet the more likely than not criteria for recognition of a deferred tax asset) are required to make. Additionally, the valuation allowance is an audited disclosure in the financial statements. This third party verification of the disclosure likely increases the reliability of the information contained within the valuation allowance and therefore the decision usefulness of the disclosure.

The hypothesized relation between material increases in the valuation allowance and creditworthiness might not be observed for several reasons. First, the valuation allowance is an accrual that is subject to managerial discretion. To the extent that managers use that discretion and opportunistically manipulate earnings through this account, changes in the balance of the

account will not be related to firm creditworthiness. Second, although a change in the valuation allowance directly affects tax expense and the deferred tax asset account, it does not appear as a separate line item within the balance sheet or income statements; rather, it is disclosed within the tax footnote. In a related setting, Raedy, Seidman, and Shackelford (2011) provide evidence consistent with investors not fully incorporating information about the disaggregation of book-tax differences in the tax footnote. To the extent that financial statement users do not search out the details related to the valuation allowance in the footnote, the hypothesized relation will be attenuated.

In my analysis I use credit ratings as a proxy for creditworthiness. A decline in creditworthiness will manifest through a decrease in credit rating. While credit analysts should incorporate this information into their ratings, the analysts face a trade-off between issuing an unbiased rating and the reputational costs of issuing a more lax rating (Mathis et al. 2009). Additionally, Kraft (2015) provides evidence that, although rating agencies are for the most part efficient in processing accounting information, analysts might not make sufficiently conservative soft adjustments (as opposed to hard adjustments to financial statement line items). As a result, it is not clear *when* the information contained within increases in the valuation allowance will be incorporated into credit ratings. Credit analysts were specifically excluded from the provisions of Regulation Fair Disclosure (FD) and, therefore, analysts at rating agencies can have access to confidential information about firms.[2] If the analysts are able to use their access to private information, then changes in credit ratings should occur prior to the public disclosure of material increases in the valuation allowance. Alternatively, credit analysts might be slow to revise their ratings due to concerns that a rating downgrade could become a self-fulfilling prophecy

[2] This exclusion from Regulation FD was removed as part of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. In section 5.1. I describe this law changes and perform analysis around them.

(Moody's 2002). Further, Beaver et al. (2006) provide evidence that certified credit rating agencies, such as those used in this study, are less timely in reflecting negative news in their ratings (as opposed to good news). Therefore, whether changes in credit ratings occur prior to, or following, material increases in the valuation allowance is an empirical question.

I find evidence consistent with material increases in the valuation allowance helping predict the future creditworthiness of a firm. I document a negative relation between changes in S&P issuer credit ratings and material increases in the valuation allowance during the fiscal period in which a firm records the allowance and in the period following the disclosure of a material increase in the valuation allowance. These results are consistent with credit rating agencies incorporating a substantial, but not complete, portion of the information from material increases in the valuation allowance prior to the release of the 10-k.

This study is of interest for several reasons. First, I contribute to the literature examining the role of financial reporting information in the formation of credit ratings. Academics have called for research that investigates the use of accounting information by lenders (Holthausen and Watts 2001). In a survey conducted by Graham and Harvey (2001), managers identify credit ratings as the second greatest concern when determining capital structure of the firm. Credit ratings play an important role in the capital markets and, in recent years, credit ratings have become increasingly important due to firms shifting debt financing from commercial banks towards the rated capital markets (Pettit et al. 2004). In response to concerns about the reliability and integrity of the credit rating process, the Securities and Exchange Commission (SEC) has called for more accountability among the credit rating agencies and greater disclosures regarding the rating process (SEC 2003; 2009). I document evidence consistent with the rating agencies

(specifically S&P) recognizing the information within the valuation allowance and incorporating that information into their ratings.

In addition, this study contributes more broadly to our understanding of the information contained within the tax accounts in the financial statements. There is an ongoing debate among policymakers and within the tax literature regarding the desirability of conforming firms' two major performance reports, the financial accounting income statement and the tax return (commonly known as book-tax conformity). Prior research argues that the conformity of these two measures of income would result in a loss of information, despite the fact that one of the sources, taxable income, is not directly observable for most public firms (see Hanlon et al. 2005; Hanlon et al. 2008).[3] Blaylock et al. (2016) argue that changes in book-tax conformity impact equity holders to a greater extent than debt holders. This difference results in firms relying on debt financing to a greater extent when book-tax conformity is higher. This study also provides further evidence on the information content of these two sources of performance reporting in a debt motivated setting. A related stream of literature documents an association between large book-tax differences and earnings persistence (Hanlon 2005; Weber 2009; Blaylock et al. 2012). Guenther (2011) documents evidence consistent with changes in the valuation allowance (as well as the use of net operating loss carryfowards) accounting for a substantial portion of influential observations in these tests. Most closely related to this study, Ayers et al. (2010) examine the relation between credit ratings and overall book-tax differences. In their study, the book-tax difference is viewed as a signal of earnings quality or off-balance-sheet financing activity. I extend Ayers et al. (2010) and document a possible source of the information related to book-tax differences, material increases in the deferred tax asset valuation allowance, and provide

[3] Taxable income must be inferred through financial accounting information as tax returns are usually not made available to investors.

evidence consistent with the valuation allowance being an important source of information about expected future performance that is associated with credit ratings.

The remainder of this paper is organized as follows. Section 2 discusses related literature and develops the hypotheses. Section 3 details the sample selection and describes the research design. Section 4 presents the empirical results. Section 5 presents additional analyses. Finally, Section 6 concludes.

**2. Prior Literature and hypotheses development**

Deferred tax assets and liabilities are the result of temporary differences between book and taxable income. A firm determines cumulative temporary differences, applies the tax rate at which these differences are expected to reverse, and presents the resulting amount as a deferred tax asset or deferred tax liability. The deferred tax expense for the year is the net change in the firm's deferred tax assets and liabilities. In a sample of Fortune 50 firms, Poterba et al. (2007) document substantial heterogeneity in the source of the timing differences that generate their deferred tax assets and liabilities. The largest sources of timing differences that generate deferred tax assets for their sample firms were NOLs and tax credit carryforwards, and Employment and Post-employment Benefits. The largest sources of the timing differences that generate deferred tax liabilities were Property, Plant & Equipment and Leases. After deferred tax assets have been recognized, firms must reduce deferred tax assets by a valuation allowance if "it is more likely than not (a likelihood of more than 50 percent) that some portion or all of the deferred tax assets will not be realized" (ASC 740-10-30-5). The primary source of realization for deferred tax assets is future taxable income.[4] Assuming a positive relation between future taxable income and future cash flows, the valuation allowance provides financial statement users, including credit

[4] Additional sources of realization for deferred tax assets are reversals of existing temporary differences, taxable income in prior carryback years, and tax-planning strategies.

rating analysts, with an assessment by management of the likelihood of future profitability. Prior research related to the valuation allowance can be organized into two groups: (i) research focused on the use of the valuation allowance as an earnings management tool; and (ii) research focused on the extent to which equity investors and financial analysts use the information in the valuation allowance account.

*2.1. Earnings management and the deferred tax asset valuation allowance*

The provisions of ASC 740 allow for considerable latitude in the timing and amount of valuation allowance managers record. Consistent with this fact, prior studies have documented the use of the valuation allowance as an earnings management tool. Schrand and Wong (2003) test for earnings management at banks through manipulation of the valuation allowance. Their evidence indicates that most banks do not record a valuation allowance to manage earnings but rather follow the guidelines of SFAS No. 109, although if a bank is sufficiently well capitalized to absorb the current-period impact on capital, the amount of the valuation allowance increases with a bank's capital and in some cases bank managers adjust the valuation allowance to smooth earnings. Frank and Rego (2006) provide evidence on earnings management (smoothing toward the mean analyst forecast) through the valuation allowance in a broader sample of firms. Christensen et al. (2008) examine whether firms increase "big bath" behavior using the valuation allowance. After modeling the expected valuation allowance, they find that firms that create a larger-than-expected allowance have poorer future operating performance and that valuation allowance reversals are used to meet or beat the mean analyst earnings forecast. These prior studies are indicative of firms possessing substantial flexibility on the timing and amount of changes in the valuation allowance.

Overall, prior research has documented evidence consistent with earnings management

through the valuation allowance, but not at levels sufficient to overwhelm the information in the account to assist in the prediction of future accounting performance. In this study, I examine the relation between increases in the valuation allowance and decreases in firm creditworthiness, building on the extant literature and documenting a potential use of the information contained within the account.

*2.2. Equity markets and the deferred tax asset valuation allowance*

Ayers (1998) was among the first to examine deferred taxes under SFAS No. 109.[5] He finds that SFAS No. 109 disclosures are incrementally more informative compared to the disclosures under APB 11. Although it is not the focus of his study, in a value-relevance regression of the components of deferred tax assets and deferred tax liabilities, he observes a significant negative coefficient on the valuation allowance, consistent with the disclosure being value relevant. Miller and Skinner (1998) examine the determinants of the valuation allowance and find that the allowance is positively associated with deferred tax assets, tax credits and NOLs, and negatively associated with higher levels of expected future income.[6]

When managers increase the valuation allowance account, they are publicly signaling poor expected future performance. This view is consistent with anecdotes and examples from the popular press indicating that increases in a firm's valuation allowance account are predictive of

[5] Prior to the Ayers (1998) study, Givoly and Hayn (1992) examine the market reaction to the Tax Reform Act of 1986 (TRA86) statutory federal tax rate reduction. They document that firms with larger deferred tax liabilities experience larger increases in the value of equity. They also document that the reduction in the statutory tax rate increases a firm's equity value for firms with greater growth in liabilities and higher likelihood of future losses (both proxies for likelihood of future deferred tax liability settlement). The Givoly and Hayn (1992) study was conducted pre-SFAS NO. 109, and as a result, they do not report any results relating to deferred tax assets (which did not exist under APB 11).

[6] Behn et al. (1998) also examine the determinants of the valuation allowance and provide empirical evidence on the association between the recognized valuation allowance and certain variables put forth as sources of evidence of future realization in the FASB's SFAS No. 109. They find a negative association between the valuation allowance and deferred tax liabilities (a proxy for future book-tax reversals), order backlog, current period earnings, effective tax rate, the deferred tax asset associated with other post-employment benefits, and market value, and a positive association with financial distress and material contingent liabilities.

future earnings problems.[7] Amir and Sougiannis (1999) examine investor and analyst valuation of tax carryforwards and document evidence consistent with analysts considering earnings of firms with tax carryforwards to be less persistent due to the increased likelihood of future losses. Consistent with the expectation of lower future performance, they also document a significant negative relation between the valuation allowance and the present value of expected earnings (5 years of analyst forecasts). In an event study around the initial disclosures of changes in the valuation allowance account, Kumar and Visvanathan (2003) observe negative abnormal announcement period returns. Dhaliwal et al. (2013) examine whether tax expense and other tax disclosures provide incremental information about the persistence of book losses for firms reporting accounting losses. They find that accounting losses are least persistent for firm-years that report positive taxable income and most persistent for firm-years in which a full valuation allowance is established against the current period NOL. They also document significant mean abnormal long window returns, results consistent with investors not correctly pricing the information contained within the valuation allowance.

*2.3. Hypotheses*

Where prior research has focused on the relation between the valuation allowance and equity performance, I examine the relation between the valuation allowance and debt. The public debt market is a key component of the capital markets. Regardless of firm performance, a firm will never pay creditors more than the promised interest and principal payments, but if a firm experiences financial difficulties they could default and pay creditors less than the promised cash flows. In this sense, a creditor's claim is parallel to a written put option (Black and Scholes 1973). As a result, creditors are primarily concerned with the downside risk of a firm. Consistent

[7] Examples include Bethlehem Steel's 2001 increase in the valuation allowance of $1.2 billion and General Motor's 2007 increase of almost $40 billion discussed in the introduction.

with heightened concern regarding the downside risk of a firm Easton et al. (2009) document a larger bond-price reaction to the announcement of earnings when earnings convey bad news. Prior research has also documented that, potentially as a result of the limited upside potential of debt, the timing of the bond market reaction to bad news surprises about financial statement information differs from the equity market reaction (DeFond and Zhang 2011).

In a tax setting, several studies have found differences in how debt markets incorporate tax related information, as compared to equity markets. Hasan el al. (2014) and Shevlin et al. (2013) document positive associations between tax avoidance and the cost of debt. In contrast, Goh et al. (2016) document tax avoiding firms have a lower cost of equity, and Desai and Dharmapala (2009) find a positive association between tax avoidance and firm value in well-governed. Highlighting the complexity of this relation to credit rating agencies, Bonsall et al. (2015) document greater disagreement between rating agencies for tax avoiding firms.

When managers record a material increase in the valuation allowance against a firm's deferred tax assets, they are publically signaling their expectation of poor future performance. Prolonged periods of losses reduce firm net assets and increase the probability of insolvency. As a result, I expect firms that materially increase the valuation allowance to have a decline in creditworthiness. Accordingly, I hypothesize the following:

*H1: There is a negative association between material increases in the deferred tax asset valuation allowance and changes in firm creditworthiness.*

In my empirical analysis, I examine the relation between material increases in the valuation allowance and firm creditworthiness using credit ratings as a proxy for creditworthiness. A firm that experiences a decline in creditworthiness will face lower credit ratings and higher borrowing costs. Credit ratings play an important role in the capital markets in

facilitating both valuation and contracting (Frost 2007). Credit rating agencies consider public information such as SEC filings, news reports, industry reports, bond and stock price trends, and proxy statements, and nonpublic information through meetings with management, questionnaires, and information request letters. Annual and periodic meetings between issuers and credit rating agencies are common (SEC 2003).

Prior to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 credit rating agencies were specifically excluded from the provisions of Regulation FD. Even after the exclusion from Regulation FD was removed, several commentators noted the opinion that Regulation FD was never intended to apply to sharing confidential information with rating agencies and an additional exemption in Regulation FD, permitting the sharing of confidential information with any person who agrees to keep the information confidential, will still apply.[8] As a result, credit analysts at rating agencies have access to confidential information before it is released to the public. Jorion et al. (2005) examine the effect of credit rating changes on stock prices and find that the informational effect of downgrades and upgrades is much greater in the post-FD period, evidence that is consistent with more private information being revealed through credit ratings post Regulation FD. It is possible that credit rating analysts use their access to private information and are able to ascertain the private information prior to management's disclosure of a change in the valuation allowance. If credit rating analysts are able to use their access to private information in order to make more timely changes in their ratings, then changes in credit ratings should lead or occur within the same period as increases in the valuation allowance. It is also possible that credit rating agencies could be slow to revise their ratings even if they possess this information before it is public, possibly due to concerns that a rating

[8] In additional analyses I examine the impact of both Regulation FD and the Dodd-Frank Act. See section 5.1. for additional discussion and these analyses.

downgrade could become a self-fulfilling prophecy (Moody's 2002). Additionally, prior research has documented that credit ratings of certified agencies, such as S&P's, are inherently "sticky," particularly in the case of credit rating downgrades (Beaver et al. 2006). Given the issues surrounding the timeliness of credit ratings, it is not clear when credit rating analysts will incorporate this information into their credit ratings.

My next set of hypotheses examine this timing issue. If credit analysts use their access to private information and make timely revisions to ratings, a credit rating downgrade will occur during the contemporaneous fiscal period as the public disclosure of a material increase in the valuation allowance (i.e., the analysis will downgrade their rating before the earnings announcement and release of the 10-k). If credit analysts are *unable* or *unwilling* to use their access to private information to preempt the negative information related to future performance contained within material increases in the valuation allowance, the information will be captured in subsequent credit ratings and there will be a negative relation between material increases in the valuation allowance and *future* changes in credit ratings. As a result, whether credit rating analysts use information within material increases in the valuation allowance in contemporaneous or future fiscal periods is an empirical question.[9] Accordingly, I hypothesize the following:

> *H2A: There is a negative association between material increases in the deferred tax asset valuation allowance and contemporaneous fiscal period changes in credit ratings.*
>
> *H2B: There is a negative association between material increases in the deferred tax asset valuation allowance and future changes in credit ratings.*

[9] I measure contemporaneous fiscal period credit rating changes from the beginning of the fiscal year for which a firm books a material increase in the valuation allowance to the end of that fiscal year. Measurement of the change in credit rating through the fiscal year end date captures the change prior to the release of the 10-k and likely before the public disclosure of the material increase in the valuation allowance.

Note that it is possible that an initial reaction consistent with hypothesis 2A might not fully account for the information in increases in the valuation allowance and, as a result, there will be a leading and subsequent relation between changes in credit ratings and material increases in the valuation allowance. It is also possible that I will not observe the hypothesized relation between material increases in the valuation allowance and either contemporaneous fiscal period or future changes in ratings for several reasons. First, as discussed above, prior studies have documented the use of the valuation allowance as an earnings management tool. To the extent that managers are opportunistically manipulating earnings through this account, changes in the balance of the account will not be as informative regarding future creditworthiness. Second, although a change in the valuation allowance impacts tax expense and the balance of the deferred tax accounts, it does not appear directly within the balance sheet or income statements; rather, it is disclosed within the tax footnote.[10] Prior research indicates that financial statement users react less to disclosed information than to recognized information. This lower level of reaction could be due to one of two factors that are difficult to disentangle. The information might not be relevant or the market may not efficiently process the information (Bernard and Schipper 1994). If rating agencies do not believe that increases in the valuation allowance are reliable or do not efficiently process the information, then I will not observe a relation with contemporaneous or future ratings changes.

**3. Research Design and Sample Selection**

I use material increases in the deferred tax asset valuation allowance as an implicit forecast by management of poor future performance. I focus on material increases in order to capture the essence of my hypothesized relation, a decline in management's expectation of future

[10] Note, increases the valuation allowance directly impacts tax expense (i.e., it is recognized in the financial statements) but the amount is not a separate line item and, to the extent that financial statement users do not search out the details in the footnote, users will not use the valuation allowance as a signal performance.

overall firm performance. Management can record small increases in the valuation allowance for reasons other than a decline in expectation of future overall firm performance. For example, a firm could have NOLs in a foreign subsidiary that cannot be used against income of the parent. The valuation allowance against these NOLs would not be indicative of management's expectations of overall firm performance. For example, in 2009 Merck & Co. Inc. recorded a $101.4 million increase in their valuation allowance (against a gross deferred tax asset of $6,858.3 million) despite a reported net income of $12,901.3 million. In their tax footnote Merck noted, "The valuation allowance in 2009 primarily relates to various foreign entity NOL carryforwards resulting primarily from losses generated by restructuring actions" (Merck & Co. Inc. 2009, p. 173).

*3.1. Earnings forecasts and the valuation allowance*

This study relies on the notion that the valuation allowance provides an implicit forecast by managers of future performance. Dhaliwal et al. (2013) provide some evidence consistent with this notion through an examination of *ex post* performance. For an *ex ante* validity check of using material increases in the valuation allowance as an implicit management forecast of poor future performance, I examine managers' explicit earnings forecasts. Specifically, I examine the association between one-year ahead management forecasts and the existence of a material increase in the valuation allowance.[11]

Material increases in the valuation allowance are captured using the indicator variable VA. I use an algorithm developed by Dhaliwal et al. (2013) and set the indicator variable (VA) equal to 1 for firm-year observations where the firm reports accounting losses (Compustat data

[11] One-year ahead management forecast is defined as the first earnings forecast issued by the firm beginning 365 days, but no less than 180 days prior to the forecasted year-end data. I include only forecasts from firms that issued a forecast in the prior year to attempt to control for the decision to release a forecast. These requirements result in 2,386 unique firm-year observations.

item ib < 0), proxying for the creation of a deferred tax asset for the loss carryforward, and zero or positive U.S. deferred tax expense (txdfed >= 0), i.e., the deferred tax asset is not recognized by recording a deferred tax benefit (see Appendix A for a more detailed explanation).[12]

Figure 1 plots the following one-year ahead items: actual earnings (as defined by First Call), management forecast of earnings, and management forecast optimism (management earnings forecast – actual earnings). Data are from First Call's CIG database and observations are scaled by lagged fiscal period end stock price. Mean actual and forecasted earnings for both groups are positive, this is likely due to First Call reporting Pro Forma earnings numbers that are adjusted to exclude unusual items that a majority of the contributing analysts deem non-operating and/or non-recurring. I include all firm-year observations with year ahead management forecast data and the required Compustat data to compile the VA variable. The "No material increase in the valuation allowance in the prior year" group includes all firm-year observations where $VA_{it} = 0$ in the year the forecast is released and the "Year following a material increase in the valuation allowance" includes all firm-year observations where $VA_{it} = 1$ in the year the forecast is released. Consistent with poor future performance following a significant increase in the valuation allowance, actual earnings in the period following a valuation allowance are significantly lower than earnings of firms that did not record a significant increase in the valuation allowance account ($p < .0001$). Management earnings forecasts are also significantly lower for firms that record a significant increase in the valuation allowance ($p < .0001$).[13]

[12] This algorithm allows for the use of a large broad sample of firms but does have some drawbacks. For example, the measure only captures when a firm with a loss before extraordinary items has recorded a valuation allowance, although this likely captures most firms experiencing financial difficulties, the results might not generalize to non-loss firms. Misclassifications are also possible even when the firm is reporting a loss before extraordinary items. For example, for a firm that has an unfavorable permanent difference and favorable temporary differences that are smaller in magnitude. To the extent that the algorithm misclassifies observations, might not generalize beyond the strict definition of the VA variable.

[13] In a contemporaneous working paper, Cazier et al. (2015) also document evidence consistent with management forecasts and valuation allowances conveying similar information.

There are several advantages of using the valuation allowance as a forecast of future earnings compared to management issued forecasts. First, firms that fail to meet the more likely than not criteria for recognition of a deferred tax asset are *required* by GAAP increase a valuation allowance. There is no similar requirement under GAAP to issue managements forecasts. Second, deferred tax assets and related valuation allowances are part of the financial statements, and are therefore subject to audit. In contrast, management forecasts are not audited and are potentially susceptible to additional management bias. Consistent with this contention, the forecasted change in earnings is significantly greater in firm-years with an increase in the valuation allowance ($p < .0001$), and management forecast are significantly more optimistic when a firm records a valuation allowance against their deferred tax asset ($p < .0001$). Based on the preceding, management appears to be relatively more conservative in their audited disclosure of a valuation allowance and relatively more aggressive in their unaudited voluntary disclosure of an earnings forecast. These preliminary findings are consistent with the valuation allowance providing a more reliable forecast of future performance than management earnings forecasts.

*3.2. Sample selection*

The sample is composed of all firm-year observation with the required data beginning in 1993, to ensure that all sample firms have adopted SFAS No. 109, through 2015. Consistent with prior research examining the financial reporting for tax information, I restrict my sample to firms that are incorporated in the U.S. because foreign firms face different tax and financial accounting rules. I further exclude financial institutions (SIC codes 6000 – 6999) or public utilities (SIC codes 4900 – 4999), as regulated firms have different financial reporting requirements then non-regulated firms (Lev and Nissim 2004; Hanlon 2005; Hanlon et al. 2005; Ayers et al. 2010). The final sample consists of 9,432 firm-year observations (1,375 firms).

*3.3. Contemporaneous changes in credit ratings*

I estimate the relation between increases in the valuation allowance and issuer credit ratings using an ordered logit model. The ordered logit specification is used as credit ratings convey ordinal risk assessments where the differences across credit ratings convey relative differences in credit quality (Standard & Poor's 2009) and change across different levels are not uniform. I use the following model to examine whether credit analysts use their access to private information and incorporate the negative information conveyed by material increases of the valuation allowance prior to the disclosure of the increase.

$$\begin{aligned}\Delta CR_{it} = f(&\beta_0 + \beta_1 * VA_{it} + \beta_2 * \Delta ROA_{it-1} + \beta_3 * \Delta CFO_{it-1} + \beta_4 * LOSS_{it-1} + \beta_5 * NUMLOSS_{it-1} \\ &+ \beta_6 * AGE_{it-1} + \beta_7 * \Delta LEV_{it-1} + \beta_8 * \Delta SIZE_{it-1} + \beta_9 * \Delta INTCOV_{it-1} + \beta_{10} * \Delta CAPINT_{it-1} \\ &+ \beta_{11} * SUB_{it-1} + \beta_{12} * NEGEQ_{it-1} + \beta_{13} * \Delta BTM_{it-1} + \beta_{14} * RETURN_{it-1} + \beta_{15} * PBTD_{it-1} \\ &+ \beta_{16} * NBTD_{it-1} + \beta_{17} * CR_{it-1} + \sum \beta_t * YEAR_{it-1} + \sum \beta_{FF48} * IND_{it-1} + \varepsilon_{it}) \end{aligned} \quad [1]$$

where, $\Delta CR_{it}$ is the change in a firm's S&P issuer credit rating during the year.[14] The S&P issuer credit rating is a current opinion of an issuer's overall creditworthiness; this opinion focuses on the obligor's capacity and willingness to meet its long-term financial commitments. Credit ratings from S&P range from a rating of D, for payment default on financial commitments, to AAA, for firms with an extremely strong capacity to meet financial commitments (Standard & Poor's 2009). For the regression analysis, credit rating letters scores are converted into a numerical scale from 1 (D) to 22 (AAA) with greater numbers assigned to higher issuer credit ratings. I choose one year change in credit ratings for the following reasons: (1) credit ratings (particularly the credit ratings issued by certified agencies such as S&P) are often slow to react to

[14] For consistency with my hypotheses I implement a changes model, as opposed to a levels model. In untabulated robustness checks I also utilize a levels model due to the following potential concern. Although estimating an order logit model does not require observations for the dependent variable to be equally spaced intervals, it does require that observations are ordinal. This might not be true for a changes model of credit ratings. For example, a 1 unit credit rating downgrade (coded as -1) from BBB- to BB+ (investment grade to noninvestment grade) might be more important than a 2 unit credit rating downgrade (coded as -2) from AA+ to AA-. In untabulated tests I repeat my analysis with the level of credit rating as my dependent variable. Inferences from these untabulated results are consistent with those from the reported changes specification.

information (Pinches and Singleton 1978; Beaver et al. 2006), and a one year horizon allows for time for rating agencies to react; (2) as shown in figure 2, credit rating changes appear to occur regularly throughout the year (i.e., there does not appear to be clustering around financial report dates or other significant events); and (3) prior research examining future credit ratings often use a one year horizons as well, so using the same horizon allows for comparability to those studies.

The dependent variable of interest is the previously defined indicator variable $VA_{it}$ (see section 3.1. or Appendix A for a detailed explanation). Consistent with hypothesis 2A, I predict a negative coefficient on VA.

In modeling changes in issuer credit ratings, I include control variables for additional firm specific characteristics where prior research has documented an association with credit ratings and/or the cost of debt (Kaplan and Urwitz 1979; Ziebart and Reiter 1992; Sengupta 1998; Pitman and Fortin 2004; Jiang 2008; Ayers et al. 2010). I control for changes in profitability using four separate proxies. Namely, I included the change in return on assets ($\Delta ROA_{it}$), the change in cash flow from operations ($\Delta CFO_{it}$), a loss indicator variable ($LOSS_{it}$), and a count variable for the number of contiguous book losses up to and including the current year ($NUMLOSS_{it}$). The inclusion of $NUMLOSS_{it}$ is also appealing because it controls for the possibility that increases in the valuation allowance are merely capturing firms that have had a string of bad performance, information that is already publicly available through examination of the historical financial statements of the firm. In fact, SFAS No. 109 (ASC 740-10-30-21) states "Forming a conclusion that a valuation allowance is not needed is difficult when there is negative evidence such as cumulative losses in recent years." $NUMLOSS_{it}$ has the advantage over other measures of the persistence of losses (i.e., a direct measure of the persistence parameter) in that it can be estimated with as few as one observation from the firm in the sample

and does not impose more stringent data requirements that would limit the sample size. The cost of this choice is that the variable is exposed to a potential survivorship bias where the longer a firm has been reported in the Compustat database, the greater the potential for a string of continuous losses. To mitigate this concern, firm age ($AGE_{it}$) is included as an additional control.

I control for changes in the capital structure of the firm by including a variable to capture the change in leverage ($\Delta LEV_{it}$). The change in firm size is controlled for using the change in the natural logarithm of total assets ($\Delta SIZE_{it}$). To control for firms' ability to meet current debt payment obligations and the availability of collateral, I include changes in the interest coverage ratio ($\Delta INTCOV_{it}$) and capital intensity ($\Delta CAPINT_{it}$) respectively. Indicator variables are included to capture if the firm has outstanding subordinate debt ($SUB_{it}$) or negative book value of shareholder's equity ($NEGEQ_{it}$). A control for the change in the book-to-market ratio ($\Delta BTM_{it}$) is also included. To capture other publicly available information about the firm that could be informative of creditworthiness but is not captured by the other control variables I include the return on the firm's common stock during the fiscal year ($RETURN_{it}$).[15]

I also include controls for the difference between book and taxable income as book-tax differences may signal changes in earnings quality or changes in off-balance sheet financing. Prior research has documented a significant relation between both positive and negative book-tax differences and firm credit ratings (Ayers et al. 2010, Crabtree and Maher 2009); as a result, I include a separate control variable for each of these two groups ($PBTD_{it}$ and $NBTD_{it}$

[15] There are a number of potential control variables such as measures of accounting quality (the Dechow and Dichev (2002) Accrual Quality measure, Big4 auditor, etc.), going concern audit opinions, management and/or analyst earnings forecasts, etc. that could have been included in the model. These variables were omitted in an attempt to maintain a sufficiently large sample size as the variables are only available for a subset of firms or require a longer time series of observations to calculate. The concern for maintaining sample size is heightened because of the type of firms lost with the inclusion of these variables, namely small and less profitable firms who are more likely to record a material increase in the valuation allowance. The inclusion of the equity return over the prior 12 months as a control variable should capture a substantial portion of the items described above, hopefully alleviating the concern that any observed result is driven by these omitted controls.

respectively) to ensure the relation between increases in the valuation allowance and issuer credit ratings is incremental to the information contained within book-tax differences. Ayers et al. (2010) and Crabtree and Maher (2009) examine the relation between credit ratings and overall book-tax differences. In their studies, the book-tax difference is viewed as a signal of earnings quality, off-balance-sheet financing activity, or tax reporting aggressiveness. In his discussion of the Ayers et al. study, Wilson (2010) suggests that researchers must understand what is driving the association between book-tax differences and credit ratings before researchers can begin to include a measure of changes in book-tax differences into a model of the determinants of credit rating. I document a possible source of the information related to book-tax differences, material increases in the valuation allowance.

A control for year *t - 1*'s credit rating is also included. The prior year credit rating control is necessary for two reasons: (1) firms that book a material increase in the valuation allowance are often firms with lower credit ratings, compared to sample firms that did not booking a material increase in the valuation allowance (mean lagged crediting rating for VA=1/VA=0 firms of B+/BBB-); and (2) credit ratings are inherently "sticky" - approximately 75% of Compustat firm-year observations have no change in credit rating (see figure 3).

Finally, I include indicator variables to capture year ($YEAR_{it}$) and industry ($IND_{it}$) fixed effects, such as macroeconomic shocks, that are not captured by the other control variables. Detailed variable definitions are presented in Appendix A.

*3.4. Future changes in credit ratings*

Next, I examine whether credit analysts use the negative information conveyed in material increases in the valuation allowance in the period following a firm booking the increase

in the valuation allowance against their deferred tax asset. To examine future changes in credit ratings, I modify equation [1] as follows:

$$\Delta CR_{it+1} = f(\beta_0 + \beta_1 * VA_{it} + \beta_2 * \Delta ROA_{it} + \beta_3 * \Delta CFO_{it} + \beta_4 * LOSS_{it} + \beta_5 * NUMLOSS_{it} + \beta_6 * AGE_{it} + \beta_7 * \Delta LEV_{it} + \beta_8 * \Delta SIZE_{it} + \beta_9 * \Delta INTCOV_{it} + \beta_{10} * \Delta CAPINT_{it} + \beta_{11} * SUB_{it} + \beta_{12} * NEGEQ_{it} + \beta_{13} * \Delta BTM_{it} + \beta_{14} * RETURN_{it} + \beta_{15} * PBTD_{it} + \beta_{16} * NBTD_{it} + \beta_{17} * CR_{it} + \sum \beta_t * YEAR_{it} + \sum \beta_{FF48} * IND_{it} + \varepsilon_{it}) \quad [2]$$

where, $\Delta CR_{it+1}$ is the change in a firm's S&P issuer credit rating during the next year. Consistent with hypothesis 2B, I predict a negative coefficient for $\beta_1$. All variables are defined as above with the exception of the dependent variable which is measured at the end of year *t + 1*, the period following a firm booking a material increase in the valuation allowance and the control for the prior year credit rating which is measured at the end of year *t*.

**4. Findings**

Table 1 Panel A presents descriptive statistics for the sample. All continuous variables are winsorized at the 1st and 99th percentiles. The mean and median credit rating is 13 (BBB-), and credit ratings range from CCC+ through AAA. The mean change in credit rating ($\Delta CR_t$), the dependent variable in my regression model, is a decrease of 0.06 and range from a decrease of 3 rating levels to an increase of 2 rating levels. 10.3% of firm-year observations record a material valuation allowance against deferred tax assets created in the year. Table 1 Panel B presents univariate correlations. Consistent with the hypotheses, contemporaneous fiscal period changes and one-year ahead changes in credit ratings both exhibit significant negative correlation with material increases in the valuation allowance ($p < .0001$).

Table 2 presents additional information about the sample. Panel A provides the distribution of observations with and without a material increase in the valuation allowance by year. There is some clustering of material increases in the valuation allowance during the early and late 2000s. This clustering could be due to poor economic conditions during those times,

potentially causing managers to revise their expectation of future taxable income downwards and be more inclined to determine that deferred tax assets do not meet the more likely than not condition of realization included in SFAS No. 109. I include year fixed effects in my multivariate analysis to control for this possibility.

Panel B of Table 2 provides the distribution of sample observations with and without a material increase in the valuation allowance by industry. Manufacturing firms represent approximately half of the sample, with an additional 10 percent of the sample represented by each of Mining and Construction, Sanitary Services, Trades, and other Services.

Table 3 presents additional descriptive statistics for the sample after separating firms that record a material increase in the valuation allowance from the remaining sample firms. Within the sample, firms that record a material increase in the valuation allowance are significantly smaller (total assets and market capitalization) and younger than the control firms ($p < .05$). Furthermore, the VA = 1 firms are less profitable, in terms of both ROA and CFO, than the control firms in the year of the material increase in the valuation allowance and in the following five fiscal periods ($p < .05$). The future profitability of the valuation allowance firms is significantly lower than control firms in the years further into the future despite the greater survivorship bias for the valuation allowance group of firms (in year t + 5 only 50% of valuation allowance firms report operating cash flows in Compustat whereas 63% of control firms report operating cash flows in Compustat).

Figure 4 presents further univariate evidence consistent with the hypotheses. Firms that book a material increase in the valuation allowance experience a mean credit rating downgrade

of 0.43 in the year of the material increase in the valuation allowance and a mean downgrade of 0.39 in the following year.[16]

*4.1. Contemporaneous changes in credit ratings*

Table 4 Panel A presents the ordered logit regression results related to hypothesis 2A. Column 1 reports the coefficients and p-values for the regression estimates for equation [1]. I observe a significant negative coefficient (-1.229, p = <.0001) on the VA variable, consistent with the hypothesized significant relation between material increases in the valuation allowance and contemporaneous fiscal period changes in credit ratings. The generalized $R^2$ of the model is 16.36% and, with the exception of NEGEQ the signs on the coefficients on the control variables are consistent with expectations and prior research.

I examine the economic significance of the relation between material increases in the valuation allowance and changes in credit ratings using the change in the predicted probability of a credit rating upgrade or downgrade for a firm that records a material increase in the valuation allowance, holding all other variables constant at their mean values. Table 4 Panel B presents the results for contemporaneous fiscal period credit rating changes. For the average firm, a material increase in the valuation allowance in year *t* is associated with a 62.0% proportional decrease in the probability of an upgrade in credit rating during year *t* and a 129.6% proportional increase in the probability of a downgrade during year *t*.

*4.2. Future changes in credit ratings*

As discussed with the results for contemporaneous credit ratings, univariate results in Table 1 and Figure 4 are consistent with an association between material increases in the valuation allowance and future changes in credit ratings. Table 5 Panel A presents the ordered

[16] The difference between VA = 0 and VA = 1 groups in Figure 4 is significant at greater than the 5% level in both time periods.

logit regression results related to future credit ratings. Column 1 reports the coefficients and p-values for the regression estimates for equation [2]. I observe a significant negative coefficient (-0.414, p = <.0001) on the VA variable, consistent with the hypothesized significant relation between material increases in the valuation allowance and future changes in credit ratings. The generalized $R^2$ of the model is 14.51% and, as in the contemporaneous fiscal period change in credit rating results, the signs on the coefficients on the control variables are generally consistent with expectations and prior research.

In Table 5 Panel B, I repeat the economic significance test discussed above for future (one year ahead) credit ratings upgrades and downgrades. For the average firm, recording a material increase in the valuation allowance in year *t* is associated with a 43.1% proportional decrease in the probability of an upgrade in credit rating during year *t + 1* and a 19.6% proportional increase in the probability of a downgrade during year *t + 1*. The observed coefficients on the VA variable and the decrease (increase) in the probability of an upgrade (downgrade) are larger in the contemporaneous fiscal period change in credit rating tests. This result is consistent with the credit rating agency capturing a substantial portion of the information contained within a material increase in the valuation allowance account during the fiscal period within which the valuation allowance is recorded. The association between material increases in the valuation allowance and future credit ratings is indicative of rating agencies being unable, or unwilling to fully preempt the information in the disclosure, perhaps because of concerns over the potential self-fulfilling prophecy of a ratings downgrade.

**5. Additional Analyses**

In addition to tests discussed above, I examine a number of settings where the relation between material increases in the valuation allowance and firm creditworthiness could vary.

*5.1. Regulation Fair Disclosure and the Dodd-Frank Wall Street Reform and Consumer Protection Act*

As discussed above in section 2, prior to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, credit rating agencies were specifically excluded from the provisions of Regulation FD and had access to confidential information before it is released to the public. Notwithstanding the preceding, the introduction of Regulation FD did have an effect on the information environment within which the credit rating agencies operate. Consistent with this change in the information environment, Jorion et al. (2005) examine the effect of credit rating changes on stock prices and find that the informational effect of rating changes is much greater in the post-FD period, consistent with more private information being revealed through credit ratings post Regulation FD. Consequently, I examine whether the association between changes in credit ratings and the valuation allowance exists in both the pre- and post-Regulation FD periods.

The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, removed the exemption of credit ratings agencies from Regulation FD. Around the time of this law's enactment, several commentators voiced the opinion that Regulation FD was never intended to apply to sharing confidential information with rating agencies and an additional exemption in Regulation FD, permitting the sharing of confidential information with any person who agrees to keep the information confidential, will still apply. For example, on the Harvard Law School Forum on Corporate Governance and Financial Regulation website, a group of lawyers from Wachtell, Lipton, Rosen & Katz note that they "do not view this as a material development" and expect issuers to continue providing credit rating agencies confidential information (Nussbaum, Robinson, and Katz 2010). Also, in a letter to Issuers and Arrangers dated August 16, 2010, S&P

expressed their view that "..,the elimination of the rating agency exemption by itself should not affect the manner in which issuers share confidential information with us as part of the ratings process." In addition to separately examining the relation between material increases in the valuation allowance and changes in credit ratings in the pre- and post-Regulation FD periods, I also examine if the relation continues to exist in the period following the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010.

To examine the effect of Regulation FD and the Dodd-Frank Act on the relation between changes in credit ratings and the information regarding creditworthiness provided by material increases in the valuation allowance, estimate models [1] and [2] on three separate subsamples. Specifically, a subsample of observations from each of the period prior to Regulation FD (i.e., prior to the year 2000), the period following Regulation RD but prior to the Dodd-Frank Act (i.e., 2000 through 2010), and the period following the Dodd-Frank Act (i.e., following the year 2010). Due to the existence of arguments that the relation between credit ratings and material increases in the valuation allowance could be either attenuated or strengthened post Regulation FD, and the arguments that the Dodd-Frank Act might not impact the relation, I do not make a prediction on differences between the groups.

Table 6 reports the results for this subsample analysis. Panel A presents the results for contemporaneous changes in credit ratings. Column 1 includes the observations from the pre-Regulation FD period, column 2 includes the observations from the period post-Regulation FD but prior to the Dodd-Frank Act, and column 3 includes the observations following the enactment of Dodd-Frank. The coefficient on VA is negative and significant in all three time periods, consistent with the information in material increases in the valuation allowance being

incorporated into contemporaneous credit ratings following both Regulation FD and the Dodd-Frank Act.

Panel B presents the results for future changes in credit ratings. Again, column 1 includes the observations from the pre-Regulation FD period, column 2 includes the observations from the period post-Regulation FD but prior to the Dodd-Frank Act, and column 3 includes the observations following the enactment of Dodd-Frank. The coefficient on VA is negative and significant in post-Regulation FD and post-Dodd-Frank Act time periods, consistent with the information in material increases in the valuation allowance being incorporated into contemporaneous credit ratings following both Regulation FD and the Dodd-Frank Act. The coefficient on VA is negative but not significant at traditional levels in the pre-Regulation FD period. These results are consistent with the relation between material increases in the valuation allowance and future credit rating changes being heightened during the period following Regulation FD. Somewhat inconsistent with this differential relation is the fact that, as discussed above, prior to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, credit rating agencies were specifically excluded from the provisions of Regulation FD. A possible explanation is as follows. Jorion et al. (2005) examine the effect of credit rating changes on stock prices and find that the informational effect of rating changes is much greater in the post-FD period, consistent with more private information being revealed through credit ratings post Regulation FD. It is possible that less information is being captured by the other control variables post-FD and the valuation allowance becomes a greater source of information.

*5.2. Investment and non-investment grade ratings*

Credit ratings on debt instruments are generally grouped in to two broad categories; investment grade (credit ratings of BBB- or higher) and non-investment grade (often referred to

as speculative grade or "junk bonds"; credit ratings of BB+ or lower). Non-investment grade debt is viewed as substantially riskier than investment grade debt. The investors in the two grades of debt can also vary as many pension funds and other bond investors are restricted to investing in debt that is investment grade. As a result of the potentially difference users of credit ratings and incentive of the rating agencies between these two categories, I examine the relation between the valuation allowance, and contemporaneous and future credit ratings separately. In untabulated tests I find that the relation between material increases in the valuation allowance and both contemporaneous and future changes in credit ratings exists for investment grade and non-investment grade ratings.

**6. Conclusion**

In this study, I examine the relation between increases in the valuation allowance and firm creditworthiness. Increases in the valuation allowance are an attractive signal of creditworthiness for several reasons. In contrast to other forms of management issued guidance of future performance such as earnings forecasts, or third party assessments of creditworthiness such as credit ratings, the valuation allowance is a required disclosure under U.S. GAAP. As a result, the disclosure is required for all firms who do not meet the more likely than not threshold for recognition of their deferred tax assets. The GAAP requirement ensures that this disclosure, or lack thereof, is available from all firms. Additionally, the valuation allowance is an audited disclosure in the financial statements. The third party verification of the disclosure increases the reliability of the information contained within the valuation allowance and therefore the decision usefulness of the disclosure.

I document evidence consistent with material increases in the valuation allowance providing a widely available signal of firm creditworthiness. I observe a negative relation

between changes in issuer credit rating and increases in the valuation allowance during the fiscal period in which a firm records the allowance and in the period following the disclosure of an increase in the valuation allowance.

The findings of this study are of interest to academics and practitioners. Creditworthiness and credit ratings play an important role in capital markets. Concerns about the reliability and integrity of the credit rating process have led to calls by the SEC for greater disclosures regarding the rating process and more accountability among the credit rating agencies. This study contributes to our understanding of the use of accounting information in the rating process. I document results consistent with the credit rating agencies using their access to private information and capturing a substantial portion of the creditworthiness information contained within a material increase in the valuation allowance account during the fiscal period within which the valuation allowance is recorded. I also contribute to our understanding of the information contained within the tax accounts in the financial statements and to the ongoing debate regarding the desirability of book-tax conformity. I provide further evidence documenting an additional information source, the valuation allowance, which is a result of having two sources of performance reporting, tax and financial reporting.

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## Appendix A
## Variable Definitions

$\Delta CR_{it}$

The change in the firm's S&P issuer credit rating (splticrm) from fiscal year-end t-1 to fiscal year-end t. Credit ratings are reported as D (payment default) to AAA (extremely strong capacity to meet financial commitments) and are converted into numerical values from 1(D) to 22 (AAA).

$VA_{it}$

An indicator variable designed to capture when a firm books a material increase in the valuation allowance against a deferred tax asset (loss carryforward) created in year t. $VA_{it}$ is set equal to 1 for firm-years with accounting losses (ib < 0) in year t and zero or positive U.S. deferred tax expense (txdfed >= 0). When a firm reports negative pretax income there should be a deferred tax benefit (i.e., the creation of a deferred tax asset for the loss carryforward). In order to create a deferred tax asset a firm must recognize a deferred tax benefit on the income statement. If U.S. deferred tax expense is zero or positive (i.e., not a deferred tax benefit), then a valuation allowance has been recorded against the "new" deferred tax asset.

$\Delta ROA_{it}$

The change in return on assets for the firm from year t-1 to year t. Return on assets is calculated as net income (ni) in year t deflated by total assets (at) at fiscal year-end t-1.

$\Delta CFO_{it}$

The change in operating cash flows for the firm from year t-1 to year t. Operating cash flows (oancf) is deflated by total assets (at) at fiscal year-end t-1.

$LOSS_{it}$

An indicator variable designed to capture when a firm reports loss. $LOSS_{it}$ is set equal to 1 for firm-years where earnings before interest and taxes (ebit) is less than zero and set equal to zero otherwise.

$NUMLOSS_{it}$

The number of contiguous prior periods with a loss ($LOSS_{it} = 1$) for the firm.

$AGE_{it}$

The number of years since the firm first appeared in Compustat (fyear – year1).

$\Delta LEV_{it}$

The change in leverage for the firm from year t-1 to year t. Leverage is calculated as the firm's long term debt (dltt) divided by total assets (at) at fiscal year end t.

$\Delta SIZE_{it}$

The change in the natural logarithm of total assets (at) from year t-1 to fiscal year-end t.

$\Delta INTCOV_{it}$

The change in the natural logarithm of one plus the interest coverage ratio for the firm. Interest coverage ratio is calculated as income before interest and depreciation (oibdp + xint) divided by interest expense (xint) for year t.

$\Delta CAPINT_{it}$

The change in capital intensity for the firm from year t-1 to year t. Capital intensity is calculated as firm's property, plant and equipment net of depreciation (ppent) at fiscal year-end t, deflated by total assets (at) at fiscal year-end t-1.

$SUB_{it}$

An indicator variable designed to capture firm-years with outstanding subordinated debt. $SUB_{it}$ is set equal to 1 for firm-years with a positive value for subordinated debt (ds) and set equal to zero otherwise.

$NEGEQ_{it}$

An indicator variable designed to capture when the firm has negative shareholders equity. $NEGEQ_{it}$ is set equal to 1 for firm-years where total stockholders equity (seq) is less than zero and set equal to zero otherwise.

$\Delta BTM_{it}$

The change in the firm's book to market ratio from year t-1 to year t. The book to market ratio is calculated as book value of common stockholder's equity (ceq) divided by its market value of equity (prcc_f*csho) at fiscal year-end t.

$RETURN_{it}$

The change in the market value of the firm's stock (prcc_f) during year t deflated by the market value of the firm's stock at fiscal year-end t-1.

Book-tax difference

Book income less estimated taxable income. Book income is calculated as pre-tax book income (pi) less minority interest (mii). Taxable income is estimated as the sum of federal tax expense (txfed) and foreign tax expense (txfo) divided by 35% (the top U.S. statutory tax rate) less the change in NOL carryforward (dtlcf). Where federal or foreign tax expense are missing, taxable income is estimated as total income tax expense (txt) less deferred income tax expense (txdi) divided by 35%. Book-tax differences are deflated by total assets (at) at fiscal year-end t-1.

$PBTD_{it}$

The decile rank for firm-years with positive book-tax differences (defined above). $PBTD_{it}$ is set equal to zero for firm-years with negative book-tax differences.

$NBTD_{it}$

The decile rank for firm-years with negative book tax differences (defined above). $NBTD_{it}$ is set equal to zero for firm-years with positive book-tax differences.

$YEAR_{it}$

An indicator variable set equal to 1 for all observations in year t and zero otherwise.

$IND_{it}$

An indicator variable set equal to 1 for all observations in a given industry and zero otherwise. I use the Fama French 48 industry classification to create the $IND_{it}$ indicators.

**Figure 1**
**Actual and Forecasted Performance Following a Material Increase in the Deferred Tax Asset Valuation Allowance**

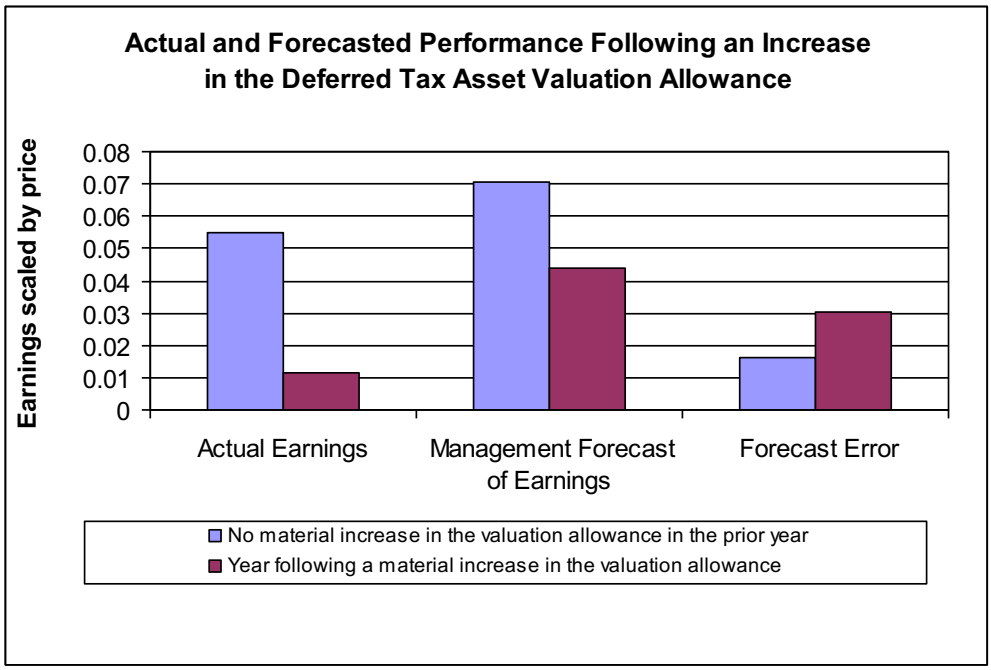



**Figure 2**
**Frequency of Credit Rating Changes by Month**

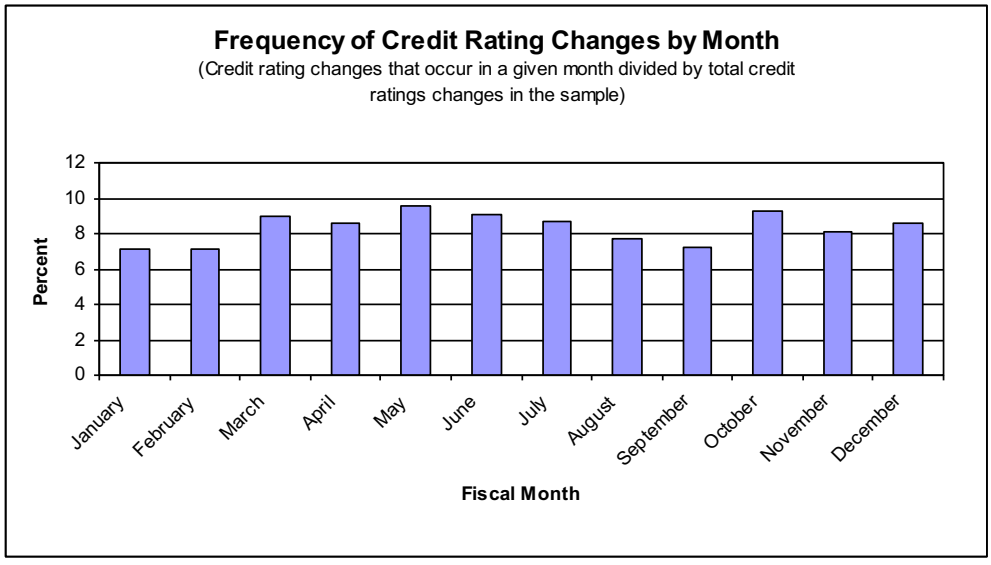


**Figure 3**
**Frequency of Credit Rating Changes by Magnitude**

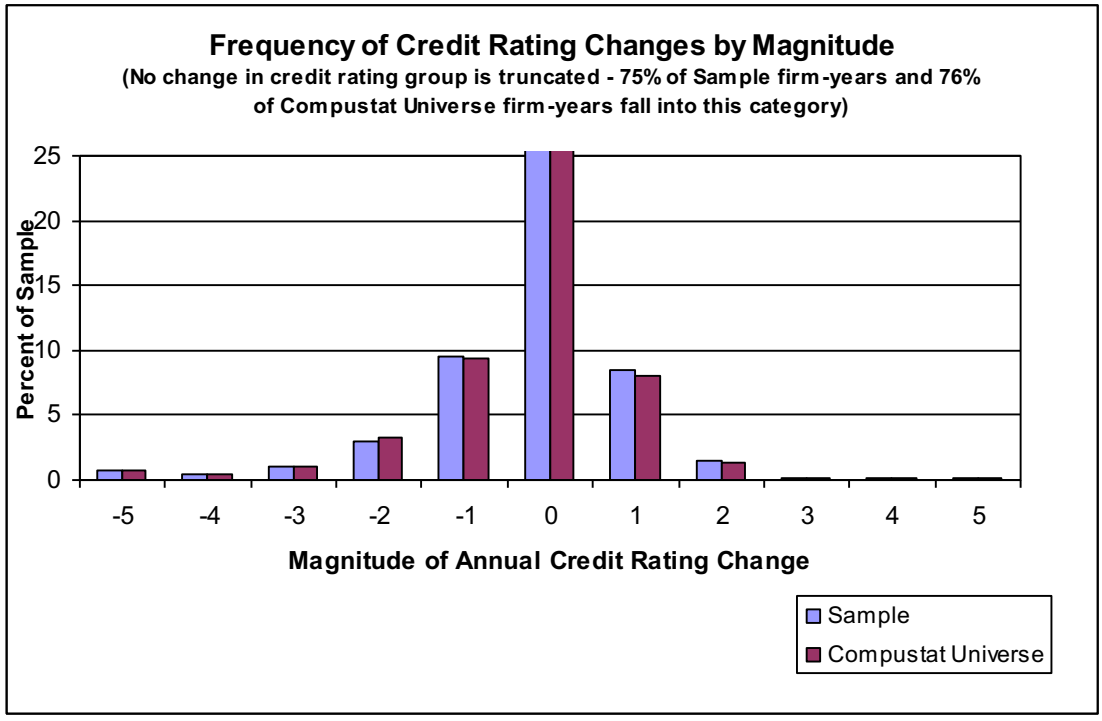
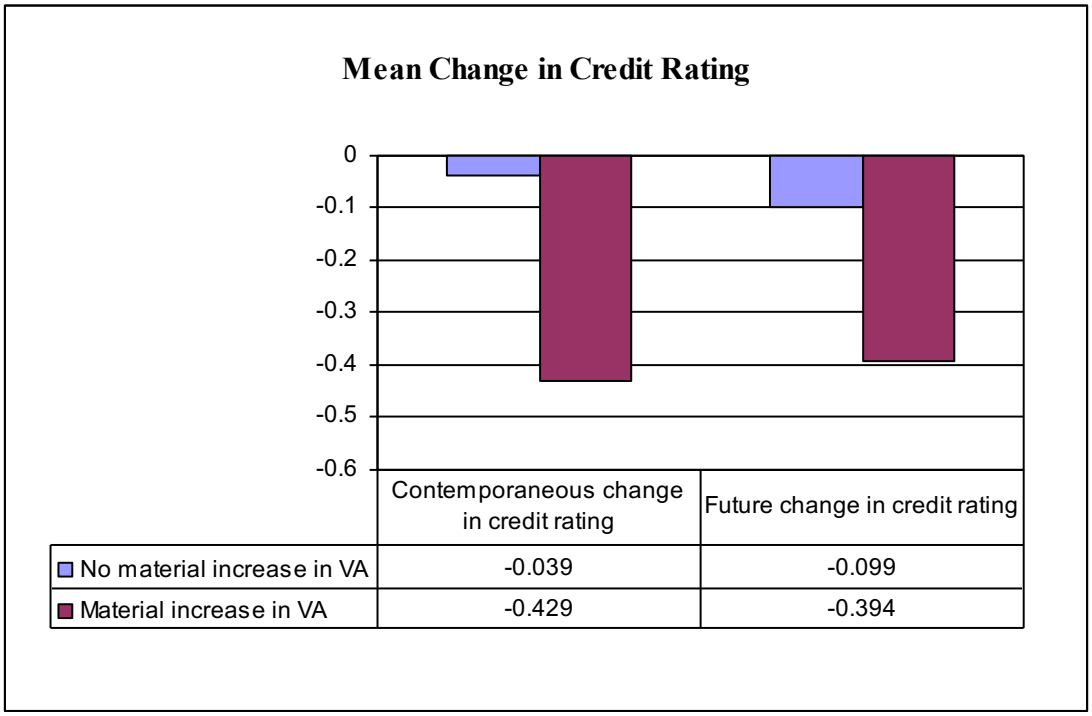



**Figure 4**
**Changes in Credit Ratings around a Material Increase in the Deferred Tax Asset Valuation Allowance**




| | Contemporaneous change in credit rating | Future change in credit rating |
|---|---|---|
| No material increase in VA | -0.039 | -0.099 |
| Material increase in VA | -0.429 | -0.394 |

**Table 1**
**Sample**

*Panel A: Sample Descriptive Statistics*

| Variable | N | Mean | Std Dev | Minimum | 25th Pctl | Median | 75th Pctl | Maximum |
|---|---|---|---|---|---|---|---|---|
| $\Delta CR_{t+1}$ | 12,695 | -0.096 | 0.787 | -4 | 0 | 0 | 0 | 2 |
| $\Delta CR_{t}$ | 12,695 | -0.059 | 0.716 | -3 | 0 | 0 | 0 | 2 |
| VA | 12,695 | 0.103 | 0.304 | 0 | 0 | 0 | 0 | 1 |
| ΔROA | 12,695 | 0.001 | 0.076 | -0.281 | -0.022 | 0.002 | 0.023 | 0.294 |
| ΔCFO | 12,695 | 0.000 | 0.059 | -0.195 | -0.028 | 0.000 | 0.028 | 0.188 |
| LOSS | 12,695 | 0.063 | 0.244 | 0 | 0 | 0 | 0 | 1 |
| NUMLOSS | 12,695 | 0.453 | 1.116 | 0 | 0 | 0 | 0 | 6 |
| AGE | 12,695 | 31.645 | 17.409 | 6 | 15 | 30 | 47 | 65 |
| ΔLEV | 12,695 | 0.002 | 0.074 | -0.226 | -0.032 | -0.004 | 0.031 | 0.280 |
| ΔSIZE | 12,695 | 0.062 | 0.183 | -0.448 | -0.023 | 0.042 | 0.122 | 0.842 |
| ΔINTCOV | 12,695 | 0.020 | 0.382 | -1.561 | -0.113 | 0.034 | 0.175 | 1.378 |
| ΔCAPINT | 12,695 | -0.004 | 0.039 | -0.155 | -0.017 | -0.002 | 0.011 | 0.129 |
| SUB | 12,695 | 0.199 | 0.400 | 0 | 0 | 0 | 0 | 1 |
| NEGEQ | 12,695 | 0.062 | 0.241 | 0 | 0 | 0 | 0 | 1 |
| ΔBTM | 12,695 | -0.013 | 0.528 | -2.992 | -0.093 | -0.006 | 0.084 | 2.465 |
| RETURN | 12,695 | 0.114 | 0.529 | -0.806 | -0.184 | 0.056 | 0.300 | 2.859 |
| PBTD | 12,695 | 3.660 | 3.494 | 0 | 0 | 3 | 7 | 10 |
| NBTD | 12,695 | 1.868 | 3.094 | 0 | 0 | 0 | 3 | 10 |
| CR | 12,695 | 12.869 | 3.535 | 6.000 | 10.000 | 13.000 | 15.000 | 22.000 |

**Table 1 cont.**

*Panel B: Correlations*

| | $\Delta CR_t$ | VA | ΔROA | ΔCFO | LOSS | NUM LOSS | AGE | ΔLEV | ΔSIZE | ΔINT COV | ΔCAP INT | SUB | NEGEQ | ΔBTM | RETURN | PBTD | NBTD | CR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\Delta CR_{t+1}$ | **0.128** | **-0.106** | **0.170** | **0.115** | **-0.113** | -0.003 | -0.017 | **-0.125** | **0.086** | **0.200** | **-0.055** | -0.010 | **-0.021** | **-0.067** | **0.260** | **0.094** | 0.006 | **-0.055** |
| $\Delta CR_t$ | | **-0.183** | **0.136** | **0.042** | **-0.201** | **-0.061** | **-0.033** | **-0.188** | **0.139** | **0.228** | -0.016 | -0.010 | **-0.088** | **0.061** | **0.133** | **0.137** | **-0.082** | **0.117** |
| VA | | | **-0.144** | **-0.052** | **0.424** | **0.398** | **-0.134** | **0.134** | **-0.207** | **-0.124** | **0.047** | **0.076** | **0.240** | **-0.095** | **-0.049** | **-0.157** | **0.244** | **-0.359** |
| ΔROA | | | | **0.276** | **-0.132** | **0.231** | -0.005 | **-0.230** | **0.141** | **0.408** | **-0.167** | -0.009 | -0.007 | **0.099** | **0.314** | **0.192** | **0.247** | **-0.026** |
| ΔCFO | | | | | **-0.086** | **0.082** | -0.005 | **-0.124** | **0.096** | **0.259** | **-0.063** | 0.007 | 0.006 | -0.010 | **0.182** | **0.062** | **0.055** | -0.017 |
| LOSS | | | | | | **0.299** | **-0.089** | **0.125** | **-0.180** | **-0.243** | **0.026** | 0.009 | **0.121** | **-0.083** | **-0.056** | **-0.128** | **0.198** | **-0.284** |
| NUMLOSS | | | | | | | **-0.160** | 0.015 | **-0.137** | **0.115** | **-0.035** | **0.076** | **0.313** | **-0.093** | **0.159** | **-0.064** | **0.432** | **-0.432** |
| AGE | | | | | | | | 0.009 | **-0.070** | -0.010 | -0.012 | **-0.220** | **-0.102** | 0.007 | **-0.049** | **-0.134** | **-0.156** | **0.421** |
| ΔLEV | | | | | | | | | **0.025** | **-0.290** | **0.070** | 0.007 | **0.090** | **-0.051** | **-0.147** | **-0.094** | 0.016 | 0.000 |
| ΔSIZE | | | | | | | | | | **0.027** | **-0.269** | **0.021** | **-0.138** | **0.148** | **0.093** | **0.164** | **-0.118** | **0.117** |
| ΔINTCOV | | | | | | | | | | | **-0.063** | -0.007 | -0.006 | **-0.034** | **0.203** | **0.137** | **0.109** | **-0.022** |
| ΔCAPINT | | | | | | | | | | | | 0.012 | **0.024** | **-0.031** | **-0.155** | -0.012 | **-0.021** | **-0.020** |
| SUB | | | | | | | | | | | | | **0.099** | -0.004 | **0.025** | **0.041** | **0.064** | **-0.276** |
| NEGEQ | | | | | | | | | | | | | | **-0.176** | 0.018 | **-0.050** | **0.190** | **-0.285** |
| ΔBTM | | | | | | | | | | | | | | | **-0.162** | **0.055** | **-0.061** | **0.062** |
| RETURN | | | | | | | | | | | | | | | | **0.089** | **0.120** | **-0.112** |
| PBTD | | | | | | | | | | | | | | | | | **-0.076** | **-0.108** |
| NBTD | | | | | | | | | | | | | | | | | | **-0.347** |

Variable definitions are presented in Appendix A.

Firm and year t subscripts are suppressed for brevity.

Correlations significant at the 5 percent level are bolded.

All continuous variables are winsorized at the 1st and 99th percentile.

**Table 2**
**Descriptive Statistics - Valuation Allowance Firms**

*Panel A: Number of material increases in the valuation allowance by year*

| Year | N | % of Sample | VA | % of Sample | VA / N |
|---|---|---|---|---|---|
| 1993 | 273 | 2.40 | 32 | 2.44 | 11.72 |
| 1994 | 384 | 3.37 | 30 | 2.29 | 7.81 |
| 1995 | 406 | 3.57 | 35 | 2.67 | 8.62 |
| 1996 | 440 | 3.86 | 38 | 2.90 | 8.64 |
| 1997 | 438 | 3.85 | 34 | 2.60 | 7.76 |
| 1998 | 430 | 3.78 | 46 | 3.51 | 10.70 |
| 1999 | 449 | 3.94 | 49 | 3.74 | 10.91 |
| 2000 | 474 | 4.16 | 55 | 4.20 | 11.60 |
| 2001 | 510 | 4.48 | 99 | 7.56 | 19.41 |
| 2002 | 546 | 4.80 | 104 | 7.94 | 19.05 |
| 2003 | 587 | 5.16 | 88 | 6.72 | 14.99 |
| 2004 | 592 | 5.20 | 66 | 5.04 | 11.15 |
| 2005 | 597 | 5.24 | 62 | 4.74 | 10.39 |
| 2006 | 591 | 5.19 | 45 | 3.44 | 7.61 |
| 2007 | 581 | 5.10 | 58 | 4.43 | 9.98 |
| 2008 | 556 | 4.88 | 90 | 6.88 | 16.19 |
| 2009 | 537 | 4.72 | 102 | 7.79 | 18.99 |
| 2010 | 573 | 5.03 | 63 | 4.81 | 10.99 |
| 2011 | 585 | 5.14 | 44 | 3.36 | 7.52 |
| 2012 | 552 | 4.85 | 58 | 4.43 | 10.51 |
| 2013 | 578 | 5.08 | 46 | 3.51 | 7.96 |
| 2014 | 569 | 5.00 | 55 | 4.20 | 9.67 |
| 2015 | 138 | 1.21 | 10 | 0.76 | 7.25 |
| Total | 11,386 | 100.0 | 1,309 | 100.0 | |

**Table 2 cont.**

*Panel B: Number of material increases in the valuation allowance by industry*

| Year | N | % of Sample | VA | % of Sample | VA / N |
|---|---|---|---|---|---|
| Agriculture, Forestry, and Fishing (SIC 0100-0999) | 37 | 0.32 | 9 | 0.69 | 24.32 |
| Mining and Construction (SIC 1000 - 1999) | 1,116 | 9.80 | 180 | 13.75 | 16.13 |
| Manufacturing (SIC 2000 - 3999) | 5,942 | 52.19 | 528 | 40.34 | 8.89 |
| Transportation, Communications, Electric, Gas, and Sanitary service (SIC 4000 - 4999) | 1,256 | 11.03 | 291 | 22.23 | 23.17 |
| Trade (SIC 5000 - 5999) | 1,593 | 13.99 | 131 | 10.01 | 8.22 |
| Services (SIC 7000 - 8999) | 1,376 | 12.09 | 155 | 11.84 | 11.26 |
| Public Administration (SIC 9000 - 9999) | 66 | 0.58 | 15 | 1.15 | 22.73 |
| Total | 11,386 | 100.0 | 1,309 | 100.0 | |

Column 1 presents the number of observations without a material increase in the valuation allowance (i.e., VA = 0).

Column 2 presents the percentage of the VA = 0 observation in a given year (industry).

Column 3 presents the number of observations with a material increase in the valuation allowance (i.e., VA = 1).

Column 4 presents the percentage of the VA = 1 observation in a given year (industry).

Column 5 presents the percentage of oberservation in a year (industry) where VA = 1.

**Table 3**
**Future Performance**

| Variable | VA = 1 | | | | VA = 0 | | | | Difference in Means |
|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | Median | Std Dev | N | Mean | Median | Std Dev | |
| $\Delta CR_{t+1}$ | 1,309 | -0.339 | 0.000 | 1.111 | 11,386 | -0.069 | 0.000 | 0.736 | -0.271 |
| $\Delta CR$ | 1,309 | -0.435 | 0.000 | 1.004 | 11,386 | -0.016 | 0.000 | 0.662 | -0.419 |
| Total Assets | 1,309 | 4,661.4 | 1,636.1 | 10,283.5 | 11,386 | 11,284.6 | 3,637.1 | 23,818.2 | -6,623.2 |
| Market Capitalization | 1,309 | 2,107.0 | 557.3 | 5,429.5 | 11,386 | 12,473.8 | 3,120.4 | 27,106.5 | -10,366.8 |
| Age | 1,309 | 24.8 | 19.0 | 16.7 | 11,386 | 32.4 | 32.0 | 17.3 | -7.7 |
| ROA | 1,309 | -0.080 | -0.055 | 0.083 | 11,386 | 0.056 | 0.053 | 0.067 | -0.135 |
| $ROA_{t+1}$ | 1,309 | -0.040 | -0.023 | 0.101 | 11,386 | 0.050 | 0.052 | 0.076 | -0.090 |
| $ROA_{t+2}$ | 1,074 | -0.008 | 0.002 | 0.102 | 10,184 | 0.048 | 0.051 | 0.076 | -0.056 |
| $ROA_{t+3}$ | 912 | 0.002 | 0.009 | 0.103 | 9,091 | 0.049 | 0.052 | 0.075 | -0.047 |
| $ROA_{t+4}$ | 769 | 0.010 | 0.017 | 0.096 | 8,111 | 0.049 | 0.052 | 0.075 | -0.039 |
| $ROA_{t+5}$ | 652 | 0.019 | 0.026 | 0.091 | 7,221 | 0.049 | 0.052 | 0.074 | -0.030 |
| CFO | 1,309 | 0.042 | 0.040 | 0.065 | 11,386 | 0.112 | 0.106 | 0.071 | -0.070 |
| $CFO_{t+1}$ | 1,309 | 0.053 | 0.049 | 0.070 | 11,386 | 0.109 | 0.104 | 0.071 | -0.057 |
| $CFO_{t+2}$ | 1,074 | 0.066 | 0.059 | 0.078 | 10,184 | 0.108 | 0.103 | 0.070 | -0.043 |
| $CFO_{t+3}$ | 912 | 0.069 | 0.064 | 0.076 | 9,091 | 0.108 | 0.103 | 0.070 | -0.039 |
| $CFO_{t+4}$ | 769 | 0.071 | 0.068 | 0.075 | 8,111 | 0.108 | 0.102 | 0.069 | -0.037 |
| $CFO_{t+5}$ | 652 | 0.078 | 0.073 | 0.077 | 7,221 | 0.107 | 0.102 | 0.069 | -0.028 |

Total assets (compustat data item at) and Market Capitalization (compustat data items prcc_f*csho) are measured at the end of year t.

CR, AGE, ROA and CFO definitions are presented in Appendix A.

Firm and year t subscripts are suppressed for brevity.

Continuous variables are winsorized at the 1st and 99th percentile.

All means across groups are significantly different at greater than the 5% level.

**Table 4**
**Contemporaneous Change in Credit Rating Order Logit Regression Estimates**

*Panel A: Dependent variable* $\Delta CR_t$

| | | 1 | |
|---|---|---|---|
| | Predicted Coefficient | Coefficient | P-value |
| **VA** | **-** | **-1.229** | **<.0001** |
| $\Delta ROA_{t-1}$ | + | 0.887 | 0.007 |
| $\Delta CFO_{t-1}$ | + | 1.192 | 0.001 |
| $LOSS_{t-1}$ | - | -0.214 | 0.025 |
| $NUMLOSS_{t-1}$ | - | -0.049 | 0.059 |
| $AGE_{t-1}$ | + | 0.001 | 0.366 |
| $\Delta LEV_{t-1}$ | ? | -2.089 | <.0001 |
| $\Delta SIZE_{t-1}$ | + | 0.706 | <.0001 |
| $\Delta INTCOV_{t-1}$ | + | 0.681 | <.0001 |
| $\Delta CAPINT_{t-1}$ | ? | -0.198 | 0.718 |
| $SUB_{t-1}$ | - | -0.106 | 0.058 |
| $NEGEQ_{t-1}$ | - | 0.126 | 0.189 |
| $\Delta BTM_{t-1}$ | - | -0.227 | <.0001 |
| $RETURN_{t-1}$ | + | 0.707 | <.0001 |
| $PBTD_{t-1}$ | - | 0.031 | <.0001 |
| $NBTD_{t-1}$ | - | -0.038 | <.0001 |
| $CR_{t-1}$ | ? | -0.141 | <.0001 |
| YEAR EFFECTS | | | Y |
| IND EFFECTS | | | Y |
| N | | | 12,695 |
| Generalized $R^2$ | | | 16.36% |

*Panel B: Probability of a Change in Credit Rating in Year t*

| | Probability of an Upgrade | Probability of a Downgrade |
|---|---|---|
| VA = 0 | 2.0% | 8.5% |
| VA = 1 | 0.8% | 19.5% |
| Change in probability | -1.2% | 11.0% |
| Proportional change | -62.0% | 129.6% |

Variable definitions are presented in Appendix A.

Firm and year t subscripts are suppressed for brevity.

One-tailed p-values are reported for coefficients with hypothesized directions, all other p-values are two-tailed.

For results presented in panel B, all variables are set equal to their sample means (excluding VA = 0 or 1).

**Table 5**
**Future Change in Credit Rating Ordered Logit Regression Estimates**

*Panel A: Dependent variable $\Delta CR_{t+1}$*

| | | 1 | |
|---|---|---|---|
| | Predicted Coefficient | Coefficient | P-value |
| **VA** | **-** | **-0.414** | **<.0001** |
| ΔROA | + | 1.507 | <.0001 |
| ΔCFO | + | 1.374 | 0.001 |
| LOSS | - | -0.332 | 0.001 |
| NUMLOSS | - | -0.087 | 0.001 |
| AGE | + | 0.001 | 0.609 |
| ΔLEV | ? | -1.834 | <.0001 |
| ΔSIZE | + | 0.715 | <.0001 |
| ΔINTCOV | + | 0.726 | <.0001 |
| ΔCAPINT | ? | 0.344 | 0.526 |
| SUB | - | -0.099 | 0.080 |
| NEGEQ | - | 0.036 | 0.703 |
| ΔBTM | - | -0.178 | <.0001 |
| RETURN | + | 0.879 | <.0001 |
| PBTD | - | 0.006 | 0.349 |
| NBTD | - | -0.031 | 0.001 |
| CR | ? | -0.101 | <.0001 |
| YEAR EFFECTS | | | Y |
| IND EFFECTS | | | Y |
| N | | | 12,695 |
| Generalized $R^2$ | | | 14.51% |

*Panel B: Probability of a Change in Credit Rating in Year t + 1*

| | Probability of an Upgrade | Probability of a Downgrade |
|---|---|---|
| VA = 0 | 3.5% | 10.3% |
| VA = 1 | 2.0% | 12.4% |
| Change in probability | -1.5% | 2.0% |
| Proportional change | -43.1% | 19.6% |

Variable definitions are presented in Appendix A.

Firm and year t subscripts are suppressed for brevity.

One-tailed p-values are reported for coefficients with hypothesized directions, all other p-values are two-tailed.

For results presented in panel B, all variables are set equal to their sample means (excluding VA = 0 or 1).

**Table 6**
**Regulation Fair Disclosure and the Dodd-Frank Wall Street and Consumer Protection Act**

*Panel A: Dependent variable* $\Delta CR_t$

| | Predicted | 1 | | 2 | | 3 | |
|---|---|---|---|---|---|---|---|
| | Coefficient | Coefficient | P-value | Coefficient | P-value | Coefficient | P-value |
| **VA** | **-** | **-1.218** | **<.0001** | **-1.149** | **<.0001** | **-1.704** | **<.0001** |
| $\Delta ROA_{t-1}$ | + | 2.135 | 0.004 | 0.789 | 0.054 | 0.159 | 0.856 |
| $\Delta CFO_{t-1}$ | + | -0.272 | 0.734 | 1.438 | 0.002 | 2.059 | 0.037 |
| $LOSS_{t-1}$ | - | -0.077 | 0.736 | -0.241 | 0.040 | -0.485 | 0.060 |
| $NUMLOSS_{t-1}$ | - | -0.192 | 0.003 | -0.031 | 0.369 | 0.016 | 0.764 |
| $AGE_{t-1}$ | + | 0.007 | 0.057 | 0.002 | 0.363 | -0.004 | 0.238 |
| $\Delta LEV_{t-1}$ | ? | -1.685 | 0.010 | -2.004 | <.0001 | -2.481 | 0.001 |
| $\Delta SIZE_{t-1}$ | + | 1.150 | <.0001 | 0.682 | <.0001 | -0.159 | 0.636 |
| $\Delta INTCOV_{t-1}$ | + | 0.895 | <.0001 | 0.579 | <.0001 | 0.821 | <.0001 |
| $\Delta CAPINT_{t-1}$ | ? | 1.601 | 0.134 | -0.168 | 0.816 | -3.311 | 0.028 |
| $SUB_{t-1}$ | - | -0.024 | 0.847 | -0.134 | 0.057 | -0.260 | 0.093 |
| $NEGEQ_{t-1}$ | - | 0.129 | 0.580 | 0.311 | 0.013 | -0.348 | 0.100 |
| $\Delta BTM_{t-1}$ | - | -0.479 | 0.001 | -0.191 | 0.000 | -0.166 | 0.229 |
| $RETURN_{t-1}$ | + | 0.654 | <.0001 | 0.701 | <.0001 | 0.742 | <.0001 |
| $PBTD_{t-1}$ | - | 0.042 | 0.002 | 0.031 | 0.000 | 0.010 | 0.499 |
| $NBTD_{t-1}$ | - | -0.045 | 0.006 | -0.033 | 0.001 | -0.043 | 0.025 |
| $CR_{t-1}$ | ? | -0.200 | <.0001 | -0.120 | <.0001 | -0.158 | <.0001 |
| YEAR EFFECTS | | | Y | | Y | | Y |
| IND EFFECTS | | | Y | | Y | | Y |
| N | | | 3,084 | | 6,976 | | 2,635 |
| Generalized $R^2$ | | | 15.66% | | 17.53% | | 15.60% |

## Table 6 cont.

*Panel B: Dependent variable $\Delta CR_{t+1}$*

| | Predicted | 1 | | 2 | | 3 | |
|---|---|---|---|---|---|---|---|
| | Coefficient | Coefficient | P-value | Coefficient | P-value | Coefficient | P-value |
| **VA** | **-** | **-0.119** | **0.531** | **-0.421** | **<.0001** | **-0.817** | **<.0001** |
| ΔROA | + | 1.384 | 0.065 | 1.518 | 0.000 | 1.181 | 0.206 |
| ΔCFO | + | 1.578 | 0.040 | 1.175 | 0.009 | 2.227 | 0.041 |
| LOSS | - | -0.317 | 0.159 | -0.336 | 0.004 | -0.236 | 0.362 |
| NUMLOSS | - | -0.140 | 0.019 | -0.082 | 0.008 | -0.056 | 0.289 |
| AGE | + | 0.000 | 0.980 | 0.001 | 0.494 | -0.001 | 0.744 |
| ΔLEV | ? | -2.401 | 0.000 | -1.470 | <.0001 | -2.445 | 0.002 |
| ΔSIZE | + | 0.914 | 0.000 | 0.699 | <.0001 | 0.479 | 0.155 |
| ΔINTCOV | + | 0.859 | <.0001 | 0.641 | <.0001 | 0.764 | <.0001 |
| ΔCAPINT | ? | 1.691 | 0.105 | 0.204 | 0.777 | -2.239 | 0.133 |
| SUB | - | 0.065 | 0.595 | -0.183 | 0.010 | -0.184 | 0.258 |
| NEGEQ | - | -0.135 | 0.547 | 0.281 | 0.020 | -0.476 | 0.024 |
| ΔBTM | - | -0.339 | 0.003 | -0.110 | 0.011 | -0.400 | 0.001 |
| RETURN | + | 0.738 | <.0001 | 0.857 | <.0001 | 1.029 | <.0001 |
| PBTD | - | 0.015 | 0.287 | 0.005 | 0.585 | -0.003 | 0.865 |
| NBTD | - | -0.035 | 0.035 | -0.023 | 0.027 | -0.049 | 0.012 |
| CR | ? | -0.140 | <.0001 | -0.085 | <.0001 | -0.111 | <.0001 |
| YEAR EFFECTS | | | Y | | Y | | Y |
| IND EFFECTS | | | Y | | Y | | Y |
| N | | | 3,084 | | 6,976 | | 2,635 |
| Generalized $R^2$ | | | 12.65% | | 16.59% | | 16.00% |

Column 1 presents results from the period prior to Regulation FD.

Column 2 presents results from the period following Regulation FD but prior to Dodd-Frank.

Column 3 presents results from the period following Dodd-Frank.

Variable definitions are presented in Appendix A.

Firm and year t subscripts are suppressed for brevity.

One-tailed p-values are reported for coefficients with hypothesized directions, all other p-values are two-tailed.