

# **The Influence of Differences in Taxable Income and Book Income on the Bond Credit Market**

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## **Abstract**

We examine the importance to bond rating analysts of information pertaining to the relationship between taxable income and reported book income. Specifically, using a relatively large sample of new bond issues over an extended period of time, we examine information related to deferred taxes as well as the overall tax-to-book position in the assessment of a firm's default risk. Our results indicate the existence of a U-shaped relationship with firms falling in the extreme upper or lower quintiles of their industry-year group receiving lower bond ratings than firms that are nearer to their industry average. Additional analyses suggest this effect is diminished for firms identified as highly effective tax planners. Finally, temporal analyses offer results consistent with bond rating analysts being more discerning of the information contained in the deferred tax numbers after the time period in which Enron collapsed.

# **The Influence of Differences in Taxable Income and Book Income on the Bond Credit Market**

## **Introduction**

High profile accounting scandals (Enron, WorldCom, Xerox, etc) in which reported earnings were misstated have given creditors, investors, and policy makers reason to focus more attention on the quality and detailed components of earnings reported by companies. During the time these frauds were perpetrated in the late 1990s, researchers began identifying the growing chasm between financial<sup>1</sup> (book) earnings and taxable income (e.g. Patrick 2001, Desai 2002, Manzon and Plesko 2002, Mills et al. 2002) while indicating that taxable income might provide an indicator of earnings quality. Given the two different sets of accounting systems that govern each calculation of income, if tax rules limit excess managerial discretion and provide additional information, then taxable income should provide supplemental information to that contained in book earnings. Recent research documents that book-tax differences are related to stock prices, future stock returns, and subsequent earnings growth (Lev and Nissim 2004); although it is unclear whether investors or analysts fully impound book-tax differences in their expectations for future earnings (Weber 2006). In addition, Hanlon (2005) provides evidence that book-tax differences are useful for evaluating the “quality” of current earnings and predicting future earnings.

We investigate the relationship that exists between a firm’s perceived risk of default and the information provided by its deferred tax position and overall tax-to-book position. We analyze new bonds issued over the period 1994-2004 and operationalize book-tax differences in two ways. First, following Hanlon (2005) we use deferred taxes as a gauge of temporary tax-

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<sup>1</sup> Throughout the paper we use the terms financial and book earnings interchangeably to indicate a firm’s GAAP-determined earnings reported in its financial statements.

book differences and find a negative relation between assigned bond ratings and large positive deferred taxes (book income > tax income). Importantly, we also find a negative relation with bond ratings and large negative deferred taxes (book income < tax income) consistent with a U-shaped relationship with regard to deferred taxes. This is consistent with bond rating analysts penalizing firms whose deferred taxes are far away from the median in its industry for that year. Further analysis reveals that the association between deferred taxes and initial bond ratings is intensified in the post-Enron time frame.

Our second method of operationalizing the book-tax difference follows the work of Lev and Nissim (2004) and uses taxable income divided by reported book income as our variable of interest. Though correlated with deferred taxes, this measure provides a comprehensive view of the overall yearly difference between book and tax records. We find that large tax-book ratios (large taxable income relative to book income) are negatively related to ratings received on new bond issues. We also document the same type of negative association between small tax-book ratios (small taxable income relative to book income) and bond ratings. These results further reinforce the U-shaped relationship we document for deferred taxes and are consistent with the view that firms receive additional scrutiny with respect to their debt ratings when they move away from some type of reasonable equilibrium boundary between book income and taxable income.

We contribute to existing research by empirically demonstrating how bond market analysts incorporate the information contained in the relationship between taxable income and reported book income. Rather than a strict monotonic relationship between a firm's tax-book ratio, we document an U-shaped relationship where firms that are in the extreme upper or lower industry-year quintile with respect to their tax-book ratio receive lower bond ratings than other

firms, *ceteris paribus*. This is consistent with the interpretation that bond rating analysts are not only concerned with firms reporting too little taxable income, but also with firms reporting too much taxable income. Our research also provides additional insight into the understanding of how capital market participants in the bond arena interpret and utilize tax-book information.

We also add to the literature by documenting a temporal difference in the way bond rating analysts incorporate the information contained in the relationship between reported book income and taxable income. The evidence is consistent with a learning effect taking place in the post-Enron period when analysts began placing more emphasis on deferred tax information when assigning a rating to a new bond issue.

The remainder of the paper is structured in the following manner. The next section provides information regarding book-tax differences and a review of relevant literature. Section 3 describes the hypothesis development. Section 4 gives details regarding our research method while Section 5 provides the results. Finally, we finish with our conclusions and summary.

## **Book-Tax Differences and Prior Research**

### ***Book-Tax Differences***

Records of US publicly traded corporations must be kept according to two accounting systems, one for the purpose of filing tax returns and the other for providing financial information to interested third parties. Differences between the two accounting systems generally arise from three sources. The first is the result of a rational application of different rules. Because tax accounting and GAAP have different underlying objectives, different treatment of identical transactions can occur. These differences in the two systems largely affect the timing of recognition of revenues and expenses. For some transactions, revenue is recognized for tax purposes (e.g. prepayments) and not for financial purposes. For other transactions, expense

recognition can vary. For example, bad debt expense is estimated and matched at the end of revenue generation for financial purposes but the tax code does not allow a deduction until a specific account is written-off. These items are ultimately handled in a similar manner in that they will eventually reverse. As these temporary differences create a divergence between an item's tax and book base, their effects are recorded as deferred tax liabilities (assets) and are reflected in the firm's income statement as deferred tax expense (benefit). A different category of items, which includes goodwill, create permanent differences that will never reverse (Scholes et al. 2005, 374) and for which deferred taxes are not recognized. These permanent differences will not show up in deferred taxes, but will nevertheless provide a difference between reported book income and taxable income.

A second reason for differences in book and tax income is that firms may attempt to manage their tax liability through either tax planning or tax sheltering activities. From a tax planning perspective, firms might adopt a strategy that will attempt to minimize the present value of taxes paid. Alternatively, they may elect to attempt to smooth the tax stream. Firms generally accomplish this by affecting the timing of transactions to manipulate when the cash flows show up in taxable income. Another source of book-tax differences can result when firms manage their tax liabilities using various tax sheltering or off-balance sheet financing activities. These activities generally allow firms to recognize book income while reducing taxable income or to minimize liabilities shown on the face of the balance sheet.

A final category of items resulting in differences between book and taxable income arise from management discretion. GAAP allows managers wide latitude in reporting transactions and determining estimates for external financial reporting purposes. Optimally, this allows managers to present signals to the market and provide information reflecting the true economic state of the

firm. A less noble utilization of this latitude could allow managers to mislead investors by manipulating earnings. In contrast to the relative freedom provided for financial reporting purposes, the tax code largely prohibits management discretion. The IRS typically prescribes the methodology to be utilized for any estimates used (e.g. depreciation) and also normally delays recognition until the transaction is complete (e.g. warranty costs). Ultimately, this discretion regarding pre-tax financial income accounts increases the difference between book and tax income (Phillips et al. 2002).

Management discretion also results in firms creating differences between book and tax income by manipulating financial reported net income through the income tax expense account as documented by Dhaliwal et al. (2004). Research has also demonstrated instances of earnings management by adjusting the valuation allowance account (Schrand and Wong, 2003; Burgstahler et al. 2002), designating foreign earnings as permanently reinvested (Krull 2004), and by the recognition and reversal of tax cushions (Gleason and Mills, 2002; Nelson et al. 2003). These items allow for considerable differences to arise between book income and taxable income.

### ***Relevant Research***

Prior research has examined the importance of tax information to investors. While the naïve view holds that paying fewer taxes in the present is always better than paying more taxes, empirical research has demonstrated that this is not universally the case. For example, Desai and Dharmapala (2006) document some negative firm effects of reducing taxes based on a negative relationship between executive incentive compensation and tax sheltering activities when tax sheltering lowers taxes paid but also increases information asymmetry. In addition, Frank et al. (2006) find that while the equity market generally rewards those firms that are aggressive for tax

purposes (through higher size-adjusted returns), firms are eventually penalized when the aggressive tax behavior is accompanied by aggressive financial reporting behavior. Therefore, it is important to look at the larger context and not strictly assume that the minimization of taxes is always beneficial to the overall firm.

An alternative stream of research has examined the effect of book-tax differences on future earnings and cash flows. Hanlon (2005) examines the relationship between the deferred tax portion of book-tax differences and the persistence of earnings. She finds that firm-years with large book-tax differences have earnings and cash flows that are less persistent in following years than firm-years with small book-tax differences. These results demonstrate that information related to temporary differences between book and taxable income can provide additional insight to capital market constituents that is incremental to the information provided by reported book earnings and cash flows.

Rather than focus on deferred taxes, Lev and Nissim (2004) examine the total difference between book earnings and taxable income. Their measure of book-tax differences is the ranked ratio of net taxable income to net book income. This variable differs from that used in Hanlon (2005) in that it encompasses all the differences that arise between financial and tax accounting, and not just those giving rise to deferred taxes. Because the diverse types of book-tax differences can have off-setting results, the authors argue this measure is the best overall reflection of a “tax-based fundamental.” Their results show that larger tax-book ratios are associated with higher levels of future earnings growth. This implies that the relationship between the tax-book ratio and future earnings is likely to be monotonic. Lev and Nissim (2004) also indicate a learning effect after the implementation of SFAS 109 in 1993; investors’ perception of the importance of

tax information appears to have increased over time with respect to its effects on current stock prices.

Weber (2006) extends this research by examining the relationship between the tax-book differences and analysts' forecasts of future earnings. He uses the ranked tax-book ratio to examine reasons that tax-book differences are associated with future stock returns. Weber documents that analysts' forecasts are inefficient in incorporating the tax-book difference information when making future earnings forecasts and demonstrates that analysts tend to be more optimistic following firm-years where book income is large relative to tax income. Weber interprets this evidence as an indication that analysts' errors largely explain the association between book-tax differences and future stock returns.

In a contemporaneous study, Ayers et. al. (2007) examine one aspect of the relationship between changes in deferred taxes and subsequent bond rating changes. The authors report that the likelihood of a bond rating downgrade increases if firms report large positive or negative changes in their deferred taxes. This suggests that bond rating analysts' associate large changes in deferred taxes with decreased earnings quality and/or increased off-balance sheet financing. These results are attenuated in instances where book-tax differences are more likely to reflect tax planning rather than deteriorating economic performance.

Our work extends existing research in at least several ways. First, our research augments and extends the work of Ayers et. al. (2007). While Ayers et. al. focus their analyses on bonds that have experienced rating changes, we utilize a levels approach that examines the effects of book-tax differences on a somewhat larger panel of "fresh" bond ratings (n=1,843). Utilizing new bond issues continues to ensure that the rating analysts have taken a current look at the company and its overall fundamentals, and yet does necessitate a dramatic enough change in

those underlying fundamentals to compel a change in the firm's bond rating. Thus, we provide additional evidence and an alternative viewpoint to complement and extend Ayers et. al. The second way we add to the literature is by incorporating two different tax-based fundamentals and by utilizing the measurement techniques to investigate bonds that previously have been utilized separately in Lev and Nissim (2004) and Hanlon (2005) with respect to equities. Third, we document the existence of a U-shaped relationship with respect to book-tax fundamentals and bond ratings. The further away a firm is from its industry average with respect to its book-tax relationship, the greater the probability they will receive a lower bond rating. Finally, we document a temporal learning effect that takes place with respect to analyst awareness of book-tax differences during the pre and post Enron time periods.

Our research also differs from the work conducted in the equity market (Lev and Nissim 2004, Hanlon 2005, Weber 2006) by concentrating on the bond market. While bond market research often complements and reinforces research performed in the equity markets, the results can differ due to the underlying diversity in the nature of the stakeholders and their contingent claims on the firm. While management serves the interests of shareholders, the interests of debtholders are not management's prime consideration. This is referred to by Penman (2004) as the "moral hazard" of debt which can result in decisions having differential effects on each constituency. This makes the bond market potentially different than the equity market and, therefore, an interesting and important environment in which to examine issues that are significant to the accounting. Specifically, we believe that the bond rating decision provides a valuable and direct setting in which to empirically examine knowledgeable end-user perceptions of book-tax differences.

## ***Bond Ratings***

Bond ratings reflect the analysts' perception of a firm's probability of default on future payments. This probability of default depends on a wide range of factors, not the least of which relates to the profitability ratios of the firm (S&P Ratings Group, 2006). Earnings, along with their perceived quality, are primary indicators of firm profitability. If the information contained in the book-tax differences provide information about earnings, in excess of other accounting information, then this should be systematically related to the ratings assigned to a firm's bonds.

Firms raise substantially more "new" funds in the bond market every year than in the equity market to finance new and continuing activities and projects. For example, in 2005 companies raised \$1,187 billion in the bond market compared to \$141 billion in the equity market (Investment Dealer's Digest 2006). The process of raising new funds initiates with management, and then proceeds through various outside parties. Typically, the process begins with the corporation obtaining a necessary bond rating for the issue from a major rating agency, such as Moody's or Standard & Poor's, and ends with an investment banker bringing the issue to market.

The independent bond rating agency examines the financial outlook of the company and the characteristics of the issue, and assigns a rating that indicates an assessment of the degree of default risk associated with the firm's bonds. Essentially, the bond rating is an attempt to inform the public (with no guarantees) of the likelihood of an investor receiving, as scheduled, all of the promised interest and principal payments associated with the bond issue. The issue is assigned to a rating class that indicates the perceived quality (or riskiness) of the bonds. These categories begin at the highest quality issues (e.g. Aaa) and proceed down to lower quality issues (e.g. Aa1, Aa2, Aa3, A1, A2, A3, Baa1, etc.).

The actual rating is obtained by contacting the bond rating agency prior to issuance and requesting a rating be assigned to their new issue. The rating agency then assigns an analytical team to conduct basic research about the company and individual issue characteristics, and then meets with the issuer to obtain any additional information it may deem pertinent. Finally, there is a rating committee meeting which results in an issued rating. Although the rating agency receives a fee for the service, the actual rating received is not influenced or dependent upon the amount of the fee. The rating agency's very existence depends upon being independent, along with the associated credibility the public attributes to the ratings it issues. This independence is corroborated by recent research indicating ratings are motivated more by reputation protection than rating fees obtained from the issuers (Covitz and Harrison, 2003).

The assigned rating is very influential because of what it implies about the bond issue. One important implication is the effect it has on the subsequent yield. Higher bond ratings imply a lower required effective interest rate, resulting in lower interest payments. Yield spread between rating categories can be substantial, often resulting in a difference of tens of millions of dollars in interest over the life of the obligation. For example, the yield spread between Baa and Ba bonds has averaged over 100 basis points (Huang and Huang, 2003). This can mean a difference in nominal payments of over \$100 million over twenty years for a \$500 million bond issue.

In addition to the interest differential, there are also many regulatory requirements in the United States and abroad that are specified in terms of a firm's assigned bond rating. Several agencies allow investments to be made only in the top rating categories (e.g. Baa3 and above), typically referred to as "Investment Grade" debt<sup>2</sup>. Ratings also play a prominent role in the

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<sup>2</sup> For example, the Federal Reserve Board and the Federal Home Loan Bank System permit their members to invest in corporate debt only with investment grade ratings. The Department of Labor allows pension funds to invest in

international rules determining the level of capital banks must maintain. Under the Basel II arrangement a bank must sustain much lower capital on hand if they invest in Aaa- rated assets compared to Baa (or unrated) assets (Wall Street Journal 2007). The fact that regulatory agencies define requirements partially based on independent ratings indicates the importance and degree to which the rating process is ingrained in the market system.

There is also substantial empirical evidence in the finance and accounting literature that establishes the importance and information content of bond ratings and changes in bond ratings. Research provides evidence of stock price movement and abnormal returns after bond rating changes (Holthausen and Leftwich 1986; Glascock et al. 1987). Additional evidence indicates the bond and stock price effects that occur when a firm is placed on Standard & Poor's Credit Watch List (Hand et al. 1992), as well as the direct impact on bond yields of an actual rating downgrade or upgrade (Ziebart and Reiter 1992). Furthermore, Dichev and Piotroski (2001) show that firms that receive upgrades on their bond ratings outperform firms that receive bond rating downgrades by 10 to 14 percent in common stock performance in the year following the bond rating change. They also report that current ratings changes predict not only future rating changes, but also changes in the firm's future profitability. Finally, Bhanot and Mello (2006) describe the effects of a rating "trigger" on equity holders, and find that rating triggers that require an equity infusion better mitigates conflicts between shareholders and bond holders than a rating trigger that is paid out by requiring liquidating assets. In summary, there is substantial evidence that indicates the importance of bond ratings to the capital markets. This makes debt

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securities only in top rating categories. In addition, the New York and Philadelphia Stock Exchanges establish margin requirements for mortgage securities depending on their ratings (S&P Rating Group 2006).

ratings an interesting and important area in which to explore the perceptions of the relationship between a firm's tax records and its financial reporting records.

## **Hypothesis Development**

Accounting research has recently examined a variety of salient attributes of the firm with respect to firm debt and its bond rating including auditor characteristics (Brandon et. al. 2004), auditor choice (Fortin and Pittman 2007; Pittman and Fortin 2004), corporate governance measures (Bhojraj and Sengupta 2003; Asbaugh-Skaife et. al. 2006), and research and development expenditures (Shi 2003). As described previously, several researchers have explored the association between book-tax differences and equity prices (Lev and Nissim, 2004; Hanlon, 2005, Weber 2006) with results generally indicating that book-tax differences provide information to the equity market and are related to future firm earnings and future stock returns. Ayers et. al. (2007) explore one facet of the relationship between book-tax differences and bond ratings by examining the effect of changes in the deferred tax account on changes in bond ratings and find large changes in deferred taxes are related to subsequent bond rating downgrades. We extend this research to a large sample of new bond issues over an extended period, and also examine the effects of multiple measures of the book-tax relationship on the perceived default risk of a firm by bond rating analysts.

Although the literature has recently explored various effects of the book-tax difference on equity-holders, there is little empirical research with respect to its effects on bond ratings and bondholders. It is important to investigate the bond market because prior research demonstrates the existence of important economic differences between the interests of shareholders and bondholders (e.g. Maxwell and Stephens 2003), and has also established that the market

interpretation of similar events can have differential interpretations and effects on these different stakeholders (Gebhardt et al. 2005). Our purpose here is to provide insight related to debt holders and investigate the extent to which the relationship between taxable income and financial reported book income impact firm default risk as represented by a firm's bond rating.

The first issue we explore is the effect on perceived default risk of the existence of relatively large positive deferred taxes (book income > taxable income) and relatively large negative deferred taxes (book income < taxable income) for a firm with respect to its industry. Our rationale is based on prior research (Hanlon 2005) as well as economic intuition that suggest relatively large positive (negative) deferred taxes may provide a signal regarding the persistence and permanence of the firm's earnings. It is unlikely that these large positive (negative) deferred taxes will continue in future years. If these large deferred taxes are due to the discretion of management in the accruals process, they could be associated with less persistent future earnings and cash flow streams. To directly explore this issue, our first set of hypotheses in the alternative form is:

***H1<sub>a</sub>**: Firm's with large positive deferred taxes relative to their industry will have a lower bond rating initially assigned to its debt issuance.*

***H1<sub>b</sub>**: Firm's with large negative deferred taxes relative to their industry will have a lower bond rating initially assigned to its debt issuance.*

We also examine the effect of the tax to book ratio on a firm's bond rating. The tax-book ratio includes the effects of deferred taxes, but also includes other differences, including permanent differences, not captured in the deferred tax number. Prior research (Lev and Nissim, 2004) indicates that the tax-book ratio can provide useful information regarding a firm's future earnings potential incremental to that found in accruals and cash flows. Lev and Nissim provide

evidence that a large tax-to-book ratio indicates higher future earnings due to taxable income reported before book income (e.g., prepayments) and expenses that are recognized in the financial statements before the tax return (e.g., estimated expenses). They posit that this effect is prevalent in growth firms. However, the authors also contend that this may be a reflection of the firm's ability to defer or shelter income. Given that our sample consists of large, relatively established firms, we expect large tax-to-book ratios relative to its industry peers to reflect a firm's inability to utilize effective tax planning, or in some way minimize its share of taxes. This is likely to be perceived negatively by rating analysts in that the firm is not making proper use of available resources that could help reduce these taxes and maximize firm cash flow. This provides our next hypothesis:

***H2<sub>a</sub>:** Firm's with large tax to book ratio relative to their industry will have a lower bond rating initially assigned to its debt issuance.*

Finally, we explore the possibility that firms with small tax to book ratios might be perceived negatively by rating analysts. The logic from an economic perspective is that a small tax-book ratio might indicate that book income is artificially inflated and will subsequently become lower in future years. These firms could be engaged in aggressive tax planning/tax shelters, or are engaged in off-balance sheet financing. We examine this with our final hypothesis:

***H2<sub>b</sub>:** Firm's with a small tax to book ratio relative to their industry will have a lower bond rating initially assigned to its debt issuance.*

We examine these questions by using a relatively large sample of new bond issues over an extended period to provide insights into the effects of book-tax differences on credit ratings.

## Research Method

### *Model Development*

Our benchmark model is based on the fundamental economic groundwork developed by Kaplan and Urwitz (1979) and enhanced by other researchers over subsequent years. The Kaplan and Urwitz model is econometrically sound and has proven robust. In recent years it has provided the basic foundation from which to examine the effects on bonds of various contemporary issues such as corporate governance (Bhojraj and Sengupta 2003; Asbaugh-Skaife et. al. 2006), auditor independence (Brandon et. al. 2004), quality of earnings (Francis et. al. 2005), and research and development expenditures (Shi, 2003). The model contains five basic independent variables that are economically linked to a firm's bond rating: subordination status of the issue, a measure of firm size, a measure of leverage, a measure of profitability, and a measure of firm risk. We enhance the basic model with a measure of research and development (Shi, 2003), modified-Jones accruals (Dechow and Dichev, 2002), cash flows from operations, plant, property and equipment, and foreign sales importance in an attempt to eliminate potential omitted correlated variables. We also include issue year indicators to control for year effects, and industry indicators to control for industry effects (utilizing industry classifications developed by Fama and French, 1997).

Building upon the recent literature, we measure book-tax differences in two different ways. Our first measure follows Hanlon's (2005) deferred tax fundamental and is a firm's deferred tax expense (benefit) scaled by total assets. The second measure is the ratio of estimated net tax income divided by book income and follows the work of Lev and Nissim (2004) and Weber (2006).<sup>3</sup> As described below, our two measures are ranked into quintiles based on firm

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<sup>3</sup> It is necessary to estimate net taxable income because the majority of firms do not make their tax returns public.

industry and year in order to make allowance for potential systematic variance among industries (Mills and Newberry 2001; Manzon and Plesko 2002; Hanlon 2005).

To develop our deferred tax fundamental, we create an indicator variable for firms with large positive book-tax differences (LPOS) which will take a value of one for those firms in the highest industry-year quintile and zero otherwise. In a similar manner, we create a second indicator variable for firms with large negative book-tax differences (LNEG) that takes a value of one for those firms in the lowest industry-year quintile and zero otherwise. The creation of these two variables allows us to isolate the effect of deferred tax information on bond ratings for those firms whose book-tax relationship falls at the extremes of their industry for that particular year.

Furthermore, we create two additional indicator variables for our second tax fundamental metric, the overall book-tax income measure. The first of these indicator variables (SmallTB) is used to designate firms with small tax-book ratios (i.e. taxable income relative to book income falls in the lowest industry-year quintile); and another indicator variable (LargeTB) for firms with large tax-book ratios (i.e. taxable income large relative to book income falls in the lowest industry-year quintile). These indicator variables represent firms in the outer quintiles of their industry with respect to the relationship between taxable income and financial reported book income. Our basic model is<sup>4</sup>:

$$\begin{aligned} \text{RATING}_j = & \beta_0 + \beta_1 \text{SUB}_j + \beta_2 \text{ASSETS}_j + \beta_3 \text{DEBT}_j + \beta_4 \text{INCOME}_j + \beta_5 \text{BETA}_j + \\ & \beta_6 \text{CASHFLOWS}_j + \beta_7 \text{R\&D}_j + \beta_8 \text{DA}_j + \beta_9 \text{PPE}_j + \beta_{10} \text{COMPLEX}_j + \beta_{11} \text{FF1-43}_j \\ & + \beta_{12} \text{YEAR94-2004}_j + \beta \text{TAXVAR}_j + v_j \end{aligned} \quad (1)$$

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<sup>4</sup> All independent variables are measured in the year prior to the bond issuance.

Where: RATING	Ordinal representation of the issue's initial rating where Aaa equal 30 and decreases for each rating category below, e.g. Aaa, Aa1, Aa2, Aa3, A1, A2, A3, Baa1, etc.
SUB	1 for subordinated bonds and 0 otherwise. The subordination status is stated on the bond indenture and is expected to be associated with a higher risk, therefore exhibiting a negative association with bond rating.
ASSETS	Log of total assets. Assets proxies for, and has, an inverse relationship with default risk. Assets is expected to have a positive association with bond rating.
DEBT	Long term debt divided by total assets. Debt represents the relative amount of debt current incurred by the firm. Debt is expected to have a negative association with bond rating.
INCOME	Operating income for the year divided by total assets. Income is expected to have a positive association with bond rating.
BETA	The firm's common stock Beta. Firms with a higher beta are considered riskier, hence Beta is expected to have negative association with bond rating.
CASHFLOWS	Cash flows from operations scaled by total assets. Cash flows represent the amount of cash rather than financial earnings the firm has received (paid) this year. Cash flow is expected to have a positive association with bond rating.
R&D	Research and Development expense for the year scaled by total assets. R&D represents the firm's willingness to incur risk for new products and ventures. R&D is expected to have a negative association with bond rating.
DA	The firm's discretionary accruals from the Modified Jones model based on industry and year estimates. DA gives an estimate of the financial aggressiveness of the firms. Also, it controls the financial side of any accruals that may affect our tax variables.
PPE	The firm's gross <sup>5</sup> plant property and equipment scaled by total assets. Fixed assets are a source of temporary differences between tax and book income.
COMPLEX	The firm's foreign sales divided by total sales. Foreign sales represent increased firm complexity and the ability to shift income from one country to another.
FF1-43	Industry indicator variables (0,1) are added as independent variables to the benchmark model to represent the Fama-French industry classifications (minus financial and insurance industries). This procedure has been utilized in the accounting and finance literature to control for industry.
YEAR94-02	Indicator variables (0,1) are included to control for specific year effects.
TAXVAR	LPOS indicator variable with a value =1 if the firm falls in the top quintile for deferred taxes in its industry for that year, and 0 otherwise. LNEG indicator variable with a value =1 if the firm falls in the bottom quintile for deferred taxes in its industry for that year, and 0 otherwise.

<sup>5</sup> Results are unchanged when net plant, property, and equipment is used.

<b>TAXVAR</b> Continued	SmallTB indicator variable with a value =1 if the ratio of taxable income to book income for the firm falls in the bottom quintile in its industry for that year, and 0 otherwise. LargeTB indicator variable with a value =1 if the ratio of taxable income to book income for the firm falls in the top quintile in its industry for that year, and 0 otherwise.
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### *Sample*

We examine new corporate bonds issues rated by Moody's bond rating agency and issued during the time period January 1994 to December 2004. The sample consists of non-financial firms that issue bonds backed solely by the issuer's ability to pay. No convertible bonds, mortgage bonds, asset-backed bonds, or deferred interest bonds are included. This allows us to examine bonds whose ratings are based entirely on the issuing firms default risk and not the risk of another underlying asset or option. The sample is restricted to new issues because this helps to ensure the rating is the result of a detailed and complete recent analysis conducted by the bond rating analysts. This helps to avoid problems related to any potential delay in changing existing ratings that has been a repeated concern expressed in the popular press (e.g. Wall Street Journal, 2001, 2002). A summary of our sample selection process is presented in Panel A of Table 1. The initial sample consists of 3,551 new debt issues from firms listed on Compustat. Of those, 201 firms did not have information for Beta available on CRSP and an additional 981 did not have the other necessary control variables on Compustat (e.g. income, cash flow data). Another 424 did not have the needed tax information available on Compustat. Finally, 102 firms did not have positive income for the year (which would distort the income ratio). This results in a final sample of 1,843 new issues during the period 1994-2004.

Panel B of Table 1 contains the descriptive statistics for our control variables. Since most firms issuing bonds are a bit larger than the average firm listed on Compustat, our sample firms

are somewhat larger than the samples used for research in the equity area with respect to book-tax differences. The firms are also profitable with positive cash flows and have a lower Beta than prior equity samples. Only 7% of the sample issued subordinated bonds and less than half of the sample recorded research and development expenses. Panel C of Table 1 contains the frequency of our test variables. Of our sample, 242 issues are associated with firms that recorded large negative deferred taxes (i.e. they are in the bottom industry-year quintile), and 415 issues were associated with firms recording large positive deferred tax benefits (i.e. in the top industry-year quintile). The quintiles are based on all Compustat firms in the industry for that year, not just those that issued bonds. For our second tax measure, the tax-book ratio variable, 80 issues were associated with firms that had very small taxable incomes for the year (i.e. in the bottom industry-year quintile) and 320 were from firms that had very large taxable incomes for the year (in the top industry-year quintile).

Panel D of Table 1 shows the distribution of ratings in the sample extending from Aaa to Ca representing a broad range of bond ratings. Table 2 presents the correlations between our independent variables. The pair-wise correlations of our variables are relatively low indicating they represent distinct measures of default risk. CASHFLOW and INCOME are highly correlated, which is to be expected for most firms given prior research. CASHFLOW is also closely correlated with PP&E indicating that firms with large capital investments also have larger cash flows. R&D is highly correlated with DEBT (negatively), INCOME, and COMPLEX. This indicates that firms with a large component of foreign sales and high income are more likely to invest in R&D. Of our variables of interest, LNEG and LPOS are negatively correlated which is to be expected given the variables construction and LNEG is positively correlated with LargeTB which, again, is expected given the variables construction. Overall,

there is nothing revealed in the pairwise correlations to suggest any difficulties in utilizing our multivariate analyses.

## **Empirical Results**

### ***Regression Results***

Results from the ordered logistic regression for the overall sample are shown in Table 3 with the results of the benchmark model shown in the first column as Model 1. The summary statistics indicate a robust model <sup>6</sup>(Pseudo  $R^2 = 69.86\%$ ; Model  $c = .845$ ) that explains a significant amount of variation involved in the bond rating decision process. All control variables are significant in the expected direction except for the R&D variable which is not significant.

The full sample results with the addition of our deferred tax variables are shown in Model 2, and consistent with expectations, indicate that large negative deferred tax expenses (LNEG) are significant and negatively related to the firms debt rating received ( $p = .0121$ ). The coefficient for large positive deferred tax benefits (LPOS) is also negative and significant ( $p = .0188$ ). These results are consistent with bond rating analysts recognizing the impact deferred taxes have on earnings quality along with potential off-balance sheet financing and adjusting the rating downward accordingly. These results are also conceptually consistent with prior research in the equity arena that shows a lack of earnings persistence when firms have large negative or large positive tax deferrals.

The results of the full sample with the addition of our second set of tax variables (overall tax/book income) are displayed in Model 3. Similar to the results of the deferred tax measures, relatively low taxable income compared to book income (SmallTB) has a significant, negative

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<sup>6</sup> Several diagnostic tests were run to help ensure there are no problems with multi-collinearity. The variance inflation factors for variables of interest are less than 2.5. Convention suggests that VIFs in excess of 10 require considering multicollinearity when interpreting relations. The condition indices (none were above 8) are well below theoretical thresholds of 30 (Hair et al., 1998).

impact on the bond rating received ( $p = .0092$ ). Interestingly, firms with relatively large taxable incomes compared to book (LargeTB) also experience a negative effect on their bond ratings ( $p < .0001$ ). This differs from the results found in the equity arena. Lev and Nissim (2004) find that future earnings growth is positively related to the current tax-book ratio and displays a relatively monotonic relationship. Our findings in the debt area demonstrate more of a U-shaped relationship between the tax-book ratio and bond ratings suggesting that bond rating analysts are more cautious of firms who record very high taxable income relative to book as well as firms that record very low taxable income relative to book. These results are consistent with the view that bond rating analysts equate excessively low taxable income with potentially risky tax behaviors (such as the use of high-risk tax shelters) and very high taxable income with a lack of proper tax planning or perhaps a lack of company flexibility with respect to taxes and capital structure.

### ***Sensitivity Analysis***

We perform a variety of sensitivity tests to help ensure that the results are not unduly influenced by a subset of the sample or biased by other variables. First, we examine the effect of different time periods by including an interaction between our variables of interest and an indicator variable representing the post-Enron time frame. Second, we add a measure of tax-planning to our model. Third, we include independent variables to represent the spread between cash flows and book income to see if the tax-to-book information is actually a subset of the cash flow effect. Finally, we re-estimate our regressions using the firm's effective tax rate as our independent variable of interest. While our additional analyses reveal several interesting characteristics concerning the relationship between bond ratings and tax to book information,

each of our tests continue to find a particular measure of the firm's tax to book relationship to be significantly associated with the bond rating decision.

### ***Temporal Analysis***

Our first sensitivity test investigates the possibility that temporal periods may be driving our overall results. The temporal exploratory analysis we run is motivated by the high profile accounting and audit failures involving well known firms such as Enron, WorldCom, and Tyco. These events are particularly germane to our research because in the aftermath of the failures, it was revealed through accounting research and reported in the popular press that these companies paid little or no taxes. This limelight brought a great deal of additional scrutiny to the tax aspects of the firms' financial records. Accordingly, we assign an indicator variable (Enron) equal to 1 when the issue date is after January 1, 2001 and 0 otherwise. We loosely refer to these two time frames as pre and post Enron periods. As shown in Panel C of Table 1, most of tax variables of interest are not concentrated in either time frame.

Our results for this pre and post-Enron segmentation are presented in Table 4 and indicate that our control variables are very similar to those in the main results section. Model 1 displays the results using the deferred tax indicator as our variables of interest. LPOS and LNEG represent the effect of deferred taxes on bond ratings in the pre-Enron period. In this case, each variable is marginally significant with respect to the bond rating (LPOS  $p=.1446$ ; LNEG  $p=.0785$ ). The main effect of the post-Enron time period on ratings is represented by the coefficient of the Enron variable and indicates an overall lowering of bond ratings assigned for new issues after the Enron period. This could reflect a greater scrutiny placed on new issues during this time period. Our test variable of principal interest is the interaction between the deferred tax indicators and the post-Enron time period indicator. The effect of LPOS (calculated

as  $LPOS + LPOS*Enron$ ) in the post-Enron period is negative and significant ( $p=.0191$ ) indicating a greater influence in this period. The effect of  $LNEG$  (calculated as  $LNEG + LNEG*Enron$ ) is negative and marginally significant ( $p=.0530$ ) also indicating a greater influence in the post-Enron time frame.

Model 2 in Table 4 displays the results of our temporal analyses using the tax-to-book indicator as our tax fundamental of interest. Both SmallTB ( $p=.0207$ ) and Large TB ( $p<.0001$ ) are negative and significantly related to bond ratings in the pre-Enron period. Interestingly, SmallTB in the post-Enron period is not significantly related to bond ratings (calculated as  $SmallTB + SmallTB*Enron$ ,  $p=.3748$ ). However, LargeTB in the post-Enron time frame remains significant and negative in this period (calculated as  $LargeTB + LargeTB*Enron$ ,  $p=.0004$ ). Taken together, these results indicate that the focus of bond rating analysts appear to have intensified with respect to the information contained in the deferred tax accounts after the Enron collapse, and they consistently remain concerned when firms recognize relatively large taxable income.

### ***Tax Planning Effects***

Our next set of sensitivity tests investigate the effects of tax planning on our results. Following Dyreng et al. (2007), we designate firms as effective tax planners if those firms are in the lowest quintile for the five-year accumulated effective tax rates. To calculate this, we utilize all firms in the Compustat database, and calculate each firm's effective tax rate as total tax expense less deferred tax expense over five years and dividing by pre-tax book income less special items (summed over five years)<sup>7</sup>. Firms in the bottom quintile for each year are considered to be effective tax planners and a value of one is assigned to the PLAN indicator

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<sup>7</sup> All inferences remain unchanged by substituting cash taxes paid in the numerator.

variable, otherwise it is set to zero. This measure reflects the ability of a firm to defer or avoid taxable income. Table 5 shows the results of the regressions and indicate the control variables continue to be reasonably consistent with the primary analyses while the tax planning variable (PLAN) is negative and significant. It is not entirely clear how to interpret this specific result except we conjecture that firm's that pay little taxes are viewed negatively by bond rating analysts due to possible implications for the permanence of their earnings and/or the utilization of high risk tax minimization measures that might cloud true economic performance. The large positive deferred tax differences (LPOS  $p=.0216$ ) and large negative deferred tax differences (LNEG  $p=.0270$ ) continue to be negative and significant. Consistent with previous research, we find that neither of the interaction terms is significant (LPOS + LPOS\*PLAN,  $p=.8982$  and LNEG + LNEG\*PLAN,  $p=.8341$ ) in the model. This indicates that the existence of highly effective tax-planning subsumes the information contained in the deferred tax accounts.

The results of incorporating the tax planning variable with our overall tax to book measures are presented in Column 2 of Table 5 and indicate that while the tax planning variable (PLAN) remains significant ( $p<.0001$ ), the small tax to book variable (SmallTB) is not ( $p=.3845$ ). This is not particularly surprising considering that they may be substitutes for each other. The interaction between the two terms is also insignificant (SmallTB + SmallTB\*PLAN,  $p=.5856$ ). Finally, the large tax to book ratio (LargeTB) remains significant ( $p<.0001$ ), as well as its interaction with PLAN (LargeTB + LargeTB\*PLAN,  $p=.0013$ ). These results are consistent with the interpretation that the negative effect of a small tax to book ratio (SmallTB) is subsumed by the existence of effective tax planning, while tax planning does not alleviate the negative effect on firms with large tax to book ratios.

### *Cash Flow vs Operating Income Effects*

Our next set of sensitivity tests examines the possibility that our results may be a consequence of the difference between cash flows and operating income. We create two indicator variables to examine this possibility. First, we compute the difference between income from operations and cash flow from operations and divide the result by operating income. Each firm is then ranked by industry (2 digit SIC) and year. Those in the bottom quintile represent firms with cash flows closely approximating operating income and the Small Cash Difference (SCD) indicator variable is set to one. Those in the top quintile are firms with the widest relative divergence between cash flows and operating income, and the Large Cash Difference (LCD) indicator variable is set to one. Table 6 presents the results and demonstrate that LPOS remains significantly negatively associated with bond rating ( $p=.0110$ ) while LNEG is no longer associated with bond ratings ( $p=.2569$ ). The SCD variable has a positive and significant association with bond ratings ( $p=.0002$ ) consistent with the interpretation that firms with the smallest differences between cash flows and operating income appear to be viewed as less risky by bond rating analysts. On the other hand, LCD is significantly negative ( $p<.0001$ ), consistent with the interpretation that relatively large differences are viewed negatively by rating analysts. The results are similar when our tax-book measures are substituted for our deferred tax measures. The cash flow to income measures retain their same level of significance (i.e. SCD  $p=.0002$  and LCD  $p<.0001$ ). Importantly, SmallTB retains a marginally significant negative effect ( $p=.0316$ ) while LargeTB remains significantly negatively associated with bond rating ( $p<.0008$ ). These analyses provide evidence that our overall results are not simply artifacts of the difference between cash flows and operating income.

Our final sensitivity test utilizes the firm's effective tax rate (ETR) as an independent variable in our model to represent an alternative tax fundamental instead of deferred taxes or the

tax-book ratio. We first rank firms by a similar upper and lower quintile identification within industry and year, and then re-run the regressions. The un-tabulated results are very similar to our main findings. Firms with a low ETR receive a lower bond rating, all else equal, than those with ETRs in the middle range for their industry and year. Likewise, firms with high ETRs receive lower bond ratings than firms in the middle range. These results support our main findings which are consistent with bond rating analysts exhibiting additional scrutiny when the relationship between book income and taxable income falls outside a certain industry range.

### **Summary and Conclusions**

Our research examines the relationship that exists between a firm's taxable income and its financial reported book income and the effects of this relationship on the perceived default risk of the firm. Specifically, we investigate the relationship between a firm's bond rating and its tax fundamentals. We create two tax fundamentals, one based on a firm's deferred tax expense (benefit) and a second based on the ratio of taxable income to book income. Using a relatively large sample of new bond issues from 1994-2004, we document a negative relationship between the tax fundamentals and bond ratings for those firms that fall into the extreme upper or lower industry-year quintiles for deferred taxes or the extreme upper or lower industry-year quintiles for the overall tax-book ratio. This is consistent with firm's being penalized in their bond ratings if they fall in the extremes of tax management, e.g. they either under manage or over manage their taxable income in relation to their reported financial income.

We contribute to existing research by providing empirical evidence concerning how bond market analysts incorporate the information contained in the relationship between taxable income and reported book income. Rather than a strict monotonic relationship between a firm's book-tax ratio, we document an U-shaped relationship where firms that are in the extreme upper

or lower industry-year quintile with respect to book-tax ratio receive lower bond ratings than other firms, *ceteris paribus*. We also provide additional analyses that document the effects that highly effective tax planning has on these relationships. Finally, we contribute to the literature by documenting a temporal difference in the way bond rating analysts incorporate the information contained in the relationship between taxable income and financially reported book income. The evidence is consistent with a learning effect taking place in the post-Enron period when analysts began placing considerably more emphasis on a firm's deferred tax information when assigning a rating to a new bond issue.

We should acknowledge some potential limitations with respect to our research. While we are careful in our attempt to econometrically model the bond rating decision correctly, and we provide empirical results consistent with the details concerning book-tax differences providing information to bond raters, it is feasible that the actual information provided is simply associated with book-tax differences. We must also recognize that our sample consists of only firms that issue bonds, and if these firms have characteristics that differ from the overall population, then our results may not be entirely representative. In a similar vein, our sample contains a relatively modest (4%) representation from firms with small tax-book ratio firms, as well as firms with large negative deferred tax accruals. We should also recognize that some of the firms with low book income could be caused by one time "big bath" behavior. Finally, we utilize a levels design to investigate our hypotheses, and while we feel it is most appropriate for our research, we should acknowledge that there have been issues raised regarding the overall use of levels in various research settings (Holthausen and Watts, 2001).

These results add to existing research and provide insight into the treatment of deferred tax and book-tax information by bond rating analysts. We add to the extant literature by

empirically examining how one set of sophisticated financial statement users, bond rating analysts, perceive the relationship between a firm's taxable income and its financial reported book income. These results should be of relevance to those interested in the importance of the relationship between book income and taxable income by capital market participants, as well anyone interested in the overall value of the firm.

## References

- Ashbaugh-Skaife, H., D.W. Collins, R. Lafond. 2006. The effects of corporate governance on firm's credit ratings. *Journal of Accounting and Economics* 42 (2): 203-243.
- Ayers, B. C., S. K. Laplante, and S. T. McGuire. 2007. Credit Ratings and Taxes: The Effect of Book/Tax Differences on Ratings Changes. *Working Paper*. The University of Georgia.
- Bhanot, K. and A.S. Mello. 2006. Should corporate debt include a rating trigger? *Journal of Financial Economics* 79: 69-98.
- Bhojraj, S. and P. Sengupta. 2003. Effect of corporate governance on bond ratings and yields: The role of institutional investors and outside directors. *Journal of Business* 76 (3): 455-475.
- Brandon, D. M., A. D. Crabtree, and J. J. Maher. 2004. Non-audit fees, auditor independence, and bond ratings. *Auditing: A Journal of Practice and Theory* 23 (2), 89-103.
- Burgstahler, D., W. B. Elliot, and M. Hanlon. 2002. How firms avoid losses: Evidence of the use of the net deferred tax asset account. *Working Paper*. The University of Washington.
- Covitz, D.M. and P. Harrison. 2003. Testing conflicts of interest at bond rating agencies with market anticipation: Evidence that reputation incentives dominate. Working paper, Federal Reserve Board.
- Dechow, P. M. and I. D. Dichev. 2002. The quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review* 77 (Supplement): 35-59.
- Desai, M. A. 2002. The corporate profit base, tax sheltering activity, and the changing nature of employee compensation. NBER Working Paper #8866. Cambridge, MA: NBER.
- Desai, M. A., D. Dharmapala. 2006. Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics* 79: 145-179.
- Dichev, I. D., and Piotroski, J. D. (2001). The long run stock returns following bond ratings changes. *Journal of Finance*, 56 (1), 173-203.
- Dhaliwal, D. S., C. A. Gleason, and L. F. Mills. 2004. Last-chance earnings management: Using the tax expense to meet analysts' forecasts. *Contemporary Accounting Research* 21 (2): 431-459.
- Dyreng, S.D., M. Hanlon, and E.L. Mayhew. 2008. Long-run corporate tax avoidance. *The Accounting Review* 83(1): 61-82.
- Fama, E.F., and French, K.R. (1997). Industry Costs of Equity. *Journal of Financial Economics* 43, 153-193.
- Fortin, S., and J.A. Pittman. 2007. The role of auditor choice in debt pricing in private firms. *Contemporary Accounting Research* 24 (3): 859-896.
- Francis, J., R. Lafond, P. Olsson, and K. Schipper. 2005. The market pricing of accruals quality. *Journal of Accounting and Economics* 39 (2): 295-327.

- Frank, M. M., L. J. Lynch, and S. O. Rego. 2006. Does aggressive financial reporting accompany aggressive tax reporting (and vice versa)? *Working Paper*. The University of Iowa.
- Gebhardt, W. R., S. Hvidkjaer, and B. Swaminathan. 2005. The cross-section of expected corporate bond returns: Betas or characteristics. *Journal of Financial Economics* 75 (1): 85-114.
- Glascocock, J. L., Davidson III, W. N., and Henderson, G. V. (1987). Announcement effects on moody's bond rating changes on equity returns. *Quarterly Journal of Business and Economics*, 26, 67-78.
- Gleason, C. and L. F. Mills. 2002. Materiality and contingent tax liability reporting. *The Accounting Review* 77 (2): 317-342.
- Hair, J., R. Anderson, R. Tatham, and W. Black, 1998, *Multivariate Data Analysis*. 5th edition. Upper Saddle River, New Jersey, Prentice Hall.
- Hand, J. R., Holthausen, R. W., and Leftwich, R. W. (1992). The effect of bond rating agency announcements on bond and stock prices. *Journal of Finance*, 47, 733-752.
- Hanlon, M. 2005. The persistence and pricing of earnings, accruals, and cash flows when firms have large book-tax differences. *The Accounting Review* 80 (1): 137-166.
- Holthausen, R. W., and Leftwich, R. W. (1986). The effect of bond rating changes on common stock prices. *Journal of Financial Economics*, 17, 57-90.
- Holthausen, R. W., and R.L. Watts. (2001). The relevance of the value-relevance literature for financial accounting standard setting. *Journal of Accounting and Economics*, 31 (1), 3-75.
- Huang, J. and M. Huang (2003). How much of the corporate-treasury yield spread is due to credit risk? Working paper, Stanford University.
- IDD Inc. 2006 *Investment Dealer's Digest*. January 9.
- Kaplan, R.S. and G. Urwitz. 1979. Statistical models of bond ratings. *Journal of Business* 52: 231-262.
- Krull, L. 2004. Permanently reinvested earnings, taxes, and earnings management. *The Accounting Review* 79 (3): 745-767.
- Lev, B. and D. Nissim. 2004. Taxable Income, future earnings, and equity values. *The Accounting Review* 79 (4): 1039-1074.
- Manzon, G. B. and G. A. Plesko. 2002. The relation between financial and tax reporting measures of income. *The Law Review* 55: 175-214.
- Maxwell, W. F., and C. P. Stevens. 2003. The wealth effects of repurchases on bondholders. *Journal of Finance* 58 (2): 895-919.
- Mills, L. F. and K. Newberry. 2001. The influence of tax and non-tax costs on book-tax reporting differences: Public and private firms. *The Journal of the American Taxation Association* 23 (1): 1-19.

- Mills, L. F. and K. Newberry, and W. B. Trautman. 2002. Trends in book-tax income and balance sheet differences. *Tax Notes* (August 19): 1109-1124.
- Nelson, M. W., J. A. Elliott, and R. L. Tarpley. 2003. How are earnings managed? Examples from auditors. *Accounting Horizons* (Supplement): 17-35.
- Patrick, K. A. 2001. Comparing NIPA profits with S&P 500 profits. *Survey of Current Business* (April): 16-20.
- Penman, S. (2004). *Financial Statement Analysis and Security Valuation*, Second Edition. New York: McGraw-Hill.
- Pittman, J.A., and S. Fortin. 2004. Auditor choice and the cost of debt capital for newly public firms. *Journal of Accounting and Economics* 37 (1): 113-136.
- Phillips, J., M. Pincus, and S. Rego. 2002. Earnings management: new evidence based on deferred tax expense. *The Accounting Review* 78 (2): 491-521.
- S&P Ratings Group. 2006. S&P Corporate rating criteria. New York, NY: Standard & Poor's.
- Schrand, C. and M. H. F. Wong. 2003. Earnings management using the valuation allowance for deferred tax assets under SFAS No. 109. *Contemporary Accounting Research* 20: 579-611.
- Scholes, M., M. Wolfson, M. Erickson, E. Maydew, and T. Shevlin. 2005. *Taxes and Business Strategy: A Planning Approach*, 3<sup>rd</sup> Edition, Upper Saddle River, NJ: Prentice Hall.
- Shi, C. 2003. On the trade-off between the future benefits and riskiness of R&D: A bondholder's perspective. *Journal of Accounting and Economics* 35: 227-254.
- Wall Street Journal. 2001. Why credit agencies didn't switch off Enron. Wall Street Journal November 29: C1.
- Wall Street Journal. 2002. Moody's and S&P may accelerate process for cutting credit ratings. Wall Street Journal January 22: C1.
- Wall Street Journal. 2007. Solving 'Official' problem. Wall Street Journal September 27: C16.
- Weber, D. P. 2006. Book-tax differences, analysts' forecast errors, and stock returns. *Working Paper*. The University of Connecticut.
- Ziebart, D. A., and Reiter, S. A. (1992). Bond ratings, bond yields, and financial information. *Contemporary Accounting Research*, 9, 252-282.

**Table 1**  
**Sample and Descriptive Statistics**

*Panel A: Sample Description*

New Debt Issues by firms listed on the 2004 Compustat database from 1994-2004	3,551
Missing Beta Information on CRSP	201
Missing Control Variables on Compustat	981
Did not have tax information available	424
Did not have positive income	102
Final Sample	1,843

*Panel B: Descriptive Statistics*

Variable		Mean	Std Dev	Min	1 <sup>st</sup> Quartile	Median	3 <sup>rd</sup> Quartile	Max
SUB		.07	.26	0	0	0	0	1
ASSETS	*	8.63	1.46	1.41	7.66	8.62	9.67	13.26
DEBT	^	.26	.15	.00	.16	.23	.34	1.52
INCOME	^	.06	.05	-.07	.03	.06	.08	.54
BETA		.93	.44	-.58	.64	.91	1.19	2.65
CASHFLOWS	^	.11	.07	-.22	.07	.11	.15	.54
R&D	^	.01	.03	.00	0	0	.02	.19
DA		-.01	.93	-.25	-.01	.02	.06	1.13
PPE	^	.72	.40	.00	.42	.65	.99	3.86
FOREIGN		.20	.28	.00	.00	.04	.33	1.00

\*Log of total assets

^ Scaled by assets

*Panel C: Frequency of Tax Variables*

Variable	Frequency	Percentage of Sample	Pre-Enron		Post-Enron	
LNEG	242	13.13%	161	12.78%	81	13.89%
Small Deferred Tax Adjustments	1,186	64.35%	799	63.41%	387	66.38%
LPOS	415	22.52%	300	23.81%	115	19.73%
SmallTB	80	4.34%	50	3.97%	30	5.15%
Intermediate TB Ratio	1,443	78.30%	1,027	81.51%	416	71.35%
LargeTB	320	17.36%	183	14.52%	137	23.50%

*Panel D: Frequency of Bond Ratings*

Rating	Frequency	Percentage of Sample
Aaa	42	2.28
Aa1	22	1.19
Aa2	26	1.41
Aa3	80	4.34
A1	189	10.26
A2	326	17.69
A3	272	14.76
Baa1	147	7.98
Baa2	344	18.67
Baa3	86	4.67
Ba1	79	4.29
Ba2	31	1.68
Ba3	45	2.44
B1	52	2.82
B2	67	3.64
B3	33	1.79
Caa1	1	0.05
Ca1	1	0.05

This table provides descriptive statistics for our sample. RATING is an ordinal representation of the issue's initial rating where Aaa equals 30 and decreases for each rating category below. SUB is an indicator variable which equals 1 if the issue is subordinated and 0 if not. ASSETS represents the log of the firms total assets. DEBT represents the firm's long term debt scaled by total assets. INCOME is the operating income of the firm scaled by total assets. BETA is the firm's common stock beta. CASHFLOWS represents the firm's cash flow from operations scaled by total assets. R&D is the firm's research and development costs scaled by total assets. DA are the firm's discretionary accruals from the Modified Jones model. PPE is the firm's gross plant, property, and equipment scaled by total assets. FOREIGN represents the firm's foreign sales scaled by total sales. LPOS is an indicator variable equal to 1 if the firm falls into the top quintile for deferred taxes in its industry for that year and 0 otherwise. LNEG is an indicator variable equal to 1 if the firm falls into the bottom quintile for deferred taxes in its industry for that year and 0 otherwise. SmallTB is an indicator variable that equals 1 if the ratio of tax-to-book income for the firm falls into the bottom quintile in its industry for that year and 0 otherwise. LargeTB is an indicator variable that equals 1 if the ratio of tax-to-book income for the firm falls into the top quintile in its industry for that year and 0 otherwise.

**Table 2**  
**Pearson Correlation Coefficients (n=1,843)**

	ASSETS	DEBT	INCOME	BETA	CASHFLOWS	R&D	DA	PP&E	FOREIGN	LPOS	LNEG	SmallTB
ASSETS												
DEBT	-.18**											
INCOME	-.11**	-.27**										
BETA	.21**	-.10**	-.02									
CASHFLOWS	.02	-.16**	.53**	-.08**								
R&D	.15**	-.32**	.35**	.17**	.17**							
DA	-.08**	.01	.04	-.02	-.00	.01						
PP&E	-.02	.02	-.08**	-.22**	.34**	-.22**	.00					
FOREIGN	.22**	-.17**	.06**	.09**	.03	.37**	-.03	-.10**				
LPOS	-.11**	-.01	.08**	.00	.07**	.05*	-.03	-.00	-.03			
LNEG	-.02	-.04	.08**	-.01	.04	.14	.00	-.00	.10**	-.21**		
SmallTB	-.09**	.17**	-.07**	-.05*	-.06**	-.02	.01	-.01	-.10**	.08**	-.04	
LargeTB	.03	.01	-.09**	.00	-.12**	.04	.02	-.02	.13**	-.12**	.39**	-.10**

This table provides data on the correlation between independent variables. ASSETS represents the log of the firms total assets. DEBT represents the firm's long term debt scaled by total assets. INCOME is the operating income of the firm scaled by total assets. BETA is the firm's common stock beta. CASHFLOWS represents the firm's cash flow from operations scaled by total assets. R&D is the firm's research and development costs scaled by total assets. DA are the firm's discretionary accruals from the Modified Jones model. PPE is the firm's gross plant, property, and equipment scaled by total assets. FOREIGN represents the firm's foreign sales scaled by total sales. LPOS is an indicator variable equal to 1 if the firm falls into the top quintile for deferred taxes in its industry for that year and 0 otherwise. LNEG is an indicator variable equal to 1 if the firm falls into the bottom quintile for deferred taxes in its industry for that year and 0 otherwise. SmallTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the bottom quintile in its industry for that year and 0 otherwise. LargeTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the top quintile in its industry for that year and 0 otherwise.\* Indicates significance at the 5% level and \*\* indicates significance at the 1% level.

Table 3

**Logistic Regression Results**

Bond Rating Models for 1,843 new bond issues from Jan 1994 – Dec 2004

$$\text{RATING}_j = \beta_0 + \beta_1 \text{SUB}_j + \beta_2 \text{ASSETS}_j + \beta_3 \text{DEBT}_j + \beta_4 \text{INCOME}_j + \beta_5 \text{BETA}_j + \beta_6 \text{CASHFLOWS}_j + \beta_7 \text{R\&D}_j + \beta_8 \text{DA}_j + \beta_9 \text{PPE}_j + \beta_{10} \text{COMPLEX}_j + \beta_{11} \text{FF1-43}_j + \beta_{12} \text{YEAR94-2004}_j + \beta \text{TAXVAR}_j + v_j$$

Variable	Model 1	Model 2	Model 3
SUB	<b>-2.70</b> (<.0001)	<b>-2.71</b> (<.0001)	<b>-2.74</b> (<.0001)
ASSETS	<b>1.15</b> (<.0001)	<b>1.14</b> (<.0001)	<b>1.15</b> (<.0001)
DEBT	<b>-5.43</b> (<.0001)	<b>-5.44</b> (<.0001)	<b>-5.39</b> (<.0001)
INCOME	<b>9.92</b> (<.0001)	<b>10.00</b> (<.0001)	<b>9.68</b> (<.0001)
BETA	<b>-0.48</b> (<.0001)	<b>-0.48</b> (<.0001)	<b>-0.48</b> (<.0001)
CASHFLOWS	<b>5.36</b> (<.0001)	<b>5.34</b> (<.0001)	<b>4.95</b> (<.0001)
R&D	<b>-1.00</b> (.7022)	<b>-0.61</b> (.8164)	<b>0.28</b> (.9158)
DA	<b>-0.30</b> (.0132)	<b>-0.29</b> (.0158)	<b>-0.28</b> (.0186)
PPE	<b>0.28</b> (.0910)	<b>0.30</b> (.0710)	<b>0.30</b> (.0713)
FOREIGN	<b>-0.35</b> (.0729)	<b>-0.34</b> (.0883)	<b>-0.22</b> (.2570)
LPOS		<b>-0.22</b> (.0188)	
LNEG		<b>-0.30</b> (.0121)	
SmallTB			<b>-0.52</b> (.0092)
LargeTB			<b>-0.68</b> (<.0001)
Likelihood Ratio	2177.63	2185.17	2211.51
Model c	.845	.845	.847
Pseudo R <sup>2</sup>	.6986	.6999	.7043

This table provides data on the relation between bond rating and the independent variables. RATING is an ordinal representation of the issue's initial rating where Aaa equals 30 and decreases for each rating category below. SUB is an indicator variable which equals 1 if the issue is subordinated and 0 if not. ASSETS represents the log of the firm's total assets. DEBT represents the firm's long term debt scaled by total assets. INCOME is the operating income of the firm scaled by total assets. BETA is the firm's common stock beta. CASHFLOWS represents the firm's cash flow from operations scaled by total assets. R&D is the firm's research and development costs scaled by total assets. DA are the firm's discretionary accruals from the Modified Jones model. PPE is the firm's gross plant, property, and equipment scaled by total assets. FOREIGN represents the firm's foreign sales scaled by total sales. LPOS is an indicator variable equal to 1 if the firm falls into the top quintile for deferred taxes in its industry for that year and 0 otherwise. LNEG is an indicator variable equal to 1 if the firm falls into the bottom quintile for deferred taxes in its industry for that year and 0 otherwise. SmallTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the bottom quintile in its industry for that year and 0 otherwise. LargeTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the top quintile in its industry for that year and 0 otherwise. Coefficients are displayed along with p-values in parentheses. Industry and year indicator variables statistics suppressed.

**Table 4**

Logistic Regression Results:  
Bond rating models with post-Enron Indicators included (n=1,843)

$$\text{RATING}_j = \beta_0 + \beta_1 \text{SUB}_j + \beta_2 \text{ASSETS}_j + \beta_3 \text{DEBT}_j + \beta_4 \text{INCOME}_j + \beta_5 \text{BETA}_j + \beta_6 \text{CASHFLOWS}_j + \beta_7 \text{R\&D}_j + \beta_8 \text{DA}_j + \beta_9 \text{PPE}_j + \beta_{10} \text{COMPLEX}_j + \beta_{11} \text{FF1-43}_j + \beta_{12} \text{YEAR94-2004}_j + \beta \text{TAXVAR}_j + u_j$$

Variable	Model 1	Model 2
SUB	<b>-2.73</b> (<.0001)	<b>-2.74</b> (<.0001)
ASSETS	<b>1.14</b> (<.0001)	<b>1.15</b> (<.0001)
DEBT	<b>-5.51</b> (<.0001)	<b>-5.46</b> (<.0001)
INCOME	<b>10.08</b> (<.0001)	<b>9.69</b> (<.0001)
BETA	<b>-0.48</b> (<.0001)	<b>-0.48</b> (<.0001)
CASHFLOWS	<b>5.42</b> (<.0001)	<b>5.04</b> (<.0001)
R&D	<b>0.62</b> (.8117)	<b>-0.22</b> (.9336)
DA	<b>-0.28</b> (.0160)	<b>-0.28</b> (.0180)
PPE	<b>0.34</b> (.0418)	<b>0.33</b> (.0497)
FOREIGN	<b>-0.36</b> (.0723)	<b>-0.24</b> (.2337)
LPOS	<b>-0.13</b> (.1446)	
LNEG	<b>-0.23</b> (.0785)	
SmallTB		<b>-0.56</b> (.0207)
LargeTB		<b>-0.68</b> (<.0001)
ENRON	<b>-1.46</b> (.0124)	<b>-1.60</b> (.0057)
LPOS*Enron	<b>-0.34</b> (.1519)	
LNEG*Enron	<b>-0.21</b> (.4487)	
SmallTB*Enron		<b>0.25</b> (.5701)
LargeTB*Enron		<b>0.02</b> (.9465)
Likelihood Ratio	2195.53	2219.21
Model c	.846	.848
Pseudo R <sup>2</sup>	.7016	.7055

This table provides data on the relation between bond rating and the independent variables. RATING is an ordinal representation of the issue's initial rating where Aaa equals 30 and decreases for each rating category below. SUB is an indicator variable which equals 1 if the issue is subordinated and 0 if not. ASSETS represents the log of the firm's total assets. DEBT represents the firm's long term debt scaled by total assets. INCOME is the operating income of the firm scaled by total assets. BETA is the firm's common stock beta. CASHFLOWS represents the firm's cash flow from operations scaled by total assets. R&D is the firm's research and development costs scaled by total assets. DA are the firm's discretionary accruals from the Modified Jones model. PPE is the firm's gross plant, property, and equipment scaled by total assets. FOREIGN represents the firm's foreign sales scaled by total sales. LPOS is an indicator variable equal to 1 if the firm falls into the top quintile for deferred taxes in its industry for that year and 0 otherwise. LNEG is an indicator variable equal to 1 if the firm falls into the bottom quintile for deferred taxes in its industry for that year and 0 otherwise. SmallTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the bottom quintile in its industry for that year and 0 otherwise. LargeTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the top quintile in its industry for that year and 0 otherwise. Enron is an indicator variable that equals 1 if the issue year is after 2000 and 0 otherwise. Coefficients are displayed along with p-values in parentheses. Industry and year indicator variables statistics suppressed.

**Table 5**

Logistic Regression Results:  
Bond rating models with Effective Tax Planning variables (n=1,611)

$$\text{RATING}_j = \beta_0 + \beta_1 \text{SUB}_j + \beta_2 \text{ASSETS}_j + \beta_3 \text{DEBT}_j + \beta_4 \text{INCOME}_j + \beta_5 \text{BETA}_j + \beta_6 \text{CASHFLOWS}_j + \beta_7 \text{R\&D}_j + \beta_8 \text{DA}_j + \beta_9 \text{PPE}_j + \beta_{10} \text{COMPLEX}_j + \beta_{11} \text{PLAN}_j + \beta_{12} \text{FFI-43}_j + \beta_{13} \text{YEAR94-2004}_j + \beta \text{TAXVAR}_j + u_j$$

Variable	Model 1	Model 2
SUB	<b>-3.02</b> (<.0001)	<b>-3.09</b> (<.0001)
ASSETS	<b>1.16</b> (<.0001)	<b>1.18</b> (<.0001)
DEBT	<b>-6.09</b> (<.0001)	<b>-6.09</b> (<.0001)
INCOME	<b>9.83</b> (<.0001)	<b>9.73</b> (<.0001)
BETA	<b>-0.53</b> (<.0001)	<b>-0.55</b> (<.0001)
CASHFLOWS	<b>5.51</b> (<.0001)	<b>5.21</b> (<.0001)
R&D	<b>-3.12</b> (.2619)	<b>-3.11</b> (.2616)
DA	<b>-0.30</b> (.0150)	<b>-0.28</b> (.0209)
PPE	<b>0.40</b> (.0396)	<b>0.41</b> (.0334)
FOREIGN	<b>-0.21</b> (.3316)	<b>-0.05</b> (.8089)
LPOS	<b>-0.25</b> (.0216)	
LNEG	<b>-0.31</b> (.0270)	
SmallTB		<b>0.12</b> (.3845)
LargeTB		<b>-0.76</b> (<.0001)
PLAN	<b>-0.95</b> (<.0001)	<b>-0.78</b> (<.0001)
LPOS*PLAN	<b>0.29</b> (.4115)	
LNEG*PLAN	<b>0.23</b> (.5346)	
SmallTB*PLAN		<b>-0.34</b> (.5440)
LargeTB*PLAN		<b>-0.39</b> (.3120)
Likelihood Ratio	1900.05	1932.90
Model c	.846	.848
Pseudo R <sup>2</sup>	.6984	.7046

This table provides data on the relation between bond rating and the independent variables. RATING is an ordinal representation of the issue's initial rating where Aaa equals 30 and decreases for each rating category below. SUB is an indicator variable which equals 1 if the issue is subordinated and 0 if not. ASSETS represents the log of the firm's total assets. DEBT represents the firm's long term debt scaled by total assets. INCOME is the operating income of the firm scaled by total assets. BETA is the firm's common stock beta. CASHFLOWS represents the firm's cash flow from operations scaled by total assets. R&D is the firm's research and development costs scaled by total assets. DA are the firm's discretionary accruals from the Modified Jones model. PPE is the firm's gross plant, property, and equipment scaled by total assets. FOREIGN represents the firm's foreign sales scaled by total sales. LPOS is an indicator variable equal to 1 if the firm falls into the top quintile for deferred taxes in its industry for that year and 0 otherwise. LNEG is an indicator variable equal to 1 if the firm falls into the bottom quintile for deferred taxes in its industry for that year and 0 otherwise. SmallTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the bottom quintile in its industry for that year and 0 otherwise. LargeTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the top quintile in its industry for that year and 0 otherwise. PLAN is an indicator of tax-planning effectiveness that equals 1 if a firm 5 year average tax rate is in the lowest quintile for its industry for that year. Coefficients are displayed along with p-values in parentheses. Industry and year indicator variables statistics suppressed.

**Table 6**

Logistic Regression Results:

Bond rating models with Income-to-Cash spread indicator variables (n=1,795)

$$\text{RATING}_j = \beta_0 + \beta_1 \text{SUB}_j + \beta_2 \text{ASSETS}_j + \beta_3 \text{DEBT}_j + \beta_4 \text{INCOME}_j + \beta_5 \text{BETA}_j + \beta_6 \text{CASHFLOWS}_j + \beta_7 \text{R\&D}_j + \beta_8 \text{DA}_j + \beta_9 \text{PPE}_j + \beta_{10} \text{COMPLEX}_j + \beta_{11} \text{CASHRATIO}_j + \beta_{12} \text{FF1-43}_j + \beta_{13} \text{YEAR94-2004}_j + \beta \text{TAXVAR}_j + v_j$$

Variable	Model 1	Model 2
SUB	<b>-2.75</b> (<.0001)	<b>-2.81</b> (<.0001)
ASSETS	<b>1.19</b> (<.0001)	<b>1.18</b> (<.0001)
DEBT	<b>-5.56</b> (<.0001)	<b>-5.52</b> (<.0001)
INCOME	<b>7.06</b> (<.0001)	<b>7.18</b> (<.0001)
BETA	<b>-0.48</b> (<.0001)	<b>-0.49</b> (<.0001)
CASHFLOWS	<b>6.04</b> (<.0001)	<b>5.65</b> (<.0001)
R&D	<b>-1.30</b> (.6207)	<b>-0.50</b> (.8490)
DA	<b>-0.33</b> (.0073)	<b>-0.32</b> (.0097)
PPE	<b>0.31</b> (.0753)	<b>0.31</b> (.0726)
FOREIGN	<b>-0.22</b> (.2715)	<b>-0.15</b> (.4395)
LPOS	<b>-0.25</b> (.0110)	
LNEG	<b>-0.09</b> (.2569)	
SmallTB		<b>-0.42</b> (.0316)
LargeTB		<b>-0.41</b> (.0008)
SCD	<b>0.49</b> (.0002)	<b>0.48</b> (.0002)
LCD	<b>-0.88</b> (<.0001)	<b>-0.71</b> (<.0001)
Likelihood Ratio	2201.01	2207.50
Model c	.850	.850
Pseudo R <sup>2</sup>	.7121	.7133

This table provides data on the relation between bond rating and the independent variables. RATING is an ordinal representation of the issue's initial rating where Aaa equals 30 and decreases for each rating category below. SUB is an indicator variable which equals 1 if the issue is subordinated and 0 if not. ASSETS represents the log of the firm's total assets. DEBT represents the firm's long term debt scaled by total assets. INCOME is the operating income of the firm scaled by total assets. BETA is the firm's common stock beta. CASHFLOWS represents the firm's cash flow from operations scaled by total assets. R&D is the firm's research and development costs scaled by total assets. DA are the firm's discretionary accruals from the Modified Jones model. PPE is the firm's gross plant, property, and equipment scaled by total assets. FOREIGN represents the firm's foreign sales scaled by total sales. LPOS is an indicator variable equal to 1 if the firm falls into the top quintile for deferred taxes in its industry for that year and 0 otherwise. LNEG is an indicator variable equal to 1 if the firm falls into the bottom quintile for deferred taxes in its industry for that year and 0 otherwise. SmallTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the bottom quintile in its industry for that year and 0 otherwise. LargeTB is an indicator variable equal to 1 if the ratio of tax-to-book income for the firm falls into the top quintile in its industry for that year and 0 otherwise. SCD is an indicator variable equal to 1 if the firm is in the bottom quintile for its cash flow to operating income spread in its industry for that year and 0 otherwise. LCD is an indicator variable equal to 1 if the firm is in the top quintile for its cash flow to operating income spread in its industry for that year and 0 otherwise. Coefficients are displayed along with p-values in parentheses. Industry and year indicator variables statistics suppressed.