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# MANAGER-DEBTHOLDER ALIGNMENT AND OPPORTUNISTIC INCOME SMOOTHING

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MANAGER-DEBTHOLDER ALIGNMENT AND OPPORTUNISTIC INCOME SMOOTHING

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BY

_____
Dr. Wayne Thomas, Chair

_____
Dr. Frances Ayres

_____
Dr. Ervin Black

_____
Dr. Dipankar Ghosh

_____
Dr. Lubomir Litov

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## Abstract

Managers' risk preferences are typically greater than those of debtholders. Managers have the potential to gain from risky activities, but debtholders share only in the losses. Debtholders recognize their misalignment with managers' risk preferences and assign a higher cost of borrowing or restrict financing to higher-risk firms. Recent literature, however, suggests that some managers hold large amounts of debt-based compensation (defined benefit pension plans and deferred compensation plans), and these managers' actions more closely align with the preferences of outside debtholders. I find that managers with low debt compensation (i.e., those with more agency conflict with debtholders) are more likely to use discretionary accruals to opportunistically reduce the volatility of underlying performance. These results are consistent with less debt-aligned managers attempting to hide excessive risk-taking activities from outside debtholders. I also document that such opportunistic smoothing increases with the firm's reliance on debt financing and debtholders' reliance on financial statement information. My study provides evidence on the motive behind managers' discretionary income smoothing behavior based on the notion that insufficient debt-based executive compensation results in misalignment between managers and debtholders.

## 1. Introduction

In this study, I investigate the informative role versus the opportunistic role of income smoothing in a context where managers' incentive alignment with *debtholders* is expected to vary. The accounting literature offers two opposing perspectives on the motives behind managers' use of discretionary accruals to smooth income. On the one hand, managers may be motivated to reduce earnings volatility arising from transitory cash flows. Using discretionary accruals to smooth transitory effects, managers better signal their expectations of the firm's long-term performance (Demski 1988; Sankar and Subramanyam 2001; Kirschenheiter and Melumad 2002). This type of discretionary reporting represents an *informative* role of income smoothing.

On the other hand, managers sometimes take risky actions that may not be in stakeholders' best interest. As outside stakeholders observe volatile performance induced by managerial risk taking, they impose agency costs. Therefore, managers have an incentive to conceal the volatility of true underlying performance (Trueman and Titman 1988; Leuz et al. 2003; Grant, Markarian, and Parbonetti 2009). Using discretionary accruals to understate the firm's true risk represents the *opportunistic* role of income smoothing.

Prior studies document that managers engage in excessive risk-taking activities for various self-interested purposes, such as maximizing personal wealth, status, power and prestige (Haugen and Senbet 1981; Guay 1999; Rajgopal and Shevlin 2002; Coles, Daniel, and Naveen 2006; Chava, Kumar and Warga 2009). Whereas managers have the potential to gain from their risky decisions,

debtholders share only in the losses (Black and Scholes 1973; Merton 1976).[1] Thus, an agency conflict is created when managers and outside debtholders lack incentive alignment (Jensen and Meckling 1976; Edmans and Liu 2011; Sundaram and Yermack 2007). One potential solution to this conflict is to provide debt-like compensation to managers so that they become the firm's *inside* debtholders. A manager's debt compensation aligns her wealth and therefore her incentives more closely with those of outside debtholders (Edmans and Liu 2011). Consistent with this theory, empirical research observes decreased risk-taking activities when managers' debt compensation increases (Sundaram and Yermack 2007; Wei and Yermack 2011; Cassell et al. 2012; Phan 2014).

In this study, I test whether and how the level of managers' debt compensation (i.e., their defined benefit pension and deferred compensation) affects their incentive for income smoothing.[2] Based on the framework in Edmans and Liu (2011), I expect managers' debt compensation to affect their alignment with the interest of outside debtholders and therefore their incentive to engage in discretionary financial reporting. Specifically, as debt compensation *decreases*, managers' and debtholders' interest tend to become less aligned. Consequently, the risk-taking behavior of managers with lower debt compensation is less likely to be

[1] Unlike debtholders, shareholders have unlimited upside potential from risky decisions and face limited losses up to their equity investments. Consequently, shareholders can shift the downside risk of the firm to debtholders by encouraging risky investments with high expected returns.

[2] Defined benefit pension plans and deferred compensation plans are referred to as debt-based executive compensation in that they generally represents *unsecured* and *unfunded* liabilities for the firm to make future payments to top managers after retirement (Wei and Yermack 2011; Sundaram and Yermack 2007; Edmans and Liu 2011). Whereas managers usually participate in firms' ordinary pension plans that are federally insured, the vast majority of their pension benefits are covered by supplemental executive retirement plans (SERPs). The latter have payouts far exceeding the maximum insured amounts under ordinary plans (Sundaram and Yermack 2007).

in the best interest of debtholders. These managers therefore have an incentive to hide their risky behavior from debtholders using opportunistic income smoothing.

For a sample of 9,060 firm-year observations over the fiscal years 2006 to 2011 (with data required for future performance through 2014), I use the model in Tucker and Zarowin (2006) to determine managers' incentives for income smoothing. Tucker and Zarowin distinguish the informative role of income smoothing from the opportunistic role by investigating the association between past income smoothing and the predictability of future earnings.[3] The authors indicate that income smoothing associated with more predictable future earnings is deemed informative, whereas income smoothing associated with less predictable future earnings is considered opportunistic.[4]

Consistent with my prediction, I find that the association between discretionary income smoothing in the past and the predictability of future earnings is reduced (i.e., opportunistic income smoothing is stronger) when managers have lower debt compensation. This result supports the expectation that when managers are provided with lower debt-based compensation, their discretionary income smoothing more likely represents an opportunistic attempt to mask the firm's true underlying performance.

[3] Tucker and Zarowin use a prices-leading-earnings model to measure (investors') predictability of future earnings.

[4] To be clear, I do *not* predict that reported income will be smoother for firms with low debt-compensated managers than for firms with high debt-compensated managers. Income smoothing is not a costless earnings management strategy (Trueman and Titman 1988; Fudenberg and Tirole 1995). Previous studies suggest that the associated costs of income smoothing include additional tax expenses (Trueman and Titman 1988; Chaney and Lewis 1995), disruption of operations (Dye 1988), and litigation charges (DuCharme et al. 2004). Firms with low debt-compensated managers are more likely engaging in risky activities, and the volatility in performance from these activities is not likely to be completely concealed through discretionary income smoothing.

I extend my analysis on the relation between manager-debtholder incentive alignment and opportunistic income smoothing in two settings. Both settings involve managers with low debt compensation having stronger incentives to hide volatile earnings performance (i.e., opportunistic income smoothing). First, I examine the extent to which the firm relies on debt financing. Debtholders of highly levered firms are more vulnerable to managerial risk taking in that even a small loss could put the firm in financial distress. Consequently, these debtholders will likely demand higher borrowing costs when they observe a given level of earnings volatility. I expect that as the firm's reliance on debt financing increases, less debt-aligned managers have a stronger incentive to reduce the firms' perceived risk. Consistent with my prediction, I find that opportunistic smoothing by low debt-compensated managers increases in firms with higher debt financing.

My second setting investigates the extent to which debtholders rely on financial statement information to assess the firm's debt repayment ability. I use the inverse of analyst coverage to proxy for such reliance based on analysts' role of collecting, analyzing and distributing private information about firm performance. Debtholders of a firm with lower analyst coverage will likely rely more on information provided on the financial statements.[5] I expect that as debtholders' reliance on financial statements increases, less debt-aligned managers have a stronger incentive to hide the firm's earnings volatility. Consistent with my expectation, I document that opportunistic smoothing by low debt-compensated managers increases in firms with lower analyst coverage.

[5] Prior research shows that investors' reliance on financial statement increases when the firm's alternative communication tunnels are limited (Holthausen and Verrecchia 1988; Kim and Verrecchia 1991; Demski and Feltham 1994).

I conduct a battery of additional analyses to corroborate my primary tests. In particular, I find stronger evidence of opportunistic smoothing by managers with low debt compensation when the CEO serves as the chairman of the board (i.e., CEO duality) or when she has no golden parachute in the change of corporate control. I also document that managers with low debt compensation engage in more opportunistic smoothing when the firm has a low percentage of independent outside directors on board or when the firm's directors are less debt-aligned. In addition, I show that managers with low debt compensation engage in more opportunistic smoothing when the firm has low blockholder governance. These results overall suggest that weaker corporate governance schemes allow less debt-aligned managers to engage in greater opportunistic earnings management. In addition, my conclusions remain the same given a set of robustness tests, thereby lending further credence to the primary findings.

This study offers several important contributions. First, it provides practical implications about debt-based executive compensation, which draws growing interest from various parties including investors, auditors, regulators, standard setters, taxing authorities, politicians, and the media (Joffe 2015; Weisberg and Hoseman 2015; DeVita and Holton 2015). Notably, substantial debtholder losses in the most recent recession suggest that agency problems of debt are still a major concern and cast doubt on managers' risk management practices (Bebchuk and Spamann 2009; Bhattacharaya and Cohn 2010; Federal Reserve 2009).[6] In the wake of the financial crisis, proposals have been put forward to resolve executive

[6] Large portions of CEOs' debt compensation were wiped out when their firms collapsed in the crisis. For example, General Motor's ex-CEO Rick Wagoner left the company with pension benefits reduced by approximately two-thirds because of the firm's high-profile bankruptcy (Isidore 2009).

pay and incentives that promote inappropriate risk taking (SEC 2010). This study shows that insufficient debt compensation leads to more opportunistic income smoothing, consistent with managers hiding risk-taking activities. These findings are informative regarding the contributing factors to managers' excessive risk taking during the financial turmoil (Edmans 2012).[7] More importantly, they can help compensation committees and board members better design and implement an efficient compensation contract. Bhagat and Romano (2010) in their proposal for executive compensation reform indicate that agency problems generated from executive compensation – earnings manipulation or taking on unwarranted risk – are a function of the *structure* of executive payments. My results suggest that lack of a debt-based component in executive pay induce opportunistic discretionary reporting.

Also, this study complements the strand of research examining the incentive effects of executive compensation on managers' financial reporting choices, which has predominantly focused on equity-based compensation (Hanlon et al. 2003; Cheng and Warfield 2005; Coles et al. 2006; Armstrong et al. 2010). In particular, the evidence presented in this study identifies the influential role of debt-based executive compensation in explaining the motive behind managers' income smoothing behavior.[8] In many settings, is it not clear whether income

[7] For example, Treasury Secretary, Timothy Geithner, addresses in the 2009 U.S. Treasure Budget that "… what happened to compensation and the incentives in creative risk taking did contribute … to the vulnerability that we saw in this financial crisis." Federal Reserve Chairman, Ben Bernake, also indicates that "Compensation practices at some banking organizations have led to misaligned incentives and excessive risk-taking, contributing to bank losses and financial stability." The SEC discusses in 2010 Proxy Disclosure Enhancements that the link between risk taking and executive compensation is still not well understood.

[8] Although income smoothing is "overwhelmingly" pervasive in practice, such strong enthusiasm among firm executives for earnings smoothness is still not adequately understood (Graham et al. 2005).

smoothing is beneficial or detrimental. This suggests that no unequivocal conclusion can be drawn by simply documenting more or less smoothing as to what impact such discretionary reporting has on financial statement users.[9] The results shown in this study therefore shed light on the ongoing discussion over whether managers use financial reporting discretion to benefit or harm financial statement users (Dechow et al. 2010). Notably, whereas Tucker and Zarowin (2006) find that discretionary smoothing is generally driven by an informative intent, I document that managers with low debt compensation are more likely to smooth earnings for opportunistic reasons.

Additionally, this study adds to accounting research investigating the interactions among executive compensation, managerial accounting choices, and corporate debt financing environment (Armstrong, Guay, and Weber 2010). The evidence in this study suggests that managers with low debt compensation have stronger incentive to engage in opportunistic discretionary reporting when the firm's reliance on debt financing increases. These findings are informative in that debt financing has been always a key component of the capital markets.[10] Relatedly, Armstrong et al. (2010) strongly encourage research on how compensation contracts and corporate governance schemes interact as complements or substitutes in disciplining managerial financial reporting. My

[9] Several concurrent studies investigate the impact of managerial debt holdings on earnings management behavior. Kalyta (2009) find a positive relation between income-increasing earnings management and managers' performance-based pensions in final pre-retirement years. He (2015) documents that managerial debt holdings positively relate to financial reporting quality. Dhole, Manchiraju, and Suk (2015) examine the relation between managerial debt compensation and a battery of proxies for earnings management behavior including the *level* of income smoothing. My study is different from these studies in that I explicitly test the *incentive* driving managers' earnings management (income smoothing in particular) behavior.

[10] In 2009, for example, about $1.1 trillion corporate debt was underwritten, whereas firms issued $263 billion in equity (SIFMA 2010).

results indicate that weak corporate governance (i.e., presence of CEO duality, lack of executive golden parachutes, inadequate board independence, less debt-aligned directors, and weak blockholder monitoring) exacerbates opportunistic smoothing by less debt-aligned managers.[11]

This study proceeds as follows. The next two sections review related literature and discuss the hypotheses. Section 4 explains the research design and sample selection. Empirical results are presented in Section 5. Sections 6 and 7 provide additional analyses and robustness tests. The last section concludes.

[11] These findings should be of particular interest to institutional investors given the critical role of corporate governance in their investment decisions (Khanna and Zyla 2012).

## 2. Background Information

In this section, I first discuss agency costs arising from managers' risk-taking incentives. Then I introduce two opposing explanations for discretionary income smoothing practice. In addition, I describe how debt-based executive compensation enhances interest alignment between managers and external debtholders.

### 2.1. Managerial Risk-Taking and Agency Conflict with Debtholders

Previous studies show that self-interested managers extract private benefits by making risky operating and investing decisions. For example, a large body of research on executive compensation shows that the positive relation between the value of option compensation and stock price volatility induces managers to take on excessive risk at the expense of firm value (Haugen and Senbet 1981; Hemmer, Kim, and Verrecchia 1999; Guay 1999; Nam, Ottoo, and Thornton 2003; Rajgopal and Shevlin 2002; Coles, Daniel, and Naveen 2006; Low 2009).[12] Managers are also documented to engage in excessive risk taking when they face pressure arising from the short-termism in stock markets (Stein 1989, 2003; Bhagat and Romano 2009). In addition, managers tend to make risky decisions as empire builders to serve their private interests including status, power, compensation and prestige (Jensen 1986, 1993; Stulz 1990; Chava et al. 2009).

When managers engage in risky operating and investing activities, debtholders receive only limited upside benefits from successful outcomes (up to

[12] The value of stock options represents a convex payoff structure that increases with the volatility of stock price (Guay 1999). Such option-based compensation would motivate managers to increase the firm's overall risk beyond a level that is optimal for firm-value maximization.

interest and principal payments) and have to bear the risk of losing the entire investment in case of unfavorable outcomes (Black and Scholes 1973; Merton 1976). Owing to such non-linear payoff structure, the utility of debtholders decreases with the variance of prospective cash flows (Minton and Schrand 1999).[13] To the extent that risk-seeking activities introduce large variations in operating outcomes, they increase the probability of financial distress and undermine the firm's long-term financial stability. Consequently, agency conflicts with debtholders arise when managers adopt risky operating and investing strategies that jeopardize the firm's ability to fulfill debt obligations (Jensen and Meckling 1976; Dewatripont and Tirole 1994; Smith and Stulz 1985; Lambert 1986).

### 2.2. Managerial Income Smoothing Incentives

One means by which managers can reduce stakeholders' perceived risk of the firm is to intentionally use discretionary accruals to offset the effects of volatile cash flows. A more stable trend of earnings performance over time reduces stakeholders' uncertainty regarding future firm value (Beaver et al. 1970; Trueman and Titman 1988; Gebhardt et al. 2001). There is little doubt that managers employ income smoothing in practice (Graham et al. 2005). However, it is not clear as to whether such smoothing is helpful or harmful in helping stakeholders understand the underlying economic performance of the firm.

[13] Even through outside shareholders receive most of the upside gains from risky investments and therefore expect managers to undertake more risk, not all forms of risk and associated volatility necessarily fit shareholders' risk preferences. They still prefer to avoid risky projects that managers undertake for private benefits at the expense of firm value (Grant, Markarian and Parbonetti 2009).

Accounting studies document two opposing views on the motive behind managers' income smoothing practice. On the one hand, managers are motivated to convey private expectations on the firm's long-term performance and help financial statement users to assess the permanent component of earnings (Lambert 1984; Demski 1998; Kirschenheiter and Melumand 2002). In other words, managers use financial reporting discretion to reduce earnings fluctuations arising from transitory cash flows and better communicate the underlying economic performance, thereby giving stakeholders a more accurate picture of the firm's future profitability.[14] In line with the theory, prior studies provide empirical evidence that confirms the informative perspective on income smoothing (Sankar and Subramanyam 2001; Gu 2005; Tucker and Zarowin 2006).

On the other hand, managers can be motivated to extract private benefits by lowering risk perceived by outside stakeholders (Healy 1985; Fudenberg end Tirole 1995; DeFond and Park 1997; Leuz et al. 2003; Jayaraman 2008). In this case, managers take advantage of accounting discretion and attempt to conceal the volatility of the firm's underlying economic performance. In particular, because risk-taking activities are likely to be revealed through volatile performance, income smoothing represents managerial intent to hide risky operating and investing strategies. As a result, such opportunistic smoothing is more likely to be present in firms with volatile underlying performance and thus less predictable future earnings.

[14] Demksi (1998) shows that managers who can better predict future earnings have incentives to demonstrate their predictive power and their aligned interests with firm-value maximization by smoothing earnings. He further suggests that to the extent income smoothing is informative, investors are better off allowing for such earnings management than if they could prevent it with a costless audit technology.

Tucker and Zarowin (2006) provide an approach to disentangling the informative role of income smoothing from the opportunistic role. The authors examine the association between past income smoothing and predictability of future earnings, where the predictability of future earnings is measured based on the extent to which current-year stock returns incorporate information on future earnings (Collins et al. 1994).[15] Specifically, to the extent that managers use income smoothing to reduce the effects of transitory cash flows and reveal private beliefs about the underlying performance, the smoothness of past earnings should be associated with more predictable future earnings. In contrast, if income smoothing arises from managerial opportunism to hide excessive risk taking, investors will understate the firm's underlying risk after observing smooth earnings streams in the past. Consequently, opportunistic discretionary smoothing is likely to be associated with less predictable future earnings.

Tucker and Zarowin provide empirical evidence that stock prices impound more information about future earnings when managers engage in income smoothing using discretionary accruals. The authors conclude that managerial discretionary income smoothing behavior on average improves the informativeness of reported current and past earnings about future earnings and cash flows, thereby producing a positive association between income smoothing and future earnings predictability.

[15] Tucker and Zarowin argue that if managers' discretionary smoothing practice makes earnings more informative about future prospects, then stock returns should impound more information about future earnings. In the contrary, if discretionary smoothing merely garbles information, then returns should reflect less future earnings information.

### 2.3. Debt-Base Executive Compensation

In this study, I am interested in the impact that debt compensation has on managers' incentive to smooth income. While the majority of prior research focuses on equity compensation, debt-based compensation comprises a considerable portion of executive pay packages in U.S. firms (Sundaram and Yermack 2007; Cassell et al 2012). For example, Wei and Yermack (2011) document that 84 percent of CEOs in their sample firms hold debt compensation, which sometimes has a greater sum than equity compensation.[16]

Managerial debt compensation includes two primary components, defined benefit pension and deferred compensation. Defined benefit pension plans are accrued under firm-specific formulas and offer executives a fixed amount of money per year after retirement. Deferred compensation can be viewed as deferred cash benefits managers voluntarily agreeing to withdraw later that they would otherwise be entitled to receive now. Deferred compensation is typically paid to retired managers in a lump sum (Cassell et al. 2012). Unlike after-retirement benefits for regular employees, debt-based executive compensation in general represents unsecured and unfunded liabilities for the firm to make future payments to top managers and thus can be wiped out in case of insolvency (Wei and Yermack 2011; Sundaram and Yermack 2007).[17]

[16] Schultz (2008) reports that debt compensation can be as high as $11.8 billion at Goldman Sach Group Inc., $8.5 billion at J.P.Morgan Chase & Co., and $10 to $15 billion at Morgan Stanley.

[17] Managers usually participate in firms' ordinary tax-qualified pension plans that are available for most employees and are insured by the federal Pension Benefit Guaranty Corporation (PBGC). For U.S. companies, however, federally insured pension benefits are only a small fraction of the amount due to top executives. The vast majority of their pension benefits fall under supplemental executive retirement plans (SERPs). SERPs are not tax-qualified and do not have a PBGC guarantee since the payouts far exceed the maximum insured amounts under ordinary plans (Sundaram and Yermack 2007). As for deferred

Starting from fiscal year 2006 and onwards, the SEC requires U.S. firms to provide detailed disclosures on debt compensation for top executives.[18] Motivated by this regulatory change, recent finance research has begun to examine the implications of managerial debt compensation. Built on the agency theory in Jensen and Meckling (1976), Edmans and Liu (2011) establish the first comprehensive theory that debt compensation leads to interest alignment between managers and external debtholders through eliciting the sensitivity of managerial personal wealth to the firm's bankruptcy risk and the liquidation value.

In line with the theory, empirical studies provide evidence that managers with lower debt-based compensation and engage in higher risk actions. For example, Sundaram and Yermack (2007) document that CEOs with lower debt compensation have a lower "distance-to-default" measure. Cassell et al. (2012) find that firms providing lower debt compensation have higher research and development expenditures, less firm diversification, and higher asset liquidity. Phan (2014) show that when managers are provided with lower debt compensation, they are less likely to diversify using mergers and acquisitions.

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compensation plans, they may occasionally be funded using devices including the "rabbi" trust, but these assets are controversial and are unprotected if the company faces claims form other creditors.

[18] The SEC explicitly stated that additional disclosures on pension benefits and deferred compensation permit a better understanding of the company's compensation obligations to named executive officers. Also, they indicate that the absence of such a disclosure requirement results in the understatement of non-performance-based compensation and distorts pay comparisons between executives and between companies (SEC 2006).

## 3. Hypothesis Development

### 3.1. Debt-Based Executive Compensation and Income Smoothing Incentive

My first hypothesis explores how managers' income smoothing incentive changes with the level of their debt compensation. Risky operating and investing strategies tend to produce volatile firm performance and thus jeopardize a firm's ability to make timely debt repayments for a given period. This volatility elicits adverse reactions from debtholders (Robert and Sufi 2009b; Nini et al. 2012).[19] Consequently, managers have incentives to hide risk-pursuing activities from debtholders through estimates of discretionary accruals.

My prediction is built on the theory that the incentive alignment between managers and outside debtholders is weakened when debt-based executive compensation is low. Specifically, risk-pursuing activities of managers with low debt compensation are less likely to be in the best interest of debtholders. To reduce agency costs imposed by debtholders, these managers have a strong incentive to conceal the firm's volatile underlying economic performance using financial reporting discretion. Therefore, I expect discretionary income smoothing by less debt-aligned managers to represent an attempt of hiding excessive risk taking. Such opportunistic use of discretionary accruals is more likely to be present in firms with less predictable future earnings.[20]

[19] Debtholders' adverse responses include increased interest costs, accelerated maturity periods, tightened collateral requirements, and stronger borrowing restrictions (Collins et al. 1981; Lys 1984; Imhoff and Thomas 1988; Rajan and Winton 1995; Harris and Raviv 1995; Amiram and Owen 2012; Li 2013; Zhang 2008). Another costly consequence, although less commonly observed, is that debtholders terminate the lending agreement immediately (DeFond and Jiambalvo 1994; Beneish and Press 1993; 1995).

[20] To be clear, the *firm-specific* effect of opportunistic smoothing is to reduce the volatility of reported performance, which could lead to more predictable future performance for the firm (compared to not smoothing at all). However, my prediction is made in the *cross section*. Specifically, I predict that firms with riskier operations are the ones engaged in opportunistic smoothing. Riskier operations are, on

The preceding argument forms my first hypothesis:

***H1: Opportunistic income smoothing increases as debt-based executive compensation decreases.***

### 3.2. Debt-Based Executive Compensation and Opportunistic Income Smoothing

In this section, I investigate two settings where managers with low debt compensation have stronger incentives to hide risk taking from debtholders by engaging in opportunistic income smoothing. More specifically, I explore the firm's reliance on debt financing and debtholders' reliance on financial statement information.

#### 3.2.1. Debt Financing

Debtholders receive limited gains from managers' risky actions yet have to share the entire loss.[21] The more debt financing a firm uses, the higher are the debt obligations that the firm must meet, and the greater the likelihood that the firm will experience financial distress (Myers 1984; Altman 1984). To the extent that using greater debt financing raises the likelihood that bankruptcy will occur, debtholders of highly levered firms are more sensitive to managers' risk-seeking activities because even a small loss can lead the firm to bankruptcy. Consequently, for a

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average, associated with more volatile performance and therefore less predictable future earnings. Thus, in the cross section, opportunistic smoothing suggests that firms with greater past income smoothing will have less predictable future earnings.

[21] When a firms is at risk of financial distress, shareholders can shift the downside risk of the firm to debtholders by encouraging managers to undertake risky investments with high expected returns (Jensen and Meckling 1976; Myers 1977; John and John 1993). Examples of research on shareholders' risk-shifting problems includes Klock et al. (2005), Bryan et al. (2006), Francis et al. (2010) and King and Wen (2011).

given level of earnings volatility, the firm will likely face higher borrowing costs as its external debt increases.

I expect that as the firm's reliance on debt financing increases, less debt-aligned managers have stronger incentives to hide risk-taking decisions from debtholders. In other words, these managers are more likely to reduce earnings volatility arising from risky recurring activities in an attempt to mitigate agency costs of debt.[22] This indicates that managers with low debt compensation tend to engage in greater opportunistic smoothing in firms with higher debt financing. The preceding discussion leads to H2a:

***H2a: The negative relation between debt-based executive compensation and opportunistic income smoothing is greater as debt financing increases.***

### 3.2.2. Analyst Coverage

Analysts are well-known for their role of collecting, analyzing and distributing private information about firm performance (Yu 2008). Analyst reports have been widely viewed as a prominent information source that potentially competes with financial statements (Givoly and Lakonishok 1979; Lys and Soo 1995; Hong et al. 2000; Gleason and Lee 2003; Lim 2001; Lang, Lin and Miller 2003; Brown and Higgins 2002). Consistent with this view, empirical research documents a negative relation between analyst following and subsequent market

[22] Prior research shows that income smoothing provides the firm with great flexibility to stay in covenant compliance over a long period of time (Carson and Bathala 1997; Chaney et al. 1998; Demerjian et al. 2015).

reactions to earnings announcements (Shores 1990; Frankel and Li 2004; Lehyavey et al. 2009; Chen, Cheng, and Lo 2010).[23]

Debtholders rely on earnings information to assess the firm's debt repayment ability (Smith and Warner 1979; Watts and Zimmerman 1986; Files, Lys, and Vincent 2001; DeFond and Jiambalvo 1994; Demerjian 2007). I expect that as analyst following decreases, the firm's debtholders will rely more on financial statements to reduce uncertainty over the unobservable economic performance. As a result, less debt-aligned managers have stronger incentives to hide earnings volatility induced by risky actions. This suggests that managers with low debt compensation will likely engage in greater opportunistic smoothing in firms with lower analyst coverage. The preceding analysis leads to H2b:

***H2b: The negative relation between debt-based executive compensation and opportunistic income smoothing is greater as analyst coverage decreases.***

[23] Analytical research indicates that investors increase reliance on financial statement information when alternative communication tunnels of firm performance are limited (Holthausen and Verrecchia 1988; Kim and Verrecchia 1991; Demski and Feltham 1994).

## 4. Research Design and Sample

### 4.1. Variable Measurement

#### 4.1.1. Debt-Based Executive Compensation

Debt-based executive compensation is measured as the ratio of the aggregate value of the CEO's debt compensation scaled by the value of her annual total compensation at the beginning of the year. The CEO's debt compensation equals to the present value of defined benefit pension plans plus the aggregate balance in non-qualified deferred compensation plans. The components of her annual total compensation include salary, bonus, stock and option awards, debt-based benefits, non-equity incentive plans and other compensation. The ratio can be interpreted as the relative importance of the CEO's debt compensation to her firm-specific wealth. An indicator variable for low debt compensation (*LDComp*) is set to one if the debt compensation ratio is below the sample's median, and zero otherwise.[24]

#### 4.1.2. Discretionary Income Smoothing

To measure managers' use of discretionary accruals to smooth income (*IS*), I calculate the correlation between the change in discretionary accruals (*DA*) and the change in pre-discretionary income (*PDI*) over the five previous years, where *PDI* is measured as income before extraordinary items less *DA*. I multiply IS by minus one so that a higher value of IS represents a greater degree of discretionary smoothing. To control for industry and year effects, I convert *IS* into

[24] For firms with missing data on CEO debt compensation, I assume that debt compensation equals zero and assign the value of one to *LDComp*. As a sensitivity test, I delete firm-years with missing data on managerial debt holdings. This reduces the sample size but does not alter the conclusion.

fractional rankings within each industry-year.[25] The estimation of *DA* is based on a modified Dechow and Dichev (2002) model that accounts for asymmetric timelier recognition of unrealized losses (Ball and Shivakumar 2006):

$$Accruals_t = \alpha_0 + \alpha_1 OCF_{t-1} + \alpha_2 OCF_t + \alpha_3 NegOCF_t + \alpha_4 OCF_t * NegOCF_t + \alpha_5 OCF_{t+1} + \alpha_6 \Delta Sales_t + \alpha_7 PPE_t + \varepsilon_t \quad (1)$$

As shown in model (1), total accruals (*Accruals*) are calculated as the difference between income before extraordinary items and operating cash flows (*OCF*). I modify the Dechow and Dichev (2002) model by including the growth in sales ($\Delta$*Sales*) and property, plant, and equipment (*PPE*) for the current year (McNichols 2002) and by allowing the coefficient on *OCF* in the current year to vary between observations with positive and negative amounts (*NegOCF*). I estimate model (1) for each industry-year (defined by two-digit SIC code) with at least ten observations, and the residuals represent *DA*.[26, 27]

[25] A fractional ranking is defined as the raw rank of the income smoothing variable divided by the total number of observations within each industry-year and has a range between 0 and 1.

[26] The results are qualitatively similar when I use industry-year combinations with at least 20 or 30 observations.

[27] Tucker and Zarowin (2006) estimate discretionary accruals using the model in Kothari et al. (2005). Dechow et al. (2012), however, indicate that the Kothari et al. model have relatively weak power and may lead to highly misspecified standard t-tests. Inferences are unchanged when I use the Kothari et al. model.

## 4.2. Model Specification

### 4.2.1. Income Smoothing Incentive and Future Earnings Predictability

To distinguish the informative role of income smoothing from its opportunistic role, Tucker and Zarowin (2006) adopt a prices-leading-earnings model (Collins et al. 1994):

$$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \varepsilon_t \quad (2)$$

In model (2), $R_t$ represents the current year's stock return and aggregates all publicly available information. $X_{t-1}$ and $X_t$ are earnings per share (*EPS*) for the past and current years, respectively, and control for unexpected earnings in the current year.[28] $X_{t3}$ equals the sum of EPS for years t+1 to t+3 and measures future earnings expectations. All *EPS* measures are scaled by the stock price at the beginning of year t. Because using *realized* future earnings ($X_{t3}$) as a proxy for expectations in the current year could introduce measurement error problems, realized future stock returns for years t+1 through t+3 ($R_{t3}$) are included to control for unexpected future events.

The coefficient on $X_{t3}$ is referred to as the future earnings response coefficient (*FERC*) and reflects the extent to which information about future earnings is impounded in current stock returns. To the extent that *FERC* captures revisions in investors' expectations of future profitability, a higher *FERC* implies higher predictability of firms' future earnings. To examine managerial income smoothing incentive, Tucker and Zarowin (2006) estimate model (3):

[28] Including $X_{t-1}$ and $X_t$ is analogous to including the level *and* change in current earnings to account for unexpected earnings (Lundholm and Myers 2002)

$$R_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 IS_t + \beta_6 IS_t * X_{t-1} + \beta_7 IS_t * X_t + \beta_8 IS_t * X_{t3} + \beta_9 IS_t * R_{t3} + \varepsilon_t \quad (3)$$

The authors document a positive coefficient on the interaction term $IS_t * X_{t3}$ and conclude that income smoothing practice using discretionary accruals *on average* is associated with more predictable earnings. This finding is consistent with the informative role of income smoothing.

### 4.2.2. Primary Model

To test the relation between low debt compensation on the incentive to smooth income, I add *LDComp* to model (3) and construct model (4) as follows:

$$\begin{aligned} R_t = {} & \beta_0 + \beta_1 X_{t-1} + \beta_2 X_t + \beta_3 X_{t3} + \beta_4 R_{t3} + \beta_5 IS_t + \beta_6 IS_t * X_{t-1} + \beta_7 IS_t * X_t + \\ & \beta_8 IS_t * X_{t3} \\ & + \beta_9 IS_t * R_{t3} + \beta_{10} LDComp_{t-1} + \beta_{11} LDComp_{t-1} * X_{t-1} \\ & + \beta_{12} LDComp_{t-1} * X_t + \beta_{13} LDComp_{t-1} * X_{t3} + \beta_{14} LDComp_{t-1} * R_{t3} \\ & + \beta_{15} LDComp_{t-1} * IS_t + \beta_{16} LDComp_{t-1} * IS_t * X_{t-1} \\ & + \beta_{17} LDComp_{t-1} * IS_t * X_t + \boldsymbol{\beta_{18} LDComp_{t-1} * IS_t * X_{t3}} \\ & + \beta_{19} LDComp_{t-1} * IS_t * R_{t3} + \gamma_n Controls_n + \delta_n Controls_n * IS_t * X_{t3} + \varepsilon_t \end{aligned} \quad (4)$$

The variable of interest in models (4) is the three-way interaction term $LDComp_{t-1} * IS_t * X_{t3}$.[29] H1 predicts that low debt compensation will lead to more

[29] When estimating model (4), I also calculate *IS* over the previous three years and take the average of *LDComp* during the same three-year period (i.e., a three-year smoothing measure is examined in

opportunistic income smoothing. Therefore, I expect a negative coefficient on $LDComp_{t-1}*IS_t*X_{t3}$. This results would suggest that the association between past discretionary income smoothing and future earnings predictability is lower for firms offering low debt-based executive compensation.

To test H2a, I split the sample into two groups based on the firm's debt financing level, which is calculated as total debt divided by total assets at the beginning of the fiscal year.[30] The low (high) debt financing group includes firm-year observations with debt financing levels lower than or equal to (greater than) the median value of the sample. I estimate Model (4) using the two subsamples respectively and compare the coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ between the two groups. If the impact of low managerial debt compensation on opportunistic income smoothing increases with corporate debt financing, I expect that the high debt financing group has a more negative $\beta_{18}$ than the low debt financing group.

To test H2b, I divide the sample into two groups based on the firm's analyst coverage level, which is measured by the average number of analyst following during the fiscal year. The low (high) analyst coverage subsample includes firm-year observations with analyst following levels lower than or equal to (greater than) the median value of the sample. I estimate Model (4) using the two subsamples respectively and compare the coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ between the two groups. If the negative relation between managerial debt holdings and opportunistic income

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conjunction with a three-year compensation measure) to mitigate the noise in the matching process (Grant, Markarian and Parbonetti 2009). For this alternative specification, my conclusions remain the same.

[30] I also adopt interest coverage ratio as an alternative measure of a firm's debt financing obligations, which is calculated as total interest expenditure divided by operating income. The results remain qualitatively similar.

smoothing decreases with corporate analyst coverage, I expect that the low analyst following group has a more negative $\beta_{18}$ than the high debt financing group.

I include in Model (4) a vector of control variables that are documented to reflect firm characteristics and/or affect financial reporting quality (Klein 2002; Hribar and Nichols 2007; Francis et al. 2004).[31] These variables are firm size (*Size*), cash flow volatility (*CashVol*), firm leverage (*Leverage*), sales growth (*Growth*), the market-to-book ratio (*MB*), firm profitability (*Profit*), investment intensity (*Invest*), asset tangibility (*PPE*), analyst coverage (*Analyst*), and loss incidence (*Loss*). I also include CEO tenure (*Tenure*) and CEO age (*Age*) given their influential role in determining the value of managerial debt compensation (Cassell et al. 2012). Additionally, because managers' equity compensation has been documented widely to affect financial reporting quality (See Armstrong et al. 2013 for a review), I control for managerial equity-based incentive (*EquityComp*). [32] The appendix provides detailed variable descriptions.

### 4.3. Sample Selection

Starting in 2006, the SEC requires detailed disclosures on debt-based executive compensation. My initial sample is extracted from *Execucomp*, which provides data on defined benefit pensions and non-qualified deferred compensation for top executives in the S&P 1500 index. I further identify firm-year observations with sufficient accounting and finance data in *Compustat*, *I/B/E/S*, *Institutional Shareholder Service* (*ISS*, formerly *RiskMetrics*), and *Thomson Reuters* to estimate the variables required for my empirical

[31] In addition to accounting for the main effects of the control variables, I also interact them with $IS_t*X_{t3}$.
[32] Shu and Thomas (2015) show that equity compensation affects managerial income smoothing incentive.

analyses. To mitigate effects of extreme observations, all continuous variables are winsorized at their 1st and 99th percentiles. Given that information on CEOs' debt holdings was not publicly available until fiscal year 2006, my sample period spans from 2006 to 2011.[33] Based on the preceding procedure, the final sample consists of 9,060 firm-year observations.

[33] I collect data for fiscal years 2006 to 2014. The sample period ends in 2011 because three future years of earnings and returns are required to estimate Model (4).

## 5. Empirical Results

### 5.1. Descriptive Statistics

Panel A of Table 1 provides summary statistics for the variables used in my empirical analyses. Earnings and returns variables are in general consistent with those reported in Tucker and Zarowin (2006). The average $R_t$ of my sample firms is 0.118, while they report an average value of 0.153 for stock returns. The mean (median) value of $X_t$ in my sample is 0.021 (0.053), relative to the mean (median) of 0.015 (0.047) for their sample firms. $X_{t3}$ for my sample firms has a mean (median) value of 0.132 (0.165), compared to the mean (median) of 0.074 (0.125) in their sample. Given that Tucker and Zarowin (2006) use *Compustat* firms and this study focuses on firms reported on *Execucomp*, these results are consistent with *Execucomp* firms being more profitable than the population of firms on *Compustat* (LaFond and Roychowdhury 2008).[34]

The correlation matrix is shown in Panel B of Table 1. The correlations between the indicator variable for low debt compensation and control variables for firm characteristics are consistent with previous findings (He 2015; Cassell et al. 2012; Cadman and Vincent 2014). That is, firms that provide managers with lower debt compensation are smaller and less profitable, have lower leverage and higher market-to-book ratio, and have more research and development expenses and higher cash flow volatility. In addition, consistent with previous research on the prices-leading-earnings model, $R_t$ is negatively correlated with $X_{t-1}$ and $R_{t3}$, and is positively correlated with $X_t$ and $X_{t3}$ (Collins et al. 1994; Tucker and Zarowin 2006).

[34] Untabulated statistics show that the mean (median) of my sample CEO's debt compensation is $8.22 million ($3.03 million) and that the mean (median) of annual change in the value of debt compensation is $1.11 million ($0.44 million). The mean (median) of the ration of debt compensation to equity compensation is 0.59 (0.25).

### 5.2. Regression Results

#### 5.2.1. Test Results for H1

Table 2 presents test results of my first hypothesis. As predicted, the main effects of the variables used in the prices-leading-earnings model remain consistent with previous research after the indicator variable for low managerial debt compensation is incorporated. For instance, both the ERC and the FERC are significantly positive, which indicates information about current and future earnings being impounded in current stock returns (Collins et al. 1994).

Consistent with my prediction, the coefficient on the three-way interaction $LDComp_{t-1}*IS_t*X_{t3}$ is negative and statistically significant (–0.4409). This suggests that the association between past income smoothing and the predictability of future earnings is lower for firms that provide low debt-based executive compensation. This result is consistent with managers with low debt compensation using opportunistic income smoothing to conceal risk-taking activities.[35] Nevertheless, such opportunistic smoothing behavior will be associated with more volatile (i.e., less predictable) future earnings. Consequently, the relation between past income smoothing and future earnings predictability decreases when managers with low debt compensation opportunistically manipulate accruals.

In contrast, the significantly positive coefficient (0.2182) on the two-way interaction $IS_t*X_{t3}$ confirms the findings in Tucker and Zarowin (20006). This suggests that when managers with higher debt compensation use discretionary accruals to

[35] The implication of my findings is that managers with low debt compensation have stronger incentives to engage in risky activities. Whereas prior research documents a negative relation between debt-based executive compensation and managerial risk-taking, I test and find a negative (positive) effect of debt compensation on the firm's R&D expenditures (working capital), thereby confirming insufficient debt compensation eliciting risk-taking.

smooth earnings, they tend to reveal private information on the firm's underlying performance and help financial statement users predict future earnings.

### 5.2.2. Test Results for H2a and H2b

Table 3 provides test results of H2a and H2b. The results for the variables used in the prices-leading-earnings model remain qualitatively similar when the sample is split into two groups based on the firm's debt financing and analyst coverage, respectively. Specifically, Column 2 and Column 3 of Table 3 present results for H2a. Whereas the coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ remains significant and negative for both the high debt financing group and the low debt financing group, it is more negative for the subsample with high debt financing. This finding indicates that when the firm's reliance on debt financing (relative to equity financing) increases, managers with low debt compensation have stronger incentive to engage in opportunistic income smoothing. Results for H2b are provided in Column 4 and Column 5 of Table 3. Whereas the coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ is significant and negative for the low analyst coverage group, it becomes insignificant and negative for the high analyst coverage group. These findings suggest that when the firm has low analyst following, managers with low debt compensation are more likely to smooth earnings for the purpose of hiding risk.

## 6. Additional Analyses

To corroborate the findings in the previous section, I further test the relation between debt-based executive compensation and opportunistic income smoothing based on corporate governance schemes related to the CEO, directors and blockholders.

### 6.1. CEO Characteristics

#### 6.1.1. CEO Duality

The CEO of a U.S. firm commonly serves as the chairman of the board (Brickley, Coles, and Jarrell 1997). Such duality provides the CEO with more power and greater discretion (Fama and Jensen 1983; Jensen 1993; Carver 1990; Millstein 1992; Worrell, Nemec, and Davidson 1997). Moreover, concentrated decision-making power makes it possible for the CEO to control information flows among other board members, potentially impending the board's oversight and governance functions (Brickley et al. 1994; Frinkelstein and D'Aveni 1994; Cadbury Committee Reports 1992). Accounting studies document a negative relation between CEO duality and financial reporting quality (Gul and Leung 2004; Klein 2002; Farber 2005).

To explore whether CEO duality allows less debt-aligned managers to engage in greater opportunistic income smoothing, I split the sample based on the presence of duality and estimate model (4) using the two subsamples. Results in Penal A of Table 4 shows that whereas the coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ remains significant and negative for the group of CEOs with duality, the coefficient becomes insignificant and *positive* for the group of CEOs without duality. This finding is consistent with CEO

duality impairing board independence and constraining the board's ability to restrain managerial opportunism.

### 6.1.2. CEO Golden Parachute

Top executives sometimes receive large amounts of payments (i.e., golden parachutes) when their employment is terminated due to some type of "change in corporate control" (Fich, Tran, and Walking 2013; Bebchuk, Cohen, and Wang 2014; Rau and Xu 2013).[36] Prior studies find that golden parachutes reduce agency costs in that they encourage managers to accept investor wealth-maximizing takeovers even if the change in control leads to employment termination (Gary and Cannella 1997; Lambert and Larcker 1985; Singh and Harianto 1989). In particular, Tirole (2006) considers a situation where managers manipulate earnings signals in an attempt to hide poor performance and avoid job termination. Tirole then demonstrates that golden parachutes reduce earnings manipulation by increasing managerial payoff in liquidation.

I expect that without golden parachutes, less debt-aligned managers will likely have stronger incentives to hide risk-taking behavior through manipulating discretionary accruals. I collect information on the provision of golden parachutes from *ISS*. I split the sample into two groups based on the presence of CEO golden parachutes and estimate model (4) using the two subsamples. Results in Panel A of Table 4 show that the coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ is significantly more negative for the subsample in which the CEO has no golden parachutes. This finding is consistent with

[36] Examples of a change in corporate control include purchase of a substantial block of outstanding stock, a change in the majority of the Board of Directors, and acquisition of the company by an unrelated party (Lambert and Larcker 1985).

managers with low debt compensation engaging in greater opportunistic smoothing in the absence of golden parachutes.

### 6.2. Director Characteristics

#### 6.2.1. Director Independence

Prior studies document that independent outside directors monitor the management more effectively and thus better protect investors (Brickley et al. 1994; Byrd and Hickman 1992; Rosenstein and Wyatt 1990; Weisbach 1988). Accounting research documents a negative link between director independence and the incidence of financial fraud or earnings manipulation (Dechow et al. 1996; Beasley 1996; Klein 2002; Xia, Davidson, and DaDalt 2003).[37]

To test the impact of director independence on the relation between debt-based executive compensation and opportunistic smoothing, I split the sample based on the sample median of the proportion of independent outside directors on board. I collect data on director classification from *ISS*, where independent outside directors are defined as those with no material connect to the company other than a board seat.[38] I estimate model (4) using the two subsamples. Results in Panel B of Table 4 indicate that the coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ is significantly more negative for the group where independent outside directors hold a lower percentage of board seats. This finding indicates that when boards are staffed with inside or affiliated directors, less debt-aligned managers tend to engage in more opportunistic smoothing.

[37] Anderson, Mansi, and Reeb (2004) show that debtholders consider the board of directors one of the most important factors influencing financial reporting integrity and document a negative relation between director independence and the cost of debt.

[38] The other two types of board affiliations defined by *ISS* are inside/employee directors and affiliated/linked outside directors.

### 6.2.2. Director Debt Compensation

Director compensation can be used to increase incentive alignment between directors and outside stakeholders (Ronen, Tzur, and Yaari 2006; Magnan, St-Onge, and Gelinas 2010). The degree of such alignment affects directors' efficacy in overseeing the management (Brick, Palmon, and Warld 2006; Linn and Parker 2005; Yermack 2004). Ronen et al. (2006) find that directors with higher equity compensation are more tolerant of earnings manipulation to the extent that they can extract benefit from insider trading.

I expect less debt-aligned directors to be more tolerant of managerial attempt to hide risk-taking from debtholders via discretionary smoothing. Information on director compensation is collected from *ExecuComp*. I first calculate the ratio of the change in the director's debt compensation scaled by her annual total compensation, and then split the sample based on the sample median of this ratio. I estimate model (4) using the two subsamples respectively. Results in Panel B of Table 4 show that the coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ remains significant and negative for both groups, but is significantly more negative for directors with low debt compensation. This finding supports that managers with low debt compensation are more likely to engage in opportunistic smoothing when the firm's directors are less aligned with debtholders.

## 6.3. Blockholder Ownership

Blockholders reduce agency costs and improve firm value through efficiently monitoring and disciplining the management (Jensen and Meckling 1976; Shleifer and Vishny 1997; Holderness 2003, 2009; Edmans 2014). Owing to various monitoring

costs, it is economically more beneficial for investors with concentrated ownership to exert governance on the management.[39] I expect that lower monitoring from blockholders creates more opportunities for managers to manipulate reported earnings and hide self-interested actions.

To test the effect of blockholder governance, I collect information on blockholders from *Thomson Reuters Institutional (13f) Holdings*. Two proxies for the monitoring strength of blockholders are employed.[40] The first measure is the number of institutional investors with block ownership of at least 5 percent in a firm, and the second measure is the total ownership by institutional blockholders scaled by the firm's outstanding shares. I split the sample into two groups based on the sample median of the number of blockholders and the total ownership by blockholders, respectively. Panel C of Table 4 provides the results. The coefficient on $LDComp_{t-1}*IS_t*X_{t3}$ remains significant and negative for the below-the-median group, whereas the coefficient is insignificant for the above-the-median group. This finding is consistent with less debt-aligned managers engaging in greater opportunistic income smoothing when the firm has lower blockholder ownership.

[39] Prior research shows that blockholders limit managers' opportunistic behavior through intervention (Shleifer and Vishny 1986; Admati, Pfleiderer, and Zechner 1994) and/or threat to exit (Edmans 2009; Edmans, Fang, and Zur 2013; Dou et al., 2015).

[40] Edmans and Mango (2011) suggest that a multiple blockholder structure is more efficient as a governance mechanism through increasing the power of trading.

## 7. Robustness Tests

### 7.1. Earnings Persistence Model

Prior research suggests that earnings persistence, *ceteris paribus*, reflects current earnings' ability to impound information on future earnings (Dechow et al. 2010). To the extent that opportunistic income smoothing is associated with less predictable future earnings, it should also relate to a less positive relation between future earnings and current earnings.

Tucker and Zarowin (2006) use the following model to explore the relation between income smoothing and earnings persistence.

$$X_{t3} = \gamma_0 + \gamma_1 IS_t + \gamma_2 X_t + \gamma_3 IS_t * X_t + \varepsilon_t \quad (5)$$

The authors document a positive coefficient on the two-way interaction $IS_t * X_t$ and conclude that income smoothing in general enhancing earnings persistence. In this study, I investigate whether the relation between income smoothing and earnings persistence varies with the level of CEOs' debt compensation. I use this earnings-based test to complete my returns-based test of earnings predictability by incorporating *LDComp* into model (5):

$$\begin{aligned} X_{t3} = {} & \alpha_0 + \alpha_1 IS_t + \alpha_2 X_t + \alpha_3 IS_t * X_t + \alpha_4 LDComp_{t-1} + \alpha_5 LDComp_{t-1} * IS_t + \\ & \alpha_6 LDComp_{t-1} * X_t + \boldsymbol{\alpha_7 LDComp_{t-1} * IS_t * X_t} + \gamma Controls + \\ & \delta Controls * IS_t * X_t + \varepsilon_t \end{aligned} \quad (6)$$

I expect a negative coefficient on the three-way interaction $LDComp_{t-1}*IS_t*X_t$ if managers with low debt compensation use discretionary accruals-based income smoothing to hide excessive risk. Results in Table 5 show that the coefficient on $LDComp_{t-1}*IS_t*X_t$ is significant and negative, thereby further validating the results in my primary test.

### 7.2. Alternative Measures

To allow greater cross-sectional variations, I construct a continuous measure of managerial debt compensation *LDComp1*. I first calculate the ratio of the change in aggregate value of the CEO's debt compensation scaled by the value of her annual total compensation at the beginning of the fiscal year. I multiply this ratio by minus one so that a higher value of *LDComp1* indicates a lower proportion of debt compensation in the compensation package. Prior studies show that managerial option holdings encourage excessive risk taking (Rajgopal and Shevlin 2002; Coles et al. 2006) and are associated with opportunistic income smoothing (Shu and Thomas 2015). To assess the importance of debt-based compensation relative to option-based benefits in influencing managers' discretionary smoothing incentive, I adopt a measure of debt-to-option compensation *LDComp2*. Specifically, I calculate the value of the CEO's debt compensation scaled by the value of her option compensation, multiplied by minus one. I take the natural logarithmic transformation of *LDComp1* and *LDComp2* to account for

skewness of executive compensation data. Untabulated results indicate that my inferences continue to hold.[41]

To lend further credence to my primary analysis, I adopt an alternative measure of discretionary accruals-based income smoothing following Demerjian et al. (2015). Specifically, I calculate an indicator variable that is set to one if the absolute value of the change in reported earnings is lower than the absolute value of the change in non-discretionary income in both year t and year t–1. Non-discretionary income is measured as net income minus discretionary accruals. I find similar result using this measure.

### 7.3. Decomposition of Debt-Based Executive Compensation

The finance literature shows that managers sometimes are permitted to make changes in how their deferred compensation is invested (Wei and Yermeck 2011).[42] Moreover, the firm may provide managers with opportunities under limited circumstances to withdraw their deferred compensation before retirement (Anantharaman, Fang, and Gong 2014). Such flexibility weakens the debt nature of deferred compensation and may bias the incentive alignment effect.

To address the potential misclassification of deferred compensation as representing debt-based executive compensation, I examine a subsample of firms that disclose both defined benefit pension and deferred compensation. I estimate model (4) after decomposing CEOs' debt compensation into defined benefit pension and deferred compensation. Untabulated results show that whereas the coefficient on

[41] As another robustness test, I also calculated the aggregate value of the CEO's debt compensation scaled by the firm's total assets, which provides a firm-level measure of managerial leverage. Results remain qualitatively similar.

[42] For example, deferred compensation can be invested at a fixed rate of return, in the firm's stock, or in stock or bond mutual funds (Wei and Yermack 2011).

$LDComp_{t-1}*IS_t*X_{t3}$ is significantly more negative for pensions, it remains significant and negative for deferred compensation. This confirms that my findings are not driven entirely by CEOs' defined benefit pension plans.

### 7.4. Endogeneity

I adopt different approaches to address endogeneity issues. First, to alleviate concerns of my findings being driven by unobservable variables that relate to both debt-based executive compensation and income smoothing incentive, I control for a battery of factors that are documented by prior accounting and finance literature to affect the design of executive compensation and the firm's earnings quality. I find qualitatively similar results with or without these control variables. I also address the problem of omitted correlated variables by including firm fixed effects, which rule out unobservable, time-invariant firm-specific factors driving my findings. My results continue to hold.

Second, the research design in Tucker and Zarowin (2006) mitigates concerns over reverse causality from income smoothing to managerial debt compensation. Instead of testing a simple correlation between debt compensation and the practice of income smoothing, I examine how debt-based executive compensation affects managers' income smoothing *incentive* (i.e., the relation between income smoothing behavior and the predictability of future earnings). In other words, the interaction effect of $LDComp_{t-1}*IS_t*X_{t3}$ on stock returns $R_t$ makes reverse causality less likely because one would need to offer an explanation as to why debt compensation is expected to decrease as opportunistic income smoothing increases.

Thirdly, I employ a series of cross-sectional tests to show that results are stronger for subsamples where the relation between debt compensation and opportunistic smoothing is expected to be more pronounced. I document that less debt-aligned managers are engaged in greater opportunistic smoothing when the firm's (debtholders') reliance on debt financing (financial statement information) is higher. Reverse causality is less likely given that results are stronger for subsamples where theory and empirical evidence suggest they should (Rajan and Zingales 1998; Lang and Maffett 2011). In addition, I find a unifying theme that the relation between low debt compensation and opportunistic income smoothing is stronger in firms with weak corporate governance schemes. This suggests that my results are less likely driven by some omitted variables in every cross-sectional regression.

Finally, to tackle the endogeneity concern in a more direct way, I estimate a two-stage least squares (*2SLS*) framework. Following prior literature, I adopt two instrumental variables, the maximum state tax rate on individual income and the industry-year median of debt-based executive compensation (Cassell et al. 2012; Anantharaman et al. 2014).[43] Managers working in jurisdictions with higher income tax are more willing to accept debt-based compensation so that they can defer associated tax burden to a later point in time. That is, managers can derive substantial tax savings from income deferral if they relocate to jurisdictions with lower income tax rate after retirement (Chason 2006; Bruce, Fox, and Yang 2010). I consider the industry-year median of debt-based executive compensation because the executive compensation contract of a given firm is typically influenced by industry practice (Murphy 1999).

[43] State tax rates are obtained from http://www.nber.org/~taxsim/state-rates/.

Untabulated results based on *2SLS* analyses are consistent with those using ordinary-least-squares (*OLS*) estimation.[44]

[44] To implement the *2SLS* approach, I first estimate debt-based executive compensation as a function of the two selected instruments and then estimate model (4) using the predicted values of debt compensation obtained from the first-stage estimation. Other control variables are defined in Appendix.

## 8. Conclusions

This study examines the informative role versus the opportunistic role of income smoothing in a context where managers' incentive alignment with debtholders is expected to vary. The accounting literature provides mixed evidence on whether managers use income smoothing to help stakeholders better predict future performance or alternatively, mask risk-taking activities that harm stakeholders. While managers have the potential to gain from risky activities, debtholders share only in the losses. The agency theory suggests that a debt-like component in executive compensation creates interest alignment between managers and outside debtholders (Edmans and Liu 2012; Cassell et al. 2012; Wei and Yermack 2011). This in turn suggests that when managers have lower debt compensation, the incentive alignment between managers and debtholders tends to be lower. Risk-taking activities of less debt-aligned managers are less likely to be in the best interest of debtholders. Consequently, these managers have a stronger incentive to hide risky actions using discretionary income smoothing.

I adopt the approach in Tucker and Zarowin (2006) to differentiate the incentive behind managers' income smoothing behavior. Consistent with my predictions, I find that managers with lower debt compensation engage in more opportunistic income smoothing. I also show that less debt-aligned managers engage in greater opportunistic smoothing as the firm's reliance on debt financing increases and as outside debtholders' reliance on financial statements increases. My results are stronger in subsamples where theory and empirical evidence suggest they should. I document a stronger relation between debt compensation and opportunistic smoothing when (1) the CEO serves as the chairman of the board or has no golden parachutes, (2) the board has lower director

independence or less debt-aligned directors, and (3) the firm has lower blockholder governance. My conclusions are robust to measuring earnings predictability using an earnings persistence model, using alternative measures of debt-based executive compensation and discretionary accruals-based income smoothing, decomposing CEO debt compensation, and using different methods to address endogeneity.

**Table 1**
**Descriptive Statistics**

Panel A: Distributions of Variables (N=9,060)

| Variables | Mean | Std. Dev. | P10 | P25 | P50 | P75 | P90 |
|---|---|---|---|---|---|---|---|
| *(1)* $R_t$ | 0.1181 | 0.4968 | –0.4120 | –0.1647 | 0.0709 | 0.3145 | 0.6457 |
| *(2)* $X_{t-1}$ | –0.0030 | 0.2503 | –0.0642 | 0.0228 | 0.0475 | 0.0666 | 0.0934 |
| *(3)* $X_t$ | 0.0206 | 0.1529 | –0.0686 | 0.0238 | 0.0525 | 0.0744 | 0.1031 |
| *(4)* $X_{t3}$ | 0.1319 | 0.3130 | –0.1845 | 0.0510 | 0.1650 | 0.2575 | 0.3837 |
| *(5)* $R_{t3}$ | 0.4270 | 0.8762 | –0.4330 | –0.0396 | 0.3446 | 0.7486 | 1.2889 |
| *(6) IS* | 0.5558 | 0.2835 | 0.1400 | 0.3182 | 0.5789 | 0.8012 | 0.9286 |
| *(7) LDComp* | 0.5000 | 0.5000 | 0.0000 | 0.0000 | 0.5000 | 1.0000 | 1.0000 |
| *(8) Size* | 7.6381 | 1.6768 | 5.5388 | 6.4507 | 7.5300 | 8.7466 | 9.9829 |
| *(9) CashVol* | 0.0868 | 0.0730 | 0.0251 | 0.0402 | 0.0661 | 0.1070 | 0.1719 |
| *(10) Leverage* | 0.1794 | 0.1787 | 0.0000 | 0.0039 | 0.1486 | 0.2828 | 0.4171 |
| *(11) Growth* | 0.0931 | 0.2206 | –0.1432 | –0.0115 | 0.0767 | 0.1748 | 0.3273 |
| *(12) MB* | 1.8507 | 1.0389 | 1.0000 | 1.1683 | 1.5157 | 2.1500 | 3.0994 |
| *(13) Profit* | 0.0470 | 0.0974 | –0.0426 | 0.0189 | 0.0528 | 0.0944 | 0.1432 |
| *(14) Invest* | 0.0774 | 0.0700 | 0.0097 | 0.0286 | 0.0586 | 0.1041 | 0.1687 |
| *(15) PPE* | 0.2635 | 0.2372 | 0.0315 | 0.0801 | 0.1831 | 0.3876 | 0.6547 |
| *(16) Analyst* | 2.0588 | 0.8526 | 0.8109 | 1.6260 | 2.1972 | 2.6912 | 3.0245 |
| *(17) Loss* | 0.1702 | 0.3758 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 1.0000 |
| *(18) Age* | 3.9477 | 0.5647 | 3.8501 | 3.9318 | 4.0254 | 4.1109 | 4.1744 |
| *(19) Tenure* | 1.7537 | 0.8532 | 0.6931 | 1.0986 | 1.7918 | 2.3026 | 2.8332 |
| *(20) EComp* | 2.7557 | 1.1721 | 1.2484 | 1.9944 | 2.7239 | 3.4616 | 4.2694 |

**Table 1 (Continued) Descriptive Statistics**

Panel B: Correlations among Variables (N=9,060)

| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* | *(13)* | *(14)* | *(15)* | *(16)* | *(17)* | *(18)* | *(19)* | *(20)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *(1)* | | **-0.031** | **0.376** | **0.394** | **-0.120** | **0.021** | 0.012 | 0.014 | **0.021** | **-0.075** | **0.135** | **0.358** | **0.216** | -0.019 | **0.036** | **0.021** | **-0.212** | 0.015 | **0.023** | -0.007 |
| *(2)* | **-0.205** | | **0.481** | **0.265** | 0.005 | **0.176** | **-0.223** | **0.271** | **-0.174** | **0.023** | **-0.117** | **-0.094** | **0.262** | **-0.120** | **0.109** | **0.133** | **-0.313** | **0.091** | **0.044** | **-0.120** |
| *(3)* | **0.152** | **0.495** | | **0.448** | -0.018 | **0.157** | **-0.174** | **0.239** | **-0.108** | **-0.025** | **0.202** | **0.091** | **0.628** | **-0.101** | **0.102** | **0.125** | **-0.649** | **0.089** | **0.028** | **-0.114** |
| *(4)* | **0.300** | **0.135** | **0.297** | | **0.358** | **0.089** | **-0.135** | **0.155** | **-0.083** | -0.014 | **0.038** | **0.151** | **0.276** | **-0.110** | **0.076** | **0.108** | **-0.273** | **0.082** | **0.027** | **-0.085** |
| *(5)* | **-0.129** | **-0.132** | **-0.192** | **0.225** | | **-0.033** | **-0.114** | **-0.026** | -0.002 | **0.068** | **-0.059** | **-0.111** | **-0.046** | -0.017 | 0.003 | 0.006 | **0.063** | -0.008 | 0.021 | **0.029** |
| *(6)* | -0.018 | **0.200** | **0.184** | **0.067** | **-0.062** | | **-0.053** | **0.085** | **-0.146** | -0.018 | **0.074** | **0.083** | **0.186** | **-0.052** | **0.034** | **0.077** | **-0.233** | **0.054** | **0.059** | -0.017 |
| *(7)* | **0.040** | **-0.065** | **-0.072** | **-0.073** | **-0.062** | **-0.053** | | **-0.388** | **0.217** | **-0.160** | **0.141** | **0.168** | 0.008 | **0.134** | **-0.169** | **-0.146** | **0.092** | **-0.118** | -0.005 | **0.224** |
| *(8)* | **-0.037** | **0.090** | **0.110** | **0.072** | **-0.055** | **0.085** | **-0.382** | | **-0.422** | **0.264** | **-0.034** | **-0.182** | -0.008 | **-0.164** | **0.160** | **0.547** | **-0.166** | **0.101** | **-0.075** | **-0.492** |
| *(9)* | **0.069** | **-0.155** | **-0.125** | **-0.063** | 0.017 | **-0.131** | **0.217** | **-0.408** | | **-0.140** | **0.066** | **0.125** | **0.025** | **0.154** | **-0.092** | **-0.195** | **0.186** | **-0.066** | 0.006 | **0.179** |
| *(10)* | **-0.061** | **-0.140** | **-0.184** | **-0.083** | **0.096** | **-0.045** | **-0.114** | **0.197** | **-0.104** | | **-0.062** | **-0.157** | **-0.177** | **-0.159** | **0.141** | **0.053** | **0.107** | **0.032** | -0.001 | **-0.042** |
| *(11)* | **0.098** | **0.096** | **0.205** | **0.034** | **-0.047** | **0.038** | **0.130** | **-0.025** | **0.080** | **-0.041** | | **0.298** | **0.343** | **0.188** | -0.004 | **0.091** | **-0.265** | **-0.044** | **0.084** | **0.039** |
| *(12)* | **0.268** | **0.078** | **0.118** | **0.107** | **-0.089** | **0.060** | **0.190** | **-0.214** | **0.189** | **-0.146** | **0.226** | | **0.621** | **0.330** | **-0.059** | **0.227** | **-0.273** | **-0.074** | **0.049** | **0.059** |
| *(13)* | **0.196** | **0.276** | **0.681** | **0.262** | **-0.138** | **0.207** | **-0.035** | **0.087** | **-0.118** | **-0.187** | **0.263** | **0.404** | | **0.159** | **0.028** | **0.251** | **-0.651** | 0.009 | **0.064** | -0.015 |
| *(14)* | -0.017 | **0.027** | 0.004 | **-0.057** | 0.002 | **-0.070** | **0.164** | **-0.192** | **0.222** | **-0.099** | **0.181** | **0.282** | -0.019 | | **0.350** | **0.146** | 0.001 | **-0.054** | 0.021 | **0.028** |
| *(15)* | 0.016 | **0.048** | **0.065** | **0.054** | -0.010 | **0.025** | **-0.150** | **0.177** | **-0.133** | **0.134** | **0.026** | **-0.133** | **0.035** | **0.287** | | **0.065** | **-0.074** | **0.115** | -0.006 | **-0.165** |
| *(16)* | **-0.029** | **0.185** | **0.183** | **0.119** | **-0.030** | **0.079** | **-0.145** | **0.484** | **-0.206** | 0.002 | **0.055** | **0.164** | **0.231** | **0.123** | **0.099** | | **-0.197** | -0.018 | 0.008 | **-0.279** |
| *(17)* | **-0.149** | **-0.332** | **-0.660** | **-0.269** | **0.152** | **-0.235** | **0.092** | **-0.175** | **0.212** | **0.150** | **-0.230** | **-0.175** | **-0.707** | **0.073** | **-0.066** | **-0.208** | | **-0.033** | **-0.071** | **0.069** |
| *(18)* | 0.018 | -0.004 | 0.014 | **0.061** | **0.063** | **0.044** | **-0.091** | **0.056** | **-0.035** | **0.026** | -0.020 | **-0.051** | 0.010 | -0.014 | **0.042** | 0.015 | **-0.027** | | **0.333** | **0.059** |
| *(19)* | 0.009 | **0.067** | **0.056** | **0.045** | -0.009 | **0.058** | -0.011 | **-0.066** | **-0.024** | 0.004 | **0.071** | **0.032** | **0.065** | **0.040** | 0.008 | 0.012 | **-0.075** | **0.098** | | **0.458** |
| *(20)* | **0.027** | **-0.021** | **-0.030** | **-0.034** | **0.027** | -0.008 | **0.209** | **-0.457** | **0.134** | **-0.031** | **0.039** | **0.081** | -0.019 | **0.067** | **-0.159** | **-0.217** | **0.048** | **0.043** | **0.464** | |

Table 1 provides descriptive statistics of all variables employed, and a detailed description of variable measurement is provided in the Appendix. Bolded text indicates correlations statistically significant at the 0.05 level or lower in a two-tailed test. The upper right-hand portion of Panel B presents Spearman rank-order correlations, and the lower left-hand portion presents the Pearson product-moment correlations.

**Table 2**
**Debt-Based Executive Compensation and Opportunistic Income Smoothing**

| Variables | Coefficient Estimate | p-value |
|---|---|---|
| Intercept | –0.2037 | 0.0053 |
| $X_{t-1}$ | –0.5681 | <.0001 |
| $X_t$ | 0.4749 | <.0001 |
| $X_{t3}$ | 0.4479 | 0.0010 |
| $R_{t3}$ | –0.1014 | <.0001 |
| $IS_t$ | –0.0424 | 0.1032 |
| $IS_t*X_{t-1}$ | 0.0862 | 0.5373 |
| $IS_t*X_t$ | 0.0726 | 0.7344 |
| $IS_t*X_{t3}$ | 0.2182 | 0.0047 |
| $IS_t*R_{t3}$ | 0.0059 | 0.8361 |
| $LDComp_{t-1}$ | 0.0009 | 0.9921 |
| $LDComp_{t-1}*X_{t-1}$ | 0.0636 | 0.2707 |
| $LDComp_{t-1}*X_t$ | –0.1403 | 0.2519 |
| $LDComp_{t-1}*X_{t3}$ | 0.1202 | 0.0269 |
| $LDComp_{t-1}*R_{t3}$ | 0.0123 | 0.5326 |
| $LDComp_{t-1}*IS_t$ | –0.0443 | 0.2071 |
| $LDComp_{t-1}*IS_t*X_{t-1}$ | –0.4815 | 0.0150 |
| $LDComp_{t-1}*IS_t*X_t$ | 1.2328 | <.0001 |
| **$LDComp_{t-1}*IS_t*X_{t3}$** | **–0.4409** | **<.0001** |
| $LDComp_{t-1}*IS_t*R_{t3}$ | 0.0003 | 0.9937 |
| *Size* | 0.0103 | 0.0452 |
| *CashVol* | –0.2276 | 0.0419 |
| *Leverage* | –0.0423 | 0.2278 |
| *Growth* | 0.1728 | <.0001 |
| *MB* | 0.0937 | <.0001 |
| *Profit* | –0.5113 | 0.0003 |
| *Invest* | –0.3545 | 0.0032 |
| *PPE* | 0.1795 | <.0001 |
| *Analyst* | –0.0403 | <.0001 |
| *Loss* | –0.0026 | 0.9141 |
| *Age* | 0.0126 | 0.3557 |
| *Tenure* | –0.0207 | 0.0105 |
| *Ecomp* | 0.0206 | 0.0028 |
| $Controls*IS_t*X_{t3}$ | Yes | Yes |
| Adj. $R^2$ | 0.4508 | |
| N | 9,060 | |

Table 2 provides test results for H1. The dependent variable is the annual stock return ($R_t$). Along with coefficient estimates, two-sided p-values are presented. Standard errors are clustered by firms. Year fixed effect indicators are not reported for brevity. A detailed description of all variables employed is provided in the Appendix.

**Table 3**
**Cross-Sectional Tests on the Relation between Debt-Based Executive Compensation and Opportunistic Income Smoothing**

| | *Debt Financing* | | *Analyst Coverage* | |
|---|---|---|---|---|
| Variables | High | Low | High | Low |
| *Intercept* | –0.1121 | –0.3024 | –0.2115** | –0.3111*** |
| $X_{t-1}$ | –0.7385*** | –0.4954*** | –0.4699*** | –0.5962*** |
| $X_t$ | 0.9515*** | 0.3360*** | 0.5641*** | 0.3755*** |
| $X_{t3}$ | 0.4075** | 0.6075*** | 0.7479*** | 0.3535** |
| $R_{t3}$ | –0.1397*** | –0.0816*** | –0.0885*** | –0.1161*** |
| $IS_t$ | –0.0256 | –0.0310 | –0.0322 | –0.0649 |
| $IS_t*X_{t-1}$ | 0.2113 | –0.0099 | –0.0915 | 0.1949 |
| $IS_t*X_t$ | –0.3632 | 0.2359 | 0.9778*** | –0.2176 |
| $IS_t*X_{t3}$ | 0.3217*** | 0.2790*** | 0.0545 | 0.2267** |
| $IS_t*R_{t3}$ | 0.0420 | –0.0201 | –0.0113 | 0.0237 |
| $LDComp_{t-1}$ | –0.0066 | –0.0062 | 0.1184 | 0.0350 |
| $LDComp_{t-1}*X_{t-1}$ | 0.1048 | 0.0572 | –0.1305 | 0.1298* |
| $LDComp_{t-1}*X_t$ | –0.3914 | –0.0960 | 0.0014 | –0.1503 |
| $LDComp_{t-1}*X_{t3}$ | 0.1344 | 0.0875 | 0.0676 | 0.1069 |
| $LDComp_{t-1}*R_{t3}$ | 0.0460 | –0.0171 | 0.0047 | 0.0279 |
| $LDComp_{t-1}*IS_t$ | –0.0812 | 0.0022 | –0.0426 | –0.0182 |
| $LDComp_{t-1}*IS_t*X_{t-1}$ | –0.2678 | –0.6879*** | 0.1682 | –0.8060*** |
| $LDComp_{t-1}*IS_t*X_t$ | 1.9709*** | 0.6320** | –0.2993 | 1.7569*** |
| ***$LDComp_{t-1}*IS_t*X_{t3}$*** | **–0.6171*** ** | **–0.2766** ** | **–0.1256** | **–0.4850*** ** |
| $LDComp_{t-1}*IS_t*R_{t3}$ | –0.0437 | 0.0491 | 0.0240 | –0.0372 |
| *Controls* | Yes | | Yes | |
| *Controls*$*IS_t*X_{t3}$ | Yes | | Yes | |
| Adj. $R^2$ | 0.4689 | 0.4533 | 0.4812 | |
| F-Test | 4.71** | | 18.49*** | |
| N | 4,530 | 4,530 | 4,515 | 4,545 |

Table 3 provides test results for H2a and H2b. *, **, and *** represent two-sided significance levels at 0.10, 0.05, and 0.01. The dependent variable is the annual stock return ($R_t$). Standard errors are clustered by firms. Year fixed effect indicators are not reported for brevity. A detailed description of all variables employed is provided in the Appendix.

**Table 4**
**Tests on Debt-Based Executive Compensation, Corporate Governance Characteristics, and Opportunistic Income Smoothing**

Panel A:
CEO Characteristics

| | *CEO Duality* | | *CEO Golden Parachute* | |
|---|---|---|---|---|
| Variables | Yes | No | Yes | No |
| *Intercept* | –0.3451*** | –0.1124 | 1.1528*** | –0.1982** |
| $X_{t-1}$ | –0.8514*** | –0.2992*** | –0.5552*** | –0.6670*** |
| $X_t$ | 0.5422*** | 0.3397*** | 0.8579*** | 0.5006*** |
| $X_{t3}$ | 0.2982 | 0.2025 | –3.2981*** | 0.4928*** |
| $R_{t3}$ | –0.0953*** | –0.1079*** | –0.1960*** | –0.0832*** |
| $IS_t$ | –0.1090*** | 0.0200 | –0.0444 | –0.0562 |
| $IS_t*X_{t-1}$ | 0.7050*** | –0.5195*** | –0.6840*** | 0.5569*** |
| $IS_t*X_t$ | –0.4827 | 0.4388* | 0.3077 | –0.1721 |
| $IS_t*X_{t3}$ | 0.5324*** | –0.0409 | 0.3168** | 0.2298** |
| $IS_t*R_{t3}$ | –0.0126 | 0.0179 | 0.0646 | –0.0114 |
| $LDComp_{t-1}$ | 0.1446 | –0.0667 | –0.8875* | 0.0561 |
| $LDComp_{t-1}*X_{t-1}$ | 0.2668*** | –0.1084 | 0.2675** | 0.1384* |
| $LDComp_{t-1}*X_t$ | –0.5103*** | 0.3008** | 0.9320*** | –0.2083 |
| $LDComp_{t-1}*X_{t3}$ | 0.3992*** | –0.1516** | –0.0496 | 0.1624** |
| $LDComp_{t-1}*R_{t3}$ | –0.0261 | 0.0749** | 0.0238 | 0.0036 |
| $LDComp_{t-1}*IS_t$ | 0.0151 | –0.1062** | –0.0071 | –0.0388 |
| $LDComp_{t-1}*IS_t*X_{t-1}$ | –1.1060*** | 0.2202 | –0.4822 | –0.7918*** |
| $LDComp_{t-1}*IS_t*X_t$ | 2.2732*** | 0.4646 | 1.4425** | 1.1881*** |
| **$LDComp_{t-1}*IS_t*X_{t3}$** | **–1.0159*** ** | **0.1677** | **–0.3879*** ** | **–0.4438*** ** |
| $LDComp_{t-1}*IS_t*R_{t3}$ | 0.0815 | –0.1103** | –0.0271 | 0.0023 |
| *Controls* | Yes | | Yes | |
| *Controls*$*IS_t*X_{t3}$ | Yes | | Yes | |
| Adj. $R^2$ | 0.469 | 0.462 | 0.399 | 0.448 |
| F-Test | 17.13*** | | 5.43** | |
| N | 4,369 | 4,691 | 2,990 | 5,824 |

**Table 4 (Continued)**
**Tests on Debt-Based Executive Compensation, Corporate Governance Characteristics, and Opportunistic Income Smoothing**

| Panel B: Director Characteristics | *Director Independence* | | *Director Debt Compensation* | |
|---|---|---|---|---|
| Variables | High | Low | High | Low |
| *Intercept* | –0.0372 | 1.1851*** | –0.2060*** | –0.2093*** |
| $X_{t-1}$ | –0.6192*** | –0.5599*** | –0.5784*** | –0.5744*** |
| $X_t$ | 0.5721*** | 1.2048*** | 0.5258*** | 0.4585*** |
| $X_{t3}$ | 0.1632 | 4.1424*** | 0.4713*** | 0.2273 |
| $R_{t3}$ | –0.1452*** | –0.0949*** | –0.1011*** | –0.1005*** |
| $IS_t$ | –0.0508 | –0.0905 | –0.0191 | –0.0488* |
| $IS_t*X_{t-1}$ | –0.4437* | –1.7115*** | 0.1315 | 0.0898 |
| $IS_t*X_t$ | 0.0522 | 1.1756** | –0.1397 | 0.0983 |
| $IS_t*X_{t3}$ | 0.6409*** | 0.9560*** | 0.1935** | 0.2352*** |
| $IS_t*R_{t3}$ | –0.0584 | –0.1011* | 0.0066 | 0.0076 |
| $LDComp_{t-1}$ | 0.9956 | –1.2333** | 0.0042 | –0.1272 |
| $LDComp_{t-1}*X_{t-1}$ | 0.0452 | 0.3505*** | 0.0780 | 0.1080* |
| $LDComp_{t-1}*X_t$ | 0.9703*** | –0.4582 | –0.1986 | –0.3949*** |
| $LDComp_{t-1}*X_{t3}$ | 0.2053 | 0.7048*** | 0.1128* | 0.1898*** |
| $LDComp_{t-1}*R_{t3}$ | 0.1034* | 0.0514 | 0.0136 | –0.0094 |
| $LDComp_{t-1}*IS_t$ | 0.1559* | 0.0913 | –0.0675* | –0.0402 |
| $LDComp_{t-1}*IS_t*X_{t-1}$ | 0.2499 | 0.1687 | –0.5078** | –0.7817*** |
| $LDComp_{t-1}*IS_t*X_t$ | 1.0259 | 1.5521** | 1.4684*** | 1.7804*** |
| **$LDComp_{t-1}*IS_t*X_{t3}$** | **–0.7916*** ** | **–1.3511*** ** | **–0.4266*** ** | **–0.6015*** ** |
| $LDComp_{t-1}*IS_t*R_{t3}$ | –0.0412 | 0.0366 | –0.0012 | 0.0469 |
| *Controls* | Yes | | Yes | |
| *Controls*$*IS_t*X_{t3}$ | Yes | | Yes | |
| Adj. $R^2$ | 0.569 | 0.589 | 0.523 | 0.464 |
| F-Test | 13.98*** | | 16.08*** | |
| N | 4,794 | 4,266 | 4,148 | 4,913 |

**Table 4 (Continued)**
**Tests on Debt-Based Executive Compensation, Corporate Governance Characteristics, and Opportunistic Income Smoothing**

| Panel C: Blockholder Ownership | *Number of Institutional Blockholders* | | *Institutional Blockholder Ownership* | |
|---|---|---|---|---|
| Variables | High | Low | High | Low |
| *Intercept* | –0.2130* | –0.2387** | –0.1948* | –0.2456** |
| $X_{t-1}$ | –0.6336*** | –0.4818*** | –0.4424*** | –0.6200*** |
| $X_t$ | 0.6935*** | 0.2669** | 0.7806*** | 0.4242*** |
| $X_{t3}$ | 0.3190 | 0.5144*** | 0.0534 | 0.5416*** |
| $R_{t3}$ | –0.0929*** | –0.1012*** | –0.0957*** | –0.0952*** |
| $IS_t$ | 0.0305 | –0.0872** | 0.0363 | –0.0693* |
| $IS_t*X_{t-1}$ | –0.2920 | 0.1473 | –0.7406*** | 0.4826** |
| $IS_t*X_t$ | 0.1444 | 0.2969 | 0.8172*** | –0.5004* |
| $IS_t*X_{t3}$ | 0.1245 | 0.2405** | –0.0570 | 0.3834*** |
| $IS_t*R_{t3}$ | –0.0105 | 0.0151 | 0.0121 | –0.0246 |
| $LDComp_{t-1}$ | –0.0611 | 0.1294 | –0.2345* | 0.1833 |
| $LDComp_{t-1}*X_{t-1}$ | 0.3485*** | –0.1184 | 0.3470*** | 0.0865 |
| $LDComp_{t-1}*X_t$ | –0.4803*** | 0.0726 | –0.3801* | –0.1609 |
| $LDComp_{t-1}*X_{t3}$ | 0.0599 | 0.1726** | 0.1224 | 0.1272* |
| $LDComp_{t-1}*R_{t3}$ | –0.0026 | 0.0030 | 0.0175 | 0.0010 |
| $LDComp_{t-1}*IS_t$ | –0.1186** | –0.0130 | –0.0138 | –0.0800 |
| $LDComp_{t-1}*IS_t*X_{t-1}$ | –0.5186 | –0.3905 | –0.6911* | –0.8317*** |
| $LDComp_{t-1}*IS_t*X_t$ | 1.8342*** | 0.7693** | 0.8872* | 1.7253*** |
| **$LDComp_{t-1}*IS_t*X_{t3}$** | **–0.1702** | **–0.6042*****| **–0.1752** | **–0.6053*****|
| $LDComp_{t-1}*IS_t*R_{t3}$ | 0.0649 | –0.0270 | 0.0054 | 0.0250 |
| *Controls* | Yes | | Yes | |
| *Controls*$*IS_t*X_{t3}$ | Yes | | Yes | |
| Adj. $R^2$ | 0.494 | 0.433 | 0.499 | 0.437 |
| F-Test | 7.40*** | | 4.62** | |
| N | 4,204 | 4,856 | 4,001 | 5,059 |

Table 4 provides subsample test results based on corporate governance characteristics. The dependent variable is the annual stock return ($R_t$). *, **, and *** represent significance levels at 0.10, 0.05, and 0.01 (two-sided). Year fixed effect indicators are not reported for brevity. A detailed description of all variables employed is provided in the Appendix.

**Table 5**
**Test on Debt-Based Executive Compensation and Earnings Persistence**

| Variables | Coefficient Estimate | p-value |
|---|---|---|
| Intercept | 0.0130 | 0.7475 |
| $IS_t$ | –0.1543 | <.0001 |
| $X_t$ | 0.2137 | 0.0001 |
| $IS_t*X_t$ | 3.0186 | <.0001 |
| $LDComp_{t-1}$ | 0.0055 | 0.5070 |
| $LDComp_{t-1}*X_t$ | –0.0075 | 0.0072 |
| $LDComp_{t-1}*IS_t$ | –0.0740 | <.0001 |
| $\mathbf{LDComp_{t-1}*IS_t*X_t}$ | **–0.1433** | **<.0001** |
| *Size* | –0.0065 | 0.0790 |
| *CashVol* | 0.4332 | <.0001 |
| *Leverage* | –0.0508 | 0.0440 |
| *Growth* | –0.0115 | 0.5498 |
| *MB* | 0.0332 | <.0001 |
| *Profit* | –0.2062 | 0.0201 |
| *Invest* | –0.4244 | <.0001 |
| *PPE* | 0.1201 | <.0001 |
| *Analyst* | 0.0050 | 0.4006 |
| *Loss* | –0.0352 | 0.0391 |
| *Age* | 0.0200 | 0.0015 |
| *Tenure* | 0.0145 | 0.0085 |
| *Ecomp* | –0.0126 | 0.0050 |
| $Controls*IS_t*X_t$ | Yes | |
| Adj. $R^2$ | 0.212 | |
| N | 9,060 | |

Table 5 provides test results for the earnings persistence model. The dependent variable is the cumulative earnings over the subsequent three years ($X_{3t}$). Along with coefficient estimates, two-sided p-values are presented. Standard errors are clustered by firms. Year fixed effect indicators are not reported for brevity. A detailed description of all variables employed is provided in the Appendix.

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## Appendix: Variable Definitions

**Test Variables**

| | |
|---|---|
| $R_t$ | Annual ex-dividend stock returns for year t. |
| $X_{t-1}$ | Earnings per share (*Compustat* epspx, adjusted for stock splits and stock dividends) at the end of year t-1, scaled by the stock price at the beginning of fiscal year t. |
| $X_t$ | Earnings per share (*Compustat* epspx, adjusted for stock splits and stock dividends) at the end of year t, scaled by the stock price at the beginning of year t. |
| $X_{t3}$ | The sum of earnings per share (*Compustat* epspx, adjusted for stock splits and stock dividends) for years t+1 through t+3, scaled by the stock price at the beginning of year t. |
| $R_{t3}$ | The annually compounded stock return for years t+1 through t+3. |
| $IS_t$ | The correlation between change in discretionary accruals (DA) and change in pre-discretionary income (*PDI*) over previous five years, multiplied by minus one. *PDI* is calculated as net income before extraordinary items (*Compustat* ibc) for year t scaled by total assets (*Compustat* at) at the beginning of year t minus discretionary accruals for year t. DA are the residuals from the following regression.<br><br>$Accruals_t = \alpha_0 + \alpha 1 OCF_{t-1} + \alpha_2 OCF_t + \alpha_3 NegOCF_t + \alpha_4 OCF_t * NegOCF_t + \alpha 5 OCF_{t+1} + \alpha_6 \Delta Sales_t + \alpha_7 PPE_t + \omega_t$<br><br>$Accruals_t$ is equal to net income before extraordinary items (*Compustat* ibc) for year t minus operating cash flows $OCF_t$ (*Compustat* oancf) for year t, scaled by total assets at the beginning of year t; $NegOCF_t$ is an indicator variable that is equal to one if $OCF_t$ is negative and zero otherwise; $\Delta Sales_t$ is the annual change in sales (*Compustat* sales) from year t to year t-1 scaled by total assets (*Compustat* at) at the beginning of year t; and $PPE_t$ is the gross property, plant and equipment for year t (*Compustat* ppegt) scaled by total assets at the beginning of year t (*Compustat* at). |
| $LDComp_{t-1}$ | An indicator variable that takes the value of one if the aggregated value of the CEO's defined benefit pensions (*Execucomp* pension_value_total) plus deferred compensation (*Execucomp* defer_balance_total) scaled by CEO annual total compensation (*Execucomp* total_sec) is greater than the sample mean at the end of year t-1, and zero otherwise. |

**Control Variables**

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|---|---|
| *Size* | The natural logarithm of total assets (*Compustat* at) at the beginning of the fiscal year. |
| *CashVol* | The standard deviation of operating cash flows (*Compustat* oancf) over the previous five years. |
| *Leverage* | The ratio of total debt (*Compustat* dlc+dltt) to total assets (*Compustat* at) at the beginning of the fiscal year. |
| *Growth* | The annual percentage change in sales (*Compustat* sales) at the beginning of the fiscal year. |
| *MB* | The ratio of the market value of total assets (*Compustat* csho*prcc_f+at–ceq) over the book value of total assets (*Compustat* at) at the beginning of the fiscal year. |
| *Profit* | The ratio of net income before extraordinary items (*Compustat* ibc) over total assets (*Compustat* at) at the beginning of the fiscal year |
| *Invest* | The ratio of research and development expenses (*Compustat* xrd) plus capital expenditures (*Compustat* capx) minus sales of fixed assets (*Compustat* sppe) over total assets (*Compustat* at) at the beginning of the fiscal year. |
| *PPE* | The ratio of net property, plant and equipment (*Compustat* ppent) over total assets (*Compustat* at) at the beginning of the fiscal year. |
| *Analyst* | The natural logarithm of one plus the average number of analyst following at the beginning of the fiscal year (*I/B/E/S*). |
| *Loss* | An indicator variable that is equal to one if the firm has negative earnings per share (*Compustat* epspx, adjusted for stock splits and stock dividends) at the end of the fiscal year, and zero otherwise. |
| *Age* | The natural logarithm of one plus the age of the CEO at the beginning of the fiscal year (*Execucomp* age) |
| *Tenure* | The natural logarithm of one plus the difference between the year of the observation and the year in which the executive became CEO (*Execucomp* becameceo). |
| *Ecomp* | The natural logarithm of one plus the ratio of CEO stock awards (*Execucomp* stock_awards) and option awards (*Execucomp* option_awards) divided by CEO total compensation (*Execucomp* total_sec) at the beginning of the fiscal year. |