Re-Examining the Association Between Unexpected Earnings and Abnormal Security Returns in the Present of Financial Leverage

Hong Kim Duong
The University of Texas at El Paso

Zuobao Wei
The University of Texas at El Paso

Karl Putnam
The University of Texas at El Paso

Carl B. McGowan
Norfolk State University

This study re-examines the theoretical prediction of Dhaliwal et al. (1991) about the association between leverage and earnings response coefficients (ERCs). Since leverage and default risk are endogenous, the estimation using leverage to proxy for default risk may produce biased results. We use a propensity score matching method to deal with this endogeneity and introduce dividend payouts as another proxy for default risk. We find that higher default risk firms are consistently associated with lower ERCs. Our findings suggest that a combination of dividend payouts and leverage is a more refined proxy for default risk.

INTRODUCTION

Prior studies suggest that the relationship between unexpected earnings and abnormal stock returns depends on the firm's capital structure. The earnings response coefficients (hereafter ERCs) are negatively associated with leverage (Dhaliwal et al., 1991, 1994). The theoretical model developed in Dhaliwal et al. (1991) predicts that firms with higher default risks as measured by leverage will have lower ERCs. Using a data sample between 1970 and 1984, Dhaliwal et al. (1991) find that firms with no debt, implying no default risk, and firms with lower debt, implying some default risk, have significantly higher ERCs than firms with debt, and firms with higher debt, respectively.

Since the publication of Dhaliwal et al. (1991, 1994), the tendency of eschewing debt has become more and more popular among large public nonfinancial firms. Between 1978 and 1989, on average 14.19% of firms had less than 5% debt in their capital structure. The average percentage of "debt-free" firms increased to 24.17% in the 1990s and to 33.82% between 2000 and 2012. Some recent studies have attempted to solve the debt-free puzzle and document surprising results. Strebualev and Yang (2013) find that debt-free firms are not homogeneous, especially in term of default risks. Some debt-free firms are highly profitable, pay higher dividends and hold high cash balances while some other debt-free firms are struggling and facing a high risk of default. The findings suggest that having low (high) leverage does not necessarily mean low (high) default risks. At the end of the study, Dhaliwal et al. (1991) also suggest an extension for future research by "using more refined proxies for the firm's default risk."

If leverage is not always positively associated with default risks, what could be these "more refined proxies?" Would these proxies provide supporting results for the prediction of the Dhaliwal et al. (1991, 1994) theoretical model? Our study aims to answer these questions.

We posit that one single factor such as leverage is not able to capture the firm risk of defaults and lower leverage does not necessarily mean lower default risk. According to Dhaliwal et al.'s (1991, 1994) theoretical prediction, financially unconstrained firms with low default risk would have high ERCs and financially constrained firms with high default risk would have low ERCs, even though the leverage levels in both groups are similar.

We first develop an alternative measure of default risk, a combination of leverage and dividend payouts. We then use our new measure of default risk to test the theoretical prediction about the negative association between ERCs and default risk. Being consistent with Dhaliwal et al. (1991, 1994) , we expect to find a negative association between default risk and ERCs. Our test results are consistent with this expectation. Our findings indicate that financially unconstrained firms, with a low level of default risk, have significantly higher ERCs than their proxy firms while financially constrained firms, with a high level of default risk, have significantly lower ERCs than their proxy firms.

Our analysis is based on a sample including 6,286 firm-year observations of 907 unique firms over the period between 1988 and 2012 and a sample of proxy firms chosen by propensity score based on determinants of leverage (industry, size, age, bond credit ratings, growth, investment and profitability) from the Compustat and CRSP databases. Next, we divide our debt-free sample into two subsamples of high and low information asymmetry based on their dividend paying status. Dividend payers are considered financially unconstrained firms and non-dividend payers are considered financially constrained firms. This classification is motivated by Skinner and Soltes (2011) who find that in the past three decades, firms use dividends as a costly signal about their future cash flows and payment commitment.

Our study extends Dhaliwal et al. (1991, 1994) and is related to Skinner and Soltes (2011) who examine the information content of corporate payout policy. Our finding that ERCs depend not only on financial leverage but also on dividend payouts contributes to a growing literature on the determinants of the variation in ERCs. We also contribute to the capital structure literature by providing evidence that debt-free firms do not have homogeneous earnings quality and market responsiveness to their earnings report. Our study should be of interest to researchers, investors, and others concerned with understanding the determinants of ERCs.

The rest of the paper is organized as follows. Section 2 reviews the related literature and proposes the research hypotheses. Section 3 specifies the research model. Section 4 presents sample construction and descriptive statistics. Empirical results are provided in Section 5. Robustness tests are in Section 6 and the conclusion and research extensions are included in Section 7.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

In this section, we review the literature on the relationship between leverage and earnings quality. Our review shows that leverage has multifaceted impacts on earnings quality. Debt obligations influence a manager's reporting discretion. Prior studies find both a positive and negative influence of debt holders on financial reporting discretion. We first review studies documenting negative impacts of leverage on earnings quality, and then those that suggest a positive relationship between leverage and earnings quality. Then, we briefly explain the theoretical model developed by Dhaliwal et al. (1991). We conclude this section by stating our hypotheses.

Negative Relationship Between Leverage and Earnings Quality

Debt holders face asset substitution risk when opportunistic shareholders induce firms to pay out large dividends, and invest in high risk projects. The asset substitution is more severe in highly levered firms (Jensen and Meckling, 1976). The solution of the agency cost of debt, suggested by Jensen and Meckling (1976) is debt contracts. Anticipating the asset substitution risk, debt holders usually set covenants or require a higher rate of return in their lending contracts. Studies that document a negative relationship between leverage and earnings manipulation usually assume that higher leverage is associated with more restriction in covenants, and thus, higher motivation for managers to manipulate earnings.

There is substantial evidence that debt levels are negatively associated with earnings quality measured by multiple proxies. Managerial discretion to manipulate earnings reduces the informativeness of earnings for other decision makers. A potential motivation to engage in earnings manipulation (thereby reducing earnings quality) is to avoid debt covenants. Dechow et al. (1996) find that earnings manipulating firms have higher leverage ratios than control firms. In a review about earnings quality, Dechow et al. (2010) argue that higher leverage is an indicator of being closer to a debt covenant restriction. Managers in highly levered firms are more likely to boost income and manipulate financial statements to avoid violating covenants. Bowen et al., (1981) and Zmijewski and Hagerman (1981) document that firms with financial ratios closer to debt covenant constraints on dividends, interest coverage, and leverage are more likely to choose income increasing accounting methods (e.g. interest capitalization) to improve earnings numbers. The existence of debt covenants also influences the decision to capitalize or expense research and development (R&D) costs. To avoid debt renegotiation costs, and other costs related to covenant violation, highly levered firms are more likely to capitalize all or part of their R&D costs (Daley and Vigeland, 1983).

Using previously reported earnings correction as a proxy for earnings quality, Kinney and McDaniel (1989) find a positive association between leverage and earnings corrections. The authors also find that firms that correct previously reported earnings are smaller and face more uncertainty than control firms. Efendi et al., (2007) measure earnings quality through restatements and find that firms that are constrained by interest coverage debt covenants tend to experience more misstatements.

Using proximity to covenant violation as a more direct measure of a debt covenant constraint effect, Sweeney (1994), DeFond and Jiambalvo (1994) and Dichev and Skinner (2002) find a consistent positive association between leverage and earnings quality proxied by abnormal accruals and target beating. These findings, however, are only weakly supported by DeAnglo et al., (1994).

Decomposing return on assets into an operating leverage component and financial leverage component, Nissim and Penman (2001) find that an increase in operating leverage tends to depress current earnings, but leads to future improvements in earnings. However, an increase in operating leverage is associated with an incrementally negative effect on future earnings.

Debt and debt covenant restrictions provide motivation for managers to engage in operational earnings management. Graham et al., (2005) survey and interview more than 400 executives about the determinants of their reported earnings and disclosure and find that managers would rather take economic actions than make within-GAAP accounting choices to manage earnings. To boost current period earnings or to avoid reporting losses, managers can tweak some of the firm's underlying operations. These actions can be postponing expenses to raise earnings, cutting prices to boost sales and timing the sales of fixed assets to report gains. These expenses include hiring, R&D, advertising, travel, maintenance, and capital expenditures to avoid depreciation. The survey and interview results of Graham et al., (2005) are in line and supported by prior and subsequent research. To alter reported earnings, managers make decisions on overproduction to reduce cost of goods sold expense, cut desirable R&D investments, time of income recognition from disposal of long-lived assets and investments, and engage in financing transactions (Schipper, 1989; Bartov, 1993; Dechow and Skinner, 2000; Roychowdhury, 2006; and Gunny, 2010).

Positive Relationship Between Leverage and Earnings Quality

Debt also has a positive impact on firm performance and earnings quality. Debt contracts between lenders and firms frequently require firms to disclose relevant information that enable lenders to monitor compliance with contractual agreements and to evaluate whether the firm's resources are managed in the interest of stakeholders. The obligation to service debt payments reduces the agency cost of free cash flow (Jensen, 1986). Since debt covenants reduce the discretion of opportunistic shareholders and managers ex post, they reduce the asset substitution risk faced by debt holders, and thereby reduce the cost of debt ex ante. Thus, the presence of debtholders and the use of debt covenants have a significant effect on the firm's investment, financing, and payout policies as well as the firm's behavior during takeover bids, and financial distress.

Myers and Majluf (1984) point out that in the context of information asymmetry about the firm's future prospects between a firm's inside manager and outside investors, debt financing is costly for existing shareholders. Good firms can separate themselves from bad firms by sending out costly signals to the market. The firm's manager can still decide to raise debt to finance their investment. Outside investors will interpret the debt financing decision as a confidence that the investment return will be sufficient to service the debt obligation. The manager can also try to reduce information asymmetry by providing more information disclosure, and thereby reduce the cost of external financing.

Using a comprehensive database about bond covenants, Chava et al. (2010) shed light on the association between debt and covenants, and on the important factors that determine the use of covenants. One of their findings, that high leverage does not necessarily mean more covenants, at first might be counterintuitive, especially when prior studies usually assume that higher leverage is associated with more restrictive covenants. Their finding supports the contracting efficiency hypothesis. Since debt can alleviate managerial moral hazard, higher leverage may reduce the demand for manager-related covenants such as investment restrictions (Grossman and Hart, 1982). Chava et al. (2010) show that because entrenched managers want to keep cash and avoid dividends and takeovers, managerial entrenchment (proxied by CEO tenure and leverage) reduces the need for dividend- and takeover-related covenants.

Supporting the prediction of Jensen (1986) that covenants are positively associated with the level of information asymmetry about the firms, Chava et al., (2010) find that firms with more information asymmetry have more operation and financing related covenants. Uncertainty about the firm's investment prospects is positively related to the use of investment covenants. Opaque financial accounts increase the restrictions in dividend payout covenants. Bondholders use covenants to supervise the firm's investment policy, subsequent financing policy, payout policy and the firm's behavior during takeover bids and financial distress.

Defining managerial fraud as misuse of investment funds, excessive payouts to managers, and aggressive senior debt financing of value-destroying projects camouflaged through off-balance-sheet transactions, Chava et al. (2010) find robust evidence that the use of covenants significantly reduces managerial fraud.

Hypotheses

As shown in prior studies, leverage can have both a positive and negative effect on the information quality conveyed in earnings. These mixed findings raise the question of whether using leverage to proxy for default risk might lead to measurement errors.

Another problem with using leverage to measure default risk is that the relationship between leverage and default risk is endogenous. Companies like Apple and Yahoo might have the same ex post leverage as newly-established firms but they might not share the same level of default risks. Firms like Apple and Yahoo maintain low leverage because they might not have the need to borrow debt to finance their investments or might want to maintain financial flexibility (Korteweg, 2010). These firms are highly profitable and cash generated is more than sufficient to meet new investment needs. We call firms like Apple and Yahoo financially unconstrained firms. In contrast, small, young and growing firms might also have a similar leverage ratio to financially unconstrained firms but it is because their debt borrowing capacity is limited. We call these small, young and growing firms financially constrained firms. Due to high information asymmetry, lenders of financially constrained firms would require higher interest rates or stricter debt covenants. Thus, the ex post low leverage levels in financially constrained firms that we observe is a consequence of these firms' default risk.

To deal with these problems, we suggest using a combination of leverage and dividend payouts to measure the firm's default risk and controlling for the possible endogeneity. We choose dividend payouts as another proxy of default risk. Our choice is motivated by prior research. Although dividends have become less popular than stock repurchases in corporate payout policy in the past three decades, recent studies find a large increase in the concentration of dividend payers. These dividend payers are big, mature and highly profitable firms (DeAngelo et al., 2004; DeAngelo and DeAngelo, 2006). Dividend payers have significantly more persistent earnings than non-dividend payers (Skinner and Soltes, 2011). Since paying dividends is a costly signal about firms' future cash flows (Lintner, 1965), we argue that dividend payers would have lower default risk. The prediction is stated in our first hypothesis as follows:

Hypothesis 1: Holding the probability of being debt-free constant, dividend payers are associated with higher earnings response coefficients than non-dividend payers.

As presented in the first two parts of this section, debt can have both positive and negative impacts on earnings quality. On the one hand, an increase in debt can be associated with more earnings management and thus is expected with lower ERCs. On the other hand, debt holders can function as monitors to prevent firms from deviating away from their main business line and taking extra risk. Firms can also use debt to signal to the market about their future cash flows. The mixed literature about the impact of leverage on earnings quality motivates us to examine the impact of leverage on ERCs. We are interested in the association between leverage and ERCs after controlling for the dividend paying status of firms. We take a further step in examining the prediction of the Dhaliwal et al. (1991) model in dividend payers and non-dividend payers.

For small, young and growing firms, debt financing is costly due to the high information asymmetry between firm managers and outside investors about the firm's future prospects and the return on their investments. Using debt financing can be considered a costly signal that separates good firms from bad firms. The presence of debtholders and their debt contract requirements for frequent monitoring, and for maintaining good business practices can result in better earnings quality. Debtholders can also set investment restriction covenants to supervise their borrowers' business activities. The market may interpret the leverage increase signal and adjust its perception about the default risk. Holding other factors constant, financially constrained firms which could afford to pay a higher interest rate and have stricter covenants to increase its leverage would have a lower default risk. This prediction is stated in our second hypothesis as follows:

Hypothesis 2: Among non-dividend payers, firms with higher leverage are associated with higher earnings response coefficients.

In more developed and mature firms, using debt to signal good investment projects is unnecessary. In this case, an increase in leverage will be interpreted by the market as an increase in default risk. Our last hypothesis is stated as follows:

Hypothesis 3: Among dividend payers, firms with higher leverage are associated with lower earnings response coefficients.

RESEARCH MODEL

Dhaliwal et al. (1991) estimate ERCs by using a simple regression model between abnormal stock returns and unexpected earnings. Some studies employ an extended version of the model used in Dhaliwal et al. (1991), namely Collins et al. (1997), Francis and Schipper (1999), Bushman et al. (2004) and

Francis et al. (2004). In these recent studies, ERCs are estimated based on a multiple regression model in which abnormal stock returns are regressed on earnings and unexpected earnings. The model is defined as follows:

$$R_{it} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 \Delta Earnings_{it} + \varepsilon_{it} \quad (1)$$

where the indices *i* and *t* correspond to firm and year, respectively. The dependent variable, *R,* is the firm's abnormal returns. The independent variable *Earnings* denotes firm earnings and ΔEarnings is the unexpected earnings.

Dhaliwal et al. (1991, 1994) argue that the firm's default risk as measured by financial leverage would affect the ERC. Firms with lower leverage would have higher ERCs. These authors combine a firm valuation model with the option pricing model to identify the economic determinants of the ERC. Their derivation shows that holding other factor constants, ERC is a negative function of the firm's default risk, negatively associated with the systematic risk of the firm's total assets and market risk premium. Their model identifies default risk, not leverage, as a determinant of the ERC. However, since default risk is unobservable, the authors decide to use leverage, one of the determinants of default risk, as a proxy of default risk.

To examine the first hypothesis, we introduce two interactions between Earnings and ΔEarnings and a dummy variable for dividend payout status that takes a value of one if firms pay dividends and zero otherwise. Equation 1 is extended as follows:

$$CAR_{it} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 \Delta Earnings_{it} + \beta_3 Earnings_{it} \times DP_{it} + \beta_4 \Delta Earnings_{it} \times DP_{it} + \varepsilon_{it} \quad (2)$$

where the indices *i* and *t* correspond to firm and year. On the right hand side of equation 2, *Earnings* is the firm operating income before interest, taxes and extraordinary items deflated by total assets at the beginning of the fiscal period, and Δ*Earnings* is the unexpected earnings computed by subtracting expected earnings (previous-year earnings) from actual earnings and then deflated by total assets at the beginning of the fiscal period. *DP* is a dummy variable that takes a value of one if firms pay dividends and zero otherwise. The dependent variable, *CAR*, is cumulative abnormal returns computed from accumulating abnormal returns over the twelve months that correspond with the fiscal year period. Abnormal stock returns are measured by differences between actual returns and expected returns as below:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (3)$$

where the indices *I, m* and *t* correspond to firm, market and month, R_{it} is the continuously compounded rate of return of common stock of firm *i* for month *t*, R_{mt} is the continuously compounded rate of return in the CRSP value-weighted index for month *t*, and α_i and β_i are estimates of the intercept and slope coefficient for firm *i* from the market model using rolling historical returns data up to 60 months.

We expect to find coefficient β_4 in equation 2 significantly positive to support our first hypothesis. In line with prior literature, other coefficients β_1, β_2 and β_3 are also expected to be significantly positive.

To examine the second and third hypotheses, we divide our final sample into two subsamples of non-dividend payers (to test the second hypothesis) and dividend payers (to test the third hypothesis) and use the following model:

$$CAR_{it} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 \Delta Earnings_{it} + \beta_3 Earnings_{it} \times DebtFree_{it} + \beta_4 \Delta Earnings_{it} \times DebtFree_{it} + \varepsilon_{it} \quad (4)$$

where the indices *i* and *t* correspond to firm and year. *CAR, Earnings,* and Δ*Earnings* are defined similarly as those in equation 3, and *DebtFree* is a dummy variable that takes the value of one if a firm is a debt-free firm and zero if it is a proxy firm.

We expect β_3 and β_4 to be significantly negative in the non-dividend payer sample to support the second hypothesis and these coefficients to be significantly positive in the dividend payer sample to support the third hypothesis. Consistent with prior literature, other coefficients β_1, β_2 and β_3 are expected to be positively significant.

SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

Sample Selection

The preliminary data sample consists of all nonfinancial, nonutility, and non-government firms from 1978 to 2012 from the merged annual Compustat and Center for Research in Security Prices (CRSP) data set. Stock return data are collected from CRSP and accounting data are collected from Compustat. Financial firms (SIC codes 6000-6999), utilities (SIC codes 4900-4999), government entities (SIC codes greater than 8999), non-US companies (International Standards Organization country code of incorporation in Compustat – *fic* – not equal to "USA"), nonpublicly traded firms and subsidiaries (stock ownership variable – *stko* – in Compustat equal to one or two) and firm-years with total book asset value (Compustat's *at* data item) less than $10 million in inflation-adjusted year 2000 dollars are excluded from the sample. All nominal values are converted into year-2000 dollar values using Consumer Price Index data collected from the US Bureau of Labor Statistics. There are 163,152 firm-year observations that satisfy these criteria with 15,056 unique firms.

Following the common definitions of book and market leverage ratios (Strebualev and Yang, 2013), we define the book leverage ratio of firm *i* in year *t* as:

$$BL_{it} = \frac{DLTT_{it} + DLC_{it}}{AT_{it}}, \qquad (5)$$

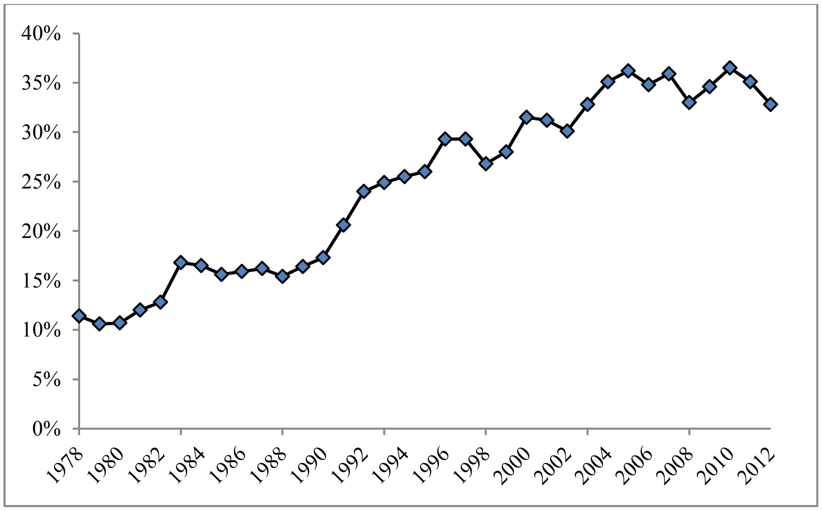
where *DLTT* is the amount of long-term debt maturing in more than one year, *DLC* is debt in current liabilities, including the current portion of long-term debt, and *AT* is the total book value of assets.
Similarly, we define the market leverage of firm *i* in year *t* as:

$$ML_{it} = \frac{DLTT_{it} + DLC_{it}}{DLTT_{it} + DLC_{it} + CSHO_{it} \times PRCC\_F_{it}} \qquad (6)$$

where *PRCC_F* is the common share price and *CSHO* is the number of common shares outstanding at the end of the fiscal year.

We define firm *i* in year *t* as a debt-free firm if in that year the outstanding amounts of both short-term (*DLC)* and long-term debt (*DLTT*) are less than 5%. Figure 1 shows the frequency of debt-free firms over the 1978-2012 periods. In the year 2010, 36.5% of publicly traded, non-financial and utility firms in the US had less than 5% outstanding debt. Consistently from the year 2000 to 2012, approximately one third of the firms had less than 5% of debt in their capital structure. On average, between the sample period 1978 and 2012, 21.26% of firms are debt-free.

FIGURE 1
FREQUENCY OF DEBT-FREE FIRMS IN THE PRELIMINARY SAMPLE FROM 1978 TO 2012



This figure presents the annual frequency of debt-free firms in our sample. Debt-free firms are firms that have book debt less than or equal to 5% (*dltt* + *dlc* ≤ 5%, where *dltt* is Compustat long-term debt and *dlc* is Compustat debt in current liabilities). The preliminary sample consists of 163,152 firm-year observations of 15,056 unique nonfinancial, nonutility, and non-government firms from 1978 to 2012.

We construct a reference set of proxy firm-years pairing a proxy firm for every debt-free firm-year observation using a propensity score matching method.

Since the decision to have debt is endogenous, the propensity score matching algorithms alleviate endogeneity and the sample selection bias problem in non-experimental settings by matching subject firms with their proxies on a vector of their covariates, X_i. Let $p(X_i)$ be the probability of firm *i* choosing to have debt (DF =1) in year *t*, defined as

$$p(X_{it}) \equiv \Pr(DF_{it} = 1 \mid X_{it}) = E(DF_{it} \mid X_{it}) \quad (7)$$

First, we estimate $p(X_i)$ for all firms in the data sample in each year. Then in each year, we randomly select 20% of the debt-free firms to match with proxy firms. We condition on $p(X_{it})$ to match each debt-free firm to one proxy firm within a 1% difference in propensity score. We implement this matching with replacement to minimize the propensity score distance between the proxy firm and the debt-free firm. After firm-year observations are matched, the unmatched observations are discarded. Vector X_i includes firm two-digit SIC, size, age, S&P credit ratings, growth, capital expenditure and profitability. These factors are determinants of leverage documented in prior literature (Rajan and Zingales, 1995; Baker and Wurgler, 2002). The propensity score matched sample consists of 6,286 firm-year observations (3,172 debt-free firms being matched with 3,114 proxy firms) from 906 unique firms (453 debt-free firms being matched with 453 proxy firms). To mitigate the influence of outliers and data coding errors, we winsorize all nominal variables at the 1st and 99th percentiles. We use this data sample in our empirical tests.

Descriptive Statistics

Table 1 shows the descriptive statistics of debt-free firms and their proxy firms.

TABLE 1
DESCRIPTIVE STATISTICS FOR DEBT-FREE FIRMS AND THEIR PROXY FIRMS

	Debt-free Firms and Proxy Firms		
Variables	Debt-free Firms	Proxy Firms	Difference *t*-statistic
Panel A: Comparison of debt-free firms and their proxy firms total sample			
Market Leverage	0.013	0.299	64.76***
Book Leverage	0.013	0.299	65.91***
Log(Size)	4.912	4.867	1.32
MTB	2.347	1.677	15.76***
Cash	0.310	0.129	37.62***
Dividend	0.013	0.007	5.07***
Tangibility	0.189	0.309	22.30***
R&D	1.135	3.222	1.32
Age	13.457	13.185	2.09
Earnings	52.518	25.468	2.88***
Capital Expenditure	42.664	53.320	1.04
S&P Rating Dummy	0.034	0.042	1.42
N	3,172	3,114	
Panel B: Comparison of debt-free dividend payers and their proxy firms			
Market Leverage	0.015	0.265	30.51***
Book Leverage	0.016	0.270	37.37***
Log(Size)	5.634	5.962	3.69***
MTB	2.120	1.563	11.68***
Cash	0.217	0.090	21.55***
Dividend	0.047	0.027	5.41***
Tangibility	0.260	0.363	5.95***
R&D	0.049	0.040	1.38
Age	19.521	18.150	6.47***
Earnings	153.574	126.027	1.35
Capital Expenditure	109.895	154.509	0.79
S&P Rating Dummy	0.064	0.260	9.93***
N	876	773	
Panel C: Comparison of debt-free non-dividend payers and their proxy firms			
Market Leverage	0.013	0.310	57.19***
Book Leverage	0.012	0.308	55.45***
Log(Size)	4.636	4.507	0.96
MTB	2.435	1.713	11.59***
Cash	0.344	0.142	31.67***
Tangibility	0.162	0.292	21.86***
R&D	1.442	4.182	1.32
Age	11.142	11.54	2.57***
Earnings	13.951	7.750	4.06***
Capital Expenditure	16.914	19.951	1.36
S&P Rating Dummy	0.022	0.102	11.61***
N	2,296	2,341	

The sample consists of 6,286 firm-year observations from 906 unique nonfinancial firms between 1978 and 2012. The table presents descriptive statistics and *t*-statistic of the difference among these characteristics between debt-free and proxy firms in Panel A, debt-free dividend payers and their proxy firms in Panel B and debt-free non-dividend payers and their proxy firms in Panel C. Debt-free firms are firms that have book debt less than or equal to 5% ($dltt + dlc \leq 5\%$, where *dltt* is Compustat long-term debt and *dlc* is Compustat debt in current liabilities). Proxy firms are selected based on the propensity score matching conducted annually using a vector of two-digit SIC, size, age, S&P credit ratings, growth, capital expenditure and probability. Variable descriptions are included in the Appendix.

As reported in Panel A of Table 1, debt-free firms and their proxy firms belong to the same size, R&D, Age, and S&P credit ratings groups. Among six firm characteristics that we use to compute the matching criteria, debt-free firms and their proxy firms are similar in Size, Age, Capital Expenditure and S&P credit ratings but significantly different in leverage, growth (as measured by market to book ratio) and profitability (as measured by earnings). Our matching procedure's goal is to generate comparable proxy firms. With that in mind, we matched on the probability of being debt free, $p(X_i)$, not on the vector of leverage determinants X_i.

In the dividend payers group, the results reported in Panel B of Table 1 suggest that debt-free dividend payers are significantly different from their proxy firms on multiple dimensions: leverage, size, MTB (market to book), cash, dividend amount, tangible assets, age and S&P credit rating. They are insignificantly different in R&D, profitability and capital expenditure.

In Panels A, B and C of Table 1, debt-free firms have significantly lower leverage than their proxy firms. These are the results expected from our matching method. As discussed in the previous section, we select the debt-free sample first and then find each debt-free firm a matching proxy from a pool of levered firms based on their propensity score. On average, our debt-free firms in the final sample have 1.3% debt in their capital structure while the leverage of their proxy firms are 29.9%. Among dividend payers, debt-free firms have 1.5% debt and their proxy firms have 26.5% debt in their capital. In the non-dividend payer sample, the proxy firms' leverage is 31% while the debt-free firms' leverage is only 1.3%.

In Panel C of Table 1, the results indicate that among non-dividend payers, debt-free non-dividend payers share similar size and investment (R&D and capital expenditure) with their proxy firms but are different in all other dimensions.

Table 2 reports the Pearson correlation coefficients and the significant statistics of our main firm characteristics. *DP* is the dividend dummy variable that takes the value of one if the firm pays dividend and zero otherwise. On average, dividend payers have lower leverage than non-dividend payers. Young, small and growing firms are less likely to pay dividends. The correlations between dividend and firm age, size and MTB are 0.129, 0.096 and -0.070, respectively. The correlation between size and age, and size and earnings are positive and significant as expected, suggesting that as firms get older they also grow in their size and earnings. Firms investing more in tangibles are also associated with higher earnings, and lower cash holdings.

TABLE 2
PEARSON PAIRWISE CORRELATION COEFFICIENTS

	ML	*BL*	*MTB*	*Dividend*	*Age*	*Logsize*	*Cash*	*Earnings*
BL	0.823***							
	(0.001)							
MTB	-0.253***	-0.095***						
	(0.001)	(0.001)						
DP	-0.093***	-0.070***	0.091***					
	(0.001)	(0.001)	(0.001)					
Age	-0.061***	-0.104***	-0.108***	0.129***				
	(0.001)	(0.001)	(0.001)	(0.001)				
Logsize	0.079***	0.023***	-0.067***	0.096***	0.223***			
	(0.001)	(0.005)	(0.001)	(0.001)	(0.001)			
Cash	-0.394***	-0.329***	0.365***	-0.060***	-0.180***	-0.225***		
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)		
Earnings	-0.012	0.025***	-0.025***	0.109***	0.125***	0.082***	-0.122***	
	(0.13)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	
Tangibility	0.283***	0.281***	-0.142***	0.087***	0.036***	0.144***	-0.427***	0.080***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

The table presents Pearson pairwise correlation coefficients among firm characteristics. *p*-values are in parentheses. The data sample consists of 6,286 firm-year observations from 906 unique nonfinancial firms between 1978 and 2012. Variable descriptions are included in the Appendix.

EMPIRICAL RESULTS

This section discusses the empirical results of the tests for our hypotheses stated in Section 2. Overall, we find robust results supporting all three hypotheses. We begin this section by discussing our interpretation of the test results reported in Table 3 of the first hypothesis. We then proceed with the interpretation of the second and third hypotheses testing results reported in Table 4. We conclude the section by presenting further evidence to explain our main findings.

TABLE 3
EARNINGS RESPONSE COEFFICIENTS OF DIVIDEND PAYERS AND NON-DIVIDEND PAYERS

$$R_{it} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 \Delta Earnings_{it} + \beta_3 Earnings_{it} \times DP_{it} + \beta_4 \Delta Earnings_{it} \times DP_{it} + \varepsilon_{it}$$

Independent variable	Expected sign	Coefficient	*t*-statistic	Adjusted R^2	N
Intercept		-0.002***	-8.54	6.8%	6,286
Earnings	+	0.077***	33.80		
ΔEarnings	+	0.428***	9.62		
*Earnings*DP*	+	0.011**	2.16		
*ΔEarnings*DP*	+	**0.129*** **	**4.66**		

This table reports the regression results for the sample of dividend payers and non-dividend payers. The sample consists of 6,286 firm-year observations from 906 unique nonfinancial firms between 1978 and 2012. The dependent variable is the firm abnormal returns adjusted by market and industry. Independent variables are earnings, unexpected earnings and their interactions with a dividend paying dummy variable, *DP,* that takes a value of 1 if firms pay dividends and zero otherwise. Details of variable description and computation are included in the Appendix. Year fixed effects are included in the regression. All standard errors adjust for heteroskedasticity and clustering at the firm level. Coefficients marked with ***, ** and * are significant at the 1%, 5% and 10% levels, respectively.

The test results reported in Table 3 are consistent with our first hypothesis. *DP* is the dividend paying dummy variable that takes the value of 1 if firms pay dividend and zero otherwise. This interaction term measures the difference in the ERCs between dividend payers and non-dividend payers. As expected, the coefficient of the interaction between unexpected earnings and the dividend paying dummy variable is positively significant and equal to 0.129. The results indicate that compared to non-dividend payers, the ERCs of dividend payers are 30% higher (0.129/0.428). The coefficients and signs of Earnings and ΔEarnings are also significantly positive as expected. These results are in line with findings in prior research (Dhaliwal et al. 1991; Collins et al., 1997; Francis and Schipper, 1999, Bushman et al., 2004; and Francis et al., 2004). We conclude that holding the probability of being debt-free constant, firms with lower default risk as measured by dividend payment are associated with higher ERCs. Our empirical result supports the prediction of Dhaliwal et al.'s (1991) theory.

Panel A and Panel B of Table 4 present the test results of the second and third hypotheses, respectively. The non-dividend payer sample has 4,637 matched firm-year observations and the dividend payer sample has 1,649 match firm-year observations. We find results as expected. The coefficient of Earnings (0.070) andΔEarnings (0.025) are positively significant as expected and in line with prior research. In Panel A, the coefficients of *DebtFree* with *Earnings* and Δ *Earnings* are consistently negatively significant and equal to -0.117 and -0.019, respectively. These results support our second hypothesis. In a high information asymmetry context, a higher level of debt can be a positive signal about the firm's future cash flows. The ERCS are significantly higher for firms with higher debt (DebtFree equal 0). It is possible to explain the findings that debt holders in more highly levered firms prevent the firms from deviating away from their core business processes and induce firms to release more information in their debt contracts. The monitor of debt holders and restriction in debt covenants might reduce the firm's default risk perceived by the market. Our findings suggest that on average the ERCs of more highly levered firms is 76% higher than those of debt free firms (0.019/0.025).

TABLE 4
EARNINGS RESPONSE COEFFICIENTS OF DEBT-FREE FIRMS AND THEIR PROXY FIRMS

$$R_{it} = \beta_0 + \beta_1 Earnings_{it} + \beta_2 \Delta Earnings_{it} + \beta_3 Earnings_{it} \times DebtFree_{it} + \beta_4 \Delta Earnings_{it} \times DebtFree_{it} + \varepsilon_{it}$$

	Non-Dividend Payer Sample		**Dividend Payer Sample**	
	Panel A		**Panel B**	
Independent Variable	**Expected sign**	**Coefficient**	**Expected sign**	**Coefficient**
Intercept		-0.001		-0.005***
(*t*-statistic)		(-1.48)		(-12.47)
Earnings	+	0.070***	+	0.096***
(*t*-statistic)		(21.79)		(16.69)
Δ*Earnings*	+	0.025***	+	0.326***
(*t*-statistic)		(2.93)		(5.53)
*Earnings*DebtFree*	-	-0.117***	+	0.027***
(*t*-statistic)		(-3.76)		(3.90)
Δ*Earnings*DebtFree*	**-**	**-0.019*** **	**+**	**0.050*** **
(*t*-statistic)		**(-2.74)**		**(3.70)**
Adjusted R^2		5.6%		7.7%
N		4,637		1,649

This table reports the regression results for debt-free and their proxy firms. Panel A reports the regression results of the non-dividend payer sample. Panel B reports the regression results of the dividend payer sample. The dependent variable is the firm abnormal returns adjusted by market and industry. Independent variables are earnings, unexpected earnings and their interactions with a *DebtFree* dummy variable that takes a value of 1 if a firm has its book leverage less than 5% and zero otherwise. Details of variable description and computation are included in the Appendix. Year fixed effects are included in the regression. All standard errors adjust for heteroskedasticity and clustering at the firm level. Coefficients marked with ***, ** and * are significant at the 1%, 5% and 10% levels, respectively.

In Panel B, the coefficients of *DebtFree* with *Earnings* and Δ*Earnings* are consistently positively significant and equal to 0.027 and 0.050, respectively. These results support our third hypothesis. In a low information asymmetry context, signals are unnecessary. Holding other factors constant, higher leverage will be interpreted as higher default risk. We find that among dividend payers, firms with higher leverage (*DebtFree* = 0) are associated with lower ERCs. On average, the ERCs of proxy firms (higher levered firms) are 15.33% lower than the ERCs of debt-free firms (0.05/0.326). The coefficient of Earnings (0.096) and ΔEarnings (0.326) are positively significant as expected and in line with prior research.

Overall we find evidence supporting the theoretical prediction of Dhaliwal et al. (1991) about the negative association between firm default risk and ERCs. However, when using leverage as a proxy for default risk, we find mixed results. The conflicts between the empirical results of Dhaliwal et al. (1991) and our results reported in this study are perhaps due to the fact that we control for endogeneity between leverage and default risk but Dhaliwal et al. (1991) do not.

The opposite results reported in Panels A and B of Table 4 for the sample of non-dividend payers and dividend payers support our prediction about the relationship between leverage and default risk discussed in Section 2. Depending on the firms' characteristics and information context, debt may induce either a positive or negative interpretation about the firm's future cash flows and default risk. We find that dividend payout is a reasonably good proxy for default risk. Using a sample free of endogeneity, we show that firms with higher default risk as measured by dividend payout are associated with higher ERCs. When controlling for dividend payout status, leverage has a positive association with ERCs in a high information asymmetry context but a negative association with ERCs in a low information asymmetry context.

ROBUSTNESS CHECKS

In this section, we discuss the results of our robustness tests. Overall, our findings reported previously are robust in the following extra tests.

Alternative Matching Selection in the Propensity Score Matching Method

To check the robustness of our results in Tables 3 and 4, we repeat the analyses using different matching selection in the propensity score matching method. Instead of choosing one proxy firm for each debt-free firm, we choose two to three proxy firms to form a proxy firm sample. We also try matching without replacement. The results, not reported here for the sake of brevity, are quantitatively similar to our findings.

Alternative Asset Pricing Models

We also separately employ the Fama-French (1992, 1993) three-factor and the Carhart (1997) four-factor asset pricing models to capture the expected return in Equation (3). The results also support our hypotheses.

Different Deflators

In the main tests, we use total assets as the deflator. We redid all our tests using market equity as the deflator and obtained similar findings.

CONCLUSION

Dhaliwal et al. (1991) has derived the theoretical prediction for the negative association between default risk and ERCs. Firms with higher default risks are expected to be associated with lower ERCs. When empirically testing their prediction, Dhaliwal et al. (1991) employ leverage as a proxy for default risk and find evidence supporting their prediction.

The literature about leverage usage and the influence of debt on firm's risk has changed significantly since the publication of Dhaliwal et al. (1991). Over the past three decades, we observe more firms eschewing debts. Investigating this leverage puzzle, Strebualev and Yang (2013) find that debt-free firms are not heterogeneous. These firms are significantly different in fundamental characteristics such as financial capacity and performance and thus their reasons to eschew debts are also different. Prior studies document both positive and negative impacts of leverage on earnings quality (Dechow et al., 2010).

Being motivated by the theoretical prediction in Dhaliwal et al. (1991) and the recent development in the literature about the relationship between capital structure and earnings quality, we re-examine the role of leverage in the association between unexpected earnings and abnormal stock returns. We first show that leverage and default risk is endogenous and thus using leverage as a proxy for default risk might introduce biased results. We then suggest using a propensity score matching method to deal with this endogeneity and use dividend payout as another proxy for default risk. Our tests results show that leverage is not a good proxy for default risk in a high information asymmetry context. Our findings show that in a high information asymmetry context, higher levered firms are associated with higher ERCs.

These findings are inconsistent with the prediction of Dhaliwal et al. (1991) if we consider leverage as a measure of default risk. This conflict perhaps can be explained in that in a high information asymmetry context, leverage can be used as a costly signal about the future cash flows and financial risk of a firm. Holding other factors constant, the market will interpret the leverage signal as a lower default risk since these firms are able to afford to pay higher interest rates.

Our findings contribute to the development of the ERC and capital structure literature. First, we provide a different measure of default risk to test for the theoretical prediction about the association between unexpected earnings and abnormal stock returns. Second, we provide insights about the earnings quality of debt-free firms and thus contribute to solving the debt-free puzzle in financial literature.

We find that future research can extend our findings by answering the following questions. First, how would changes in payout policy affect the change in ERCs? Second, when a debt-free firm levers up, what would be the change in their ERCs? Third, when a levered firm pays their debt and becomes a debt-free firm, what would be the change in their ERCs?

REFERENCES

Bartov, E. (1993). The timing of asset sales and earnings manipulation. *The Accounting Review*, 840-855.

Bowen, R. M., Noreen, E. W., & Lacey, J. M. (1981). Determinants of the corporate decision to capitalize interest. *Journal of Accounting and Economics*, *3(2),* 151-179.

Bushman, R., Chen, Q., Engel, E., & Smith, A. (2004). Financial accounting information, organizational complexity and corporate governance systems. *Journal of Accounting and Economics*, *37(2)*, 167-201.

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance*. *52(1)*, 57-82.

Chava, S., Kumar, P., & Warga, A. (2010). Managerial agency and bond covenants. *Review of Financial Studies*, *23(3)*, 1120-1148.

Collins, D. W., Maydew, E. L., & Weiss, I. S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics*, *24(1),* 39-67.

Daley, L. A., & Vigeland, R. L. (1983). The effects of debt covenants and political costs on the choice of accounting methods: The case of accounting for R&D costs. *Journal of Accounting and Economics*, *5*, 195-211.

DeAngelo H., DeAngelo L., & Skinner DJ. (1994). Accounting choice in troubled companies. *Journal of Accounting and Economics*; *17(1)*, 113-143.

DeAngelo, H., DeAngelo, L., & Skinner, D. J. (2004). Are dividends disappearing? Dividend concentration and the consolidation of earnings. *Journal of Financial Economics*, *72(3),* 425-456.

DeAngelo, H., DeAngelo, L., & Stulz, R. M. (2006). Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory. *Journal of Financial economics*, *81(2)*, 227-254.

Dechow, P., Ge W, & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, *50(2)*, 344-401.

Dechow, P. M., & Skinner, D. J. (2000). Earnings management: Reconciling the views of accounting academics, practitioners, and regulators. *Accounting Horizons*, *14(2),* 235-250.

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1996). Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the sec. *Contemporary Accounting Research*, *13(1)*, 1-36.

DeFond, M. L., & Jiambalvo, J. (1994). Debt covenant violation and manipulation of accruals. *Journal of Accounting and Economics*, *17*, 145-176.

Dhaliwal, D. S., Lee, K. J., & Fargher, N. L. (1991). The association between unexpected earnings and abnormal security returns in the presence of financial leverage. *Contemporary Accounting Research*, *8(1)*, 20-41.

Dhaliwal, D. S., & Reynolds, S. S. (1994). The effect of the default risk of debt on the earnings response coefficient. *The Accounting Review*, 412-419.

Dichev, I. D., & Skinner, D. J. (2002). Large–sample evidence on the debt covenant hypothesis. *Journal of Accounting Research*, *40(4)*, 1091-1123.
Efendi, J., Srivastava, A., & Swanson, E. P. (2007). Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics*, *85(3),* 667-708.
Fama E. F., & French K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance, 47(2*), 427-465.
Fama E. F., & French K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33(1),* 3-56.
Francis, J., LaFond, R., Olsson, P. M., & Schipper, K. (2004). Costs of equity and earnings attributes. *The Accounting Review*, *79(4),* 967-1010.
Francis, J., & Schipper, K. (1999). Have financial statements lost their relevance?. *Journal of accounting Research*, 319-352.
Graham, J. R., Harvey, C. R., Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, *40*(1), 3-73.
Grossman, S. J., & Hart, O. D. Corporate financial structure and managerial incentives. (1982). In *The Economics of Information and Uncertainty*, 107-140.
Gunny, K. A. (2010). The Relation Between Earnings Management Using Real Activities Manipulation and Future Performance: Evidence from Meeting Earnings Benchmarks. *Contemporary Accounting Research*, *27*(3), 855-888.
Jensen, M.C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*. 323-329.
Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics; 3(4*), 305-360.
Kinney, Jr, W. R., & McDaniel, L. S. (1989). Characteristics of firms correcting previously reported quarterly earnings. *Journal of Accounting and Economics*, *11(1)*, 71-93.
Korteweg, A. (2010). The net benefits to leverage. *The Journal of Finance*, *65(6):*2137-2170.
Lintner, J. (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *The Review of Economics and Statistics*. 13-37.
Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, *13(2),* 187-221.
Nissim, D., & Penman, S. H. (2001). Ratio analysis and equity valuation: From research to practice. *Review of Accounting Studies*, *6(1),* 109-154.
Rajan, R. G., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *The Journal of Finance*, *50*(5), 1421-1460.
Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics*, *42(3),* 335-370.
Schipper, K. (1989). Commentary on earnings management. *Accounting Horizons*, *3(4),* 91-102.
Skinner, D. J., & Soltes, E. (2011). What do dividends tell us about earnings quality? *Review of Accounting Studies*, *16(1),* 1-28.
Strebulaev IA, Yang B. (2013). The mystery of zero-leverage firms. *Journal of Financial Economics*. *109(1),* 1-23.
Sweeney, A. P. (1994). Debt-covenant violations and managers' accounting responses. *Journal of Accounting and Economics*, *17(3),* 281-308.
Zmijewski, M. E., & Hagerman, R. L. (1981). An income strategy approach to the positive theory of accounting standard setting/choice. *Journal of Accounting and Economics*, *3(2)*, 129-149.

APPENDIX

Definition of Variables

The third column of the following table lists variable construction, using the abbreviated names from Compustat.

Variable	Description	Construction
Age	Number of years since the firm's record first appears in Compustat (Age = 0 for the first record)	
Book leverage	Book leverage	*(dltt+dlc)/at*
Cash	Ratio of cash holdings to book assets	*che/at*
Capital expenditure	The ratio of capital expenditure and total assets	*Capx/at*
CPI	Annual Consumer Price Index from the US Bureau of Labor Statistics	
DebtFree	Dummy variable that equals 1 if book leverage less than 5% and 0 otherwise	
Dividend	Ratio of common dividends to book assets	*dvc/at*
DP	Dummy variable that equals 1 if firms pay dividends and 0 otherwise	
Earnings	Ratio of operating income before interest, taxes, and depreciation to book assets	*oibdp/at*
Investment Grade	Equals 1 if firms have an investment grade rating (BBB- or higher), zero if firms have a speculative grade rating (BB+ or lower), and missing otherwise	
Log(Size)	Natural logarithm of book assets adjusted to 2000 dollars	$Log(at_t*CPI_{2000})/CPI_t$
Market leverage	Market leverage	*(dltt+dlc)/(dltt+dlc+csho*prcc_f)*
MTB	Ratio of market assets to book assets	*(lt + pstkl – txditc + csho*prcc_f)/at*
S&P Rating Dummy	Dummy variable equals 1 if a firm has a credit rate and 0 otherwise	
Tangibility	Ratio of fixed assets to book assets	*ppent/at*