

Can the Bond Price Reaction to Earnings Announcements Predict Future Stock Returns?

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Abstract

In this paper I show that the bond price reaction to earnings announcements has predictive power for post-announcement stock returns and that it is incremental to previously documented accounting-related anomalies. I find that bonds' predictive ability is driven by non-investment grade bonds, for which earnings releases provide more value-relevant information. It is also stronger in firms with a lower proportion of institutional shareholders and for bonds whose trading is more heavily dominated by sophisticated investors. This suggests that the greater level of investor sophistication in the bond market relative to the stock market is what gives bond returns the ability to predict future stock returns. By demonstrating that a firm's bond price reaction to an earnings announcement can predict future stock returns, this paper adds to the literature which documents that various earnings components also have predictive ability for post-announcement stock returns.

1. Introduction

The information contained in earnings announcements plays an important role in the determination of stock prices. Despite its importance, though, there is substantial evidence that stock prices do not fully and immediately reflect this information. Perhaps the best-known examples of the inefficient incorporation of earnings news are the post-earnings announcement drift, which is characterized by a general under-reaction of stock prices to earnings surprises, and the accrual anomaly, in which stocks with high (low) levels of accruals experience negative (positive) future abnormal returns. Among the reasons given for these apparent inefficiencies are limits on investor attention, which lead investors to focus on subsets of information, and investors' inability to fully understand the complexities of the information contained in earnings reports. (See, for example, Hirshleifer, Lim, and Teoh, 2011, Dellavigna and Pollet, 2009, Battalio and Mendenhall, 2005, Peress, 2008, and You and Zhang, 2009.) These limitations give earnings information the ability to predict future stock prices.

Previous research has shown that bond prices, like stock prices, react to earnings news.¹ The bond market, though, is more heavily dominated by sophisticated investors than is the stock market (Bessembinder et al., 2009, De Franco et al., 2009, Chen et al., 2011, and Ronen and Zhou, 2013). These investors have greater resources at their disposal to analyze earnings reports and are arguably less constrained than are individual investors by either limited attention or difficulties in interpreting the information in earnings announcements. This suggests that bond prices may incorporate earnings news more efficiently than do stock prices, raising the possibility that the bond price reaction to earnings announcements can predict future stock returns.

¹ Datta and Dhillon (1993), Defond and Zhang (2014), and Ederington and Yang (2013) all show that there is a significant bond price reaction to the news in earnings releases. Furthermore, Easton et al. (2009) find that there is an increase in bond trading around earnings announcements.

Testing whether, and under what circumstances, the bond price reaction to earnings announcements has predictive ability for post-announcement stock returns is the central focus of this study.

For my tests I use the *TRACE* database to calculate bond returns around 17,456 quarterly earnings announcements of 835 unique firms between the years 2005 and 2012. As a first step in my analysis, I partition each quarter's earnings announcements into quintiles according to the magnitude of the accompanying bond return. (For a firm with multiple bonds, I average the firm's individual bond returns.) For each quintile I then calculate the average market-adjusted stock return over the succeeding 60 days. For the quintile with the highest bond returns, the average market-adjusted stock return is 1.65 percent. This compares to -0.32 percent for the lowest quintile. The difference of 1.97 percentage points is significantly positive and provides preliminary evidence that the reaction of a firm's bonds to its earnings announcements has predictive power for the firm's post-announcement stock return. This return difference is similar in magnitude to that found for the post-earnings announcement drift and accrual anomalies using the same sample.

I employ a multivariate regression framework for my main test of whether earnings-announcement bond returns are incrementally informative about post-announcement stock returns. In addition to the bond price reaction to an earnings release, I include in the regression standardized unexpected earnings as well as the ratio of accruals to cash flows as explanatory variables. Control variables for firm size, book-to-market ratio, and price momentum are also included. The dependent variable in the regression is the 60-day market-adjusted post-announcement stock return. I find that the coefficient on the bond reaction variable in this regression is positive and significant, consistent with the bond return providing incremental explanatory power for post-announcement stock returns. To verify that these results are not

driven by the recent financial crisis, I re-estimate this regression, excluding the years 2008 and 2009. The coefficient on the bond reaction variable remains positive and significant.

I conjecture that the predictive ability of bond returns for future stock returns is stronger for riskier bonds, for which earnings releases likely provide more value-relevant information. (Ederington and Yang, 2013, and Defond and Zhang, 2014, find that earnings have greater information content for non-investment grade bonds than for those that are investment grade.) To test this, I partition each quarter's earnings announcements into quintiles, separately for the subsample of firms with non-investment grade bonds and for the subsample of firms with only investment-grade bonds, according to the magnitude of the accompanying bond price reaction. For each quintile I then calculate the average market-adjusted stock return over the succeeding 60 days. I find that the difference between the average market-adjusted returns of the highest and lowest quintiles of the non-investment grade bond firms is a positive and significant 4.15 percentage points, while it is insignificant for the subsample of investment-grade bond firms. I alternatively test this conjecture by creating an indicator variable for firms with non-investment grade bonds and interact it with the bond price reaction to the earnings announcement. Adding both the indicator variable and the interaction term to the regression, I find that the coefficient on the bond price reaction becomes insignificant. The coefficient on the interaction term, though, is significant and positive, consistent with my conjecture. These results suggest that the ability of bond returns to predict stock prices comes exclusively from firms with non-investment grade bonds.

I next test the conjecture that the greater level of investor sophistication in the bond market relative to the stock market is a fundamental driver of the ability of bond returns to predict future stock returns. I do so in two different ways. First, I partition my observations into two groups, based on whether the fraction of institutional stockholders, my proxy for stockholder

sophistication, is above or below the sample average. Re-estimating the multivariate regression for each group, I find that the ability of bond returns at the time of an earnings announcement to predict future stock returns is negatively correlated with institutional stockholdings, providing support for my conjecture. This result is consistent with Bartov et al. (2000), Doyle et al. (2006), and Ng et al. (2008), who find that the level of investor sophistication, as proxied for by institutional stock ownership, is negatively correlated with the magnitude of the post-announcement drift and with Collins et al. (2003) who find that the returns on an accrual-based hedge portfolio are significantly smaller for firms with more sophisticated investors.

I alternatively partition my observations into two groups, based on whether the fraction of bond trades during the announcement window above \$1 million in par value (my proxy for trades by sophisticated investors) is greater or less than the sample average. Re-estimating the multivariate regression for each group, I find that the ability of bond returns at the time of an earnings announcement to predict future stock returns is significantly greater for those bonds whose trading is more heavily dominated by sophisticated investors, again consistent with my conjecture.

My study adds to the literature that examines the relation between bond and stock prices. In a small-sample study, Kwan (1996) finds that lagged weekly stock returns have explanatory power for current weekly bond yield changes. Gebhardt et al. (2005) show that stock returns over a six month period predict bond returns over the following six months. In contrast, Bittlingmayer and Moser (2011) show that large monthly bond price declines predict negative stock returns over the subsequent week. With respect to shorter-term price movements, Downing et al. (2009) present evidence that hourly stock returns lead bond returns for non-convertible junk and BBB rated bonds, and that stock returns lead bond returns for convertible bonds in all rating classes. For a small sample of firms with high-yield bonds and a one-year sample period, Hotchkiss and

Ronen (2002) find that stock returns do not necessarily predict bond returns over very short horizons. None of these papers, though, examine the relation between bond and stock prices at the time of earnings announcements, when there is an increase in the level of bond trading and liquidity (see Easton et al., 2009, and Ronen and Zhou, 2013). Ronen and Zhou (2013) do look at these returns around earnings announcements. However, their objective is very different from that of this paper in that they attempt to identify factors that affect the speed with which bonds and stocks react to earnings during the minutes and hours (up to ten hours) after an earnings announcement.

My study makes three main contributions to the extant literature. It is the first to provide evidence that bond prices can predict post-announcement stock returns. While prior literature established a strong connection between bond prices and the information in earnings announcements (see, for example, Datta and Dhillon, 1993, Hotchkiss and Ronen, 2002, Defond and Zhang, 2014, and Ederington and Yang, 2013), it did not examine this issue. Second, it adds to those studies showing that earnings components can be used to predict post-earnings announcement stock returns by demonstrating that the price of one of the firm's other securities can also predict these returns. Third, it is the first study to examine the impact that the presence of sophisticated traders has on the relative efficiency of bond and stock prices. Previous work concentrated on investigating the relation between sophisticated traders in the stock market and the efficiency of prices within that market (Bartov et al., 2000, Doyle et al, 2006, and Ng et al., 2008).

The remainder of this paper is organized as follows. In the next section I develop my hypotheses. This is followed in Section 3 by a description of the sample. The main empirical results are reported in Section 4. Section 5 presents an analysis of the factors that affect the

extent to which bond prices predict post-announcement stock returns. Section 6 provides a summary and conclusions.

2. Hypotheses development

Stocks and bonds represent claims on a firm's assets. Since earnings announcements provide information about the value of those assets, both bond and stock prices should react to earnings news. However, numerous studies have shown that stock prices do not immediately and fully incorporate all of the information in earnings announcements, and that various financial statement components have the ability to predict future stock prices (Ou and Penman, 1989, Lev and Thiagarajan, 1993, Sloan, 1996, Bernard and Thomas, 1989 and 1990, Abarbanell and Bushee, 1997, Collins and Hribar, 2000, Jegadeesh and Livnat, 2006, Thomas and Zhang, 2013, and Balakrishnan et al., 2010). A number of papers have provided evidence that this is due, at least in part, to the presence of individual stock traders, who may have limited resources with which to analyze financial statements, exhibit limited attention, and may be influenced by market sentiment (Bartov et al., 2000, Doyle et al., 2006, Ng et al., 2008, and Hirshleifer, Lim, and Teoh, 2011). Since sophisticated traders, who are less likely to have these limitations, are more dominant in the bond market than in the stock market, it is expected that bond prices will incorporate the earnings information more accurately and efficiently than will stock prices. Consequently, the bond price reaction to earnings announcements should have predictive power for future stock returns. This leads to my first hypothesis:

H1: There exists a positive relation between the bond price reaction to earnings announcements and future stock returns.

I expect this relation to be stronger for firms with non-investment grade bonds than for those with bonds that are investment grade. This is because investment-grade bonds are in little

danger of default, and so earnings news is unlikely to have much of an effect on their prices. In contrast, the prices of non-investment grade bonds, which are closer to default, should be more sensitive to earnings information. The price reaction of these bonds to an earnings announcement is more likely to be predictive of how the firm's stock price will respond. This is consistent with empirical evidence that the frequency of trading is higher and the price reaction to earnings announcements is stronger for lower-rated bonds (see Easton et al, 2009, and Defond and Zhang, 2013). Therefore, my second hypothesis is:

H2: The positive relation between the bond price reaction to earnings announcements and future stock returns will be stronger for firms with non-investment grade bonds than for those whose bonds are investment grade.

Prior research has provided evidence that the lower the institutional ownership of a firm's shares, the less efficient is its stock price reaction to earnings announcements (see, for example, Bartov et al., 2000, Doyle et al., 2006, and Boehmer et al., 2009). Consistent with these findings, I hypothesize that the ability of bond returns to predict post-announcement stock returns will be stronger in firms whose shares are less heavily held by institutions. Formally:

H3: The positive relation between the bond price reaction to earnings announcements and future stock returns will be stronger for firms with fewer institutional shareholders.

The link between bond trader sophistication and the ability of bond returns to predict post-announcement stock returns implies that bonds' predictive ability should increase the more heavily bond trading is dominated by these investors. This leads directly to my fourth hypothesis:

H4: The positive relation between the bond price reaction to earnings announcements and future stock returns will be stronger for firms whose bonds are more heavily traded by sophisticated traders.

3. Sample Selection, Variable Definitions, and Descriptive Statistics

My initial sample consists of all quarterly earnings announcements contained in the *CRSP-Compustat* quarterly file for firms with at least one traded bond available in the *TRACE* database of corporate bond trades. I use the *Mergent Fixed Income Securities (FISD)* database to obtain bond-specific information (including bond issue size, issue date, bond features, bond ratings, coupon rate, and frequency of payment). My sample spans the period January 2005 through December 2012. I choose January 2005 as the beginning of my sample period because this is when *TRACE* extended its coverage from a small subset of bonds to 99 percent of the U.S. corporate bond market. I exclude observations for which the earnings announcement date recorded in *I/B/E/S* differs by more than five trading days from the date recorded in *Compustat*. If the dates differ by between one and five trading days, then the earlier of the two is used as the earnings announcement date for my analysis (see Dellavigna and Pollet, 2009). If the precise time of the earnings announcement is also available and is after trading hours, I advance the earnings announcement date by one trading day. To establish the link between the *Mergent FISD* and *Compustat* databases I use the linking table employed in Kerr and Ozel (2013).² My final sample consists of 17,456 firm-quarter observations for 835 unique bond issuers.

² To create their linking table, Kerr and Ozel (2013) first match the firm CUSIPs in *Mergent* to those in *Compustat*. They verify that for each matched observation, the company name and industry membership is the same in the two databases. They then identify all observations in *Mergent* that cannot be matched based on *CUSIP* and manually match them with firms on *Compustat* based on company name and industry membership (and other identifying information). In constructing the table, they take into account name changes, mergers and acquisitions, and spinoffs. I thank Jon Kerr and Bugra Ozel for generously sharing their linking table with me.

To compute daily bond returns, I first calculate daily prices for each traded bond. In order to do so, I eliminate cancelled, corrected, and commission trades, as well as special trades. The top and bottom 1% of the remaining clean trade prices (prices before accrued interest) are then truncated in order to minimize the impact of erroneous trading records in the *TRACE* database.³ Following the recommendation of Bessembinder et al. (2009), I also exclude all trades whose values are less than \$100,000 and weight each of the remaining bond trades by its dollar value.⁴ Bessembinder et al. (2009) provides evidence that this method minimizes the noise in computed bond prices. I denote by P_{ijt} the computed price of bond issue j of firm i on date t .

Using the *Mergent FISD* database, accrued interest for bond issue j of firm i as of date t , AI_{ijt} , is computed as follows:

$$AI_{ijt} = C_{ij} \times \frac{D_{ijt}}{365/freq_{ij}}, \quad (1)$$

where C_{ij} is the coupon payment for bond issue j of firm i , D_{ijt} is the number of days between date t and the date of the prior coupon payment, and $freq_{ij}$ is the number of coupon payments per year for bond issue j of firm i . The dates of the coupon payments are determined by coupon frequency and by the date of the first coupon payment (both reported in *Mergent FISD*). The bond return for date t is then given by:

$$RET_{ijt} = \frac{(P_{ijt} + AI_{ijt}) + C_{ijt} - (P_{ijt-1} + AI_{ijt-1})}{P_{ijt-1} + AI_{ijt-1}}, \quad (2)$$

where C_{ijt} is the coupon payment (if any) on date t . In the case of a firm that has more than one traded bond, I aggregate the individual bond returns at the firm-level by taking an equally-

³ The data filters I use address known issues in *TRACE*. They are implemented using the SAS code available on William Maxwell's website.

⁴ Results remain qualitatively unchanged when I use all trades to calculate bond prices.

weighted average over all of the firm's bonds.⁵ Treating each bond as a separate observation would have biased the sample toward larger firms with many bonds. More importantly, with bond returns for the same firm being correlated, it would have led to biased test statistics (see Bessembinder et al., 2009, and Ederington et al., 2013). The bond price reaction to the announcement of firm i 's earnings for quarter q , $Bond_{iq}(-1,1)$, is then calculated as the average of the cumulative returns of the firm's bonds over the three-day announcement window of the earnings for quarter q (days -1, 0, and 1, where day 0 denotes the date of the earnings announcement).

For my analysis, I convert *Mergent's FISD* ratings from a letter grade to a numerical scale, ranging from 1 to 22 (where AAA = 1, AA+ = 2, AA = 3, and so on, up through D = 22).⁶ Ratings of 1 through 10 (AAA through BBB-) are classified as investment-grade bonds and ratings of 11 through 22 are classified as non-investment grade bonds.⁷ Of the 17,456 total firm-quarter observations, 5,120, or 29.33 percent, are from firms with non-investment grade bonds. In the subsequent analysis, a firm with only investment-grade bonds outstanding at the time of the announcement of earnings for quarter q is referred to as an investment-grade firm, while a firm with at least one non-investment grade bond is referred to as a non-investment grade firm.⁸

The cumulative post-announcement market-adjusted stock return of firm i for quarter q is measured over the period beginning two trading days after the date of the announcement of the earnings for quarter q and ending 60 trading days later. It is calculated as the cumulative raw

⁵ The nature of my results is unaffected if I compute the firm-level bond return as a value-weighted, rather than an equally-weighted, average of the individual bond returns.

⁶ This is consistent with Bhojraj and Swaminathan (2009).

⁷ Results remain qualitatively unchanged when a firm's credit rating is estimated using S&P credit ratings and non-investment grade bonds are defined as those with ratings of BB+ or below.

⁸ A small number of firm-quarter observations (518) have both investment-grade and non-investment grade bonds. Excluding these observations does not change the nature of my results.

stock return over the relevant 60-day period less the cumulative value-weighted market return for the same period, as provided by *CRSP*.⁹

My regressions include two accounting variables, both available at the time of the firm's earnings announcement, that have widely been shown to have predictive power for post-announcement stock prices. The first, SUE_{iq} (standardized unexpected earnings), is equal to the difference between firm i 's earnings before extraordinary items for quarter q (*Compustat* item $EPSPXQ$) and the corresponding earnings for quarter $q-4$, normalized by the share price at the end of quarter q .¹⁰ The second, $Accruals_{iq}$, is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q (see Collins and Hribar, 2002, Dechow and Ge, 2006, and Pincus et al., 2007).¹¹

My proxy for the level of sophisticated trading in a firm's stock is the fraction of shares held by institutional investors (see, for example, Bartov et al., 2000, and Collins et al., 2003). The fraction of institutional stock ownership in firm i 's shares at the time of the announcement of the earnings for quarter q , denoted by IS_{iq} , is defined as the number of outstanding common shares held by institutional investors at the end of quarter q divided by the number of common shares outstanding at that time. *Thomson Financial Institutional Holdings* is the source of data

⁹ Results remain qualitatively unchanged when I use size-adjusted returns.

¹⁰ Results remain qualitatively unchanged under two alternative SUE measures. The first measure is the difference between the current quarter's earnings and the earnings of the corresponding quarter of the prior year, scaled by the standard deviation of this difference (computed over the last eight quarters, including the current one). The second measure is the difference between the current quarter's earnings reported on $I/B/E/S$ and the $I/B/E/S$ consensus forecast (computed as the average of all valid individual forecasts in $I/B/E/S$ that are outstanding two trading days before the earnings announcement), normalized by the share price of the firm at the end of the previous quarter.

¹¹ This is the cash flow statement approach to the estimation of accruals. An alternative method, the balance sheet approach, was used by Sloan (1996). That approach has been less widely used since SFAS 95 was issued, requiring firms to release cash flow statements.

on institutional holdings. Data on institutional share ownership is available for 13,243 firm-quarter observations.

My proxy for the level of sophisticated trading in a firm's bond is the fraction of all bond trades (exclusive of those less than \$100,000 in size) during the earnings announcement window that have a par value of at least \$1 million (see Goldstein et al, 2007). This fraction is denoted by $Large\ Trades_{ijq}$ for bond j of firm i at the time of the announcement of its earnings for quarter q . The level of sophisticated bond trading for firm i at the time of the announcement of quarter q earnings is defined as the average value of $Large\ Trades_{ijq}$, over all of the firm's bonds, and is denoted by $Large\ Trades_{iq}$.¹²

I also include three control variables in my regressions. $Size_{iq}$ is the log of the end-of-quarter q market value of equity for firm i . BTM_{iq} is the log of the ratio of end-of-quarter q book value of equity of firm i to end-of-quarter q market value of equity of firm i .¹³ $Momentum_{iq}$ is computed as the cumulative monthly stock return for firm i over months $t-12$ through $t-2$, where t is the month of the announcement of the earnings for quarter q .

Descriptive statistics for the full sample, for the non-investment grade firms, and for the investment-grade firms are presented in Table I, panels A, B, and C, respectively. From panel A, we see that both the mean equally-weighted bond return over the three-day earnings announcement window (days -1, 0, and 1) and the average cumulative market-adjusted stock return over the subsequent 60 days are positive and significant, which is consistent with the documented earnings announcement premium.¹⁴ Standardized unexpected earnings are positive,

¹² While decimalization and automated trading algorithms in the stock market make it problematic to use trade size to distinguish between sophisticated and non-sophisticated trading in a firm's shares after 2001 (see Barber et al., 2009, Barber and Odean, 2011, and Da et al., 2011), this has not been found to be an issue in the bond market (where trade sizes have increased over the last decade).

¹³ I set the value of BTM_{iq} equal to zero if firm i has a negative book value at the end of quarter q .

¹⁴ See Frazzini and Lamont (2007) and Barber et al. (2013).

on average, consistent with empirical evidence that earnings tend to increase over time. In contrast, the accruals variable is negative, indicating that cash flow from operations is greater than earnings, on average, in my sample. The fraction of total bond trades around earnings announcements that are identified as large (trades greater than \$1 million in par value) is 36.06 percent, while the fraction of outstanding shares that are held by institutional investors is 72.9 percent. Note that these two percentages are not strictly comparable; in the first case I am estimating the percentage of *trading* accounted for by sophisticated traders, while in the second case I am calculating the percentage of shares *held* by institutions.

A comparison of panels B and C reveals that the percentages of sophisticated bond trades and institutional stockholdings are slightly greater for non-investment grade firms than for investment-grade firms. In addition, the mean equally-weighted bond return for the non-investment grade firms over the three-day earnings announcement window is significantly higher than for the investment-grade firms (0.22 percent as compared to 0.10 percent). The mean cumulative market-adjusted stock return for the non-investment grade firms over the post-announcement period (days 2 through 61) is also higher than for the investment-grade firms (1.44 percent versus 0.41 percent). These findings are consistent with the notion that non-investment grade firms are riskier than investment-grade firms. The non-investment grade firms are also smaller. The mean (median) market value of the non-investment grade firms, \$3.33 billion (\$1.92 billion), compares to \$20.25 billion (\$8.53 billion) for the investment-grade firms.

Cross-variable Spearman correlations are presented in Table II, panel A, for the entire sample and in panels B and C for the subsamples of non-investment grade firms and investment-grade firms, respectively. Of particular note, the correlation between the announcement-window bond return for a firm and the cumulative market-adjusted stock return for the same firm during the post-announcement period is positive and significant for both the full sample and the non-

investment-grade firm subsample. It is not significant, however, for the subsample of investment-grade firms. This suggests that the earnings announcement bond price reaction for non-investment grade firms is better able to predict post-announcement stock returns than is the bond price reaction for investment-grade firms. The significantly positive correlation between standardized unexpected earnings and post-announcement stock returns reported in all three panels is consistent with stock prices underreacting to the earnings surprise. The significantly negative correlation between the accruals variable and the cumulative market-adjusted stock return during the post-announcement period, both within the entire sample and in each of the two subsamples, is consistent with the documented underperformance (outperformance) of the shares of firms with a high (low) level of accruals.

4. The bond price reaction to earnings announcements as a predictor of post-announcement stock returns

In this section, I test whether the bond price reaction to earnings announcements has predictive ability for post-announcement stock returns. I begin by partitioning each quarter's observations into quintiles according to the magnitude of the earnings announcement window bond price reaction. As mentioned previously, if a firm has more than one publicly traded bond, I compute the bond reaction as the equally-weighted average return of the individual bonds.¹⁵ I then calculate the average market-adjusted stock return over the succeeding 60 days within each quintile. Table III, panel A presents the results. As reported there, the average 60-day market-adjusted stock return monotonically decreases as we move from the highest to the lowest quintile of bond price reactions. For the highest quintile the return is 1.65 percent, while for the lowest quintile it is -0.32 percent. An investment strategy of buying stocks in the highest quintile and

¹⁵ My results remain qualitatively unchanged when I value-weight all of the firm's bond or when I keep only the most heavily traded bond of each firm.

shorting those in the lowest generates average market-adjusted returns of 1.97 percent over the 60-day period following an earnings announcement. This difference is statistically significant, providing preliminary evidence that the reaction of a firm's bonds to its earnings announcement has predictive power for the firm's post-announcement stock price.¹⁶ Panels B and C present the results of partitioning observations according to the magnitude of accruals and SUE, respectively. They show that the hedge returns from a trading strategy based on either the accruals anomaly or the post-earnings announcement drift are of similar magnitude to the hedge returns from a trading strategy based on the bond price reaction to earnings announcements.

While this univariate test provides evidence that bond returns have predictive ability for post-announcement stock returns, it cannot address the question of whether this predictive ability is *incremental* to that of accruals and unexpected earnings. To test this, I first sort my sample into quintiles by *SUE* and, separately, by *Accruals* every quarter. Within each of these quintiles, I again sort into quintiles based on the bond price reaction. Panels A and B of Table IV present the results for the highest and lowest quintiles of *SUE* and *Accruals*, respectively. As shown in panel A, for the lowest *SUE* quintile the difference between the 60-day average market-adjusted stock return of the highest and lowest quintile of bond price reactions is a significant 3.65 percentage points, while it is a significant 4.08 percentage points for the highest SUE quintile. As reported in panel B, the difference between the 60-day average market-adjusted stock return of the highest and lowest quintile of bond price reactions is a significant 1.75 percentage points for the lowest quintile of accruals and a significant 3.71 percentage points for the highest quintile. These results provide evidence that the predictive ability of the bond price reaction to earnings announcements

¹⁶ Results remain significant for 5, 10, 30, 120, and 240-day periods following earnings announcements.

for future stock prices is incremental to that of two of the most well-known anomalies in accounting research.

I alternatively test whether the bond price reaction has incremental predictive power over accruals and unexpected earnings by estimating the following regression:

$$Stock_{iq}(2,61) = \alpha_0 + \beta_1 Bond_{iq}(-1,1) + \beta_2 SUE_{iq} + \beta_3 Accruals_{iq} + \beta_4 Size_{iq} + \beta_5 BTM_{iq} + \beta_6 Momentum_{iq}. \quad (3)$$

In this regression, standardized unexpected earnings, the ratio of accruals to cash flows, and the bond reaction to earnings announcements are all included as explanatory variables for the 60-day post-announcement stock return. Control variables for firm size, book-to-market ratio, and price momentum are also included. (All variables are defined in Section 3.)

To mitigate the impact of outliers and to facilitate the interpretation of the regression coefficients, I follow Narayanamoorthy (2006), Livnat and Mendenhall (2006), and Cao and Narayanamoorthy (2012), and separately sort each of the independent variables into quintiles, numbered 0 through 4, within each calendar quarter. I then convert these numbers into scaled ranks by dividing by 4 and subtracting 0.5. The resulting scaled ranks, which vary from -0.5 to 0.5, are used in place of the actual variable values in (3). The range of the modified variables allows me to interpret the coefficient on $Bond_{iq}(-1,1)$ as the 60-day abnormal return from a zero-investment strategy of purchasing the shares of the firms in the highest bond return quintile and selling short those in the lowest bond return quintile.

Panel C of Table IV presents the results from estimating (3). As seen in column 1, the coefficient on the bond return over the earnings announcement window (β_1) is significantly positive. Consistent with prior literature, the coefficient on standardized unexpected earnings (β_2) is significantly positive, while the coefficient on the ratio of accruals to cash flow (β_3) is

significantly negative. These results are qualitatively unchanged when estimating quarterly Fama-MacBeth regressions to control for cross-sectional correlations (column 2). These findings provide additional evidence that the bond price reaction to earnings announcements can predict future stock returns and that this predictive ability is incremental to that of accruals and unexpected earnings.

To test whether the unusual market conditions during the 2008-09 financial crisis (a flight to quality and a steep widening of bond spreads) could be driving my results (see Acharya et al., 2013, and Dick-Nielsen et al., 2012), I re-estimate regression (3), excluding the years 2008 and 2009 from my sample period. Column 1 of Table V presents the regression results. Excluding these two years, the coefficient on the bond return over the earnings announcement window remains significant and positive, confirming that my results are not driven by the years of the financial crisis.

I next test whether my results are sensitive to the inclusion of the stock price reaction to earnings announcements as another independent variable. The motivation for this analysis is the finding of Chan et al. (1996) and Brandt et al. (2007) that the stock price reaction has predictive power for future returns. In column 2 of Table V, I report the results of re-estimating regression (3), including the variable $Stock_{iq}(-1,1)$, which is firm i 's cumulative market-adjusted stock return over the three-day announcement window of the earnings for quarter q . The coefficient on the bond price reaction to the earnings announcement remains significant and positive, indicating that the bond reaction's predictive ability is not subsumed by the stock return over the earnings announcement window.

Lastly, I examine whether my results are robust to the use of abnormal, rather than raw, cumulative bond returns. To test this, I compute the cumulative abnormal bond return, denoted by $AR_Bond_{iq}(-1,1)$, by subtracting from $Bond_{iq}(-1,1)$ the cumulative return over the earnings

announcement window on a benchmark portfolio of bonds, matched on bond rating and maturity. I form 28 benchmark portfolios, based on seven rating classes (Aaa, Aa, A, Baa, Ba, B, and below B) and four maturity groups (1 to 3 years, 3+ to 5 years, 5+ to 10 years, and over 10 years).¹⁷ Then, I re-estimate regression (3), substituting $AR_Bond_{it}(-1,1)$ for $Bond_{it}(-1,1)$. The regression results are reported in column 3 of Table V. The coefficient on the bond return over the earnings announcement window is somewhat smaller, but is still positive and significant, confirming that my results are robust to the use of abnormal, rather than raw, bond returns around earnings announcements.¹⁸

5. Factors affecting the ability of bond prices to predict post-announcement stock returns

5.1 Bond riskiness

I expect that the predictive ability of bond prices for post-announcement stock returns will be stronger for riskier (non-investment grade) bonds than for those that are safer (investment-grade bonds). As discussed earlier, this is because earnings are more informative for non-investment grade bonds (see Ederington and Yang, 2013, and Defond and Zhang, 2014). To test my hypothesis, I perform two sets of analyses. In the first, I divide my sample into non-investment grade and investment-grade firms. For each subsample, I partition each quarter's earnings announcements into quintiles, according to the magnitude of the accompanying bond price reaction, and calculate the average market-adjusted stock return over the succeeding 60 days for each quintile. Table VI, panels A and B present the results for the subsamples of non-investment grade firms and investment-grade firms, respectively. The difference in market-

¹⁷ For the very small number of observations for which there is no matched portfolio, I assume a zero benchmark return.

¹⁸ In untabulated results, I find that my results are robust to (a) the inclusion of year and industry fixed effects, (b) the use of the four-factor model (Carhart, 1997) as an alternative risk adjustment, (c) the truncation of the observations in the top and bottom 0.25 percent of the distribution of 60-day market-adjusted returns, (d) the exclusion of firms with share prices below \$10, and (e) the exclusion of financial firms.

adjusted stock returns between the highest and lowest bond return quintiles for non-investment grade firms is positive and significant (4.15 percentage points), while it is insignificant for the subsample of investment-grade firms. This evidence supports the conjecture that bond riskiness is a factor affecting the ability of bond returns to predict future stock prices.

For the second analysis, I expand regression (3) by adding an indicator variable, $NonIG_{iq}$, which takes the value one for non-investment grade firms, and zero, otherwise. I also interact it with the bond return over the earnings announcement window, $Bond_{iq}(-1,1)$. Including both of these variables in (3) gives:

$$Stock_{iq}(2,61) = \alpha_0 + \beta_1 Bond_{iq}(-1,1) + \beta_2 NonIG_{iq} + \beta_3 Bond_{iq}(-1,1) \times NonIG_{iq} + \beta_4 SUE_{iq} + \beta_5 Accruals_{iq} + \beta_6 Size_{iq} + \beta_7 BTM_{iq} + \beta_8 Momentum_{iq}, \quad (4)$$

Panel C of Table VI presents the results of estimating (4). In this augmented regression, the coefficient on the bond return over the earnings announcement window (β_1) is insignificant. In contrast, the coefficient on the non-investment grade interaction term (β_3) is significantly positive and economically large. The coefficient value of 0.044 implies that the shares of non-investment grade firms whose bonds are in the highest quintile of earnings announcement returns outperform those in the lowest quintile by 4.40 percentage points over the subsequent 60 days (17.60 percentage points, annualized). Results remain qualitatively unchanged when estimating quarterly Fama-MacBeth regressions to control for cross-sectional correlations (column 2). These results are consistent with my conjecture and suggest that the ability of bond returns to predict stock returns is driven solely by non-investment grade bonds.¹⁹

¹⁹ To ensure that my results are not driven by differences in the levels of institutional stockholders in investment-grade and non-investment grade firms, I re-estimate (4) after adding a control variable for the percentage of institutional stockholders. The nature of my results are not affected by the addition of this variable.

5.2 The presence of sophisticated investors in the firm's shares

I expect that the ability of bond prices to predict post-announcement stock returns will be stronger the greater the dominance of unsophisticated investors in the firm's stock, since these investors are less able than sophisticated shareholders to process earnings information. To test this conjecture, I divide my observations into two groups, based on whether the fraction of institutional stockholders in firm i at the end of quarter q (which is my proxy for the level of investor sophistication in the firm's shares), IS_{iq} , is above or below than the sample average, and then re-estimate (4) for each group.

Table VII reports the results of this analysis. As shown in columns 1 and 2, the coefficient on the non-investment grade bond interaction term is significantly positive for both groups. The 60-day difference in post-announcement stock returns between the highest and lowest bond return quintiles is 6.40 percentage points (25.6 percentage points, annualized) for the subsample of observations with below-average institutional stock holdings. For the subsample with above-average institutional stock holdings the difference is 3.2 percentage points (12.8 percentage points, annualized). Each of these differences is reliably greater than zero.²⁰ Using the method described in Paternoster et al. (1989), I find that β_3 is significantly larger for the group with below-average institutional holdings than for the group with above-average institutional holdings.²¹ These findings support my hypothesis that the predictive ability of bond returns for post-announcement stock returns is stronger the lesser the presence of sophisticated stock investors.

²⁰ Results remain qualitatively unchanged when estimating quarterly Fama-MacBeth regressions to control for cross-sectional correlations.

²¹ Paternoster et al. (1989) indicate that the appropriate test statistic to use for comparing two coefficients generated by regressions having the same model specification, but different samples, is

$$Z = (\beta_{2, \text{largetrades}} - \beta_{2, \text{smalltrades}}) / ([SE(\beta_{2, \text{largetrades}})]^2 + [SE(\beta_{2, \text{smalltrades}})]^2)^{1/2}.$$

It is interesting to note that the coefficient on SUE (β_4) for the subsample of observations with below-average institutional stock holdings is positive and significant, while it is insignificant for the above-average subsample. This finding is consistent with evidence in Bartov et al. (2000) and Doyle et al. (2006) that the presence of institutional stockholders enhances the ability of share prices to incorporate the information contained in earnings announcements in a timely manner.

I alternatively test my hypothesis by employing a unique database containing the daily buy and sell volume of executed orders placed by individual stock investors for a large cross-section of NYSE stocks for the years 2005-2007.²² The use of this database restricts my sample to 4,760 observations. For this analysis I divide my observations into two groups, based on whether the intensity of trading by individual stock investors is greater or less than the sample average, and then re-estimate (4) for each group. I calculate the trading intensity of individual investors on the day of an earnings announcement as the total dollar volume of individual stock trading that day divided by that day's total dollar volume. In untabulated results, I find that the coefficient on the non-investment grade bond interaction term is significantly positive for the group of firms with above-average trading by individual stock investors on the day of the earnings announcement, but is insignificant for the group of firms with below-average individual stock trading. These results provide additional evidence supporting the hypothesis that the predictive ability of bond returns is greater in firms with fewer sophisticated stock investors.

²² This database is similar to that used in Kaniel et al. (2008) and Kaniel et al. (2012). I thank Ron Kaniel and his co-authors for generously sharing this database with me.

5.3 The presence of sophisticated traders in the firm's bonds

As discussed earlier, I expect that the ability of bond returns to predict post-announcement stock returns will be stronger the greater the dominance of sophisticated traders in the trading of a firm's bonds. The greater their presence, the more quickly and accurately should bond prices incorporate earnings information relative to stock prices. To test this conjecture, I calculate for every bond-earnings announcement observation in the sample the fraction of trades (exclusive of those less than \$100,000 in size) during the announcement window that are greater than \$1 million in par value (my proxy for sophisticated traders). The observations are then divided into two groups, based on whether this fraction is above or below than the sample average. Bonds of the same firm are treated as a single observation, which is classified as above (below) the sample average if the mean of this fraction over all of the firm's bonds falls above (below) the sample average.

Table VIII reports the results of re-estimating (4) for each of these two groups. As seen in the table, the coefficient on the non-investment grade interaction term is significantly positive for both groups.²³ Comparing β_3 across the two regressions (using the method described in Paternoster et al., 1989), I find that it is significantly larger for the subsample of observations with above-average sophisticated bond trading. For that subsample, the difference in post-announcement stock returns for the highest and lowest quintiles is 4.90 percentage points over the subsequent 60 days (19.2 percentage points, annualized). The corresponding difference for the subsample of observations with below-average sophisticated bond trading is 3.70 percentage points (14.80 percentage points, annualized). These results are consistent with bond trader

²³ Results remain qualitatively unchanged when estimating quarterly Fama-MacBeth regressions to control for cross-sectional correlations.

sophistication being a driver of the predictive ability of bond returns for post-announcement stock returns.

6. Summary and concluding remarks

In this paper, I test the conjecture that the bond price reaction to an earnings announcement has explanatory power for future stock returns. The results of my empirical analyses support this conjecture. I find that the bond price reaction provides incremental explanatory power for post-announcement stock returns over and above the information contained in the earnings surprise (the post-earnings announcement drift), the level of reported accruals (the accruals anomaly), and the stock price reaction to the earnings announcement. Exploring the factors that affect the ability of bond returns to predict post-announcement stock returns, I find that bonds' predictive ability comes exclusively from non-investment grade bonds. This is consistent with the notion that earnings have greater information content for these bonds. Additionally, I show that bonds' predictive power is stronger for firms whose shares are less heavily held by sophisticated shareholders and for bonds whose trading is more heavily dominated by sophisticated investors. This suggests that the sophistication of bond traders relative to stock traders is a driver of the ability of bond returns to predict post-announcement stock returns.

My study offers three contributions to the extant literature. It is the first to provide evidence that bond prices can predict post-announcement stock returns, suggesting that bond prices reflect the accounting information in earnings announcements more efficiently than do stock prices. As such, it offers insights into the relation between bond and stock prices. Second, it adds to those studies which find that earnings components can be used to predict post-earnings announcement stock returns. Third, it is the first study to examine the impact that the presence of

sophisticated traders in the stock market has on the relative efficiency of bond and stock prices. Previous work concentrated on investigating the relation between sophisticated stock traders and the efficiency of prices within that market.

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Table I
Descriptive Statistics

This table provides descriptive statistics for the entire sample (panel A), for the non-investment grade firm subsample (panel B), and for the investment-grade firm subsample (panel C). Bond j is classified as a non-investment grade bond if its rating is below BBB-, and is classified as an investment-grade bond, otherwise. Firm i is referred to as an investment-grade firm for quarter q if it has only investment-grade bonds outstanding at the time of the announcement of earnings for quarter q , and is referred to as a non-investment-grade firm for quarter q , otherwise. $Bond_{i,t}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement. $Stock_{i,t}(2,61)$ is the cumulative market-adjusted return (using the CRSP value-weighted market index) over the 60 days (days 2 through 61) following firm i 's announcement of the earnings for quarter q . $SUE_{i,t}$ (standardized unexpected earnings) is equal to the difference between firm i 's earnings before extraordinary items for quarter q (*Compustat* item *EPSPXQ*) and the corresponding earnings for quarter $q-4$, normalized by the share price at the end of quarter q , and multiplied by 100. $Accruals_{i,t}$ is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q . $Large\ Trades_{i,t}$ is defined as the fraction of all trades in bond j (exclusive of those less than \$100,000 in size) during the earnings announcement window that have a par value of at least \$1 million. $IS_{i,t}$ is the level of institutional stock ownership in firm i 's shares at the time of the announcement of the earnings for quarter q and is defined as the number of outstanding common shares held by institutional investors at the end of quarter q divided by the number of common shares outstanding at that time. $Size_{i,t}$ is the end-of-quarter q market value of equity for firm i . $BTM_{i,t}$ is the end-of-quarter q book value of equity for firm i divided by its end-of-quarter q market value of equity. This variable is set equal to zero for all firms with negative book value at the end of quarter q . $Momentum_{i,t}$ is the cumulative abnormal return on the shares of firm i over months $t-12$ through $t-2$, where t is the month in which earnings for quarter q are announced. The sample period spans 2005 through 2012.

Panel A: All firms

Variable	No. of observations	Mean	Median	Std. Dev.	25th percentile	75th percentile
Bond(-1,1)	17,456	0.13%	0.07%	0.02	-0.01%	0.25%
Stock(2,61)	17,456	0.71%	0.05%	0.18	-6.79%	7.11%
SUE	17,456	0.006	0.001	0.87	-0.004	0.005
Accruals	17,456	-0.037	-0.027	0.05	-0.061	-0.059
Large Trades	17,456	36.06%	30.00%	0.34	0.00%	50.00%
IS	13,243	72.90%	75.87%	0.16	63.98%	84.77%
Size (in millions)	17,456	15,294	5,065	31,359	2,102	14,282
BTM	17,456	0.63	0.50	0.75	0.31	0.76
Momentum	17,456	10.48%	7.92%	0.453	-10.87%	26.46%

Panel B: Non-investment grade firms

Variable	No. of observations	Mean	Median	Std. Dev.	25th percentile	75th percentile
Bond(-1,1)	5,120	0.22%	0.09%	0.03	-0.05%	0.52%
Stock(2,61)	5,120	1.44%	-0.44%	0.27	-1.38%	1.40%
SUE	5,120	0.03	0.001	1.58	-0.013	0.014
Accruals	5,120	-0.038	-0.028	0.06	-0.064	-0.004
Large Trades	5,120	38.86%	30.00%	0.39	0.00%	75.00%
IS	3,842	76.85%	81.19%	0.17	68.59%	89.56%
Size (in millions)	5,120	3,330	1,923	4,283	879	3,995
BTM	5,120	0.75	0.57	1.01	0.31	0.91
Momentum	5,120	12.92%	7.92%	0.682	-23.72%	34.70%

Panel C: Investment-grade firms

Variable	No. of observations	Mean	Median	Std. Dev.	25th percentile	75th percentile
Bond(-1,1)	12,336	0.10%	0.06%	0.10	0.00%	0.19%
Stock(2,61)	12,336	0.41%	0.17%	0.12	-5.78%	6.34%
SUE	12,336	-0.003	0.001	0.21	-0.003	0.004
Accruals	12,336	-0.037	-0.026	0.16	0.625	0.824
Large Trades	12,336	34.90%	30.00%	0.31	3.33%	50.00%
IS	9,401	71.27%	73.70%	0.16	62.59%	82.41%
Size (in millions)	12,336	20,259	8,533	36,054	3,208	19,974
BTM	12,336	0.58	0.48	0.611	0.32	0.7
Momentum	12,336	9.44%	8.68%	0.311	7.05%	24.52%

Table II
Pairwise correlations

This table provides the average of the quarterly pairwise Spearman coefficients between key variables for the entire sample (panel A), for the non-investment grade firm subsample (panel B), and for the investment-grade firm subsample (panel C). Bond j is classified as a non-investment grade bond if its rating is below BBB-, and is classified as an investment-grade bond, otherwise. Firm i is referred to an investment-grade firm for quarter q if it has only investment-grade bonds outstanding at the time of the announcement of earnings for quarter q , and is referred to as a non-investment grade firm for quarter q , otherwise. $Bond_{iq}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement. $Stock_{iq}(2,61)$ is the cumulative market-adjusted return (using the CRSP value-weighted market index) over the 60 days (days 2 through 61) following firm i 's announcement of the earnings for quarter q . SUE_{iq} (standardized unexpected earnings) is equal to the difference between firm i 's earnings before extraordinary items for quarter q (Compustat item EPSPXQ) and the corresponding earnings for quarter $q-4$, normalized by the share price at the end of quarter q , and multiplied by 100. $Accruals_{iq}$ is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q . $Large\ Trades_{iq}$ is defined as the fraction of all trades in bond j (exclusive of those less than \$100,000 in size) during the earnings announcement window that have a par value of at least \$1 million. IS_{iq} is the level of institutional stock ownership in firm i 's shares at the time of the announcement of the earnings for quarter q and is defined as the number of outstanding common shares held by institutional investors at the end of quarter q divided by the number of common shares outstanding at that time. $Size_{eq}$ is the end-of-quarter q market value of equity for firm i . BTM_{iq} is the end-of-quarter q book value of equity for firm i divided by its end-of-quarter q market value of equity. This variable is set equal to zero for all firms with negative book value at the end of quarter q . $Momentum_{iq}$ is the cumulative abnormal return on the shares of firm i over months $t-12$ through $t-2$, where t is the month in which earnings for quarter q are announced. The sample period spans 2005 through 2012. Numbers in bold are significant at the 10% level or better.

Panel A: All firms

Variable	Bond(-1,1)	Stock(2,61)	SUE	Accruals	Large Trades	IS	Size (in millions)	BTM
Stock(2,61)	0.02							
SUE	0.02	0.04						
Accruals	0.01	-0.08	0.07					
Large Trades	0.00	0.00	-0.01	-0.02				
IS	0.03	0.01	0.04	-0.08	-0.03			
Size (in millions)	-0.05	-0.02	0.04	-0.06	0.27	-0.13		
BTM	0.05	0.01	-0.11	0.14	-0.01	-0.03	-0.30	
Momentum	-0.04	0.00	0.30	-0.01	0.00	0.04	0.16	-0.29

Panel B: Non-investment grade firms

Variable	Bond(-1,1)	Stock(2,61)	SUE	Accruals	Large Trades	IS	Size (in millions)	BTM
Stock(2,61)	0.06							
SUE	0.05	0.03						
Accruals	-0.03	-0.08	0.10					
Large Trades	0.03	-0.01	-0.02	-0.04				
IS	-0.01	0.00	0.01	-0.08	0.09			
Size (in millions)	-0.02	-0.03	0.06	-0.06	0.10	0.18		
BTM	0.02	0.03	-0.12	0.14	0.05	-0.07	-0.27	
Momentum	-0.07	-0.12	0.31	-0.01	-0.03	0.09	0.28	-0.32

Panel C: Investment-grade firms

Variable	Bond(-1,1)	Stock(2,61)	SUE	Accruals	Large Trades	IS	Size (in millions)	BTM
Stock(2,61)	0.00							
SUE	0.00	0.05						
Accruals	0.03	-0.08	0.04					
Large Trades	-0.05	-0.01	0.00	-0.01				
IS	0.02	0.02	0.05	-0.08	-0.04			
Size (in millions)	-0.02	-0.03	0.06	-0.07	0.28	-0.12		
BTM	0.06	0.00	-0.11	0.19	-0.03	-0.04	-0.32	
Momentum	-0.02	0.01	0.30	-0.03	0.01	0.03	0.11	-0.27

Table III
Average post-announcement stock returns by quintiles
of earnings-announcement bond price reaction, accruals, and SUE

This table presents the time-series average cumulative market-adjusted stock returns, by quintile of earnings-announcement bond price reaction (panel A), by quintile of accruals (panel B), and by quintile of standardized unexpected earnings (panel C). $Bond_{i,t}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement. $Accruals_{i,t}$ is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q . $SUE_{i,t}$ (standardized unexpected earnings) is equal to the difference between firm i 's earnings before extraordinary items for quarter q (*Compustat* item *EPSPXQ*) and the corresponding earnings in quarter $q-4$, normalized by the share price at the end of quarter q , and multiplied by 100. Quintiles are formed within each calendar quarter. Cumulative market-adjusted returns (using the CRSP value-weight market index) are measured for the three-day window surrounding the announcement and for the 60-day period beginning two trading days after the announcement of the earnings of firm i for quarter q . The sample period spans 2005 through 2012. All returns are shown as percentages. The t -statistics are calculated using the time-series difference in returns between the highest and lowest quintiles. ***, **, and * denote significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Panel A: Bond price reaction

Quintile bond price reaction	No. of observations	Days relative to quarterly earnings announcement	
		2 to 61	
		Cumulative market-adjusted stock return, %	
1 (Low)	3,478	-0.32	
2	3,501	0.21	
3	3,493	0.87	
4	3,501	1.03	
5 (High)	3,483	1.65	
High-Low		1.97***	
(t -statistic)		(4.21)	

Panel B: Accruals

Quintile accruals	No. of observations	Days relative to quarterly earnings announcement	
		2 to 61	
		Cumulative market-adjusted stock return, %	
1 (Low)	3,478	1.94	
2	3,501	1.07	
3	3,493	1.29	
4	3,501	-0.21	
5 (High)	3,483	-0.49	
High-Low		2.43***	
(t -statistic)		(5.26)	

Panel C: SUE

Quintile SUE	No. of observations	Days relative to quarterly earnings announcement	
		2 to 61	
		Cumulative market-adjusted stock return, %	
1 (Low)	3,478	0.43	
2	3,478	0.59	
3	3,476	0.49	
4	3,478	0.40	
5 (High)	3,483	1.67	
High-Low		1.24**	
(t -statistic)		(2.14)	

Table IV

Post-announcement stock returns and the bond price reaction to earnings announcements

For panel A, firms are first sorted in ascending order each calendar quarter according to the level of standardized unexpected earnings (SUE), and then partitioned into quintiles. SUE_{it} is equal to the difference between firm i 's earnings before extraordinary items for quarter q (Compustat item EPSPXQ) and the corresponding earnings for quarter $q-4$, normalized by the share price at the end of quarter q , and multiplied by 100. Within each SUE quintile for each quarter, firms are then ranked in ascending order according to the earnings announcement bond price reaction. For panel B, firms are first sorted in ascending order each calendar quarter according to the level of accruals (Accruals), and then partitioned into quintiles. $Accruals_{it}$ is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q . Within each Accruals quintile for each quarter, firms are then ranked in ascending order according to the earnings announcement bond price reaction. The earnings announcement bond return for firm i for quarter q is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day window (days -1, 0, and 1) surrounding the announcement of quarter q earnings. The cumulative market-adjusted stock return (using the CRSP value-weight market index) for firm i in quarter q is measured over the three-day window surrounding the announcement and for the 60-day period beginning two trading days after the announcement. The sample period spans 2005 through 2012. All returns are shown as percentages. The t -statistics are calculated for the time-series differences in returns between the 5th and 1st quintiles. ***, **, and * indicate significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively. Column 1 of panel C reports the estimated coefficients for the regression:

$$Stock_{it}(2,61) = \alpha_0 + \beta_1 Bond_{it}(-1,1) + \beta_2 SUE_{it} + \beta_3 Accruals_{it} + \beta_4 Size_{it} + \beta_5 BTM_{it} + \beta_6 Momentum_{it},$$

where $Stock_{it}(2,61)$ denotes the cumulative market-adjusted return (using the CRSP value-weighted market index) over the 60 days (days 2 through 61) following firm i 's announcement of the earnings for quarter q ; $Bond_{it}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement; $Size_{it}$ is the log of the end-of-quarter q market value of equity for firm i ; BTM_{it} is the log of the ratio of the end-of-quarter q book value of equity of firm i to the end-of-quarter q market value of equity. This variable is set equal to zero for all firms with negative book value. $Momentum_{it}$ is the cumulative abnormal return on the shares of firm i over months $t-12$ through $t-2$, where t is the month in which earnings for quarter q are announced. To mitigate the impact of outliers and to facilitate interpretation of the regression coefficients, all of the independent variables are sorted independently into quintiles within each calendar quarter, and the quintiles are scaled to range from -0.5 to 0.5. Column 2 of panel C presents the coefficients when estimating quarterly Fama-Macbeth regressions to control for cross-sectional correlations. The sample period spans 2005 through 2012. Below each coefficient value is the corresponding t -statistic. ***, **, and * denote significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Panel A: Univariate Analysis - SUE

Quintile SUE	Quintile bond price reaction	No. of observations	Days relative to quarterly earnings announcement	
			2 to 61	Cumulative market-adjusted stock return, %
1 (Low)	1 (Low)	682		-1.31
1 (Low)	5 (High)	687		2.34
1 (Low)	High-Low (t -statistic)			3.65** (2.10)
5 (High)	1 (Low)	683		-0.71
5 (High)	5 (High)	687		3.37
5 (High)	High-Low (t -statistic)			4.08*** (3.82)

Panel B: Univariate Analysis - Accruals

Quintile Accruals	Quintile bond price reaction	No. of observations	Days relative to quarterly earnings announcement	
			2 to 61	Cumulative market-adjusted stock return, %
1 (Low)	1 (Low)	682		1.41
1 (Low)	5 (High)	687		3.16
1 (Low)	High-Low (t -statistic)			1.75** (2.12)
5 (High)	1 (Low)	683		-2.48
5 (High)	5 (High)	687		1.22
5 (High)	High-Low (t -statistic)			3.71*** (3.74)

Panel C: Multivariate analysis

Variable	Dependent variable - cumulative market-adjusted stock return (days 2 to 61)	
	Panel regression	Fama-Macbeth quarterly regressions
	(1)	(2)
Intercept	0.007*** (5.35)	0.007 (1.40)
Bond(-1,1)	0.017*** (4.50)	0.012*** (3.27)
SUE	0.0137*** (3.47)	0.016** (2.10)
Accruals	-0.027*** (-7.09)	-0.025*** (-3.25)
Size	-0.021*** (-5.30)	-0.020** (-2.11)
BTM	0.0002 (0.06)	-0.001 (-0.08)
Momentum	-0.01** (-2.53)	-0.008 (-0.50)
Adj R-squared (%)	0.62	5.88
No. of observations	17,456	32

Table V
Post-announcement stock returns and the bond price reaction
to earnings announcements – sensitivity analyses

Column 1 reports the estimated coefficients for a regression of:

$$Stock_{i,q}(2,61) = \alpha_0 + \beta_1 Bond_{i,q}(-1,1) + \beta_2 SUE_{i,q} + \beta_3 Accruals_{i,q} + \beta_4 Size_{i,q} + \beta_5 BTM_{i,q} + \beta_6 Momentum_{i,q},$$

where $Stock_{i,q}(2,61)$ is the cumulative market-adjusted return (using the CRSP value-weighted market index) over the 60 days (days 2 through 61) following firm i 's announcement of the earnings for quarter q ; $Bond_{i,q}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement; $SUE_{i,q}$ (standardized unexpected earnings) is equal to the difference between firm i 's earnings before extraordinary items for quarter q (Compustat item EPSPXQ) and the corresponding earnings for quarter $q-4$, normalized by the share price at the end of quarter q , and multiplied by 100. $Accruals_{i,q}$ is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q . $Size_{i,q}$ is the log of the end-of-quarter q market value of equity for firm i . $BTM_{i,q}$ is the log of the ratio of the end-of-quarter q book value of equity of firm i to end-of-quarter q market value of equity. This variable is set equal to zero for all firms with negative book value. $Momentum_{i,q}$ is the cumulative abnormal return on the shares of firm i over months $t-12$ through $t-2$, where t is the month in which earnings for quarter q are announced. To mitigate the impact of outliers and to facilitate interpretation of the regression coefficients, all of the independent variables are sorted independently into quintiles within each calendar quarter, and the quintiles are scaled to range from -0.5 to 0.5. The sample period spans 2005 through 2012, but excludes the years 2008-09 (the years of the financial crisis). In Column 2, I report the results of re-estimating the regression above, with the inclusion of the variable $Stock_{i,q}(-1,1)$, which is firm i 's cumulative market-adjusted stock return over the three-day announcement window of the earnings for quarter q . In column 3, I re-estimate the regression, replacing $Bond_{i,q}(-1,1)$ with $AR_Bond_{i,q}(-1,1)$. $AR_Bond_{i,q}(-1,1)$ is computed by subtracting from $Bond_{i,q}(-1,1)$ the cumulative return over the earnings announcement window on a benchmark portfolio of bonds, matched on bond rating and maturity. The sample period used for columns 2 and 3 spans 2005 through 2012. Below each coefficient value is the corresponding t -statistic. ***, **, and * denote significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Variable	Dependent variable - cumulative market-adjusted stock return (days 2 to 61)		
	Excluding 2008-09	Adding earnings-announcement stock return as an independent variable	Using abnormal bond returns
	(1)	(2)	(3)
Intercept	0.00 (0.02)	0.007*** (5.35)	0.007*** (5.34)
Bond(-1,1)	0.012*** (3.84)	0.016*** (4.22)	
AR_Bond(-1,1)			0.009*** (3.34)
Stock(-1,1)		0.007* (1.72)	
SUE	0.021*** (6.51)	0.013*** (3.20)	0.014*** (3.52)
Accruals	-0.018*** (-5.66)	-0.027*** (-7.06)	-0.027*** (-7.08)
Size	-0.006 (-1.69)	-0.022*** (-5.30)	-0.022*** (-5.46)
BTM	-0.011*** (-3.21)	0.0003 (0.06)	0.0006 (0.14)
Momentum	0.005 (1.37)	-0.010** (-2.49)	-0.01** (-2.54)
Adj R-squared (%)	0.83	0.64	0.54
No. of observations	13,178	17,456	17,456

Table VI

Post-announcement stock returns and the price reaction of non-investment grade and investment-grade bonds to earnings announcements

Panel A (panel B) presents the time-series average cumulative market-adjusted stock returns, for the top and bottom quintiles of the earnings-announcement bond price reaction of non-investment (investment) grade firms. $Bond_{it}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement. Quintiles are formed within each calendar quarter. The cumulative market-adjusted stock return (using the CRSP value-weighted market index) for firm i in quarter q is measured for the three-day window surrounding the announcement and for the 60-day period beginning two trading days after the announcement of the earnings of firm i for quarter q . The sample period spans 2005 through 2012. All returns are shown as percentages. The t -statistics are calculated for the time-series differences in returns between the 5th and 1st quintiles. ***, **, and * indicate significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Column 1 of panel C reports the estimated coefficients for the regression:

$$Stock_{iq}(2,61) = \alpha_0 + \beta_1 Bond_{iq}(-1,1) + \beta_2 NonIG_{iq} + \beta_3 Bond_{iq}(-1,1) \times NonIG_{iq} + \beta_4 SUE_{iq} + \beta_5 Accruals_{iq} + \beta_6 Size_{iq} + \beta_7 BTM_{iq} + \beta_8 Momentum_{iq},$$

where $Stock_{iq}(2,61)$ is the cumulative market-adjusted return (using the CRSP value-weighted market index) over the 60 days (days 2 through 61) following firm i 's announcement of the earnings for quarter q ; $Bond_{iq}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement.; $NonIG_{iq}$ is an indicator variable equal to 1 if firm i for quarter q is a non-investment grade firm, and equal to zero, otherwise (a firm is referred to as an investment-grade firm for quarter q if it has only investment-grade bonds outstanding at the time of the announcement of earnings for that quarter- q , and is referred to as a non-investment grade firm for quarter q , otherwise.); SUE_{iq} (standardized unexpected earnings) is equal to the difference between firm i 's earnings before extraordinary items for quarter q (*Compustat* item *EPSPXQ*) and the corresponding earnings for quarter $q-4$, normalized by the share price at the end of quarter $q-1$, and multiplied by 100. $Accruals_{iq}$ is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q ; $Size_{iq}$ is the log of the end-of-quarter q market value of equity for firm i . BTM_{iq} is the log of the ratio of end-of-quarter q book value of equity of firm i to end-of-quarter q market value of equity. This variable is set equal to zero for all firms with negative book value. $Momentum_{iq}$ is the cumulative abnormal return on the shares of firm i over months $t-12$ through $t-2$, where t is the month in which earnings for quarter q are announced. To mitigate the impact of outliers and to facilitate interpretation of the regression coefficients, all of the independent variables are sorted independently into quintiles within each calendar quarter, and the quintiles are scaled to range from -0.5 to 0.5. Column 2 of panel C presents the coefficients when estimating quarterly Fama-Macbeth regressions to control for cross-sectional correlations. The sample period spans 2005 through 2012. Below each coefficient value is the corresponding t -statistic. ***, **, and * denote significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Panel A: Univariate Analysis - Non-investment grade bonds

Quintile bond price reaction	No. of observations	Days relative to quarterly earnings announcement	
		2 to 61	
		Cumulative market-adjusted stock return, %	
1 (Low)	1,010		-1.15
5 (High)	1,018		3.00
High-Low (t -statistic)			4.15*** (3.25)

Panel B: Univariate Analysis - Investment-grade bonds

Quintile bond price reaction	No. of observations	Days relative to quarterly earnings announcement	
		2 to 61	
		Cumulative market-adjusted stock return, %	
1 (Low)	2,456		0.34
5 (High)	2,456		0.64
High-Low (t -statistic)			0.30 (0.81)

Panel C: Multivariate analysis

Variable	Dependent variable - cumulative market-adjusted stock return (days 2 to 61)	
	Panel regression	Fama-Macbeth quarterly regressions
	(1)	(2)
Intercept	0.006*** (4.11)	0.009* (1.97)
Bond(-1,1)	0.002 (0.34)	-0.0005 (-0.13)
NonIG	-0.0008 (-0.24)	-0.007 (-0.81)
Bond(-1,1)*NonIG	0.044*** (5.46)	0.034*** (3.05)
SUE	0.013*** (3.35)	0.016** (2.04)
Accruals	-0.027*** (-7.05)	-0.024*** (-3.37)
Size	-0.021*** (-4.71)	-0.023*** (-3.19)
BTM	0.0005 (0.13)	-0.008 (-0.11)
Momentum	-0.0103** (-2.52)	-0.006 (-0.45)
Adj R-squared (%)	0.78	7.11
No. of observations	17,456	32

Table VII
Post-announcement stock returns and the bond price reaction to earnings announcements,
for above-average and below-average levels of institutional stock ownership

For each firm i and calendar quarter q , the level of institutional stock ownership is defined as the proportion of common shares outstanding that are held by institutional investors at the end of calendar quarter q . The sample is divided into two groups, based on whether this fraction is less than or greater than the sample average. The following regression is estimated for each group:

$$Stock_{iq}(2,61) = \alpha_0 + \beta_1 Bond_{iq}(-1,1) + \beta_2 NonIG_{iq} + \beta_3 Bond_{iq}(-1,1) \times NonIG_{iq} + \beta_4 SUE_{iq} + \beta_5 Accrual_{s,q} + \beta_6 Size_{iq} + \beta_7 BTM_{iq} + \beta_8 Momentum_{iq}$$

Column 1 (column 2) reports the regression results for the below-average (above-average) subsample. In this regression, $Stock_{iq}(2,61)$ is the cumulative market-adjusted return (using the CRSP value-weighted market index) over the 60 days (days 2 through 61) following firm i 's announcement of the earnings for quarter q ; $Bond_{iq}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement; $NonIG_{iq}$ is an indicator variable equal to 1 if firm i for quarter q is a non-investment grade firm, and equal to zero, otherwise (a firm is referred to as an investment-grade firm for quarter q if it has only investment-grade bonds outstanding at the time of the announcement of earnings for that quarter, and is referred to as a non-investment grade firm for quarter q , otherwise.); SUE_{iq} (standardized unexpected earnings); SUE_{iq} (standardized unexpected earnings) is equal to the difference between firm i 's earnings before extraordinary items for quarter q (*Compustat* item *EPSPXQ*) and the corresponding earnings for quarter $q-4$, normalized by the share price at the end of quarter q , and multiplied by 100. $Accrual_{s,q}$ is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q . $Size_{iq}$ is the log of the end-of-quarter q market value of equity for firm i . BTM_{iq} is the log of the ratio of end-of-quarter q book value of equity of firm i to end-of-quarter q market value of equity. This variable is set equal to zero for all firms with negative book value. $Momentum_{iq}$ is the cumulative abnormal return on the shares of firm i over months $t-12$ through $t-2$, where t is the month in which earnings for quarter q are announced. To mitigate the impact of outliers and to facilitate interpretation of the regression coefficients, all of the independent variables are sorted independently into quintiles within each calendar quarter, and the quintiles are scaled to range from -0.5 to 0.5. The sample period spans 2005 through 2012. Below each coefficient value is the corresponding t -statistic. ***, **, and * denote significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Variable	Dependent variable - cumulative market-adjusted stock return (days 2 to 61)	
	Below-average institutional ownership (1)	Above-average institutional ownership (2)
Intercept	0.005 (1.66)	0.009*** (3.37)
Bond(-1,1)	0.006 (0.66)	0.005 (0.63)
NonIG	0.01 (1.19)	-0.001 (-0.28)
Bond(-1,1)*NonIG	0.064*** (3.74)	0.032*** (2.80)
SUE	0.016** (2.17)	0.001 (0.23)
Accruals	-0.044*** (-5.81)	-0.020*** (-3.54)
Size	-0.022** (-2.38)	-0.019*** (-2.75)
BTM	0.011 (1.28)	0.0001 (0.03)
Momentum	-0.020** (-2.51)	-0.006 (-0.96)
Adj R-squared (%)	1.48	0.43
No. of observations	5,452	7,791

Table VIII
Post-announcement stock returns and the bond price reaction to earnings announcements
for above-average and below-average levels of sophisticated bond trading

For each firm i and calendar quarter q , the fraction of trades (exclusive of those less than \$100,000 in size) during the announcement window that are made by sophisticated investors is calculated. Trades by sophisticated investors are defined as those with par values of at least \$1 million in par value. The observations are then divided into two groups, based on whether this fraction is greater or less than the sample average. Bonds of the same firm are treated as a single observation, which is classified as above (below) the sample average if the mean of this fraction over all of the firm's bonds falls above (below) the sample average. The following regression is estimated for each group:

$$Stock_{iq}(2,61) = \alpha_0 + \beta_1 Bond_{iq}(-1,1) + \beta_2 NonIG_{iq} + \beta_3 Bond_{iq}(-1,1) \times NonIG_{iq} + \beta_4 SUE_{iq} + \beta_5 Accruals_{iq} + \beta_6 Size_{iq} + \beta_7 BTM_{iq} + \beta_8 Momentum_{iq}$$

Column 1 (column 2) reports the regression results for the below-average (above-average) subsample. In this regression, $Stock_{iq}(2,61)$ is the cumulative market-adjusted return (using the CRSP value-weighted market index) over the 60 days (days 2 through 61) following firm i 's announcement of the earnings for quarter q ; $Bond_{iq}(-1,1)$ is the equally-weighted average of the cumulative raw returns of firm i 's bonds over the three-day announcement window (days -1, 0, and 1) of the earnings for quarter q , where day 0 is the day of the earnings announcement; $NonIG_{iq}$ is an indicator variable equal to 1 if firm i for quarter q is a non-investment grade firm, and equal to zero, otherwise (a firm is referred to as an investment-grade firm for quarter q if it has only investment-grade bonds outstanding at the time of the announcement of earnings for that quarter, and is referred to as a non-investment grade firm for quarter q , otherwise.); SUE_{iq} (standardized unexpected earnings); SUE_{iq} (standardized unexpected earnings) is equal to the difference between firm i 's earnings before extraordinary items for quarter q (*Compustat* item *EPSPXQ*) and the corresponding earnings for quarter $q-4$, normalized by the share price at the end of quarter q , and multiplied by 100. $Accruals_{iq}$ is the difference between firm i 's net income before extraordinary items for quarter q and its cash flow from operations for that quarter, scaled by the average of the total assets at the beginning and the end of quarter q . $Size_{iq}$ is the log of the end-of-quarter q market value of equity for firm i . BTM_{iq} is the log of the ratio of end-of-quarter q book value of equity of firm i to end-of-quarter q market value of equity. This variable is set equal to zero for all firms with negative book value. $Momentum_{iq}$ is the cumulative abnormal return on the shares of firm i over months $t-12$ through $t-2$, where t is the month in which earnings for quarter q are announced. To mitigate the impact of outliers and to facilitate interpretation of the regression coefficients, all of the independent variables are sorted independently into quintiles within each calendar quarter, and the quintiles are scaled to range from -0.5 to 0.5. The sample period spans 2005 through 2012. Below each coefficient value is the corresponding t -statistic. ***, **, and * denote significance at the 1%, 5%, and 10% levels for two-tailed tests, respectively.

Variable	Dependent variable - cumulative market-adjusted stock return (days 2 to 61)	
	Below-average sophisticated bond trading	Above-average sophisticated bond trading
	(1)	(2)
Intercept	0.007** (2.88)	0.006*** (2.80)
Bond(-1,1)	0.004 (0.54)	0.0004 (0.08)
NonIG	0.001 (0.26)	-0.003 (-0.63)
Bond(-1,1)*NonIG	0.037*** (2.96)	0.049*** (4.74)
SUE	0.012** (1.99)	0.014*** (2.99)
Accruals	-0.020*** (-3.53)	-0.028*** (-6.05)
Size	-0.020*** (-3.11)	-0.023*** (-4.31)
BTM	0.002 (0.37)	0.0001 (0.02)
Momentum	-0.018*** (-4.20)	0.0006 (0.14)
Adj R-squared (%)	0.80	0.76
No. of observations	7,297	10,159