Does insider trading have information content for the bond market?

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Abstract

This study documents that there is significant information content in stock trading by registered corporate insiders for the bond market. We report significant positive price reactions for convertible and straight bonds in response to the Wall Street Journal's Insider Trading Spotlight publication of insider buy transactions and significant negative reactions for insider sell transactions. The stock market response to the publication of the insider transactions, although weaker than the bond market reaction, is also found to be significant. Cross-sectional results suggest that bond market participants extract the quality of the insider-trading signal by observing factors such as the dollar volume of the trade, the percentage change in the holding of the insider, and the insider's position in the firm. Lower-rated (riskier) bonds are found to be more sensitive to the information than higher-rated issues. The empirical evidence presented in this paper suggests that the absence of any reporting requirement for insider *bond* transactions may create an enhanced opportunity for the insiders to exploit private information to expropriate wealth from uninformed bond traders.

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1. Introduction

The effects of insider trading in the stock market have been the focus of several academic studies. Lorie and Niederhoffer (1968), Pratt and DeVere (1970), Jaffe (1974), Finnerty (1976) and Seyhun (1986), to name a few, reach two main conclusions based on their examination of stock prices. First, these studies find that registered corporate insiders in possession of private information earn substantial abnormal profits by trading in their firms' shares. Second, the studies also conclude that outsiders can also earn significant abnormal profits by exploiting the publicly available information about trades by insiders. [1] Thus, the information content of insider trades is found to be valuable to stock market participants. Although these studies document important results on insider trading, there are several interesting issues in this area which remain unexplored. This article fills a gap in the current literature by investigating whether stock trading by insiders has any information content for the bond market. We also document the stock price response to insider-trading information provided in the Wall Street Journal's (WSJ's) Insider Trading Spotlight, which is a relatively recent source of such information and may provide more timely reports than the SEC publication of the Official Summary of Security Transactions and Holdings used in previous studies.

This study has several potentially important investment and policy implications. First, we propose that since information conveyed through the insider stock trades signals a change in the firm's cash flow prospects, it should not only affect the stock prices but also the bond prices of these firms. Seyhun (1988) posits that although an unanticipated change in the cash flows observed by the insiders can be due to firm-specific, industry-wide, or economy-wide factors, all that is necessary for the equity investors is to observe this change in the cash flows and trade on that information. In our study we are not concerned with the *source* of the unanticipated change in the cash flows of the firm but rather with the information content of insider stock trades for bondholders. Datta and Dhillon (1993) document that the information content of unexpected earnings announcements has similar effects on bond and stock markets. Like earnings announcements, stock

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[1] Lorie and Niederhoffer (1968), Pratt and DeVere (1970), Jaffe (1974), Finnerty (1976) and Seyhun (1986) generally conclude that insiders have superior ability to predict large price changes in their stock. Givoly and Palmon (1985) show that a good portion of abnormal performance of insiders is due to information revealed through the trades themselves, i.e., insider trading serves as a leading indicator to the market. Seyhun (1988) documents that the net aggregate insider trading activity can be a useful leading indicator of future stock prices and economic activity, even though insiders cannot always distinguish between the effects of firm-specific and economy-wide factors. However, Lin and Howe (1990) find that insider trading in the OTC market has predictive content and that outsiders cannot earn abnormal returns after accounting for the bid–ask spread, while Rozeff and Zaman (1988) conclude that corporate insiders do not earn substantial profits after controlling for transaction costs, size and earnings to price ratio.

trading by corporate insiders is also expected to provide similar information content for bondholders and stockholders.

Second, a feature specific to the bond market that makes this study particularly interesting is that, although bond trading based on material non-public information is illegal, the current insider-trading laws do not require insiders to disclose their trades in straight debt securities. Hence, there exists a potential for bond-trading profits for insiders with a concomitant lower probability of facing retribution.

Our empirical results suggest several conclusions about insider stock trading and its impact on the bond market. This is the first study to document that the information content of insider stock trades is valuable for the bond market. Our results show that there is significant abnormal bond market reaction to the *publication* of insider stock trading in the WSJ's Insider Trading Spotlight column. The stock market response to the Spotlight publication is also found to be significant. The regression results indicate that bond market participants also extract the value (or quality) of the insider-trading signal by observing several characteristics of the transaction, such as the dollar value of the trade, the change in the insider's stock holding due to the trade, and the position of the insider.

2. Insider trading and bondholders

Ideally, we would like to examine the effect of insider bond trading on corporate bond prices. However, the current insider-trading laws do not mandate insiders to disclose their bond trades to the SEC, making it infeasible to gather a representative sample of insider bond trades. Therefore, we investigate the informational content of insider stock trading on bond prices in order to infer the potential effects of insider bond trading on the bond market.

Lin and Howe (1990), Seyhun (1986) and Givoly and Palmon (1985), among others, document that insider stock trades have predictive content for stock prices. Since insiders are assumed to be in possession of superior information, insider stock trading is viewed as a signal about the firm's future cash flows. Datta and Dhillon (1993) document that the information content of unexpected earnings announcements have similar impacts on both bond and stock markets. Like earnings announcements, the information revealed by the insider stock trades is expected to be valuable, not only for the stock market, but also for the bond market. Additionally, it can be argued that if the bond market responds to insider stock trades, then there is reason to believe that it would respond, at least as much, to insider bond trades as well.

There are two major provisions in the Securities Exchange Act of 1934 (henceforth called the Act of 1934) that regulate insider trading, namely, Rule 10b-5 and Section 16. Under Rule 10b-5, it is unlawful for an individual with fiduciary duty to shareholders of a firm to engage in trading based on non-public information in *any* of the firm's securities. Section 3(a)(10) defines the term

'security' to include notes, bonds and debentures. However, insider trading remains without a statutory definition. As a result, the courts' interpretation of Rule 10b-5 is vital for defining insider trading (Mitchell and Netter, 1992). For example, there is no clear court precedent that specifies that trading in bonds is illegal. In fact, in Chiarella v. United States [2] (1980) the Supreme Court based the illegality of insider trading on the existence of fiduciary duty between executives and directors of the firm and uninformed investors. The fiduciary duty theory is the only theory explicitly adopted by the Supreme Court thus far. By doing so, the Supreme Court restricted the scope of liability in insider-trading cases since insiders have no fiduciary duty toward the firm's bondholders, including convertible bondholders. The Delaware courts also held that convertible debtholders are creditors to whom contractual duties, but no fiduciary duties, are owed as long as the option to convert is not exercised (Corey et al., 1991). Thus, although the actual language of Rule 10b-5 is very broad, the legal rule of insider liability is much narrower in scope (see N.N., 1992). In fact, the SEC commissioner Edward Fleischman said: ''There's no real body of law to bring insider-trading cases in the junk bond area.'' (Cohen and Salwen, 1991).

In addition, Section 16(a) does not require insiders to report their straight bond transactions to the SEC. [3] This section dictates reporting holdings and transactions *only* in equity-related securities such as stocks and convertible bonds. Section 16(b) compels insiders to disgorge any profits accumulated from the sale of *shares* held for six months or less. Again, this section does not apply to insider bond transactions. Subsequently, the Insider Trading Sanctions Act of 1984 (ITSA) and the Insider Trading and Securities Fraud Enforcement Act of 1988 (ITSFEA) broadened the scope of the SEC to impose harsher penalties of up to three times the insider-trading profits from trading in stocks. The ITSA also brought insider trading in derivative securities, such as options, within the prosecutory power of the SEC.

In 1987, the SEC enacted Rule 14e-3 which regulates trading around public tender offers by imposing a duty to disclose or abstain from trading in the securities of a target firm. Hence, this rule seems to bar insider trading in the bonds of target firms. Moreover, Rule 14e-3 is more restrictive than Rule 10b-5 since it does not require breach of fiduciary duty before liability is imposed (Mitchell and Netter, 1992; N.N., 1992).

Seyhun (1986) observes that insiders' abnormal profits due to stock trading do not appear to be large. He attributes this to the lack of trading by insiders in their firms' stocks prior to highly profitable events since stock trading is regulated by

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[2] See 445 U.S. 222, 230 (1980). Chiarella was an employee of a financial printer who was able to decode the identity of target firms before takeover announcements were made public and thereafter bought stock in those firms. The Court ruled that Chiarella was not obligated to disclose his information before trading since he did not owe a fiduciary duty to the shareholders of the target firms.

[3] Insiders are defined as officers, directors, and shareholders with 10% or more equity ownership.

the Securities Exchange Act of 1934 and insiders can be sued for violating their fiduciary duties to shareholders if they trade on material non-public information. Debt issues are traded for the same reasons as equity and, therefore, offer similar opportunities for speculative exploitation. However, insiders face a smaller probability of reprisal as the current laws do not require them to report their straight bond trades, which makes tracking insider transactions on the bond market more difficult and time consuming than those on the stock market.

In the recent past, the financial press provided anecdotal evidence of widespread insider trading in bonds (Anders, 1991; Schifrin, 1991; Cohen and Salwen, 1991; Galen, 1991). The press also has brought attention to the abuse of insider trading in bonds in bankruptcy cases where some investors who are on the creditors' committee are privy to confidential information, which they use for personal gain. For example an article in Forbes reports:

"... [M]oney manager Talton Embry gathered useful information while one of his employees was on the creditors committee of bankrupt fertilizer maker Beker Industries. He learned that the judge supervising the bankruptcy was going to subordinate first mortgage bondholders' claims and thus lessen their value. Embry's representative resigned from the committee and, without informing the public or the SEC, Embry sold his bonds, after which their price dropped from around 30 cents on the dollar to a low of about 16 cents." (Schifrin, 1991)

Another example of abuse by members of creditor committees involves increasing bond ownership to a certain block size, which is an effective tactic to influence reorganization plans and possibly gaining control of the emerging firm as bonds are exchanged for shares. Goldman Sachs Partners discussed reorganization plans of Texas International with an unsecured creditor committee and, at the same time, was buying Texas International bonds. Subsequently, when the firm made an exchange offer and emerged from bankruptcy, Goldman Sachs owned more than 50% of the new firm's equity (Schifrin, 1991).

In 1991, the SEC made its first major probes into bond trading undertaken by S.N. Phelps, R.D. Smith and Co. (investment firm), and Steinhardt Partners (a hedge fund) in an attempt to extend the insider-trading laws beyond equity-related securities and into junk bonds of financially distressed firms (Galen, 1991; Cohen and Salwen, 1991). However, the possibility for bond-trading abuses by insiders is not unique to financially distressed firms. Insiders can take big positions in a healthy firm's bonds without being required to disclose these transactions to the SEC and can also liquidate their position at any time. Because bond market trades are more difficult to track than trades in the stock market, the insiders may face a smaller probability of retribution by the law due to the absence of disclosure requirements. Similarly, raiders can accumulate large holdings in a firm's junk bonds without a requirement to disclose this information to the SEC and investors at large. Mariel Clemenson, head of high-yield research at Citicorp, believes that "trading on advance knowledge of market-moving information is 'pretty widespread' in the junk bond market" (Anders, 1991).

A committee on Federal Regulation of Securities (1984) recommended that Section 16 of the Act of 1934 be amended to include insider trading in debt. Major changes in the bond market in recent years, such as growth in the amount of corporate debt outstanding, more active bond trading, greater proportion of lower-quality bonds and more individual investors, have resulted in greater prominence of debt in the capital markets and the consequent need for enhanced protection for bond investors (McDaniel, 1986).

Insider trading in bonds has the potential of wealth expropriation from bond-holders and thereby can deter capital formation in the bond market. Seyhun (1986) indicates that in the case of insider trading in stocks "a generally overlooked implication of profitable trading by informed investors is that there is a loser for each winner, since informed traders' abnormal profits reduce the opposing traders' realized returns dollar for dollar." Insider trading has been found to have negative implications for stock market efficiency by increasing transaction costs and reducing liquidity, both of which result in the dampening of capital formation (Glosten and Milgrom, 1985; Glosten and Harris, 1988; Glosten, 1989; Ausubel, 1990). The presence of traders with superior information (such as insiders) subjects the market makers to an adverse selection problem, hence forcing them to widen the bid–ask spread. Glosten and Harris (1988) provide evidence that a significant portion of the NYSE common stock bid–ask spread can be attributed to informational asymmetry between insiders and outsiders. In spite of the wider bid–ask spread, insiders profit systematically from their transactions at the expense of market makers because of the value of their inside information. On the other hand, market makers recoup the losses suffered in these trades by gains made at the expense of uninformed investors who shoulder a higher bid–ask spread. Since under current securities laws, insiders have no fiduciary duty toward the bondholders (McDaniel, 1986), this leaves the bondholders exposed to a type of wealth expropriation which cannot be limited by strengthening the bond covenants or any other firm-specific factor.

3. Sample selection and data description

A preliminary sample of insider trading between September 1989 and April 1991 is collected from WSJ's Insider Trading Spotlight (henceforth Spotlight), which is published every Wednesday. The source of the data is Invest/Net of Fort Lauderdale, Florida. The Spotlight is composed of two sections. The first section provides the largest twenty individual buy and sell transactions by registered insiders based on reports filed with regulators the previous week. The information provided by the Spotlight for these trades is: (a) name of the company, (b) exchange on which the company is traded, (c) name of the insider and the insider's position in the firm (director, officer, chairman of the board, vice president or other), (d) number of shares traded, (e) dollar value of shares traded, and (f)

percent change in holdings of the insider. These insider trades include open market and private transactions which involve both direct and indirect holdings. Also, these trades exclude stocks selling at less than $2 a share, trades that involve acquisitions through options, and companies being acquired.

The second section of the Spotlight reports companies with the biggest net changes in insider ownership over the latest eight weeks based on actual transaction dates in reports filed through the previous Friday. [4] The Spotlight ranks the companies by the net change in shares held by those insiders who bought or sold during the prior eight weeks, expressed as a percentage change of their holdings at the start of the period. [5] This section provides the name of the company, the exchange on which it is traded, the net percentage change in holdings of active insiders over the latest 8 and 24 weeks, the ratio of buyers to sellers during the last 8 and 24 weeks, and the multiple of the historical norm based on the last three years.

We chose the Spotlight as a source of stock insider trades for four reasons. First, the Spotlight provides the largest sell and buy transactions made by insiders; it is more likely to detect a price response for the large insider trades, [6] and the Spotlight provides an excellent source of such trades. Second, hand collection of bond data makes it infeasible to study thousands of trades, as in stock studies was done. Third, the Spotlight's publication date is a more appropriate event date than the insider stock transaction date because the more general market participants may not be aware of the trade at that point. Moreover, there is no reason to believe that insiders trade in bonds on the same day they trade in their firm's shares. In the absence of any regulation that mandates the insiders to report their bond trading, it is not possible to discern when (and if) insiders trade in their firm's bonds. For this reason, in contrast to prior stock studies, it is not possible to measure the insider's profits generated from bond trading based on private information. Finally, due to more frequent (weekly) publication of the Spotlight it may, in most cases, be the first *broad* public dissemination of the insider trades (prior to the monthly Official Summary of Security Transactions and Holdings published by the SEC). Most of the previous studies on insider trading used the Official Summary as one of the primary sources of their samples.

Firms are excluded from the initial sample if their bonds are not listed on the New York Stock Exchange. We also delete any observation where the bond trades on fewer than 5 days during the 21-day event period. Additionally, a bond has to trade both before and after the announcement day to be included in the sample.

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[4] In 1992, the WSJ changed the ranking of firms in terms of the largest net change during the last eight weeks to that occurring during the last twelve weeks.

[5] The Spotlight excludes trades valued under $75 000, option-related sales, companies with fewer than three buyers or sellers, or fewer buyers or sellers than the historical average for the period.

[6] Healy et al. (1992) chose the largest merger transactions for similar reasons. Also see Seyhun (1986, 1992).

The final sample contains 196 announcements, 94 of which are insider buy transactions and 102 are sell transactions.

Following Handjinicolaou and Kalay (1984), daily bond prices of the most frequently traded bond for each firm in the sample (one bond per firm) are used in the analysis. The bond prices are collected from the WSJ for 11 trading days before and 10 days after the Spotlight publication date (day 0). [7] Treasury bond prices with matching coupons and maturities as those of the sample bonds are also retrieved from the WSJ. To compute daily returns from bond prices, with cumulated daily coupon interest, Moody's Bond Record is used to identify the interest payment dates of the sample bonds.

Table 1 presents a description of the sample. Panel A reports the distributions of the total sample, and buy and sell sub-samples by the year of the publication. Panel B of the table presents Standard and Poor's rating distribution of the sample bonds at the time of the announcement. Approximately 19% of the bonds in the sell sample are speculative grade (rating BB or lower), whereas 31% of the buy sample belongs to this class. Panel C of Table 1 presents the trading distribution of the sample bonds during the 21-day event window. It shows that 75% of the sample bonds trades more than seven times during the event window.

Table 2 reports the summary statistics for our sample firms from the information reported in the two parts of the Spotlight. It is worth noting here that extensive random checking of the Official Summary of Security Transactions and Holdings revealed very sparse *voluntary* reporting of straight bond trading by the insiders. [8] However, it is difficult to say whether this sparse reporting of bond trades is due to the insiders choosing not to report their trades or that fewer insiders, in fact, trade in their firm's debt securities. Moreover, for the few entries that indicated insider bond trading, the information in a majority of the cases was incomplete. Most commonly the price at which the insiders traded was missing.

4. Empirical methods

The mean-adjusted-returns methodology developed by Masulis (1980) and adapted for bonds in Handjinicolaou and Kalay (1984) is used to estimate excess bond returns. To adjust for changes in the term structure of interest rates, the corporate bonds are matched with treasury bonds according to maturity and coupon rate, and the adjusted bond return ($ABR_{i,d}$) is calculated as follows:

$$ABR_{i,d} = BR_{i,d} - TBR_{i,d} \tag{1}$$

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[7] Handjinicolaou and Kalay (1984), Jayaraman and Shastri (1988) and Datta and Dhillon (1993), among others, used daily bond prices from the WSJ or one of the commercial databases.

[8] We thank Nejat Seyhun for suggesting that we check the Official Summary for any reported bond trades by insiders.

Table 1
Frequency of sample bonds by year for the total sample, and for subsets of insider buy and sale transactions occurring between September 1989 and April 1991

Year	Total	Buy	Sell
Panel A: Frequency distribution of bond samples by year			
1989	49	17	32
1990	111	58	53
1991	36	19	17
Total	196	94	102
Panel B: Frequency distribution of S and P's bond rating			
Bond rating			
AAA	12	7	5
AA	39	15	24
A	55	25	30
BBB	42	18	24
BB	19	13	6
B	20	14	6
CCC	3	0	3
CC	2	0	2
NR	4	2	2
Total	196	94	102

Panel C: Frequency distribution of sample bond trades		
Range of trades	Number	Percent
$17 \leq R < 20$	60	30.60
$14 \leq R < 17$	26	13.30
$11 \leq R < 14$	30	15.30
$8 \leq R < 11$	31	15.80
$5 \leq R < 8$	49	25.00
Total	196	100.00

where $BR_{i,d}$ is the holding-period bond return for bond i for day d and $TBR_{i,d}$ is the return over the same period for an equivalent treasury bond. The holding period return ($BR_{i,d}$) for corporate bond i for day d is calculated as follows:

$$BR_{i,d} = \ln[F_{i,d}/F_{i,d-1}] \tag{2}$$

where $F_{i,d}$ is the flat price for corporate bond i for day d. [9]

[9] Flat price is calculated as follows: $F_{i,d} = P_{i,d} + (C_i/180)N_i$ where $P_{i,d}$ is the closing price for bond i on day d, C_i is the semi-annual coupon payment for bond i, and N_i is the number of days that elapsed since the last coupon payment.

Table 2
Descriptive statistics of large insider transactions as provided in the Insider Trading Spotlight in the WSJ

Variable	Mean	Median	Min	Max
Panel A: Largest individual trades				
Insider buyers				
Percent change in holdings (%)	87.87	37.00	0.40	1272.00
Dollar value (in $ millions)	2.63	0.24	0.03	104.02
Number of shares ($\times$ 1000)	136.31	10.00	1.00	4400.00
Insider sellers				
Percent change in holdings	34.78	26.00	1.00	100.00
Dollar value (in millions)	3.36	2.42	0.27	36.63
Number of shares ($\times$ 1000)	90.93	53.00	2.60	1000.00
Panel B: Largest company holding changes				
Insider buyers				
8-week % holding change	164.52	81.00	12.00	1781.00
24-week % holding change	108.08	44.00	$-$38.00	108.08
Insider sellers				
8-week % holding change	$-$48.74	$-$43.00	$-$10.00	$-$100.00
24-week % holding change	$-$44.62	$-$40.00	4.00	$-$100.00

A 19-day interval around the Spotlight publication (day 0) is used to estimate the comparison and announcement period returns. The comparison period is day $t-10$ to day $t-2$ and day $t+1$ to day $t+10$. The mean comparison period return $(R_{i,\text{cp}})$ for bond i as derived by Handjinicolaou and Kalay (1984) is as follows:

$$R_{i,\text{cp}} = \frac{1}{19} \sum_{\text{cp}} \frac{ABR_{i,d}}{d_k - d_{k-1}} \tag{3}$$

where $d_k - d_{k-1}$ is the number of trading days that elapsed between two successive trades. Since bond returns are a series of single- and multiple-day returns, they are adjusted to yield equivalent *single-day* returns and standardized as follows:

$$SBER_{i,d} = \frac{ABR_{i,d} - R_{i,\text{cp}}(d_k - d_{k-1})}{S_i \sqrt{d_k - d_{k-1}}} \tag{4}$$

where $SBER_{i,d}$ is the daily standardized excess return for bond i and S_i is the

estimated standard deviation of the comparison-period returns for bond i computed as follows:

$$S_i^2 = \frac{1}{18} \sum_{k_i=2}^{K} \left[\frac{ABR_{i,d}}{\sqrt{d_k - d_{k-1}}} - R_{i,cp}\sqrt{d_k - d_{k-1}} \right]^2 \tag{5}$$

where k is the number of trading days for bond i during the event period.

The standardized mean excess return ($SMER_d$) for the portfolio of bonds for day d is then estimated for each day in the event period and is given by

$$SMER_d = \sum_i \frac{SBER_{i,d}}{q} \tag{6}$$

where q is the number of bonds trading on day d. Assuming that individual standardized excess bond returns are cross-sectionally independent and normally distributed, the appropriate test statistic for any event day is ($SMER_d/s_p$) where s_p is the standard deviation of the portfolio standardized excess returns over the comparison period, which is calculated as follows

$$s_p = \sqrt{\frac{1}{18} \sum_{cp} [SMER_d - SMER^*]^2} \tag{7}$$

where $SMER^*$ is the average standardized portfolio excess return over the comparison period and cp is the comparison period. [10] Finally, the t-statistic for cumulative excess return ($CMER$) is computed by the following equation:

$$t\text{-statistic} = \frac{CMER}{\sqrt{n}\, s_p} \tag{8}$$

where n is the number of days over which the CMER is measured.

The standard market model event study is used to examine the stock price response to the Spotlight publication. The market model parameters are estimated using daily stock returns from 300 to 46 days preceding the publication day (day 0). The appropriate test statistic in this case is again

$$t\text{-statistic} = \frac{CMER}{\sqrt{n}\, s_p} \tag{9}$$

where n is the number of days over which the cumulative stock excess return ($CMSER$) is measured and s_p is the standard deviation of portfolio excess returns computed over the estimation period.

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[10] Detailed derivations of the formulas in this section are provided in Handjinicolaou and Kalay (1984).

Table 3
Standardized daily portfolio bond excess returns (SMER) and cumulative excess returns (CMER) for insider buy samples (straight and convertible) surrounding the publication of the Insider Trading Spotlight in the WSJ

Event day	Convertible bonds ($N = 21$)			Straight bonds ($N = 73$)		
	SMER	t-stat.	CMER	SMER	t-stat.	CMER
−10	0.300	1.105	0.300	−0.040	−0.222	−0.040
−9	0.513 c	1.892	0.813	0.306 c	1.682	0.266
−8	−0.334	−1.232	0.479	0.043	0.237	0.309
−7	0.100	0.368	0.579	0.058	0.318	0.366
−6	−0.083	−0.306	0.496	−0.013	−0.073	0.353
−5	−0.128	−0.472	0.368	0.170	0.934	0.523
−4	−0.091	−0.334	0.277	−0.051	−0.281	0.472
−3	0.295	1.087	0.572	0.461 a	2.533	0.933
−2	−0.382	−1.409	0.189	−0.016	−0.086	0.917
−1	0.119	0.440	0.309	0.007	0.040	0.925
0	1.227 a	3.961	1.536	0.913 a	5.301	1.838
+1	−0.399	−1.470	1.137	−0.578 a	−3.175	1.260
+2	−0.220	−0.810	0.917	−0.215	−1.181	1.045
+3	0.296	1.092	1.213	0.086	0.472	1.131
+4	−0.550 b	−2.025	0.663	−0.171	−0.939	0.960
+5	0.231	0.852	0.894	−0.062	−0.339	0.898
+6	0.113	0.417	1.007	−0.253	−1.393	0.645
+7	−0.063	−0.231	0.944	0.009	0.052	0.654
+8	0.019	0.071	0.963	0.180	0.988	0.834
+9	−0.232	−0.855	0.731	0.140	0.768	0.974
+10	−0.105	−0.387	0.626	−0.238	−1.310	0.736

[a,b,c] Significant at the 10%, 5%, and 1% level, respectively.

5. Empirical results

5.1. Information content of insider trading

The return data are analyzed separately for both straight and convertible debt for the buy and sell transactions. Table 3 presents the convertible and straight bond price reactions to the Spotlight publication for the insider buy transactions. The publication day (day 0) standardized straight bond excess return is 0.91 while the corresponding excess return for the convertible bond sample is 1.23. [11] Both straight and convertible bond excess returns are significant at the 1% level. Table

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[11] Since standardized returns are not *technically* percentage returns, we do not assign any units to these excess returns.

Table 4
Standardized daily portfolio bond excess returns (*SMER*) and cumulative excess returns (*CMER*) for insider sell samples (straight and convertible) surrounding the publication of the Insider Trading Spotlight in the WSJ

Event day	Convertible bonds ($N = 16$)			Straight bonds ($N = 86$)		
	SMER	t-stat.	CMER	SMER	t-stat.	CMER
−10	−0.014	−0.049	−0.014	−0.227 [c]	−1.361	−0.227
−9	−0.127	−0.452	−0.140	0.018	0.109	−0.209
−8	0.557 [b]	1.987	0.416	−0.101	−0.604	−0.310
−7	0.086	0.308	0.503	−0.071	−0.428	−0.381
−6	−0.450 [c]	−1.606	0.053	0.100	0.597	−0.282
−5	0.090	0.323	0.143	0.140	0.840	−0.141
−4	−0.110	−0.391	0.034	−0.110	−0.658	−0.251
−3	0.035	0.124	0.068	−0.119	−0.716	−0.370
−2	0.280	0.999	0.348	0.068	0.408	−0.302
−1	−0.194	−0.691	0.155	0.250 [c]	1.501	−0.052
0	−1.506 [a]	−5.375	−1.352	−0.635 [a]	−3.808	−0.687
+1	−0.045	−0.162	−1.397	0.125	0.741	−0.564
+2	0.337	1.202	−1.061	0.343 [b]	2.056	−0.221
+3	−0.059	−0.212	−1.120	0.135	0.808	−0.086
+4	−0.333	−1.188	−1.453	0.228 [c]	1.368	0.142
+5	0.180	0.642	−1.273	−0.103	−0.618	0.039
+6	−0.661 [a]	−2.359	−1.934	−0.140	−0.840	−0.101
+7	0.149	0.532	−1.785	−0.142	−0.852	−0.243
+8	0.018	0.063	−1.768	0.190	1.137	−0.053
+9	−0.163	−0.580	−1.930	−0.159	−0.953	−0.212
+10	−0.065	−0.233	−1.996	−0.113	−0.677	−0.325

[a,b,c] Significant at the 10%, 5% and 1% level, respectively.

4 reports the price reactions for the insider sell transactions, the publication day standardized excess returns for straight and convertible bond samples are −0.64 and −1.51, which are also significant at the 1% level. To examine the robustness of these results, we compute the binomial sign z-statistic, which tests the null hypothesis of equal distribution of positive and negative excess returns on the event day, for each of the four sub-samples. The non-parametric z-statistic for the straight (convertible) bonds for the buy portfolio is 3.63 (3.71) while the z-statistic for the straight (convertible) bonds for the sell portfolio is 3.02 (3.50). All the above z-statistics are significant at the 1% level, indicating that the event-study results are robust to the distributional assumptions and are not driven by outliers. [12]

Overall, these results document that there is substantial information content of insider trading in stocks for the bond market. Perhaps the large bond price reactions documented here may be due to the selection of the biggest insider trades

Table 5
Cumulative stock excess returns (CSER) over various intervals for insider buy ($N = 86$) and sell ($N = 91$) samples surrounding the publication of the Insider Trading Spotlight in the WSJ

Event window	CSER	t-statistic
Panel A: CSER for buy sample (%)		
−10, −1	−0.39	−0.61
0	0.48	2.31 [b]
0, +1	0.78	2.68 [a]
−1, +1	1.10	3.09 [a]
+1, +10	0.43	0.66
Panel B: CSER for sell sample (%)		
−10, −1	−0.69	−1.43 [c]
0	−0.21	−1.38 [c]
0, +1	−0.43	−2.01 [b]
−1, +1	−0.38	−1.44 [c]
+1, +10	−1.09	−2.27 [b]

[a,b,c] Significant at the 10%, 5% and 1% level, respectively.

by the Spotlight (as described in Section 3. Seyhun (1992) finds that the largest insider trades convey a stronger signal about the firm's prospects.

In light of the significant bond price response, the following question may be raised. Can investors earn any trading profits based on this insider-trading information? The answer hinges on the magnitude of the bid–ask spread in the bond market. Stoll and Whaley (1983) estimate the bid–ask spread for stocks to be between 2.9 and 0.7% depending on the firm size. Unfortunately, the bid–ask spread for the bond market is not directly comparable to that of the stock market because of the nature of bond trading. The majority of bond trading is conducted off-the-floor, primarily by financial institutions, by matching buy and sell orders. Hence, the bid–ask spread may have a large variance. Therefore, no definitive statement can be made concerning the *economic* efficiency of the bond market.

Although the primary focus of this study is the investigation of information content of insider stock trading for the bond market, the analysis of the stock market response is also interesting, because the source of the insider-trading information used in this study is relatively new and more timely than the SEC Official Summary, used in prior studies. Table 5 reports the stock market response to the Spotlight publication of insider trades. The mean standardized excess return

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[12] The results are very similar when the sample bonds are partitioned into two sub-samples based on the two segments of the Spotlight. Specifically, for the sub-sample of bonds appearing in the first part of the Spotlight, the publication-day standardized bond excess return for the insider sell transactions is −0.712 and 1.086 for the insider buy transactions; both are significant at the 1% level. The comparable figures for the sub-sample of bonds based on the second segment are −0.786 and 0.775, respectively. Again, both of these bond excess returns are significant at the 1% level.

on day 0 for the buy portfolio is 0.48, which is significant at the 5% level ($t = 2.31$). The cumulative mean standardized excess return for days 0 and $+1$ is 0.78, which is significant at the 1% level. The non-parametric sign z-statistic for day 0 is significant at the 10% level ($z = 1.43$), while the two-day (days $0, +1$) z-statistic is significant at the 5% level ($z = 2.08$). However, for the sell sample, the stock price response on the publication day is significant only at the 10% level, with a mean standardized excess return of -0.21. The corresponding two-day cumulative excess return of -0.43% is significant at the 5% level. The non-parametric sign z-statistics for day 0 and days $(0, +1)$ are -1.76 and -2.18, respectively. They are both significant at the 5% level.

The results suggest that insider stock trading information published in the Spotlight column also has information content for the stock market. It is interesting to note that the bond price response to the insider-trading information is stronger than the stock price reaction. This result may be due to the fact that the stock market, which trades more actively than the bond market, is more efficient in incorporating the insider stock trading information than the bond market. However, as our results indicate, the impact of the information is not fully impounded in the stock prices before the Spotlight publication. [13]

To provide additional evidence in support of the basic premise of this paper that insider stock trades should convey similar information for both bond and stock markets, we estimate the following regression model for buy and sell samples (t-statistics in parentheses):

$$\text{Buy sample:} \quad SBER_0 = 0.526 + 0.408\,SER_0, \quad \text{adjusted } R^2 = 0.044, \quad (10)$$
$$\underset{(0.19)}{} \quad \underset{(1.92)}{}$$

$$\text{Sell sample:} \quad SBER_0 = -0.200 + 0.208\,SER_0, \quad \text{adjusted } R^2 = 0.030$$
$$\underset{(-0.12)}{} \quad \underset{(1.70)}{}$$

$$(11)$$

where $SBER_0$ is the publication-day standardized individual bond excess returns and SER_0 is the publication-day standardized individual stock excess returns. The coefficients of SER_0 in both regressions are significant at the 5% level, providing evidence that the bond price reaction is significantly correlated with the stock price reaction to the insider-trading information.

5.2. Cross-sectional analysis

Previous researchers have proposed that the strength of the insider-trading information as a signal is dependent on several observable factors. To analyze the

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publication-day bond excess returns, we estimate various versions of the following model with different explanatory variables representing the strength of the insider-trading signal and the risk sensitivity of the bond price response captured by the bond rating:

$$SBER_0 = a_0 + a_1(\text{VALUE}) + a_2(\text{HOLD}) + a_3(\text{POSITION})$$

$$+ a_4(\text{RATING}) + e \qquad (12)$$

where $SBER_0$ is the publication-day standardized individual bond excess return, VALUE represents the dollar value of the insider trade, HOLD is the percentage change in the holding of the insider, POSITION is a dichotomous variable which assumes a value of 1 if the insider is a director, chairperson of the board, president, or vice president and 0 otherwise, RATING is an ordinal variable indicating the bond rating (e.g. assumes a value of 9 if the rating is AAA, 8 if it is AA, etc.), [14] and e is the random error term. Given that the Spotlight column provides different sets of information about insider trading in its top and bottom segments (as detailed in Section 3, we estimate two different sets of regressions. The results of these two sets of regressions are presented in Tables 6 and 7, respectively. In the presence of heteroskedasticity in the models, the t-statistics were corrected using the procedure of White (1980). [15]

Following Jaffe (1974) and Seyhun (1986), we include in one version of the model the dollar value of the insider transaction as one of the explanatory variables capturing the strength or the value of the information. Models 1 and 3 of Table 6 indicate that the dollar value of the insider stock trades is an important determinant of bond excess return. [16] The coefficients of the variable VALUE are significant at the 5% level for both insider sell (model 1) and buy (model 3) groups. [17,18] Although Jaffe (1974) and Seyhun (1986), when examining stock prices, find no relation between the dollar value of insider trades and the value of insider information, Seyhun (1986) reports that the *natural log* of the dollar value

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[14] All sub-ratings, such as AA+, AA and AA−, are subsumed in one category (in this case AA).

[15] We detected heteroskedasticity using White's general heteroskedasticity test (see Fomby et al., 1984).

[16] To identify influential outliers, we use diagnostic methods described in Belsley et al. (1980). Specifically, we employ the studentized residual, the hat matrix diagonal, the covariance matrix ratio, the change of fit and coefficient sensitivity to eliminate any influential outliers. These diagnostic methods identified the same influential outliers in most cases. Our regression results are based on the sample without influential outliers.

[17] To examine if the dollar value of the insider trades is proxying for firm size, we computed the correlation between the two variables. For both buy and sell samples, the correlations between the dollar value of the transaction and the firm size are insignificant, with values of 0.049 ($t = 0.33$) and −0.088 ($t = -0.65$), respectively.

[18] Both models 1 and 3 were re-estimated using the dollar value of the insider trade scaled by the market value of equity instead of the VALUE variable. However, this scaled variable was insignificant in both sell and buy regressions.

Table 6

Regressions explaining the Insider Trading Spotlight publication day bond excess returns for insider sell and buy samples with largest individual insider trades

Variable	Insider sell sample		Insider buy sample	
	Model 1	Model 2	Model 3	Model 4
INTERCEPT	− 1.001	− 2.479 [b]	1.817 [b]	1.260 [b]
	(− 1.11) [d]	(− 2.32)	(1.93)	(1.80)
VALUE	− 0.001 [b]	–	0.001 [b]	–
	(− 1.69)		(1.74)	
HOLD	–	− 0.002	–	0.001
		(− 0.40)		(0.30)
POSITION [e]	− 0.642 [b]	− 0.789 [a]	–	–
	(− 2.03)	(− 2.81)		
RATING	0.208 [b]	0.354 [a]	− 0.142 [c]	− 0.061
	(1.96)	(2.64)	(− 1.30)	(− 0.62)
Adj. R^2	0.156	0.173	0.038	0.025

[a,b,c] Significant at the 10%, 5% and 1% level, respectively.

[d] White's (1980) correction is used to calculate t-statistics.

[e] POSITION variable is not used in models 3 and 4 since all of the insider transactions were made by informed insiders such as directors, chairpersons of the board, presidents or vice presidents.

VALUE: represents the dollar value of the insider trade (in millions).

HOLD: denotes the percentage change in the holding of insiders.

POSITION: takes a value of 1 if the insider making the sale/purchase is a director, chairperson of the board, president or vice president and 0 otherwise.

RATING: takes a value of 9 if the bond rating is Aaa, 8 when the rating is Aa, etc.

Table 7

Regressions explaining the Insider Trading Spotlight publication day bond excess returns of insider sell and buy samples with the largest change in insider trades over the prior 8-week and 24-week periods

Variable	Insider sell sample		Insider buy sample	
	Model 1	Model 2	Model 3	Model 4
INTERCEPT	− 1.937 [a]	− 1.785 [a]	0.196	0.812
	(− 4.63) [d]	(− 3.78)	(0.49)	(1.44)
HOLD8	− 0.009 [b]	–	0.002 [a]	–
	(− 1.82)		(2.34)	
HOLD24	–	− 0.006	–	− 0.001
		(− 0.89)		(− 0.30)
RATING	0.264 [a]	0.299 [a]	− 0.029	− 0.035
	(3.74)	(3.40)	(− 0.05)	(− 0.22)
Adj R^2	0.137	0.145	0.048	0.009

[a,b,c] Significant at the 10%, 5% and 1% level, respectively.

[d] White's (1980) correction is used to calculate t-statistics.

HOLD8: denotes the percentage change in holding of insiders due to sale/purchase during the last eight weeks.

HOLD24: denotes the percentage change in holding of insiders due to sale/purchase during the last twenty-four weeks.

RATING: takes a value of 9 if the bond rating is Aaa, 8 when the rating is Aa, etc.

of insider trades is significant at the 1% level in explaining insiders' abnormal (stock) profits. He explains that the non-linearity of information content of large dollar volume transactions in stock studies may be due to these trades being driven by large shareholders of large firms who happen to trade on less valuable information. It is interesting to note that in contrast to the previous studies that examined stock prices, we find that large dollar volume transactions by insiders have information content for the bond market.

Models 2 and 4 in Table 6 include the percentage change in the holding of the insiders, HOLD, as an explanatory variable. A larger percentage change in the holding of the insider in the firm would indicate that the insider is attaching a greater value to the private information leading to the trade, ceteris paribus. Seyhun (1986) uses a similar variable (log of the proportion of the firm traded) and finds that it is significant at the 1% level in explaining insider abnormal profits. The coefficients of the variable, HOLD, are insignificant in both model 2 (sell) and model 4 (buy). [19] In explaining the insignificance of this variable, it must be recognized that a relatively small pre-trade holding by the insider may result in a large percentage change in the insider holding even though the number of shares traded by the insider is the same or less than that of some other insider with a large pre-trade holding.

The quality of the information conveyed through the insider trade can also be captured by observing the position of the insider in the firm. Seyhun (1986) posits that "insiders who are more familiar with the overall operations of the firm trade on more valuable information." We find that for the sell sample the POSITION variable is significant at the 5% level in model 1 and at the 1% level in model 2, which is in support of the results explaining stock excess returns documented by Seyhun (1992). However, we do not include this variable in models 3 and 4 since all the trades in the buy sample were conducted by top officers. Inclusion of the variable in these models would result in the covariance matrix not being of full rank.

Finally, the bond rating variable, RATING, is included as an independent variable in the model to examine whether the riskiness of the bond issue has any influence in determining the bond excess return. Several researchers have used bond rating as a measure of risk in capturing the relation between the riskiness of the issue and the abnormal security price reaction to an announcement, such as the issuance of a security. [20] Intuition suggests that low-rated (riskier) bonds would be more sensitive to a change in the expectation of the firm's cash flow prospects due to the information revealed through a signal, such as insider-trading information. As a result, a positive (negative) relation between the bond's rating and the bond excess return is expected when the insider transaction involves a sale (purchase).

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[19] We do not incorporate the variables VALUE and HOLD in the same model as they are expected to be correlated.

We find that this variable is positive and significant at the conventional levels for the sell sample while it is negative and significant in model 3 for the buy sample. As expected, these findings imply that the lower-rated bonds are more sensitive to the publication of the insider information than the higher-rated issues. [21]

In another formulation of the model, the inclusion of the publication-day stock excess return as an independent variable (not shown in the table) resulted in a multicollinearity problem because the explanatory powers of the remaining variables are subsumed by the stock excess return. This finding reinforces our argument that stock and bond markets are both reacting to information derived from insider trading.

Using the information contained in the second part of the Spotlight, we run a separate set of regressions for the insider sell and buy samples. The results of these regressions are presented in Table 7. We observe that the change in the holdings of the active insiders in the 8-week period prior to the transactions (HOLD8) is a significant determinant of the bond excess return on the day the information is published in the Spotlight. However, in models 2 and 4, the coefficients of the change in the holdings over the 24-week period prior to the transaction (HOLD24) is not statistically significant. Taken together, these results indicate that investors put more emphasis on more recent information about insider trades. Finally, the bond rating variable is positive and significant at the 1% level in models 1 and 2 (sell sample), implying that lower-rated bonds are more sensitive to the information revealed by the insider trades. Although this variable has the expected sign, it is insignificant in models 3 and 4 (buy sample).

6. Summary and conclusions

This study documents that there is significant information content in stock trading by registered corporate insiders for the bond market. Specifically, we observe significant positive convertible and straight bond price reactions to the publication of insider buy transactions and significantly negative reaction for insider sell trades. Stock market response to the publication of the Insider Trading

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[20] Shyam-Sunder (1991) uses bond rating in an attempt to explain the stock price reaction to safe and risky debt issues. She finds no difference in response between risk classes. Linn and Pinegar (1988) also use bond rating and find a stronger negative effect for low-rated preferred stock issuance. Mikkelson and Partch (1986) find a stronger negative stock price reaction to high-rated convertible debt issues than to low-rated issues. Hence, conflicting results exist relating to whether low- or high-rated bonds are more sensitive to a change in the expectation of firm value revealed through a signal.

[21] In one formulation of the model we include a size variable (natural log of the assets of the firm), which is found to be insignificant for all sub-samples. In contrast, Seyhun (1986) finds this variable to be statistically significant for a stock sample.

Spotlight is also examined and found to be significant for both the buy and sell samples. Furthermore, the bond market response to the insider-trading information is found to be strongly related to the stock market reaction.

Results from the cross-sectional analysis suggest that bond market participants extract the quality of the insider-trading signal by observing factors such as the dollar volume of trade, the percentage change in the holding of the insider, and the insider's position in the firm. As expected, lower-rated (riskier) bonds are found to be more sensitive to the insider-trading information than higher-rated issues.

Anecdotal evidence from the financial press presented in the paper suggests that it is possible for insiders who have informational advantage to generate illicit profits by trading in bonds. In light of our empirical results a case may be made for an amendment of the current laws making it obligatory for the insiders to report their bond trades to the Securities and Exchange Commission (SEC). This will limit the potential for abnormal profits that may be generated by insider trading in bonds. A fruitful area for future research would be to investigate bond-trading profits by insiders.

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