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Debt Structure Adjustments and Long-Run Stock Price Performance[1]

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We examine the long-run implications of debt structure adjustments using a sample of U.S. bond IPOs from 1971 to 1994. Bond IPOs result in simultaneous and pronounced changes in both debt maturity and debt ownership structures. We document that firms engaging in debt IPOs substantially underperform their size-and-book-to-market-matched benchmarks by 33.39 and 55.99% over the 3- and 5-year post-offer periods. Our results are strikingly similar to those reported for equity offers but contrast the evidence for seasoned debt offers. We find evidence that debt IPOs are timed to coincide with the market having the highest expectations concerning firms' prospects. A negative relation is documented between debt maturity and future growth opportunities. In part, the underperformance can be attributed to significantly reduced growth opportunities following the offering. Post-offer underperformance is more pronounced for (a) longer maturity issues and (b) firms that do not experience an increase in bank monitoring. *Journal of Economic Literature* Classification Numbers: G12, G24, G30, D82.

Key Words: Initial public debt offering; debt maturity and debt ownership structures; bank monitoring; long-run performance.

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1. INTRODUCTION

Capital structure decisions occupy an important place in financial research. While earlier research in this area focused on understanding the debt/equity mix, a plethora of recent studies explore firms' choices regarding different features of debt securities and their role in alleviating agency costs. Primarily, these studies concentrate on the implications of corporate debt structure choice.[2]

The decision to undertake a bond initial public offering is an important turning point in a firm's capital acquisition history. Effectively, a bond IPO results in simultaneous and precipitous changes in both debt maturity and debt ownership structures of the issuing firm. In sharp contrast to the insignificant stock price response documented for seasoned debt issues (see, e.g., Eckbo, 1986; Shyam-Sunder, 1991), Datta, Iskandar-Datta, and Patel (2000) find significant negative stock price reaction to announcements of bond IPOs and explain their findings in the context of debt structure choice theories. The substantial changes in debt maturity and ownership structures due to the introduction of arm's length debt have important long-term implications for stockholders. The focus of this study is the question raised by this: What is the long-run stock price performance following bond IPO announcements? A related question is: How does stock price performance following bond IPOs compare with that following seasoned debt offerings?

A major consequence of a bond IPO is the extension of the firm's debt maturity. Based on this, the theoretical literature provides insights to address the above questions. In an asymmetric information framework, where firm insiders are better informed than outside investors, Flannery (1986) and Kale and Noe (1990) show that long-term debt can potentially be more mispriced than short-term debt. Thus, firms with favorable private information issue short-term debt to reduce borrowing costs when favorable information materializes. A similar conclusion can be drawn based on Myers' (1977) model in which firms with growth options will not issue long maturity debt in order to avoid committing the firm to share the benefits of exercising those options with debtholders. Easterbrook (1984) argues that agency costs of monitoring are lower if firms commit to periodic evaluations by issuing short-term debt. Thus, the effect of lengthening debt maturity, via a bond IPO, on the long-run stock price performance should add to our understanding of the relevance and implications of debt maturity choice.

Besides extending debt maturity, initial access to public debt capital also drastically changes the firm's private–public debt mix. There are two implications of this change in debt structure mix. First, the introduction of public debt to the firm's capital structure precipitates agency costs associated with public debt. Greater

[2] See, for example, Barclay and Smith (1995), Guedes and Opler (1996), Houston and James (1996), Johnson (1997), Anderson and Makhija (1999), Datta, Iskandar-Datta, and Patel (1999, 2000), and Krishnaswami, Spindt, and Subramaniam (1999).

informational asymmetry between public debtholders and stockholders increases the firm's contracting costs by producing adverse incentive effects such as underinvestment and asset substitution problems (see Fama, 1985; Berlin and Loeys, 1988; and Diamond, 1991). Contracting costs arising from asset substitution and underinvestment are typically greater for firms with growth options because of the increased potential agency conflicts between stockholders and bondholders. Recently, Krishnaswami, Spindt, and Subramaniam (1999) report that firms with low contracting costs have higher proportion of public debt. Supporting Myers (1977), they document that firms with more growth opportunities benefit more from the monitoring associated with privately placed debt. This suggests that the market would view negatively the firm's decision to change its debt structure mix (by accessing public debt markets for the first time) as it implies lower growth opportunities in the future. We test this notion by examining measures of growth opportunities surrounding the debt IPO.

Another type of agency cost of debt is the adverse selection problem which affects the firm's borrowing decisions. If bank lenders are better informed than public debtholders, then firms with less favorable information about the firm's future prospects will opt for public debt financing. Thus, we hypothesize that issuance of initial public debt has negative implications concerning the firm's long-run prospects.

Second, publicly placed debt can result in a firm receiving lower levels of monitoring than that which generally accompanies private debt financing. While private debt includes both bank and nonbank borrowing, it is argued that banks have a comparative advantage vis-à-vis other private lenders in monitoring borrowers (Campbell and Kracaw, 1980; Ramakrishnan and Thakor, 1984; and Fama, 1985).[3] Houston and Venkataraman (1994) show that bank commitments are valuable particularly when there is a high likelihood that information will be publicly revealed. Datta *et al.* (2000) find that the restructuring of a firm's debt mix at the bond IPO when accompanied by lower bank monitoring conveys a negative signal about the firm's future prospects. Thus, the agency costs of public debt discussed above, combined with lower monitoring by banks, suggest that firms issuing bond IPOs are likely to underperform.

This study contributes in several respects. First, given that equity IPOs and bond IPOs are significant financing events in a firm's life, our study facilitates a comparison of long-run stock price performance following bond IPOs with that of equity IPOs. Second, comparison of our results with those obtained in prior studies on seasoned debt offers can enhance our understanding of the information content of the two types of debt financing. Firms issuing initial public debt are typically

[3] Empirically, James (1987) shows that the existence of bank credit agreements emits a positive signal to the stock market, while Lummer and McConnell (1989) find that only renewal of bank credit agreements result in a positive stock price reaction at the announcement. Recently, Datta, Iskandar-Datta, and Patel (1999) documented that the existence of bank cross-monitoring significantly reduces the at-issue yield spreads for initial public debt offers.

small, lesser known, and have a short public track record.[4] As such, they are subject to severe informational asymmetries relative to firms undertaking seasoned debt offers. Thus, incremental agency costs as a result of the offering are expected to be more pronounced for firms issuing initial public debt. Datta *et al.* (2000) document that the information content of bond IPOs is fundamentally different from that of seasoned debt offers. Given the simultaneous and precipitous changes in the debt structure associated with bond IPOs, whether the long-run implications of such offers differ from those of seasoned debt offers is, therefore, an empirical issue of interest. Third, we explore cross-sections of our sample to understand the link between changes in debt structure characteristics and firm performance following bond IPOs.

This study also contributes to research relating investor psychology and stock returns by providing evidence on whether the negative shareholder wealth effect at the bond IPO continues in the long run. There is mounting evidence indicating that the post-announcement stock price drift is in the same direction as the initial market reaction to different types of security offerings, and lasts from 3 to 5 years (see Loughran and Ritter, 1995; Spiess and Affleck-Graves, 1995, 1999). The post-announcement price drift is explained by recent theoretical models of quasi-efficient security markets (see Barberis, Shleifer, and Vishny, 1998; and Daniel, Hirshleifer, and Subrahmanyam, 1998).

We examine the stock price performance of 138 firms that issued initial public debt during the period 1971 to 1994. Applying the Barber and Lyon (1997) methodology, we document that the median sample firm underperforms its size-and-book-to-market-matched control firm by 33.39% over a 3-year period and by 55.99% over a 5-year period following the bond IPO. Our results are robust to the use of alternative benchmarks in measuring abnormal performance.

The mean 3-year wealth relative for our sample, 0.80, is strikingly similar to the mean 3-year wealth relatives reported in Ritter (1991) for equity IPOs, and Loughran and Ritter (1995) for equity IPOs and seasoned equity offers. We conclude that firms issuing initial public debt underperform as severely as firms issuing new or seasoned equity. Our results, however, contrast with those reported for seasoned debt offerings. Over the 5-year post-bond-IPO period, the median firm in our sample underperforms its matched firm by almost 56%, which is three times that for seasoned debt offers documented by Spiess and Affleck-Graves (1999). Our long-run stock price performance results suggest that agency costs of public debt and private lender monitoring are critical at the stage when firms decide to introduce arm's-length debt in their capital structure.

In combination with the negative announcement-period wealth effect documented in Datta *et al.* (2000), our finding that firms introducing public debt

[4] Blackwell and Kidwell (1988) and Krishnaswami, Spindt, and Subramaniam (1999) show that firms with only private debt in their capital structure (like our sample firms prior to the bond IPO) are significantly younger and have higher levels of information asymmetry than firms with existing public debt.

underperform in the long run provides evidence of post-bond IPO stock price drift. Unlike stock offers, our evidence indicates that bond IPOs are not announced after a stock price run-up, but rather are timed prior to significant stock price underperformance. We also find that debt IPOs are undertaken when the market's perception of the firm's growth opportunities is highest relative to both the past and the future. We conclude that sample firms take advantage of this "window of opportunity" and lock-in low borrowing costs by issuing bonds prior to the period of deteriorating growth prospects and a declining stock price.

Cross-sectional analyses show a negative relation between debt maturity and expected growth opportunities. More importantly, long-run abnormal returns are negatively related to the maturity of the initial public debt issue. This finding indicates that the signal associated with debt maturity extension unfolds over the long term, and is not merely a short-term announcement effect.

We document that issuing firms that experience an increase in bank monitoring in the offer year have higher expected growth opportunities and do not underperform their matched counterparts. We find that issuing firms that experience a lower or similar level of bank monitoring have lower expected growth opportunities and exhibit significant underperformance. Our findings imply that changes in bank debt accompanying the bond IPO signal private information about long-term firm value. From an agency perspective, our results suggest that increases in bank debt accompanying the bond IPO mitigate the agency costs associated with the public debt issue.

The rest of the paper is organized as follows. The next section describes the sample selection process and the data sources. Section 3 describes the methodology. Empirical results are presented in Section 4. Section 5 concludes.

2. SAMPLE FORMATION PROCESS AND DATA SOURCES

We obtain a sample of U.S. initial public offers of corporate straight debt made between January 1971 and December 1994 from the Securities and Exchange Commission's Registered Offerings Statistics (ROS) tape and the Securities Data Company. We then examine Moody's Manuals to verify that the firms did not have any preexisting public straight debt outstanding. We obtain 233 firms that made a public debt IPO during this period. The offers made by these firms are then screened using the following criteria. The exact date of the first announcement of the initial public bond offer must be identifiable. The ROS tape and Securities Data Company are used to obtain the registration date of the issue, and the Dow Jones News Retrieval Service is searched to determine the first announcement. Unit offerings composed of debt and common stock are deleted. Further, common stock return data for the 3-year post-BIPO period must be available on the University of Chicago's Center for Research in Security Prices (CRSP) master tapes. Financial information is obtained from COMPUSTAT tapes while Moody's Manuals and Standard and Poor's Bond Guides are used to obtain additional financial

information and bond-specific characteristics. The final sample consists of 138 initial public straight debt offerings. Barring five firms that are eliminated due to lack of sufficient stock price data, this sample is effectively the same as that used in Datta *et al.* (2000). We do not observe any clustering of bond offerings. The greatest frequency of offerings were made in 1985 and 1986 with 15 issues each year while no offerings were made in 1972, 1974, and 1975.

3. METHODOLOGY AND RESEARCH DESIGN

a. Size-and-Book-to-Market-Matched Control Firms

The primary motivation for our procedure to identify appropriate benchmarks stems from the seminal work of Ritter (1991) in this area. Recently, Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999) noted that the size-and-book-to-market-matched control firm approach yields well-specified statistics. Hence, we use size-and-book-to-market-matched control firms as benchmarks. At the end of each month from January 1971 to December 1994 (the sample period), all NYSE/AMEX common stocks listed on the CRSP tape without any equity or debt offerings during the prior 5-year period are used as a pool of possible matching firms. Issuing firms become eligible to be in the pool of possible matches 5 years after the offer. We rank these firms at each month-end by their market capitalization (size) and book-to-market (BM) ratio.

We try to guarantee that the book value is available to the market when used by proceeding as follows. The book value of a given fiscal year is not used until at least four months after the end of the fiscal year (e.g., firms with a December 31 fiscal year begin using the new book value for calculations done on or after April 30). The BM ratio is calculated by dividing the book equity value (COMPUSTAT annual data item 60) by the market capitalization (share price times number of shares outstanding on CRSP). For a sample firm, the BM ratio is computed at the end of the month immediately preceding the calendar month of the public debt announcement, and the market capitalization is as of the day prior to the announcement date.

We match each NYSE/AMEX listed sample firm with the first control firm from the pool of NYSE/AMEX firms such that the sum of the absolute percentage difference between the size and book-to-market ratio of the sample firm and the matched firm is minimized. As in Spiess and Affleck-Graves (1999), the pool of potential matching firms is constrained so that matched firms are not more than 10% smaller than their sample firms. One firm did not have potential matched firms meeting this criterion, and was matched with the closest fit available.

We apply the same algorithm to choose matched firms for NASDAQ listed sample firms. At the end of each month from January 1971 to December 1994, all NASDAQ listed common stocks available on the CRSP tape without any equity or debt offerings during the prior 5-year period form the potential pool of matched

firms. For NASDAQ listed firms with bond IPOs between 1973 and 1977, we use all firms trading on December 14, 1972 (the earliest CRSP NASDAQ trading date) as potential matched firms. There are 42 firms in our sample that do not have book equity values in COMPUSTAT. These firms are matched with the first control firm from the pool of firms in the same industry (using 2-digit SIC), and trading on the same exchange as the sample firm such that the absolute percentage difference between the size of the sample firm and the matched firm is minimized. If no matching firms are available in the same industry, sample firms are matched using only size and exchange.

b. Buy-and-Hold Returns

We measure abnormal common stock returns associated with bond IPOs using the buy-and-hold return (BHR) approach. Differences in BHRs rather than cumulative abnormal returns (CARs) are used to measure abnormal performance for two reasons. First, the difference in returns on sample firms and their respective benchmarks is obtainable by an implementable investment strategy. While CARs are associated with fewer statistical problems than long-term BHRs, it is hard to interpret the results using CARs in a meaningful way. Second, since we are interested in examining the stock price performance following bond IPOs, using BHRs allows us to compare our results with those of prior studies examining long-run performance following security offerings.

The buy-and-hold return, BHR_i, is calculated as

$$BHR_i = \left[\prod_{t=1}^{T} (1 + R_{i,t}) - 1 \right] \times 100,$$

where day $t = 1$ is the first trading day following the offer, R_{it} is the return on stock i on day t, and, T_i is the 3-year (or 5-year) anniversary date of the offer, or the offering firm's CRSP delisting date, whichever is earlier. We use the same holding periods to calculate BHRs of sample firms and their corresponding benchmarks. If a matched firm is delisted before the end of the 3-year (or 5-year) anniversary or the sample firm's delisting day, whichever is earlier, CRSP value-weighted returns are spliced into the calculation of the BHR from the removal date. Replacing a delisted firm with the CRSP value-weighted index (as opposed to using another matched firm) does not significantly change the BHR for the benchmark (see Lyon *et al.*, 1999).

c. Nonparametric Test of Long-Run Buy-and-Hold Abnormal Returns

Barber and Lyon (1997) and Kothari and Warner (1997) show that the distribution of BHRs around firm-specific events is skewed, particularly over long horizons. These studies demonstrate that skewness of BHRs leads to biased inferences when using standard parametric tests. To address this issue, we use the

bootstrap method to conduct significance tests. For comparison, we also report the *t* statistic for the difference between means, and the Wilcoxon (rank sum test) *Z* statistic for the difference between medians.

The bootstrap procedure is employed as follows. The null hypothesis is that the distribution of returns for sample firms and their matched firms is identical. We therefore start by pooling the BHRs of sample firms and their corresponding matched firms. Next, from the pooled set of observations, we randomly choose (with replacement) a subsample of 138 observations (or the appropriate size of the subsample) and record the (mean) median. We then choose another similar size subsample and record the (mean) median. The difference between (means) medians of the two randomly chosen subsamples is recorded as one observation. We repeat this procedure 1000 times to form an empirical distribution of recorded differences between (means) medians. The two-tailed *p* value is computed as the proportion of 1000 recorded differences for which the absolute value of the recorded difference is greater than or equal to the absolute value of the observed difference.

4. EMPIRICAL FINDINGS

a. Comparison of Sample and Control Firm Characteristics

Table IA presents summary statistics comparing characteristics of bond IPO firms and their matched controls. Not surprisingly, the mean and median size and book-to-market ratio for our sample are similar to those of their matched controls indicating that the control firms are reasonably precise matches for our sample firms. However, as row 4 of Panel A shows, firms undertaking their first public straight debt offer are significantly younger than their matched firms (3.29 years vs 8.47 years from first CRSP trading day to the bond IPO announcement). Our sample firms are also younger than firms issuing seasoned debt with median firm age of 13.22 years reported by Spiess and Affleck-Graves (1999).

Our sample firms with a mean size of $431 million, are about half the size of Spiess and Affleck-Graves' (1999) sample of seasoned debt issuers ($898 million). Furthermore, bond IPO firms have a mean BM ratio of 0.60 which is much lower than the corresponding mean of 0.88 for seasoned debt issuers indicating that firms issuing bond IPOs have relatively more growth options than firms issuing seasoned debt. These comparisons indicate that at the security offering announcement, bond IPO firms are generally smaller, younger, and have higher expected growth opportunities than their seasoned debt offering counterparts.

Row 5 of Panel A indicates that the median 1-year pre-offering stock return for sample firms is 12.53% compared to 16.60% for the control sample. The difference between medians is not statistically significant. The lack of abnormal performance prior to bond IPOs is similar to Spiess and Affleck-Graves' (1999)

TABLE I
Summary Statistics Comparing Characteristics of Bond Initial Public Offering Firms and Their Size-and-Book-to-Market-Matched Controls and Bond IPO's Rating Distribution, 1971–1994

A: Characteristics of sample and matched firms

Characteristics	Sample firm	Matched firm	Difference	*p* value
Relative amount offered (%), $N = 127$	37.39 (98.04)	NA	NA	NA
Firm size at the bond IPO ($ millions), $N = 138$	129.66 (431.22)	141.56 (465.45)	−11.90 (−34.23)	0.74 0.75
Book-to-market ratio at the bond IPO, $N = 96$	0.54 (0.60)	0.56 (0.58)	−0.02 (0.02)	0.82 (0.75)
Age from first trading day (in years), $N = 138$	3.29 (5.42)	8.47 (9.72)	−5.18 (−4.3)	0.00 (0.00)
One-year pre-offering return (%), $N = 138$	12.53 (23.11)	16.60 (25.73)	−4.07 (−2.62)	0.46 0.72

B: Distribution of bond ratings at the initial public bond offering

Standard & Poor's bond rating	Frequency	Percentage
AA	2	1.45
A	16	11.59
BBB	18	13.04
BB	14	10.15
B or lower	47	34.06
Not rated	28	20.29
Unavailable	13	9.42
Total	138	100

Note. The sample consists of 138 bond IPOs between January 1, 1971 and December 31, 1994 by firms listed on the Center for Research in Security Prices (CRSP) and COMPUSTAT tapes. The matched firms are chosen based on size and book-to-market ratio (or industry, if book value is unavailable). Relative amount offered is computed as the outstanding amount of the bond offer divided by the market capitalization of the firm on the day prior to the offer. Size is the CRSP market capitalization on the day prior to the offer. Book-to-market is book value of equity (COMPUSTAT data item 60) divided by market value of equity (price per share times shares outstanding, from CRSP) at the month-end prior to the offer. Age of the firms is measured from first CRSP trading day up to the debt offer date. The 1-year pre-offering return is measured as the daily return compounded for 252 trading days ending the day prior to the offer date. For sample firms that begin trading less than 1 year prior to the offer date, daily returns are compounded from the first CRSP listing date. The 1-year pre-offer return for the matched firm is computed for the same holding period as the sample firm. Mean figures are reported below the medians in parentheses. *p* values reflect the significance level based on the *t* statistic for difference between means and the Wilcoxon *Z* statistic for difference between medians. NA, not applicable.

result for seasoned debt offers. This is, however, in contrast to the significant pre-event price run-up documented for convertible debt offers and seasoned equity offerings (see Lee and Loughran, 1998; Loughran and Ritter, 1995).

Table IB shows Standard and Poor's bond rating distribution for our sample firms. Only 26.08% are rated investment grade, 44.21% are rated junk grade (with

a rating of BB or lower), while 20.29% are not rated. Thus, a majority of initial public bond issuers are of relatively poor quality. This is in contrast to seasoned debt offers where 81 and 52.8% are documented to be investment grade by Mikkelson and Partch (1986) and Spiess and Affleck-Graves (1999), respectively. The main conclusion from Table I is that the characteristics of bond IPO firms are substantially different from those of seasoned debt issuers at the announcement of the debt offering.

For our sample, the debt IPO significantly alters the firm's debt ownership structure as the proportion of public debt goes from 0 to 41% (not reported in the table). In comparison, for firms with existing public debt in the capital structure, the proportion of public debt observed by Johnson (1997) is 56%. In spite of the significant change in the firm's debt ownership structure, the figures above indicate that the typical sample firm's public debt component (41%) is still lower than that of an average firm (56%) that has already accessed the public debt market. Our findings and those of Johnson's (1997) indicate that firms tend to increase their reliance on public debt as they mature, implying that the lengthening of debt maturity at the IPO marks the beginning of a series of offerings during the firm's life that further extend debt maturity.

b. Long-Run Stock Price Performance following Bond IPOs

Table II presents the distribution of 3- and 5-year buy-and-hold returns for our sample firms, their matched controls, and the difference in the BHRs for the two groups. The first four columns in the table report 3-year BHRs and wealth relatives following the offer. Wealth relative is computed as the ratio of the end-of-period wealth from holding a portfolio of bond IPO firms to the end-of-period wealth from holding a portfolio of matched firms. A wealth relative of one indicates no abnormal performance.

The median issuing firm exhibits a BHR of 31.69% in the 3 years following the offer, which is less than half that experienced by the control sample (65.08%). The difference in stock performance is statistically significant at the 1% level. Similarly, the means indicate that sample firms exhibit significant underperformance relative to their matched counterparts by 38.87%. The mean wealth relative of 0.80 is strikingly similar to 3-year wealth relatives reported in previous studies for both equity IPOs and SEOs (see Ritter, 1991; and Loughran and Ritter, 1995).

The last four columns in Table II report 5-year BHRs and the corresponding wealth relatives. The median 5-year BHR, 48.34%, is significantly less than the corresponding return for the median control firm (104.33%). The means show underperformance of 64.08% over the 5-year period following the bond IPO. The median and mean wealth relatives are 0.73 and 0.74, respectively. Again, the mean wealth relatives for our sample are close to the mean five-year wealth relative of 0.70 for IPOs and 0.69 for SEOs reported by Loughran and Ritter (1995).

In sharp contrast to our results, Spiess and Affleck-Graves (1999) document that the median seasoned debt issuing firm underperforms the median matched control

TABLE II
Distribution of Buy-and-Hold Returns following Bond Initial Public Offerings, 1971–1994

	Three-year BHR ($N = 138$)				Five-year BHR ($N = 138$)			
	Sample firms	Matched firms	Difference[a]	Wealth relative	Sample firms	Matched firms	Difference[a]	Wealth relative
Minimum	−96.82	−72.58	−24.24		−99.01	−86.96	−12.05	
Q1	−22.78	18.99	−41.77		−28.60	34.51	−63.11	
Median	31.69	65.08	−33.39***	0.80	48.34	104.33	−55.99***	0.73
Q3	79.63	116.96	−37.33		131.17	192.31	−61.14	
Maximum	919.90	888.76	31.14		1807.91	1057.94	749.97	
Mean	53.43	92.30	−38.87**	0.80	82.61	146.68	−64.08***	0.74

Note. The buy-and-hold return on stock i, BHR_i, is calculated as:

$$BHR_i = \left[\prod_{t=1}^{T}(1 + R_{i,t}) - 1\right] \times 100,$$

where $t = 1$ is the first trading day following the offer, R_{it} is the return on stock i on day t and T_i is the 3-year (or 5-year) anniversary date of the offer, or the offering firm's CRSP delisting date, whichever is earlier. The sample consists of 138 bond IPOs between January 1, 1971 and December 31, 1994 by firms listed on the Center for Research in Security Prices (CRSP) and COMPUSTAT tapes. Five-year BHRs are computed using 122 sample firms that had the bond IPO before December 1992 with complete 5-year returns, and incomplete 5-year BHRs are used for the remaining 16 firms that had bond IPOs in 1993 and 1994 with truncated data in the 1997 CRSP tapes. The matched firms are chosen based on size and book-to-market ratio. The BHR for matched firms is computed over the same holding period as the sample firms. If a matched firm is delisted prior to the end of the holding period, CRSP value-weighted returns are spliced in for the remainder of the holding period. At the end of each month from January 1971 to December 1994, all NYSE/AMEX common stocks listed on the CRSP tape without any equity or debt offerings during the prior 5-year period are ranked by their market capitalization (size) and book-to-market ratio (BM). Firm book value for a given fiscal year is not used until at least four months after the end of the fiscal year (e.g., firms with a December 31 fiscal year begin using the new book value for calculations done on or after April 30). The BM ratio is calculated by dividing book equity (COMPUSTAT annual data item 60) by CRSP market capitalization at the month-end preceding the bond IPO. Size is the CRSP market capitalization on the day prior to the offer. Each NYSE/AMEX listed sample firm is matched with the first control firm from the pool of NYSE/AMEX firms such that the sum of the absolute percentage difference between the sizes and BM ratios of the sample firm and the matched firm is minimized. The pool of potential matching firms is constrained so that matched firms are not more than 10% smaller than their sample firms. We follow a similar procedure to choose matched firms for NASDAQ listed sample firms. Wealth relative is computed as the ratio of the end-of-period wealth from holding a portfolio of bond IPO firms to the end-of-period wealth from holding a portfolio of size-and-book-to-market matched firms. A wealth relative of one indicates no abnormal performance.

[a] The p value for difference between medians is 0.00 for both three and five year BHRs using the Wilcoxon rank sum test and the bootstrap method. For the 3-year (5-year) BHR, the p value for the difference between means is 0.02 (0.00) using the t test and 0.03 (0.00) using the bootstrap method. The bootstrapped p value is the proportion of 1000 observations for which the absolute value of the recorded difference between medians (means) is greater than or equal to the observed difference between the medians (means) of offering firms and their corresponding benchmark.

***,** Significance at the 1 and 5% levels, respectively.

firm by 18.7%. Hence, the magnitude of underperformance by firms issuing initial public debt is three times that of firms issuing seasoned debt. The median (mean) 5-year wealth relative for Spiess and Affleck-Graves' sample of seasoned debt offerings is 0.87 (0.93) which is larger than the wealth relatives for our sample of bond IPOs and for equity offerings in prior studies.

The above results highlight that firms issuing bond IPOs are closer in underperformance to firms issuing equity IPOs and SEOs than to firms issuing seasoned debt. Datta *et al.* (1997) show evidence that speculative grade offerings of initial public debt, like equity IPOs, are underpriced at the issue. Our results confirm that bond IPO firms are characteristically closer to firms going public.

Overall, our finding of substantial stock price underperformance following the initial infusion of public debt capital confirms that pronounced changes in debt ownership and debt maturity structures convey significant negative information about long-run firm prospects as contended in Datta *et al.* (2000). In addition, unlike stock offers, bond IPOs are not announced after a stock price run-up, but rather are timed prior to significant stock price underperformance. The most likely motivation to issue public debt prior to underperformance is to obtain external financing at favorable terms. In contrast to the significant negative excess return (approximately −3%) for seasoned equity announcements, the market reaction to announcements of debt offerings has been weaker, with the strongest reaction being −1.00% for debt IPOs (Datta *et al.*, 2000). Thus, firms may be motivated to issue initial public debt to the extent equity mispricing at the debt IPO announcement is relatively insufficient to render an equity issue economical. Since there is no stock price run-up prior to the offer, the firm chooses to finance through a public debt offering rather than an equity offering. If initial public debt is issued later during the period of deteriorating growth prospects and a declining stock price, the issuing firms may miss the 'window of opportunity' to access the public debt market on favorable terms or may not be able to access the public debt market altogether.

c. Robustness Tests Using Alternative Benchmarks

To test the robustness of our results, we apply three alternative benchmarks to measure abnormal stock price performance following bond IPOs. We use closest size-matched control firms, book-to-market-matched firms, and the reference portfolio benchmark suggested by Lyon *et al.* (1999). The results using these alternative benchmarks are presented in Table III. The algorithms for the three alternative benchmarks are detailed in Table III.

c.1. Size-matched and book-to-market-matched controls as benchmarks. Following Spiess and Affleck-Graves (1999), we construct a portfolio of closest size-matched firms as the benchmark for our sample firms. To qualify, size-matched control firms must fall within 5% of the sample firm's market capitalization. We also measure the 3-year buy-and-hold returns on a portfolio of sample firms with available book values on COMPUSTAT and report the corresponding returns on their book-to-market-matched firms. The results for both types of controls are

TABLE III
Three-Year Buy-and-Hold Returns following Bond Initial Public Offerings
Using Alternative Benchmarks

Type of benchmark	Sample firms 3-year BHR	Benchmark 3-year BHR	Difference	Bootstrapped p value[a]
Closest size-matched firms ($N = 70$)	23.49	65.08	-41.59^{***}	0.00
	(44.89)	(87.39)	$(-42.50)^{*}$	(0.06)
Book-to-market-matched firms($N = 96$)	34.12	64.24	-30.12^{***}	0.01
	(54.90)	(88.13)	$(-33.23)^{*}$	(0.06)
Size-and-book-to-market reference portfolio ($N = 138$)	31.69	67.58	-35.89^{***}	0.00
	(53.43)	(78.98)	$(-25.55)^{**}$	(0.03)

Note. The sample consists of 138 firms that announced initial public debt offerings between 1971 and 1994. This table compares issuing firms' 3-year buy-and-hold return (BHR) with the BHR for three alternative benchmarks: (1) closest size-matched firms, (2) book-to-market-matched firms', and (3) size-and-book-to-market reference portfolio. Size is the CRSP market capitalization on the day prior to the offer. The closest size-matched subset includes firms for which the market capitalization of the chosen matched firm is within 5% of the market capitalization of the issuing firm. The book-to-market-matched firms consist of all firms for which book value of common equity (data item 60) is available on COMPUSTAT. Book-to-market ratio for a sample firm and its matched firm is computed as book value of equity (COMPUSTAT data item 60) divided by market value of equity (price per share times shares outstanding, from CRSP) at the month-end prior to the offer. For each issuing firm, we identify a benchmark portfolio based on size and book-to-market ratio. Specifically, we form 25 portfolios on the basis of size and book-to-market equity ratio at the end of each month from January 1971 to December 1994. All CRSP- and-COMPUSTAT-listed firms on the NYSE, AMEX, and NASDAQ without any equity or debt offering during the prior 5-year period are used as potential matching firms. To be consistent with our sample, we exclude ADRs, closed-end funds, and REITs. Each potential matching firm is assigned to its corresponding size quintile. The cutoff points for size quintiles are based on the market capitalization at the end of each month using only NYSE and AMEX firms on the CRSP tapes. Next, we assign the pool of matching firms to their corresponding book-to-market quintiles. The cutoff points for book-to-market quintiles are based on the book value of equity (COMPUSTAT data item 60) divided by the CRSP market capitalization at the end of each month using all NYSE, AMEX, and NASDAQ firms. The intersection of size and book-to-market cutoff points results in 25 size-and-book-to-market portfolios. The book-to-market ratio of an issuing firm is calculated at the month-end prior to the announcement date. Each issuing firm is matched with its corresponding size-and-book-to-market portfolio. Firms without BM ratio are matched by firms in the corresponding size quintile. We compute 3-year BHR for the sample firm by compounding daily returns for the 3-year period (or till delisting date of the sample firm, whichever is earlier). The same holding period is used to calculate 3-year BHR for the benchmark portfolio. The BHR for a portfolio is computed as the equal weighted buy-and-hold return over all firms (excluding the issuing firm) in the portfolio. Medians (means) are reported below.

[a] The bootstrapped p value is the proportion of 1000 observations for which the absolute value of the recorded difference between medians (means) is greater than or equal to the observed difference between the medians (means) of calling firms and their corresponding benchmark.

***,**,* Significance at the 1, 5, and 10% levels, respectively, using the Wilcoxon rank sum test for difference between medians, and the t test for difference between means.

presented in the first two rows of Table III and are consistent with our main result that offering firms underperform their benchmarks during the 3-year post-issue period. Thus, our earlier result based on size-and-book-to-market-matched controls is highly robust to the use of these alternative benchmarks.

c.2. Size-and-book-to-market reference portfolio approach. Our procedure to construct reference portfolios based on size and book-to-market ratio is similar to the method used in Brav and Gompers (1997) and Lyon *et al.* (1999). All CRSP and COMPUSTAT-listed firms, excluding ADRs, closed-end funds, and REITs, on the NYSE, AMEX, and NASDAQ exchanges without an equity or debt offering during the prior 5-year period are used as a pool of potential matching firms. The benchmark portfolios are formed at the end of each month from January 1971 to December 1994.

The third row in Table III presents 3-year buy-and-hold returns using the size-and-book-to-market portfolio approach. The buy-and-hold returns on the appropriate reference portfolio are measured for the same holding period as the sample firm. We find that the median sample firm significantly underperforms the median size-and-book-to-market reference portfolio by 35.89%. The means also indicate significant underperformance. Thus, our result that issuing firms underperform is robust to the reference portfolio approach.

c.3. The use of value-weighted returns. Fama (1998) argues that the magnitude and statistical significance of abnormal performance disappears using value-weighted returns, and as a result, informational market efficiency is maintained. However, Loughran and Ritter (1999) reason that managers selectively announce events in response to temporary misvaluations. If misvaluations are greater for small firms than large firms, then value-weighting reduces the probability of detecting abnormal performance. Thus, according to Loughran and Ritter, tests of informational market efficiency around events under managerial control should rely on equal-weighted returns.

We measure value-weighted mean 3-year buy-and-hold returns and find that bond IPO firms underperform their size-and-book-to-market matched control firms by 9% (not reported in the table). This difference is not statistically significant. The result that underperformance disappears with value-weighting is consistent with findings in Brav and Gompers (1997), Loughran and Ritter (1999), and Spiess and Affleck-Graves (1999). Following Loughran and Ritter (1999), we limit our inference to evidence found using equal-weighted returns as in Tables II and III. We do so because managers control the announcement of bond IPOs. Moreover, being young and small, our sample firms are even stronger candidates for potential misvaluations at the announcement.

d. Bond IPOs as Signals of Lower Growth Opportunities?

Pagano, Panetta, and Zingales (1998) find that the main factors affecting the probability of a stock IPO are growth opportunities and firm size. They show that firms go public not to finance investments, but to rebalance their accounts after a

period of high growth and investment. Similarly, Datta *et al.* (2000) find that the primary determinants of firms choosing to issue public debt are size and capital expenditure in the year prior to the offer. They document that larger firms and firms with greater financing needs in the pre-offer year are more likely to issue public debt than a control sample. Consistent with Myers' (1977) model, where firms issue long maturity debt if they do not have growth options to exercise, Datta *et al.* (2000) conjecture that the negative stock price response at the announcement of bond IPOs is likely due to lower future growth expectations. The negative long-run abnormal performance for our sample suggests the possibility that growth options are lower over the long run. We directly test this hypothesis by examining the fiscal year-end BM ratio for sample firms and their respective controls over a 7-year period around the offer year.[5] The year of the bond IPO is designated as year 0. Since capital markets should be particularly appealing for companies with large investments needs, we also examine firms' capital expenditures as a percent of total assets over the same 7-year period. The median and mean BM and capital expenditure ratios are reported in Table IV for each year. The sample sizes vary with the availability of data in COMPUSTAT.

As noted in Section 2, the BM ratio is one of the criteria used to select control firms. Therefore, by construction, the ratio is similar for both groups in year -1. The BM ratio for issuing firms is not statistically different from that of the control firms in years -2 and -3 relative to the offer year. However, in each of the following years (0, $+1$, $+2$, $+3$), issuing firms experience a significant increase in their BM ratio vis-à-vis the control firms. For instance, the median BM ratio for sample firms is 0.54 prior to the offer and rises to 0.65 3 years after the offer. In comparison, the ratio for the median matched firm is 0.56 prior to the offer and falls to 0.51 3 years following the offer. The table also shows that while the BM ratio for control firms undergoes a continuous decline from year -3 to year $+3$ (perhaps due to a rising stock market), the sample firms issue debt when their BM ratio is at its lowest level. This trend suggests that managers time the debt IPO to coincide with the market having the greatest expectations for issuing firms. This observation along with the significant underperformance over the 3 years following the issue supports the view that managers time maturity-lengthening debt IPOs, most likely to obtain a lower cost of financing.

The increase in BM ratio following the offer provides direct evidence that the decision to substantially change the debt maturity structure by issuing initial public debt is, at least partially, in expectation of lower growth opportunities. The documented decline in the firms' growth opportunities supports the view that firms with low contracting costs choose public debt financing. Our result is consistent with Krishnaswami *et al.*'s (1999) study that shows that firms with low market-to-book ratio tend to have higher proportions of public debt in their debt structure. The results also support Hoshi, Kashyap, and Scharfstein's (1993) model that

[5] We also use the R&D to total assets as another proxy for growth opportunities. The implications of the results from this variable are qualitatively similar to those obtained using the book-to-market ratio.

TABLE IV
Book-to-Market Ratios (Growth Opportunity) for Initial Public Bond Issuers and Matched Firms around Bond IPOs, 1971–1994

Fiscal year relative to offering	B/M		*Z* statistic (*t* statistic) of difference	CE/TA		*Z* statistic (*t* statistic) of difference
	Issuers	Matched firms		Issuers	Matched firms	
−3	0.63 (0.76) [51]	0.71 (0.83) [65]	−0.93 (−0.64)	0.06 (0.11) [37]	0.07 (0.10) [34]	−0.19 (0.39)
−2	0.58 (0.71) [67]	0.66 (0.75) [77]	−0.49 (−0.37)	0.06 (0.10) [50]	0.05 (0.05) [49]	1.90* (2.61)***
−1	0.54 (0.60) [96]	0.56 (0.58) [96]	−0.22 (0.32)	0.06 (0.10) [67]	0.05 (0.06) [63]	1.91* (2.48)***
0	0.52 (0.68) [79]	0.53 (0.53) [92]	0.99 (2.22)**	0.07 (0.10) [71]	0.05 (0.06) [74]	2.29** (2.10)***
+1	0.62 (0.81) [72]	0.54 (0.61) [84]	1.55 (2.15)**	0.06 (0.10) [79]	0.06 (0.08) [75]	1.33 (0.93)
+2	0.65 (0.73) [69]	0.54 (0.60) [79]	1.73* (1.70)*	0.07 (0.09) [74]	0.05 (0.08) [76]	1.27 (0.98)
+3	0.65 (0.71) [66]	0.51 (0.66) [71]	1.70* (0.41)	0.06 (0.08) [73]	0.05 (0.06) [74]	0.82 (1.38)

Note. This table presents median (means are in parentheses) book-to-market ratio for bond IPO firms and their matched firms for a 7-year period around the bond offer year (year 0). The *Z* statistic is from the Wilcoxon rank sum test of the equality of the distributions of issuers and matched firms. The *t* statistic is for the difference between means. The book-to-market ratio, BM, is calculated by dividing book equity value (COMPUSTAT annual data item 60) by CRSP market capitalization at the respective fiscal year end. CE/TA represents capital expenditures (data item 128) divided by total assets (data item 6). The number of observations is in brackets.

**,* Significance at the 5 and 10% levels, respectively.

predicts that the lowest quality firms (or firms with poor prospects) will opt for low monitoring type of debt such as public debt over private placement.

The capital expenditure ratios in Table IV indicate that issuing firms invest significantly more than the matched firms in years −2, −1, and 0. However, in each of the 3 years following the offer, sample firms' capital expenditures are not significantly different from those of the control group indicating a relative slowdown in growth opportunities for debt issuers. Jung, Kim, and Stulz (1996) report that debt-issuing firms invest significantly less than equity-issuing firms following the offering. Their evidence supports our argument that firms attempt

to obtain low borrowing costs by issuing maturity-lengthening initial public debt prior to stock return underperformance and prior to a significant drop in growth opportunities. Loughran and Ritter (1997) find that equity issuers continue to invest more than their matched firms following the offering in spite of deteriorating performance. They view this finding as consistent with managerial overoptimism. In contrast, our evidence that firms invest relatively less following debt IPOs, in combination with poor post-issue performance, suggests that managers time the issuance of initial public debt.

e. Maturity Structure of Initial Public Debt and Long-Run Performance

Barclay and Smith (1995) and Guedes and Opler (1996) find that firms with high growth opportunities are more likely to issue short-term debt. Recently, Datta *et al.* (2000) document that one factor for the adverse reaction at the bond IPO announcement is the substantial lengthening of debt maturity as a result of the offering. In this section we examine whether the information conveyed by the extended debt maturity about potential growth opportunities is reflected in long-term stock price performance.

The data, presented in Tables VA and VB, show that the median firm issues initial public debt with a maturity of 10 years. The mean term to maturity for issuing firms is 11.90 years. These averages are similar to those reported by Guedes and Opler (1996) for their public debt offer sample. We find that the maturity of the initial public debt is between 5 to 24 years for a majority (120 out of 126) of our sample firms. This is not surprising as our sample issues are largely speculative grade, and as shown by Guedes and Opler (1996), speculative grade issues are typically screened out of the short- and long-end of the debt maturity spectrum. It is also interesting to note from Panel B that typically the bond's maturity increases with the age of the firm.

Lummer and McConnell (1989) document that the mean maturity of revised bank credit agreements is 4.8 years and that for new bank credit agreements is 6.2 years with a maximum maturity of 15 years. Given that our sample's maturity is similar to that observed for seasoned public debt offers but much higher than that of bank debt, we infer that bond IPOs extend the firm's debt maturity. Even if firms can extend their private debt maturity to the highest point in the range (15 years), it is still shorter in maturity than that possible with a public debt offering.

It can be argued that since some public bonds include features such as callability, sinking fund and/or floating interest rate, their effective maturity is less than the stated term to maturity, and as a result, the issue's maturity overstates the extension of the firm's debt maturity.[6] Although the call option allows the firm to refinance if

[6] Although none of the bonds in our sample carry a floating interest rate, some have call features and sinking fund provisions. Approximately 80% of our offers have a call feature. In comparison, for a sample of investment grade public bond issues made between 1983 and 1985, Crabbe (1991) finds that 77.7% of the bonds are callable before maturity. Thus, the callability in our bond sample is similar to that observed for seasoned bond offers.

TABLE V
Maturity, Book-to-Market Ratios, and 3-Year Post-Bond-IPO Buy-and-Hold Returns

A: Descriptive statistics on debt maturity (years) at bond initial public offerings

Mean	11.90
Median	10.00
Minimum	2.00
Maximum	30.00
Number of observations	126

B: Frequency of bond initial public offerings by maturity

Term to maturity	Median firm age (in years)	Number of debt issues
0–4 years	7.64	2
5–9 years	1.68	22
10–14 years	2.22	68
15–19 years	5.18	19
20–24 years	6.26	11
25–29 years	—	0
30 years or more	4.75	4

C: Book-to-market ratio categorized by maturity of bond issue at the initial public offering

Type of subsample	Short maturity issues	Long maturity issues
Median	0.43	0.64**
(Mean)	(0.53)	(0.69)*
Number of observations	58	30

D: Three-year BHR categorized by maturity of bond issue at the initial public debt offering

	Short maturity (<= 10 years)	Long maturity (>10 years)
Sample firms' 3-year BHR	31.50	35.07
	(46.08)	(71.42)
Matched firms' 3-year BHR	40.77	117.19
	(43.13)	(176.06)
Difference	−9.27	−82.12
	(2.95)	(−104.64)
Wilcoxon rank sum test Z statistic	−1.45	−4.20
t statistic for difference between means	0.16	−2.92
Bootstrapped p value of difference		
Between medians	0.17	0.00
Between means	(0.87)	(0.00)
Number of observations	78	48

Note. The sample consists of 138 public straight bond IPOs during 1971 to 1994 by firms listed on CRSP and COMPUSTAT tapes. Panel A provides descriptive statistics on debt maturity. Panel B presents the frequency of offerings by the term to maturity for the sample. In Panels C and D, sample firms are categorized as short-maturity (<= median of 10 years) or long-maturity (>10 years). Panel C presents the book-to-market (BM) ratio for the two categories of firms. The BM ratio is calculated by dividing book equity (COMPUSTAT annual data item 60) by CRSP market capitalization at the month-end preceding the offering. Panel D presents 3-year buy-and-hold returns (BHRs) on sample firms (categorized by debt maturity) and their matched control firms. The information on debt maturity is from various issues of Moody's Manuals.

** Difference between medians is significant at the 5% level.

* Difference between means is significant at the 10% level.

interest rates decline, the refinancing does not necessarily imply a shorter debt maturity. Notwithstanding the reduction in the debt *issue's* maturity, the callability feature does not materially affect the *firm's* new debt maturity structure. As noted earlier, firms tend to increase their reliance on public debt as they mature. Thus, the dramatic jump in the firm's maturity structure after the initial public debt issue is only a part of a series of steps that effectively extend the firm's overall debt maturity.

In Panel C, we examine the link between debt maturity and firms' growth opportunities as measured by the book-to-market equity ratio at the bond IPO announcement. We categorize firms with maturity less than or equal to the median (10 years) as short-maturity issuers and those above the median as long-maturity issuers. Among firms with available information on debt maturity, there are 78 short-maturity issuers and 48 long-maturity issuers. Firms with short maturity debt have a median (mean) BM ratio of 0.43 (0.53). This is significantly lower than the median (mean) ratio of 0.64 (0.69) for firms issuing long maturity debt. These results are consistent with findings in Barclay and Smith (1995) and Guedes and Opler (1996), and indicate that short-maturity issuers are associated with higher expected growth opportunities than long-maturity issuers. More importantly, these results suggest a negative relation between debt maturity and firm value in the long run.

We compare the 3-year BHR for firms issuing short-maturity debt with that of firms issuing long-maturity debt in Panel D. Among firms issuing short-maturity debt, the median firm underperforms the median size-and-book-to-market matched firm by only 9.27%. The difference between the mean 3-year BHR of sample firms and that of matched controls is 2.95%. These differences are not statistically significant at conventional levels. In contrast, for firms issuing long-maturity debt, the difference between the 3-year BHR on the median issuing firm and that of the median control is −82.12%. The mean underperformance is −104.64%. The p value of the difference is 0.00 for both median and mean. Thus, the evidence indicates a negative relation between debt maturity and long-run performance as predicted by Flannery (1986), and Kale and Noe (1990). The results are consistent with long-run implications of evidence in Barclay and Smith (1995), Guedes and Opler (1996), and Datta *et al.* (2000).

f. Bank Monitoring and Long-Run Performance

At the initial public debt offering, firms experience a precipitous change in their private-public debt mix. Prior studies argue that the relative cost advantage of banks in monitoring loan agreements and enforcing restrictive covenants helps reduce the adverse selection and moral hazard costs of new financing (Fama, 1985). There is strong evidence that suggests changes in bank debt convey information about the borrowing firm (e.g., Lummer and McConnell, 1989; Shockley and Thakor, 1992; Datta *et al.*, 1999). To understand the relation between changes in private-public debt mix and subsequent stock price performance, we examine changes in firms' bank loan commitments in the year of the bond IPO.

We measure the change in bank monitoring as the difference in bank commitment between the year of the offer and the year prior to the offer, scaled by total assets

prior to the offering. We collect information on bank commitment from various issues of Moody's Manuals. The sample is partitioned into two groups: (a) firms experiencing an increase in bank commitment, and (b) firms that experience a reduction or no change in their bank commitment.

Recently, Anderson and Makhija (1999) document a positive relation between growth opportunities and the proportion of bank debt for a sample of Japanese firms following deregulated access to public bond markets. Houston and James (1996) find similar results for U.S. firms borrowing from multiple banks. By conveying information about expected future growth opportunities, changes in bank debt can have implications for long-term firm value. In the short-run, Datta, *et al.* (2000) find that stockholders of issuing firms that experience increased bank debt due to the bond IPO are less adversely affected by the public debt offer.

In Table VIA, we examine the link between changes in bank debt and sample firms' growth opportunities as measured by the book-to-market equity ratio at the bond IPO announcement. We find firms issuing initial public debt that decrease or do not change bank borrowings have a median (mean) BM ratio of 0.63 (0.69). This is significantly higher than the median (mean) ratio of 0.41 (0.50) for issuing firms that increase their bank loan commitment. Thus, issuing firms that experience an increase in bank debt have higher expected growth opportunities, consistent with findings in Anderson and Makhija (1999). For the long term, the results suggest that firms increasing bank debt in addition to the bond IPO are of high quality and are expected to perform well.

In Panel B, we compare 3-year BHRs of issuing firms that experience a decrease or no change in bank loan commitment with those of issuing firms that increase bank commitment. Among the former group of firms, the median firm underperforms the median matched firm by 37.09%. The mean underperformance is 51.80%. Both median and mean underperformance are significant at the 1% level. In comparison, for issuing firms that experience an increase in bank debt, the difference between the three-year BHR on the median issuing firm and that of the median control firm is −6.04%. The mean underperformance is 24.73%. These differences are statistically insignificant at conventional levels.

Our findings imply that changes in bank debt accompanying the bond IPO signal private information about long-term firm value. From an agency perspective, our results suggest that an increase in bank debt accompanying the bond IPO partially offsets agency costs associated with the public debt issue. These results are consistent with long-run implications of evidence in Houston and James (1996), Datta *et al.* (1999, 2000), and Anderson and Makhija (1999). In summary, the results underscore the importance of debt maturity and bank monitoring in determining long-term stock performance following bond IPOs.

g. Multivariate Regression Analysis

In this section, we use multivariate analysis to examine the association between the 3-year buy-and-hold return following initial public bond offers and

TABLE VI
Book-to-Market Ratios and 3-Year Post-Bond-IPO Buy-and-Hold Return Categorized by Firm's Bank Loan Commitment

Statistic	Decrease or no change	Increase in commitment
A: Book-to-market ratio categorized by change in bank loan commitment		
Median	0.63	0.41**
(Mean)	(0.69)	(0.50)**
Number of observations[a]	57	32
B: Three-year BHRs categorized by change in bank loan commitment		
Sample firms' 3-year BHR	31.41	37.95
	(37.66)	(69.04)
Matched firms' 3-year BHR	68.50	43.99
	(89.46)	(93.77)
Difference	−37.09	−6.04
	(−51.80)	(−24.73)
Wilcoxon rank-sum test Z statistic	−3.80	−1.06
t statistic of difference between means	−3.11	−0.64
Bootstrapped p value of difference		
Between medians	0.00	0.29
Between means	(0.00)	(0.41)
Number of observations[b]	81	43

Note. The sample consists of 138 public straight bond IPOs during 1971 to 1994 by firms listed on CRSP and COMPUSTAT tapes. Change in bank loan commitment is defined as the difference in bank debt from the year prior to the bond IPO to the year after the bond IPO, scaled by total assets prior to the offering. Panels A and B categorize offering firms into those that decreased or did not change bank debt in the year of the offering and those that increased bank debt. Panel A presents the book-to-market (BM) ratio for the two categories of firms. The BM ratio is calculated by dividing book equity (COMPUSTAT annual data item 60) by CRSP market capitalization at the month-end preceding the offering. Panel B presents 3-year buy-and-hold returns (BHRs) on sample and their matched control firms. The information on bank loan commitment is from various issues of Moody's Manuals.

[a] The subsamples do not add up to the total sample due to unavailability of data to calculate BM for some firms.

[b] Some firms are lost because of unavailability of bank loan commitment information.

** Difference between medians and difference between means significant at the 5% level.

maturity of the debt issue, degree of bank monitoring, issuer's growth opportunity, degree of information asymmetry associated with the issuer, pre-issue stock return, exchange-listing, and bond rating. Various version of the following general model are estimated:

$$LAR = f(Size, Maturity, Commitchg, Mkt/bk, Mkt/bk{*}Creditchg, Age, Adjusted\ Pre\text{-}bond\text{-}IPO\text{-}return, Exchange, Rating) \quad (1)$$

The dependent variable in the regression models is *LAR*, defined as the natural logarithm of (1 + issuing firm's 3-year buy-and-hold return (BHR)) minus the natural logarithm of (1 + matched firm's 3-year BHR).[7] *Size*, measured as the natural logarithm of the market capitalization on the day prior to the bond IPO, is used as a control variable. The results are presented in Table VII.

We test the debt maturity hypothesis, that firms with favorable private information issue short-maturity debt, by including *Maturity* as an independent variable. *Maturity* is defined as the natural logarithm of the debt offer's maturity. In all models, the coefficient is negative and statistically significant. This result supports our univariate results in Table V and the predictions of Myers (1977), Flannery (1986), and Kale and Noe (1990). Thus, consistent with the debt maturity explanation for negative announcement wealth effect around bond IPOs (Datta *et al.*, 2000), we find that short-maturity debt issuers indeed perform better in the long run than firms issuing long-maturity debt.

We test the bank monitoring hypothesis by including the variable *Commitchg* in Models 2 and 4. *Commitchg* is defined as the change in bank commitment across the year of the offer, as a percent of total assets measured at the end of the year prior to the bond IPO. Consistent with the univariate results, the coefficients of this variable are positive and significant. Our finding supports the view that the agency costs of issuing public debt are ameliorated by an increase in bank monitoring.

We use the market-to-book ratio (*Mkt/bk*) as an index of the firm's investment opportunity set. *Mkt/bk* is computed as the natural logarithm of the market value of equity plus the book value of debt divided by the book value of total assets at year-end prior to the offer. This variable is statistically insignificant in both Models 3 and 4.

To test whether firms with greater investment opportunities that are subject to a high level of bank monitoring are less likely to underperform, we use an interaction variable, *Mkt/bk*∗*Creditchg*, in Model 5, where *Creditchg* is a dummy variable which equals one if the firm experiences an increase in bank loan commitment across the offer year, and zero otherwise. The coefficient of this cross-product term has a positive sign and is significant at the 1% level. This result, consistent with Anderson and Makhija (1999), indicates that an increase in bank debt for a firm with high investment opportunities leads to superior long-run performance.

The adverse selection hypothesis suggests a positive relation between long-run stock price performance and the age of the firm. The firm's age can reflect the reputation of the firm in terms of repayment in the debt market (Diamond, 1991). Age could also capture potential information asymmetries faced by younger firms with limited financial histories. We define *Age* as the natural logarithm of (1 + the time in years since the firm's stock began trading publicly). Consistent

[7] The LAR has been used as a dependent variable in recent studies of long-run performance such as Lee (1997) and Brav and Gompers (1997). Our basic results are qualitatively similar if we use abnormal returns as the dependent variable. The log transformation helps minimize the non-normality of the residuals arising from the skewed distribution of long-run abnormal returns.

TABLE VII
Multivariate Regressions Explaining Size-and-Book-to-Market Adjusted 3-Year Post-Bond-IPO Stock Price Performance

Independent variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	−0.37 (−0.52)	−0.38 (−0.45)	−0.74 (−0.88)	−1.12 (−1.07)	−0.79 (−0.89)
Size	−0.01 (−0.01)	0.01 (0.12)	0.01 (0.14)	0.01 (0.11)	−0.02 (−0.24)
Maturity	−0.56 (−2.50)***	−0.48 (−2.40)***	−0.50 (−2.24)**	−0.41 (−1.83)*	−0.45 (−2.25)**
Commitchg		0.86 (2.01)**		1.03 (2.30)***	
Mkt/bk			0.05 (0.15)	0.28 (0.89)	
Mkt/bk * Creditchg					0.31 (3.13)***
Age	0.08 (1.83)*	0.05 (0.80)	0.11 (1.77)*	0.08 (1.13)	0.09 (1.27)
Adjusted pre-bond-IPO-return	0.24 (1.70)*	0.28 (1.98)**	0.31 (2.19)**	0.35 (2.02)**	0.27 (1.91)*
Exchange	−0.49 (−1.89)*	−0.64 (−2.42)***	−0.53 (−1.74)*	−0.74 (−2.34)**	−0.68 (−2.27)**
Rating	0.14 (2.04)**	0.11 (1.42)	0.12 (1.43)	0.09 (1.01)	0.13 (1.72)*
N	120	108	99	92	94
Adj-R^2	12.25	13.57	11.38	14.16	14.98
F statistic	3.77[a]	3.40[a]	2.80[a]	2.88[a]	3.34[a]

Note. The sample consists of 138 bond IPOs during 1971–1994 by firms listed on CRSP and COMPUSTAT tapes. The dependent variable, LAR, is defined as (Ln(1 + issuing firm's 3-year buy-and-hold return (BHR)) minus (Ln(1 + matched firm's 3-year BHR)). The 3-year BHR starts at the close of the day of bond IPO and ends either on the 3-year anniversary or on the delisting day of the issuing firm, whichever is earlier. Size, measured as the natural logarithm of the market capitalization on the day prior to the bond IPO; Maturity, the natural logarithm of the number of years to maturity of the bond offering; Commitchg, the change in bank loan commitments as a percentage of total assets between years −1 and 0; Mkt/bk, the natural logarithm of (market value of equity plus the book value of debt divided by the book value of total assets at year-end prior to the offer). Creditchg takes a value of 1 if the firm experiences an increase in bank loan commitment over the year of the public offering, and 0 otherwise; Age, the natural logarithm of one plus the number of years between the first CRSP trading day and the day of the offer; Adjusted pre-bond-IPO-return, measured as the issuing firm's pre-offer annual return minus the respective size-and-book-to-market matched firm's annual return for the same holding period. Exchange equals 1 if the stock trades on NASDAQ and 0 otherwise. Rating takes a value of 6 for AA rated issues, 5 for A rated bonds, etc. The *t* statistics, in parentheses, are calculated using White's (1980) heteroskedasticity-consistent standard errors.

[a] Significance at 1% level or better, based on *p* value of regression.

*,**,*** Significance at the 10, 5, and 1% levels, respectively.

with Diamond's (1991) prediction, we find that *Age* is positively related to long-run abnormal performance. However, the coefficient becomes insignificant when we control for the change in bank monitoring in Models 2 and 4, indicating no incremental explanatory power for *Age*.

Prior studies of post-equity-issue performance find a strong pre-issue performance coupled with poor post-issue performance (e.g., Jain and Kini, 1994, and Loughran and Ritter, 1995). Similar results are reported for long-run stock price performance around convertible debt offerings (Lee and Loughran, 1998; Spiess and Affleck-Graves, 1999). To test whether this pattern exists for bond IPOs, we include the variable, *Adjusted Pre-bond-IPO-return*. This variable is defined as the buy-and-hold return on the issuing firm's stock during the pre-offer year minus the contemporaneous return for the control firm. We find that the coefficient is positive and significant in almost all regression models. The result indicates that firms performing well prior to the offer continue to do so following the offer. However, when we use raw prior returns without controlling for the benchmark performance in the pre-issue period, the variable is insignificant.

The variable *Exchange* takes the value one for NASDAQ firms and zero otherwise. The coefficient is negative and statistically significant in all models indicating that NASDAQ listed firms undertaking bond IPOs perform poorly in the long run. This result is similar to that reported in prior studies for equity issues and seasoned debt offers (Spiess and Affleck-Graves, 1995, 1999). We use the *Rating* variable to test whether the issue's bond rating has any significant explanatory power in the regressions. *Rating* takes a value of 6 for "AA"-rated issues, 5 for "A"-rated bonds, etc. This coefficient is positive and significant in two of the five models. In particular, we find the incremental explanatory power of the variable diminishes when we control for factors such as growth opportunities and change in bank monitoring. Thus, bond ratings do not have any incremental explanatory power about the firm's prospects.

5. SUMMARY AND CONCLUSIONS

We examine a sample of 138 initial public debt offerings by U.S. firms during the period 1971 to 1994. A bond IPO presents an ideal setting to study long-run implications of debt structure adjustments as it results in simultaneous and pronounced changes in both debt maturity and debt ownership structures of the issuer. Our findings indicate that bond IPOs indeed convey negative information about the firm's prospects which unfolds over the long run. We document severe erosion of equity value vis-à-vis a control group during the three- and five-year post-offer periods. Our results based on size-and-book-to-market-matched controls are highly robust to the use of alternative benchmarks.

A striking result of our study is that firms issuing bond IPOs are similar, in terms of underperformance, to firms issuing equity IPOs and SEOs. So, investing in firms that issue initial public debt is equally "hazardous to your wealth." Interestingly,

our results sharply contrast those reported for seasoned debt offers by Spiess and Affleck-Graves (1999).

Our analysis provides direct evidence that issuing firms indeed experience significant reduction in growth opportunities following the offering. This reduction in growth opportunities is one possible explanation of the underperformance of issuing firms. Unlike stock offers, our evidence indicates that bond IPOs are not announced after a stock run-up, but are rather timed prior to stock price underperformance. Further, debt IPOs are undertaken when the market's perception of the firm's growth opportunities is the highest relative to both the past and the future. In contrast to equity issuers, our results show that debt issuers invest relatively less in the years following the offering. Our finding also indicates that firms attempt to obtain low borrowing costs by issuing maturity-lengthening initial public debt prior to a significant drop in growth opportunities and poor stock return performance.

We document a negative relation between debt maturity and expected growth opportunities. More importantly, long-run abnormal returns are negatively related to the maturity of the initial public debt issue. This result provides strong support for the argument that high quality firms issue short-term debt, while low quality firms issue long-term debt. We find issuing firms that experience an increase in bank monitoring have higher expected growth opportunities and do not underperform their matched counterparts, while those experiencing a lower or similar level of bank monitoring have lower expected growth opportunities and exhibit significant underperformance.

The findings in this study question the ex-post efficiency of firms' operations following a major capital structure change. While debt IPOs adversely impact shareholders, their influence on firms' operating performance remains an unresolved issue for future research.

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