Risk and performance of bonds sponsored by private equity firms

Xiaping Cao
Lingnan College
Sun Yat-sen University

Konan Chan
College of Commerce
National Chengchi University

Kathleen M. Kahle
Eller College of Management
University of Arizona

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Abstract

The bond market is an important source of financing for Private Equity (PE) sponsored transactions. Using the methodology suggested by Bessembinder et al. (2009), we find that PE-sponsored bonds underperform comparable benchmarks. This is especially true for bonds with credit ratings below investment grade and those issued in hot bond markets. Furthermore, bonds sponsored by more experienced PE groups (PEGs) underperform bonds associated with less experienced PE groups, while bonds backed by investment bank-affiliated PEGs underperform bonds sponsored by other PEGs. These findings highlight the risk and return relationship in the high-yield bond market related to leveraged buyouts (LBOs) and PEGs.

1. Introduction

The market witnessed an increasing volume of (junk) bond issuances related to leveraged buyouts (LBOs) or sponsored by private equity groups (PEGs) in the years leading up to the financial crisis. The long-run impact of some these deals is now being referred to as the retail apocalypse: these private equity groups purchased numerous big-box retailers and loaded them up with unsustainable debt payments. Many of these retailers are now in bankruptcy. Not all of these deals turn out poorly, however. As noted in a recent Wall Street Journal article:

Armed with easy credit and a lack of competition from corporate buyers, buyout shops made a series of big bets in the years leading up to the crisis, often joining with rivals and loading their targets with debt. In some cases, these deals led to big profits through sales or initial public offerings--Blackstone's purchase of Hilton Worldwide Holdings Inc. is one of the most-successful private-equity investments ever. But in a number of others, the buyers failed to find a profitable exit path as onerous debt restricted their ability to respond to competitive threats and multi-headed ownership structures further hampered flexibility.[1]

Despite the prevalence of high-yield bonds sponsored by private equity, little research has systematically examined their returns. One exception is a clinical study by Dammon, Dunn, and Spatt (1993) that documents a pattern of large and persistent mispricing in the three high-yield bonds of RJR Nabisco after it was acquired by Kohlberg Kravis Roberts & Co (KKR) during the peak of the junk bond market in the late 1980s. The performance of such high-yield bonds is important since institutional investors such as pension funds are the main investors in them, due to the lack of liquidity in the secondary markets (Kaplan and Stein, 1990). Consequently, we attempt to fill this gap in the literature.

Bondholders' main concern is whether the pricing of bonds matches their risk, especially for high-yield or subprime bonds. Thus, we follow the methodology of Bessembinder, Kahle, Maxwell, and Xu (2009) to examine how PE-sponsored bonds perform relative to various benchmarks with comparable risk profiles and bond characteristics. The lack of systematic studies on PE-backed bonds is mainly due to data

[1] "Toys 'R' Us, iHeartMedia Haunt Buyout Firms Sitting on Trillion-Dollar Cash Pile," by Miriam Gottfried, *The Wall Street Journal*, March 22, 2018.

constraints and the difficulty of assessing bond returns. We solve this data problem in the following manner: First, we collect data from Capital IQ on PE-sponsored bond issuances and second, we merge this data with bond pricing data from Lehman Brothers Bond Database (LBBD). Our research is therefore the first to provide a comprehensive analysis of post-LBO (abnormal) bond performance for U.S. companies backed by PEGs.

We examine several hypotheses regarding the performance of PE-sponsored bonds. The question of whether private equity sponsors bring value to high-yield investors is an important one, given that PEGs try to raise bond capital cheaply. In contrast to previous studies on the cheaper yields of PE-sponsored bonds (Fang et al., 2013; Huang et al., 2016), our focus is on the performance of PE-sponsored bonds in the secondary market. This secondary market bond performance is important to understand. Deviations can occur between yields to maturity (YTM) at issuance and post-issuance bond returns for several reasons: (1) institutions may flip bonds immediately after issuance (Goh and Yang, 2017); (2) market conditions may change drastically after bonds are issued (e.g., financial crisis); (3) new information regarding issuing firms (e.g., credit rating change) may become available. Thus, an examination of post-issuance bond returns is as important as a study of YTMs at issuance. Consequently, we ask the following question - Do bonds sponsored by PEGs systematically exhibit lower post-issuance buy-and-hold returns? Since institutional investors buy and hold large amounts of debt from the secondary bond market, it is imperative to understand whether they are fairly compensated for the risks they bear when investing in junk bonds sponsored by PEGs.

Most PE-sponsored bonds have junk bond credit ratings and thus cannot easily be traded due to an inactive secondary market. Consequently, institutional investors who hold these bonds are mostly concerned with the long-run performance. Our research is the first paper that systematically examines the post-issuance performance of bonds sponsored by PEGs.[2] Our first hypothesis is that PEGs are able to raise funds, especially bonds with low credit ratings, with a low cost of debt capital. We empirically test this hypothesis by examining whether PE-sponsored bonds underperform other bonds with similar risk

[2] Hotchkiss, Smith, and Stromberg (2014) find that PE-sponsored companies are no more likely to default than other high-yield issuers and that conditional on default, they conduct faster and cheaper debt restructurings.

profiles. We further examine whether PE-sponsored bond performance is worse in bonds with lower credit ratings. Our second hypothesis is the market timing hypothesis, which states that PEGs are more likely to issue bonds when the market is hot and demand is high, and as a result bond investors overpay for the bonds. Our third hypothesis is the PEG reputation hypothesis, which states that more reputable PEGs issue better-performing bonds in order to maintain that reputation. Fang, Ivashina, and Lerner (2013) find evidence that investment bank-affiliated PEGs can raise cheaper debt capital due to their bank affiliation. Consequently, our final hypothesis examines whether bonds sponsored by investment bank-affiliated PEGs underperform more than other bonds.

Consistent with our first hypothesis, we find that PE-sponsored bonds on average have negative abnormal returns: they underperform comparable benchmarks following issuance, especially in the first post-issue year.[3] We thus provide solid evidence that high-yield bonds sponsored by PEGs are overpriced. These findings are consistent with our hypothesis that PEGs can raise bonds at a lower financing cost. This evidence is also consistent with Huang, Ritter, and Zhang (2016), who show that bonds sponsored by PEGs have low yield spreads. In contrast to their study, our analysis shows that the risk of high-yield bonds, especially those with lower rating, is not fairly compensated. Such empirical evidence of mispricing is also consistent with general theories that the market is not able to eliminate mispricing due to limits of arbitrage (Shleifer and Vishny, 1997) or investor's sentiment in high-yield bond markets (Nayak, 2010). However, it is possible that bond investors are compensated elsewhere, such as participation in LBO deals with an equity portion.

We further find that bonds with ratings below Ba perform worse in the post-issuance period compared to bonds with a Ba rating. Our evidence suggests that the enduring power of private equity in LBOs is their ability to issue highly risky bonds with low returns for bondholders. This is consistent with Kaplan and Stein (1993) in the sense that junk bonds investors misprice their debt by focusing too much on stated yields and past buyout successes, and pay too little attention to subtle capital structure details of the deals. Our new evidence confirms that most of the poor performance of buyout-related

[3] In Table 2, the risk-adjusted mean returns show consistent underperformance while median returns do not. This is probably due to the skewness or fat tails in the distribution of the bond returns.

bonds is caused by those with lower credit ratings.[4] Other researchers have examined whether the high returns of PE sponsors are due to the expropriation of other financial claimants. For example, Harford and Kolasinski (2014) find that portfolio company payouts to PE sponsors are unrelated to future portfolio company distress. They conclude that PE sponsors do not systematically take advantage of debt investors who finance buyouts. In contrast, our evidence suggests that a wealth transfer from bondholders with high risk to PE sponsors is possible.

We also find evidence to support our market timing hypothesis. PE-sponsored bonds issued during hot market periods perform worse than bonds issued during cold market periods. The results suggest that PE sponsors are good at exploiting windows of opportunity and selling bonds when demand in the bond market is high. Bonds issued in these hot bond market periods subsequently underperform.

We do not find evidence to support the PEG reputation hypothesis. Bonds sponsored by more reputable PE firms underperform those sponsored by less experienced PEGs. This is consistent with Demiroglu and James (2010), who find that borrowing costs are lower for buyouts sponsored by high reputation PE groups. Our results suggest that larger and older PEGs take advantage of institutional investors to raise cheaper bonds to finance LBOs, especially when debt market is favorable. This is consistent with the conclusion of Axelson, Jenkinson, Stromberg, and Weisbach (2013) that PEGs help portfolio firms to obtain cheap loans.

Finally, we find that bonds sponsored by commercial bank-affiliated PEGs outperform those bonds sponsored by either investment-bank affiliated PEGs or independent PEGs. This result suggests that the latter two types of PEGs have an advantage in raising cheap bonds in the sense that they have lower returns than comparable benchmarks (Fang et al., 2013).

2. Background

PEGs such as KKR depend heavily on junk bond issuance to finance LBOs through "bootstrap debt financing." In bootstrap debt financing, PEGs first set up a new acquisition

[4] Using an extensive panel of corporate bonds, rather than bonds sponsored by PEGs, Chordia et. al. (2017) find riskier bonds earn higher returns, although this relation reverses during down markets.

subsidiary to issue bonds or other debt instruments backed by the targets' assets and future cash flows, and then finance an acquisition of the target firms through a takeover. To complete LBO transactions, PEGs merge the targets with the indebted acquisition conduits so that the target companies become portfolio firms. Guo, Hotchkiss and Song (2011) find that PEGs earn high returns when managing LBO portfolio companies.

Private equity groups typically raise equity from investors such as pension funds or university endowments at the time a fund is formed. This equity funds approximately 30 percent of the cost of leveraged buyouts (LBOs), according to the Global Private Equity Report 2011 by Bain & Company. Additionally, deal-level capital is raised in the form of high-yield debt and syndicated loans at the time of a specific transaction such as a leveraged buyout; these loans are in the target company's name. This debt almost always includes a portion that is senior and secured such as bank debt, and often includes a junior unsecured portion, such as high-yield bonds or "mezzanine debt" (see Kaplan and Stromberg (2009) for a more detailed view of the private equity market). Institutional investors are typically the major investors in these risky (junk) bonds or leveraged loans backed by private equity. These LBO-related or PE-backed bonds often trade at a large discount[5], hence attracting many yield-oriented hedge funds and institutional investors.

The LBO market in the U.S has experienced several waves. KKR's $25 billion hostile takeover of RJR Nabisco in 1987 marked the peak of the first LBO boom. After the collapse of Drexel Burnham Lambert and the crash of the junk bond market in 1988, leveraged buyouts almost disappeared. Andrade and Kaplan (1998) report that approximately 29% of 136 management buyouts (MBOs) and leveraged recaps done in 1980s later failed. Although buyout activity was very low in the early 1990's, it recovered in the later part of the 1990's and reached record volume during the credit boom in 2006-2007, only to come to an abrupt end with the credit crisis in late 2007.

While the early U.S. buyout industry was composed of a relatively small number of organizations, the LBO market underwent tremendous growth in both size and number of transactions in the 2000s. Large LBO funds and large deals started to emerge. Some of

[5] For example, according to TRACE, the bond-price reporting system of the Financial Industry Regulatory Authority, First Data's $2.4 billion of 11.25 percent notes due in 2016 fell 18.25 cents to 66 cents on the dollar on May 21, 2010.

the largest transactions include purchases such as: Harrah's Entertainment ($27.4 billion) by Apollo and Texas Pacific; Freescale SemiConductor ($17.6 billion) by Blackstone, Carlyle, Permira, and Texas Pacific; and Hertz ($15 billion) by Carlyle, Clayton Dubilier & Rice, and Merrill Lynch. As part of its leveraged buyout by KKR, First Data Corp. reportedly issued $8 billion in high-yield bonds and $14 billion in leveraged loans (almost nine times the amount on its balance sheet before the LBO). According to the Private Equity Council, in 2007 alone private equity groups raised more than $516 billion in capital for LBO funds and completed 2,238 acquisitions and/or investments for a record $721 billion.[6]

Credit Suisse in its 2006 Global Trend Report states that:

[D]ebt-financed corporate takeovers bring with them considerable risks, not least for owners of "old" bonds. An LBO is a problem for an existing or "old" bond because it involves a higher level of debt for the company taken over, and thus typically leads to falls in bond prices. Unless, that is, such takeovers come with a degree of protection offered by legally binding bond clauses or so-called "bond covenants". Moreover, these bonds are typically transferred to a holding company. By contrast, the newly issued securities aimed at financing the acquisition are placed at the level of the operationally active company. As a result, existing bonds find themselves structurally disadvantaged (subordinated). This in turn causes the credit rating to fall, perhaps even as far as the speculative rating category, where the price of affected bonds falls significantly.

While the 2007-2008 financial crisis revitalized the scrutiny on junk bonds related to LBOs, the pace of buyouts has recently surged, once again leading to concerns about the high pricing of these bonds at issuance. For example, a 2013 Bloomberg article warns that "Investors holding almost $1 trillion of the lowest-rated U.S. investment-grade corporate bonds are at a greater risk of losses as the pace of buyouts surges to the fastest pace in six years because the debt offers few protections." [7] And a 2017 Bloomberg story finds that the worst performing retail bonds are backed by private equity and suggests that while

[6] http://www.privateequitycouncil.org/private-equity-by-the-numbers/

[7] "LBOs imperil $940 billion of U.S. company bonds: credit markets," by Sridhar Natarajan, Bloomberg, March 15, 2013.

companies are taking actions to help the PE owners mitigate their losses, bond investors overlooked weak covenants in their thirst for high-yield securities.[8]

Aside from the anecdotal evidence supplied by Dammon et al. (1993) on the mispricing of RJR Nabisco bonds after the KKR acquisition, little is known about the performance of PE-sponsored bonds issued at or after LBOs. The earlier literature provides some evidence that LBO transactions acted as bad news for debt investors. For example, Asquith and Wizman (1990) find that pre-buyout bond investors suffer losses when their bonds have no covenants. Warga and Welch (1993) find that incumbent bondholders of target firms suffer significant losses when LBOs are announced. Recent studies such as Shivdasani and Wang (2011) suggest that LBO markets overheated due to the rapid growth of securitization of loans. In contrast, the buyout-related junk bond market attracts little academic attention, despite the fact that high-yield bonds related to PE-sponsored LBOs have great volume and are important to institutional investors such as insurance firms, pension funds or hedge funds.

3. Methodology

3.1. Firms with multiple bonds

Bessembinder et al. (2009) note that in their sample, the majority of firms have a single bond outstanding. To assess bond performance, our research follows the recommendations in Bessembinder et al. (2009) to calculate bond abnormal returns.[9] They advocate the firm-level approach to examine bond returns by treating each firm as a portfolio of bonds issued. This mitigates the primary concern with the bond-level approach, namely that results may be driven by a handful of firms with multiple bonds. However, PEGs manage a portfolio of firms with each firm issuing their own bonds. In general, the level of debt in these firms is substantially higher than in other leveraged transactions. At the PE-sponsor level, the average PE firm in our sample sponsors 8.7 public bonds in 3.3 different target companies. The average (median) LBO firm in our sample has 2.65 (2)

[8] "Private equity's retail debt carnage," by Lisa Abramowicz and Shelly Banjo, Bloomberg, March 17, 2017.
[9] Bessembinder et al. (2009) provide a caveat that the possibility of detecting a moderate price shock for a noninvestment grade company is extremely low unless the sample size approaches to 500 companies. This small sample issue works against our findings. Our result thus provides the lowest-bound evidence on the underperformance of PE-sponsored bonds.

public bonds outstanding. Since we examine sub-samples based on bond characteristics and since bonds can be issued at different points in time even for the same target firm, using the firm-level approach seems less appropriate. Consequently, we rely on the bond-level approach in our main analysis but also do robustness checks on our results at the firm level.

To evaluate bond performance at the firm level, we follow Bessembinder et al. (2009) and treat each target firm as a value-weighted portfolio. We employ both event time and calendar time approaches to compute the value-weighted average returns. In the event-time approach, as shown in equation (1), we first compute the average monthly return over the holding horizon H (H = 12, 24, or 36 months) for each bond from the event month 1 and then calculate the weighted average return across bonds within a firm, where the weight is inflation-adjusted market value of bond at the end of event month 0 or at the first available month-end, whichever is later. This approach is designed to put bonds in the event-time framework, a method similar to buy-and-hold returns in stocks. In the calendar-time approach, for each calendar month, we compute the firm-level bond returns using all bonds issued by the same firm with available returns in that month, where the weight is the market value of bonds in the prior month. For bonds that defaulted within the first three years of issuance, we include them until their return is not available. We then average the monthly firm-level returns over the sample period, as in equation (2), as long as there are bonds still within the holding horizon (12-, 24-, 36-months). This approach implicitly assumes a trading strategy based on bonds issued by the firm. As we employ a value-weighting scheme, the investment strategy here is less subject to the concern of large transaction costs involved in returns.

$$FR = \sum_{i=1}^{N} w_i \left(\frac{\sum_{t=1}^{H} BR_{it}}{H} \right) \tag{1}$$

$$FR = \frac{1}{T} \sum_{t=1}^{T} \left(\sum_{i=1}^{N} w_{it} BR_{it} \right) \tag{2}$$

where FR is the firm-level return and BR is the bond-level return.

3.2. Measuring abnormal bond performance

We follow the literature, especially Bessembinder et al. (2009), to measure abnormal bond returns. Three approaches employed in our paper are the mean-adjusted model, the risk-adjusted model (or matching portfolio model), and the factor model.

The most popular approach in the literature to estimate abnormal bond returns is the mean-adjusted model. The abnormal return (AR) is the difference between the bond excess return (ER) and the expected excess return (EER) for a same bond. The bond excess return is the bond total return (BR) minus the return on a matched Treasury security (TR), and the expected excess return is the average of the historical excess returns. That is,

$$AR_t = ER_t – EER_t \tag{3}$$

where $ER_t = BR_t – TR_t$, and $EER_t = \left(\sum_{y=1}^{k} ER_{t-y}\right) \Big/ k$.

Following Bessembinder et al. (2009), we use a six-month window to estimate the expected excess return. We require at least three non-missing monthly returns during this six-month window.

The second approach we use to measure abnormal bond returns is the risk-adjusted model. This method aims to control for the major risk components of bonds with matching portfolios. We form matching portfolios on the dimensions of credit rating and time-to-maturity in order to control for default risk and maturity risk. We take all non-investment grade bonds with available data from the bond database. We then drop the sample bonds from the remaining bond universe and classify them into four rating categories (Ba, B, Caa, Ca) and three maturity groups, totaling 12 portfolios. The maturity cutoffs for ratings Ba and B are 0 to 6 years, +6 to 9 years, and +9 years. For ratings below B, the maturity cutoffs are 0 to 5 years, + 5 to 8 years, and +8 years. We choose these cutoffs to generate portfolios with roughly equal numbers of bonds. In forming the benchmark for the risk-adjusted model, we apply both the equal- and value-weighted schemes to compute portfolio returns, since bond size might affect liquidity risk. The abnormal return is the sample bond return minus the return of the corresponding matching portfolio in the same month.

For the factor model, we rely on the four-factor model developed by Elton, Gruber, and Blake (1995) and revised by Bessembinder et al. (2009) as follows:

$$R_{b,t} - R_{f,t} = \alpha + \beta_1 (R_{m,t} - R_{f,t}) + \beta_2 R_{bond,t} + \beta_3 DRP_t + \beta_4 Term_t + e_t \tag{4}$$

where R_b is the bond portfolio return, R_m is the CRSP value-weighted stock index return, R_{bond} is the Lehman corporate bond index return, *DRP* is the default risk premium, and

Term is the term premium. We form calendar time bond portfolios by including sample bonds that were issued in the past 1, 2, or 3 years, and then regress the time-series regressions as in equation (4). The abnormal return is measured by the regression intercept. To prevent smaller bond issues from dominating the regression estimations, we examine both equal-weighted and value-weighted bond portfolio returns. Moreover, since our sample bonds are not evenly distributed in time, the typical ordinary least square (OLS) regressions may assign inappropriately heavy weights to calendar months with few bond issues. This will generate a low power test (Loughran and Ritter, 2000). To correct this potential bias, we also report results based on weighted least square (WLS) regressions, where the weight is the number of bonds in the portfolio in a given month.

Among the three models we use to gauge abnormal bond returns, the risk-adjusted model with value-weighting (VW) scheme exhibits the best statistical features (Bessembinder et al., 2009). In particular, the risk-adjusted model with the VW benchmark generates well-specified test statistics and higher power to detect abnormal returns compared to other models. While the mean-adjusted model is popular in the literature, it tends to over-reject in the lower tail of the distribution. The factor model tends to be well-specified, but has much lower power to detect abnormal returns.

The mean-adjusted model requires at least three non-missing monthly returns during the prior six-month window to estimate abnormal returns. However, the risk-adjusted model and the factor model do not rely on prior returns. As such, there exists an inconsistency in the investment horizon between the mean-adjusted model and other two methods. Consequently, to ensure these three methods capture the abnormal performance over the same period, we define the one-year return as the return from month 4 to month 15 after bond issuance (i.e. the event month 1 in our return calculations is the fourth month after issuance), and the two-year and three-year returns as the returns over the post-issue month 4 to month 27 and month 4 to month 39, respectively.[10] To enlarge our sample size,

[10] Our event window starts with the fourth month after issuance due to the requirement of at least three non-missing monthly returns to compute the expected excess return in the mean-adjusted model (see equation (3)). For example, for the post-issue month 4, the expected excess return is the average of excess returns over post-issue months 1 to 3. For the post-issue month 5, the expected excess return is the average of excess returns over post-issue months 1 to 4. For the post-issue month 6, it's the average of excess returns over post-issue months 1 to 6. For the post-issue month 7 and onwards, the expected excess return is the average of excess returns in the prior 6 months.

we do not impose the prior three month return requirement on the sample bonds, except for the mean-adjusted model. However, our results for the risk-adjusted model and the factor model are very similar when the prior three-month return requirement is imposed.

4. Data

4.1. Bond return data

Our bond data are obtained from the Lehman Brothers Bond Database (LBBD).[11] LBBD offers month-end information on price, yield to maturity, credit rating, and returns for a comprehensive set of publicly traded corporate bonds. Bessembinder et al. (2009) show that LBBD contains very similar information compared with TRACE month-end transaction data. Elton, Gruber, Agrawal, and Mann (2001) also find that bond pricing in LBBD is comparable to CRSP in accuracy.

One limitation of LBBD database is the short sample period from 1991 to 2006.[12] We have no data on bonds issued after the financial crisis of 2008-2009. One defense is that since we examine returns for the three years after issuance, bonds issued after 2011 wouldn't be available. Another reason is that the buyout activities largely subsided during 2008-2010 (Global M&A Outlook, 2010, 2011), and hence there were not many LBO bonds issued during that period. Indeed, we tried to expand our sample using TRACE bond data to go beyond 2006, but doing so did not improve the sample size. Therefore, we limit our data to bonds available from LBBD database.

4.2. The sample

Our sample of bond issuances is obtained from Capital IQ, a Standard & Poor's subsidiary for financial data. Capital IQ provides comprehensive bond issuance information from U.S. companies that have financial sponsors after 1990. We define a bond issue as a PE-sponsored bond based on the Capital IQ deal synopsis, which classifies deals

[11] See Bessembinder et al. (2009) for a comprehensive list of research in using LBBD. Although daily TRACE data has become increasingly popular, TRACE is unavailable for most of our sample period.

[12] Our return data stop in 2006 as this is the most recent data we can get from LBBD. However, LBO activity also declined significantly after 2006 due to the effects of the financial crisis and the drastic increase in spreads on high-yield bonds. For example, PE-related deal flow fell from 24% of M&A activity during the peak of the PE boom in 2006 to 3% in 2009 ("Private Equity feeds on bite sized deals," Megan Davies and Simon Meads, Reuters, June 23, 2011).

according to the type of leading equity investor. We only keep those bonds issued in 2006 or earlier[13] by firms that are sponsored by private equity groups, including LBOs, leveraged recapitalizations, and reverse LBOs that are backed by private equity. We keep only bond issuances with deal values greater than 5 million U.S. dollars to avoid the potential outlier effect due to small bond deals. Our sample is fairly consistent with other studies examining LBOs in terms of firm number or firm size (Axelson et al., 2013).

We match the monthly bond return data from LBBD with the sample of PE-sponsored bond issues from Capital IQ. We require that each corporate bond in LBBD have available information on bond rating, issue size, issue date, maturity date, and coupon rate over the period of 1991 to 2006. We drop both zero-coupon bonds and puttable bonds due to their unique features.[14] Following Elton et al. (2001) and Bessembinder et al. (2009), we eliminate monthly observations with large return reversals, where a 20% or higher return is followed by a 20% or larger return of the opposite sign. We further drop bond-months without bond market values and bond-months with zero total returns. To ensure our sample bonds are not close to default, we eliminate bonds with credit ratings of C or below.[15] We further drop bonds where the issuance date is prior to the LBO transaction date. Unlike Warga and Welch (1993), we are not examining the impact of the LBO on target firms' existing bondholders. This leaves us a final sample of 697 bonds issued by 312 firms. These 312 firms are sponsored by 96 different PE sponsors.

[INSERT TABLE 1]

Table 1 reports the sample distribution and summary statistics. Consistent with the buyout market boom after 2000, our sample bond issuance clusters in the early 2000s, with 49% of our full sample issuance occurring in 2002-2004. Approximately 75% of the sample bonds are rated B at issuance. PEG age, defined as the difference between the PEG founding year and the bond issuance year, varies across bond issues. Most of the bonds in

[13] Although the aggregate capital invested in LBOs peaks in 2006-2007, the number of observations in our sample declines in 2005 and 2006. There are two reasons for this. First, transactions completed in 2005 and 2006 will not be in our sample if there is no LBBD pricing data until after 2006. Second, as shown in Table 2 of Demiroglu and James (2009) and discussed in Shivdasani and Wang (2011), a substantial portion of financing during the LBO boom came from collateralized loan obligations (CLOs) rather than corporate bonds. We find a similar decline in the number of bonds issued in 2005-2006 in the high-yield bond universe from LBBD.

[14] When these bonds are included, our findings remain similar.

[15] Our results are very similar with the inclusion of C-rated bonds.

our sample are sponsored by PE groups with an age ranging from 6 to 25 years. There are very few bond issues by very young or old PEs. The average bond issue size is about 285 million, with average 8.3 years to maturity and a 9.4% annual coupon rate.

5. Empirical Results

5.1. Long-run bond returns to PE-sponsored bonds

In Table 2, we report the long-run returns of bonds sponsored by private equity groups. We analyze the long-run bond returns by examining cross-sectional bond-level returns, firm-level event-time returns, and firm-level calendar-time returns. Panel A reports the summary statistics for raw returns and Panel B the excess returns. Panels C, D, and E provide the mean-adjusted returns, the returns adjusted by the equal-weighted portfolio matched on maturity and credit rating matching, and the returns adjusted by the value-weighted portfolio matched on maturity and credit rating matching, respectively. Finally, Panel F shows winsorized risk adjusted returns. We report one-, two-, and three-year post-issuance returns.

[INSERT TABLE 2]

Across all bonds, PE-sponsored bonds have a mean (median) monthly return of 0.20% (0.75%) in the three years post issuance. When we aggregate bonds at the firm level in event time (calendar time), PE-sponsored bonds have a mean return of 0.14% (0.23%) and a median return of 0.78% (0.78%). When PE-sponsored bond returns are adjusted by the treasury rate in Panel B, mean excess returns are negative but insignificant while median returns are positive and significantly greater than zero. However, when PE-sponsored bond returns are adjusted by mean historical excess returns (Panel C), their abnormal returns are negative and significant at the bond level. For example, the average (median) monthly mean-adjusted three-year return is -0.25% (-0.02%), which is significant at the 1% (10%) level. At the firm level, the mean returns are negative and significant, while the medians are generally insignificant. Since many bonds have different credit ratings or maturities, examining mean-adjusted returns may not fully control for the risks in these bonds. We therefore match PE-sponsored bonds with the corresponding credit rating and maturity matched portfolios in Panels D and E, following the procedure in Bessembinder et al. (2009). Panel D reports abnormal returns based on an equal-weighted

benchmark while Panel E uses a value-weighted benchmark. The mean abnormal bond returns are consistently negative and significant regardless of whether they are calculated at the bond level or at the target firm level. The median returns are significantly negative in the first year at the bond level, but generally small in magnitude and not significant over longer horizons and at the firm level.

The cross-sectional analysis above shows that on average, PE-sponsored bonds have significantly negative mean returns. The medians tend to be slightly negative and significant at the bond level, but insignificant at the firm level. PE-sponsored bonds underperform bonds with similar credit rating & maturity profiles. As the mean returns may be sensitive to outliers, in Panel F we report results in which the average monthly returns for each horizon are winsorized at the top and bottom 1% levels before summarizing the monthly returns across bonds and firms. We find that mean returns are still negative and significant over the different horizons. These results suggest that the underperformance of PE-sponsored bonds is not driven simply by a few outliers.

[INSERT TABLE 3]

Table 3 presents the calendar-time portfolio regression analysis by forming calendar-time portfolios for the one, two, and three years post issuance. The bond return is adjusted by the risk-free rate as shown in equation specification 3.[16] The factor-adjusted analysis in the OLS regressions indicates that PE-sponsored bonds underperform in the first year after issuance; the post-issue performance in years two and three is negative but not significant. As the OLS regressions assign equal weights to both heavy and light issuance months and thus under-estimate the abnormal performance of bonds, we also show the results based on WLS regressions, in which the weight is proportional to the number of bonds in a given month. The alphas, or intercepts of the regressions, are all negative and larger in magnitude than those in OLS regressions. First year underperformance is statistically significant and robust across different weighting schemes

[16] For additional robustness, we adjust bond returns with the matching portfolio return and present results in the Online Appendix. Specifically, we regress hedge portfolio returns against factors where the hedge portfolio return is the difference between the sample bond return and the corresponding matching portfolio return. The matching portfolio return is either the equal-weighted (Online Appendix Table A1) or value-weighted (Online Appendix Table A2) return of the benchmark based on non-PE bonds matched on credit rating and maturity.

and regression methods. Overall our results show that PE-sponsored bonds exhibit poor long-run performance.

5.2. Subsample Results by Bond, PEG, and Credit Market Characteristics

5.2.a. Bond Ratings

The prior analysis treats all bonds as homogenous, while in reality the performance of bonds may differ across bonds with different characteristics. For example, bonds with low credit ratings may behave very differently from those with high credit ratings. Therefore, we divide the whole bond sample into two subsamples, bonds with ratings of Ba and bonds with ratings below Ba, since most PE-sponsored bonds have ratings below Ba.

Panel A of Table 4 examines the mean-adjusted returns. The mean and median of the mean-adjusted returns for Ba bonds are negative but not significant. In contrast, bonds with below Ba ratings display significantly negative performance across all three post-issue periods; the medians are significantly negative in the one, two, and three years post issuance. The differences between the Ba and below Ba returns are not significant however.

[INSERT TABLE 4]

Panels B and C show the risk-adjusted EW and VW returns, respectively. Both the EW and VW mean returns are negative and significant for both Ba and below Ba bonds, although the magnitude of the underperformance is more than twice large for the below Ba bonds. The differences in the mean abnormal returns between the Ba and below Ba groups are significant in the one-, two-, and three-year post-issuance. Interestingly, the median returns are not significantly negative for below Ba bonds, suggesting that a few of below Ba bonds severely underperform.

In the calendar-time portfolio analysis reported in Panel D, bonds with ratings of Ba that are sponsored by PE groups have insignificant alphas, while those with below Ba ratings have negative and significant alphas over the one and two-year horizons.

In untabulated results, we examine alternative measures of credit risk, such as the spread between BAA and AAA bond returns, the spread between high yield bonds and the monthly LIBOR rate, and the credit tightening variable (measured as the net percentage of domestic banks reporting a tightening of standards for commercial & industrial loans in

the quarter prior to the bond issue). Bonds issued in the Low (High) credit spreads are assumed to have less (more) risk. We find that bonds issued when either credit spreads or the credit tightening variable are high exhibit significantly negative performance. The median performance of bonds issued when credit spreads are high is significantly more negative than the median performance of bonds issued when spreads are low. This finding is consistent with riskier bonds earning lower returns.[17]

5.2.b. PEG Reputation

Our PEG reputation hypothesis suggests that reputation is an important factor in determining performance or raising funds. Following Cao and Lerner (2009), we use PEG age to proxy for experience. We divide the sample of PE-sponsored bonds into two subsamples, those with more experienced PE sponsors and those with less experienced sponsors, based on a cutoff of 15 years. The results are reported in Table 5.[18]

[INSERT TABLE 5]

Overall, bonds sponsored by more experienced PE groups exhibit significantly lower risk-adjusted returns than those backed by less experienced PE groups, which is inconsistent with our reputation hypothesis.[19] Both the means and medians of risk-adjusted abnormal returns, using either the equal- or value-weighted benchmark returns, are significantly lower for the more experienced PE sponsors. This underperformance of bonds backed by more experienced PEGs persists for one, two, and three years post-issuance. For example, the mean (median) abnormal returns of bonds issued by more experienced PE firms are -0.75% (-0.09%), while the mean (median) abnormal returns of bonds backed by less experienced PE groups are -0.10% (0.09%) for the three post-issuance years (see Panel

[17]The results on spreads are inconsistent with the argument in Axelson et al (2013) that firms tend to borrow when the credit spread is low. For robustness, we also sort by both PEG age and by the credit spread or tightening percentage. When using the BAA-AAA spread or tightening percentage, underperformance is driven by the older, more experienced PEG sponsors. This finding suggests that when credit is easy, market timing does not matter. It is most relevant when credit is tight. Older PEGs seem to have an advantage in this.
[18]As in Cao and Lerner (2009), we also examine total capital raised by the PEG prior to the LBO date as a proxy for reputation. We find some evidence that the median performance of firms with higher capital is worse. The detailed results are reported in Online Appendix Table A3.
[19] This result is also seemingly inconsistent with Demiroglu and James (2009), who find that reputable PEs are more active when credit spreads are low. However, Demiroglu and James also find that reputable PEs use less traditional bank debt but more overall debt. They suggest this is consistent with reputable PEs having less need for monitoring. It could also allow more experienced PEs to take advantage of bondholders to benefit stockholders.

C of Table 5). Similar results are obtained when we examine equal- and value-weighted calendar time portfolio regressions. This new and important result suggests that more experienced PE sponsors may have the advantage of raising cheaper bonds to finance their investment activities, which has important implications for capital market and policy makers.

5.2.c. Hot vs. Cold Bond Markets

We next examine the market timing hypothesis. To do so, we sort each calendar month during our sample period into Cold or Hot bond markets based on the number of issuances of sample bonds.[20] Months with above median numbers are classified as hot markets, while those with below median are classified as cold markets. Bonds issued in a Cold (Hot) month are classified as the Cold (Hot) bond portfolio.

[INSERT TABLE 6]

Table 6 shows that bonds issued during hot markets generate low returns. In each method examined (mean-adjusted, risk-adjusted EW, and risk-adjusted VW), abnormal returns for bonds issued in hot market periods are consistently negative and statistically significant. On the contrary, bonds issued during cold bond market periods do not suffer significantly negative abnormal returns; median abnormal returns are even positive, albeit insignificant. The differences in the risk-adjusted VW returns are significant for both means and medians and for all horizons we examine. These results suggest that PE sponsors exploit windows of opportunity and sell bonds when there is a larger demand in the bond market. Bonds issued in these hot bond market periods then subsequently underperform. These results are consistent with the model presented in Axelson, Stromberg, and Weisbach (2009) that PE sponsors are able to raise cheaper debt in hot bond market.

5.2.d. PEG Affiliation

Fang et al. (2013) examine whether PEGs with a bank affiliation may have certain advantages over other PEGs due to superior information; their findings suggest that there are certain downsides or risks for investors in combining banking and PEG investing. We

[20] We also use prior bond market returns as an alternative way to classify Hot versus Cold bond markets. We find that bonds issued in the Hot market periods have lower long-run bond returns. The results are presented in Online Appendix Table A4 and Online Appendix Table A5.

therefore ask a natural question in the context of bonds sponsored by PEGs, that is, whether bank-affiliated PEGs have an advantage in raising bond financing? To do so, we use Table II of Fang et al. (2013), which provides a list of 14 PEGs that are bank-affiliated and 6 PEGs that are investment bank-affiliated.[21] We match these 20 bank-affiliated PEGs to our sample. When bonds have multiple sponsors, we define the bond as sponsored by a bank-affiliated PEG if their sponsors include one or more of those bank-affiliated PEGs; we divide bank-affiliated PEGs into the commercial and investment bank-affiliated groups. PEGs that are not bank-affiliated are classified as independent PEGs. We divide the sample of bonds into three sub-groups according to PEG affiliation, and report the performance in Table 7.[22]

[INSERT TABLE 7]

We find that bonds sponsored by PEGs with commercial bank affiliation outperform bonds sponsored by independent PEGs. The difference in performance is robust to various benchmarks or estimation methods. Bonds sponsored by PEGs with investment bank affiliations significantly underperform bonds backed by PEGs with commercial bank affiliation. Among these three groups, the bonds sponsored by PEGs with investment bank affiliations have lowest performance. Since section 5.2.a finds that lower rated bonds perform worse, we compare bond ratings for the three bank-affiliation groups. Bonds sponsored by PEGs with commercial bank affiliations have slightly lower ratings than bonds sponsored by banks with investment-bank affiliations, so differences in bond ratings are not driving the results. This is consistent with Fang et al. (2013) that some risk has been underestimated in bonds issued by investment bank-affiliated PEGs.

5.3. Regression Analysis

We also use cross sectional regressions to analyze the bond returns. We pool all monthly observations from 1992 to 2006 to run regressions, and adjust t-statistics for the double clustering effect based on Petersen (2009). The dependent variable is the monthly

[21] Fang et al. (2013) define the following six PEGs as investment bank-affiliated: Goldman Sachs Capital Partners, Lehman Brothers Merchant Banking, Merrill Lynch Capital Partners, Morgan Stanley Private Equity, DLJ Merchant Banking, and Wasserstein & Co.

[22] As the number of bonds sponsored by bank-affiliated PEGs, especially PEGs with investment bank affiliation, is relatively small, we do not use the calendar time approach to avoid the outlier effect. These bonds are distributed across different industries and not driven by one particular industry.

risk-adjusted bond return using the VW benchmark matched on credit ratings and time-to-maturity. The independent variables include issue size, coupon rate, maturity, credit rating, PEG age, a dummy equal to one if the bond market is hot, and bank affiliation. The results are reported in Table 8. We also use alternative proxies of bond market conditions (e.g., prior bond market returns) and PEG reputation (e.g., PEG capital), and document similar but slightly weaker results.

The regressions provide negative and significant coefficients for both PE age and a dummy for above median PEG age. Specifically, when bonds are sponsored by more experienced PE groups, the monthly bond returns are 0.53% lower over the 36-month post-issue period (Model 9). The low rating dummy (a dummy variable equal to one if bonds are rated B or below) is negatively associated with bond returns, especially in returns within the post-issue one-year and two-year windows. The hot bond market return dummy is consistently negatively associated with bond returns and significantly so in the two-year horizon.

[INSERT TABLE 8]

The regression results suggest that PE-sponsored bond returns are decreasing in lower credit rating, PEG age, and hot bond market. More experienced PE sponsors are actually delivering lower (abnormal) returns for institutional investors who are major players in investing in LBO related bonds. Our evidence also suggests that institutional investors who are typically attracted by the high yields should think twice before investing in PE-sponsored bonds with very poor credit ratings issued during the market peak, especially if the PE firm is affiliated with an investment bank. In untabulated results, we also add high credit spread and high credit tightening dummies to the analysis. The coefficients are negative but insignificant in general. We further include the offering yield to maturity (YTM) of each bond in the regression. This significantly reduces the sample size, but the results are quantitatively similar, and available upon request.

5.4. Robustness Tests

Kaplan and Stein (1993) suggest that the drop in the LBO activity during early 1990s was due to the poor performance of the deals made during latter part of 1980s. Since Table 1 shows that our sample is concentrated in 2002-2004, in untabulated results we

separately examine deals issued during this period to see if the performance of bonds issued in these years drives our results. When we do so, both the bonds issued during 2002-2004 and the bonds issued in other years exhibit significant underperformance. The mean underperformance of the bonds issued in 2002-2004 is slightly worse, but the differences are not significant. The median underperformance of the bonds issued in 2002-2004 is significantly lower than that of bonds issued in other years, however. Consequently, we re-run the regressions in Table 8 after including a dummy equal to one for bonds issued in 2002-2004. The coefficient on the dummy is negative but insignificant, indicating that after controlling for other determinants of bond returns, bonds issued between 2002-2004 do not perform worse than other bonds.

Several additional robustness tests are also carried out and reported in Online Appendix Table A5. These tests report the significance level of adjusted returns of PEG-backed bonds using different benchmarks. We also match PE-sponsored bonds with portfolios based on both (1) refined rating and maturity, and (2) letter rating, maturity, and callability. We also use a single matching bond as the benchmark. The result that PEG-backed bonds underperform holds strongly regardless of the benchmark used. The evidence shows that underperformance of PEG-backed bonds is not driven by various other factors that may affect bond performance. The backing of PEG is the main factor that explains their underperformance with various benchmarks and in various risk-adjusted models.

In Online Appendix Table A6, we examine whether our results in Tables 4-7 are sensitive to outliers, using the same procedure used to calculate returns in Panel F of Table 2. Specifically, we first calculate monthly abnormal returns for each bond in our sample, and use those returns to compute the average monthly abnormal returns over one, two, and three year horizons (or up to the final month with available returns). Thus, each bond has one average monthly return for each of the three horizons. Next, for each horizon we obtain the bottom and top 1% of the average monthly abnormal returns. Finally, calculate the mean and median monthly returns across all bonds after either winsorizing or trimming the sample at the 1% levels. As shown in Online Appendix Table A6, the magnitudes of the returns are similar to those reported in Tables 4-7, and the significance is often slightly stronger.

5.5. Anecdotal Evidence

As a final examination of bonds sponsored by PEGs, we search for details regarding the firms issuing the bonds with the highest and lowest 5% of average monthly returns in our sample. Specifically, we search the internet for stories related to the issuing firm in the three years after the bond issuance in an attempt to understand what went right (or wrong).

As shown in Online Appendix Table A7, when examining the worst performing bonds, we found that in many cases, the issuing firm either filed for bankruptcy or had its debt downgraded within three years. Specifically, of the 25 firms for which we could identify specific events that led to poor performance, 18 of these companies filed for bankruptcy within three years of issuing the bond and four had their debt rating downgraded. One additional firm filed for bankruptcy within five years. We also noted that several of the bankruptcies (Conseco Inc., Fleming Companies, and Just For Feet Inc.) occurred around the time of the internet bubble and were at least partially attributable to investigations into the company's accounting practices.

Finding specific events for the top performing bonds proved to be more difficult. One company, Concentra, went through a period of expansion following the LBO. Another made acquisitions that doubled their assets base following a management buyout. A third, Seagate Technology, went public again less than two years later. But for most of the top performing bonds, we could find no specific events that explained the bond performance. For these firm, no news appeared to be good news, in the sense that the firm simply did not go bankrupt or experience any major setbacks following the bond issuance.

6. Conclusions

Following the methodology suggested by Bessembinder et al. (2009), we find that PE-sponsored bonds underperform comparable bonds. The underperformance is statistically and economically significant, and remains robust to cross-sectional analysis, calendar-time portfolio analysis, and a variety of benchmarks. The worst underperformance is experienced by the bonds with credit ratings below Ba, bonds sponsored by more experienced PE groups, bonds by investment bank-affiliated PEGs, and bonds issued in hot bond market periods. Multivariate regressions confirm such patterns.

The empirical evidence from this research suggests that institutional investors may not fully incorporate the risks associated with PE-sponsored bonds, especially those junk bonds with lower credit ratings or issued during hot markets. Investments in these PE-sponsored bonds deliver poor long-run performance on average. This underperformance can be attributed to the ability or experience of PE groups who are better able to time the bond market. Alternatively, institutional investors may invest in these bonds for relationship purposes and they are subsequently compensated by other business from PE groups. Private equity sponsors seem to raise "cheaper" bonds to finance their LBOs or post-LBO transactions, consistent with the view that private equity has enduring power to finance deals with cheap debt. Our research thus provides new insights on the performance of PE-sponsored bonds that are important for policy makers and institutional investors.

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Table 1. Sample distribution and summary statistics

This table reports the distribution and summary statistics of sample bond issues. We collect bond issues from Capital IQ, and select bonds from firms that have private equity groups as their financial sponsors in US from 1991. We drop bonds with deal value less than 5 million. We require bonds with available maturity date, bond rating, issue size, coupon rate, and monthly returns from Lehman Brothers Bond Database. We further drop puttable bonds, zero coupon bonds, bonds with ratings of C or below, and bonds with big return reversals. *Rating* reflects the ratings from either Moody's or S&P. *PE age* is the number of years between PE founding year and bond issue year. *Issue amount* is the face value of bonds, expressed in millions. *Maturity* is the time-to-maturity in years. To be consistent with our return calculation, we report the ratings, maturity, and coupon rate at the fourth month after bond issuance month.

Panel A: By year		
Issue year	N	%
1991	2	0.3
1992	10	1.4
1993	1	0.1
1994	1	0.1
1995	5	0.7
1996	17	2.4
1997	31	4.4
1998	69	9.9
1999	41	5.9
2000	28	4.0
2001	49	7.0
2002	79	11.3
2003	163	23.4
2004	106	15.2
2005	58	8.3
2006	37	5.3
All	697	100.0
Panel B: By rating		
Rating	N	%
Ba	90	12.9
B	525	75.3
Below B	82	11.8
All	697	100.0
Panel C: By PE age		
PE age	N	%
below 6	65	9.3
6 to 10	133	19.1
11 to 15	160	23.0
16 to 20	147	21.1
21 to 25	83	11.9
26 to 30	68	9.8
above 30	41	5.9
All	697	100.0

Panel D: Summary statistics					
	Mean	Median	Min	Max	Std
Issue amount (Mil.)	285.1	220	100	2400	213.2
Maturity (Years)	8.29	8.83	1.04	29.6	2.21
Coupon Rate (%)	9.42	9.5	4.38	14.5	1.74

Table 2. Long-run raw and abnormal monthly bond returns (%)

This table shows the long-run raw and abnormal average monthly returns for bonds backed up by private equity groups. *Bond level* means that all returns are first averaged across time for each bond, then summarize across bonds. Firm level returns treat each firm (not each bond) separately. *Firm level – Event Time* is obtained by first computing the average monthly return for each bond, then calculating the value-weighted return of bonds issued by the same firm where the weight is inflation-adjusted market value of bond at post-issuance month 3 or at the first available month-end, whichever is later. *Firm level – Calendar Time* is obtained by first computing the value-weighted monthly return for each firm with multiple bonds in each calendar month, and then averaging the monthly firm-level bond return over time. Numbers in parentheses are t-value for mean tests and p-values for median tests. All returns are in %. The detailed methods to measure abnormal returns are explained in the text. To ensure the three methods measure the abnormal performance over exactly the same period, we define the one-year return as the return from month 4 to month 15 after bond issuance (i.e. the event month 1 in our return calculations is the fourth month after issuance), and the two-year and three-year returns as the returns over the post-issue month 4 to month 27 and month 4 to month 39, respectively. To enlarge our sample size, we do not impose prior three-month return requirement on sample bonds, except for the mean-adjusted model. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively. The numbers in brackets are the percentages of bonds (or firms in the event time approach) with positive returns.

	Bond level			Firm level					
				Event Time			Calendar Time		
Horizon	# of bonds	Mean	Median	# of firms	Mean	Median	# of firms	Mean	Median
Panel A: Raw returns									
1 year	680	0.205*	0.728***	310	0.175	0.767***	310	0.207	0.766***
	[75.88%]	(1.81)	(0.000)	[78.39%]	(1.08)	(0.000)	[78.71%]	(1.29)	(0.000)
2 years	689	0.216*	0.72***	310	0.138	0.767***	310	0.195	0.751***
	[81.13%]	(1.88)	(0.000)	[80.32%]	(0.82)	(0.000)	[82.90%]	(1.20)	(0.000)
3 years	697	0.198*	0.745***	311	0.139	0.776***	311	0.226	0.78***
	[81.78%]	(1.73)	(0.000)	[81.99%]	(0.81)	(0.000)	[84.89%]	(1.38)	(0.000)
Panel B: Excess returns (bond return - matched Treasury return)									
1 year	680	-0.186	0.314***	310	-0.246	0.371***	310	-0.19	0.37***
	[66.62%]	(-1.60)	(0.000)	[68.06%]	(-1.48)	(0.000)	[69.68%]	(-1.15)	(0.000)
2 years	689	-0.155	0.375***	310	-0.241	0.393***	310	-0.155	0.391***
	[72.86%]	(-1.32)	(0.000)	[71.94%]	(-1.40)	(0.000)	[77.10%]	(-0.93)	(0.000)
3 years	697	-0.18	0.389***	311	-0.243	0.431***	311	-0.132	0.43***
	[75.61%]	(-1.54)	(0.000)	[73.95%]	(-1.39)	(0.000)	[80.39%]	(-0.78)	(0.000)

Table 2 (continued).

	Bond level			Firm level					
				Event Time			Calendar Time		
Horizon	# of bonds	Mean	Median	# of firms	Mean	Median	# of firms	Mean	Median
Panel C: Mean-adjusted returns (bond return – average return in prior 6 months)									
1 year	667	-0.309***	-0.091*	310	-0.238***	-0.026	310	-0.187**	0.03
	[46.33%]	(-3.05)	(0.063)	[49.03%]	(-2.58)	(0.776)	[51.29%]	(-2.10)	(0.691)
2 years	683	-0.181*	-0.032*	310	-0.195**	-0.037	310	-0.172**	-0.023
	[46.27%]	(-1.93)	(0.056)	[46.13%]	(-2.13)	(0.191)	[46.77%]	(-2.10)	(0.281)
3 years	692	-0.253***	-0.024*	311	-0.215**	-0.043	311	-0.177**	-0.002
	[46.68%]	(-2.68)	(0.087)	[45.98%]	(-2.37)	(0.173)	[49.84%]	(-2.15)	(1.000)
Panel D: Risk-adjusted returns EW (bond return - EW rating/maturity matched portfolio return)									
1 year	680	-0.480***	-0.136***	310	-0.444***	-0.044	310	-0.385***	-0.005
	[43.38%]	(-4.52)	(0.001)	[44.52%]	(-3.05)	(0.061)	[49.68%]	(-2.63)	(0.955)
2 years	689	-0.441***	-0.058	310	-0.465***	0.031	310	-0.373**	0.058
	[47.17%]	(-4.05)	(0.148)	[49.35%]	(-3.03)	(0.865)	[53.23%]	(-2.50)	(0.281)
3 years	697	-0.444***	-0.045	311	-0.432***	0.011	311	-0.325**	0.076**
	[47.35%]	(-4.09)	(0.173)	[49.84%]	(-2.79)	(1.000)	[54.34%]	(-2.17)	(0.140)
Panel E:Risk-adjusted returns VW (bond return - VW rating/maturity matched portfolio return)									
1 year	680	-0.472***	-0.119***	310	-0.447***	-0.059	310	-0.376**	-0.009
	[43.82%]	(-4.45)	(0.001)	[47.74%]	(-3.05)	(0.460)	[49.35%]	(-2.56)	(0.865)
2 years	689	-0.428***	-0.039*	310	-0.453***	0.016	310	-0.353**	0.060*
	[46.73%]	(-3.95)	(0.094)	[50.32%]	(-2.97)	(0.955)	[52.58%]	(-2.38)	(0.394)
3 years	697	-0.436***	-0.039	311	-0.429***	0.028	311	-0.314**	0.064***
	[47.49%]	(-4.04)	(0.198)	[50.48%]	(-2.77)	(0.910)	[54.66%]	(-2.10)	(0.112)
Panel F:1% winsorized risk-adjusted returns VW									
1 year	680	-0.427***	-0.119***	310	-0.387***	-0.059	310	-0.339***	-0.009
	[43.82%]	(-4.80)	(0.001)	[47.74%]	(-3.30)	(0.460)	[49.35%]	(-2.79)	(0.865)
2 years	689	-0.381***	-0.039*	310	-0.408***	0.016	310	-0.318**	0.060*
	[46.73%]	(-4.15)	(0.094)	[50.32%]	(-3.18)	(0.955)	[52.58%]	(-2.50)	(0.394)
3 years	697	-0.393***	-0.039	311	-0.382***	0.028	311	-0.276**	0.064***
	[47.49%]	(-4.29)	(0.198)	[50.48%]	(-2.92)	(0.910)	[54.66%]	(-2.14)	(0.112)

Table 3. Calendar-time portfolio regressions

This table reports long-run monthly abnormal returns (in %) based on calendar-time bond portfolio regressions. The abnormal return is measured by the regression intercept. We use Elton et al. (1995) factor model excluding the unexpected change in GDP and the unexpected change in consumer price index. *Rm–Rf* is the excess CRSP value-weighted stock index return, *R bond* is the return on the Lehman Corporate bond index, *DRP* is the default risk premium, and *Term* is the term premium. To avoid that smaller bond issues dominating the regression estimations, we examine both equal-weighted and value-weighted bond portfolio returns. Moreover, the regressions are conducted in both the ordinary least square (OLS) approach that assigns an equal weight to each calendar month and the weighted least square (WLS) approach that assigns the number of bonds in a given month as the weight. For OLS regressions, we require at least five observations in each month. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively.

Horizon	Intercept	Rm - Rf	R bond	DRP	Term	Adj R2
Panel A: OLS regressions						
Equal-weighted portfolio						
1 year	-0.281***	0.016	1.555	0.786	-0.335	0.71
	(-2.60)	(0.57)	(4.80)	(14.06)	(-2.37)	
2 years	-0.090	-0.050	1.567	0.835	-0.372	0.71
	(-0.91)	(-1.83)	(5.22)	(15.60)	(-2.77)	
3 years	-0.043	-0.031	1.557	0.826	-0.387	0.73
	(-0.48)	(-1.23)	(5.82)	(16.44)	(-3.20)	
Value-weighted portfolio						
1 year	-0.183*	0.015	1.951	0.735	-0.500	0.71
	(-1.71)	(0.54)	(6.07)	(13.25)	(-3.55)	
2 years	-0.053	-0.014	1.510	0.717	-0.338	0.74
	(-0.65)	(-0.60)	(5.94)	(15.82)	(-2.98)	
3 years	-0.038	-0.005	1.492	0.723	-0.340	0.77
	(-0.51)	(-0.22)	(6.73)	(17.38)	(-3.39)	
Panel B: WLS regressions						
Equal-weighted portfolio						
1 year	-0.319***	0.028	1.349	0.746	-0.267	0.72
	(-3.43)	(1.11)	(4.59)	(15.55)	(-2.09)	
2 years	-0.146	-0.036	1.363	0.765	-0.269	0.68
	(-1.58)	(-1.38)	(4.69)	(15.82)	(-2.12)	
3 years	-0.083	-0.019	1.431	0.754	-0.307	0.69
	(-0.91)	(-0.74)	(5.02)	(15.70)	(-2.46)	
Value-weighted portfolio						
1 year	-0.213**	0.021	1.799	0.710	-0.443	0.72
	(-2.33)	(0.83)	(6.23)	(15.09)	(-3.52)	
2 years	-0.096	-0.006	1.428	0.677	-0.283	0.72
	(-1.23)	(-0.27)	(5.82)	(16.56)	(-2.64)	
3 years	-0.072	0.007	1.446	0.668	-0.294	0.74
	(-0.97)	(0.32)	(6.19)	(16.98)	(-2.88)	

Table 4. Long-run abnormal monthly bond returns (%) sorted by bond ratings

This table shows the long-run abnormal monthly returns (in %) sorted by bond ratings. We classify bonds as *Ba* with ratings of Ba and *Below Ba* with ratings of B or below. Numbers in parentheses are t-value for mean tests and p-values for median tests. *Difference* is the difference between Ba and Below Ba. We measure abnormal returns based on three approaches, mean-adjusted model (Panel A), risk-adjusted model (Panels B and C), and factor model (Panel D). Both EW and VW benchmark returns are used in the risk-adjusted model. For the factor model, we run weighted least square regressions. The difference in the factor model is obtained by taking the difference in returns between the Ba portfolio and the below Ba portfolio and running regressions against factors. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively. The numbers in brackets are the percentages of bonds with positive returns.

	Ba (1)			Below Ba (2)			Difference (1)- (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value
Panel A: Mean-adjusted returns (bond return – average return in prior 6 months)								
1 year	83	-0.211	-0.063	584	-0.323***	-0.108*		
	[45.78%]	(-1.51)	(0.510)	[46.40%]	(-2.83)	(0.090)	0.62	0.686
2 years	86	-0.147	-0.008	597	-0.186*	-0.039**		
	[48.84%]	(-1.25)	(0.914)	[45.90%]	(-1.75)	(0.049)	0.25	0.585
3 years	89	-0.146	-0.004	603	-0.269**	-0.033*		
	[48.31%]	(-1.21)	(0.832)	[46.43%]	(-2.52)	(0.087)	0.76	0.515
Panel B: Risk-adjusted returns EW (bond return – EW rating/maturity matched portfolio return)								
1 year	85	-0.288***	-0.202***	595	-0.507***	-0.114**		
	[31.76%]	(-2.87)	(0.001)	[45.04%]	(-4.21)	(0.017)	1.39	0.074
2 years	88	-0.167**	-0.139***	601	-0.482***	-0.027		
	[35.23%]	(-2.61)	(0.007)	[48.92%]	(-3.87)	(0.625)	2.25	0.123
3 years	90	-0.199***	-0.126***	607	-0.480***	-0.007		
	[35.56%]	(-2.89)	(0.008)	[49.09%]	(-3.87)	(0.685)	1.98	0.034
Panel C: Risk-adjusted returns VW (bond return – VW rating/maturity matched portfolio return)								
1 year	85	-0.273**	-0.194***	595	-0.501***	-0.094**		
	[29.41%]	(-2.71)	(0.000)	[45.88%]	(-4.16)	(0.049)	1.45	0.082
2 years	88	-0.169**	-0.139**	601	-0.465***	-0.021		
	[34.09%]	(-2.59)	(0.004)	[48.59%]	(-3.77)	(0.514)	2.12	0.097
3 years	90	-0.206***	-0.131***	607	-0.470***	-0.003		
	[32.22%]	(-3.01)	(0.001)	[49.75%]	(-3.81)	(0.935)	1.87	0.025
Panel D: Calendar-time portfolio regression (WLS)								
	# of months	EW	VW	# of months	EW	VW	EW diff	VW diff
1 year	151	-0.110	-0.121	155	-0.351***	-0.246**	0.282	0.19
		(-0.84)	(-0.81)		(-3.20)	(-2.22)	(1.49)	(0.93)
2 years	175	0.067	0.035	167	-0.18*	-0.137	0.222	0.153
		(0.68)	(0.30)		(-1.68)	(-1.53)	(1.55)	(1.12)
3 years	177	-0.080	-0.045	172	-0.08	-0.079	-0.041	-0.001
		(-0.56)	(-0.41)		(-0.83)	(-0.98)	(-0.28)	(-0.01)

Table 5. Long-run abnormal monthly bond returns (%) sorted by PE experience

This table shows the long-run abnormal monthly returns (in %) sorted by PE age. PE age is the number of years between PE founding year and bond issue year. We classify bonds as *Less experienced* with PE age equal to or smaller than 15 years and *More experienced* with PE age greater than 15 years. Numbers in parentheses are t-value for mean tests and p-values for median tests. *Difference* is the difference in returns between two PE age portfolios. We measure abnormal returns based on three approaches, mean-adjusted model (Panel A), risk-adjusted model (Panels B and C), and factor model (Panel D). Both EW and VW benchmark returns are used in the risk-adjusted model. For the factor model, we run weighted least square regressions. The difference in the factor model is obtained by taking the difference in returns between two PE age portfolios and running regressions against factors. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively. The numbers in brackets are the percentages of bonds with positive returns.

	Less experienced PE (1)			More experienced PE (2)			Difference (1)- (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value
Panel A: Mean-adjusted returns (bond return - average return in prior 6 months)								
1 year	342	-0.265**	-0.122	325	-0.354**	-0.079		
	[45.91%]	(-2.30)	(0.144)	[46.77%]	(-2.10)	(0.267)	0.44	0.635
2 years	350	-0.056	-0.033	333	-0.313*	-0.031		
	[46.00%]	(-0.57)	(0.149)	[46.55%]	(-1.92)	(0.228)	1.35	0.673
3 years	356	-0.184*	-0.028	336	-0.325**	-0.024		
	[46.35%]	(-1.81)	(0.185)	[47.02%]	(-2.01)	(0.300)	0.74	0.830
Panel B: Risk-adjusted returns EW (bond return - EW rating/maturity matched portfolio return)								
1 year	348	-0.192*	-0.020	332	-0.782***	-0.183***		
	[49.14%]	(-1.86)	(0.789)	[37.35%]	(-4.18)	(0.000)	2.76	0.002
2 years	352	-0.100	0.076	337	-0.798***	-0.136***		
	[55.11%]	(-0.95)	(0.062)	[38.87%]	(-4.15)	(0.000)	3.19	0.000
3 years	358	-0.106	0.085	339	-0.801***	-0.118***		
	[55.03%]	(-1.00)	(0.064)	[39.23%]	(-4.18)	(0.000)	3.18	0.000
Panel C: Risk-adjusted returns VW (bond return - VW rating/maturity matched portfolio return)								
1 year	348	-0.194*	-0.023	332	-0.764***	-0.158***		
	[48.85%]	(-1.87)	(0.708)	[38.55%]	(-4.08)	(0.000)	2.66	0.003
2 years	352	-0.093	0.073	337	-0.777***	-0.124***		
	[54.26%]	(-0.89)	(0.122)	[38.87%]	(-4.09)	(0.000)	3.15	0.000
3 years	358	-0.103	0.088	339	-0.787***	-0.104***		
	[54.47%]	(-0.97)	(0.101)	[40.12%]	(-4.15)	(0.000)	3.15	0.000
Panel D: Calendar-time portfolio regression (WLS)								
	# of months	EW	VW	# of months	EW	VW	EW diff	VW diff
1 year	139	-0.081	0.039	170	-0.56***	-0.444***	0.697***	0.618***
		(-0.70)	(0.37)		(-3.99)	(-3.12)	(3.71)	(3.30)
2 years	151	0.072	0.086	175	-0.382***	-0.285**	0.668***	0.514***
		(0.64)	(0.90)		(-2.86)	(-2.40)	(3.90)	(3.30)
3 years	163	0.128	0.111	175	-0.321**	-0.265**	0.63***	0.5***
		(1.40)	(1.38)		(-2.32)	(-2.22)	(4.25)	(3.54)

Table 6. Long-run abnormal monthly bond returns (%) sorted by the number of sample bonds issued

This table shows the long-run abnormal monthly returns (in %) sorted by the number of sample bonds issued. We sort calendar months from January 1991 to December 2006based on the number of sample bonds issued and classify them into Cold or Hot bond market portfolios. Months with above median numbers are classified as hot markets, while those with below median are classified as cold markets. Bonds issued in a Cold (Hot) month are assigned into the Cold (Hot) bond portfolio. Numbers in parentheses are t-value for mean tests and p-values for median tests. *Difference* is the difference in returns between Cold and Hot portfolios. We measure abnormal returns based on two approaches, mean-adjusted model (Panel A) and risk-adjusted model (Panels B and C). Both EW and VW benchmark returns are used in risk-adjusted model. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively. The numbers in brackets are the percentages of bonds with positive returns.

	Cold bond market (1)			Hot bond market (2)			Difference (1)- (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value
Panel A: Mean-adjusted returns (bond return - average return in prior 6 months)								
1 year	63	-0.015	0.064	604	-0.339***	-0.122**		
	[52.38%]	(-0.16)	(0.801)	[45.70%]	(-3.05)	(0.038)	2.23	0.250
2 years	66	-0.017	-0.029	617	-0.199*	-0.033		
	[42.42%]	(-0.20)	(0.268)	[46.68%]	(-1.92)	(0.107)	1.36	0.662
3 years	67	0.062	-0.002	625	-0.287***	-0.033*		
	[49.25%]	(0.86)	(1.000)	[46.40%]	(-2.76)	(0.078)	2.75	0.435
Panel B: Risk-adjusted returns EW (bond return - EW rating/maturity matched portfolio return)								
1 year	65	-0.043	0.001	615	-0.535***	-0.164***		
	[50.77%]	(-0.22)	(1.000)	[42.60%]	(-4.64)	(0.000)	2.59	0.036
2 years	66	0.095	0.197**	623	-0.498***	-0.104**		
	[65.15%]	(0.60)	(0.019)	[45.26%]	(-4.18)	(0.020)	3.01	0.006
3 years	67	0.155	0.165***	630	-0.508***	-0.083*		
	[68.66%]	(0.90)	(0.003)	[45.08%]	(-4.28)	(0.015)	3.16	0.002
Panel C: Risk-adjusted returns VW (bond return - VW rating/maturity matched portfolio return)								
1 year	65	0.088	0.030	615	-0.532***	-0.131***		
	[52.31%]	(0.45)	(0.804)	[42.93%]	(-4.61)	(0.001)	2.72	0.033
2 years	66	0.131	0.207**	623	-0.487***	-0.083***		
	[65.15%]	(0.81)	(0.019)	[44.78%]	(-4.12)	(0.010)	3.09	0.007
3 years	67	0.152	0.124***	630	-0.498***	-0.076**		
	[67.16%]	(0.84)	(0.007)	[45.40%]	(-4.24)	(0.023)	3.02	0.004

Table 7. Long-run abnormal monthly bond returns (%) sorted by PE's affiliation as commercial banks or investment banks

This table shows the long-run abnormal monthly returns (in %) sorted by PE firm's affiliation as commercial banks or not. We classify bonds into 3 groups: bonds backed by non-bank affiliated PEs, commercial bank affiliated PEs, and investment bank affiliated PEs. Numbers in parentheses are t-value for mean tests and p-values for median tests. *Difference* is the difference in returns between two portfolios. We measure abnormal returns based on two approaches, mean-adjusted model (Panel A) and risk-adjusted model (Panels B and C). Both EW and VW benchmark returns are used in risk-adjusted model. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively. The numbers in brackets are the percentages of bonds with positive returns.

	Non-Bank Affiliates (1)			Commercial Bank Affiliates (2)			Investment Bank Affiliates (3)			Difference (1)- (2)		Difference (3)- (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value	Mean t-stat	Median p-value
Panel A: Mean-adjusted returns (bond return - average return in prior 6 months)													
1 year	563	-0.353***	-0.122**	68	0.154	0.195	36	-0.496	-0.117				
	[45.65%]	(-3.06)	(0.043)	[57.35%]	(0.92)	(0.275)	[36.11%]	(-1.26)	(0.132)	-2.49	0.023	-1.52	0.162
2 years	577	-0.224**	-0.045**	70	0.221*	0.023	36	-0.285	0.02				
	[45.06%]	(-2.08)	(0.020)	[51.43%]	(1.74)	(0.905)	[55.56%]	(-0.74)	(0.618)	-2.67	0.040	-1.26	0.875
3 years	585	-0.298***	-0.033*	71	0.159	0.008	36	-0.335	0.003				
	[45.98%]	(-2.76)	(0.057)	[50.70%]	(1.31)	(1.000)	[50.00%]	(-0.87)	(1.000)	-2.81	0.038	-1.22	0.800
Panel B: Risk-adjusted returns EW (bond return - EW rating/maturity matched portfolio return)													
1 year	574	-0.518***	-0.149***	70	0.049	0.085	36	-0.896**	-0.595**				
	[43.21%]	(-4.34)	(0.001)	[52.86%]	(0.26)	(0.720)	[27.78%]	(-1.83)	(0.011)	-2.53	0.059	-1.80	0.002
2 years	582	-0.496***	-0.058	71	0.107	0.135	36	-0.642	-0.286**				
	[47.08%]	(-4.01)	(0.171)	[57.75%]	(0.68)	(0.235)	[27.78%]	(-1.31)	(0.011)	-3.02	0.056	-1.46	0.015
3 years	589	-0.492***	-0.027	72	0.081	0.146	36	-0.710	-0.331**				
	[47.54%]	(-3.98)	(0.249)	[55.56%]	(0.55)	(0.410)	[27.78%]	(-1.44)	(0.011)	-2.96	0.082	-1.54	0.010
Panel C: Risk-adjusted returns VW (bond return - VW rating/maturity matched portfolio return)													
1 year	574	-0.506***	-0.119***	70	0.052	0.064	36	-0.956**	-0.576**				
	[43.55%]	(-4.24)	(0.002)	[52.86%]	(0.25)	(0.720)	[30.56%]	(-1.97)	(0.029)	-2.35	0.108	-1.91	0.003
2 years	582	-0.477***	-0.039	71	0.106	0.151	36	-0.683	-0.262**				
	[46.91%]	(-3.89)	(0.147)	[53.52%]	(0.64)	(0.635)	[30.56%]	(-1.41)	(0.029)	-2.82	0.087	-1.54	0.021
3 years	589	-0.479***	-0.037	72	0.076	0.132	36	-0.758	-0.339**				
	[47.88%]	(-3.91)	(0.323)	[54.17%]	(0.49)	(0.556)	[27.88%]	(-1.56)	(0.011)	-2.79	0.121	-1.63	0.011

Table 8. Cross-sectional regressions

This table reports the pooled cross-sectional regressions. The dependent variable is the monthly risk-adjusted return using the value-weighted return of the portfolio matched on ratings and maturity as the benchmark. The t-statistics is based on the Petersen's (2009) time-series and cross-section double-clustering standard errors. *Coupon* is the bond coupon rate in percentage. *Maturity* is the natural log of years between issuance and maturity. *Rating* reflects the ratings from either Moody's or S&P: 4 for Baa (BBB), 5 for Ba (BB), 6 for B, 7 for Caa (CCC), and 8 for Ca (CC). *PE age* is the number of years between PE founding year and bond issue year. *High coupon dummy*, *High maturity dummy*, and *High PE age dummy* are one if the value of the corresponding variable is above the median, and 0 otherwise. *Low rating dummy* is 1 if the rating is B or below, and 0 otherwise. We sort each calendar month based on the number of sample bonds issued in the month and classify them into Cold or Hot market. *Hot market dummy* is equal to one if the issuing month for the bond is classified as the Hot market, and zero otherwise. *Commercial bank dummy* is one if a bond is sponsored by commercial bank affiliated PEs. *Issue amount* is natural log of face value of bonds. Coupon, maturity, and ratings are measured at the fourth month after bond issuance month. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively.

Horizon	1 year			2 years			3 years		
Model	1	2	3	4	5	6	7	8	9
Coupon	0.035			-0.003			0.005		
	(0.47)			(-0.05)			(0.09)		
Maturity	-0.488			-0.170			0.214		
	(-1.21)			(-0.57)			(0.66)		
Rating	-0.091			0.037			0.069		
	(-0.54)			(0.31)			(0.56)		
PE age	-0.022**			-0.025**			-0.021**		
	(-2.23)			(-2.56)			(-2.51)		
High coupon		0.141	0.112		0.098	0.070		0.144	0.121
dummy		(0.61)	(0.49)		(0.52)	(0.38)		(0.87)	(0.73)
High maturity		-0.015	-0.039		-0.077	-0.097		0.048	0.034
dummy		(-0.08)	(-0.20)		(-0.50)	(-0.64)		(0.35)	(0.25)
Low rating		-0.335	-0.357		-0.324*	-0.345*		-0.222	-0.238
dummy		(-1.37)	(-1.45)		(-1.71)	(-1.79)		(-1.19)	(-1.26)
High PE age		-0.564**	-0.571**		-0.591***	-0.595***		-0.530***	-0.532***
dummy		(-2.40)	(-2.42)		(-3.00)	(-3.03)		(-3.19)	(-3.20)
Hot market	-0.388	-0.338	-0.347	-0.352*	-0.329*	-0.337*	-0.213	-0.195	-0.204
dummy	(-1.45)	(-1.27)	(-1.30)	(-1.84)	(-1.85)	(-1.88)	(-1.04)	(-1.00)	(-1.04)
Commercial bank			0.565**			0.498***			0.399**
dummy			(2.22)			(2.74)			(2.52)
Issue amount	-0.066	-0.056	-0.052	-0.082	-0.080	-0.079	-0.163	-0.161	-0.160
	(-0.51)	(-0.43)	(-0.39)	(-0.67)	(-0.65)	(-0.65)	(-1.52)	(-1.47)	(-1.47)
Intercept	2.428	1.158	1.100	1.702	1.652	1.638	1.530	2.411	2.402
	(1.10)	(0.67)	(0.63)	(0.87)	(1.05)	(1.04)	(0.92)	(1.70)	(1.70)
# of bonds	5388	5388	5388	9831	9831	9831	12957	12957	12957
Adj-R2	0.17%	0.27%	0.36%	0.14%	0.27%	0.33%	0.14%	0.25%	0.29%

Online Appendix Table A1. Calendar-time portfolio regressions of hedge bond portfolio returns

This table is similar to Table 3, but the dependent variable is the difference between the sample bond return and the non-PE matching portfolio *equal*-weighted return (the benchmark used in Panel D of Table 2). The non-PE matching portfolio includes the bonds that have the same rating and similar maturity as of the sample bond.

$$R_{b,t} - R_{matching,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 R_{bond,t} + \beta_3 DRP_t + \beta_4 Term_t + e_t$$

Horizon	Intercept	Rm-Rf	R bond	DRP	Term	Adj R2
Panel A: OLS regressions						
Equal-weighted portfolio						
1 year	-0.291***	0.005	0.926	-0.136	-0.408	0.10
	(-3.15)	(0.20)	(3.34)	(-2.84)	(-3.36)	
2 years	-0.129	-0.053	0.913	-0.059	-0.409	0.11
	(-1.59)	(-2.38)	(3.67)	(-1.33)	(-3.68)	
3 years	-0.074	-0.030	0.858	-0.070	-0.404	0.10
	(-1.06)	(-1.52)	(4.06)	(-1.76)	(-4.23)	
Value-weighted portfolio						
1 year	-0.223**	0.002	1.244	-0.148	-0.536	0.13
	(-2.25)	(0.07)	(4.18)	(-2.88)	(-4.13)	
2 years	-0.112	-0.023	0.822	-0.131	-0.368	0.15
	(-1.54)	(-1.13)	(3.70)	(-3.29)	(-3.70)	
3 years	-0.079	-0.010	0.775	-0.126	-0.353	0.13
	(-1.23)	(-0.55)	(4.02)	(-3.47)	(-4.05)	
Panel B: WLS regressions						
Equal-weighted portfolio						
1 year	-0.324***	0.009	0.730	-0.147	-0.358	0.08
	(-3.92)	(0.41)	(2.79)	(-3.45)	(-3.14)	
2 years	-0.155**	-0.056	0.717	-0.065	-0.341	0.10
	(-2.07)	(-2.67)	(3.05)	(-1.65)	(-3.32)	
3 years	-0.074	-0.037	0.793	-0.073	-0.387	0.11
	(-1.10)	(-1.90)	(3.76)	(-2.06)	(-4.19)	
Value-weighted portfolio						
1 year	-0.241***	-0.001	1.066	-0.148	-0.488	0.11
	(-2.76)	(-0.02)	(3.87)	(-3.30)	(-4.06)	
2 years	-0.121*	-0.031	0.736	-0.112	-0.340	0.13
	(-1.79)	(-1.64)	(3.48)	(-3.19)	(-3.68)	
3 years	-0.081	-0.017	0.774	-0.116	-0.363	0.14
	(-1.34)	(-0.96)	(4.07)	(-3.63)	(-4.37)	

Online Appendix Table A2. Calendar-time portfolio regressions of hedge bond portfolio returns

This table is similar to Table 3 of the paper, but the dependent variable is the difference between the sample bond return and the non-PE matching portfolio *value*-weighted return (the benchmark used in Panel E of Table 2). The non-PE matching portfolio includes the bonds that have the same rating and similar maturity as of the sample bond.

$$R_{b,t} - R_{matching,t} = \alpha + \beta_1(R_{m,t} - R_{f,t}) + \beta_2 R_{bond,t} + \beta_3 DRP_t + \beta_4 Term_t + e_t$$

Horizon	Intercept	Rm-Rf	R bond	DRP	Term	Adj R2
Panel A: OLS regressions						
Equal-weighted portfolio						
1 year	-0.242**	-0.012	0.915	-0.159	-0.435	0.12
	(-2.51)	(-0.49)	(3.16)	(-3.18)	(-3.43)	
2 years	-0.077	-0.071	0.956	-0.093	-0.455	0.15
	(-0.86)	(-2.88)	(3.51)	(-1.92)	(-3.74)	
3 years	-0.028	-0.050	0.890	-0.103	-0.444	0.14
	(-0.35)	(-2.24)	(3.76)	(-2.33)	(-4.16)	
Value-weighted portfolio						
1 year	-0.182*	-0.015	1.222	-0.170	-0.556	0.17
	(-1.89)	(-0.59)	(4.23)	(-3.41)	(-4.40)	
2 years	-0.073	-0.038	0.825	-0.161	-0.397	0.21
	(-1.00)	(-1.89)	(3.68)	(-4.03)	(-3.96)	
3 years	-0.041	-0.027	0.791	-0.155	-0.387	0.19
	(-0.63)	(-1.48)	(4.03)	(-4.20)	(-4.36)	
Panel B: WLS regressions						
Equal-weighted portfolio						
1 year	-0.283***	-0.005	0.709	-0.169	-0.375	0.10
	(-3.28)	(-0.22)	(2.60)	(-3.80)	(-3.16)	
2 years	-0.105	-0.074	0.721	-0.095	-0.367	0.14
	(-1.29)	(-3.20)	(2.82)	(-2.22)	(-3.29)	
3 years	-0.027	-0.058	0.798	-0.104	-0.417	0.14
	(-0.36)	(-2.66)	(3.37)	(-2.60)	(-4.02)	
Value-weighted portfolio						
1 year	-0.203**	-0.015	1.024	-0.170	-0.494	0.14
	(-2.39)	(-0.64)	(3.82)	(-3.88)	(-4.23)	
2 years	-0.084	-0.046	0.692	-0.137	-0.345	0.18
	(-1.25)	(-2.44)	(3.27)	(-3.89)	(-3.73)	
3 years	-0.045	-0.035	0.755	-0.143	-0.382	0.20
	(-0.73)	(-1.98)	(3.91)	(-4.38)	(-4.51)	

Online Appendix Table A3. Long-run abnormal monthly bond returns (%) sorted by PE capital

This table shows the long-run abnormal monthly returns (in %) sorted by PE capital. PE capital is the cumulative fund, adjusted by CPI, of a PE from its founding year. We classify bonds as *LowPE capital* with CPI-adjusted PE capital below the median and *High PE capital* above the median. Numbers in parentheses are t-value for mean tests and p-values for median tests. *Difference* is the difference in returns between two PE capital portfolios. We measure abnormal returns based on three approaches, mean-adjusted model (Panel A), risk-adjusted model (Panels B and C), and factor model (Panel D). Both EW and VW benchmark returns are used in the risk-adjusted model. For the factor model, we run weighted least square regressions. The difference in the factor model is obtained by taking the difference in returns between two PE capital portfolios and running regressions against factors. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively.

	Low PE capital (1)			High PE capital (2)			Difference (1) - (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value
Panel A: Mean-adjusted returns (bond return - average return in prior 6 months)								
1 year	291	-0.477**	-0.076	291	-0.136	-0.06		
	[46.74%]	(-2.54)	(0.291)	[47.42%]	(-1.14)	(0.412)	-1.53	0.497
2 years	298	-0.353**	-0.071*	299	-0.063	-0.018		
	[44.30%]	(-2.01)	(0.056)	[48.16%]	(-0.57)	(0.563)	-1.40	0.303
3 years	302	-0.5***	-0.048**	303	-0.05	-0.002		
	[44.04%]	(-2.83)	(0.044)	[49.17%]	(-0.47)	(0.818)	-2.17	0.066
Panel B: Risk-adjusted returns EW (bond return - EW rating/maturity matched portfolio return)								
1 year	297	-0.485***	-0.053	296	-0.545***	-0.185***		
	[48.48%]	(-2.61)	(0.643)	[38.18%]	(-3.70)	(0.000)	0.25	0.016
2 years	301	-0.450**	0.058	301	-0.507***	-0.136***		
	[53.16%]	(-2.36)	(0.299)	[39.20%]	(-3.51)	(0.000)	0.24	0.002
3 years	305	-0.453**	0.044	304	-0.505***	-0.121***		
	[52.46%]	(-2.38)	(0.423)	[40.13%]	(-3.51)	(0.001)	0.22	0.002
Panel C: Risk-adjusted returns VW (bond return - VW rating/maturity matched portfolio return)								
1 year	297	-0.491**	-0.021	296	-0.519***	-0.185***		
	[48.15%]	(-2.61)	(0.562)	[38.85%]	(-3.59)	(0.000)	0.12	0.011
2 years	301	-0.445**	0.048	301	-0.480***	-0.130***		
	[52.82%]	(-2.33)	(0.356)	[39.20%]	(-3.42)	(0.000)	0.15	0.001
3 years	305	-0.452**	0.032	304	-0.488***	-0.114***		
	[51.80%]	(-2.37)	(0.567)	[40.79%]	(-3.47)	(0.002)	0.15	0.001
Panel D: Calendar-time portfolio regression (WLS)								
	# of months	EW	VW	# of months	EW	VW	EW diff	VW diff
1 year	138	-0.273*	-0.161	167	-0.387***	-0.182	0.314	0.134
		(-1.96)	(-1.37)		(-2.82)	(-1.44)	(1.60)	(0.80)
2 years	150	-0.14	-0.063	177	-0.188	-0.069	0.225	0.126
		(-1.18)	(-0.72)		(-1.62)	(-0.68)	(1.56)	(1.01)
3 years	161	-0.017	-0.011	177	-0.201	-0.1	0.328**	0.18*
		(-0.17)	(-0.13)		(-1.58)	(-1.03)	(2.41)	(1.66)

Online Appendix Table A4. Long-run abnormal monthly bond returns (%) sorted by prior market returns

This table shows the long-run abnormal monthly returns (in %) sorted by prior bond market returns. Prior bond market return is the LBBD bond market index return cumulative over past 24 months. We classify each calendar month from January 1992 to December 2006 into Low or High prior return portfolio. Numbers in parentheses are t-value for mean tests and p-values for median tests. *Difference* is the difference in returns between two prior return portfolios. We measure abnormal returns based on two approaches, mean-adjusted model (Panel A) and risk-adjusted model (Panels B and C). Both EW and VW benchmark returns are used in risk-adjusted model. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively.

	Low prior market return (1)			High prior market return (2)			Difference (1) - (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value
Panel A: Mean-adjusted returns (bond return - average return in prior 6 months)								
1 year	239	-0.23*	0.072	426	-0.353**	-0.176***		
	[53.56%]	(-1.68)	(0.301)	[42.49%]	(-2.55)	(0.002)	0.63	0.071
2 years	241	0.115	0.053	440	-0.344**	-0.092***		
	[53.94%]	(1.13)	(0.246)	[42.27%]	(-2.57)	(0.001)	2.73	0.000
3 years	246	0.013	0.043**	444	-0.401***	-0.057***		
	[56.50%]	(0.13)	(0.048)	[41.44%]	(-2.94)	(0.000)	2.47	0.001
Panel B: Risk-adjusted returns EW (bond return - EW rating/maturity matched portfolio return)								
1 year	242	-0.273*	0.048	436	-0.597***	-0.195***		
	[51.24%]	(-1.79)	(0.748)	[38.99%]	(-4.20)	(0.000)	1.56	0.001
2 years	244	-0.217	0.086	443	-0.567***	-0.114***		
	[54.51%]	(-1.44)	(0.179)	[43.12%]	(-3.84)	(0.004)	1.66	0.001
3 years	248	-0.215	0.100	447	-0.573***	-0.085**		
	[54.03%]	(-1.43)	(0.228)	[43.62%]	(-3.89)	(0.008)	1.71	0.003
Panel C: Risk-adjusted returns VW (bond return - VW rating/maturity matched portfolio return)								
1 year	242	-0.313**	0.039	436	-0.563***	-0.182***		
	[51.65%]	(-2.03)	(0.653)	[39.45%]	(-3.98)	(0.000)	1.19	0.006
2 years	244	-0.242	0.091	443	-0.532***	-0.099***		
	[53.69%]	(-1.63)	(0.276)	[42.89%]	(-3.62)	(0.003)	1.39	0.006
3 years	248	-0.252*	0.101	447	-0.540***	-0.077**		
	[52.82%]	(-1.70)	(0.409)	[44.52%]	(-3.68)	(0.023)	1.38	0.012

Online Appendix Table A5. Long-run abnormal monthly bond returns (%) controlling for refined ratings, callability, or single matching bond

Panel A: Matching portfolios matched on refined rating and maturity

This panel reports the monthly abnormal returns using the non-PE matching bond portfolio as the benchmark. The procedure is the similar to that in Panels D, E, F of Table 2 but control for refined rating rather than letter rating. Specifically, when we search for the benchmark, we delete sample PE bonds from the matching pool. Then we require the non-PE bonds to have the same refined rating and similar maturity as of the sample bond.

Horizon	# of bonds	% positive	Mean	T-value	Median	P-value
Risk-adjusted returns EW (bond return - EW rating/maturity matched portfolio return)						
1 year	680	45.00%	-0.414***	(-3.842)	-0.088***	(0.010)
2 years	689	46.59%	-0.400***	(-3.649)	-0.049**	(0.080)
3 years	697	46.92%	-0.399***	(-3.662)	-0.029	(0.112)
Risk-adjusted returns VW (bond return - VW rating/maturity matched portfolio return)						
1 year	680	44.85%	-0.396***	(-3.728)	-0.084***	(0.008)
2 years	689	46.01%	-0.377***	(-3.528)	-0.051**	(0.040)
3 years	697	47.06%	-0.381***	(-3.581)	-0.030	(0.130)
1% winsorized risk-adjusted returns VW						
1 year	680	44.85%	-0.366***	(-4.127)	-0.084***	(0.008)
2 years	689	46.01%	-0.350***	(-3.795)	-0.051**	(0.040)
3 years	697	47.06%	-0.350***	(-3.797)	-0.030	(0.130)

Online Appendix Table A5 (continued).

Panel B: Matching portfolio matched on credit rating, maturity, and callability

This panel reports the monthly abnormal returns using the non-PE matching bond portfolio as the benchmark. The procedure is the similar to that in Panels D, E, F of Table 2 but additionally control for callability. Specifically, if a sample bond's call type is not missing nor non-callable, we require the call type of bonds in the matching portfolio cannot be missing or non-callable. When the sample bond's call type is missing or non-callable, call type of bonds in the matching portfolio have to be missing or non-callable.

Horizon	# of bonds	% positive	Mean	T-value	Median	P-value
Risk-adjusted returns EW (bond return - EW rating/maturity matched portfolio return)						
1 year	680	44.56%	-0.441***	-4.15	-0.107***	0.005
2 years	689	47.61%	-0.394***	-3.62	-0.030	0.223
3 years	697	48.64%	-0.400***	-3.70	-0.015	0.495
Risk-adjusted returns VW (bond return - VW rating/maturity matched portfolio return)						
1 year	680	44.71%	-0.461***	-4.30	-0.104***	0.006
2 years	689	47.17%	-0.408***	-3.75	-0.039	0.148
3 years	697	48.64%	-0.421***	-3.88	-0.023	0.495
1% winsorized risk-adjusted returns VW						
1 year	680	44.71%	-0.413***	-4.62	-0.104***	0.006
2 years	689	47.17%	-0.357***	-3.89	-0.039	0.148
3 years	697	48.64%	-0.374***	-4.08	-0.023	0.495

Panel C: Single matching bonds matched on credit rating and maturity

This panel reports the monthly abnormal returns based on the single matching bond benchmark. The procedure is the similar to that in Panel D of Table 2 but a single matched bond, instead of a matching bond portfolio, is used as the benchmark. For each sample bond, one single matching bond, which has the same rating and similar maturity and closest market value as of the sample bond, is selected. The abnormal return is the difference between the sample bond return and matching bond return.

Horizon	# of bonds	% positive	Mean	T-value	Median	P-value
1 year	680	45.88%	-0.443***	(-2.912)	-0.076**	(0.035)
2 years	689	49.78%	-0.381**	(-2.563)	-0.006	(0.939)
3 years	697	47.63%	-0.442***	(-2.924)	-0.029	(0.225)

Online Appendix Table A6. Long-run abnormal monthly bond returns (%) by controlling for outliers

We examine whether our results in Tables 4-7 are sensitive to outliers, using the same procedure used to calculate returns in Panel F of Table 2. Specifically, we first calculate monthly abnormal returns for each bond in our sample, and use those returns to compute the average monthly abnormal returns over one, two, and three year horizons (or up to the final month with available returns). Thus each bond has one average monthly return for each of the three horizons. Next, for each horizon we obtain the bottom and top 1% of the average monthly abnormal returns. Finally, calculate the mean and median monthly returns across all bonds after either winsorizing or trimming the sample at the 1% levels.

We measure abnormal returns based on the risk-adjusted model using the VW benchmark returns. Panel A reports results sorted by bond ratings, Panel B by PE experience, Panel C by cold vs. hot bond market, and Panel D by PE's affiliation. ***, **, and * denote the significance level of 1%, 5%, and 10%, respectively. The numbers in brackets are the percentages of bonds with positive returns.

Panel A: Long-run abnormal monthly bond returns (%) sorted by bond ratings

	Ba (1)			Below Ba (2)			Difference (1)- (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value
1% winsorization								
1 year	85	-0.273**	-0.194***	595	-0.448***	-0.094**		
	[29.41%]	(-2.71)	(0.000)	[45.88%]	(-4.46)	(0.049)	1.23	0.083
2 years	88	-0.169**	-0.139**	601	-0.412***	-0.021		
	[34.09%]	(-2.59)	(0.004)	[48.59%]	(-3.93)	(0.514)	1.96	0.097
3 years	90	-0.206***	-0.131***	607	-0.421***	-0.003		
	[32.22%]	(-3.01)	(0.001)	[49.75%]	(-4.02)	(0.935)	1.72	0.025
1% truncation								
1 year	85	-0.273**	-0.194***	583	-0.342***	-0.094**		
	[29.41%]	(-2.71)	(0.000)	[45.80%]	(-4.29)	(0.047)	0.53	0.077
2 years	88	-0.169**	-0.139**	589	-0.297***	-0.021		
	[34.09%]	(-2.59)	(0.004)	[48.56%]	(-3.59)	(0.510)	1.21	0.090
3 years	90	-0.206***	-0.131***	595	-0.303***	-0.003		
	[32.22%]	(-3.01)	(0.001)	[49.75%]	(-3.63)	(0.935)	0.90	0.023

Panel B: Long-run abnormal monthly bond returns (%) sorted by PE experience

	Less experienced PE (1)			More experienced PE (2)			Difference (1)- (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value
1% winsorization								
1 year	348	-0.197*	-0.023	332	-0.667***	-0.158***		
	[48.85%]	(-1.92)	(0.708)	[38.55%]	(-4.58)	(0.000)	2.64	0.003
2 years	352	-0.100	0.073	337	-0.674***	-0.124***		
	[54.26%]	(-0.96)	(0.122)	[38.87%]	(-4.44)	(0.000)	3.13	0.000
3 years	358	-0.114	0.088	339	-0.687***	-0.104***		
	[54.47%]	(-1.10)	(0.101)	[40.12%]	(-4.53)	(0.000)	3.12	0.000
1% truncation								
1 year	346	-0.165*	-0.023	322	-0.514***	-0.158***		
	[48.84%]	(-1.78)	(0.707)	[38.20%]	(-4.80)	(0.000)	2.46	0.002
2 years	348	-0.089	0.073	329	-0.482***	-0.120***		
	[54.02%]	(-0.97)	(0.148)	[38.91%]	(-4.31)	(0.000)	2.72	0.000
3 years	353	-0.111	0.084	332	-0.481***	-0.103***		
	[54.11%]	(-1.19)	(0.136)	[40.36%]	(-4.26)	(0.001)	2.53	0.001

Panel C: Long-run abnormal monthly bond returns (%) sorted by cold vs. hot bond market

	Cold bond market (1)			Hot bond market (2)			Difference (1)- (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value
1% winsorization								
1 year	65	0.082	0.030	615	-0.480***	-0.131***		
	[52.31%]	(0.42)	(0.804)	[42.93%]	(-5.01)	(0.001)	2.60	0.033
2 years	66	0.131	0.207**	623	-0.435***	-0.083***		
	[65.15%]	(0.81)	(0.019)	[44.78%]	(-4.36)	(0.010)	2.98	0.007
3 years	67	0.132	0.124***	630	-0.449***	-0.076**		
	[67.16%]	(0.76)	(0.007)	[45.40%]	(-4.51)	(0.023)	2.90	0.004
1% truncation								
1 year	64	0.023	0.018	604	-0.371***	-0.130***		
	[51.56%]	(0.12)	(0.901)	[42.88%]	(-4.91)	(0.001)	1.95	0.050
2 years	66	0.131	0.207**	611	-0.324***	-0.083***		
	[65.15%]	(0.81)	(0.019)	[44.68%]	(-4.16)	(0.010)	2.54	0.006
3 years	65	0.028	0.119***	620	-0.323***	-0.074**		
	[66.15%]	(0.17)	(0.013)	[45.48%]	(-4.11)	(0.027)	1.94	0.013

Panel D: Long-run abnormal monthly bond returns (%) sorted by PE's affiliation as commercial banks or investment banks

	Non-Bank Affiliates (1)			Commercial Bank Affiliates (2)			Investment Bank Affiliates (3)			Difference (1)- (2)		Difference (3)- (2)	
Horizon	# of bonds	Mean	Median	# of bonds	Mean	Median	# of bonds	Mean	Median	Mean t-stat	Median p-value	Mean t-stat	Median p-value
1% winsorization													
1 year	574	-0.445***	-0.119***	70	0.008	0.064	36	-0.977**	-0.576**				
	[43.55%]	(-4.54)	(0.002)	[52.86%]	(0.04)	(0.720)	[30.56%]	(-2.04)	(0.029)	-2.14	0.109	-1.91	0.003
2 years	582	-0.420***	-0.039	71	0.101	0.151	36	-0.701	-0.262**				
	[46.91%]	(-4.10)	(0.147)	[53.52%]	(0.61)	(0.635)	[30.56%]	(-1.46)	(0.029)	-2.69	0.087	-1.58	0.021
3 years	589	-0.426***	-0.037	72	0.076	0.132	36	-0.788*	-0.339**				
	[47.88%]	(-4.16)	(0.323)	[54.17%]	(0.49)	(0.556)	[27.78%]	(-1.65)	(0.011)	-2.68	0.121	-1.72	0.011
1% truncation													
1 year	564	-0.320***	-0.117***	69	-0.048	0.061	35	-1.115**	-0.589**				
	[43.62%]	(-4.26)	(0.003)	[52.17%]	(-0.27)	(0.810)	[28.57%]	(-2.36)	(0.017)	-1.38	0.162	-2.11	0.001
2 years	572	-0.286***	-0.037	70	0.046	0.141	35	-0.834*	-0.287**				
	[47.03%]	(-3.66)	(0.168)	[52.86%]	(0.29)	(0.720)	[28.57%]	(-1.76)	(0.017)	-1.89	0.131	-1.76	0.012
3 years	578	-0.298***	-0.036	72	0.076	0.132	35	-0.912*	-0.354***				
	[47.92%]	(-3.77)	(0.339)	[54.17%]	(0.49)	(0.556)	[25.71%]	(-1.92)	(0.006)	-2.13	0.120	-1.97	0.005

Online Appendix Table A7. Firms with bonds in the bottom 5% of performance

CUSIP	Issuer	Issue Date	Event in the three post-event years
116881AB	BRUNOS INC	19950810	Bankruptcy
143436AD	CARMIKE CINEMAS INC	19990203	Bankruptcy
181475AF	CLARK MATL HANDLING CO	19980717	Bankruptcy in 5 years
194832AE	COLLINS & AIKMAN PRODUCTS	20040812	Bankruptcy
195910AA	COLOR SPOT NURSERIES	19971222	
208464BE	CONSECO INC	20020417	Bankruptcy
23326LAA	DEL LABORATORIES INC	20050119	Downgrade
29255UAC	ENCOMPASS SVCS CORP	20011207	Bankruptcy
302088AL	EXODUS COMMUNICATIONS INC	20001108	Bankruptcy
339130AX	FLEMING COMPANIES INC	20020613	Bankruptcy
346377AE	FORMICA CORP	19990901	Bankruptcy
37047RAC	GENERAL NUTRITION CENTERS	20031125	Lawsuit
37957FAC	GLOBIX CORP	20000208	Bankruptcy
390606AE	GREAT LAKES DREDGE & DOCK	20031222	Downgrade
40414QAB	FLEETPRIDE	19991112	Downgrade
420781AC	HAYES LEMMERZ INTL INC	20010614	Bankruptcy
42279QAC	HEDSTROM CORP	19971104	Bankruptcy
447013AD	HUNTSMAN PACKAGING CORP	20000525	
452842AC	IMPERIAL HOME DECOR GROUP	19980924	Bankruptcy
47758RAD	JITNEY-JUNGLE STORES	19971107	Bankruptcy
48213PAC	JUST FOR FEET INC	19990412	Bankruptcy
62874LAC	ORIUS CAPITAL CORP	20000914	Bankruptcy
686286AC	ORION POWER HOLDINGS INC	20010621	Downgrade
69073TAE	OWENS-BROCKWAY GLASS CON	20021211	
758754AE	REGAL CINEMAS INC	19990115	Bankruptcy
767754AN	RITE AID CORP	19981216	Accounting fraud
866933AJ	SUN HEALTHCARE GROUP INC	19980630	Bankruptcy
989524AA	ZILOG INC	19980224	Bankruptcy